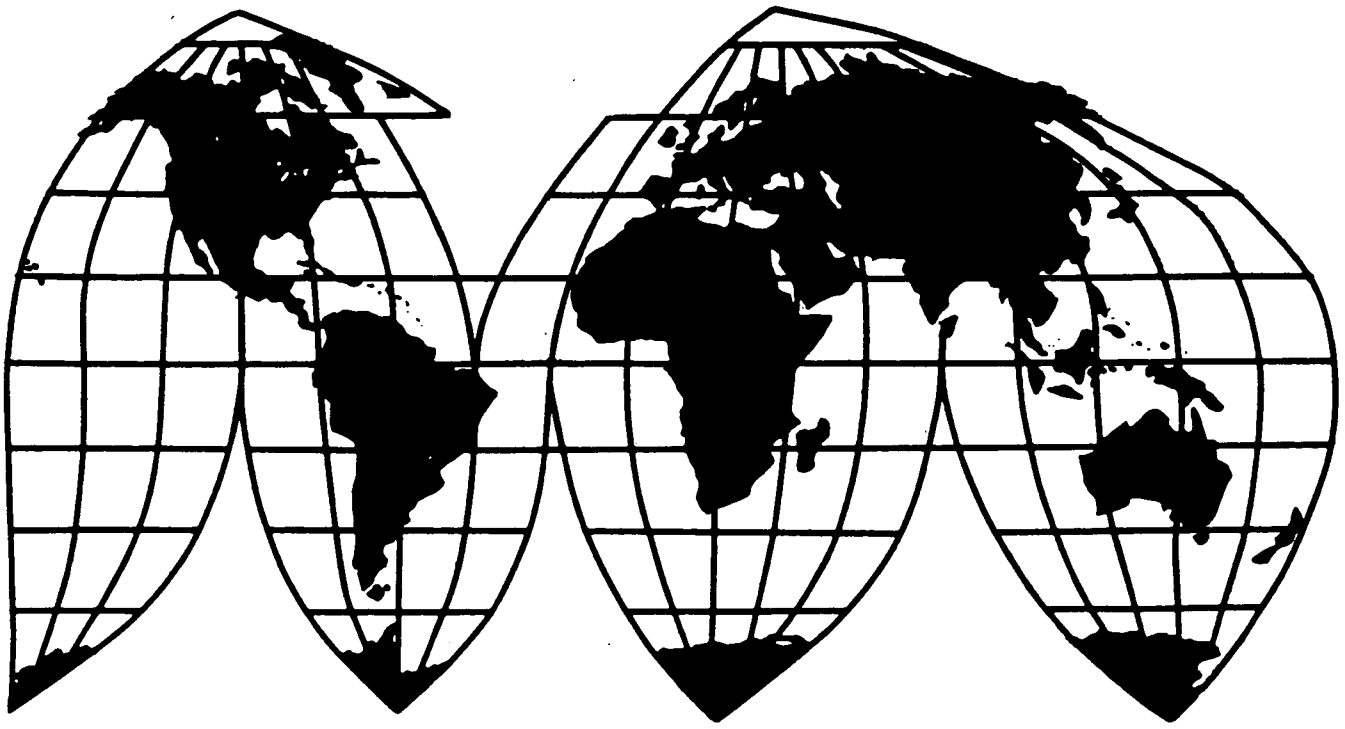
The Economic Effects of Antidumping and Countervailing Duty Orders and Suspension Agreements

Investigation No. 332–344

Publication 2900 **June 1995**

U.S. International Trade Commission



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THE ECONOMIC EFFECTS OF ANTIDUMPING AND COUNTERVAILING DUTY ORDERS AND SUSPENSION AGREEMENTS

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Special Acknowledgements

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PREFACE

Following receipt on June 9, 1993, of a request from the United States Trade Representative (appendix A), the U.S. International Trade Commission instituted investigation No. 332-344 under section 332(g) of the Tariff Act of 1930 (19 U.S.C. 1332(g)) on July 1, 1993. The purpose of this report is to analyze the economic effects of antidumping and countervailing duty orders and suspension agreements and the economic effects of the dumping and subsidy practices that such orders and agreements address.

Copies of the notice of the investigation were posted in the Office of the Secretary, U.S. International Trade Commission, Washington, DC 20436, and the notice was published in the *Federal Register* (58 F.R. 37966-37967) on July 14, 1993 (appendix B). The Commission held a public hearing in connection with the investigation on September 29-30, 1994. All persons were allowed to appear by counsel or in person, to present information, and to be heard. In addition, interested parties were invited to submit written statements concerning the investigation (see appendix C for list of submissions and hearing participants).

The information and analysis in this report are for the purpose of this report only. Nothing in this report should be construed to indicate how the Commission would find in an investigation conducted under other statutory authority covering the same or similar matter.

GLOSSARY OF ABBREVIATIONS

Act	Tariff Act of 1930
AD	Antidumping
BBs	Ball bearings
CGE	Computable general equilibrium
China	People's Republic of China
CNIF	Customs' Net Import File
Commission	U.S. International Trade Commission
Commerce	U.S. Department of Commerce
CPE	Computable partial equilibrium
CPTs	Color picture tubes
CRBs	Cylindrical roller bearings
CRT	Cathode ray tube
CTVs	Color television receivers
Customs	U.S. Customs Service
CVD	Countervailing duty
DRAM	Dynamic random access memory
EPROM	Erasable programmable read–only memory
EEPROM	Electronically erasable programmable read only memory
EU	European Union
FCOJ	Frozen concentrated orange juice
FCOJM	Frozen concentrated orange juice for manufacturing
FCOJR	Frozen concentrated orange juice for retail sale
FMV	Foreign market value
F.O.B	Free on board
FTC	Federal Trade Commission
GATT	General Agreement on Tariffs and Trade
GSA	General Services Administration
HHI	Herfindahl–Hirschman index
HTS	Harmonized Tariff Schedule of the United States
IC	Integrated circuit
IMF	International Monetary Fund
K	Kilobit, 1,000 bits
Korea	Republic of Korea
LCD	Liquid crystal display
LTFV	Less than fair value
Meg	Megabit, 1,000,000 bits
MFN	Most favored nation
OMA	Orderly Marketing Agreement
PRW	Production and related workers
ROM	Read only memory
SIC	Standard Industrial Classification
SSE	Single strength equivalent
SSOJ	Single strength orange juice
TR	Transcript of the public hearing
TRBs	Tapered roller bearings
TRQ	Tariff rate quota
TSUS	Tariff Schedules of the United States (former version)

UAN	Urea ammonium nitrate
UFTP	Unfair trade practice
URAA	Uruguay Round Agreements Act
USDA	U.S. Department of Agriculture
USP	U.S. price
USSR	Union of Soviet Socialist Republics (former)
USTR	United States Trade Representative
VER	Voluntary export restraint
VRA	Voluntary restraint arrangement
WTO	World Trade Organization

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EXECUTIVE SUMMARY[1]

The U.S. Trade Representative requested that the U.S. International Trade Commission (Commission) estimate the economic effects of unfair trade practices as transmitted through unfair imports and of the remedies imposed under U.S. antidumping (AD) and countervailing duty (CVD) laws. The analysis consists of estimating economic effects at an economy-wide level and at the industry level. The industry-specific case studies include (a) comprehensive empirical analyses of conditions in the affected industries; (b) quantitative estimates of the effects for such key industry performance indicators as prices, production, employment, wages, income, and trade; and (c) comparative static analysis of petitioning, upstream and downstream industries/consumers and net welfare effects.

To accomplish this extensive task the Commission has undertaken a multi-part study. The Commission's computable general equilibrium (CGE) model is used to measure economy-wide effects. In addition, a trend analysis of AD/CVD cases filed since 1980 provides insights into the effects enforcement actions have had on different kinds of product markets. One general effect, for example, is trade diversion toward nonsubject imports when orders are imposed. Finally, eight case studies combine thorough industry expertise with rigorous economic and statistical analyses to examine market conditions, industry performance and welfare effects of AD/CVD enforcement. The broad range of data sources employed include industry questionnaires, interviews, public and private data, Commission reports on AD/CVD investigations, and a relatively new U.S. Customs Service database of U.S. imports subject to AD/CVD orders.

Economy-Wide Analysis

The Commission's CGE model estimates the economy-wide effects of a simultaneous removal of outstanding AD/CVD orders in 1991. These orders affected approximately 1.8 percent of total U.S. merchandise imports or $9 billion out of $491 billion in 1991. The Commission CGE model simulates the U.S. economy in 1991, including interactions among U.S. producers and consumers in markets for goods, services, labor, and capital, as well as upstream and downstream linkages. The model is static and cannot take into account the cumulative or dynamic effects of existing orders, which may have been in place for many years.

The removal of outstanding AD/CVD orders in 1991 leads to different estimated economic effects across the U.S. economy. A direct consequence of the simulated order removal is lower prices and resulting gains experienced by consumers and industries downstream to the sectors subject to AD/CVD orders. The estimates obtained from the CGE model indicate that with the removal of outstanding AD/CVD orders the eight sectors highlighted in the CGE analysis experience import price declines of 7 percent or more, with ball and roller bearing import prices falling by nearly 20 percent in 1991. At the same time, the U.S. industrial sectors subject to orders would suffer adverse economic consequences. For example, ball and roller bearings and

[1] For views of individual Commissioners see "Commissioner Comments" after chapter 14.

electrical industrial apparatus (small business telephone systems), are estimated to experience a 3 to 4 percent decline in output and employment.

The Commission model estimates that the removal of outstanding AD/CVD orders in 1991 results in a welfare gain to the U.S. economy of $1.59 billion, or 0.03 percent of 1991 U.S. gross domestic product ($5,724.8 billion) as calculated by using a standard equivalent variation measure. This welfare measure reflects both gains and losses experienced by all sectors in the U.S. economy from removal of the outstanding AD/CVD orders. Thus, the estimated welfare effect of $1.59 billion represents the amount by which the economy-wide gains outweigh the losses.

The estimation includes 163 AD and 76 CVD orders for a total of 239 AD/CVD investigations. Not included are 170 orders that were revoked, 9 suspended and 37 terminated investigations, and 41 orders in which subject imports stopped completely after their imposition. The impact of the excluded AD/CVD cases, and others that were filed and withdrawn, such as the steel cases in the 1980s (withdrawn pursuant to voluntary restraint arrangements), may be sizable but is not measured. The model thus tends to underestimate the economy-wide effects of AD/CVD cases as it does not capture the effects of the excluded cases mentioned above. At the same time, the model tends to overestimate the economy-wide effects of AD/CVD orders because it assumes that the price the U.S consumers ultimately pay for subject imports is equal to the pre-duty U.S. price plus the full amount of the original margin.

Petitioning industries and industries upstream from petitioners are estimated to experience losses as the result of removing outstanding AD/CVD orders. For the most adversely affected sectors highlighted in the model, losses of output are estimated to be $658 million and losses of employment are estimated to be 4,075 full-time equivalent workers. A specific estimate of the component of the net welfare effects of order removal that can be attributed to adversely affected industries is precluded because of intractable empirical issues with regard to petitioner-specific industries and the limits of currently available models with regard to comparisons of the distribution of income and consumption among different groups.

As a rough proxy for the direct decomposition of the net welfare effects, the value-added measure generated by the Commission model of $1.85 billion can be used as the basis to approximate the relative effects of the removal of AD/CVD orders on gainers and losers. The economy-wide losses in income to workers and firm owners in the petitioning and upstream industries as a result of removing outstanding AD/CVD orders fall within the range of $320 million to $1.09 billion for 1991. The corresponding implied gains to the rest of the economy range from $2.17 billion to $2.94 billion.

Historic Caseload

Examining the trends for the overall caseload for which an injury determination was required from 1980 to 1993, the data indicate that 33 percent of all AD/CVD investigations had affirmative determinations, 45 percent had negative, and the remaining 22 percent were terminated or suspended. Of the 1040 AD/CVD cases filed in this period, 44 percent involved steel products. Evidence of trade diversion is observed as trade shifts from imports originating in subject countries to imports from nonsubject sources. In particular, imports subject to AD orders fell by 32 percent while nonsubject imports rose by 24 percent during the 1990-92 period.

Case-Study Effects

To address the request of the U.S. Trade Representative, eight case studies were conducted, representing the caseload of agricultural, high-technology and commodity industries; final and intermediate products; and new and mature industries. These case studies included: frozen concentrated orange juice (FCOJ), lamb meat, erasable programmable read only memories (EPROMs), color television picture tubes (CPTs), solid urea, brass sheet and strip, standard welded carbon steel pipes and tubes, and certain bearings. A detailed trend analysis of each industry examines the dynamic forces at work in the marketplace. Time series and comparative static analyses estimate the effects of AD/CVD enforcement over time and for a given year, respectively.

Analysis Over Time

To estimate the combined impact of the petition filing and remedy over time, it is necessary to account for the influence of market demand and supply variables so that the estimated effects of the petition filing and remedy can be isolated from the market forces affecting a given industry. These market variables include input costs, exchange rates, downstream demand growth, and changes in technology. The econometric analyses partition the time series data into pre-petition, investigation, and post-final determination periods to estimate the effects of the petitions and remedial duties given the key demand and supply variables. The impact of filing petitions could not be estimated separately from the impact of the remedy in all the cases because detailed data were not available to distinguish these two closely occurring events. The impact of dumping could not be estimated because the date when the dumping started could not be determined with any precision.

The time-series analyses find that AD/CVD petition filing and remedy generally had an impact on prices and quantities of domestic output and subject imports, though other factors were also influential in determining the behavior of these variables. For example, urea prices and domestic shipments rose by 19 and 48 percent, respectively, following the imposition of the order. Subject urea imports stopped completely, while nonsubject imports from Canada increased by about 38 percent. In the case of tapered roller bearings cone assemblies, subject imports fell by an estimated 30 percent while nonsubject imports doubled as a result of the investigation process. The time-series estimates for tapered roller bearings and ball bearing products however, were inconclusive. The effects of the remedies were likely outweighed by the aggressive direct investment in the United States by bearing producers from subject countries during the pre-petition period. This investment, beginning before the petition, helped limit post-determination imports, and also resulted in declining prices.

In the case of CPTs, the trend analysis indicates that subject imports dropped by 68 percent the year of the petition filing. Subject countries dropped from 100 percent of imports in 1986 to 30 percent in 1993. Despite this drop, rapid foreign investment in the United States and aggressive competition within the CPT industry considerably reduced the effect of the AD filing and order. Both the time-series analysis and interviews with the U.S. CPT producers indicate that the investigation process did not have a significant impact on the industry.

The time series results indicate that imports of frozen concentrated orange juice from Brazil were 75 percent lower in the years after the remedy and that consumption of domestic FCOJ increased. This substantial decline in Brazilian imports despite the low dumping margin is most likely due to the changes in Brazilian exporter behavior. According to the U.S industry and FCOJ purchasers, the AD order spurred Brazil to seek non-U.S. markets as well as to establish a pricing formula tied to the U.S. spot market to avoid further U.S. antidumping actions.

In the case of lamb, the CVD process led to trade diversion where imports of lamb from nonsubject Australia largely replaced imports from subject New Zealand. Domestic prices nevertheless rose by 10 percent. The relatively small impact of the CVD process on the U.S. domestic lamb meat market was also due to the very small market share held by imports.

Prices did not always rise in response to remedies as other market factors overpowered the trade remedy. For example, aggressive competition among domestic producers of brass sheet and strip kept prices down while the foreign competition from subject imports spurred improved U.S. product quality. Domestic shipments of brass sheet and strip were an estimated 34 percent by the end of 1991 than they would have been in the absence of trade remedies; subject imports were 73 percent lower.

In the case of the pipes and tubes industry, domestic prices increased by 10 percent after the AD order went into effect, while domestic shipments also increased. Lacking the necessary data to estimate the effects of the title VII process on EPROMS, an estimate using a hedonic price index (i.e, quality adjusted price) found that the long-term decline in prices slowed after the investigation process. Also, while EPROMS remained an almost constant portion of total integrated circuits (IC) unit shipments, EPROM revenues increased as a share of total IC revenue during 1987-89, indicating that the EPROM investigation may have affected the industry.

The case studies also suggest that AD/CVD relief affects upstream firms and downstream consumers in different ways and amounts. When the subject product is only a small component of downstream firms' demand or consumers' input, demand is relatively less sensitive to price and not diminished by higher prices, such as the case of ball bearings or brass sheet and strip. When downstream industries are competitive, such as farmers purchasing urea, increased prices may not be fully passed through to consumers.

Comparative-Static Analysis

In contrast to time series and trend analysis, simulation models built on standard partial equilibrium analysis provide comparative static, or "snapshot" estimates that isolate the effect of AD/CVD relief on the prices and quantities of domestic product, fairly traded imports, and unfairly traded imports from the impact of other factors, such as business cycles. The model also estimates the total net welfare effects on the upstream and downstream industries. These effects reflect the gains (losses) realized by consumers (producers) due to unfair trade practices and the reverse effects associated with the remedies.

Table A (placed at the end of this executive summary) presents the effect on price, output, revenue, and employment for the domestic like product relative to the "fair values," estimated to have been in place without the unfair trade practice (column 1) and the effects on these variables with the remedy in place (column 2). Column 3 indicates the extent to which the remedy offsets the unfair trade practice for each one of these key industry variables for each case study. Similarly, the effects on the price and output for subject imports as estimated by the model are also presented in Table A. Revenue and employment effects tend to be larger for those industries with a relatively high import market share and a high dumping margin.

The remedies offset the unfair trade practice for lamb meat, EPROMs, and urea, and almost offset the effect of the unfair trade practice for pipes and tubes (column 3 in table A). However, the remedies did not completely offset the effect of the unfair trade practice in the case of frozen concentrated orange juice, color picture tubes, brass sheet and strip, and bearings. This incomplete offset is a terms of trade effect that arises when import supply is not assumed to be

completely responsive to changes in prices. A U.S. duty reduces demand for subject imports, which in turn increases supply and reduces prices in non-U.S. markets. The fair market price estimated by the Department of Commerce in administrative reviews will therefore be lower and dumping will be reduced or remedied without raising U.S. subject import prices by the full amount of the dumping margin.

The effects of both the unfair trade practice and the remedy are greater on output than on prices in each case but color picture tubes (figure A, at the end of this executive summary). In the former cases, domestic producers were not facing capacity constraints and were therefore able to increase supply without increasing price substantially. In the case of color picture tubes, however, U.S. producers had been operating near capacity since 1984. Hence for the color picture tubes, the effect of the unfair trade practice and remedy is greater on prices than output.

Net welfare effects measure the difference between consumer and producer welfare changes. As shown in column 1 of table A and in figure B, the largest consumer and net welfare effects of the unfair trade practices in the case studies were found in the ball bearing and tapered roller bearing investigations. For ball bearings, the consumer and net welfare effects were $212 million and $106 million, respectively, while for tapered roller bearings, they were $66 million and $31 million, respectively. Both had very large U.S. markets ($2.0 billion in 1985 sales of ball bearings and $904 million in 1987 sales of tapered roller bearings) and large dumping margins. Comparing columns 1 and 2 in table A for certain bearings estimates, model results also suggest that 64 ($68.1 million/$105.6 million) and 39 ($13.6 million/$34.8 million) percent, respectively, of the welfare loss to U.S. bearings producers were remedied in the two case studies.

FCOJ and brass sheet and strip also had fairly large net welfare effects due to the unfair trade practices. For FCOJ, despite a 1.96 percent weighted average dumping margin, a net welfare loss occurs because of the very large U.S. market and high subject import market share of 49 percent. Additionally, 52 percent ($2.7 million/$5.2 million) of the U.S. producer welfare loss was estimated to be remedied by the AD order. The relatively large welfare effects due to unfair trade practices for the brass sheet and strip industry were due to a relatively high subject import market share of 24 percent and a 21 percent weighted average margin of dumping. AD orders remedied 86 percent ($4.4 million/$5.1 million) of the U.S. producer welfare loss for the brass and strip industry.

Solid urea, color picture tubes, and EPROMS all experienced moderate net welfare losses ($8.4 million, $8.1 million, and $5.7 million, respectively, in column 1 of table A) due to unfair trade practices. All three faced subject import penetration above 10 percent; solid urea and EPROMs obtained large dumping margins. Despite a large U.S. color picture tube market ($1.1 billion in 1986), relatively low weighted average margins kept the net welfare effects moderate. According to model estimates, there would have been no subject imports of urea and EPROMS but for the dumping and all the producer welfare losses were remedied in both industries. In the case of the CPT industry, 54 percent of the welfare losses to U.S. producers was estimated to be remedied.

Pipe and tubes and lamb had the lowest net welfare effects ($3.8 million and $2.0 million) associated with unfair trade practices. Both had weighted average margins over 20 percent, but small subject import market shares (4 and 5 percent, respectively). For the pipes and tubes industry, 89 percent ($.8 million/$.9 million) of the welfare loss due to dumping was remedied. In the case of lamb, the loss from subsidies was fully remedied by the countervailing duty.

Table A
Comparative static effects of unfair trade practices and remedies for selected U.S. industries[1]

Product group and case types	Effects	Unfair trade practice	Remedy	Unfair trade practice and remedy
		Change from fair value[3]		
Frozen concentrated orange juice (AD/CVD[2] cases)		*(Base year: 1984/85)*		
	MARKET EFFECTS *(percent):*			
	Domestic:			
	Price	-0.5	0.2	-0.3
	Output	-.6	.4	-.2
	Revenue	-1.2	.7	-.5
	Employment	-.5	.3	-.2
	Subject imports:			
	Price	-1.5	.9	-.6
	Volume	2.1	-1.2	.9
	Revenue	.6	-.4	.2
	WELFARE EFFECTS *(million dollars):*			
	Consumers	19.0	-10.7	8.3
	Producers	-5.2	2.7	-2.5
	Net welfare effect	13.8	-8.0	5.8
Lamb meat (CVD cases)		*(Base year: 1985)*		
	MARKET EFFECTS *(percent):*			
	Domestic:			
	Price	-0.2	0.2	0
	Output	-.4	.4	0
	Revenue	-.6	.6	0
	Employment	-.4	.4	0
	Subject imports:			
	Price	-9.0	9.0	0
	Volume	25.5	-25.5	0
	Revenue	14.1	14.1	0
	WELFARE EFFECTS *(million dollars):*			
	Consumers	3.0	-3.0	0
	Producers	-1.0	1.0	0
	Net welfare effect	2.0	-2.0	0
EPROMS (AD case[2])		*(Base year: 1985)*		
	MARKET EFFECTS *(percent):*			
	Domestic:			
	Price	-3.8	3.8	0
	Output	-11.0	11.0	0
	Revenue	-14.4	14.4	0
	Employment	-8.0	8.0	0
	Subject imports:			
	Price	(4)	(4)	0
	Volume	(4)	(4)	0
	Revenue	(4)	(4)	0
	WELFARE EFFECTS *(million dollars):*			
	Consumers	16.7	-16.7	0
	Producers	-11.0	11.0	0
	Net welfare effect	5.7	-5.7	0

See footnotes at end of table.

Table A—*Continued*
Comparative static effects of unfair trade practices and remedies for selected U.S. industries[1]

Product group and case types	Effects	Unfair trade practice	Remedy	Unfair trade practice and remedy
		Change from fair value[3]		
Color picture tubes (AD cases)		*(Base year: 1986)*		
	MARKET EFFECTS *(percent):*			
	Domestic:			
	Price	-2.8	1.4	-1.4
	Output	-1.2	1.2	0
	Revenue	-4.0	2.6	-1.4
	Employment	-1.0	1.0	0
	Subject imports:			
	Price	-6.0	3.8	-2.2
	Volume	26.9	-19.9	7.0
	Revenue	19.2	-14.6	4.6
	WELFARE EFFECTS *(million dollars):*			
	Consumers	37.1	-20.8	16.3
	Producers	-29.1	15.6	-13.5
	Net welfare effect	8.1	-5.3	2.8
Solid urea (AD cases)		*(Base year: 1985)*		
	MARKET EFFECTS *(percent):*			
	Domestic:			
	Price	-2.5	2.5	0
	Output	-7.3	7.3	0
	Revenue	-9.6	9.6	0
	Employment	-5.1	5.1	0
	Subject imports:			
	Price	(4)	(4)	0
	Volume	(4)	(4)	0
	Revenue	(4)	(4)	0
	WELFARE EFFECTS *(million dollars):*			
	Consumers	20.0	-20.0	0
	Producers	-11.7	11.7	0
	Net welfare effect	8.3	-8.3	0
Brass sheet and strip (AD/CVD cases)		*(Base year: 1985)*		
	MARKET EFFECTS *(percent):*			
	Domestic:			
	Price	-1.3	1.1	-0.2
	Output	-9.6	8.4	-1.2
	Revenue	-10.8	9.5	-1.3
	Employment	-9.4	8.2	-1.2
	Subject imports:			
	Price	-16.3	14.2	-2.1
	Volume	47.5	-42.8	4.7
	Revenue	23.8	-21.3	2.5
	WELFARE EFFECTS *(million dollars):*			
	Consumers	26.2	-22.9	3.3
	Producers	-5.1	4.4	-.7
	Net welfare effect	21.1	-18.5	2.6

See footnotes at end of table.

Table A—*Continued*
Comparative static effects of unfair trade practices and remedies for selected U.S. industries[1]

Product group and case types	Effects	Unfair trade practice	Remedy	Unfair trade practice and remedy
		Change from fair value[3]		
Standard welded carbon steel pipes and tubes (AD/CVD[2] cases)		*(Base year: 1986)*		
	MARKET EFFECTS *(percent):*			
	Domestic:			
	Price	-0.2	0.2	0
	Output	-1.6	1.5	-.1
	Revenue	-1.9	1.7	-.2
	Employment	-1.6	1.5	-.1
	Subject imports:			
	Price	-13.6	12.5	-1.1
	Volume	70.5	-64.3	6.2
	Revenue	48.7	-44.4	4.3
	WELFARE EFFECTS *(million dollars):*			
	Consumers	4.7	-4.3	.4
	Producers	-.9	.8	-.1
	Net welfare effect	3.8	-3.5	.3
Certain bearings		*(Base year: 1985)*		
A) Tapered roller bearings (AD cases)	**MARKET EFFECTS** *(percent):*			
	Domestic:			
	Price	-4.8	1.8	-3.0
	Output	-8.4	3.6	-4.8
	Revenue	-12.8	5.2	-7.6
	Employment	-6.7	3.0	-3.7
	Subject imports:			
	Price	-23.6	9.5	-14.1
	Volume	104.5	-56.9	47.6
	Revenue	56.1	-30.0	26.1
	WELFARE EFFECTS *(million dollars):*			
	Consumers	65.7	-28.6	37.1
	Producers	-34.8	13.6	-21.2
	Net welfare effect	30.9	-15.0	15.9
B) Ball bearings (AD/CVD cases)		*(Base year: 1987)*		
	MARKET EFFECTS *(percent):*			
	Domestic:			
	Price	-6.8	4.3	-2.5
	Output	-12.7	8.0	-4.7
	Revenue	-19.1	11.3	-7.8
	Employment	-11.7	7.4	-4.3
	Subject imports:			
	Price	-27.3	11.6	-15.7
	Volume	221.9	-174.8	47.1
	Revenue	134.9	-110.2	24.7
	WELFARE EFFECTS *(million dollars):*			
	Consumers	211.9	-137.6	74.3
	Producers	-105.6	68.1	-37.5
	Net welfare effect	106.3	-69.5	36.8

[1] The estimated effects reported are the results of the Commission's CPE model using the midpoint values of parameter ranges

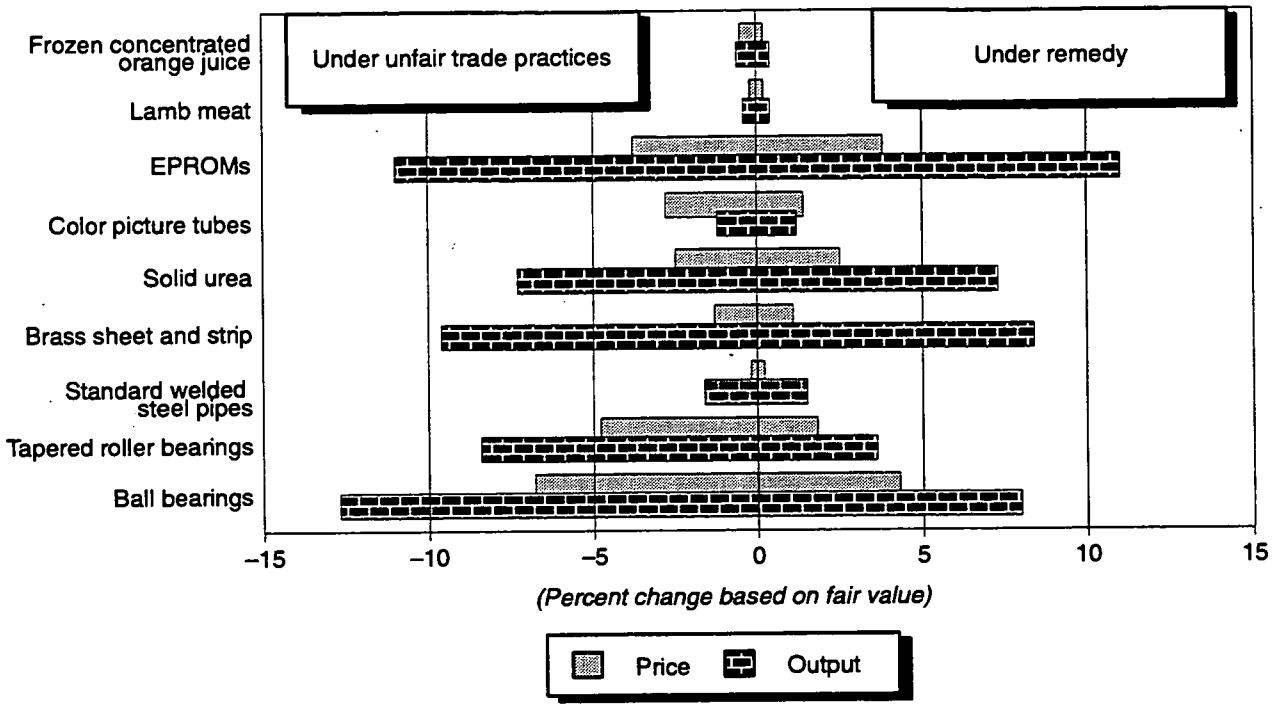
[2] Suspended; one pipe CVD case suspended

[3] The "fair values" are the values estimated by the model to have been in place without the effect of the unfair trade practice

[4] The margins determined by Commerce are so large that the model calculates that there would be no imports from the subject country but for the unfair trade practice.

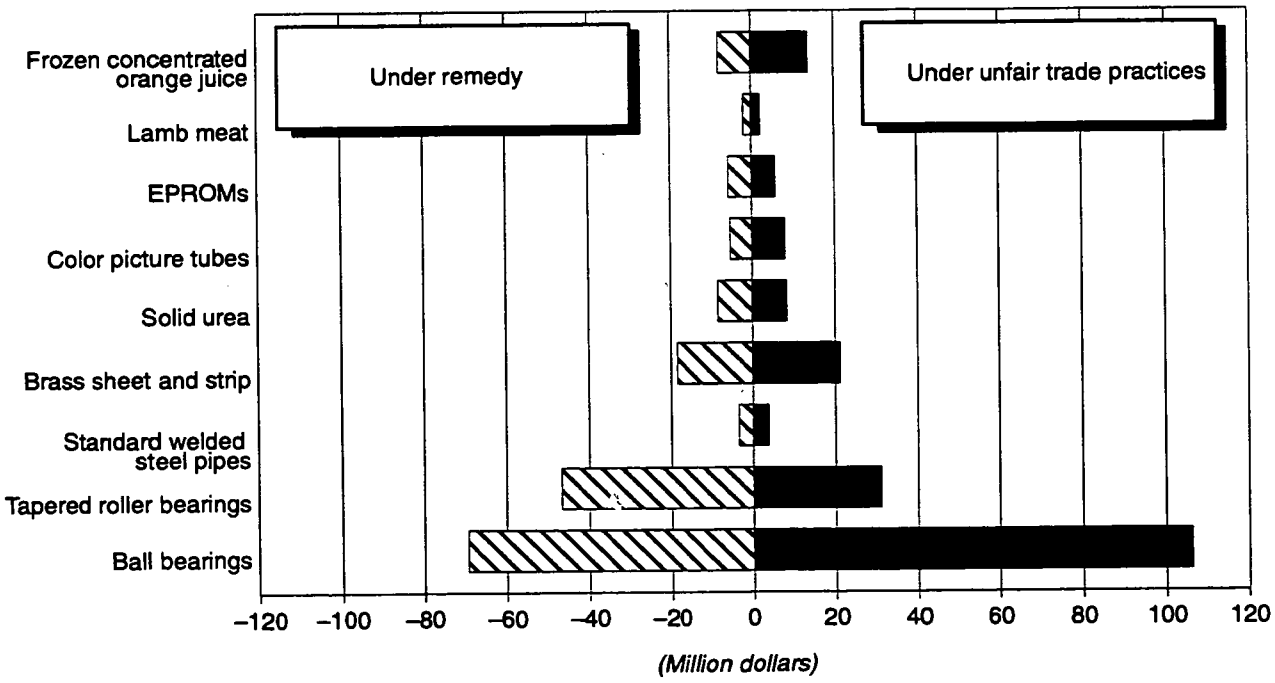
Source: Estimated by the staff of the U.S. International Trade Commission.

Figure A
Comparative static effects of unfair trade practices and remedies on U.S. price and output for a given year



Source: Estimated by the staff of the U.S. International Trade Commission.

Figure B
Net welfare comparative static effects of unfair trade practices and remedies for a given year



Source: Estimated by the staff of the U.S. International Trade Commission.

PART I
Introduction and Administration of the Law

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CHAPTER 1
Introduction

Purpose

The U.S. Trade Representative requested that the Commission "investigate the economic effects of existing antidumping and countervailing duty orders and/or suspension agreements, and economic effects of the dumping and subsidy practices as transmitted through unfair imports to the United States." Further, the U. S. Trade Representative requested that the Commission's response consist of three parts.

First, the Commission was requested to "include a comprehensive empirical analysis of conditions in the U.S. domestic industries impacted by unfairly traded imports both for a proximate period prior to the provision of relief and for a period sufficiently later than the date relief was accorded for the condition of the industry to fully reflect the effects of the relief." Specifically, the U.S. Trade Representative has asked the Commission to provide quantitative estimates of the effects of the investigations brought under title VII of the Tariff Act of 1930 (title VII investigation) on selected U.S. industries for such key industry performance indicators as employment, wages, income, production, prices, and trade.

Second, the Commission was directed to employ a standard comparative static framework to investigate the economic effects of unfair trade practices and remedies on selected U.S. industries. The U.S. Trade Representative asked that the comparative static assessment of dumping, subsidy practices, and remedies be complemented with quantitative estimates of the effects on labor and other domestic adjustment costs. These effects are to be measured for the petitioning industries as well as the upstream and downstream industries.

Third, in addition to estimating the above-mentioned market effects for each industry being investigated, the U.S. Trade Representative has asked the Commission to assess the economy-wide welfare effects of the unfair trade practices and the remedy provided.

Approach

The Commission has taken a multi-part approach to the complex task set forth by the U.S. Trade Representative. Estimating the economic effects of unfair trade practices and remedies on the petitioning and upstream and downstream industries, measured across the numerous specific variables enumerated in the request, requires choosing a manageable sample of case studies to represent the more than 1,000 cases filed since enactment of the Trade Agreements Act of 1979. Eight cases were selected, representing the breadth of industries covered—agricultural, high-technology, basic commodities, rapidly changing and mature industries—and the types of trade remedies achieved—antidumping, countervailing duty and suspension agreements. All the cases fall between 1983-89. The case selection methodology is presented in chapter 6. The cases selected are frozen concentrated orange juice (FCOJ), lamb, erasable programmable read only memories (EPROMS), color picture tubes (CPTs), urea, brass sheet and strip, standard welded carbon steel pipes and tubes, and certain bearings.

Three basic approaches are taken in the case studies. First, trends are analyzed for the key industry indicators, such as prices and output of the domestic like product, prices and level of imports, cost of production, market share, investment, employment, profitability, and research and development expenditures of the domestic producers.

Second, using this information, time-series analysis is used to estimate the supply and demand parameters underlying the industry's historical performance. Estimating these parameters, in turn, permits measurement of the economic effects of the unfair trade practices and the remedy on prices and quantities of the domestic like product, and imports of the product from countries subject to the duties and those from countries not subject to the duties.

Third, for a comparative static estimation of the effect of unfair trade practices and remedy, a computable partial equilibrium (CPE) model was developed and applied to each selected industry. In

contrast to time series analysis where effects are measured over time, this CPE model estimates the market effects (i.e., effects on prices and quantities) and the net welfare effects of both the dumping and relief on the affected U.S. industries for a given base year. The CPE methodology isolates the effect of the unfair trade practice and remedy on the prices and quantities of domestic product, fairly traded imports, and unfairly traded imports from the impact of other factors, such as business cycles. The CPE model also provides comparative static quantification of the effects on the upstream and downstream industries. These effects reflect the gains and losses realized by consumers and producers due to unfair trade practices and the reverse effects associated with the remedy. The economic effects of unfair trade practices and remedies on wages, investment, and other competitive factors were assessed using data gathered from questionnaires, fieldwork and the literature.[1]

To examine the broader, economy-wide effects of the AD/CVD orders on the U.S. economy, the Commission's computable general equilibrium (CGE) model is used. The Commission CGE model simulates the interactions among producers and consumers within the U.S. economy in markets for goods, services, labor, and physical capital. The Commission model explicitly accounts for upstream and downstream production linkages, and intersectoral competition for labor and capital. In one simulation exercise, the Commission CGE model estimates the effects of existing AD/CVD orders by postulating that all the orders in place in 1991 are simultaneously removed. In addition, the modeling exercise takes into account the fact that AD/CVD orders can change from their initial levels through the administrative review process. For example, after an AD order is put in place, it is possible that a foreign firm could raise its U.S. price by the full amount of the margin or leave the U.S. price unchanged, or some combination of both to reduce or eliminate the AD margin and lower or avoid AD duties. By changing their U.S. price, foreign firms can capture some of the revenue that would have gone to the U.S. Treasury. A CVD margin is modeled as an ad valorem tariff as collected by the U.S. Customs Service in 1991. The model will tend to underestimate the economy-wide effects of AD/CVD cases as it does not capture the effects of the cases that were revoked, terminated or suspended or in which imports ceased completely or where petitions filed were withdrawn before 1991. At the same time, the model will tend to overestimate the economy-wide effects of AD/CVD cases as it assumes that the price the U.S consumers pay is equal to the pre-duty U.S. price plus the full amount of the original margin.

[1] Data needed for conducting the econometric analysis as well as the CPE analysis were gathered from public sources, fieldwork, questionnaires, and submissions at the public hearing held at the Commission on the 29th and 30th September 1994. The period of time covered by the analysis in the cases spanned years from 1974 to 1994. Chapters 7 to 14 in Part III of the study provide information on specific data sources used for each case study.

Organization of the Report

This report is divided into three parts. Part I contains chapters 1 and 2. The latter chapter presents information on the administration of the current and past U.S. AD/CVD duty laws. Part II contains chapters 3 and 4 and presents material related to economy-wide effects due to unfair trade practices and AD/CVD orders. Chapter 3 presents an overview of existing orders and suspension agreements over the 1980-1993 period while Chapter 4 provides the economy-wide effects of remedies using the Commission CGE model for the year 1991.

Part III contains chapters 5 to 14 which present the analysis on selected U.S. industries. Chapter 5 reviews the theoretical and empirical literature on the economics of dumping and subsidization of imports. This chapter also describes the Commission methodology developed to respond to the U.S. Trade Representative's request. Chapter 6 provides the case selection methodology and the summary of economic effects for the 8 cases selected for the analysis. Chapters 7 through 14 provide case studies of eight industries that have been the subject of unfair trade investigations and remedies.

CHAPTER 2
The Administration of Antidumping and Countervailing Duty Laws in the United States

This chapter provides a brief history of U.S. antidumping and countervailing duty laws and describes the current roles and procedures of U.S. agencies in the administration of the U.S. antidumping and countervailing duty laws set forth in the Tariff Act of 1930.[1] In addition, the chapter describes the various appeals processes in connection with antidumping and countervailing duty determinations. The case study investigations discussed in this report were initiated between 1982 and 1989 and were governed by the antidumping and countervailing duty laws as they existed at the time the investigations were conducted. However, the antidumping and countervailing duty laws were amended several times during the 1980s[2] and were amended again in late 1994 (effective January 1, 1995) by the Uruguay Round Agreements Act (URAA).[3] Thus, the law as it exists today and as it existed at the time of the various investigations is not identical. Descriptions of changes in key provisions are noted in footnotes to the text below.

[1] Tariff Act of 1930, ch. 497, 46 Stat. 703, and 19 U.S.C. 1671 et seq.

[2] The current U.S. antidumping and countervailing duty laws are set forth, for the most part, in title VII of the Tariff Act of 1930. As is explained in the textual portion of this chapter, these laws were enacted in this form by the Trade Agreements Act of 1979 (1979 Act), Public Law 96-39, Title I, 101, 93 Stat. 150, which added title VII to the Tariff Act of 1930. The provisions in title VII became effective January 1, 1980. Since that time, title VII has been further amended by the Trade and Tariff Act of 1984 (1984 Act), Public Law 98-573, Title VI, 601, 98 Stat. 3024-3043, by the Omnibus Trade and Competitiveness Act of 1988 (1988 Act), Public Law 100-418, Title I, 1311, 102 Stat. 1184-1211, and by the Customs and Trade Act of 1990 (1990 Act), Public Law 101-382, Title II, 224(a), 104 Stat. 659.

[3] Public Law 103-465, Title II, 108 Stat. 4809.

U.S. Law

Antidumping Law

The Antidumping Act, 1921 (1921 Act),[4] which was part of the Emergency Tariff Act of 1921, was the predecessor to current title VII of the Tariff Act of 1930. It was patterned after a then-existing Canadian antidumping provision, which required the customs inspectors to inspect every transaction for evidence of dumping. Congress included an injury test in the original 1921 law to reduce the burden on the Treasury Department in administering the provision and delegated the task of making both the dumping and injury determinations[5] to the Department of the Treasury. The administration of the antidumping law was split in 1954, with the function of determining injury transferred from the Treasury Department to the U.S. Tariff Commission (now the U.S. International Trade Commission).[6]

[4] Act of May 27, 1921, ch. 14, 42 Stat. 11. There is another U.S. antidumping law, commonly referred to as the Antidumping Act of 1916, which is a criminal and civil statute. Act of September 8, 1916, ch. 463, Title VIII, 39 Stat. 798. The 1916 law, which requires a showing of intent to injure, has rarely been used and has never been successfully invoked.

[5] Generally, an antidumping determination assesses whether subject imports are being dumped and, if so, provides the relevant margin of dumping. An injury determination assesses whether a domestic industry is materially injured, threatened with material injury, or materially retarded by reason of the dumped imports. See discussion *infra* for a more comprehensive explanation of these terms and procedures.

[6] Customs Simplification Act of 1954, Public Law 83-768, ch. 1213, Title III, 68 Stat. 1138.

The 1921 Act was the model for a draft article on dumping that was proposed by the United States during negotiations to establish an International Trade Organization (ITO) and resulted in Article VI of the General Agreement on Tariffs and Trade of 1947 (GATT).[7] The GATT Antidumping Agreement of 1967 was negotiated to clarify and supplement the broad concepts of Article VI of the GATT during the Kennedy Round of multilateral trade negotiations.[8] During the Tokyo Round of trade negotiations completed in 1979, a new GATT Antidumping Agreement was drafted to supersede the 1967 GATT Antidumping Agreement and to conform to Article VI of the GATT and the newly negotiated Agreement Relating to Subsidies and Countervailing Measures (GATT Subsidies Agreement).

The 1979 GATT Antidumping Agreement was implemented into U.S. law by the Trade Agreements Act of 1979. The 1979 Act repealed the 1921 Act and added a new title VII to the Tariff Act of 1930, implementing the provisions of the GATT agreement in a new U.S. antidumping law. The statute substantially changed a number of substantive and procedural aspects of U.S. antidumping law. In 1980, the responsibility for making dumping determinations was transferred from Treasury to the Department of Commerce.[9] Subsequently, amendments to the U.S. antidumping law were made by the 1984 Act, the 1988 Act, and the 1990 Act.[10] The U.S. antidumping law was amended further in December 1994 (with an effective date of January 1, 1995) to implement changes required by the Uruguay Round Agreements to the Antidumping Agreement.[11]

Countervailing Duty Law

The first U.S. statute dealing with unfair trade practices was a countervailing duty law passed as part of the Tariff Act of 1897 (the Dingley Act), which was subsequently renumbered as section 303 of the Tariff Act of 1930[12] and remained substantially the same until 1979.[13]

The Trade Agreements Act of 1979 added a second countervailing duty provision to U.S. law to conform with the GATT Subsidies Agreement, established during the Tokyo Round of multilateral trade negotiations. The second law, like the current antidumping law, is found in title VII of the Tariff Act of 1930. It requires an injury test in all countervailing duty cases involving imports from so-called "countries under the agreement"—that is, countries that are signatories to the Subsidies Agreement or that have

[7] Article VI of the GATT sets out the international framework governing national antidumping laws.

[8] The 1967 Agreement entered into force with respect to the United States on July 1, 1968. However, this Agreement was never implemented into U.S. law. In fact, Congress passed legislation stating that U.S. law was to override this 1967 Agreement in all areas of conflict. Renegotiation Amendments Act of 1968, Public Law 90-634, Title II, 82 Stat. 1347; Conference Rept. 1951, 90th Cong., 2nd sess., p. 1 (1968).

[9] Reorganization Plan No. 3 of 1979, 44 F.R. 69273 (Dec. 3, 1979); and Executive Order No. 12188, Jan. 4, 1980, 45 F.R. 989.

[10] The 1984 Act added provisions that require Commerce to establish a monitoring program for cases involving persistent dumping and that require the Commission to cumulate imports from two or more countries. In the 1988 Act, provisions were added to the U.S. law to prevent circumvention of antidumping orders, to consider the treatment of negligible imports in determining whether to cumulate for present material injury, to address concerns about foreign dumping in third country markets, and to address short life cycle merchandise. The 1990 Act added the exception to cumulation for material injury, or the threat thereof, for designated Caribbean Basin Initiative countries.

[11] The Uruguay Round Agreements (URA) established the World Trade Organization (WTO). The URA incorporates previous GATT agreements, as amended, and includes such implementing agreements as the Agreement on Implementation of Article VI of GATT 1994 (Antidumping Agreement 1994) and the Agreement on Subsidies and Countervailing Measures (Subsidies Agreement 1994). Under URA, all countries that become members of the WTO automatically will be subject to the implementing agreements, such as the Antidumping and Subsidies Agreements 1994. Previously, under GATT, members separately decided whether to accept the obligations of the implementing agreements or codes. The Antidumping and Subsidies Agreements 1994 were implemented into U.S. law by the Uruguay Round Agreements Act (URAA).

[12] Section 303 of the Tariff Act of 1930 provided for the imposition of countervailing duties whenever a subsidy was bestowed by a foreign country upon the manufacture or production for export of an article which was subsequently imported into the United States. Section 303, originally, applied only to dutiable goods and did not include an injury test.

[13] The Trade Act of 1974 amended the statute to extend the application of the countervailing duty law to duty-free imports, subject to a finding of injury for GATT signatories as required by Article VI of the GATT. The provisions of the statute regarding dutiable imports, however, were not amended by the 1974 Act. Dutiable imports still were not subject to an injury test since they were governed by section 303 of the Tariff Act, which was grandfathered under the GATT and did not include an injury test for such imports.

undertaken similar obligations.[14] Section 303 of the Tariff Act of 1930 continued to apply to all other countries until January 1, 1995. The authority to make subsidy determinations was transferred from Treasury to Commerce at the same time that the authority was transferred for making dumping determinations. U.S. countervailing duty law also was amended by the 1984 Act (which modified the application of countervailing duty law to upstream subsidies), and the 1988 Act (which explicitly granted authority to prevent circumvention of countervailing duty orders). U.S. countervailing duty law was amended in December 1994 by the URAA to implement changes required by the Uruguay Round Agreement on Subsidies and Countervailing Measures. The URAA repealed section 303 of the Tariff Act of 1930.[15]

U.S. Antidumping and Countervailing Duty Procedures[16]

The Petition

An antidumping or countervailing duty petition may be filed with Commerce and the Commission by certain interested parties,[18] on behalf of an industry,[19] alleging that an industry in the United States is materially injured or threatened with material injury, or that the establishment of an industry is materially retarded, by reason of imports that are being, or are likely to be, sold in the United States at less than fair value (LTFV) or by reason of imports that are being subsidized.

A petition must contain information reasonably available to the petitioner supporting its allegations of dumping or countervailable subsidy and injury to a domestic industry by reason of LTFV or subsidized

WHAT IS DUMPING?

Dumping, or selling at less than fair value, is defined as selling a product in the United States at a price which is lower than the price for which it is sold in the home market (the "normal value," formerly termed foreign market value), after adjustments for differences in the merchandise, quantities purchased, and circumstances of sale. In the absence of sufficient home market sales, dumping may be measured by comparing the export price, or constructed export price, to the United States of the subject merchandise with the price for which the product is sold in a surrogate "third country," or with a "constructed value."[17]

[14] When the 1979 Act was implemented, there were seven countries (Venezuela, Honduras, Nepal, North Yemen, El Salvador, Paraguay, and Liberia) with such bilateral agreements with the United States. S. Rept. No. 249, 96th Cong., 1st sess., 45 (1979). In 1994, there were six countries (Estonia, Latvia, Liberia, Lithuania, Saudi Arabia, and Yemen) with such bilateral agreements; all, except Liberia and Yemen, have applied for accession to the WTO, which is pending. Statement of Administrative Action on the Uruguay Round (SAA), H. Doc. 103-316, vol. 1 (1994), p. 254.

[15] Under the URA, all countries that become members of the WTO automatically will be subject to the Subsidies Agreement, rather than under the previous system where GATT countries separately decided whether to accede to the obligations of each Agreement.

[16] Before the URAA, the antidumping and countervailing duty laws discussed in this chapter were governed by the title VII provisions enacted by the 1979 Act, as amended by the 1984 and 1988 Acts. The antidumping and countervailing duty provisions in title VII of the Tariff Act, as amended by the URAA, are discussed in the text; previous law is described in the footnotes, as appropriate.

These procedures generally apply to all case study investigations as discussed in chapters 7 to 14 of this report.

[17] See SAA, p. 150.

[18] 19 U.S.C. 1671a(b)(1) or 1673a(b)(1).

[19] To conform to the URA, the statute has been changed to require Commerce, which, as the administering authority, has jurisdiction over this issue, to poll the industry "[i]f the petition does not establish support of domestic producers or workers accounting for more than 50 percent of the total production of the domestic like product." 19 U.S.C. 1671a(c)(4)(D) and 1673a(c)(4)(D), as amended by URAA.

WHO CAN FILE?

"Interested parties" that may file a petition are defined in the statute, 19 U.S.C. 1671a(b)(1) or 1673a(b)(1), as (1) a manufacturer, producer, or wholesaler in the United States of a domestic like product; (2) a certified or recognized union or group of workers that is representative of the industry engaged in the manufacture, production, or wholesale in the United States of a domestic like product; (3) a trade or business association, a majority of whose members manufacture, produce, or wholesale a domestic like product in the United States; (4) an association of firms, unions, or trade associations as described above; and (5) in cases involving processed agricultural products, a coalition or trade association representative of processors, or processors and producers, or processors and growers. 19 U.S.C. 1677(9)(C)-(G).

imports.[20] The petition also must include a clear and concise description of the imported merchandise to be investigated, or the "subject merchandise."[21] The petition also must name each country in which the allegedly dumped or subsidized merchandise originates or from which the merchandise is exported, identify each known exporter, foreign producer, and importer of the merchandise, and include statistical data, such as the volume and value of exports to the United States over a recent representative period (usually the three most recent calendar years), to support its allegations of material injury by reason of the alleged unfair imports.

WHAT IS THE SCOPE OF THE INVESTIGATION?

"Subject merchandise" is a term that defines the scope of an antidumping or countervailing duty investigation (i.e., the specific imported product or products that are under investigation). The petition should identify the technical characteristics or precise parameters that distinguish the goods from other merchandise not intended to fall within the scope of the investigation.

In addition to the above information, an antidumping petition must provide factual information regarding the alleged dumping relevant to the calculation of the export price or constructed export price of the subject merchandise and the normal value of the foreign like product.[22] A countervailing duty petition must identify the alleged subsidies and provide factual information concerning the nature and amount of any subsidy provided with respect to the subject merchandise, including the authority under which they are provided, the manner in which they are paid, and the value of the subsidies to producers and exporters of the merchandise. If an upstream subsidy is alleged, the petition must include information on domestic subsidies that the government of the affected country provides to the upstream supplier, the competitive benefit the subsidies bestow on the merchandise, and the significant effect the subsidies have on the cost of producing the merchandise.

[20] 19 U.S.C. 1671a(b)(1) and 1673a(b)(1). In particular, the petitioner must provide detailed information identifying the petitioner and all known domestic producers of the domestic product like or most similar in characteristics and uses to the imported product, as well as information on the volume and value of the domestic like product produced by the petitioner and each domestic producer identified. For further information regarding the contents of a petition, see SAA, pp. 190 and 191 (specific petition requirements provided in legislative history to URAA); and U.S. International Trade Commission (USITC), *Antidumping and Countervailing Duty Handbook*, Sept. 1994 (3rd ed.), Part I (petition requirements before URAA amendments).

[21] The term "subject merchandise" has been substituted for "class or kind of merchandise" in the statute in order to conform to the terminology used in the Uruguay Round Agreements. 19 U.S.C. 1677(25), as amended by URAA.

[22] The term "foreign like product" has been substituted for "such or similar merchandise" in the statute in order to conform to the terminology used in the Uruguay Round Agreements. 19 U.S.C. 1677(16), as amended by URAA.

Review of the Petition and Initiation of an Investigation

Antidumping and countervailing duty petitions are filed simultaneously (i.e., on the same day) with Commerce and the Commission.[23] Commerce notifies the government of any exporting country named in the petition by delivering a public version of the petition to an appropriate government representative.[24]

Generally, within 20 days after the date on which the petition is filed, Commerce determines whether the petition alleges the elements necessary for the imposition of a duty and contains information reasonably available to the petitioner supporting the allegations,[25] and if the petition has been filed by or on behalf of the industry.[26] If the petition does not establish sufficient support by the domestic producers or workers, Commerce must poll the domestic industry regarding support for the petition and may postpone its determination on the sufficiency of the petition to a maximum of 40 days after the filing of the petition.[27] If the determination is affirmative, Commerce initiates an investigation to determine whether dumping or subsidies exist; if the determination is negative, Commerce dismisses the petition and terminates the proceeding.[28]

[23] Commerce also has the authority to self-initiate an investigation whenever it determines, from information available to it, that a formal investigation is warranted.

[24] 19 U.S.C. 1671a(b)(4)(A) and 1673a(b)(3)(A), as amended by URAA. Although there was no similar requirement in previous law, Commerce policy was to notify appropriate embassies.

[25] See 19 U.S.C. 1671a(c)(1)(A)(i) and 1673a(c)(1)(A)(i), as amended by URAA. Because most petitions are submitted in draft form to both agencies before filing, deficiencies generally are identified and remedied before filing. The URAA amendments added a provision whereby the agencies are prohibited from disclosing information with regard to any draft petition before it is filed. 19 U.S.C. 1671a(b)(4)(C) and 1673a(b)(3)(C), as amended by URAA.

[26] 19 U.S.C. 1671a(c) and 1673a(c), as amended by URAA. Before the URAA, the statute made no provision for Commerce to poll the domestic industry to determine whether the petition had been filed on behalf of the industry.

[27] 19 U.S.C. 1671a(c) and 1673a(c), as amended by URAA. This provision is new; there was no similar requirement in previous law.

[28] In either case, Commerce publishes a notice of its findings in the *Federal Register*. From January 1980 to September 1993, 88 title VII investigations (evenly divided between antidumping and countervailing duty investigations) were terminated either because Commerce declined to initiate an investigation or the petition was withdrawn.

Preliminary Investigation by the Commission

WHAT ARE NEGLIGIBLE IMPORTS?

Negligible imports, with a few exceptions, are defined as imports from the country subject to investigation that account for less than 3 percent of the volume of all such merchandise imported into the United States in the most recent 12-month period preceding the filing of the petition. The negligibility exception generally does not apply if the aggregate volume of subject imports from all countries, which otherwise would be deemed to have negligible imports and on which investigations were initiated on the same day, exceeds 7 percent. Moreover, for countervailing duty investigations, the negligibility threshold for certain developing countries is 4 percent, rather than 3 percent, for the volume of imports from individual countries and 9 percent for the aggregate volume of imports. If the Commission determines that imports are negligible, it does not make a material injury or threat determination.

Within 25 days after the date on which the Commission receives notice from Commerce of initiation of the investigation,[29] the Commission determines, based on the information available to it at the time, whether there is a "reasonable indication"

[29] This means that the Commission's preliminary determination may be made up to 65 days after filing of the petition if Commerce postpones initiation of the investigation because of its polling of the industry for support of the petition. 19 U.S.C. 1671b(a)(2) and 1673b(a)(2), as amended by URAA. Before the URAA, the deadline for the Commission's preliminary determination was within 45 days from the date the petition was filed.

MATERIAL INJURY BY REASON OF SUBJECT IMPORTS: STATUTORY FACTORS CONSIDERED BY COMMISSION

In evaluating the volume of imports, the Commission considers whether the volume of subject imports, or any increase in that volume, either in absolute terms or relative to production or consumption in the United States, is significant.

In evaluating the effect of imports of subject merchandise on prices, the Commission considers (1) whether there has been significant price underselling by the imported merchandise as compared with the price of domestic like products in the United States and (2) whether the effect of imports of such merchandise otherwise depresses prices to a significant degree or prevents price increases, which otherwise would have occurred, to a significant degree.

In examining the impact of subject imports on domestic producers of like products, the Commission considers all relevant economic factors which have a bearing on the state of the industry in the United States. These factors include output, sales, inventories, capacity utilization, market share, employment, wages, productivity, profits, cash flow, return on investments, ability to raise capital, research and development, and, for antidumping investigations, the magnitude of the margin of dumping. The Commission considers all relevant factors within the context of the business cycle and conditions of competition that are distinctive to the affected industry. 19 U.S.C. 1677(7)(C), as amended by URAA.

that an industry[30] in the United States is materially injured,[31] or is threatened with material injury, or the establishment of an industry in the United States is materially retarded, by reason of imports of the subject merchandise and that such imports are not negligible.[32] If the Commission determines that such imports are negligible, the investigation is terminated.

To determine if there is material injury to a domestic industry by reason of subject imports, the Commission considers the volume of imports, their effect on prices for the domestic like product, and their impact on domestic producers of the domestic like product.[33] To determine if there is threat of material injury to the domestic industry by reason of the subject merchandise, the Commission determines "whether further dumped or subsidized imports are imminent and whether material injury by reason of imports would occur unless an order is issued. . . ."[34]

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[30] The Commission must first define the domestic like product and the domestic industry. 19 U.S.C. 1677(4)(A) and (10), as amended by URAA.

[31] The statute defines "material injury" as "harm which is not inconsequential, immaterial, or unimportant." 19 U.S.C. 1677(7)(A).

[32] 19 U.S.C. 1671b(a)(1) and 1673b(a)(1) as amended by URAA. A new provision to conform with the URA, 19 U.S.C. 1677(24), defines negligible imports. Before the URAA, a separate determination on negligibility was not required apart from its consideration in determining whether imports from more than one country should be cumulated.

[33] 19 U.S.C. 1677(7)(B), as amended by URAA. Before the URAA amendments, the statute did not require that "the magnitude of the margin of dumping" be considered as a factor for the Commission to consider.

[34] 19 U.S.C. 1677(7)(F)(i) and (ii), as amended by URAA. The Commission's determination "may not be made on the basis of mere conjecture or supposition." Ibid. The URAA provided no substantive change to Commission threat analysis. Specific differences in the law before the URAA included: an additional factor requiring the Commission to consider the presence of underutilized capacity for production in the exporting country; the consideration of market penetration only, and not of the volume of imports, in determining the likelihood that the penetration will increase to an injurious level; and the consideration of any substantial increase in inventories in the United States. Although the URAA refers to imports as being imminent whereas previous law referred to actual injury as being imminent and the threat as being real, the legislative history to the URAA indicates that Congress does not consider this a change from preexisting Commission practice. SAA, p. 184.

THREAT OF MATERIAL INJURY BY REASON OF SUBJECT IMPORTS: STATUTORY FACTORS CONSIDERED BY COMMISSION

The statutory factors considered by the Commission in making a threat determination include: information on countervailable subsidies, if applicable; the likelihood of increases in imports because of existing unused capacity or increases in production capacity, or due to increases in volume or market penetration of subject merchandise; the likelihood of increases in demand for imports because of import prices that depress or suppress domestic prices; inventories of subject merchandise; potential for product shifting; actual or potential negative effects on existing development and production efforts; and other demonstrable adverse trends.

Finally, in the few cases where the Commission has considered whether the establishment of an industry in the United States is materially retarded[35] by reason of imports of the subject merchandise, the Commission first determines whether the domestic industry is "established," that is, whether the U.S. producers have commenced production of the product and have "stabilized" their operations. If the industry is not established, the Commission considers whether the performance of the industry reflects normal startup difficulties or whether the imports of the subject merchandise have materially retarded the establishment of the industry.

[35] Allegations of material retardation of the establishment of an industry, which is not defined in the statute, have been relatively uncommon. *See e.g., Benzyl Paraben from Japan*, Inv. No. 731-TA-462, (Final), USITC Pub. 2355 (Feb. 1991); *Compare Wheel Inserts from Taiwan*, Inv. No. 731-TA-721 (Preliminary), USITC Pub. 2824 (Oct. 1994).

Based on the record,[36] each Commissioner makes a determination on the country(ies) involved in the investigation. The vote of the majority of the Commissioners participating in the decision constitutes the determination of the Commission.[37]

The Commission transmits its determination in a preliminary investigation to Commerce[38] and, in 5 working days, the Commission forwards to Commerce the facts and conclusions on which its determination is based, i.e., its opinion, or views.[39] If the determination is negative, the investigation is terminated.[40]

[36] The record includes all information submitted to or obtained by the Commission, including: a confidential report prepared by staff that presents and analyzes the statistical data and other information collected through Commission questionnaires to producers and importers, the Commission conference, public documents, field visits, telephone interviews, and other sources; a memorandum prepared by staff regarding legal issues in the investigation; the transcript of the Commission conference; the postconference briefs filed by the parties that present their positions; and all other information obtained by the Commission in the course of its investigation. 19 U.S.C. 1516a(b)(2).

[37] An evenly divided vote by the Commission constitutes an affirmative determination in antidumping and countervailing duty investigations. 19 U.S.C. 1677(11).

[38] 19 U.S.C. 1671b(a)(2) and 1673b(a)(2), as amended by URAA. The Commission is required by statute to transmit its determination within 45 days after the date of filing of the petition, or, if Commerce has postponed its sufficiency determination in order to poll the industry, 25 days after the Commission receives notice that Commerce has initiated the investigation. Before the URAA, the statute required the Commission determination and views to be transmitted to Commerce within 45 days after the date of the filing of the petition, with no exception.

[39] 19 U.S.C. 1671b(f) and 1673b(f), as amended by URAA. Before the URAA, the statute required the Commission's conclusions to be transmitted to Commerce with the Commission's determination.

The determination is subsequently published in the *Federal Register*, and a publication containing the determination, nonconfidential views of the Commission, and the nonconfidential version of the staff report is printed for distribution to the public.

[40] Between January 1980 and September 1993, the Commission made 197 negative preliminary determinations in title VII investigations; this represents 22 percent of total Commission preliminary determinations for that period.

Preliminary Investigation by Commerce

Following the Commission's affirmative preliminary determination, Commerce makes its preliminary determination within 140 days after the date on which the investigation is initiated in antidumping cases or 65 days in countervailing duty cases.[41] Commerce makes its determination based upon the information available to it at the time, of whether there is a reasonable basis to believe or suspect that the subject merchandise is being, or is likely to be, sold at LTFV, or whether a subsidy is being provided with respect to the subject merchandise. Commerce's preliminary determination includes the factual and legal conclusions on which the determination was based and the estimated weighted-average dumping margin (the amount by which the normal value, formerly termed foreign market value, exceeds the United States price), if any, or the subsidy margin for each firm or country investigated. In antidumping investigations, Commerce calculates a dumping margin for individual firms that it investigates and an appropriate "all other" rate for firms not investigated. The "all other" rate generally is equal to the weighted average of the individual firm rates, exclusive of *de minimis* margins[42] or margins determined entirely on the basis of facts available.[43]

In antidumping investigations, Commerce uses responses to questionnaires from foreign exporters or producers to establish the statutory values required for comparison of the "United States price" and the "normal value," and, thus, to determine the dumping margin. Commerce first determines the United States price, which may be based on either "export price" (formerly, "purchaser price") or "constructed export price" (formerly, "exporter's sales price"). If the import transaction involves a foreign exporter that is unrelated to the U.S. purchaser, the export price is used; when the two parties are related, the constructed export price is used as the basis of comparison. "Export price" is "the price at which the subject merchandise is first sold (or agreed to be sold) before the date of importation by the producer or exporter of the subject merchandise outside of the United States to an unaffiliated purchaser in the United States or to an unaffiliated purchaser for exportation to the United States. . . ."[44] "Constructed export price" is "the price at which the subject merchandise is first sold (or agreed to be sold) in the United States before or after the date of importation by or for the account of the producer or exporter of such merchandise. . . ."[45]

Commerce generally computes dumping margins by comparing normal value, based on home market sales of the foreign like product, to the United States price, based on export sales to the United States. If home market sales are inadequate, i.e., home market sales by the exporter account for less than 5 percent of the quantity of the sales by the exporter to the U.S. market, normal value is based on sales to a third country. The third country is selected on the basis of whether its exports are most similar to exports to the United States, its market is "viable," i.e., sales to the third country must account for at least 5 percent of sales to the United States, and its market, in terms of organization and development, is most like the U.S. market.[46] If third country sales also are inadequate, normal value may be based on constructed value, which is calculated by adding manufacturing costs of the merchandise in the home market country;

[41] Commerce has the statutory authority to postpone its preliminary determination by up to 50 days in antidumping cases and by up to 65 days in countervailing duty cases. It may do so either (1) by declaring the investigation extraordinarily complicated or (2) at the request of the petitioner, if such request is made no later than 25 days before the scheduled date of the determination. 19 U.S.C. 1671b(c) and 1673b(c).

[42] Under the URAA, weighted-average dumping margins of less than 2 percent are defined as *de minimis* and, thus, must be disregarded by Commerce in making its determination. 19 U.S.C. 1673b(b)(3), as amended by URAA. Before the URAA, *de minimis* dumping margins were defined in Commerce regulations as any weighted-average dumping margin that was less than 0.5 percent. 19 C.F.R. 353.6. The change in the definition of *de minimis* under the URAA applies only to new antidumping investigations, not to reviews of antidumping orders or suspended investigations to which the Commerce regulatory standard for *de minimis* of less than 0.5 percent still applies. See SAA, pp. 174 and 175.

[43] 19 U.S.C. 1673b(d), as amended by URAA. The URAA added the requirement to exclude margins that are *de minimis* or based on facts available (formerly, "best information available" or "BIA," 19 U.S.C. 1677e, as amended by URAA). Before the URAA, the "all other" rate was a weighted-average of individual firms' rates including those rates that were based on facts available or BIA. See SAA, p. 203.

[44] 19 U.S.C. 1677a(a), as amended by URAA. The URAA changed the prior reference regarding purchase to first sale to an unaffiliated purchaser.

[45] 19 U.S.C. 1677a(b), as amended by URAA. The URAA added the reference to the first sale in this provision. The URAA also added a new adjustment regarding the deduction of profits to the calculation of the constructed export price which reflects language in the URA. See SAA, p. 153.

[46] 19 U.S.C. 1677b(a)(1), as amended by URAA. See also SAA, pp. 156-160. Before the URAA, the law did not include an explicit provision stating the circumstances under which a third country market was viable.

selling, general and administrative (SG&A) expenses and profits; and packaging costs.[47]

In determining normal values, Commerce may disregard sales that are made below costs within an extended period of time and in substantial quantities.[48] Disregarding such sales may in some circumstances prevent Commerce from either using home market sales or third country sales as a basis for normal value. In addition, there are special rules for finding normal value with respect to imports from nonmarket economies.[49]

When comparing the normal value to the United States price in order to determine the dumping margin, Commerce must make an "apples to apples" comparison, i.e., Commerce must compare (1) the weighted-average normal value to the weighted-average United States price (either export price or constructed export price) for comparable merchandise or (2) the normal values of individual transactions to the United States prices (either export prices or constructed export prices) of individual transactions for comparable merchandise.[50]

In countervailing duty investigations, Commerce uses responses to questionnaires from the government of each country involved as well as producers, manufacturers, and exporters to determine the monetary benefit[51] derived by each company from each government program alleged to confer a countervailable subsidy. Of the three types of countervailable subsidies (i.e., export, import substitution, and domestic) set forth in the statute, the first two are defined by statute as being "specific" and, thus, countervailable.[52] For domestic subsidies, Commerce must apply a "specificity" test to determine if they are countervailable. The specificity test is intended to avoid the imposition of countervailing duties in situations where, because of the widespread availability and use of a subsidy, the benefit of the subsidy is spread throughout an economy.

Commerce calculates individual countervailing subsidy rates for each exporter or producer investigated by dividing the weighted-average net amount of the subsidy conferred on a particular company by the company's total sales in the case of domestic subsidies or the firm's total exports in the case of export subsidies.[53] When Commerce

[47] 19 U.S.C. 1677b(e), as amended by URAA. When the constructed value method is used for the calculation of normal value, the actual SG&A and profits of the exporter or producer under investigation are to be used if available. If such factual data are not available, alternative methods are provided that include either using averages of data collected for other exporters or estimating SG&A expenses and profits that would be normal for such an industry. The law no longer includes minimum percentages to be used for SG&A expenses and profits. Before the URAA, the statute set an amount for general expenses of at least 10 percent of the cost of manufacture and a profit margin of at least 8 percent of general expenses and costs. Commerce generally used either the actual value of general expenses and profits determined from the investigated firm's books, if available, or the respective statutory minimum percentage, whichever was greater. See SAA, pp. 169-171.

[48] 19 U.S.C. 1677b(b), as amended by URAA. The URAA amended the statute to provide that below-cost sales need occur only *within* (rather than over as in the law before the URAA) an extended period of time. This means that Commerce no longer must find that below-cost sales occurred in a minimum number of months before excluding such sales from its normal value analysis and that Commerce will examine below-cost sales occurring during the entire period of investigation rather than in a shorter time period. See SAA, pp. 161 and 162. The URAA also changed the definition of substantial quantities from a benchmark of 10 to 20 percent. 19 U.S.C. 1677b(b)(2)(C), as amended by URAA.

[49] 19 U.S.C. 1677b(c), as amended by URAA.

[50] 19 U.S.C. 1677f-1(d), as amended by URAA. There is an exception that permits Commerce to compare weighted-average normal values to individual United States prices where targeted dumping may be occurring and Commerce can explain why the exception should

[50]—*Continued*
apply. The average-to-average or transaction-to-transaction comparison is limited to antidumping investigations, with the preferred methodology for reviews of antidumping orders continuing to be a comparison of weighted-average normal value to individual United States prices. 19 U.S.C. 1677f-1(d), as amended by URAA; see also SAA, pp. 172 and 173. Before the URAA, Commerce's preferred practice, although the law permitted the comparison of averages, was to compare a weighted-average normal value to individual United States prices (either export prices or constructed export prices) in both antidumping investigations and reviews of antidumping orders.

[51] 19 U.S.C. 1677(5)(E), as amended by URAA. To conform to the URA, Commerce will issue regulations that set forth the details of the methodologies used to identify and measure the benefit of a subsidy. See SAA, p. 258.

[52] 19 U.S.C. 1677(5A), as amended by URAA. While the specificity provision was added by the URAA, it generally reflects law and practice before the URAA. See SAA, pp. 258-268.

[53] 19 U.S.C. 1677f-1(e), as amended by URAA. If a large number of exporters or producers are involved, there is an exception which permits Commerce to calculate individual countervailable subsidy rates for a reasonable number of exporters and producers or calculate a single countrywide subsidy rate for all exporters and producers. These provisions apply to investigations and reviews of countervailing duty orders. Before the URAA, Commerce normally calculated a countrywide rate applicable to all exporters and producers, pursuant to 19 U.S.C. 1671e(a)(2), repealed.

examines a limited number of companies, it calculates an "all other" rate that generally is equal to the weighted-average countervailable subsidy rates established for exporters and producers individually investigated, exclusive of *de minimis* countervailable subsidy margins[54] or margins determined entirely on the basis of facts available.[55]

If the petitioner submits an allegation of critical circumstances not later than 20 days before the scheduled date for Commerce's preliminary determination, Commerce must make a preliminary finding on the issue as part of its preliminary determination.[56] The "critical circumstances" provisions in the antidumping and countervailing duty laws allow for the limited retroactive imposition of duties if Commerce determines that there has been a surge of imports of the subject merchandise prior to the suspension of liquidation, and the Commission determines that the surge in imports will undermine the effectiveness of relief.[57]

[54] Under the URAA, a countervailable subsidy generally is defined as *de minimis* if the aggregate of the net countervailable subsidies is less than 1 percent; *de minimis* margins must be disregarded by Commerce in making its determination. There are exceptions for developing countries that define *de minimis* as countervailable subsidy rates that do not exceed 2 percent and for least developed countries that define *de minimis* as rates that do not exceed 3 percent. 19 U.S.C. 1671b(b)(4), as amended by URAA. Before the URAA, *de minimis* countervailing subsidy margins were defined in Commerce regulations as any aggregate net subsidy margin that was less than 0.5 percent. 19 C.F.R. 355.7. The change in the definition of *de minimis* under the URAA applies only to countervailing subsidy investigations, not to reviews of countervailing duty orders to which the Commerce regulatory standard for *de minimis* of less than 0.5 percent stills applies. See SAA, pp. 268 and 269.

[55] 19 U.S.C. 1671d(c)(5), as amended by URAA. The URAA added the "all other" rate provision to the statute. Before the URAA, Commerce generally issued a countrywide countervailable subsidy margin.

[56] Petitioner may amend the petition to allege critical circumstances at any time more than 20 days before Commerce's final determination.

[57] For a critical circumstances finding in an antidumping investigation, Commerce determines (1) whether (a) there is a history of dumping and material injury by reason of dumped imports in the United States or elsewhere of the subject merchandise or (b) importers knew or should have known that the exporters were selling the subject merchandise at LTFV and that there was likely to be material injury by reason of such sales and (2) whether there have been massive imports of the subject merchandise over a relatively short period. 19 U.S.C. 1673b(e)(1) and 1673d(a)(3), as amended by URAA. In a countervailing duty investigation, Commerce determines whether (1) the subsidy is inconsistent with "the Subsidies Agreement" and (2) there have been massive imports of the subject merchandise over a relatively short period. 19 U.S.C. 1671b(e)(1) and 1671d(a)(2), as amended by URAA. The URAA added the requirement for antidumping investigations that Commerce must determine that "there was likely to be material injury by reason of the such [LTFV] sales." For a discussion of the Commission's finding, see footnote 76 infra. 19 U.S.C. 1671d(b)(4) and 1673d(b)(4), as amended by URAA.

Suspension of Liquidation

If Commerce's preliminary determination is affirmative, it instructs the U.S. Customs Service (Customs) to order the suspension of liquidation of all entries of the subject imports that are entered, or withdrawn from warehouse for consumption, on or after the later of the date of publication of the notice of determination in the *Federal Register* or the date that is 60 days after publication of the notice of initiation of the investigation in the *Federal Register*.[58] If Commerce makes a preliminary affirmative determination of critical circumstances, the suspension of liquidation applies retroactively for 90 days[59] to all unliquidated entries of merchandise entered, or withdrawn from warehouse for consumption. Thereafter, importers are required to post a cash deposit, a bond, or other security for each entry of subject merchandise equal to the estimated amount by which the normal value exceeds the United States price, or equal to the estimated amount of the net subsidy. If the preliminary determination is negative, Commerce nevertheless conducts a final investigation, although there is no suspension of liquidation and, thus, no requirement that importers post a cash deposit or bond.

Suspension Agreements[60]

Commerce may suspend an antidumping investigation if exporters that account for substantially

[58] A new statutory provision to conform to the URA limits the duration of Commerce's preliminary order to Customs to 4 months, with an extension to 6 months permitted for antidumping cases, if exporters of a significant proportion of exports of the subject merchandise agree.

[59] For a critical circumstances finding, the suspension of liquidation would apply on the later of 90 days before the date suspension of liquidation was first ordered or the publication date of the notice of initiation of investigation.

[60] This section specifically applies to the case study investigations on concentrated orange juice, EPROMs, and standard welded pipes discussed in chapters 7, 9, and 13 of this report.

all imports of the subject merchandise agree to cease exports of the merchandise to the United States within 6 months after the investigation is suspended or to revise their prices to eliminate completely any amount by which the normal value of the subject merchandise exceeds the United States price, or to eliminate completely the injurious effect of the imports.[61] Similarly, Commerce may suspend a countervailing duty investigation if the government of the country in which the subsidy practice is alleged to occur agrees, or exporters who account for substantially all imports of the subject merchandise agree, within 6 months after the investigation is suspended, to eliminate the subsidy or offset completely the amount of the net subsidy, or to cease exports of the subject merchandise to the United States or to eliminate the injurious effect of the imports.[62] Commerce may suspend an investigation only if it is satisfied that such suspension is in the public interest and effective monitoring of a suspension agreement is practical.[63]

If Commerce determines to suspend an investigation,[64] it must publish in the *Federal Register* a notice of suspension of the investigation and issue an affirmative preliminary determination, with dumping or subsidy margins but without ordering suspension of liquidation,[65] and the Commission must suspend any investigation it is conducting.[66] If Commerce rejects a suspension agreement, it must provide its reasons for the rejection and, where possible, provide exporters with an opportunity to submit comments.

If Commerce determines that a suspension agreement is being, or has been, violated, it will order the suspension of liquidation and the investigation will resume, if it had not been completed.[67] If the original investigation was completed, Commerce will issue an antidumping or countervailing duty order.

Final Investigation by Commerce

Generally, within 235 days after the date on which the petition is filed in antidumping cases or 160 days in countervailing duty cases, Commerce makes a final determination[68] that includes (1) an analysis of issues raised by interested parties[69] and the Department's rulings on those issues, and (2) the estimated weighted-average dumping or subsidy margin, if any, for each firm or country investigated.[70] [71]

[61] 19 U.S.C. 1673c. Commerce may suspend an investigation only in extraordinary circumstances (i.e., suspension will be more beneficial to the domestic industry than a complex investigation) based on an agreement to eliminate the injurious effect.

[62] 19 U.S.C. 1671c.

[63] 19 U.S.C. 1671c(d) and 1673c(d). In addition, if the suspension agreement is with a nonmarket economy country to restrict the volume of imports, Commerce also must determine that the suppressing or undercutting of domestic prices will be prevented by the agreement. 19 U.S.C. 1673c(l).

[64] Before suspending an investigation upon acceptance of an agreement, Commerce must notify the petitioner, other parties to the investigation, and the Commission of its intention to suspend, must provide a copy of the proposed agreement to the petitioner, together with an explanation of how the agreement will be carried out and enforced, and must permit all interested parties an opportunity to submit comments. 19 U.S.C. 1671c(e) and 1673c(e).

[65] If Commerce has already issued an affirmative preliminary determination and ordered suspension of liquidation, it must instruct Customs to terminate the suspension of liquidation and release any bond or other security and refund any cash deposit made up to that point.

[66] 19 U.S.C. 1671c(f) and 1673c(f). Certain interested parties may request continuation of the investigation or review of the suspension, within 20 days of the publication of the notice that the investigation is suspended. See 19 U.S.C. 1671c(g) and (h), and 1673c(g) and (h).

[67] 19 U.S.C. 1671c(i) and 1673c(i).

[68] Commerce has the statutory authority to postpone its final determination by up to 60 days in antidumping investigations. It may do so at the request of either (1) the petitioner, if the preliminary determination was negative or (2) the exporters if the preliminary determination was affirmative, providing that such request is made no later than the scheduled date for the final determination. 19 U.S.C. 1673d(a)(2).

If the petitioner submits an allegation of critical circumstances more than 20 days before the scheduled date for Commerce's final determination, Commerce must make a finding in its final determination on the critical circumstances factors discussed supra.

[69] Interested parties may file case briefs, rebuttal briefs, and request that Commerce hold a public hearing.

[70] In antidumping investigations and some countervailing duty investigations, an appropriate "all other" rate is also issued for firms not investigated, which generally is equal to the weighted average of the individual firm rates, exclusive of *de minimis* margins or margins determined entirely on the basis of facts available. 19 U.S.C. 1671d(c)(1) and (5), and 1673d(c)(1) and (5), as amended by URAA. See footnotes 43 and 55 *supra*, regarding previous law.

[71] In the computable partial equilibrium analyses of the case studies of chapters 7 through 14 in this report, Commerce's "all other" margin for each country is used as the measure of dumping or subsidy, where a range of rates was assessed.

If Commerce's final determination is affirmative, it instructs Customs to continue to order the suspension of liquidation of all entries of the subject merchandise that are entered, or withdrawn from warehouse for consumption.[72] If Commerce's final determination is negative, it instructs Customs to terminate the suspension of liquidation and release any bond or other security and refund any cash deposit made up to that point.

Final Investigation by the Commission

The Commission makes a final determination within 120 days after the date on which Commerce makes its affirmative preliminary determination or 45 days after Commerce's affirmative final determination,[73] whichever is later. As in its preliminary determination, the Commission considers the statutory factors regarding material injury, threat of material injury, and material retardation but no longer applies the "reasonable indication" standard. The vote of the majority of the Commission constitutes the Commission's determination.[74] The Commission notifies Commerce of its final determination.[75]

Under certain circumstances, the Commission must make additional findings in its final affirmative determination. First, if Commerce makes an affirmative final determination regarding the existence of critical circumstances, and the Commission makes an affirmative final determination of present material injury by reason of dumped imports, the Commission must make an additional finding as to whether the surge in imports of the subject merchandise prior to suspension of liquidation is likely to undermine seriously the remedial effect of the antidumping or countervailing duty order.[76] An affirmative finding regarding critical circumstances by the Commission means that limited retroactive duties will be assessed.

Second, if the Commission makes an affirmative final determination of threat of material injury, it must make an additional finding as to whether it would have found present material injury but for the suspension of liquidation of entries of the subject merchandise. This finding determines the effective date of the imposition of duties: if affirmative, duties are effective on the date of suspension of liquidation; if negative, duties are effective on the date of publication in the *Federal Register* of the notice of the Commission's final affirmative determination.

If the Commission's final determination is negative, Commerce instructs Customs to terminate the suspension of liquidation and release any bond or other security and refund any cash deposit made up to that point.

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[72] See discussion of suspension of liquidation *supra*.

[73] If Commerce's preliminary determination was negative, the Commission's final determination must be transmitted 75 days after notification of Commerce's final affirmative determination.

[74] The Commission's determination is based on the agency record in the investigation, which includes the final confidential staff report and other memoranda regarding legal and economic issues prepared by the staff, the transcript of the Commission hearing, the briefs of the parties, and other information. The record is closed prior to the Commission's vote. Interested parties to the investigation are permitted to have access to all information of record and make final comments, which cannot contain new factual information, on all information not previously disclosed. Before the URAA, the record was closed at the time of the vote, with disclosure and comments permitted if there was sufficient time before the Commission's vote. The more comprehensive opportunity for parties to the investigation to inspect the record and comment is a new provision under the URAA amendments. See 19 U.S.C. 1677m(g), as amended by URAA, and new Commission rule 207.29.

The Commission's determination is subsequently published in the *Federal Register*, and a publication containing the determination, nonconfidential views of the Commission, and the nonconfidential version of the staff report is printed for distribution to the public. See 19 U.S.C. § 1677(11).

[75] Between January 1980 and September 1993, 340 of the Commission's final determinations in title VII

[75]—*Continued*
investigations were affirmative; this accounts for 62 percent of total Commission final determinations for that period. For antidumping investigations, 69 percent of total Commission final determinations were affirmative, whereas for countervailing duty investigations, 47 percent of total final determinations, were affirmative. See chapter 3 of this report for a detailed summary of antidumping and countervailing duty activity and final determinations.

[76] 19 U.S.C. 1671d(b)(4)(A) and 1673d(b)(4)(A), as amended by URAA. See SAA, p. 207. In making this evaluation, the Commission is to consider (1) the timing and the volume of the imports, (2) any rapid increase in inventories of imports, and (3) any other circumstances indicating that the remedial effect of the antidumping or countervailing duty order will be seriously undermined. Ibid. Before the URAA, the Commission was required to determine whether the retroactive imposition of duties appeared necessary to prevent recurrence, and whether the order would be materially impaired if imposition did not occur based on consideration of such factors as the condition of the domestic industry, whether the surge in imports resulted from efforts to avoid duties or foreign economic conditions, and whether the impact of the surge of imports was likely to continue.

The Antidumping or Countervailing Duty Order

Within 7 days after being notified by the Commission of an affirmative final determination, Commerce publishes in the *Federal Register* an antidumping or countervailing duty order.[77] Thereafter, importers are required to pay a cash deposit[78] for each entry of the subject merchandise after publication of the order, equal to the amount of the estimated antidumping or countervailing duties times the value of the subject merchandise, pending liquidation of the entries of merchandise and assessment of final duties.[79]

Duties are levied on all subject merchandise entered on or after the date of suspension of liquidation (i.e., Commerce's preliminary affirmative determination) unless the Commission's final determination is based on threat of material injury[80] or material retardation; in these cases, duties are required only on merchandise entered on or after the date of publication of the Commission's final affirmative determination.[81]

Assessment of Antidumping and Countervailing Duties

Each year during the anniversary month of the publication of an antidumping or countervailing duty order or suspension agreement, an interested party[82] may request that Commerce conduct an administrative review of the amount of any net countervailable subsidy, antidumping duty, or the status of compliance with a suspension agreement. The administrative review covers entries of the merchandise during the 12 months immediately preceding the most recent anniversary month for antidumping cases, and entries during the most recently completed reporting year of the government of the affected country for countervailing duty cases.

In conducting an administrative review, Commerce (1) issues the preliminary results of the administrative review, along with an invitation for comment, within 245 days of the anniversary month;[83] (2) issues the final results within 120 days after publication of the preliminary results;[84] (3) provides to parties a disclosure of the methodology used in reaching the final results; and (4) instructs Customs to assess final antidumping or countervailing duties on the subject merchandise entered during the review period (i.e., liquidation of entries)[85] and to collect a cash deposit equal to the newly estimated margins on entries for at least the next 12 months. If no interested party requests an administrative review, Commerce instructs Customs to (1) liquidate entries during the review period at rates equal to the estimated antidumping or countervailing duties required to be posted as cash deposits on that merchandise at the time of entry and (2) continue to collect the cash deposits at the rate previously ordered.

[77] 19 U.S.C. 1671e and 1673e. The order describes the subject merchandise to which it applies, requires the deposit of estimated antidumping or countervailing duties pending liquidation of entries, and directs Customs to assess a duty equal to the amount by which the normal value of the subject merchandise exceeds the United States price of the subject merchandise or the amount of the net countervailable subsidy.

[78] The posting of a bond or other security is permitted only under special circumstances.

[79] In the computable partial equilibrium analyses of the case studies of chapters 7 through 14 in this report, Commerce's "all other" margin for each country is used as the measure of the dumping or subsidy remedy when a range of duties has been assessed.

[80] This exception does not apply to a threat of material injury determination in which the Commission determines that but for the suspension of liquidation it would have found present material injury. 19 U.S.C. 1671e(b) and 1673e(b).

[81] In these cases, Commerce releases any bond or other security and refunds any cash deposit made to secure the payment of antidumping or countervailing duties related to subject merchandise that was entered, or withdrawn from warehouse for consumption, before the

[81]—*Continued*
date of publication of the Commission's final determination.

[82] For interested parties that are new shippers, the law, which was amended in 1994 to conform to the URA, requires Commerce to accelerate administrative reviews. Such new shippers, which are liable for antidumping duties under the all other rate, must not have exported to the United States during the original investigation and must not be affiliated with any original exporter. 19 U.S.C. 1675(a)(2)(B), as amended by URAA.

[83] The preliminary results consist of (1) factual and legal conclusions; (2)(a) the weighted-average dumping margin for each company reviewed or (b) the net countervailable subsidy on a countrywide basis, the estimated net subsidy for cash deposit purposes, and a description of changes in subsidy programs; and (3) in the case of suspension agreements, conclusions with respect to the status of, and compliance with, the agreement.

[84] In general, the final results consist of the same types of information as the preliminary results.

[85] Any liquidation of entries ordered by Commerce pursuant to an administrative review must be completed by Customs within 90 days of such instructions.

Review and Revocation of Orders and Suspended Investigations

Commerce may revoke an antidumping order or terminate a suspended antidumping investigation, in whole or in part, if it concludes that all or some of the producers and exporters covered by the order or suspension agreement have sold the subject merchandise at not less than foreign market value for a period of at least 3 consecutive years and that they are unlikely to do so in the future.[86] It may revoke a countervailing duty order or terminate a suspended countervailing duty investigation if it concludes that (1) the government of the affected country has eliminated all subsidies on the imported merchandise by abolishing all countervailable programs for the subject merchandise for a period of at least 3 consecutive years, and (2) the government is unlikely to reinstate those programs or substitute other countervailable programs.[87]

The Uruguay Round Agreements Act amended the antidumping and countervailing duty laws to require that Commerce and the Commission conduct "sunset reviews" no later than 5 years after issuance of an order, suspension of an investigation, or completion of a changed circumstances review to determine whether revocation of the relevant order or termination of the suspended investigation would be likely to lead to continuation or recurrence of dumping or countervailable subsidies and injury.[88] Commerce initiates the review no later than 30 days before the fifth anniversary of the relevant event by issuance of a *Federal Register* notice. If there is no response from the domestic interested parties to the notice of initiation, Commerce will revoke the order or terminate the suspended investigation within 90 days of the initiation of the review. If adequate responses are received, a sunset review will be conducted with Commerce's final sunset determination to be made within 240 days of the initiation of the review. If Commerce's determination is affirmative, the Commission makes its final sunset determination within 360 days of the initiation of the review.[89]

Commerce and the Commission also may review a final affirmative determination or suspension agreement based on a request by an interested party of changed circumstances sufficient to warrant such a review.[90] The Commission must determine whether revocation of the order or finding, or termination of a suspension agreement, is likely to lead to continuation or recurrence of material injury.[91] If Commerce completely or partially revokes an order, it instructs Customs to release any cash deposit or bond and to cease suspension of liquidation of the subject merchandise on the first day after the review period.

Appeal Procedures

Judicial Review

Any aggrieved interested party who is a party to a proceeding may seek judicial review by the U.S. Court of International Trade (CIT) of any factual findings or legal conclusions that are the basis for final determinations by the Commission or Commerce, or negative preliminary determinations by the Commission.[92] Such parties also may appeal decisions by Commerce to suspend an investigation or not to initiate an investigation, final results of administrative reviews by Commerce, decisions by the Commission not to review a determination based upon changed circumstances, and determinations made under the sunset reviews. In most of these cases, the court will consider whether any determination, finding, or conclusion is not supported by substantial evidence on the record, or otherwise is not in accordance with law. For determinations by

[86] 19 C.F.R 353.25(a).

[87] 19 C.F.R. 355.25(a). Commerce also may revoke a countervailing duty order or terminate a suspended countervailing duty investigation in whole or in part if it concludes that all or some of the producers and exporters covered by the order or suspension agreement have not applied for or received any net subsidies on the subject merchandise for a period of at least 5 consecutive years and that they are unlikely to do so in the future. 19 C.F.R. 355.25(a).

[88] 19 U.S.C. 1675(c), as amended by URAA.

[89] 19 U.S.C. 1675(c), as amended by URAA. For orders, findings, and suspended investigations that were in effect at the time the URA entered into force with respect to the United States (January 1, 1995), the URAA provides a transition schedule for sunset reviews of these cases. Commerce must begin its review of these cases by July 1, 1998, and Commerce and the Commission must complete all transition cases by June 30, 2001.

[90] In the absence of good cause shown, such reviews may not occur less than 2 years from the date of publication in the *Federal Register* of such determination or suspension agreement.

[91] 19 U.S.C. 1675(b), as amended by URAA.

[92] 19 U.S.C. 1516a. The parties commence an action in the CIT by filing a summons within 30 days after the date of publication of the determination or order in the *Federal Register.*

Commerce not to initiate an investigation or by the Commission not to review a determination based upon changed circumstances, determinations made under sunset reviews based on inadequate responses, and preliminary negative determinations by the Commission, the court will consider whether the determination was arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law.

Binational Panel Review

In antidumping and countervailing duty determinations involving subject merchandise from Canada or from Mexico, any aggrieved interested party who was a party to the investigation may forego judicial review for binational panel review pursuant to Article 1904 of the North American Free Trade Agreement. If the panel remands a determination to Commerce or the Commission, those agencies must take action "not inconsistent with the decision of the panel." Subsequent action by Commerce or the Commission is subject only to further review by the panel,[93] or by an extraordinary challenge committee pursuant to Article 1904.13 of NAFTA.

WTO Dispute Settlement Process

The Understanding on Rules and Procedures Governing the Settlement of Disputes (DSU) of the World Trade Organization (WTO) contains dispute settlement provisions designed to resolve conflicts between signatory countries over alleged violations of the Uruguay Round Agreements, including the Antidumping and Subsidies Agreements 1994.[94] The DSU provides for the following sequential process for resolving disputes: (1) mandatory consultations between the parties to the dispute,[95] (2) voluntary conciliation mediated by the Dispute Settlement Board (DSB), (3) proceedings before a DSB panel, which issues a report to the DSB if the dispute has not been resolved, and (4) issuance by the administering DSB of appropriate findings, rulings, or recommendations. The dispute may be resolved to the mutual satisfaction of all parties at any stage in the process, at which time the process would terminate.

If within 60 days the parties are unable to reach a solution through consultations, the complaining party may request that the DSB establish a panel.[96] If the dispute remains unresolved, the panel issues a report with findings and recommendations to the DSB, which adopts it within 60 days, unless a party notifies the DSB that it intends to appeal or the DSB decides by "consensus"[97] not to adopt the report.[98]

An appeal of the issues of law covered by the panel report or legal interpretations developed by the panel can be made to the standing Appellate Body of the DSB. The Appellate Body reviews the appeal and issues a report that is adopted by the DSB and unconditionally accepted by the parties to the dispute, unless the DSB declines by consensus to adopt the report within 30 days of its issuance.

The DSB explicitly applies the specific standard of review in Antidumping Agreement 1994 to all disputes involving antidumping actions.[99] Article

[93] There is an exception to the exclusive binational panel review if the agency determination or the completed binational panel review is challenged solely on the basis of a Constitutional issue; such an action is reviewed by a three-judge panel of the CIT. 19 U.S.C. 1516a(g)(4)(B) and (C).

[94] Before the URA, separate dispute settlement provisions were contained in the GATT Antidumping and Subsidies Agreements rather than centralized under the DSU. While the process for resolving disputes was similar to that set forth in the DSU, no central administering body, such as the DSB, was established. Moreover, the timeframe for the process generally was longer and there was no firm deadline for panel action and for action by the administering committee. See *Review of the Effectiveness of Trade Dispute Settlement Under the GATT and the Tokyo Round Agreements,* Inv. No. 332-212, USITC Pub. 1793, pp. 32-36 (Dec. 1985).

[95] At the consultation stage, discussions are solely among the parties concerned, although other WTO members are notified of a request for consultations.

[96] Members of panels, composed of either 3 or 5 members, are selected from a list of persons maintained by the DSB. Citizens of countries that are principal participants in the dispute are ineligible to serve on a panel dealing with the dispute.

[97] The DSB must reach all decisions by "consensus." The DSB shall be deemed to have decided by consensus on a matter presented for its consideration if no member, present at the meeting of the DSB when the decision is taken, formally objects to the proposed decision. DSU (in URA), p. 354, footnote 1.

[98] DSU, art. 16.4.

[99] Article 1.2 of the DSU provides that special or additional rules and procedures in covered multilateral trade agreements, including the Antidumping Agreement 1994, shall prevail if they differ from the DSU. Article 17.6 of the Antidumping Agreement 1994 contains special provisions regarding the standard of review for antidumping actions. While the Subsidies Agreement 1994 does not include a similar provision, the Declaration on Dispute Settlement Pursuant to Antidumping Agreement

17.6 of the Antidumping Agreement 1994 states in relevant part that:

> In examining the matter [before the DSB] . . . the panel shall determine whether the authorities' establishment of the facts was proper and whether their evaluation of those facts was unbiased and objective. If the establishment of the facts was proper and the evaluation was unbiased and objective, even though the panel might have reached a different conclusion, the evaluation shall not be overturned (emphasis added).

Where a DSB panel or Appellate Body report concludes that a measure is inconsistent with a covered Agreement, it shall recommend that the party bring the measure into conformity with that Agreement. The DSU recognizes that it may not be possible, although it is preferred, for a party to agree to the removal of a measure that the DSB has found to be inconsistent with a covered Agreement. Accordingly, the DSU provides for alternative resolutions: the party with the offending measure may enter negotiations to provide compensation or other settlements in lieu of removal of the measure. If a Member has not complied with the recommendations and rulings within a reasonable period following adoption of the DSB report, or the parties have not agreed to satisfactory compensation within 20 days after that period, the complaining party may request that the DSB authorize suspension of concessions or obligations under the covered agreements to the offending party equivalent to the "nullification or impairment" of benefits caused by the offending measure.

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[99]—*Continued*
1994 or Subsidies Agreement 1994 (URA, p. 403) would appear to apply the special antidumping standards to countervailable subsidy actions.

PART II
Overview and Economy-Wide Effects

CONTENTS

CONTENTS—*Continued*

CHAPTER 3
An Overview of Existing Orders

Introduction

This chapter presents a general summary and trend analysis of AD/CVD cases initiated after January 1, 1980.[1] It provides an overall context for the more specific economic analysis provided in the chapters that follow. It also reveals a number of important insights that may be used to understand the economic effects of AD/CVD orders and investigations covering products with a number of different characteristics.

Two different types of comprehensive data and analyses are used to examine the effects of AD/CVD orders and their remedies. First, summary statistics describe—by type of investigation, year, country, and final outcome—the number of AD/CVD investigations initiated between 1980 and 1993. Second, a new U.S. Customs database is combined with other data compiled from Commission final reports to conduct simple statistical tests on import quantity and unit value data representing AD cases initiated during 1990-93.[2] This analysis demonstrates how prices and quantities reacted in the years before and after cases are initiated. Cases are split into individual tariff categories and grouped by margin size, product type, and degree of product substitutability to show relationships between these categorizations and the behavior of importers.

The U.S. Customs database used in this chapter is important because it contains records of U.S. imports subject to AD and/or CVD investigations or orders at some point between 1989 and the first half of 1994 by 10-digit HTS item and country.[3] Thus, subject import categories are identified at the 10-digit HTS level when there are imports in this period.[4] The Customs database was supplemented with quantity and unit value (used as proxy for price) data for 10-digit HTS items from official U.S. Department of Commerce statistics. Data at this high level of disaggregation across so many title VII cases provide a unique opportunity for economic analysis.

The final section of this chapter uses the supplemented Customs database to examine the incidence of trade diversion in response to AD investigations and orders. Trade diversion occurs when the source of imports of a specific product is diverted from a subject country to a country that is not subject to an investigation or order. To the extent that trade diversion occurs, AD/CVD remedies may have little or no impact on overall import volume for the affected HTS line. The analysis groups imports into those subject to affirmative orders, those that are subject to investigation but are not part of an affirmative order, and nonsubject imports. Comparisons of average import quantities and unit values are used to indicate the extent of trade diversion between the various groups.

Summary Measures of Case Filings

From 1980 through 1993, 682 AD and 358 CVD cases were filed in the United States, with 39.4 percent of the AD and 21.2 percent of the CVD cases resulting in affirmative final determinations and remedies. Despite the relatively large number of cases and remedies, tables 3-1 and 3-2 show a relatively small amount of total U.S. imports affected each year by new AD/CVD cases. Even the most active years have a very small share of imports that are subject to AD/CVD orders. However, the

[1] This focuses on trends in filings and final determinations in the period since the Trade Agreements Act of 1979 as data on cases before this Act are less reliable and often inconsistent.

[2] This period is chosen based on data availability and consistency with HTS tariff classification codes which were instituted in 1989.

[3] For internal usage, U.S. Customs refers to this database as the ENB database.

[4] Some duties imposed under AD/CVD orders are prohibitively high and there are no subject imports for Customs to process. Thus, the affected HTS lines from these prohibitive orders are not in the Customs database.

Table 3-1
AD investigations, 1980-93: Coverage of subject imports relative to total U.S. imports and weighted average margins for new case filings, by year

Year	Subject imports	Subject imports as a share of total U.S. imports	Weighted-average margin
	Million dollars	*Percent*	
1980	103.7	0.04	13.2
1981	[1]40.0	[1].02	[1]3.9
1982	194.8	.08	19.3
1983	566.1	.21	15.5
1984	93.6	.03	21.1
1985	757.7	.22	42.5
1986	1,398.0	.38	14.4
1987	372.2	.09	35.6
1988	980.5	.22	69.8
1989	1,255.0	.26	16.8
1990	694.4	.14	27.2
1991	541.7	.11	41.0
1992	2,158.0	.40	30.4
1993	258.8	.04	41.6

[1] Excludes data that could not be aggregated without revealing business proprietary information.

Source: U.S. Customs data and compiled by Commission staff.

Table 3-2
CVD investigations, 1980-93: Coverage of subject imports relative to total U.S. imports and weighted average margins for new case filings, by year[1]

Year	Subject imports	Subject imports as a share of total U.S. imports	Weighted-average margin
	Million dollars	*Percent*	
1980	33.9	0.02	20.8
1981	(2)	(2)	(2)
1982	2,747.7	1.04	3.2
1983	[3]35.5	[3].01	[3]34.9
1984	[3]372.7	[3].14	[3]8.0
1985	[3]164.8	[3].05	[3]2.6
1986	[3]81.9	[3].02	[3]6.4
1987	61.5	.02	38.4
1988	7.0	(4)	113.6
1989	[3]352.5	[3].08	[3]4.5
1990	93.7	.02	8.6
1991	2,926.0	.59	5.2
1992	626.9	.13	7.9
1993	15.2	(4)	24.4

[1] Because of data availability, only those countervailing duty cases which required an injury determination are included in the data for this section. This is not the case for subsequent sections that use the ENB database.

[2] Not applicable - no affirmative determinations.

[3] Excludes data that could not be aggregated without revealing business proprietary information.

[4] Shares less than 0.005 percent are recorded as zero.

Source: U.S. Customs data and compiled by Commission staff.

potentially large effects these cases have on subject imports is reflected by the magnitude of the average yearly initial margins and the cumulative imports that are subject to orders.

A first glance at the number of filings shows a fair amount of variability from year to year, with relative peak years in 1982 and 1992 (figures 3-1 and 3-2), corresponding to years with large numbers of steel product cases.[5] Overall, 33 percent of the total AD/CVD investigations from 1980 through 1993 had affirmative determinations, 45 percent had negative determinations,[6] and the remaining 22 percent were terminated or suspended. By case type, 39.4 percent of AD and 21.2 percent of CVD cases requiring an injury determination from 1980 to 1993 went affirmative.[7] More AD cases went negative than affirmative each year from 1980 through 1984, while affirmative AD cases outnumbered negative ones each year from 1985 through 1989. Recent years have seen a relatively equal ratio of negative and affirmative AD determinations.

Of all AD cases from 1980 through 1993, 262 (or 38.4 percent) involved steel products, while steel product cases accounted for 195 (or 54.5 percent) of all CVD cases requiring injury determination (figures 3-3 and 3-4). Since 1980, the number of nonsteel AD cases has been rising slightly, while nonsteel CVD cases requiring an injury test have declined. In addition, almost 70 percent of the terminated or suspended AD cases from 1980 through 1993 involved steel product cases, primarily in the first half of the 1980s.

Southeast Asian countries comprise four of the top five countries for which AD or CVD petitions were initiated during 1980-93. Japan is the country most often subject to AD petitions, with 79 cases, while Brazil tops the list for CVD cases with 44 (figures 3-5 and 3-6). With the exception of Brazil, CVD cases subject to injury determination have been filed primarily against European steel producers. Together, the top 10 countries accounted for 62 and 57 percent of AD and CVD cases, respectively.

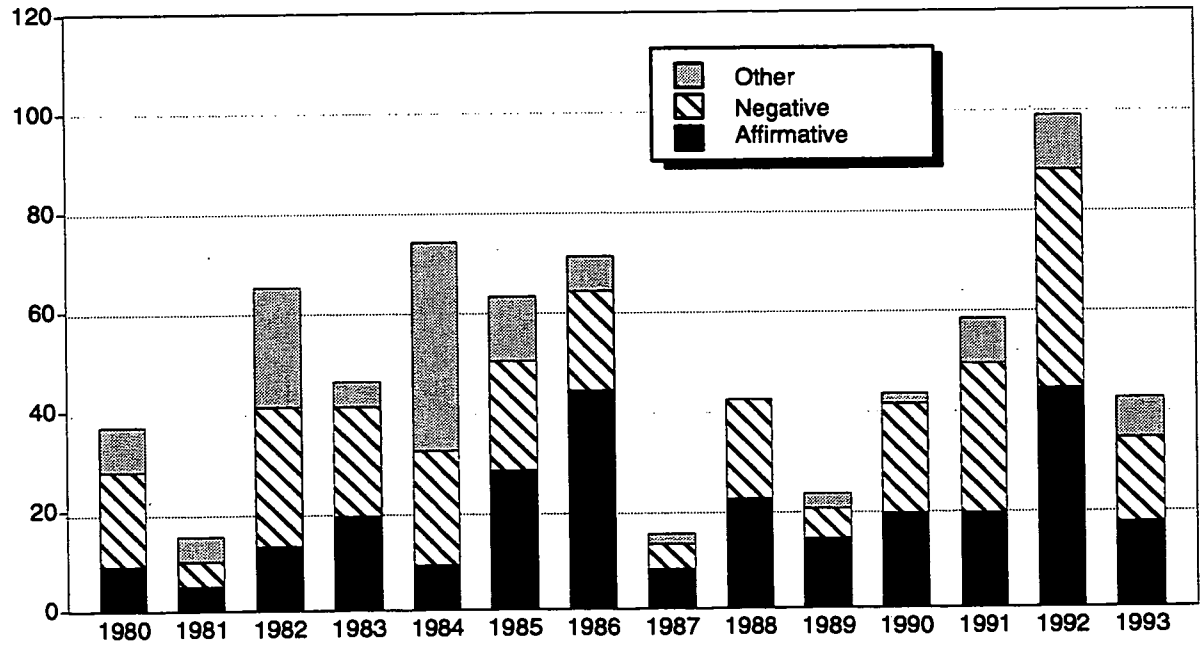
[5] Steel products are defined to include among others, steel wire nails, steel wire rod, steel rails, steel pipe (including oil country tubular goods), steel plate, steel sheet, steel bar, steel shapes, etc.

[6] These include both Commerce or Commission negatives.

[7] In the vast majority of CVD cases where no injury determination was necessary, Commerce found a positive margin and assessed a countervailing duty.

Figure 3-1
AD case summary, 1980-93

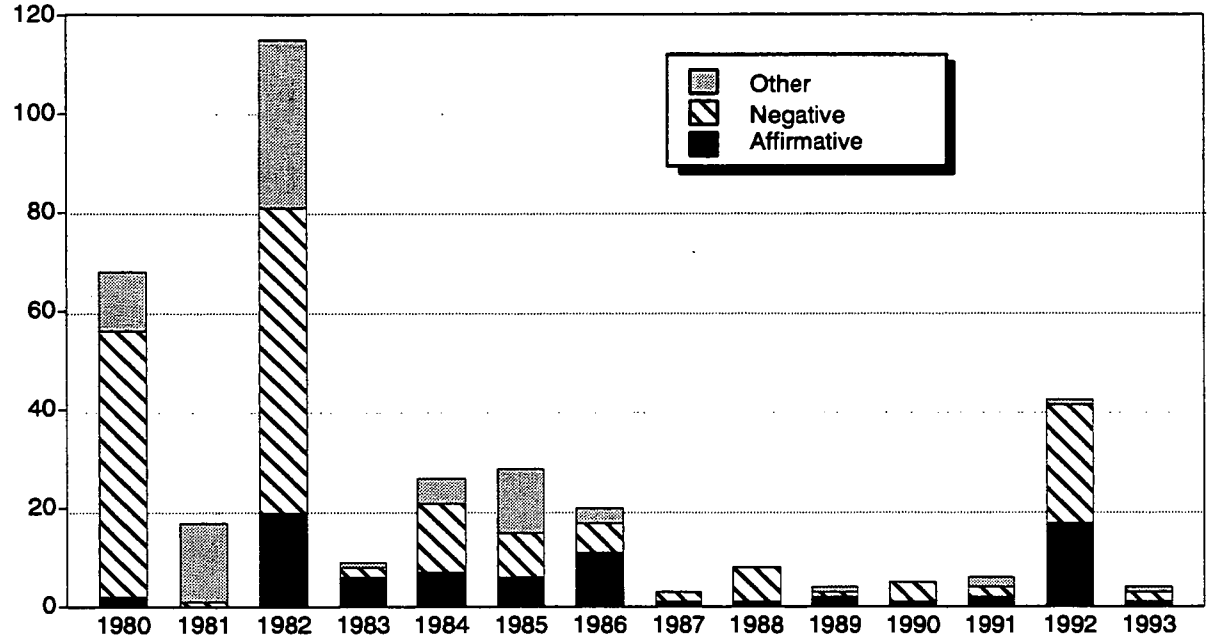
Number of cases filed



Source: U.S. International Trade Commission.

Figure 3-2
CVD case summary, 1980-93

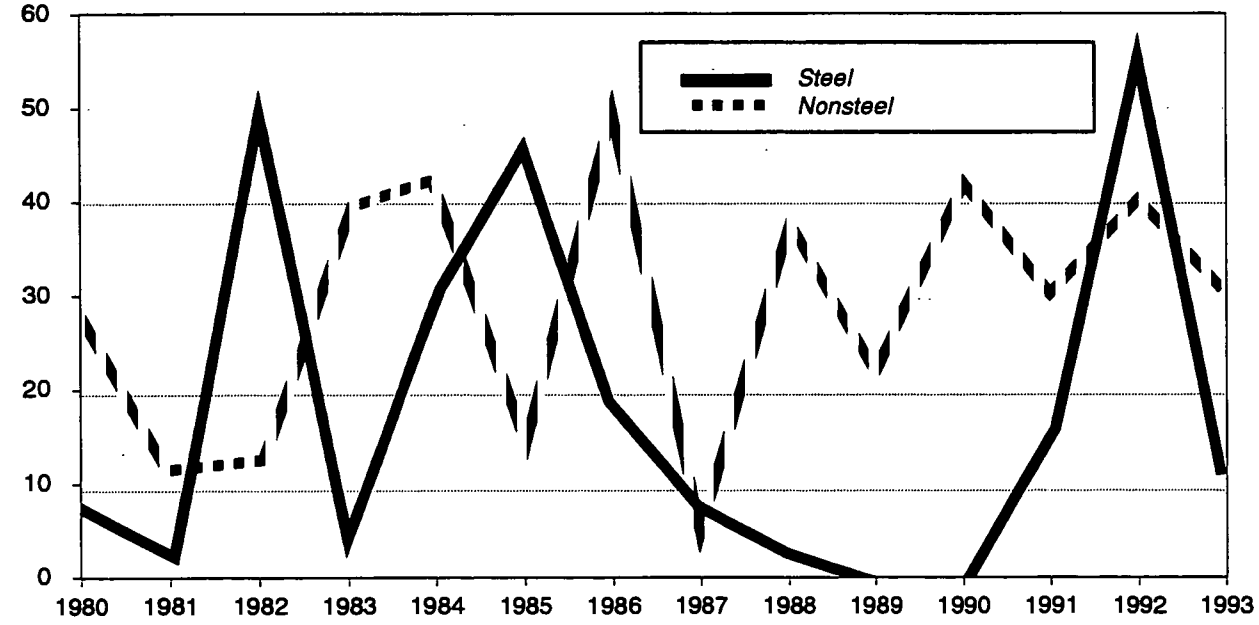
Number of cases filed



Source: U.S. International Trade Commission.

Figure 3-3
Steel and nonsteel product AD case summary, 1980-93

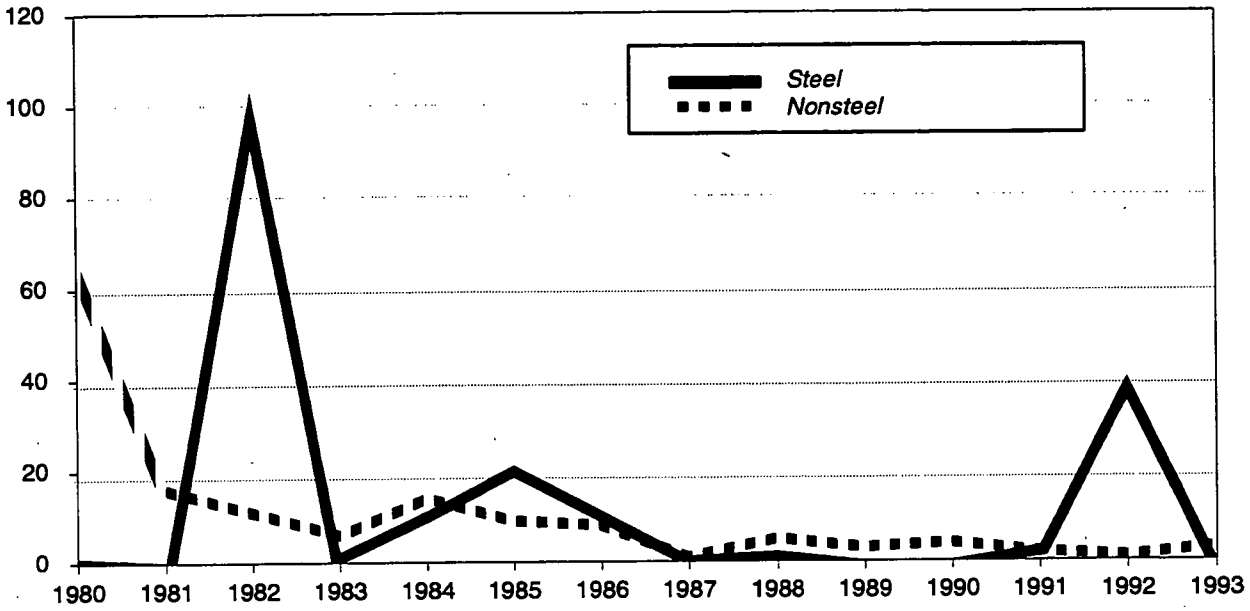
Number of cases filed



Source: U.S. International Trade Commission.

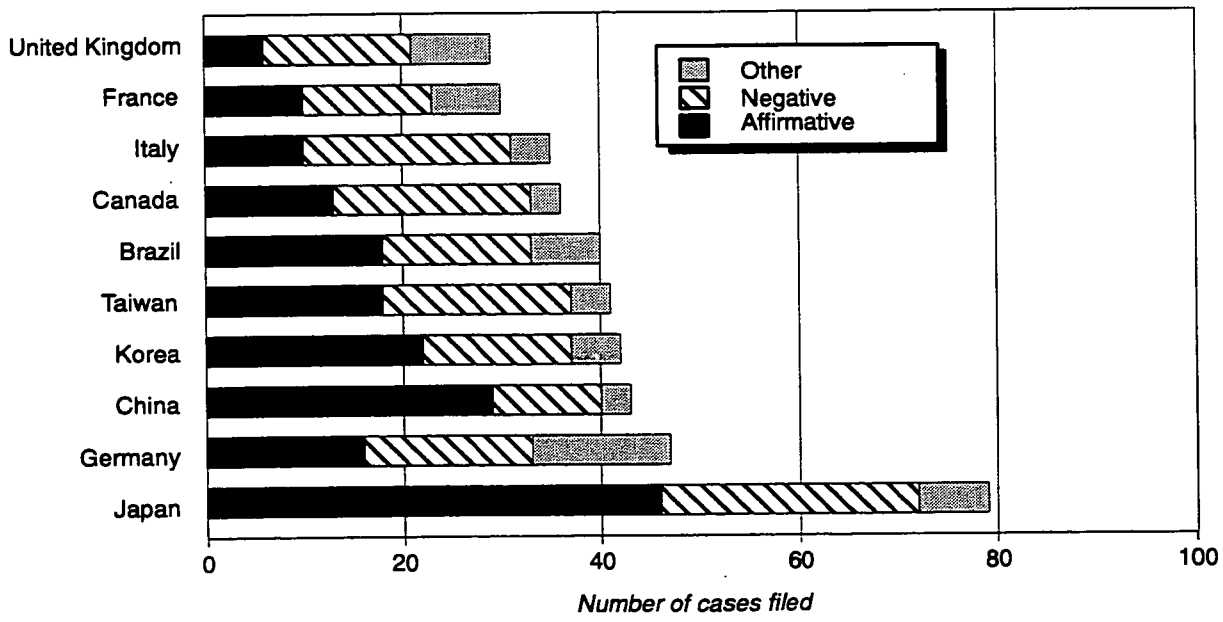
Figure 3-4
Steel and nonsteel product CVD case summary, 1980-93

Number of cases filed



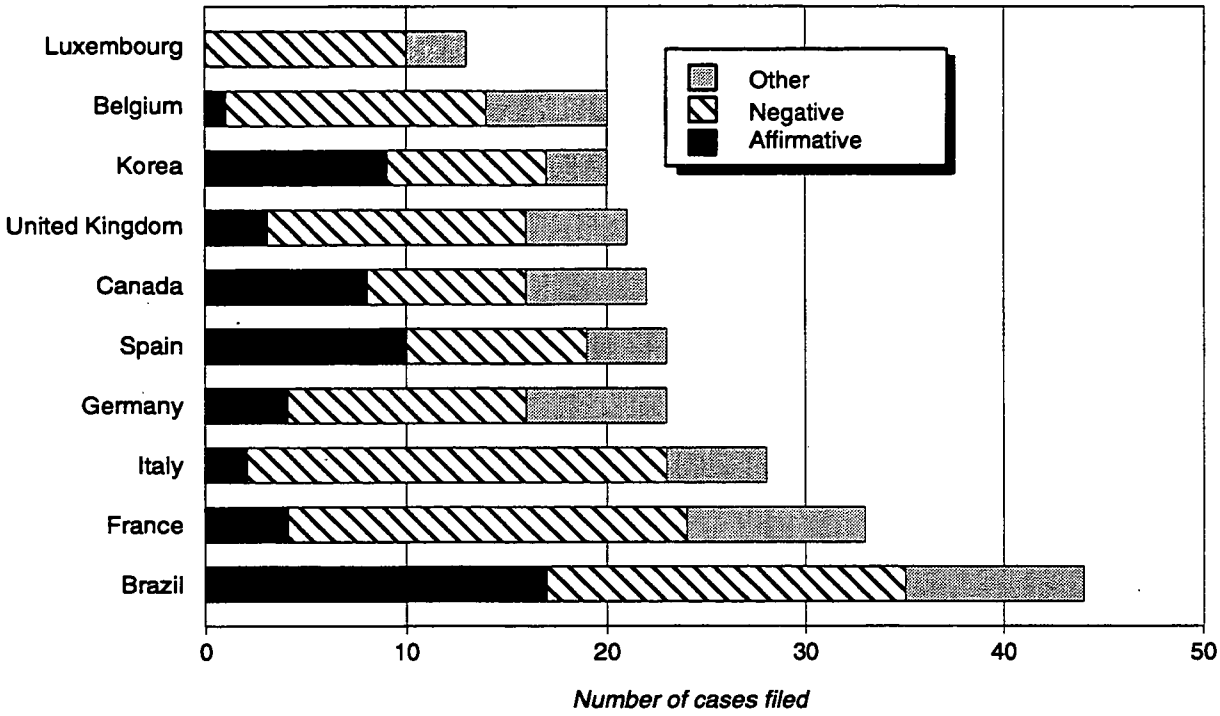
Source: U.S. International Trade Commission.

Figure 3-5
AD case summary, by top 10 countries, 1980-93



Source: U.S. International Trade Commission.

Figure 3-6
CVD case summary, by top 10 countries, 1980-93



Source: U.S. International Trade Commission.

These countries also had a higher percentage of affirmative AD decisions relative to other countries (45 versus 31 percent). In particular, Japan and China had higher percentages of AD cases ruled affirmative than other countries. The top 10 countries with respect to CVD investigations received affirmative determinations in 23 percent of the cases compared with 18 percent for the remaining countries.

Analyses of Changes in Import Volumes and Unit Values

This section provides a detailed analysis of how import prices and quantities change in response to AD orders and investigations.[8] It includes a set of statistical tests to provide evidence of relationships between characteristics of subject imports and changes in import behavior that result from the imposition of AD orders and investigations.[9] In particular, the impact of AD orders on imports might depend on characteristics of the order, characteristics of the importing country, or characteristics of the product itself. For example, the development status or the export emphasis of a country might influence the reaction of import volume or price to

[8] Only AD investigations are analyzed in this section. This is done for two reasons. First, the relatively small number of CVD cases in the subject time period provided an insufficient number of data observations to complete these analyses. Second, changes in both import price and quantity are more likely for AD investigations

[8]—*Continued*
because firms can change their pricing behavior to reduce the margins paid on imports. Import quantity will be impacted by either type of investigation, but CVD margins can generally be reduced only with the removal of government subsidies.

[9] Because of the limited numbers of years covered by the Customs database and the need to have as many observations as possible, the analysis below focuses only on changes in economic variables occurring from one year prior to the observed AD investigations to one year after. This shorter-run analysis differs from, but complements, the analysis in the case studies of chapters 7 through 14, which look at longer periods before and after case initiations.

AD investigations. The size of the final margin imposed in affirmative cases may also play a role in the behavior of importers. On the other hand, uncertainty associated with the review process may be strong enough to make any margin equally effective. The degree to which a product has substitutes and the degree to which it must be processed before it is consumed are also factors that may influence how import volume and unit values change in the face of AD orders.

Methodology

First, imports are grouped according to whether the final determination in the case affecting them was affirmative or not.[10] Through the use of proxies for the characteristics mentioned above (e.g. per capita income is used to proxy the level of development), imports are grouped for analysis. Categorizations include the income level of the exporting country, the exporting country's rate of aggregate export growth, the magnitude of initial margins applied in affirmative cases, the type of product imported (primary, intermediate, or final goods), and a measure of the degree of product substitutability. Catagories are arranged so average import volumes and unit values of these groups are compared three ways: between affirmative and nonaffirmative determinations, between categories arranged by characteristics, and across time (the year before versus the year after the start of an investigation). Comparisons between categories of imports (e.g. affirmative high versus affirmative low income countries) are made only in the year after the initiation of the cases. Difference of means tests are used for these comparisons.[11]

Tables in this section report percentage differences between the average quantities and unit values of two groups at a time. If these differences are statistically significant, the differences between the average means of two samples are expected to be observed with a high probability. These are noted with asterisks to indicate (one-tailed) statistical significance levels.[12] It is important to emphasize that regardless of the size of the difference between two samples' means, it is uninformative unless the statistical level of confidence is high enough to indicate that the difference is not likely to occur by chance.

Data

Country-specific imports for tariff lines that were affected by AD orders or investigations were identified from the U.S. Customs (ENB) database described earlier. Because subject products are not defined by HTS code, the analysis is problematic when HTS product codes from a country affected by an AD investigation contain both subject and nonsubject products. To avoid these problems, the sample includes only those HTS product codes in which 80 percent or more of the code is covered by an investigation filed during 1990-92.[13]

The data are organized around the year the case was initiated with Commerce. Imports from cases initiated over the 3-year period are combined so the year the case was filed with Commerce represents a reference time period. Each tariff line is indexed with respect to the filing period. For example, the quantity index for the year preceding the filing is the quantity imported in the year before the filing divided by the import quantity in the year of the filing. A similar ratio is constructed for the year after the initiation of a case. Difference of means tests are conducted on the indices for the years before and after the filing dates.[14]

The measures used to categorize the samples come from a variety of sources. Initial margins were collected from publicly available Commission reports. Commission industry specialists identified whether the products within an HTS line were primary, intermediate, or final goods on the basis of standard economic definitions. The measure used to characterize the substitutability of products is described in the section examining this product characteristic.

[10] In the categorizations that follow, the term nonaffirmative is used to describe imports that were subject to investigations but did not receive affirmative determinations. The outcome of these cases may be a negative final determination, a suspension of the investigation, or a case termination before the final decision was reached.

[11] A difference of means test is a standard statistical procedure that can be used to test the probability that the mean (average) of one data sample is larger than the mean of a second sample. Results of the test indicate the magnitude of difference between samples and a measure of the probability with which a difference between means is expected to be observed. The only differences that have meaning in this context are those that have a high probability of being observed.

[12] These tests measure only the reaction of subsamples relative to one another and should not be used to develop generalizations about these samples relative to nonsubject import categories.

[13] Commission staff determined the degree to which imports of an individual HTS product code were affected.

[14] This approach minimizes the problems associated with the analysis of annual data subject to mid-year filings.

The data used in this section are described below and in appendix 3A by identifying the average margins and shares of trade subject to AD/CVD orders initiated during 1989-93. Imports are grouped according to the characteristics described above and these statistics are calculated for each group. Table 3-3 illustrates the average AD/CVD margins and subject import shares for each country that is included in the sample.

The results illustrated in appendix 3A show that countries with high rates of aggregate export growth and those in the highest per capita income category are subject to the highest AD margins. High export growth countries also have the largest share of trade subject to AD orders initiated during 1989-93. Imported intermediate goods have higher average margins than primary or final goods and, similarly, imports with a low degree of substitutability face AD margins substantially higher than more highly substitutable products.

Size of the Initial Final Margin

The first analysis addresses the connection between import behavior and the size of the initial final margins. One expects higher final margins to reduce import volume. However, because orders are subject to administrative review and margins can be adjusted—higher or lower—at a later period, the existence of an order may be sufficient to alter import

Table 3-3
Average initial margins and import shares subject to AD/CVD orders initiated during 1989-93, by sample country

(Percent)

Country	AD		CVD	
	Weighted-average margin[1]	Share of country imports subject to AD[2]	Weighted average margin[1]	Share of country imports subject to CVD[2]
Argentina	8.65	0.55	15.00	10.39
Australia	24.96	0.95	(3)	(3)
Belgium	9.71	1.30	(3)	(3)
Brazil	70.89	0.52	0.08	0.02
Canada	32.01	0.16	21.61	(4)
China	27.31	1.83	(3)	(3)
Finland	32.25	0.82	(3)	(3)
France	71.45	0.40	23.14	0.03
Germany, West	16.38	1.03	16.83	0.08
Hong Kong	5.13	2.51	(3)	(3)
India	162.44	0.06	(5)	(5)
Italy	(5)	(5)	(5)	(5)
Japan	96.99	2.31	6.32	0.02
Korea, South	3.93	7.45	(3)	(3)
Malaysia	7.58	0.02	(4)	0.02
Mexico	44.62	0.50	(3)	(3)
Netherlands	105.75	1.58	(3)	(3)
New Zealand	98.60	1.40	(3)	(3)
Norway	(5)	(5)	0.23	0.35
Sweden	24.28	0.45	(3)	(3)
Taiwan	14.90	3.61	(3)	(3)
Thailand	39.00	0.28	2.16	0.33
United Kingdom	20.22	0.39	12.38	0.31
Venezuela	18.25	0.38	20.92	0.32

[1] Margins are weighted by the share of total subject imports.
[2] Share of each country's total U.S. imports that are subject to AD or CVD orders initiated between 1989-93.
[3] Indicates that either no affirmative cases exist against this country or there is no record in the Commerce data identifying imports that are subject to orders initiated in the sample period.
[4] Less than .005 percent.
[5] Import categories were identified in which there were outstanding orders, but import data indicate no 1989 imports in those categories.

Source: Commission staff calculations based on data from the U.S. Customs Service and official statistics from the U.S. Department of Commerce.

prices and significantly curtail imports.[15] Tariff lines subject to affirmative determinations are broken into "high," "medium," and "low-margin" groups, corresponding, respectively, to margins exceeding 50 percent, between 50 and 20 percent, and less than 20 percent. A final sample includes the identified tariff lines for which investigations were initiated, but the final outcome was not affirmative.

The relationship between the magnitude of the remedy and the import response is captured in comparisons of each group's average import volume and unit values over time. Data for the year preceding the initiation of a case are compared with data for the year after the investigation begins. To examine the importance of uncertainty related to the review process, comparisons are made across groups of imports in the period after the investigations were initiated. Average unit values and quantities are compared across the groups with different sized margins and these individual groups are compared to the imports that were not subject to affirmative determinations to see if the changes in volume and price are associated with the size of the margin.

Table 3-4 shows the results comparing the quantity and unit value indices before and after investigations were initiated. Products subject to remedy exceeding 50 percent show a sharp and significant reduction in import quantity (-73.0 percent) and an increase in unit values (32.7 percent),[16] suggesting that orders with high remedies were successful in raising subject import prices and reducing import volume. This unit value increase captures the price effect exclusive of tariffs or AD duties.

The medium-margin group showed no statistically significant changes in quantities and unit values. The low-margin group had a significant 9.7-percent price reduction over this period, but no significant quantity decrease, suggesting that subject import prices continued to decline despite the affirmative decisions in these investigations. Imports that were not subject to affirmative determinations had no significant change in volume or price.

Table 3-5 illustrates cross-group comparisons of the average indices for the period after the cases were initiated.[17] The data in the table correspond to the percent difference between the first and second group identified in the left-hand column. For example, the first row indicates that the average quantity index of the group of products with a high margin is 69.9 percent lower than the average quantity index of the products with a medium margin, and shows that the average unit value index of high margin products is 25.5 percent higher than medium-margin group. In fact, each comparison involving imports with high margins shows lower import volume and significantly higher average unit value changes relative to the other groups. The quantity index for imports subject to the highest remedies are 63.0 and 71.7 percent lower than the index of affirmative low-margin and nonaffirmative imports, respectively, and unit values are 35.3 and 29.0 percent higher, respectively. However, when the unit values and quantities are compared between the affirmative medium-margin group and the low and nonaffirmative categories, the differences are generally not significant.

[15] See Boltuck, Richard, and Robert Litan eds., *Down in the Dumps: Administration of the Unfair Trade Laws* (Washington DC: The Brookings Institution, 1991), and Congressional Budget Office, *How the GATT Affects U.S. Antidumping and Countervailing-Duty Policy* (Washington DC: Congressional Budget Office, 1994), chap. 4 for discussions of this behavior.

[16] Although unit values are not true prices, they represent an approximation of prices, and the terms will be used interchangeably in the following discussion.

[17] Cross-category comparisons in the year prior to the investigations yielded few statistical differences.

Table 3-4
Percent changes in import volume and unit value comparing the year prior and the year following the initiation of AD investigations, by initial margin

(Percent)

Import category	Quantity	Unit value
High margin	-73.0*	32.7*
Medium margin	-21.5	1.8
Low margin	-16.4	-9.7**
Nonaffirmative determination	- 3.2	2.9

* 95-percent level of confidence.
** 90-percent level of confidence.

Source: Commission staff calculations based on data from the U.S. Customs Service and official statistics from the U.S. Department of Commerce.

Table 3-5
Postfiling comparisons across imports that are grouped by the size of the initial margin

(Percent)

Comparison	Quantity	Unit value
High margin vs. medium margin	-69.9*	25.5**
High margin vs. low margin	-63.0*	35.3*
High margin vs. nonaffirmative	-71.7*	29.0*
Medium margin vs. low margin	22.8	8.8**
Medium margin vs. nonaffirmative	-5.8	3.7
Low margin vs. nonaffirmative	-23.3*	-4.7**

* 95-percent level of confidence.
** 90-percent level of confidence.

Source: Commission staff calculations based on data from the U.S. Customs Service and official statistics from the U.S. Department of Commerce.

The strong results associated with the high margin group combined with the ambiguous results for the medium- and low-margin groups suggest that high margins have disproportionately larger effects on quantities and unit values than medium or low margins. If the main effect of affirmative orders is due to uncertainty about future margins, one would expect there to be no significant differences among the high, medium, and low-margin groups in table 3-5. However, the magnitude of these changes is strongly related to the size of the initial margin, lending support to the notion that the uncertainty of the review process does not outweigh the size of the margin in affecting import behavior.[18]

Per Capita Income of the Exporting Country

The first of two analyses relating country-specific characteristics to changes in import behavior is described in this section. Imports from the different subject countries are grouped into "high" and "low" per capita income categories.[19] Table 3-6 shows the volume and price changes between the year prior to and year following the initiation of AD investigations. Like the comparisons in table 3-4, the results illustrate percentage changes in quantity and unit value for each import category.

Only the changes in import volumes from the low-income countries are statistically significant (table 3-6). The volume of imports from low-income countries dropped by 47.0 for affirmative and 56.4 percent for nonaffirmative investigations. There is no appreciable difference in unit values, so this volume reduction is probably only partially due to higher prices. Instead, importers from low-income countries appear to curtail imports into the U.S. market in response to AD investigations regardless of the final determination.

The next comparison looks at the how the average import quantities and unit values differ in the year after the AD investigations are initiated. As in table 3-5, table 3-7 represents the percentage difference between the average means of the first and second samples indicated in the left-hand column. Relative to the imports from the low-income countries, imports from high income countries that are subject to affirmative determinations have a 46.2 percent higher quantity index and an 18.0 percent higher unit value index in the year subsequent to the filing (table 3-7). Even for nonaffirmative determinations, high-income countries had an average import volume index more than twice that of the low income countries.

Growth Rate of Aggregate Source-country Exports

In this section, import data were divided into groups based on the rate of aggregate export growth by the exporting country between 1979 and 1989. Imports were classified into either a "high" or "low" category.[20] AD investigations and orders are likely to

[18] It is also important to emphasize that this analysis does not imply that low and medium margins do not have an effect on import volume or unit values. The difference of means comparisons are across groups of products that have all been subject to investigations. It is possible that all categories, including the tariff lines with negative determinations, change in ways that are significantly different from unaffected HTS lines.

[19] The per capita income levels in 1989 are used for this division. See footnote 3 in appendix 3A for a list of countries in each group. Groupings are applied separately to the affirmative and nonaffirmative tariff lines.

[20] The high and low income groups are identified in footnote 4 in appendix 3A, with the exception of China which is in the low income group in this analysis.

Table 3-6
Percentage changes in import volume and unit value comparing the year prior and the year following the initiation of AD investigations, grouped by per capita income

(Percent)

Import category	Quantity	Unit value
Affirmative high income	-20.6	6.3
Affirmative low income	-47.0*	-2.0
Nonaffirmative high income	-10.6	3.9
Nonaffirmative low income	-56.4*	2.8

* 95-percent level of confidence.

Source: Commission staff calculations based on data from the U.S. Customs Service and official statistics from the U.S. Department of Commerce.

Table 3-7
Postfiling comparisons between imports that are grouped by per capita income

(Percent)

Comparison	Quantity	Unit value
Affirmative high vs. affirmative low	46.2**	18.0*
Affirmative high vs. nonaffirmative high	-5.5	11.2**
Affirmative low vs. nonaffirmative low.	39.2**	-8.3**
Nonaffirmative high vs. nonaffirmative low	115.7*	-1.8

* 95-percent level of confidence.
** 90-percent level of confidence.

Source: Commission staff calculations based on data from the U.S. Customs Service and official statistics from the U.S. Department of Commerce.

generate different reactions by trading partners depending on the emphasis producers place on export markets. Export growth may signal productivity gains, a policy shift towards an international orientation, or trade practices that include subsidies or dumping. Without assessing the cause of the export growth, table 3-8 shows that import quantities and unit values change significantly after affirmative AD orders if they originate from countries with high rates of export growth. In contrast, imports subject to nonaffirmative investigations from these countries show no significant changes. The changes in import quantities and unit values from low export growth countries are generally insignificant for the affirmative and nonaffirmative groups.

The relative impact of affirmative AD orders on fast growing exporters is most easily seen in the cross-group comparisons reported in table 3-9. In the year following the initiation of investigations, the quantity index of imports from countries with high rates of export growth was 59.2 percent lower than from countries with lower export growth rates. The average unit value index of the high-growth group is 13 percent higher than the low-growth group. These results indicate that relative to low export growth countries, high export growth countries respond more strongly to affirmative determinations.

Analysis By Product Type

The characteristics of a product may also affect the response of imports to AD investigations and orders. In this section, imports are divided into groups on the basis of the type of product imported. Three standard categories were used for this division: primary, intermediate, and final goods.[21] However, there were an insufficient number of primary product observations to be included in the means tests. The product categorizations are applied separately to the affirmative and nonaffirmative groups.

The market channels through which goods flow may influence quantity and price changes that occur near case initiations. In particular, final goods are more likely to be sold with observable posted prices than intermediate or primary products that more often use firm-to-firm exchange under negotiated contracts. This suggests that final goods should generate sharper unit value increases relative to intermediate or primary products. The data analysis shows that prices for final goods are more responsive to affirmative orders than are prices for intermediate goods. The

[21] These are described further in footnote 5 in appendix 3A.

Table 3-8
Percentage change in import volume and unit value comparing the year prior and the year following the initiation of AD investigations, by export growth rates

(Percent)

Import category	Quantity	Unit value
Affirmative high export growth	-49.2*	10.2**
Affirmative low export growth	-2.7	-5.4
Nonaffirmative high export growth	-4.8	2.8
Nonaffirmative low export growth	34.3	7.1*

* 95-percent level of confidence.
** 90-percent level of confidence.

Source: Commission staff calculations based on data from the U.S. Customs Service and official statistics from the U.S. Department of Commerce.

Table 3-9
Postfiling comparisons across imports that are grouped by aggregate country export growth

(Percent)

Comparison	Quantity	Unit value
Affirmative high vs. affirmative low	-59.2*	13.3**
Affirmative high vs. nonaffirmative high	-40.0*	9.2**
Affirmative low vs. nonaffirmative low	4.3	0.0
Nonaffirmative high vs. nonaffirmative low	-21.1**	3.8

* 95-percent level of confidence.
** 90-percent level of confidence.

Source: Commission staff calculations based on data from the U.S. Customs Service and official statistics from the U.S. Department of Commerce.

average unit value index of final goods that are subject to affirmative determinations increased by 65.0 percent from the year before to the year after the cases were initiated (table 3-10). These cases also saw a 68.3-percent drop in import quantity. The results are strongly significant.

Intermediate goods subject to affirmative determinations showed a significant 23.1-percent reduction in import volume but without a significant change in price. Nonaffirmative determinations generated on average a 19.5-percent drop in import volume and a 4.8-percent increase in price. The strong quantity reductions are consistent with the imposition of AD remedies and the lack of sharp differences in unit values are consistent with the expectation of a greater price effect for final goods.

Table 3-11 shows the comparison between groups of imports that are classified by product type for the year following the initiation of the AD cases. The only consistent changes occur with respect to the differences involving affirmative final goods. These products had an average unit value index that was 83.0 percent higher and a quantity index 75.8 percent lower than the group of final good imports with nonaffirmative determinations. When compared with the intermediate imports subject to affirmative final determinations, final goods had an average unit value index that was 58.9 percent higher and a quantity index 63.1 percent lower than the intermediate products.

A comparison of final and intermediate good imports that were not subject to affirmative determinations yielded a result consistent with the hypothesis of greater price effects on final goods. Although there was no (statistically) significant difference in import volume, the average unit value index of final goods was 14.7 percent below the unit value of intermediate products. This implies that even in the case of investigations that were not affirmative, prices of final goods are more responsive than prices of intermediate products.

Analysis by Product Substitutability

Finally, this section examines the relationship between changes in import volume and price and the degree to which a product can be distinguished in an economic sense from other goods in the market. The ability to adjust to the price or availability of an individual product depends on the closeness and number of substitute goods. Fewer similar products

Table 3-10
Percentage change in import volume and unit value comparing the year prior and the year following the initiation of AD investigations, by good type

(Percent)

Import category	Quantity	Unit value
Affirmative final goods	-68.3*	65.0*
Affirmative intermediate goods	-23.1**	- 2.7
Nonaffirmative final goods	12.1	- 7.9
Nonaffirmative intermediate goods	-19.5**	4.8**

* 95-percent level of confidence.
** 90-percent level of confidence.

Source: Commission staff calculations based on data from the U.S. Customs Service and official statistics from the U.S. Department of Commerce.

Table 3-11
Percentage differences in unit value and import volume when imports are grouped according to product type

(Percent)

Comparison	Quantity	Unit value
Affirmative final vs. nonaffirmative final	-75.8*	83.0*
Affirmative final vs. affirmative inter.[1]	-63.1*	58.9*
Affirmative inter. vs. nonaffirmative inter.	4.0	-1.8
Nonaffirmative final vs. Nonaffirmative inter.	58.6	-14.7*

* 95-percent level of confidence.
** 90-percent level of confidence.
[1] Inter. is used as an abbreviation for intermediate.

Source: Commission staff calculations based on data from the U.S. Customs Service and official statistics from the U.S. Department of Commerce.

within an industry limits consumers' ability to adjust to changes in the availability of one. More substitutes means that a given price change will generate larger volume swings as consumers can more readily seek alternative products. As a consequence, producers of highly substitutable goods are less able to raise price without observing a decrease in sales volume. Hence, the more substitutable a product, the more likely are AD investigations to lead to quantity shifts rather than unit value swings.

Imports are classified into "high" and "low" substitution categories.[22] Comparing these groups across time (table 3-12), the most striking result is that only the products having a high degree of substitution show significant changes. Affirmative subject imports with a high degree of substitutability show a 37.4-percent quantity reduction between periods. This drop is associated with no significant change in unit value, which is consistent with the description relating changes in import volume and price and the degree of product substitutability.

Comparisons across import groups in the period after the initiation of the cases are also generally consistent with the hypothesis relating changes in imports to the degree of substitutability. Table 3-13 shows that in the period after the initiation of AD cases, highly substitutable products have a 14.2 percent lower unit value index relative to the less substitutable group, and a 6.4 percent lower unit value index when compared to the highly substitutable group subject to nonaffirmative investigations. Producers of more highly substitutable products do not raise import prices as readily as with the less substitutable group. The average quantity index of less substitutable imports that are subject to affirmative investigations decreased 32.1 percent more than nonaffirmative imports. Similarly, the more substitutable group is more strongly affected by nonaffirmative investigations than the less substitutable group.

[22] Imports are ranked according to the median measure of substitutability for the set of subject HTS codes. This measure is described in footnote 6 in appendix 3A. Affirmative and nonaffirmative imports are divided according to the same median value.

Table 3-12
Percentage change in import volume and unit value comparing the year prior and the year following the initiation of AD investigations, by product substitutability

(Percent)

Product category	Quantity	Unit value
Affirmative high substitutability	-37.4*	0.1
Affirmative low substitutability	-15.2	5.3
Nonaffirmative high substitutability	-26.2*	7.8*
Nonaffirmative low substitutability	6.5	-2.8

* 95-percent level of confidence.
** 90-percent level of confidence.

Source: Commission staff calculations based on data from the U.S. Customs Service and official statistics from the U.S. Department of Commerce.

Table 3-13
Percentage differences in unit value and import volume when imports are grouped according to product substitutability

(Percent)

Comparison	Quantity	Unit value
Affirmative high vs. affirmative low	16.9	-14.2*
Affirmative high vs. nonaffirmative high	15.6	-6.4**
Affirmative low vs. nonaffirmative low	-32.1**	15.4*
Nonaffirmative high vs. nonaffirmative low	-31.3*	5.8

* 95-percent level of confidence.
** 90-percent level of confidence.

Source: Commission staff calculations based on data from the U.S. Customs Service and official statistics from the U.S. Department of Commerce.

In general, the evidence supports the notion that imports from the more substitutable group show a larger change in import quantity and less change in import prices in response to AD orders. The one strong exception is the lack of a quantity difference between the high and low categories that are subject to affirmative orders.

Analysis of the Incidence of Trade Diversion

Antidumping orders raise the price of imports from subject countries. Total U.S. imports of the product need not fall if subject country imports are replaced by imports from other sources.[23] This is called trade diversion. Trade diversion in response to AD orders filed during 1989-93 is examined by comparing imports at the 10-digit HTS level that were subject to AD investigations with those that were not.

[23] The volume of subject imports is expected to fall, the average unit value for this group should increase, and the imports from nonsubject countries should increase.

The procedure used to make these comparisons is the difference of means test.

Four categories of imports are identified for comparison in this section:

1) imports under affirmative AD orders (affirmative imports);
2) imports that were investigated, but did not receive an affirmative determination (nonaffirmative imports);
3) nonsubject imports that correspond to the affirmative imports; and,
4) nonsubject imports that correspond to the nonaffirmative imports.

The imports in these groups are compared before and after the filing of the case. When AD case determinations are affirmative, there is strong evidence supporting the existence of trade diversion. Imports subject to affirmative AD orders dropped 31.9 percent, while nonsubject imports of the same products rose by 24.0 percent (table 3-14). Both changes are statistically significant, suggesting that a significant portion of the reduction in trade that occurs

Table 3-14
Comparisons across time for AD subject and nonsubject imports

(Percent)

Import category	Quantity	Unit value
Affirmative subject	-31.9*	4.6
Affirmative nonsubject	24.0**	-4.6
Nonaffirmative subject	-24.0*	3.8**
Nonaffirmative nonsubject	19.4	-2.9

* 95-percent level of confidence.
** 90-percent level of confidence.

Source: Commission staff calculations based on data from the U.S. Customs Service and official statistics from the U.S. Department of Commerce.

as a result of affirmative AD orders is replaced by imports from nonsubject sources. A comparison of the subject and nonsubject products for nonaffirmative final determinations lends additional (weak) support to the notion of trade diversion. The volume of subject imports fell by a significant 24.0 percent.

The differences in import volume and unit values between groups is a more meaningful measure of the change in import volume or unit values than individual group comparisons across time because different groups of the same products are compared in the same time period. This is done in the period following the initiation of AD cases.

In this set of comparisons, one would again expect the most significant differences to occur between subject and nonsubject imports under affirmative AD determinations. The average quantity index of subject products should be less than the index of nonsubject products, and the average unit value index of the former should be larger. One might expect the same differences between subject and nonsubject imports that were investigated but had nonaffirmative final determinations if nonaffirmative cases resulted in voluntary quantity controls or if AD cases had a deterrent effect on importers as a result of the costs of the investigation process.

The cross-group comparisons yield few significant differences between the groups (table 3-15). However, the results that are most significant are also the ones that were strongly expected. The average quantity index of imports that were subject to affirmative final determinations was 37.2 percent lower than the index of nonsubject imports. In addition, the average unit value index of subject products was 9.7 percent higher than the same nonsubject products. A similar set of results appears in the case of products that received nonaffirmative final determinations. The average change in import quantity of goods that were subject to investigation was 26.4 percent lower than the nonsubject products.

Overall, evidence of trade diversion is observed in the comparison across time and between imports that are subject and not subject to outstanding affirmative AD orders. In addition, trade diversion is also suggested in the case of imports that were subject to investigation but received nonaffirmative final determinations. This is important because case investigations may be costly to importers, but their effects should not be as strong as with the affirmative orders.

Table 3-15
Comparison of changes in subject and nonsubject imports

(Percent)

Comparison	Quantity	Unit value
Affirmative subject vs. affirmative nonsubject	-37.2*	9.7*
Affirmative subject vs. nonaffirmative subject	-14.7	5.6
Nonaffirmative subject vs. nonaffirmative nonsubject	-26.4*	5.9
Affirmative nonsubject vs. nonaffirmative nonsubject	0.0	0.9

* 95-percent level of confidence.
** 90-percent level of confidence.

Source: Commission staff calculations based on data from the U.S. Customs Service and official statistics from the U.S. Department of Commerce.

Appendix 3A
An Overview of Affirmative 1989-93 Cases

The volume of trade, the magnitude of relief granted, and the products covered by a case will affect how trade remedies impact the U.S. economy and its trading partners. This appendix identifies the volume of trade and the kinds of products affected by AD/CVD cases.[1]

In general, imports from high-income countries are subject to higher average AD remedies (81.02 percent) than imports from the lower income countries (10.85 percent), but a lower percentage of imports[2] are covered (1.1 percent versus 2.6 percent)(table 3A-1).[3] China is separated as the sole non-market country, but the AD margins and subject shares are consistent with those of the low income countries.

Countries with the highest rates of export growth tend to have higher AD margins placed on their subject imports relative to low export-growth countries. The share of imports subject to affirmative AD determinations is also highest for the fast-growing exporters. However, countries with the lowest rates of aggregate export growth have the highest initial margins and the largest share of imports into the U.S. subject to CVD orders.[4]

Distinguishing imports by primary, intermediate and final good types indicates that intermediate goods generally face the highest AD margins, followed closely by final goods.[5] In contrast, CVD cases place higher remedies on primary products.

The degree to which an import has substitutes may have a bearing on the scope or injury determination of an investigation.[6] The sample of subject HTS codes was split into high, medium, and low levels of substitution.[7] Average margins and the share of subject imports are calculated to identify differences between the groups, shown in table 3A-3.

[1] Imports are categorized by per capita income, aggregate export growth, type of product imported, and substitutability. Initial margins were collected from publicly available Commission reports.

[2] The import lines for affirmative cases initiated during 1989-93 are matched to 1989 data to calculate the share of total 1989 U.S. imports that are subject.

[3] Per capita income levels were obtained from the World Bank publication, *World Tables*. Data for Taiwan were obtained from *Financial Statistics* published by the Central Bank of China (Taiwan). The high income group includes Australia, Belgium, Canada, Finland, France, Germany, Italy, Japan, the Netherlands, New Zealand, Norway, Sweden and the United Kingdom. The low income group consists of Argentina, Brazil, Hong Kong, India, South Korea, Malaysia, Mexico, Taiwan, Thailand and Venezuela. The medium income level was initially used to separate these countries; however, Taiwan was placed in the low income group because its per capita income was closer to the upper tier of that group than it was to the lower tier of the high income group.

[4] Export growth rates were calculated from aggregate 1979 to 1989 export data from *World Tables*. Data for

[4]—*Continued*
Taiwan were obtained from *Financial Statistics* published by the Central Bank of China (Taiwan). The sample was split into groups of countries with cumulative export growth over the period 1979-89, respectively, of less than 81 percent, between 81 and 136 percent, and greater than 136 percent.

[5] Commission staff identified whether products within an HTS line were primary, intermediate, or final goods based on standard definitions. Primary products are raw materials which require substantial additional processing before they can be consumed in a final form or used to produce other goods. Intermediate products are semi-processed goods used as inputs in other production processes and final goods are products requiring little additional processing before being consumed by individuals, businesses or governments. The values of total U.S. imports that are primary, intermediate, and final goods are not available, so subject imports are measured relative to the value of total imports subject to each type of order. For example, 60.8 percent of subject AD imports were intermediate products.

[6] Substitutability refers to the degree to which a product can be distinguished from other goods in the same industry. The measure of product substitution, derived from the U.S. tariff schedule, is the number of 10-digit tariff categories within the respective 4-digit HTS item. More 10-digit categories detailing the 4-digit item is assumed to indicate a higher degrees of product substitution.

[7] Percentiles were calculated and were adjusted slightly to take advantage of the fact that when the tariff lines were ranked by the number of HTS categories, distinct jumps occurred near the 33rd and 66th percentiles.

Table 3A-1
Trade-weighted initial margin, by country classification

(Percent)

Country groups	AD		CVD	
	Weighted-average margins[1]	Share of total imports[2]	Weighted-average margins[1]	Share of total imports[2]
High income	81.02	1.062	11.86	0.042
Low income	10.85	2.574	14.50	0.625
China	27.31	1.830	([3])	([3])
High export growth	47.10	2.690	4.43	.033
Medium export growth	29.92	.329	11.84	.021
Low export growth	46.51	.623	15.09	.573

[1] Margins weighted by the share of total subject imports.
[2] Share of each country group's total U.S. imports subject to AD or CVD orders initiated between 1989-93.
[3] Not applicable.

Source: Commission staff calculations based on data from the U.S. Customs Service and official statistics of the U.S. Department of Commerce.

Table 3A-2
Trade-weighted initial margin, by product type

(Percent)

	Average margin[1]	Share of subject[2]
Antidumping orders:		
Primary products	23.44	0.554
Intermediate products	47.84	60.845
Final products	42.44	38.601
Countervailing orders:		
Primary products	22.06	6.927
Intermediate products	13.34	89.684
Final products	.32	3.389

[1] Margins weighted by the share of 1989 imports subject to outstanding AD or CVD orders initiated between 1989-1993.
[2] Share of each group's total 1989 U.S. imports subject to AD or CVD orders initiated between 1989-1993.

Source: Commission staff calculations based on data from the U.S. Customs Service and official statistics from the U.S. Department of Commerce.

Table 3A-3
Trade-weighted initial margins and share of subject imports, by substitutability

(Percent)

	Average margin[1]	Share of subject[2]
Antidumping orders:		
Low substitutability	60.35	44.50
Medium substitutability	25.67	6.92
High substitutability	34.97	48.58
Countervailing orders:		
Low substitutability	14.87	38.59
Medium substitutability	14.02	54.79
High substitutability	1.68	6.62

[1] Margins weighted by the share of imports subject to outstanding AD or CVD orders.
[2] Share of each group's total U.S. imports relative to the total value of imports subject to AD or CVD orders.

Source: Commission staff calculations based on data from the U.S. Customs Service and official statistics from the U.S. Department of Commerce.

CHAPTER 4
The Economy-Wide Effects of Outstanding Antidumping and Countervailing Duty Orders

This chapter examines the economy-wide effects of outstanding AD/CVD orders on the U.S. economy in 1991.[1] "Outstanding" orders include all affirmative AD/CVD determinations prior to 1992, that had not been revoked, terminated, or suspended. In 1991, hundreds of active AD/CVD orders affected $9.0 billion in imports from over 1,300 10-digit HTS product categories from nearly 50 countries. This represents 1.8 percent of total U.S. merchandise imports, which was nearly $491 billion in 1991. The modeling technique used in this chapter estimates the *collective* effect of all of these orders on the U.S. economy in 1991. Some of the orders in place are recent (e.g., Portland Cement From Japan, 731-TA-461, 1990), while other orders have been in place for decades (e.g., Large Power Transformers from France, Italy, Japan, Switzerland, and the United Kingdom, AA1921-86 through 90, 1971). Hence, regardless of when an order went into effect, if it was in place in 1991, it is represented in the estimation.[2]

The estimated effect of removing outstanding AD/CVD orders is a net economic welfare gain to the U.S. economy of $1.59 billion in 1991. In other words, the presence of AD/CVD orders represents a *collective* net cost to the U.S. economy of $1.59 billion in 1991. This is the equivalent to 0.03 percent of 1991 U.S. Gross Domestic Product ($5,724.8 billion). As a comparison with other significant U.S. import restraints (in 1991 dollars), the AD/CVD orders collectively rank behind the Multifiber Arrangement restrictions ($15.8 billion) and the Jones Act maritime restrictions ($3.1 billion).[3] It is important to note that this is a static estimate for the year 1991 and it does not take into account the cumulative effects of existing orders, which may have been in place for many years prior to 1992. In addition, petitions may have been filed and withdrawn (e.g., the steel cases of the early 1980s) or AD/CVD activity may have been started and discontinued/completed before 1991 (e.g., affirmative determinations that were revoked, terminated or suspended). The impact of these actions are not captured by the modeling technique used in this chapter.

As highlighted in the economic literature review in chapter 5, a number of recent studies have used computable partial equilibrium (CPE) models to estimate the economic effects of AD/CVD orders.[4] These simulation methods are best for analyzing the economic effects of dumping, subsidization, and their remedies for an individual sector or industry. As noted in chapter 1 and further described in chapter 5, the CPE methodology is used in the case study chapters. However, analysis of the economic effects of numerous AD/CVD orders across a variety of industries within a consistent framework requires the use of a computable general equilibrium (CGE)

[1] In the request letter (see app. A), the USTR asked the Commission to "[take] into account the potential conflicts that would arise from an investigation of any order or remedy that is currently before an appellate body or may result from currently pending proceedings ..." There are a number of 1992 cases that are currently in litigation. Thus, 1991 was chosen for the analysis in this chapter.

[2] See the Data section below for an accounting of the AD/CVD orders that are included in the estimation. Data contraints, especially for orders that resulted in a cessation of imports, precluded the inclusion of every outstanding order.

[3] See U.S. International Trade Commission (USITC), *The Economic Effects of Significant U.S. Import Restraints*, USITC publication No. 2699, Nov. 1993.

[4] Among others, see Morris E. Morkre and Kenneth H. Kelly, *Effects of Unfair Imports on Domestic Industries: U.S. Antidumping and Countervailing Duty Cases, 1980-1988*, FTC Bureau of Economics Staff Report, 1994, and Tracy Murray and Donald J. Rousslang, "A Method for Estimating Injury Caused by Unfair Trade Practices," *International Review of Law and Economics*, vol. 9 (1989), pp. 149-164.

model.[5] Despite the extensive work analyzing the economic effects of individual AD/CVD orders with CPE models and the considerable work modeling commercial policies in a CGE framework, this chapter is the first CGE analysis of the economic effects of outstanding AD/CVD orders on the U.S. economy to date.[6]

This lack of CGE analysis on AD/CVD orders is not surprising for a number of reasons. First, AD/CVD orders are very targeted actions, often affecting only a few 10-digit HTS product categories. Most CGE simulation models specify industrial sectors at very aggregated levels. However, the Commission CGE model, with the potential to model hundreds of separate production sectors, can simultaneously focus on the economic effects of narrowly targeted AD/CVD orders in certain sectors (as with a CPE analysis), while at the same time estimating the combined economy-wide effects of all outstanding AD/CVD orders, which a CPE analysis cannot do within a consistent framework.

Another barrier to easy application of a CGE model to estimate the effects of outstanding AD/CVD orders is the extensive data requirements. These requirements entail gathering data on AD/CVD duties collected (in addition to other information) on hundreds of AD/CVD orders affecting over 1,000 10-digit HTS product categories in the year of analysis. Through the use of the Customs ENB database described in chapter 3, this task became manageable.

[5] There is considerable literature analyzing commercial policies within a CGE framework. For surveys of this literature, see John Shoven and John Whalley, "Applied General-Equilibrium Models of Taxation and International Trade: An Introduction and Survey," *Journal of Economic Literature*, vol. 22 (1984), pp. 1007-1051, and Jamie de Melo, "Computable General Equilibrium Models for Trade Policy Analysis in Developing Countries: A Survey," *Journal of Policy Modeling*, vol. 10 (1988), pp. 469-503. For examples of analyzing commercial policies using the Commission CGE model, see USITC, *The Economic Effects of Significant Import Restraints*, USITC publication No. 2699, Nov. 1993, and Bruce A. Blonigen, Joseph E. Flynn, and Kenneth A. Reinert, "Modeling Detailed Commercial Policies," in *Trade Policy Modeling: A Handbook*, Joseph F. Francois and Kenneth A. Reinert, eds. (Cambridge, U.K.: Cambridge University Press, forthcoming).

[6] Unlike the case study chapters, this chapter focuses solely on the effect of the remedy at a particular point in time, 1991. The reason is that it is relatively easy to identify all sectors in the U.S. economy for which an AD/CVD order exists—it is precisely those sectors whose products had an affirmative AD/CVD determination, not revoked, suspended or terminated, prior to 1992.

Analyzing the economic effects of outstanding AD/CVD orders presents an unusual modeling challenge, in that the length of time a particular order has been in place varies from one order to the next. As a result, the modeling effort must take into account how these AD/CVD remedies vary over time. Thus, before describing the methodology used to estimate the effects of outstanding orders, it is important to briefly review the salient points connected with implementation and assessment of AD/CVD orders over time.

Implementation and Assessment of AD/CVD Orders[7]

When a final affirmative determination is made by the Commission, Commerce issues an AD or CVD order. In an AD investigation, the imports under investigation become subject to a cash deposit equal to the value of subject imports times the percentage difference (the margin) between the "normal value"[8] and the U.S. price of the imports as determined in the final investigation by Commerce. For CVD investigations, imports under investigation become subject to a cash deposit equal to the value of subject imports times a subsidy margin representing the subsidy received by the foreign firm. When an AD or CVD order is implemented by Customs, however, the duty deposits do not necessarily represent the final amount of duties to be assessed on the subject imports. Rather, the margin determined in Commerce's final investigation is used as a basis for estimating the duty liability of the importer.

The actual liability of the importer is determined after the fact by Commerce. Before 1984, this was accomplished by automatic yearly administrative reviews by Commerce. However, since 1984, such reviews have become voluntary; that is, unless an interested party requests a review, the duties assessed are those found in Commerce's final determination (or most recent administrative review). The purpose of an administrative review is to adjust the margin on subject imports as changes occur in the difference between their U.S. price and their normal value or in

[7] See chapter 2 for a more detailed explanation of the issues discussed here.

[8] The normal value of the foreign like product is generally based on its home market sale prices. If home market sales are inadequate, then normal value is based on sale prices in third country markets. Finally, if third country sales are inadequate, then normal value is based on a constructed value for the foreign like product.

the subsidy rate. If a subsequent review determines that the margin during the review period is different from the previous margin used as a basis for the importer's cash deposit, a bill (or refund) in the amount of the difference plus interest is assessed (or rebated). From 1980 through 1991, over 80 percent of outstanding AD orders were subject to at least one administrative review.[9] For modeling purposes, it is assumed that when a foreign firm changes its U.S. price, it has some degree of certainty as to what the effective duty assessed will be.[10]

Methodology

The Commission CGE model estimates in one simulation exercise the economy-wide impact of all AD/CVD orders in place during 1991. The Commission CGE model simulates the interactions among producers and consumers within the U.S. economy in markets for goods, services, labor, and physical capital. Distinguishing features of CGE models are their economy-wide coverage and multisectoral nature. The Commission model explicitly accounts for upstream and downstream production linkages, and intersectoral competition for labor and capital.

Policy changes, such as AD/CVD order removal, are introduced into the Commission CGE model under the assumption that there are no changes in macroeconomic activity such as monetary policy, fiscal policy, or foreign economic behavior. In addition, the model is static (e.g., the dynamic effects of economic growth are not modeled), total employment is held constant at the level observed in 1991, and the current account balance is held constant. Furthermore, the model does not incorporate expected future changes in these factors, and thus, it is not a forecast. In the application of the Commission CGE model, it compares one static situation (AD/CVD orders in place) with another static situation (AD/CVD orders not in place) for the year 1991. Therefore, the analysis emphasizes the effect of the orders in isolation from other factors that affect the U.S. economy.

The data used by the Commission CGE model are in the form of a large "social accounting matrix" (SAM). The SAM organizes into a consistent framework data on interindustry flows, value added, imports, and final demand for 491 sectors in agriculture, manufacturing, and services. In the modeling exercise, sectors of interest are isolated and the remaining sectors are aggregated into nine broad sectors that represent the remainder of the U.S. economy. The Commission SAM is assembled from a variety of government data sources and updated to the most current data available. The other major inputs into the Commission model are the parameters that represent the behavior of economic agents in the U.S. economy.[11] The database assembled for this analysis also includes the actual AD/CVD duty rates assessed by Customs in 1991, the final Commerce margins by subject product at the time of its original investigation, and the value of imports from Commerce.

Modeling the economic effects of outstanding AD/CVD orders using the Commission CGE model must take into account a number of important issues concerning the differences between how AD/CVD duties are calculated, collected, and reviewed.[12] The modeling technique used is also constrained by the data and information available on outstanding AD/CVD orders. As discussed below, AD orders can cause foreign firms to change their pricing decisions, and since the data contain no specific information on

[9] See H.J. Shin, "Do Anti-Dumping Duties Work? An Analysis of the Effect of Anti-Dumping Duties on Foreign Firm Behavior," unpublished manuscript, 1994.

[10] Some observers have contended that there is uncertainty involved with Commerce administrative reviews because Commerce can change its methodology for determining margins from one investigation or review to another. For example, see Richard Boltuck and Robert Litan, eds., *Down in the Dumps: Administration of the Unfair Trade Laws* (Washington, DC: The Brookings Institution, 1991), ch. 3, and Congressional Budget Office, *How the GATT Affects U.S. Antidumping and Countervailing-Duty Policy* (Washington, DC: Congressional Budget Office, 1994), ch. 4.

[11] As noted in the prehearing brief submitted by Dewey Ballantine, these parameters, which are in the form of elasticities, are an important input into the Commission model. These elasticities have been carefully assembled by the staff of the Commission and are either econometrically estimated or gathered from published sources such as economic journals. See USITC, *The Economic Effects of Significant U.S. Import Restraints*, USITC publication No. 2699, Nov. 1993, for more details on the SAM and the model.

[12] One issue the model does not take into account is the uncertainty generated in the market once a petition is filed or an order is put in place. In particular, the potential open ended liability on the importer of orders (even with small margins) could have a chilling effect on imports given the administrative review options of the parties. Another issue that is beyond the scope of the modeling technique employed in this chapter are the legal, administrative, and other dollar costs associated with AD/CVD investigations. Questionnaire responses indicated that, in general, a simple case costs about $250,000 and a complicated case can cost $1 million.

these pricing decisions, it is only possible to infer what these changes may be.

The Commission model specifically takes into account the differences in the behavior that antidumping duties and countervailing duties are designed to remedy. Under a CVD order, the margins are intended to compensate for the effect of subsidization of the subject good by a foreign government. Thus, calculation of the CVD margin is unrelated to any changes in behavior, such as pricing decisions, by the foreign firm or the importer of the subject good. However, with AD orders, the calculated margin is endogenously determined by the prices charged by the foreign firm in the U.S. market and the subject import's normal value. This significantly affects how each type of order should be modeled. In the case of a CVD order, modeling the margin as a simple ad valorem tariff is appropriate, since the foreign firm's behavior cannot affect the level of the CVD margin, and this is the method used to model CVD orders in the Commission CGE model. On the other hand, accurate modeling of AD orders is more complicated.

The AD margin determined by Commerce in its final investigation represents the amount of duties that will ultimately be assessed on the subject imports, unless the margin of dumping is eliminated. Consequently, the prices of subject imports are expected to rise in the U.S. market. However, it is possible that the foreign firm could raise its U.S. price, lower its home-market or third-country price, or some combination of both to close the margin and avoid AD duties.[13] If the foreign firm decides not to react to an AD order by changing prices, then the duty collected each year should be equal to the final margin determination made at the time of the investigation. In this case, modeling the AD margin as an ad valorem tariff is appropriate.

However, in the Customs ENB database and in the discussion of the cases highlighted in part III of this report, it is often the case that the actual AD duties assessed and collected are smaller than the final margins determined by Commerce at the time of the original investigation. This suggests that the foreign firm's pricing decisions have changed and that the margin has been subsequently reduced through an administrative review.[14] In fact, an examination of tables 14-2 and 14-3 in chapter 14 for the ball bearings cases reveals that a large number of administrative reviews have taken place and have greatly reduced the original AD margins. Similarly, administrative reviews for frozen concentrated orange juice (chapter 7), color picture tubes (chapter 10), and brass sheet and strip (chapter 12), have resulted in lower AD duties. Unfortunately, the data do not indicate whether the foreign firm has been assessed a reduced duty as a result of a reduction in the import's normal value, an increase in its U.S. price, or some combination of both.

However, the analysis in the latter part of chapter 3 suggests that importers increase the U.S. price of subject imports when an AD order is put in place. In addition, this increase in the price of subject imports is also supported by information from the case studies. In particular, after remedies were put in place, Brazil changed its export pricing formula for frozen concentrated orange juice (see figure 7-6), the price of imported color picture tubes rose considerably (see figure 10-4), and the import prices (net of input costs) of the brass sheet and strip rose above domestic prices (see figure 12-3). Consequently, in the analysis below, it is assumed that lower margins from administrative reviews stem from increases in foreign firms' U.S. prices of subject imports.[15]

Given the assumption that price increases for subject imports occur in the U.S. market, leaves three possible actions by the foreign firm, depending on how its pricing decisions are influenced by the imposition of an AD order:

1) The foreign firm may leave its U.S. price unchanged;

2) The foreign firm may raise its U.S. price by the full amount of the AD margin; or

3) The foreign firm may raise its U.S. price, but not by the full amount of the AD margin.

For this analysis, it is assumed that the AD margin is fully passed through to U.S. consumers. Consequently, the price effect in the U.S. market will be the same in all three cases. That is, the price U.S. consumers ultimately pay for a subject import is equal to the pre-duty U.S. price plus the full amount of the original margin regardless of whether or how much a foreign firm raises its U.S. price. However, a foreign firm or an unrelated importer could choose to reduce its revenues by not passing on to U.S.

[13] This assumes, of course, that the foreign firm requests an administrative review.

[14] A recent study found that average antidumping duty rates fall by 40 percent after the first administrative review is conducted. See James DuVault, "Antidumping Administrative Reviews and Import Pricing," unpublished manuscript, 1993.

[15] To the extent that foreign firm normal value is reduced, this analysis would tend to overestimate the economic cost of the orders.

consumers the full amount of the margin in the form of a price increase. The data do not indicate the degree of pass through.[16]

However, in other respects, each of the three actions have different overall economic welfare consequences. Specifically, in the first case (the foreign firm does not change its U.S. price), duties are collected by Customs at a rate equal to the margin calculated by Commerce. In this case, the AD margin can be accurately modeled in the Commission CGE model as a simple ad valorem tariff, which generates revenue for the U.S. Treasury equal to the margin times the value of subject imports.

Modeling the AD margin as a simple ad valorem tariff in the second case would be incorrect, however. In this case, the foreign firm raises its U.S. price to match the normal value of the subject imports as calculated by Commerce. Presuming that administrative reviews are consistent, the foreign firm could then request an administrative review and receive a refund of its cash deposit (with interest) in the amount of the full margin times the import value. Thus, effectively no tariff revenue is collected by the U.S. Treasury. Instead, the increased revenue from the higher price would now accrue to the foreign firm, which implies very different welfare effects. In fact, the welfare effect in this case is similar to the analysis of a quantitative restriction, such as a quota or voluntary restraint agreement. When the foreign firm responds to an order by raising the U.S. price of the subject import by the full margin, there is an income transfer (i.e., an economic welfare gain) to the foreign firm. Thus, this case is modeled like a quantitative restriction that generates no tariff revenue for the U.S. Treasury, but revenue for the foreign firm.[17] However, note that in these two cases, a price difference equal to the full margin is in effect, and thus, the price effect in the U.S. market will be the same. The difference is that in the first case, the U.S. Treasury benefits from the AD margin, while in the second case, the foreign firm enjoys the full benefit of the margin.

The third case simply involves modeling the price effect of Commerce's final margin as an appropriate combination of the two actions described above. To the extent that the foreign firm raises its U.S. price, that price increase is modeled similar to a foreign-held quota. Any remaining difference between the U.S. price charged by the foreign firm and its normal value is the duty rate that will be collected as revenue for the U.S. Treasury. This remaining difference is modeled as an ad valorem tariff in the model.

Data

Modeling the economic effects of outstanding AD/CVD orders as described in the previous section requires data on 1991 AD/CVD ad valorem duty rates and original AD margins by Commission sector. The estimation database includes a total of 163 AD orders and 76 CVD orders. In assembling the database, there are cases that are not captured by the Commission model. For example, the model does not capture the economic effects of AD/CVD cases that were revoked, terminated, or suspended prior to 1991. Moreover, many AD/CVD petitions have been filed and withdrawn as well. For example, a large number of AD/CVD steel cases filed in the early 1980s ended with voluntary export restraints and are not included in the estimation. Consequently, AD/CVD activity that were discontinued/completed before 1991 certainly had some impact on the U.S. economy, but it is beyond the scope of this estimation. The following discussion outlines how the AD/CVD orders were assembled for this estimation.

From 1955-91 there have been 307 AD investigations for which non-negative final Commission determinations have been made. Since the model estimates the effects for the year 1991, the economic impact of the AD cases that were revoked (84), terminated (16), or suspended (3) prior to 1991 are not estimated in this exercise. In addition, 45 of the remaining active AD cases do not have imports.[18] Of the 45 active AD orders with no imports, a majority of cases (41) affect a small volume of trade in the market for the U.S. like product (imports less than $10 million or less than a 5 percent share of U.S. imports) and/or are cases in which data necessary to include them are unavailable.[19] The remaining 4 of

[16] To the extent that the duty is not fully passed through to U.S. consumers, this analysis would tend to overestimate the economic cost of the orders.

[17] Modeling scenario two in this way is more precise than modeling a traditional quantitative restriction. When modeling a quantitative restriction, the equivalent price effect of the restriction must be estimated, but in scenario two, the price effect is analytically equal to the price effect represented by the original AD margin.

[18] AD/CVD orders that resulted in a cessation of imports are still likely to have an impact on the U.S. economy in 1991. There are a variety of reasons why subject imports have ceased entering the U.S. market. For example, importers may be facing prohibitively high AD margins or the administrative burden and open liability of future margins may deter subject imports.

[19] In fact, one case faces an embargo, In-Shell Pistachio Nuts From Iran, 731-TA-287, 1986.

the 45 active AD orders with no imports are included in the estimation because they are recent cases that accounted for a sizable amount of imports (nearly $150 million at the time of the original investigation) and data necessary to included them are available.[20] Overall, 163 AD orders are included in the estimation (307 (non-negative determinations) - 84 (revoked) - 16 (terminated) - 3 (suspended) - 41 (missing) = 163).

In 1991, there were 192 non-negative CVD determinations identified by Commerce as active since 1980.[21] The effects of CVD cases that were revoked (86), terminated (21), or suspended (6) prior to 1991 are not estimated in this exercise. In addition, three of the remaining active CVD cases do not have imports. These cases are not included because data on two are unavailable and the third has a margin of less than one percent. Overall, 76 CVD orders are included in the estimation (192 (orders active since 1980) - 86 (revoked) - 21 (terminated) - 6 (suspended) - 3 (missing) = 76).

Since AD/CVD margins and duty rates are determined and collected by Customs for individual foreign firms at the 10-digit HTS level, aggregating the relevant data to the level of the Commission model sectors (which approximate 4-digit SIC commodity industries) requires care. There were over 1,300 affected 10-digit HTS product categories, with imports from nearly 50 countries, in 1991. Once aggregated into the Commission model sectors, close to 100 (or 20 percent) of the Commission CGE sectors are affected in some manner by an AD or CVD order. Most sectors covered by orders are manufacturing industries; however, several agricultural products are also covered. The next section describes the aggregation of the original AD margins to the Commission sectoring scheme. Following that, the procedure used to aggregate the actual 1991 AD/CVD duty rates is described.

[20] These 4 AD investigations include Urea From the German Democratic Republic, Romania, and the Union of Soviet Socialist Republics, 731-TA-338 through 340, 1987, and Certain Electrical Conductor Aluminum Redraw Rod From Venezuela, 731-TA-378, 1988.

[21] The 192 CVD orders include those determined prior to 1980. In addition, many affirmative determinations did not have an injury determination by the Commission because the subject country was not a signatory to the GATT Subsidies Agreement. Consequently, it is not possible to quantify the CVD orders in the same manner as the AD orders.

Original AD Margin Calculation

During AD investigations and administrative reviews, Commerce determines individual margins for each investigated firm that exports from the foreign country subject to the investigation. In addition, Commerce also determines a margin that is applicable for all other firms that might also export the subject product from that same foreign country. Specifically, Commerce determines an "all other" margin for a country that is a trade-weighted average margin determined from the firms identified in the original investigation.[22] Since firm level trade flows are not available, the "all other" margin is used for each affected country by 10-digit HTS product category in the Commission database.

Next, an important adjustment is made to the country-specific margins. Specifically, the amount of trade within a 10-digit HTS product category that is covered by particular AD orders needs to be accounted for, since some orders do not affect all the products within a HTS category.[23] The share of each 10-digit HTS product category subject to an outstanding AD order in 1991 is used to adjust the country-specific margin appropriately.[24] Once adjusted, these country-specific margins are aggregated across countries using weights determined by each country's 1991 share of trade within the HTS product category to arrive at an effective margin for the entire 10-digit HTS category.[25]

[22] See chapter 2 for a more detailed description and for exceptions.

[23] Nearly 78 percent of the HTS categories identified are fully affected by AD/CVD orders. For the cases that were only partially affected, Commission staff were able to specify the proportion of the category affected to reasonably narrow levels.

[24] For example, if 80 percent of the imports in a 10-digit HTS product category from a certain country are subject to a 50-percent AD margin, then the entire 10-digit HTS code from that country is effectively subject to a 40- percent (0.8 * 0.5) margin. To the extent that the trade mix within the HTS category has changed since the time of the original investigation, the calculated margin for the entire HTS category may either understate or overstate the effective margin. That is, if trade diversion occurs from the 80 percent of the code that is affected by the order to the 20 percent that is unaffected, then the calculated margin will overstate the effective margin. However, given the fact that little is known about the trade mix within HTS categories, the adjustment just described seems reasonable.

[25] Since 1991 represents the final year of the sample, the trade weights used give less weight to high margin countries because if the AD/CVD orders were not in

The final step is to aggregate the margins from the 10-digit HTS level to the 491 industry sectors contained in the Commission model. Once again, this aggregation uses 1991 trade volumes to assign weights that account for each HTS category's share of imports across the relatively broad Commission sectors.

Actual 1991 AD/CVD Margin Calculation

Data on firm-specific original final AD margins are published in the Commission reports for each AD/CVD investigation and published in the Federal Register by Commerce. However, actual 1991 AD/CVD duty rates by country at the 10-digit HTS level were determined using the Customs ENB database. Aggregating these AD/CVD duty rates into an average duty for each affected Commission sector is accomplished in a similar fashion to the above aggregation of the original AD margins.

[25]—*Continued*
place, imports would have been higher and the trade weights would have been larger. Therefore, using weights from actual 1991 trade volumes underestimates the impact of the orders. Consequently, the estimates presented in this chapter on the economic effects of the orders should be considered conservative.

First, the proportion of a 10-digit HTS product category affected by an order is determined, and this information is used to obtain an adjusted average country-specific duty rate for that 10-digit HTS category. Second, using 1991 trade volumes, the country-specific duty rates are aggregated in a trade-weighted fashion to the 10-digit HTS level. And finally, 1991 trade volumes and Commission concordances are used to aggregate the duties from the 10-digit HTS level to the sector level contained in the Commission model. In addition, AD/CVD duty rates are aggregated separately, so that the 1991 AD duty rate and original AD margin for each Commission sector could be compared to determine any additional price effect for individual sectors.

CGE Model Sectoring Scheme

Table 4-1 presents the Commission CGE sectors substantially affected by outstanding AD/CVD orders in 1991, their average actual 1991 AD/CVD ad valorem tariff rates, and their average additional AD price effects.[26] As discussed in the methodology

[26] Commission Investigation No. 731-TA-469 (flat panel displays) is excluded from this analysis because of data problems.

Table 4-1
AD/CVD ad valorem tariffs and additional AD price effects, 1991
(Percent)

Sector	Actual 1991 Average AD/CVD tariff rate[1]	Additional AD price effect[2]
Highlighted sectors:		
Ball and roller bearings	14.9	9.5
Telephone and telegraph apparatus	10.1	0.5
Rubber and plastics hose and belting	10.1	0.0
Electrical industrial apparatus, n.e.c.	9.0	6.2
Office machines, n.e.c.	6.5	1.9
Gaskets, packing and sealing devices	4.7	4.8
Cement, hydraulic	6.4	1.1
Industrial trucks, tractors, trailers and stackers	3.4	5.0
Rest of the U.S. economy:		
Agriculture, forestry, and fisheries	0.1	[3]
Mining	[3]	[3]
Construction	[4]	[4]
Nondurable manufacturing	0.2	0.1
Durable manufacturing	0.1	0.2
Transportation, communications, and utilities	[4]	[4]
Wholesale and retail trade	[4]	[4]
Finance, insurance, and real estate	[4]	[4]
Other services	[4]	[4]

[1] Average ad valorem tariff rates concorded specifically to the Commission CGE model sectoring scheme.
[2] Average additional price effect concorded specifically to the Commission CGE model sectoring scheme.
[3] Less than one-tenth of 1 percent.
[4] Not applicable.

Sources: Compiled from official statistics of the U.S. Department of Commerce and from the U.S. Customs Service.

section, additional AD price effects are calculated as the difference between the average original AD margin and the average actual 1991 AD duty rate for each Commission CGE sector. This difference represents the extent to which foreign firms have raised their U.S. price to reduce the margin determined by Commerce in subsequent administrative reviews. The eight sectors with the largest combined AD/CVD tariff rate and additional price effects are highlighted in the modeling exercise, with other less affected sectors aggregated with non-affected sectors into (1) agriculture, forestry, and fisheries; (2) nondurable manufacturing; and (3) durable manufacturing, which constitute three of the nine sectors describing the rest of the U.S. economy. As table 4-2 demonstrates, the highlighted Commission CGE sectors correspond well with cases considered to be significant prior to 1992, including the ball bearings cases, the small-business telephone systems cases, and the industrial belts cases.[27]

By and large, the highlighted sectors encompass AD case determinations only. In general, CVD margins are much smaller than AD margins (see table 3-3), and consequently, are likely to have smaller effects. Finally, the calculated average actual tariff rates and additional AD price effects are consistent with the timing of administrative reviews in these cases. Specifically, sectors affected by orders put in place in the early 1990s, which have not yet had their margins changed by administrative reviews, have average ad valorem duty rates that are essentially the same as the calculated aggregate original margin (e.g., small business telephone systems and industrial belts). Alternatively, for cases that have had administrative reviews completed, such as ball bearings and electrical industrial apparatus, average actual AD duty rates are substantially lower than the average original margin calculated for the sectors, and thus, generate larger additional price effects.

Economic Effects of AD/CVD Order Removal

Removing outstanding AD/CVD orders results in lower import prices in those sectors formerly subject to such orders, causing both gains and losses across the U.S. economy. First, it causes consumers to substitute away from domestic products to the imports now free of the orders. Thus, domestic industries formerly subject to AD/CVD orders produce less output and employ fewer workers in the absence of these orders, while imports in those sectors increase. Consequently, upstream suppliers of those sectors formerly subject to orders will also experience a decline in demand for their output. At the same time, however, lower prices in the economy represent an economic welfare gain to downstream industrial sectors and U.S. consumers.

Detailed Economic Effects of Order Removal

Table 4-3 presents the detailed effects of AD/CVD order removal on sectors that had the highest AD/CVD remedy levels as of 1991 and on the remainder of the U.S. economy. Many other sectors are affected by 1991 outstanding AD/CVD orders as well. However, their economic effects are small compared with those for the highlighted sectors. Therefore, these sectors were aggregated with other non-affected sectors into the nine aggregate sectors that represent the rest of the economy (see table 4-3). The majority of these non-highlighted, but affected, sectors are part of the durable manufacturing and nondurable manufacturing sectors. Thus, table 4-3 focuses specifically on those sectors that realize the greatest adverse effects because of the removal of outstanding AD/CVD orders in 1991.

The two sectors most significantly affected are ball and roller bearings and electrical industrial apparatus. In particular, the ball and roller bearing sector experiences a 3.0-percent decrease in output of $190 million and a similar 3.0-percent loss of 1,277 full-time equivalent workers (FTEs). In addition, imports increase by 15.7 percent ($164 million), and exports decrease by 2.8 percent ($21 million). Electrical industrial apparatus experiences a 3.6-percent decline in output ($62 million) and employment (229 FTEs), and a 6.3-percent increase in imports ($53 million) and a 3.0-percent decrease in exports ($12 million). Another sector with notable effects is telephone and telegraph apparatus; output decreases by $258 million with a loss of 1,464 FTEs. In addition, imports increase by $205 million, or by 4.4 percent, and exports decrease by $13 million, or by 0.5 percent. The effects of removing the orders in the many non-highlighted sectors do show up in the estimated effects for the durable and nondurable manufacturing sectors. Durable manufacturing experiences a $337 million output loss and 1,923 fewer FTEs, and nondurable manufacturing sees output fall by $118 million and 476 fewer FTEs. In percentage terms, however, these losses are quite small.

[27] Of course, many other significant cases, such as the steel cases of the early 1980s, resulted in trade agreements and a corresponding withdrawal of AD/CVD petitions. These cases are not part of the estimation.

Table 4-2
AD/CVD investigations included in the highlighted Commission sectors

Sector	Year filed	Source	Investigation	Product
Ball and roller bearings	1988	Germany	731-TA-391	Antifriction bearings
	1988	France	731-TA-392	Antifriction bearings
	1988	Italy	731-TA-393	Antifriction bearings
	1988	Japan	731-TA-394	Antifriction bearings
	1988	Romania	731-TA-395	Antifriction bearings
	1988	Singapore	731-TA-396	Antifriction bearings
	1988	Sweden	731-TA-397	Antifriction bearings
	1988	Thailand	731-TA-398	Antifriction bearings
	1988	United Kingdom	731-TA-399	Antifriction bearings
	1988	Singapore	303-TA-19	Antifriction bearings
	1988	Thailand	303-TA-20	Antifriction bearings
	1986	Hungary	731-TA-341	Tapered roller bearings
	1986	Italy	731-TA-342	Tapered roller bearings
	1986	Japan	731-TA-343	Tapered roller bearings
	1986	China	731-TA-344	Tapered roller bearings
	1986	Romania	731-TA-345	Tapered roller bearings
	1986	Yugoslavia	731-TA-346	Tapered roller bearings
	1975	Japan	AA1921-143	Tapered roller bearings
Telephone and telegraph apparatus	1989	Japan	731-TA-426	Small business telephone systems
	1989	Korea	731-TA-427	Small business telephone systems
	1989	Taiwan	731-TA-428	Small business telephone systems
Rubber and plastics hose and belting	1988	Italy	731-TA-413	Industrial belts
	1988	Japan	731-TA-414	Industrial belts
	1988	Singapore	731-TA-415	Industrial belts
	1988	Germany	731-TA-419	Industrial belts
Electrical industrial apparatus, n.e.c.	1989	Japan	731-TA-426	Small business telephone systems
	1989	Korea	731-TA-427	Small business telephone systems
	1989	Taiwan	731-TA-428	Small business telephone systems
	1971	France	AA1921-86	Large power transformers
	1971	Italy	AA1921-87	Large power transformers
	1971	Japan	AA1921-88	Large power transformers
	1971	Switzerland	AA1921-89	Large power transformers
	1971	United Kingdom	AA1921-90	Large power transformers
Office machines, n.e.c.	1991	Japan	731-TA-483	Word processors
	1980	Japan	731-TA-12	Portable electric typewriters
Gaskets, packing and sealing devices	1988	Germany	731-TA-391	Antifriction bearings
	1988	France	731-TA-392	Antifriction bearings
	1988	Italy	731-TA-393	Antifriction bearings
	1988	Japan	731-TA-394	Antifriction bearings
	1988	Romania	731-TA-395	Antifriction bearings
	1988	Singapore	731-TA-396	Antifriction bearings
	1988	Sweden	731-TA-397	Antifriction bearings
	1988	Thailand	731-TA-398	Antifriction bearings
	1988	United Kingdom	731-TA-399	Antifriction bearings
	1977	Canada	AA1921-166	Certain parts for paving equipment
Cement, hydraulic	1990	Japan	731-TA-461	Portland cement
	1989	Mexico	731-TA-451	Portland cement
Industrial trucks, tractors, trailers and stackers	1987	Japan	731-TA-377	Internal combustion forklift trucks

Source: U.S. International Trade Commission

Table 4-3
Economic effects of AD/CVD removal, 1991

Sector	Employment		Output		Imports		Exports	
	Number[1]	Percent	Value	Percent	Value	Percent	Value	Percent
Sector			*Million dollars*[2]		*Million dollars*[2]		*Million dollars*[2]	
Highlighted sectors:								
Ball and roller bearings	-1,277	-3.0	-190	-3.0	164	15.7	-21	-2.8
Telephone and telegraph apparatus	-1,464	-1.4	-258	-1.4	205	4.4	-13	-0.5
Rubber and plastics hose and belting	-31	-0.1	-4	-0.1	5	1.0	-1	-0.1
Electrical industrial apparatus, n.e.c.	-229	-3.6	-62	-3.6	53	6.3	-12	-3.0
Office machines, n.e.c.	-344	-0.8	-30	-0.8	29	6.1	-5	-0.7
Gaskets, packing and sealing devices	-174	-0.9	-33	-0.9	32	6.6	-3	-0.8
Cement, hydraulic	-137	-0.6	-33	-0.6	32	7.5	([3])	-0.6
Industrial trucks, tractors, trailers, and stackers	-419	-1.5	-48	-1.5	36	5.8	-11	-1.4
Rest of the U.S. economy:								
Agriculture, forestry, and fisheries	157	([4])	26	([4])	7	0.1	31	0.1
Mining	-3	([4])	-4	([4])	-7	([4])	3	([4])
Construction	25	([4])	-1	([4])	([5])	([5])	([5])	([5])
Nondurable manufacturing	-476	([4])	-118	([4])	217	0.2	19	([4])
Durable manufacturing	-1,923	([4])	-337	([4])	463	0.1	89	([4])
Transportation, communications, and utilities	507	([4])	87	([4])	-20	([4])	35	0.1
Wholesale and retail trade	818	([4])	44	([4])	([5])	([5])	([5])	([5])
Finance, insurance, and real estate	667	([4])	137	([4])	-1	([4])	4	([4])
Other services	2,856	([4])	219	([4])	-11	([4])	35	([4])

[1] Full-time equivalent workers.
[2] In 1991 prices.
[3] Change less than $1 million.
[4] Change less than one-tenth of 1 percent.
[5] Nontradable sector.

Source: Estimated by the staff of the U.S. International Trade Commission.

In a general equilibrium framework, the extent of the adverse effects to the sectors previously subject to AD/CVD orders is related not only to how large these duties were for the particular industry, but also whether the industry is upstream or downstream to other industrial sectors affected by the orders. If AD/CVD orders are eliminated in sectors upstream to a particular sector, then that downstream sector enjoys lower input prices and this tends to increase output and employment in that downstream sector. This outcome may mitigate or completely offset the effects of removing a sector's AD/CVD order, which tends to reduce output and employment in that sector. These types of effects highlight a distinction of CGE models—economic effects in one sector can affect other sectors.

The importance of these upstream and downstream relationships can be seen to some extent in the estimated effects of the highlighted sectors. Ball and roller bearings and electrical industrial apparatus have few upstream industrial sectors. Thus, they have less chance to benefit from lower input prices because of the removal of other AD/CVD orders. As a result, their estimated output and employment losses in percentage terms are relatively high. On the other hand, these sectors supply a large number of downstream sectors that would benefit from lower input prices if the orders were lifted.

Much of the gain from removing outstanding AD/CVD orders in 1991 comes from lower import prices, and thus, lower market prices in the U.S.

economy. Table 4-4 presents import price changes and U.S. market price changes by highlighted and aggregated sector.[28] Removing the orders results in significantly lower import prices in the highlighted sectors. All highlighted sectors experience import price declines of 7 percent or more, with ball and roller bearing import prices falling by almost 20 percent. These lower import prices translate into lower overall prices for U.S. consumers as well. For example, the market price in electrical industrial apparatus falls by 5.6 percent, while U.S. consumers of ball and roller bearings enjoy prices that are lower by nearly 4 percent.

While the adverse effects due to order removal are concentrated in those sectors formerly subject to such orders, gains from order removal in the form of lower prices represent price changes that are dispersed across the entire U.S. economy. Thus, while each sector previously subject to an order experiences price decreases that are roughly the same magnitude as the loss in output and employment, the cumulative effect of such price decreases across all related downstream sectors and consumers can be quite large.

[28] The U.S. market price change is a weighted average of changes in the domestic industry's prices and of changes in its import prices.

Differential Effects on Wages and Profits

Petitioning industries and industries upstream from petitioners are estimated to experience losses as the result of removing outstanding AD/CVD orders. Estimates of these losses in the form of declines in output and employment are presented in Table 4-3. The purchasers of imports formerly subject to orders benefit from the opportunity to buy these goods at lower prices. In addition, the rest of the economy experiences a small, but measurable, indirect gain from the removal of AD/CVD orders due to the effects of such orders on economic efficiency.

To derive more insight from the simulation regarding the specific effects on adversely affected industries, one can utilize the CGE model results on the gains and losses in wages received by workers and profits received by firm owners (i.e., value-added) in each model sector. The model yields an increase of $1.85 billion in wages and profits as a result of the removal of AD/CVD orders, as compared with the estimated $1.59 billion increase in net economic

Table 4-4
Price effects of AD/CVD removal, 1991

(Percent)

Sector	Price of imports	U.S. market price[1]
Highlighted sectors:		
Ball and roller bearings	-19.7	-3.9
Telephone and telegraph apparatus	-9.2	-2.6
Rubber and plastics hose and belting	-8.8	-1.2
Electrical industrial apparatus, n.e.c.	-13.4	-5.6
Office machines, n.e.c.	-7.7	-1.1
Gaskets, packing and sealing devices	-8.7	-1.2
Cement, hydraulic	-7.0	-0.6
Industrial trucks, tractors, trailers, and stackers	-7.8	-2.0
Rest of the U.S. economy:		
Agriculture, forestry, and fisheries	-0.1	(2)
Mining	(2)	(2)
Construction	(3)	(3)
Nondurable manufacturing	-0.2	(2)
Durable manufacturing	-0.3	-0.1
Transportation, communications, and utilities	0.1	(2)
Wholesale and retail trade	(3)	(3)
Finance, insurance, and real estate	0.1	(2)
Other services	0.1	(2)

[1] This price change represents the final prices faced by U.S. consumers, i.e., it represents a composite of domestic prices and import prices.

[2] Change less than one-tenth of 1 percent.

[3] Nontradeable sector.

Source: Estimated by the staff of the U.S. International Trade Commission.

welfare.[29] A decomposition of the value-added measure can provide useful information about the relative effects of the removal of AD/CVD orders on gainers and losers and serve as a useful proxy for the theoretically more desirable, but computationally intractable, direct decomposition of the economic welfare measure.

Of the 17 model sectors, 12 experience both imports subject to AD/CVD orders and non-subject imports, i.e., these sectors contain both losers and gainers. The other five are service sectors for which there are no AD/CVD orders. To obtain a specific decomposition of model results for wages and profits by the gainers and losers from the removal of AD/CVD orders, it is necessary to decompose the model's estimate of the change in value-added for the 12 relevant sectors into the portion attributable to the losses of petitioning and upstream industries, and the gains attributable to the rest of the sector. This composition could be performed directly given three values: 1) the percentage of value-added in each sector attributable to petitioning and upstream industries; 2) the percentage losses in value-added experienced by petitioning and upstream industries; and 3) the percentage gains in value-added experienced by the rest of the model sector. None of these three percentages is directly observable.

The data used for the CGE model experiment were used in conjunction with the logical limits on the three percentages referred to above as well as reasonable economic assumptions in order to provide a feasible and reasonable range of losses in wages and profits experienced by those industries adversely affected by the removal of the orders within each model sector. These were then aggregated to provide a similar range of implied losses for adversely affected industries in the economy as a whole. The implied losses fall within a range of $320 million to $1.09 billion. The corresponding implied gains to the rest of the economy thus range from $2.17 billion to $2.94 billion. The midpoint of these estimates yields losses of $710 million and gains of $2.56 billion; the difference between these two figures corresponds to the $1.85 billion net increase in wages and profits.[30]

[29] The differences between the value-added measure and the net economic welfare measure are primarily due to the behavior of savings, taxation, and miscellaneous forms of income (other than value-added to labor and capital arising from production) in the model.

[30] Formally, any decomposition of value-added within a model sector must satisfy

Net Economic Welfare Effects of Order Removal

The Commission CGE model estimates the net economic welfare effects of policy changes, such as AD/CVD order removal, by using an "equivalent variation" measure of economic welfare. The equivalent variation measure asks what income change (in constant prices) would need to be *given to* or *taken away from* U.S. households so that they would remain equally well off under the alternative policy scenario of AD/CVD order removal. Since the Commission model specifies that firms pay income to households (including wages and profits), changes in the income of firms from order removal are fully reflected in changes in the income of households. For this reason, the equivalent variation measure is appropriate to assess the economy-wide net economic welfare change. That is, it measures not only the income gain consumers experience from lower prices due to order removal, but also the net gain or loss to

[30]—*Continued*

$$\left(\frac{dY}{Y}\right)_{ms} = \beta \left(\frac{dY}{Y}\right)_{pu} + (1-\beta)\left(\frac{dY}{Y}\right)_{rs}$$

where dY/Y is the proportionate change in value-added as the result of the experiment; the subscripts *ms*, *pu* and *rs* denote the model sector, the petitioning and upstream industries, and the rest of the sector respectively; and β denotes the share of petitioning and upstream industries in the value-added of the model sector prior to the experiment. The three variables on the right-hand side of the equation are unknown. However, the value of $(dY/Y)_{ms}$ is provided by the model, $(dY/Y)_{pu} < 0$, $(dY/Y)_{rs} > 0$ and $0 < \beta < 1$. Let δ denote the share of model sector imports covered by AD/CVD orders. Import penetration for petitioning industries is likely to be greater than for non-petitioning industries in the same model sector. Examination of the quadrant of the input-output table spanned by the highlighted sectors provided an estimate of the maximum share of upstream firms in the production of those sectors, denoted as μ. Thus, $0 < \beta < (\delta + \mu)$. It is also the case that $(dY/Y)_{pu} > -1$ (a sector can lose no more than its original value-added). Furthermore, $(dY/Y)_{rs}$, which represents primarily indirect efficiency gains in the rest of the economy, is small, very likely not exceeding 0.001.

The above restrictions on β, $(dY/Y)_{pu}$ and $(dY/Y)_{rs}$ imply a feasible range of decompositions for value-added in each model sector into value-added for producers and upstream industries and value-added for the rest of the sector. The upper and lower bounds of feasible decompositions for each sector are then summed to produce upper and lower bounds of the aggregate decomposition.

all firms in the economy from removal of outstanding AD/CVD orders.

In this modeling exercise, the estimated effect of removing outstanding AD/CVD orders is a net economic welfare gain to the U.S. economy of $1.59 billion in 1991. In other words, the presence of AD/CVD orders represents a collective net cost to the U.S. economy in 1991 of $1.59 billion. This figure represents the magnitude by which the cost of these orders in 1991 (from higher prices and accompanying inefficiencies such as the misallocation of labor and physical capital) outweighs the benefits derived by having the orders in place.

The magnitude of this welfare estimate is affected by many of the underlying assumptions dictated by the modeling technique employed and various data constraints. As discussed throughout this chapter, there are several assumptions and data constraints that result in an underestimation and overestimation of the effects of AD/CVD orders. Those that would result in an underestimation include: 1) this is a static estimate for the year 1991 and it does not take into account the cumulative effects of existing orders; 2) AD/CVD petitions may have been filed and withdrawn; 3) AD/CVD activity may have been revoked, terminated, or suspended before 1991; 4) 44 active AD/CVD orders are missing because they resulted in a cessation of imports; 5) the trade weights used give less weight to high margin countries because 1991 represents the final year of the sample; and 6) the model does not take into account uncertainty generated in the market once an order is put in place such as the open liability facing the importer of orders, which could have a chilling effect on imports. In additon, the modeling technique employed does not account for the legal, administrative, and other dollar costs associated with AD/CVD investigations. Those that would result in an overestimation include: 1) it is assumed that lower subsequent margins from administrative reviews stem from changes in foreign firms' U.S. prices for the subject imports; and 2) it is assumed that the prices U.S. consumers ultimately pay for the subject imports are equal to the pre-duty U.S. price plus the full amount of the original margin.

PART III
Case Studies:
Economic Effects on Selected Sectors

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CHAPTER 5
The Case Study Methodology: The Economics of Dumping and Subsidization of Imports and Remedies

Introduction

This chapter consists of two sections. The first section reviews the literature on the economics of dumping and subsidization of imports and their remedies.[1] The second section presents this study's methodology for analyzing the economic effects of unfair trade practices (in the form of dumping and subsidization of imports) and remedies (in the form of AD and CVD orders) on selected industries in chapters 7 to 14.

Review of Economic Literature[2]

The Economic Rationale for Dumping and Subsidization of Imports

The Economic Rationale for Dumping

Dumping has various economic definitions, as well as a legal definition. In economic terms, dumping is commonly used to describe a firm selling its goods at a lower price in the export market than in its own domestic market—traditional price discrimination. The origin of this argument is often attributed to Viner (1923), who observed that profit-maximizing prices were likely to be higher in home markets than abroad, under the reasonable assumption that home markets tend to be relatively more protected for home producers than are foreign markets.[3]

A second rationale for dumping is predatory pricing; lowering prices to harm and ultimately eliminate competitors or to enforce a cartel. This concept seems straightforward. However, whether predatory pricing is rational behavior or even occurs has been a source of controversy in the economics literature. Early economists (Viner (1931), Haberler (1936)) contend that predatory pricing as a motivation for dumping should be a rare event. More recent game theoretical papers on predatory pricing in general corroborate their analysis by showing that predatory pricing is profitable only under strict conditions that would enable future supra-competitive profits to offset the certain losses in the near term.[4] On the other hand, Hartigan (1994a) notes that a foreign firm may engage in predatory pricing in a world of incomplete

[1] The review of literature specific to the industries analyzed in this study is addressed in each case study analysis in chapters 7 to 14 in part III below.

[2] An alphabetical list at the end of this chapter contains sources cited by chapter 5.

[3] This argument also assumes a competitive structure other than perfect competition. For a thorough recent review of how this theory may operate in the current global marketplace, with specific examination of certain Japanese industries, see Marion (1993).

[4] For a discussion of antitrust treatment of predation (and how economists have analyzed this issue), see Scherer and Ross (1990), pp. 468-479. The Supreme Court has confirmed the small likelihood of success in such a case in *Zenith Radio Corp. v. Matsushita Elec. Ind. Co.* 475 U.S. 574 (1986). Compare Jeffrey Garten, "New Challenges in the World Economy: The Antidumping Law and U.S. Trade Policy," remarks before the U.S. Chamber of Commerce, Apr. 7, 1994, esp. pp. 3-13. Also, "Prehearing brief of Dewey Ballentine," before the U.S. International Trade Commission, Sept. 13, 1994, esp., pp. 5-11.

and asymmetric information; the foreign firm may induce exit by the home firm by acting like a low-cost competitor regardless of its actual costs. Empirical work on predatory pricing has been ambiguous as well.[5]

In the 1970s, as most industrialized countries moved to floating exchange rates, "exchange dumping," a lagged response of exporters to currency fluctuations, has appeared as an explanation for dumping (Wares, 1977). For example, in response to a depreciation of the dollar against the yen, the price of Japanese imports quoted in dollars would fall in yen terms as compared to home sales (in Japan) until these prices can be readjusted; meanwhile, dumping will be observed. Palmeter (1988) maintains that spurious claims of dumping can arise from inappropriate usage of exchange-rate adjustments, while Feinberg (1989) provides evidence of the importance of exchange-rate fluctuations in leading to dumping petitions.

The rapid advancement of theoretical industrial organization in the past decade and its application to international economics has lead to several new rationales for dumping. Ethier (1982) focuses on the role of demand uncertainty and the difficulty of reallocating inputs across manufacturing sectors of an economy in leading to cost-based dumping of a type sometimes referred to as "cyclical dumping." Hillman and Katz (1986) likewise focus on demand uncertainty and illustrate that the nature of the uncertainty faced in the exporter's home market may influence the likelihood of dumping.

Brander and Krugman (1983) introduced the term "reciprocal dumping" to explain the common practice of trade between developed nations in similar goods (intraindustry trade), often accompanied by claims of dumping in both directions. From each firm's perspective, demand in a foreign market is more price-elastic than in its domestic market, leading to lower prices (or equal prices, but absorbing transport costs) abroad than at home. While reciprocal dumping leads to wasteful cross-hauling, net welfare benefits can occur from increased competition in each market.

Gruenspecht (1988b) and Dick (1991) focus on "dynamic scale economies" (or "learning curve" effects) and note that the current static unit cost may overstate the relevant marginal cost of an extra unit of output. Since expanding output today may move the firm down the learning curve and reduce next period's average and marginal costs, an exporter will be dumping as its price (based on the true lower marginal cost incorporating future benefits) will be less than the measured unit cost.[6]

Anderson (1992, 1993) and Clarida (1993) present more novel views of dumping. Anderson stresses that since many AD petitions are resolved through settlements as voluntary export restraints (VERs) and since quotas under VERs are often based on past exports, exporters may resort to dumping in order to expand their market shares in foreign markets if they expect some VERs (either directly or indirectly following an AD action). Clarida tries to explain the surge in dumping filings in the mid-1980s, a time when the dollar was very strong, and hence foreign firms should have been able to sell well in the United States without dumping. He proposes a model in which increased world demand for a product leads to a surge of new entry by firms of varying efficiency (and uncertainty about their true levels of efficiency). Price is driven down to the level dictated by the most efficient firms, with those who turn out *ex post* to be higher-cost exiting the industry eventually, but matching the price and dumping in the short-run (which may not be of trivial duration).

The legal definition of dumping arose from legislation in the early part of this century through the Antidumping Act of 1916 and the Antidumping Act of 1921, which was the predecessor to the current title VII of the Tariff Act of 1930.[7] As a result, the legal definition arising from these laws is based on the more traditional economic rationales for dumping—predatory pricing and price discrimination. The Antidumping Act of 1916 specifically required showing an intent to injure and made predatory dumping illegal, while making violators subject to criminal penalties, as well as civil damages. The 1916 Act has never been successfully invoked.[8]

[5] For examples see Isaac and Smith (1985), who cannot obtain predatory pricing in computer simulations even under conditions when theory suggests such an outcome is probable. On the other hand, Burns (1986) uses regression analysis to show that in cases when predatory pricing by the old American Tobacco Company was alleged from 1891 to 1906, the tobacco trust was able to purchase rivals at much lower acquisition costs.

[6] The case study on EPROMs in chapter 9 accounts for potential "learning curve" effects in its economic analysis, particularly in the time series econometric analysis. Other econometric studies of the learning curve effect in the semiconductor industry include Gruber (1994), Irwin and Klenow (1994), and Udayagiri and Balakrishnan (1993).

[7] Chapter 2 describes the administration of the current law (since the completion of the Uruguay Round Agreements Act in 1994) and the AD/CVD law in effect in the 1980's, when the cases selected for analysis in chapters 7 to 14 were filed.

[8] Victor (1983) gives a history of prosecutions under this Act. See also Knoll (1987).

On the other hand, title VII of the Tariff Act of 1930 deals much more broadly with injury to a domestic industry due to imports of goods sold at "less than fair value." U.S. trade laws do not require predatory intent. As discussed in chapter 2, dumping, or selling at "less than fair value," is legally defined as selling a product in the United States at a price which is lower than the price for which it is sold in the home market. This is the primary method of calculating dumping and seems closely related to the price discrimination rationale. Many of the more recent theories on why various situations cause exporters to "price-to-market" by manipulating profit margins on export sales can be viewed as forms of price discrimination. Thus, this method of calculating dumping can be seen to encompass numerous rationales for dumping in the theoretical literature. A secondary method of determining whether import goods are sold at less than fair value is to compare the U.S. price for export sales with third-country sales or, if necessary, a third method, a constructed value of the foreign firm's price for the foreign like product based on foreign firm's costs. The constructed value is calculated by adding manufacturing costs, selling, general, and administrative expenses, profit, and packaging costs.

An important distinction regarding the various economic rationales for dumping is that some reasons for dumping are consistent with a competitive environment in an industry, while others are not. In contrast, the legal definition makes no such distinction. According to professor Willig, certain forms of dumping are a natural part of a healthy market economy, yet are defined in international agreement as dumping and are subject to U.S. AD laws.[9] Predatory pricing, which is intended to drive out competitors, generally is agreed by all to have anticompetitive effects and should be corrected. However, other forms of selling at "less than fair value" (as currently determined by Commerce), including exchange-rate dumping described by Palmeter (1988) and Feinberg (1989), cost-based dumping caused by demand uncertainty as described by Ethier (1982) and Hillman and Katz (1986), learning curve effects described by Gruenspecht (1988b) and Dick (1991), as well as the strategic VER reactions given by Anderson (1992, 1993) and the influx of inefficient entrants notion of Clarida (1993), may be consistent with a competitive environment.

How often do AD cases involve forms of dumping that many economists would consider consistent with competition? Shin (1994) addresses this question with respect to the 282 AD investigations in the 1980's that resulted in non-negative outcomes.[10] Shin uses criteria developed in the antitrust literature to screen out the AD cases in her sample for which the industry characteristics are inconsistent with the hypothesis that AD duties are "protect[ing] competition from monopolization that could result from predatory-pricing dumping." (p. 84) For example, predatory pricing is unlikely to occur in unconcentrated industries. Thus, Shin screens out industries with a minimum Herfindahl-Hirschman index of 0.18 or greater.[11] Other screens include foreign seller concentration, changes in import penetration, and barriers to entry present in the domestic industry. Shin finds that 27 of the 282 cases (9.6 percent) could be consistent with dumping motivated by anticompetitive reasons on the part of foreign sellers.[12]

Given this contrast between dumping designed to injure competition and when the legal definition actually provides relief, a number of scholars have shifted attention away from why foreign exporters engage in dumping to why U.S. domestic industries seek enforcement of current U.S. AD law.[13] U.S. protection of any form is an entry barrier to the U.S. market, and entry barriers tend to reduce competition and raise profits for firms already present in the market. As a result, U.S. firms have an incentive to invest resources on using U.S. AD laws to garner protection. This "rent-seeking" or "directly unproductive, profit-seeking (DUP) activities," uses real resources to gain profits (or rents) at the expense

[9] Dr. Robert Willig's comments at the public hearing for this study drew this distinction among various economic rationales for dumping and formed the basis for the logic of this paragraph.

[10] In particular, this means that cases that were suspended or terminated, as well as cases that ended in affirmative determinations, were included in her sample.

[11] The Herfindahl-Hirschman index is the sum of the squared market shares of the firms in an industry. It equals one for an industry comprised of a single monopolist and approaches zero as the number of firms in the industry, each capturing the same share of the market, becomes very large.

[12] This result should be regarded with caution, as noted by Dr. Robert Willig at the public hearing for this study. Shin's result does not say that predatory pricing occurs in 9.6 percent of the cases she examines, but only that it cannot be ruled out as a possibility for those cases.

[13] A few references (among many possible) are Krueger (1974), Brock and Magee (1978), Bhagwati (1982), Finger et al. (1982), Becker (1983), and Baldwin (1985).

of others, rather than for producing goods and services; in other words, gaining a larger slice of the pie, without increasing the size of the pie. The role of rent-seeking in U.S. trade policy, including use of AD laws, has been a common focus for scholars looking at the political economy of protection.[14]

The Economic Rationale for Export Subsidies

Motivations for export subsidies (or production subsidies that effectively support exports) are more straightforward than those for dumping. Mercantilist philosophies have always favored the promotion of export sales, focusing more on the volume of domestic production than on consumer welfare. Subsidies are a way to increase exports and, hence, domestic production.

In addition, it is sometimes argued that these subsidies are necessary to offset duties on imported inputs (duty drawbacks) or general domestic taxes that put exporters on unequal footing with its international competitors. There is little case for ruling duty drawbacks as an unfair trade practice, if the export subsidy only offsets the input tax in the foreign country. However, it is more ambiguous when foreign governments compensate their exporters for general domestic taxes. A high tax country may put its exporters at a relative disadvantage without such adjustments, but it is difficult to draw the line between "levelling the playing field" and giving unfair advantage relative to domestic producers in other (perhaps equally taxed) national markets.

The recent literature on strategic trade theory has provided more formal analysis of the motivations for export subsidies.[15] Brander and Spencer (1985) analyze strategic policy in a world of imperfect competition (in which price exceeds the marginal cost of exports), where two exporting countries compete in a third foreign market. They find that export subsidization by a government can increase its firm's market share and profits in this third market at the expense of the other country's firm, when the firms compete in quantities (a Cournot game).[16] However, this result is very sensitive to the assumptions of their model. For example, if the two firms compete in prices (a Bertrand game) with differentiated products, rather than competing in quantities, Gruenspecht (1988a) shows that an export tax (rather than an export subsidy) will raise profits for a country's exporting firm. Thus, the optimal strategic government policy is very sensitive to the assumed oligopolistic structure of the export market.

Hartigan (1994b) finds that export subsidies can allow a firm to increase its output and market share in foreign markets, while a subsidy is in effect and even after it is removed, if there are "switching costs" to consumers of changing buying patterns. A similar argument is that subsidies to new industries enable them to lower costs through experience and to remain internationally competitive after the phase-out of the subsidy.

The Economic Effects of Dumped and Subsidized Imports and Remedies

Measurement of Economic Effects of Dumped and Subsidized Imports

The direct effect of dumping and subsidization of imports is lower import prices. Certain predictable economic effects follow. First, lower import prices usually harm the domestic producers of import-competing goods (in the terminology of the trade laws, the "like-product" industry). Second, they also provide at least short-run gains to consumers (including end users) in the home market. The difficult question is the size of these gains and losses and the possibility of long-run harm to consumers of the product in question. Measuring the magnitude of these effects depends on what the import price would be in the absence of the distortionary policy.

If dumping is simply price discrimination, the absence of discrimination is a unified (non-discriminatory) price. The non-discriminatory price will lie somewhere between the foreign firm's domestic price and the home import price. Determination of this price requires knowing the elasticities of demand and supply in the foreign firm's domestic market and the home import market, the shape of cost curves, and the foreign firm's distribution of production between its domestic

[14] For references, see footnote 13.

[15] There are redistributional elements to any subsidies; they must be paid by others in the economy. Political influences play a large role in identifying which sectors are to be favored by subsidies and there is a large economic literature dealing with this topic. For references, see footnote 12.

[16] Cournot and Bertrand games are common alternatives to model a rivalrous duopoly setting in modern industrial organization. For a further discussion, see Tirole (1990), pp. 209-234.

market and exports.[17] If dumping is cost-based, a "fair" import price would be at unit cost.[18] If dumping is viewed as predatory, the short-run predatory import-price reduction will benefit consumers and harm producers in the short run. If successful, home country firms will be driven out, foreign firms will attain monopoly power, and consumers must pay monopoly prices. If predation is unsuccessful, both home and foreign firms will be harmed, while consumers will have enjoyed lower prices during the period of predation. Finally, the price impacts of dumping are more ambiguous when the possibility of strategic interactions among oligopolistic firms in international competition are taken into account.

Turning to subsidies, the price effects depend on whether the subsidies in the foreign country are applied only to exports, to all domestic production in a particular industry, or to inputs utilized by that industry. Diamond (1989, 1990) discusses the economic underpinnings of countervailing duty law, while Boltuck and Litan (1991) and Francois et al. (1991) conclude that evaluation of these price impacts requires knowledge or estimates of price elasticities of demand and supply in both home and export markets, substitutability among inputs, and input and output shares.

The predicted effects of dumped and subsidized imports on industries upstream (input-providing) and downstream (end user, or consumer) to the like-product industry are straightforward. In general, these related sectors are affected in opposite directions: the upstream sectors are harmed along with the like-product industry, while downstream sectors benefit from lower prices.[19] The magnitude of gains or losses in these related sectors depends primarily on the substitutability among inputs and input and output shares between upstream and downstream sectors.

Economists have relied mainly on simulation models and, to a lesser extent, case studies to estimate the economic effects of dumping and subsidization. Perhaps the most comprehensive empirical study of dumping and subsidization to date is Morkre and Kelly (1994). They use a computable partial equilibrium (CPE) model to estimate the economic effects of dumping and subsidization in 174 AD/CVD cases in the United States from 1980 to 1988.[20] Using final dumping margins calculated by Commerce to model the price effect of dumping and subsidization on import prices, their analysis begins with parameter estimates that tend to overestimate the effect of these unfair trade practices on the U.S. domestic industry. These initial upperbound estimates show domestic revenue falling by 10 percent or greater in only 18 of the 174 cases they study. In 50 of the cases the drop in revenue exceeds 5 percent.

Morkre and Kelly extend their analysis by examining the relationship between parameter values (such as demand and supply elasticities) and the magnitude of their estimated price and quantity changes. They show that in their model: (1) higher dumping/subsidy margins lead to larger reductions in "like-product" demand when fairly-traded imports are inelastic in supply and when demand for the general product category is price-inelastic; (2) higher market shares for unfairly-traded imports also imply greater contraction in "like-product" demand; and (3) increased substitutability between imports and the like-product implies greater contraction in like-product demand; and (4) distribution of the decline in like-product demand between price and quantity declines depends on the domestic price elasticity of supply.[21]

Morkre and Kelly only estimate price and quantity effects of dumping and subsidization on the U.S. domestic industry, but one advantage of simulation models is that they can detail many other economic effects at the same time. This is exemplified by Murray and Rousslang (1989), who examine four Commission cases and report changes in wages and employment, in addition to domestic price and output changes, due to unfair imports.[22] Of the four cases, they find the least harm to the domestic industry for oil country tubular goods from Canada and

[17] This discussion is particularly important with respect to the issue of pass-through in the case of remedies, as discussed below.

[18] See, several papers in Boltuck, Richard and Robert Litan, eds. *Down in the Dumps: Administration of Unfair Laws*, The Brookings Institution, Washington, DC, 1991.

[19] These effects on related sectors from dumping and subsidization may be reversed however, if dumping is predatory and leads to higher prices in the future.

[20] Morkre and Kelly's sample includes all AD and CVD cases with a negative or affirmative Commission final decision from 1980 to 1988 for which they had adequate data on margins and market shares.

[21] For relatively inelastic supply, most of the impact will be felt in terms of price reductions, for relatively elastic supply, price will be little-affected but domestic shipments will fall substantially.

[22] The four cases they examine are 1) certain brass sheet and strip from Brazil and Korea, 2) certain unfinished mirrors from Germany, Japan, Portugal, and the United Kingdom, 3) candles from the People's Republic of China, and 4) oil country tubular goods from Canada and Taiwan; recent cases at the time of the article.

Taiwan.[23,24] They estimate the greatest harm comes in the case of certain unfinished mirrors from Germany, Japan, Portugal, and the United Kingdom, where prices fall by 1.2 to 9.8 percent, output falls by 1.8 to 10.8 percent, and employment falls by 9.8 to 12.1 percent.

Huang et al. (1993) use a different type of simulation model to forecast economic effects of dumped boneless beef from the European Union (EU) on Canadian beef producers. Their model of 231 linked econometric equations allows estimation of the effects of many variables within a consistent framework, while at the same time generating necessary parameter estimates internally through econometric estimation. They find that an additional 22,000 tons of dumped "low-quality" beef onto the eastern Canadian market by the EU would lower the wholesale price of cow carcasses by 1.6 percent, with the retail price of low-quality beef decreasing by 0.8 percent. The technical problem with their methodology is that they estimate their equations via ordinary least-squares (OLS), which may ignore substantial simultaneity among variables.[25] In this respect, partial and general equilibrium simulation models have an advantage, since simultaneity is modeled directly. Huang et al. also note that their econometric-based simulation model requires relatively large data and time requirements compared with other methods of analysis.

Measurement of the Economic Effects of Remedies

AD/CVD remedies are expected to raise unfairly traded import prices. However, like the dumping and subsidization practices they are intended to correct, the magnitude of the remedies' effect on import prices, import quantities, and domestic like-product shipments depends upon the elasticities of import demand and supply and cross-price elasticities of demand (or alternatively, the relevant elasticities of substitution). An important issue with respect to remedies in this regard is pass-through. When a foreign firm's product is assessed an ad valorem duty, the foreign firm may not raise this duty-ridden price by the full amount of the duty; i.e., there may be only partial pass-through of the duty. This occurs when the foreign firm has some degree of market power. As discussed above, if the foreign firm is price discriminating between its own domestic market and exports to the home country, the price in the foreign domestic market may be adjusted so that only part of the duty is passed through to import prices in the home country. In addition, Feenstra (1989) shows that in an oligopoly setting, a foreign firm with increasing marginal costs will not fully pass-through an assessed duty.

Similar to estimating the effects of dumping and subsidization, economists have relied on simulation models to analyze the effects of AD/CVD remedies. In addition, case studies and econometric analysis have been used to analyze AD/CVD remedies. In CPE models, the relationship between the estimated effects of dumping and subsidization versus the effect of the remedy is directly related to the issue of pass-through. In the case of full pass-through, the remedy will exactly offset dumping and/or subsidization; i.e., the estimated effects of the remedy is of opposite sign, but exact magnitude, of the estimated effects of the unfair trade practices. This is true in general with the CPE analysis of Morkre and Kelly discussed above. However, for the five cases they estimate the effects of dumping and subsidization (or remedy) assuming partial pass-through and find that the estimated injury (or relief) to the domestic industry is smaller.[26]

One limitation of the CPE models discussed above is that they do not estimate the economic effects of AD/CVD remedies on upstream and downstream industries, since they model only the sector subject to an AD/CVD investigation (hence, the term "partial"). While little empirical work has been done in this regard with respect to AD or CVD remedies, Mendez (1986) uses input-output analysis to find fairly large short-run trade and employment effects of the steel VERs negotiated in the mid-1980s on steel-using

[23] In this case, domestic prices of tubular goods fall from 0.4 to 2.1 percent, output in the industry falls from 1.4 to 2.6 percent, industry wages fall from 1.7 to 3.5 percent, and its employment falls by 2.1 to 4.3 percent.

[24] They give a range to account for uncertainty with parameter estimates.

[25] OLS techniques specify a dependent variable as a function of exogenous, explanatory variables. However, if the dependent variable is an important explanatory variable for one or more of the exogenous variables or if the dependent variable and one or more of the "exogenous" variables are jointly determined by another common exogenous variable, serious simultaneity problems may arise and statistically bias the OLS estimates.

[26] Morkre and Kelly contend that full pass-through is an "extreme assumption" for most goods. However, they employ this assumption since it conforms with the rest of their analysis in providing an initial upperbound estimate of the effect of dumping and subsidization. Deriving an upperbound estimate is crucial to the point of their paper, since they conclude that estimated injury to the U.S. domestic industry from unfair trade practices is small in most cases, even when using upperbound estimates.

industries. Under the assumption of flexible exchange rates, Mendez finds that while the VERs raise employment in the steel sector by 27,000 man-years, downstream consumers of steel lose over 40,000 man-years. Using trend analysis, Feinberg and Kaplan (1993) show that AD/CVD remedies in one industry often lead to AD and CVD filings in the downstream industries. The implication is that since AD/CVD remedies hurt downstream industries, that may lead to further protectionism downstream.

Another potential criticism of simulation methodology is that important historical and institutional characteristics specific to each case may be ignored. An alternative literature looks at specific cases in great detail, taking into account historical and institutional factors. Finger (1993) examines a number of U.S. title VII cases and concludes that the cases of frozen orange juice, cut flowers, consumer electronics, and stainless steel (and an EU case in chemicals from Poland) were due largely to declining domestic industry fortunes unrelated to actions by foreign trading partners and that these cases have not been especially successful at reviving domestic producers. In some cases foreign firms were little affected; in others, imports from third countries grew. Messerlin (1990) finds that the major impact of EU AD cases in chemicals was to strengthen the degree of collusion in that European industry. The European Parliament (1993) examines several EU AD cases, finding that where trade diversion to third-country sources was limited (as in plain paper copiers) AD duties were effective in raising industry prices; however, in cases where production is highly mobile throughout the world (as in small screen color televisions), prices continued to fall after the imposition of duties. The general point is that the size of the duty and its country coverage are important determinants of market effects.

Kalt (1988) combines the case study approach with a simple CPE analysis to study the 1986-87 Canadian softwood lumber countervailing duty case, focusing on the political determinants of actions in that case, related trade matters, and the welfare implications of the 15-percent countervailing duty originally ordered and the 15-percent Canadian export tax finally imposed. A simple simulation model of the North American lumber market assesses gainers and losers and concludes that while U.S. lumber producers gained, U.S. consumers lost more.

Econometric analysis has had an important role in estimating the effects of AD and CVD remedies. Recent theoretical work has pointed to the importance of the AD and CVD remedy process itself. Simulation models, which are a comparative static exercise, provide no guidance as to the various economic effects that may occur during the investigation and remedy process. Thus, econometric analysis of remedies complements simulation models by including the economic effects occurring during the investigation process, as well as the effects of the ultimate duties imposed.

Econometric estimation of the economic effects during an investigation process requires consideration of some difficult issues. First, AD/CVD investigation events occur within a fairly condensed time series context, yet necessary data are often available only on a yearly or, at best, quarterly basis. Thus, it may be difficult or impossible to separately identify the economic effects of investigation events that occur within a specified time period.[27] A second related problem is that AD/CVD investigations are product-specific, but attainable data are often at a much more aggregated industry level. A third issue is identification. Numerous factors are constantly buffeting U.S. producer prices, trade flows, output, and income; controlling for these factors in a credible fashion is crucial to separately identifying the economic effects of AD/CVD investigations and resulting remedies.

Perhaps the most important issue in testing the effect of the investigation with time series analysis is that theory provides a number of possible, sometimes contradictory, predictions about the economic effects that will occur during a AD and/or CVD investigation. Anderson (1992, 1993) contends that dumping may be motivated by the foreign firm attempting to increase market share in anticipation of a negotiated VER in some cases. This suggests that subject import prices will be low and volumes high during an investigation. On the other hand, Harrison (1991) and Staiger and Wolak (1994) view the AD/CVD investigation process as a signaling process, whereby the petition and preliminary determinations give the foreign firm a signal as to how likely an AD or CVD remedy is at the end of the investigation. The more the foreign firm thinks a remedy is likely, the more the firm will change its behavior in anticipation of the remedy; i.e., higher subject import prices and lower volumes.[28]

[27] A number of the case studies in chapters 7 to 14 use quarterly, and in some instances, monthly data; this helps mitigate the problem of identifying the effect of remedies.

[28] For Staiger and Wolak (1994) this discussion pertains more to cases filed by what they call "outcome" filers (U.S. firms that are filing an AD or CVD cases to obtain a remedy).

This is the exact opposite prediction of Anderson. While this discussion on the effect of the investigation process has shown the economic effects to be theoretically ambiguous, in reality, analysis of an AD/CVD investigation for a certain product (or group of products) may reveal one of the above strategic responses to be more applicable than the other. Thus, there is the potential for empirical work to "inform" theory in this regard by determining if the effect of AD/CVD investigations has unambiguous effects for individual products.[29]

One of the first econometric papers to analyze remedies for dumped and subsidized imports focuses only on the economic effect of the AD or CVD investigation. Herander and Schwartz (1984) examine through cross-industry regression analysis how the threat of protection, in the form of AD/CVD investigations, affects the pricing decisions of foreign firms; in this sense, they do not test the economic effect of imposed duties or of actual cases, but rather the effects of potential investigation events. Specifically, they test whether the probability of an AD/CVD petition being filed or the probability of an affirmative final Commission decision in an industry had any effect on the dumping margins of rival foreign firms during 1976-81. They find that higher probabilities of a Commission petition being filed in an industry tends to reduce rival foreign firm's dumping margins, but that higher probabilities of an affirmative Commission material injury decision has little impact on foreign firm pricing decisions.

More recently, the econometric literature has begun to test the economic effects of actual AD/CVD duties, as well as their accompanying investigations. Harrison (1991) analyzes import prices on 41 different SITC product groups during 24 quarters from 1981-86 using time series econometric analysis. Approximately one-half of these product groups were not subject to any AD/CVD investigations or duties and were included to control for other factors in the economy that can determine import prices. To take into account the potentially different effects that may occur during the investigation process, versus the effects after a remedy is imposed, Harrison specifies two separate binary variables—one that takes on the value of "1" during the investigation and one that takes the value of "1" after a duty is imposed. Her initial results, using simple ordinary least-squares (OLS) and a specification to take into account the panel nature of the data, show the investigation effect to be quite mixed, but duties have a positive effect on import prices of up to 10 percent. However, once she takes into account potential simultaneity of import prices and duties, the effects of duties on import prices is inconclusive as well.

Harrison's overall ambiguous results may stem from not adequately handling the issues mentioned above. Indeed, her paper exemplifies the problems facing econometric estimation of the economic effects of AD/CVD duties and their accompanying investigations. First, the mixed result on the investigation effect is not surprising, since her sample includes data on a variety of products, not just one. Second, her specified SITC product groups may be too aggregated to estimate precisely the effects on import prices. Finally, import prices are only one indication of the economic effects of AD/CVD duties and investigations, and there may be significant economic effects even if import prices do not change much.[30]

Staiger and Wolak (1994) use more advanced and innovative econometric methods to correct for these limitations.[31] They find that "the imposition of an AD duty on a single Tariff Schedules of the United States Annotated (TSUSA) code predicts a reduction of 10.55 million 1972 dollars in the annual rate of imports." Less precisely estimated, they find the duty increases domestic output by 7.13 million 1972 dollars. Staiger and Wolak also make an important distinction between different types of firms that file an AD and/or CVD petitions. They define "outcome filers" as filers who expect an affirmative final decision and imposition of duties and "process filers" as filers who use the petition filing as a credible threat of punishment on a foreign firm. Their results confirm

[29] This is a strong motivation for inclusion of an investigation variable in the time series analysis in chapters 7-14, where possible. This variable is referred to as the "petition" variable in the case studies.

[30] Specifically, import volume may change significantly and, thus, affect domestic output and income, despite little movement in import prices.

[31] Specifically, Staiger and Wolak jointly estimate the probability of an AD or CVD filing, imports, and output for all U.S. 4-digit SIC manufacturing industries from 1980 to 1985 via maximum likelihood estimation. Joint estimation is done to take into account potential simultaneity and correlation among the three equations. In order to resolve the problem that AD/CVD filings occur at the Tariff Schedules of the United States Annotated (TSUSA) *product*-level, but their regressors are at the *industry*-level, they model the likelihood of a filing with a probability distribution that can be easily aggregated across product categories in an industry to get an overall probability distribution of the number of filings for each industry. To estimate investigation events, even though their data are annual, they use indicator (or binary) variables for each investigation event that specify how many product categories in an industry experienced that event during the year.

the hypothesis that the investigation process should lead to differing economic effects for outcome filers and process filers.[32] As predicted, they find that there is an immediate fall in imports for process filers when the petition is filed, whereas imports do not decline in the case of outcome filers until a preliminary affirmative decision is made.[33] Finally, they find that suspension agreements tend to decrease imports, while withdrawn petitions have no statistically significant effect. Domestic output effects follow these import effects closely, except opposite in sign.

Although the econometric studies of Harrison and Staiger and Wolak estimate movements of important economic variables, they do not specifically estimate the impact of AD/CVD duties and their accompanying investigations on the economic welfare of domestic and foreign producers or consumers. One novel way of estimating the direct impact on U.S. domestic producers is by estimating changes in their stock price due to AD/CVD investigations through event studies. If stock markets are efficient, changes in a firm's stock price due to an exogenous "event" should represent the discounted present value of changes in the firm's future profits.[34] In other words, changes in a firm's stock price that are not due to normal market fluctuations indicate changes in the firm's future profitability or welfare. Hartigan et al. (1986), Hartigan et al. (1989), and Lenway et al. (1990) are examples of research using event studies to analyze protective trade measures.

Hartigan et al. (1989) specifically look at the effects of AD/CVD investigations. They first look at the cumulative abnormal return (CAR) experienced by the filing firms' stock price over the entire decision process.[35] They find that the filing firms expected future welfare increases during the investigation process as a whole, even when one of those events was a negative decision by either the Commission or Commerce. This suggests that firms can derive benefits from the investigation process, even when the outcome is negative, which is in line with Staiger and Wolak's "process filers" conjecture. Hartigan et al. (1989) then separately examine the CAR for three investigation events: the preliminary Commission decision, the final Commerce decision, and the final Commission decision.[36]

Interestingly, only a negative decision at the preliminary Commission stage has any significant negative effect on the firm's expected future stream of profits. Affirmative decisions affect firms differently depending on whether the Commission has concluded that the firm has already been injured or is threatened to be injured. Injured firms are not helped by a preliminary affirmative Commission decision, but only gain once an affirmative final Commerce decision is made (about 4 percent of stock market value for the firms they study). For petitioning firms that are only threatened, the gain (about 9 percent) comes from the preliminary Commission decision, not the final Commerce one.[37]

Case Study Methodology

The U.S. Trade Representative requested a comprehensive empirical analysis of the economic effects of unfair trade practices and AD/CVD orders for selected U.S. industries. To respond fully to this request, several standard analytical approaches are used. First, trends for key variables such as price, output, imports, and market share are examined to determine the conditions in the selected U.S. domestic industries for a period before the case filing, during the investigation process and after the final determination. Second, time series econometric analysis is developed to estimate the impact of subject imports during "both a proximate period prior to the provision of the relief and for a period sufficiently later than the date the relief was accorded for the condition of the industry to fully reflect the effects of the relief".

[32] Staiger and Wolak specifically model the possibility that a case could involve either an outcome filer or a process filer in their econometric estimation. From their estimated coefficients they are then able to compute whether the domestic firms in a case are more likely outcome or process filers. In virtually all cases, they find that it is more likely that the case has been filed by outcome filers. The three industries for which it is most likely that the domestic firms are process filers are steel (SIC 3312), auto parts (SIC 3714), and autos (SIC 3711).

[33] In fact, Staiger and Wolak's results show that import volumes experience a small rise after a petition is filed, but before a preliminary decision is made, in the case of outcome filers.

[34] These changes are often aggregated over several days and called cumulative abnormal returns or CARs.

[35] The sample in Hartigan et al. (1989) includes those petitions since 1979 for which the filing firms and/or other significant firms in the industry had available stock price data. This resulted in a sample of 47 petitions and a total of 130 filing, and other significant, firms.

[36] The preliminary Commerce decision was left out by the authors, since the investigation proceeds at Commerce regardless of this decision.

[37] The magnitude of the loss or gain to future firm welfare from the AD or CVD investigation depends on the relative importance of the product in each firm's profitability. Thus, the size of these gains and losses are specific to the firms Hartigan et al. investigated.

The U.S. Trade Representative also asked that the Commission employ a standard comparative static framework to analyze the economic effects on employment, wages, income, production, prices, and trade for a given petitioning industry[38] for a given year. Also, in addition to measuring the economy-wide welfare effects, the effect of the title VII process should be measured for the upstream and downstream industries. A partial equilibrium comparative static analysis is developed to estimate the effects of the unfair trade practice and remedy on prices, employment, production, imports for each selected industry, as well as the upstream and downstream industries, if possible. Producers and growers' questionnaires are used to assess the impact of the title VII process on wages, profitability, and investment. In contrast to time series analysis, which assesses effects over time, comparative static analysis estimates the impact of unfair trade practices and remedies during a particular year for each selected industry. Finally, the bearings industry, which is the case study with the most extensive linkages in the economy, is analyzed using the CGE model to measure the economy-wide effects as well as upstream and downstream effects of the unfair trade practice and remedy.

The next section explains the time series methodology, followed by a brief explanation of the economic theory that underlies the comparative static analysis. Finally, a description is provided of the computable partial equilibrium (CPE) model developed to quantify the comparative static effects of the unfair trade practices and AD/CVD orders for selected U.S. industries.

Time Series Analysis

The time series analysis tests whether the investigation process and/or the final determination (i.e., the remedy) has an impact on the domestic like product and prices, subject imports and prices, and non-subject import and prices.[39] The effect of the investigation process is theoretically ambiguous since it is difficult to predict the strategic behavior of the importers during the investigation. As discussed above, strategic behavior during the investigation process may raise subject import volumes, lower their prices, and lower domestic output and prices (Anderson (1992, 1993)), or the exact opposite could occur (Harrison (1991) and Staiger and Wolak (1994)). However, one strategic response may dominate for a particular case and thus give unambiguous results with respect to the investigation process. In this way, the study's empirical work is able to inform theory about the relative importance of observed strategic responses.

The expected effect of the remedy is more straightforward: the remedy should reduce subject imports, increase domestic price and output, and increase the price of subject imports. These hypotheses are tested by using binary variables that mark the periods of investigation and remedy, respectively. Typically, there is no clear documentary evidence to show the starting date for the dumping/subsidization; thus, there is no similar test for the effects of the unfair trade practice in the econometric analysis. As a consequence, the case studies rely on trend analysis and CPE analysis to estimate the economic effects of the unfair trade practices.

In order to estimate the impact of the title VII investigation and remedy, it is necessary to account for the influence of market demand and supply variables so that estimated effects of the title VII investigation and remedy can be isolated from the traditional market forces of a given industry. These market variables include input costs, exchange rates, downstream demand growth, and changes in technology. Specifically, the quantity demanded of an industry's product will depend on its price, prices of substitute products (both competing imports and domestic substitutes), and the demand of end users (downstream demand). Domestic supply will depend on price as well, along with input prices and the level of productivity or technology in the industry. Import demand will depend on downstream demand in the U.S. market for the product, the price of imports, and prices of domestic goods in this market, while import supply would depend on the import price and exchange rates.[40]

[38] The methodology employed to select 8 cases for purposes of investigating the economic effects of unfair trade practices and AD/CVD orders is presented in chapter 6.

[39] The investigation process has a number of "events" that may have differing effects on variables of interest. However, multicollinearity concerns (i.e., high correlation between explanatory variables) prevent specifying a binary variable for each of these events during the investigation period.

[40] In this discussion, exports have not been considered, and the model below excludes the export market as well. If exports are significant for a particular industry under study, data permitting, the export sector also needs to be modeled (but along the lines suggested here).

An econometric model of demand and supply in a competitive domestic market,[41] with imports and domestic goods regarded as imperfectly substitutable, is developed to estimate the effects of the case filing and the final determination. Using time series data, the relationships that underlie the system of equations that form this econometric model are as follows:[42]

(1) supply of the domestic like-product = f(petition, remedy, input costs, domestic price)

(2) demand for the domestic like-product = f(petition, remedy, downstream demand, domestic price, price of subject imports, price of nonsubject imports, price of substitutes)

(3) supply of subject imports = f(petition, remedy, dollar exchange rate relative to the currency of the subject imports, price of subject imports)

(4) demand for subject imports = f(petition, remedy, downstream demand, domestic price, price of subject imports, price of nonsubject imports, price of substitutes)

(5) supply of nonsubject imports = f(petition, remedy, dollar exchange rate relative to the currency of the subject imports, price of subject imports)

(6) demand for nonsubject imports = f(petition, remedy, downstream demand, domestic price, price of subject imports, price of nonsubject imports, price of substitutes)

By controlling for other explanatory variables, the coefficients of the investigation (petition) and remedy variables will indicate the independent effect of the investigation process and remedy on the domestic industry. Since the dependent variable is put into log form in the case studies, a simple transformation allows interpretation of the investigation and remedy coefficients as a percentage change effect on the dependent variable. For example, in an equation explaining domestic shipments, the coefficient on the remedy variable will be able to estimate the percentage change in domestic shipments during the period of the remedy relative to the non-remedy period of the data sample.

The econometric analysis in each case study is augmented with the information gathered on field trips, personal interviews with industry researchers and representatives, questionnaires, and literature reviews. Specific data sources are stated in each case write-up in chapters 7 to 14. As explained in each of the chapters, data limitations often prevented estimation of the entire six equation system presented above. The time series econometric analysis for those chapters is adjusted according to standard econometric methodology to account for these limitations.

Comparative Static Analysis

Prior to describing how the comparative static effects were estimated by using the CPE analysis, a brief explanation is provided of the economic theory that underlies the comparative static analysis employed to examine the impact of unfair trade practices and remedy on the petitioning industry.[43] For purposes of illustration, the impact of unfair trade practice and it's remedy is examined for a simple market, where the domestic good and imported good are perfect substitutes. The discussion can, however, be applied more generally to markets where goods are imperfectly substitutable for each other. In such a case, the impact of both unfair trade practice and its remedy on the domestic industry is not as great as when the goods are perfect substitutes. In the current study, unlike the simple market case, the domestic product, the unfairly traded import, and the fairly traded import are being considered as imperfect substitutes. Hence, these market segments have to be examined separately. The models developed in this study consider these three market segments separately.

Market Effects

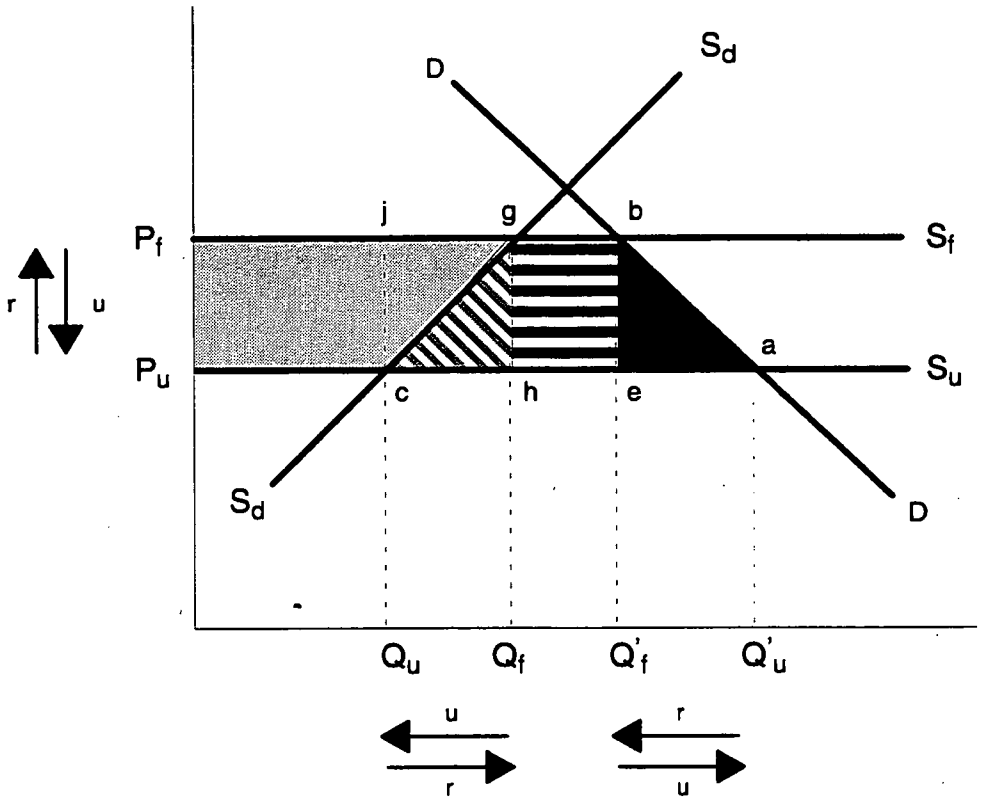
Figure 5-1 presents the economic effects of dumping and relief on the domestic industry where it

[41] Although one could complicate the analysis by testing for market power, supracompetitive pricing, etc., this seems unnecessary for purposes of this study. If the markets are to be modeled as imperfectly competitive, then the supply curves (as typically discussed) do not exist, but can be analyzed as "supply responses" that would still be influenced by the variables being considered in the empirical analysis.

[42] In order to capture domestic demand and supply influences separately, the above 6-equation system can be estimated as a simultaneous system. Or, using the equilibrium conditions of supply equals demand (for both imports and domestic like products), equations reflecting the relationships in (1) to (6) can be solved to obtain reduced form regression equations.

[43] For a more detailed treatment of the use of partial equilibrium models in this type of analysis see Francois and Hall (1995).

Figure 5-1
The simple market: Perfect substitutes



u = Unfair trade practice
r = remedy
f = Fair value

Source: U.S. International Trade Commission.

is assumed that the domestic good and the unfairly traded imports are perfect substitutes.[44] In figure 5-1, S_dS_d and DD represent the domestic supply and demand for a given product. P_fS_f is the price with "fair value" imports. Total supply (domestic production and imports) is represented by S_dgbS_f. Domestic production is represented by Q_f and fairly traded imports are represented by $Q_fQ'_f$. In the presence of less-than-fair value (LTFV) imports, domestic price falls to P_uS_u. The total supply curve then shifts downward to S_dcheaS_u. The unfair trade practices reduce domestic production from Q_f to Q_u and increase imports from $Q_fQ'_f$ to $Q_uQ'_u$. These changes in prices and quantities in turn imply adverse effects for employment, investment, and profits for the domestic industry. Similar effects (not shown in figure 5-1) are expected for the fairly traded imports. In contrast, consumers (or downstream industries) gain due to cheaper competing imports. Offsetting relief, provided to the industry in terms of either a countervailing duty or antidumping duty, is expected to permit the domestic industry to regain its initial sales (quantity Q_f) imports decline to the initial level of $Q_fQ'_f$ (figure 5-1). The increase in domestic production implies an increase in employment, investment, and profits for the petitioning industry. There are, however, welfare effects associated with the remedy process as consumers lose while producers gain from higher

[44] For the purposes of simplification, the market segment for fairly traded imports is not being discussed in this section.

prices. The overall net welfare effects due to the remedy process are represented by triangles gch and abe in Figure 5-1. In addition, tariff revenue is generated for the Treasury (gheb in Figure 5-1).

Welfare Effects of Import Price Changes

The net welfare effect associated with dumping/subsidy or its remedy is the balance of economic costs and benefits to all U.S. residents. For dumping/subsidy this includes: the benefit to consumers if imports are finished goods and to consuming industries that use the imports as intermediate inputs into their own production; and the costs to the import competing U.S. industry, its workers, and other U.S. industries selling intermediate inputs into production of the import competing industry. For the remedy, this includes: the cost to consumers if imports are finished goods and to consuming industries that use the imports as intermediate inputs into their own production; the benefits to the import competing U.S. industry, its workers, and other U.S. industries selling intermediate inputs into production to the protected industry; and the net gain (if any) in U.S. tax revenues. The net welfare effects associated with dumping/subsidy and remedy are estimated using standard economic techniques to measure consumer and producer surplus[45] explained below.

Consumer Effects

Consumer surplus measures the total net benefit to users of a product from being able to purchase the product at current prices (DbP_f in figure 5-1). In other words, consumer surplus in a single market represents the downstream user valuation of the products purchased in a market (in dollar terms) in excess of their expenditure on the products. A change in consumer surplus therefore provides a measure of the net welfare effects of a price change on downstream users of a product. A price increase from P_u to P_f in figure 5-1 reduces consumer surplus by P_uabP_f and results in a welfare loss to consumers (referred to below as the "net consumer welfare effect", the measure of consumer valuation eliminated or lost from the market because of the higher prices). P_uebP_f in figure 5-1 represents the increase in spending on the product for those users who pay the higher price. The triangle abe (figure 5-1) is a dollar measure of the welfare cost to users from reduced consumption of the product.

An equivalent price decrease (from P_f to P_u) will have an equal but reverse effect (i.e., P_fbaP_u in figure 5-1). Specifically, a price decrease will increase consumer surplus and result in a welfare gain for consumers.

Producer Effects

Producer surplus measures the total net benefit to owners of factors of production in an industry at current prices. Measuring a change in producer surplus gives the net welfare effects of a price change on all factors employed in the petitioning industry, including upstream products (P_fgcP_u).

The producer surplus in a single market represents all upstream factor owners' returns in excess of their maximum potential returns from use in next most efficient use of these resources. For example, a price increase raises producer surplus (producer gain) and is the increase in returns to factors initially (P_ucjP_f in figure 5-1) in the industry plus a dollar measure of the additional gains to new factors moving into the industry from employment elsewhere (cgj in figure 5-1).

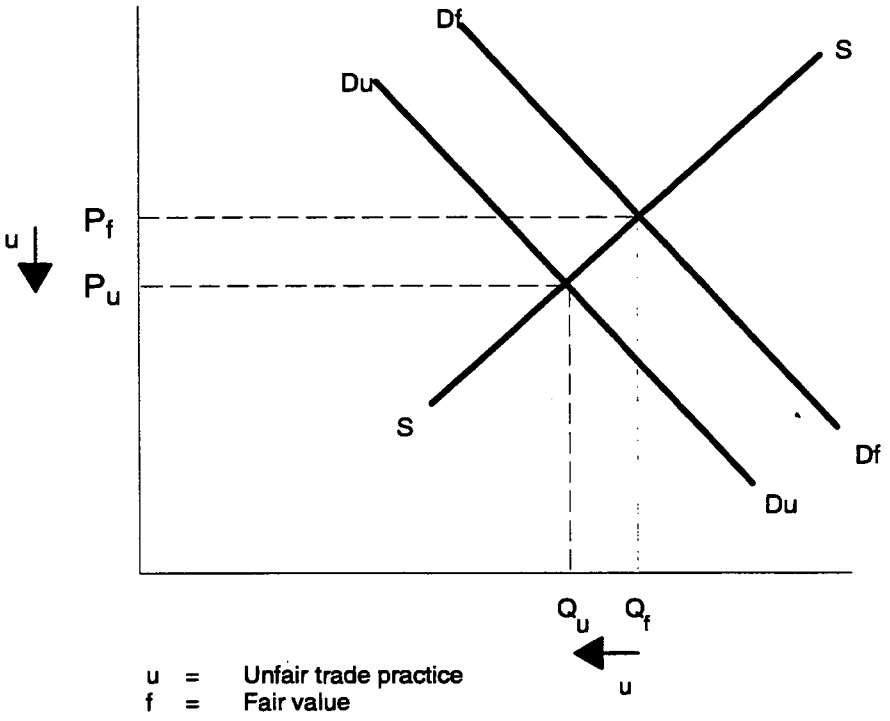
An equivalent price decrease (from P_f to P_u) will have reverse effects, but of the same magnitude (i.e., P_fgcP_u in figure 5-1). Specifically, a price decrease will lower producer surplus and result in a shift of factors away from the affected industry.

Upstream and Downstream Effects

The impact of unfair trade practices on the domestic upstream and downstream industries is illustrated in figures 5-2 and 5-3, respectively. Assuming upstream producers supply primarily to domestic producers, it is expected that the demand for upstream products (figure 5-2) will decline as their customers' output declines due to competition from cheaper imported products. As shown in figure 5-2, in the absence of unfair trade practices, quantity demanded by the petitioning industry is Q_f at a price of P_f. With the presence of unfair trade practices in the subject industry, the demand for the products of the upstream industries falls to Q_u. Hence, production

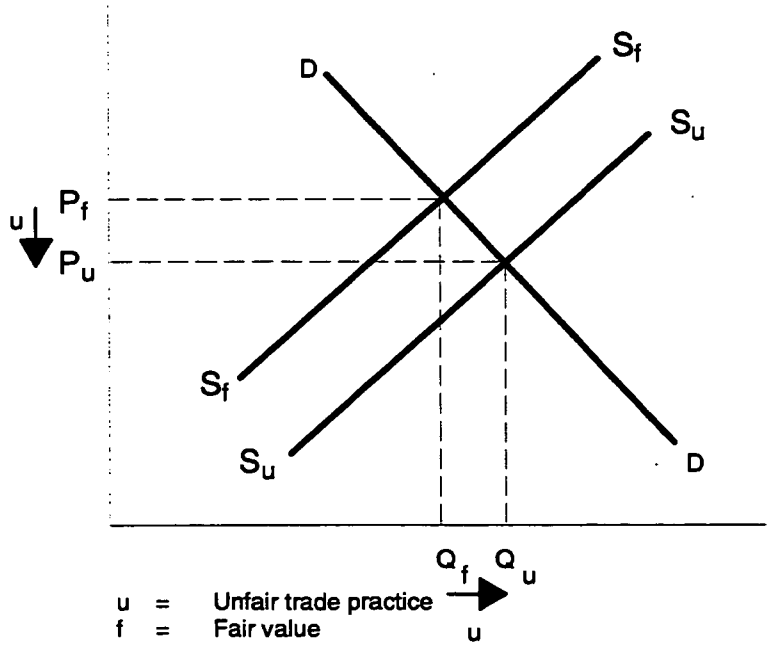
[45] See Mishan (1981) for a general survey of normative economics that includes a discussion of the basic theory and limitations of the concepts of market surplus. See Corden (1984) for a survey of the normative theory of international trade. The concept of market surplus also serves as the basis for the compensation principal used in cost-benefit analysis. For a more detailed discussion of welfare measurement in partial equilibrium trade models, see Rousslang and Soumela (1985).

Figure 5-2
Impact of Unfair Trade Practices on Upstream Industries



Source: U.S. International Trade Commission.

Figure 5-3
Impact of Unfair Trade Practices on Downstream Industries



Source: U.S. International Trade Commission.

in the upstream industries also falls, which in turn implies adverse effects for employment and revenues in these industries. In the case of downstream industries, production will increase (figure 5-3) as their costs decline because of the availability of cheaper imported inputs. As shown in figure 5-3, production increases from Q_f to Q_u (as the supply curve shifts downward) for the downstream industries with accompanying positive effects on employment and revenues.

The effect of an exactly offsetting remedy in the petitioning industry implies the regaining of the initial values of prices and quantities (i.e., P_f and Q_f in figures 5-2 and 5-3) in the upstream and downstream industries. The CPE model has been used to estimate the effects on upstream and downstream industries. The discussion of these effects has been augmented with information from questionnaire responses and information gathered during staff field work over the course of the investigation. In the case of the bearings case study, the Commission's CGE model for large sectors has been used. The CGE analysis has also been supplemented by information gathered from the other sources mentioned above.

Computable Partial Equilibrium Analysis

The second part of the case studies, as requested by the U.S. Trade Representative, entails a comparative static analysis of the effects of both the unfair trade practices and the remedy. CPE analysis, developed to provide comparative static quantification, is a fundamental technique of economic analysis that estimates the change in selected economic variables that results from an external event or "shock" to the market.[46] For example, a typical case for CPE analysis is the effect of a sales tax as an external shock imposed on a given market. The effect of the tax on the quantity demanded is obtained by estimating the equilibrium quantity demanded with the sales tax. This quantity is compared to the (observed) equilibrium quantity demanded without the tax. The difference between the two quantities is the change directly attributable to the sales tax.

[46] A similar comparative static framework with imperfect substitutes is used to measure the cost of U.S. protection in Gary C. Hufbauer and Kimberly A. Elliot, *Measuring the Costs of Protection in the United States*, Institute of International Economics, Washington, DC, January 1994. Hufbauer and Elliot present a detailed discussion of their methodology in chapter 2 of their book, "A Computable Partial Equilibrium Model."

The CPE analysis compares two equilibrium outcomes—one observed and one deduced—at a fixed point in time, hence the name comparative static.[47] This is in contrast to a dynamic analysis that estimates changes over time.[48] The principal advantage of the CPE methodology is that it isolates the effects of the external shock. All other factors that could affect the outcome are held constant, such as changes in consumer income, consumer preferences, and the price of substitutes. Similarly, a time series analysis achieves this by explicitly incorporating all other variables in the specification of the econometric model.

For this investigation, the external shocks imposed on the market are (1) the unfair trade practices, and (2) the remedy.[49] These two shocks are examined in two separate comparative static simulations, comparing the "shock-outcome" to a "base-year outcome," where the base year is the year prior to the year in which the case was filed.

The CPE model developed to assess the impact of unfair trade practices consists of three sets of demand and supply equations. The demand and supply equations represent the U.S. market for the domestically produced, the unfairly traded, and the fairly traded products, respectively, in the base year. Two common assumptions in trade policy research underlie the CPE model: (1) the elasticities of

[47] For further discussion on comparative static methods see Walter Nicholson, *Microeconomic Theory: Basic Principles and Extensions*, Dryden Press, Chicago, 3rd Edition, 1985; James Henderson and Richard Quandt, *Microeconomic Theory: A Mathematical Approach*, McGraw-Hill Book Co., 2nd Edition, 1971; and Eugene Silberberg, *The Structure of Economics: A Mathematical Analysis*, McGraw-Hill Book Co., 1978.

[48] For further discussion on dynamic analysis see Joseph F. Francois and Clinton R. Shiells, "The Dynamic effects of Trade Liberalization: A Survey," (investigation no. 332-324), USITC Publication 2608, 1993.

[49] Specifically, the CPE analysis was used to estimate the effects of dumping and antidumping duties, as well as unfair subsidies and countervailing duties, on market equilibrium prices and quantities. In the case of suspension agreements, the CPE analysis was used to estimate the effects of the dumping or subsidization only. Since no antidumping or countervailing duties are associated with suspension agreements, the remedy effect may not be readily quantified. For example, in the case of EPROMs (chapter 9), AD duties were not applicable and hence no effects of the remedy were quantified due to the suspension agreement. The effect of the remedy was estimated relative to the fair value conditions as well as relative to the actual market values that existed in a given base year.

demand, substitution, and supply are all constant[50] and (2) the market is competitive, with domestic and imported goods being imperfect substitutes.[51,52]

The demand and supply model would be comprised of the following two equations:[53]

$$(7)\quad \ln(Q_i) = \ln(k_i) + \eta_i \ln(P_i) + \sum_{\substack{j=d,u,f \\ j \neq i}} \eta_{ij} \ln(P_j)$$

$$(8)\quad \ln(Q_i) = \varepsilon_i \ln(P_i) \quad \textit{for all } i = d, u, f$$

The subscripts d, u, and f refer to the U.S. domestic product, unfairly traded imports, and fairly traded imports, respectively. Demand is described in equation (7) and supply in equation (8) for all three products. Q_i and P_i represent quantity and price for product i. The η_i is the uncompensated own-price demand elasticity for good i. The η_{ij} is the uncompensated elasticity of demand for good i with respect to price j. The ε_i is the elasticity of supply for each of the three products and k_i is a constant term. The log-linear form of the equations provides constant elasticities, which are generally used in trade research.

The extent of the change of domestic prices and quantities is a function of: (1) the size of the price shock (which is either the percentage increase in the price of unfairly traded imports needed to eliminate the unfair act or the dumping/countervailing ad valorem duty imposed on subject imports as a remedy), (2) the price responsiveness of demand for each product with respect to changes in prices (i.e., the own- and cross-price responsiveness of demand for the domestic goods, fair imports, and unfair imports), and (3) the price responsiveness of supply of each product (producers are assumed to be marginal cost pricers).[54]

Measurement of Dumping and Remedy for CPE Analysis

By definition, dumping involves either sales below cost, or sales below a measure of fair market value (FMV) due to price discrimination. While Commerce typically calculates margins of dumping on an entry by entry basis, they report them as weighted average values over a six month time period on both a company (foreign exporter) and a country basis. The difference between the actual and fair price levels of subject imports as a percentage of actual prices equals the Commerce's weighted average margin (after adjustments are made for U.S. tariff levels and transportation costs to the U.S. market). In the case studies, Commerce's weighted average margin for each country is used to estimate the economic effects of this average margin over a one year time period that includes Commerce's period of investigation. Using the weighted average margin precludes the

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[50] USITC, *Potential Impact on the U.S. Economy and Selected Industries of the North American Free-Trade Agreement*, USITC Pub. No. 2596, January 1993. Robert E. Baldwin and Tracy Murray, "MFN Tariff Reductions and Developing Country Trade Benefits Under the GSP," *Economic Journal*, 87 (March 1977), pp. 30-46. John H. Mutti, "Welfare Effects of Multilateral Tariff Reductions," *Southern Economic Journal*, 45 (January 1979), pp. 760-772.

[51] The following commercial policy studies are a selected few that have used a comparative static analysis within a perfectly-competitive, imperfect-substitutes framework: Robert E. Baldwin and Tracy Murray, "MFN Tariff Reductions and Developing Country Trade Benefits Under the GSP," *Economic Journal*, 87 (March 1977), pp. 30-46; John H. Mutti, "Welfare Effects of Multilateral Tariff Reductions," *Southern Economic Journal*, 45 (January 1979), pp. 760-772; Donald Rousslang and Phillip Young, "Calculating the Short-Run Welfare Effects of a Tariff Reduction When Wages Are Rigid," *Canadian Journal of Economics*, 17 (February 1984), pp. 39-47; Charles Stuart, "Welfare Cost per Dollar of Additional Tax Revenue in the United States," *American Economic Review*, 74 (June 1984), pp. 352-362; Tracy Murray and Donald Rousslang, "A method for Estimating Injury Caused by Unfair Trade Practices," *International Review of Law and Economics*, 9 (1989), pp. 149-164; and Morris E. Morkre and Kenneth H. Kelly, *Effects of Unfair Imports on Domestic Industries: U.S. Antidumping and Countervailing Duty Cases, 1980-1988*, (1994), Federal Trade Commission Bureau of Economics Staff Report.

[52] The concern has been expressed (among others, by Dewey Ballantine in their prehearing brief) that imperfectly competitive markets render this model inoperable. The existence of imperfectly competitive markets does not necessarily preclude the use of a CPE model such as that used here. In most cases, the quantity responses of firms to changes in prices can still be reflected in the model, yielding inferences about revenue changes that are generally valid. In such cases, the supply elasticities (or more correctly, "price response elasticities") should be appropriately chosen and interpreted.

[53] A similar type of CPE model was used in the sector level analyses conducted in the Commission's

[53]—*Continued*
analysis of the NAFTA. See USITC, *Potential Impact on the U.S. Economy and Selected Industries of the North American Free-Trade Agreement*, USITC Publication No. 2596, January 1993.

[54] See footnote 49, above. In most cases this assumption can be relaxed, provided that an appropriate "price response elasticity" is used.

estimation of the effects that variations in dumping margins on an entry by entry basis or on an individual export company basis over the time period may have had on the domestic industry or on the distribution of the effects over different domestic producers, U.S. market segments, or regions of the country. All subject country imports that were sold over the one year time period are therefore assumed to have been priced the same percentage below their fair values. It is also assumed that the dumping is perceived by buyers and competing producers as permanent and that fair value prices as measured by Commerce would have been no different absent the dumping.

When an antidumping order is issued, the firm-specific margins of dumping serve as provisional duty rates on which importer cash deposit rates are set. While the volume of imports of the subject product is likely to be inversely related to the size of this cash deposit, actual duties are assessed through administrative review on an entry-by-entry basis.[55] The first review may be conducted one year after an AD order is in place and covers entries from the effective date of Commerce's preliminary margin.[56] Administrative reviews therefore essentially generate new margins of dumping that serve as cash deposit rates for future entries[57]. In estimating the effect of the dumping remedy, the weighted average margin of dumping is used as an ad valorem duty. Since the duty may be partially or totally refunded, however the tariff revenue effects are not added to the net welfare calculations in dumping cases. This amounts to estimating the economic effect of the elimination of dumping by foreign producers.

The Commission methodology in estimating the effects of remedy differs from estimating the effects of dumping in that it is assumed that foreign producers reduce their home market prices (i.e., FMV prices decrease) as exports are diverted back from the U.S. market.[58] The result then, is that for certain case studies the remedy eliminates dumping but does not eliminate all of the adverse effects of dumping on domestic producers.

[55] See Horlick, Gary N. (1989).

[56] Normally 280 days after a successful petition is filed, Commerce will instruct Customs that importers must make antidumping deposits in cash. One year after the antidumping order is published (under normal circumstances, 645 days after the petition is filed, but usually longer), domestic producers, foreign producers, or importers can request a Section 751 review of individual foreign producers.

[57] See Appendix C for a more detailed discussion of the antidumping process.

[58] This is very similar to the terms of trade effect of a simple ad valorem tariff.

Measurement of Subsidy and Remedy for CPE Analysis

The comparative static estimation of the effects of subsidy begins with the weighted average margin of subsidy for each subject country as measured by Commerce over their one year period of investigation and focuses on the effects of foreign subsidy over this same time period. The estimation therefore does not consider the effects that different types of subsidies may have had on foreign production costs[59] or the effects that variations in subsidies to individual foreign producers may have had. Also, as with dumping, it does not consider the distribution of the effects over different domestic producers, U.S. market segments, or regions of the country. The margin of subsidy calculated by Commerce is simply treated as an ad valorem subsidy,[60] all companies producing subject country imports over the one year time period are assumed to have received the same level of subsidy, and the resulting price decline in subject imports was perceived by buyers and competing producers as permanent.

[59] In assessing the benefits of subsidies to foreign producers, although Commerce generally examines a one year time period, they may be looking at subsidy programs that involved equity or other cash infusions that took place a decade or more ago. This is particularly important for capital-intensive industries or industries that have large up-front product development costs. For example, a one-time subsidy for capital can generate benefits over the life of the capital equipment. By measuring a current year benefit for subsidy payments made in previous years, Commerce is implicitly estimating the effect of subsidy programs over a period when all costs are variable. For this reason, one needs to carefully consider the types of subsidies identified by Commerce and, if appropriate, attempt to assess what the condition the U.S. industry would be in if foreign long-run costs, including those incurred years prior to the investigation, had not been subsidized. For example, in their model of the aircraft industries, R. Baldwin and P. Krugman focus on a twenty-year product cycle to measure the injury caused by EC subsidies to Airbus industries. See R. Baldwin and P. Krugman, 'Industrial Policy and International Competition in Wide-Bodied Jet Aircraft,' in R. Baldwin, ed., *Trade Policy Issues and Empirical Analysis* (Chicago: University of Chicago Press, 1988).

[60] In their pre-hearing brief, Dewey Ballantine point out that the margin, as calculated by Commerce, is an allocation of the amount of a subsidy over the subsidized firm's sales. It therefore may not accurately measure the actual cost reduction enjoyed by the subsidized exporter. In some cases, additional information might lead to a superior measure of a cost shock. However, in the absence of such information, the Commerce margin remains the best quantitative measure.

The price effects of subsidy depend on whether the subsidies in the foreign country are applied only to exports, to all domestic production in a particular industry, or to inputs utilized by that industry. If Commerce has calculated a subsidy margin based on domestic production, then only part of the subsidized production may be sold in the U.S. market. With sales of the subsidized product to non-U.S. markets, there will be less than full pass-through of the subsidy margin to the U.S. market.[61] Therefore, to estimate the economic effects of the subsidy, the extent to which the subsidy is reflected in lower U.S. prices (i.e., how much is passed through to the U.S. market) must be estimated.[62]

To remedy subsidy, a countervailing duty is imposed on subject imports equal to the subsidy margin calculated by Commerce. Since this duty is imposed on exports to the U.S. market only and a production subsidy may benefit sales in markets other than the U.S. market, it may over-compensate for the subsidy. That is, average U.S. prices for subject imports will remain below their non-subsidized level as a result of the subsidy remedy.

Measurement of Suspension Agreements for CPE Analysis

Finally, in the case of suspension agreements, which typically take the form of either removing all dumping/subsidization or having subject imports temporarily removed from the U.S. market, the impact of the dumping/subsidization is estimated by employing the AD/CVD margin. In the eight cases selected for analysis in this study, frozen concentrated orange juice, EPROMS, and standard welded pipes are the only cases where suspension agreements were found.

Data Needs for CPE Analysis

The data requirements for the CPE simulations of the dumping and the remedy for each case study are explained in chapters 7 to 14. These included: (1) U.S. market shares in the base year for the domestic product and fairly and unfairly traded imports; (2) the elasticities of demand and supply for each of the three products; (3) the elasticities of substitution among the three products; (4) the magnitude of the price and quantity shocks reflecting dumping; and (5) the magnitude of the cost shock capturing the effect of the remedy or antidumping duty. Market shares were obtained either from public sources or from questionnaire responses. Where possible the demand, supply, and substitution elasticities were estimated econometrically from public data.[63] Finally, as discussed above, the magnitude of the price and quantity shocks to the unfair imports were obtained from Commerce, and the cost shocks corresponded to the average antidumping duty rates collected by Customs.[64]

Measurement of Net Welfare Effect

The CPE analysis and the econometric analysis provide price and quantity effects for three different sectors of the U.S. market: domestic production, unfairly traded imports, and fairly traded imports. These price and quantity effects are used to estimate the welfare effects due to the unfair trade practices and the remedy process. Let hats (^) denote percentage changes; p, q, and V denote price, quantity, and market shares (based on value); and the subscripts d, u, and f denote the domestic product, unfairly traded imports, and fairly traded imports, respectively. The net consumer welfare (CW) effect of a price change may be estimated in percentage terms as the sum of three terms: $CW=CW_d+CW_u+CW_f$. Each of these is calculated as follows:[65]

[61] For a more detailed discussion of the model used to estimate the U.S. market pass-through see Arce, Francois, and Hall (1993).

[62] For a discussion of this, see Francois et al. (1991).

[63] In those cases where the data were not available, the elasticity estimates were obtained from published sources such as academic journals or government reports. Ranges of benchmark estimates were used in conjunction with information developed from questionnaires and fieldwork. Results reported in the case studies reflect the use of intermediate point estimates of these elasticities.

As has been pointed out, the CPE analysis is a comparative static analysis. It measures a response to a given shock at a single point in time, rather than a path of responses over time. As a general rule in the CPE analysis, elasticities are chosen to reflect the response to a shock after one year.

[64] These rates are typically published by Commerce in the *Federal Register.*

[65] If the price level increases (decreases), this is a net welfare loss (gain) to consumers.

$$(9)\quad CW_d = V_d p_d \hat{} \left(1+ \frac{\hat{q}_d}{2}\right)$$

$$(10)\quad CW_u = V_u p_u \hat{} \left(1+ \frac{\hat{q}_u}{2}\right)$$

$$(11)\quad CW_f = V_f p_f \hat{} \left(1+ \frac{\hat{q}_f}{2}\right)$$

The net welfare effect on domestic producers (PW_d) of a price change will exactly equal the inverse of the net welfare effect on consumer
s of just the domestic product as follows:[66]

[66] If the price level increases (decreases), then this is a net welfare gain (loss) to U.S. producers.

$$(12)\quad PW_d = V_d p_d \hat{} \left(1+ \frac{\hat{q}_d}{2}\right)$$

The net welfare effect on the domestic economy of a price change (W) is therefore:

$$(13)\quad W = V_u p_u \hat{} \left(1+ \frac{\hat{q}_u}{2}\right) + V_f \hat{p_f} \left(1+ \frac{\hat{q}_f}{2}\right)$$

If the industry has a price increase from the imposition of an antidumping or countervailing duty, then the welfare cost to consumers of the import price increase will be offset at least partially by a gain from the ad valorem duties collected. The net welfare effect can be calculated as the welfare effect of the estimated import price increase minus the duties,

$$(14)\quad W = V_u \hat{p_u} \left(1+\frac{\hat{q}_u}{2}\right) + V_f \hat{p_f} \left(1+ \frac{\hat{q}_f}{2}\right) - \textit{Duties}$$

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CHAPTER 6
The Case Studies: Selection Methodology and Major Findings

This chapter provides the methodology used to select the eight cases for estimating economic effects of unfair trade practices and remedies over the 1983-89 period. A summary of major findings for each of these case studies follows. The detailed case analyses are presented in chapters 7 to 14 below.

Selection Methodology

More than 1,000 petitions were filed for AD/CVD investigations between 1979 and 1990. More than 400 resulted in duties or suspension agreements. This list was broken into about 140 industry categories amenable to case study. To address the questions posed by the U.S. Trade Representative, a sample of cases had to be selected that represented as closely as possible the entire caseload of title VII actions. Several criteria for selection were identified. First, certain legal restrictions had to be accommodated. Cases could not be or would not likely be in litigation. The sample was designed so that it would not complicate Commission reviews pursuant to 751(b) investigation to review an outstanding order, or sunset reviews under the new legislation implementing the GATT agreement. Therefore, cases subject to these conditions were eliminated from sample selection.

In order to conduct an economic analysis, an effort was made to select those industries for which necessary data were available. Two to three years of data prior to the filing of the case as well as two to three years of data after the determination date was desired to effectively analyze economic effects. The cases were bound for this practical reason by the mid 1980s and for the legal reason noted above, the back-end cutoff for cases was mid-1989. Within these constraints, the sample selection process aimed toward representing the industries that petition for relief from unfair trade practices, including mature, high-technology, agriculture, and commodity industries; final goods and intermediate goods; and rapidly changing and mature industries. Practical considerations including confidentiality, availability of public data, and industry cooperation also guided selection. Based on these criteria, the following cases were selected: frozen concentrated orange juice, lamb meat, EPROMS, color television picture tubes, solid urea, brass sheet and strip, standard welded carbon steel pipes and tubes, and certain bearings.

Table 6-1 identifies the title VII cases, the range of final margins, and final determination dates for AD and CVD investigations for each of the proposed case study industries. It also identifies the industries that are upstream and downstream to the petitioning/target industry.

As has been stated in chapter 2 of this report, these cases were governed by the antidumping and countervailing duty laws as they existed at the time of the investigation. The laws have been amended several times, most recently by the Uruguay Round Agreements Act (effective January 1, 1995), and many of these changes are highlighted in chapter 2. The reader is cautioned against inferring that specific amendments would necessarily have resulted in a different determination in certain investigations if that determination had been made under current law. The prior investigations were conducted using different methods for collecting and calculating data, including determining the dumping and subsidy margins.

Many of the changes in methodology are interrelated and interdependent; thus, a change to the calculation of one variable may provide choices regarding calculations and data that were not alternatives for this investigation at the time it was conducted. Similarly, there are different and separate methodologies and law governing the conduct of different types of investigations, such as original antidumping or countervailing duty investigations and reviews.

Table 6-1
Investigation 332-344: Overview statistics for case studies

Product group	Case dates	Type	Source	Final margin range *(percent)*	Principal upstream products	Principal downstream products
Frozen concentrated orange juice	3/ 2/83 4/22/87	CVD AD	Brazil[1] Brazil[2]	3.51 1.96	Machinery & equipment suppliers, grove care companies	Retail + industrial packages of juice and juice products in all forms
Lamb meat	9/17/85	CVD	New Zealand[3]	$0.18/lb (18 percent)	Equipment suppliers, feed distributors, veterinarian services	Retail cuts
EPROMS	8/ 6/86	AD	Japan[1]	60.1-188.0	Semiconductor manufacturing equipment, silicon wafers	Computers and communications equipment
Color picture tubes	1/ 7/86 1/ 7/86 1/ 7/86 1/ 7/86	AD AD AD AD	Canada Japan Korea Singapore	0.65 1.34-33.5 1.91 5.33	Glass, electron guns	TV receivers
Solid urea	7/14/87 7/14/87 7/14/87 7/14/87 7/14/87 7/14/87 7/14/87 7/14/87 7/14/87 7/14/87 7/14/87 7/14/87 7/14/87 7/14/87 7/14/87 7/14/87	AD AD AD AD AD AD AD AD AD AD AD AD AD AD AD AD	Armenia Azerbaijan Belarus Estonia Georgia Germany Kazakhstan Kyrgyzstan Latvia Lithuania Moldova Romania Russia Tajikistan Turkmenistan Ukraine Uzbekistan	53.23-68.26 53.23-68.26 53.23-68.26 53.23-68.26 53.23-68.26 44.80 53.23-68.26 53.23-68.26 53.23-68.26 53.23-68.26 53.23-68.26 90.71 53.23-68.26 53.23-68.26 53.23-68.26 53.23-68.26 53.23-68.26	Natural gas	Agricultural crops
Brass sheet and strip	1/ 8/87 1/12/87 1/12/87 1/12/87 3/ 6/87 3/ 6/87 3/ 6/87 3/ 6/87 3/ 6/87 8/12/88 8/12/88	CVD AD AD AD AD CVD AD AD AD AD AD	Brazil Brazil Canada Korea France France Germany Italy Sweden Japan Netherlands	3.47 40.62 2.51-11.54 7.17 42.24 7.24 5.31-15.94 12.08 9.49 13.3-57.98 16.99	Copper, zinc, and brass in the form of cathodes, ingots or scrap	Ammunition, auto radiators, builders' hardware, lamps, jewelry, electrical/ electronic connectors
Standard welded carbon steel pipes and tubes[4]	10/29/82 12/27/82 2/15/83 5/ 7/84 5/ 7/84 2/11/85 2/ 8/85 3/27/85 8/14/85 10/28/85 11/13/85	CVD CVD CVD AD AD CVD AD AD CVD AD CVD	Italy Brazil[1] Korea[5] Korea[5] Taiwan Spain Spain Brazil Thailand[3] Venezuela Venezuela	Negative 12.95 1.88 0.22-2.13 9.7-43.7 Terminated[6] Terminated[6] Terminated[6] 1.79 Terminated[6] Terminated[6]	Hot-rolled steel, sheet and strip	Plumbing, heating, cooling, and sprinkler systems; tubular fences

See footnotes at end of table.

Table 6-1—*Continued*
Investigation 332-344: Overview statistics for case studies

Product group	Case dates	Type	Source	Final margin range *(percent)*	Principal upstream products	Principal downstream products
Standard welded carbon steel pipes and tubes—*Continued*	1/15/86	CVD	India	0.42		
	1/15/86	CVD	Taiwan	Terminated[6]		
	3/ 7/86	CVD	Turkey	18.81		
	3/11/86	AD	Thailand	15.6-15.9		
	4/16/86	AD	Yugoslavia	Terminated[6]		
	5/12/86	AD	India	7.08		
	5/15/86	AD	Turkey	1.26-23.12		
	9/ 4/86	AD	China	Negative		
	11/13/86	AD	The Philippines	Negative		
	11/13/86	AD	Singapore	Negative		
	9/27/88	CVD	Argentina[3]	5.77		
	9/17/92	CVD	Venezuela[3,4]	0.78		
	11/ 4/92	AD	Brazil	103.38		
	11/ 4/92	AD	Korea	4.91-11.63		
	11/ 4/92	AD	Mexico	32.62		
	11/ 4/92	AD	Romania	Negative		
	11/ 4/92	AD	Taiwan	19.46-27.65		
	11/ 4/92	AD	Venezuela	52.51		
Certain bearings						
a.Tapered roller:						
Small tapered	8/18/76	AD	Japan	0-18.07	Special alloy steel seamless tubing, bar, and wire	Autos, auto after-market, aircraft, gears, farm machinery, conveyors, etc.
Tapered	6/15/87	AD	China	0.97		
Tapered	6/19/87	AD	Hungary	7.42		
Tapered	6/19/87	AD	Romania	8.70		
Tapered	8/14/87	AD	Italy	124.75		
Tapered	8/14/87	AD	Yugoslavia	33.61		
Large tapered	10/ 6/87	AD	Japan	47.05-70.44		
b.Antifriction:						
All	5/ 3/89	CVD	Singapore	2.34	Special alloy steel seamless tubing, bar, and wire	Motor vehicle, aerospace, other transportation and industrial machinery
Ball	5/15/89	AD	France	56.50-66.42		
Cylindrical roller	5/15/89	AD	France	11.03-18.37		
Spherical roller	5/15/89	AD	France	39.00		
Ball	5/15/89	AD	Germany	31.29-132.25		
Cylindrical roller	5/15/89	AD	Germany	52.43-76.27		
Spherical roller	5/15/89	AD	Germany	74.88-118.98		
Ball	5/15/89	AD	Italy	68.29-155.99		
Cylindrical roller	5/15/89	AD	Italy	212.45		
Ball	5/15/89	AD	Japan	21.36-106.61		
Cylindrical roller	5/15/89	AD	Japan	4.00-51.21		
Spherical roller	5/15/89	AD	Japan	84.26-92.00		
Ball	5/15/89	AD	Romania	39.61		
Ball	5/15/89	AD	Singapore	25.08		
Ball	5/15/89	AD	Sweden	180.00		
Cylindrical roller	5/15/89	AD	Sweden	13.69		
Ball	5/15/89	AD	Thailand	18.77		
Ball	5/15/89	CVD	Thailand	21.54		
Ball	5/15/89	AD	UK	44.02-61.14		
Cylindrical roller	5/15/89	AD	UK	43.06		

[1] Suspended.
[2] With regard to the antidumping investigation of orange juice from Brazil, an affirmative remand determination was made in February 1989.
[3] CVD determinations on lamb from New Zealand (Sept. 1985) and standard pipe and tube from Thailand (Aug. 1985), Argentina (Sept. 1988), and Venezuela (Sept. 1992) were made by the Department of Commerce only. These exporting countries were not deemed to be "countries under the agreement" with regard to the obligations of the GATT Subsidies Code at the time of the investigation and thus imports were not subject to an injury test.

Table 6-1 Footnotes—*Continued*

[4] Countervailing duty determinations on standard welded carbon steel pipe and tube imports from Venezuela in October 1992 and antidumping determinations on such imports from Brazil, Taiwan, Korea, Mexico, Romania, and Venezuela in September 1992 are not within the scope of this investigation, but are presented here for purposes of comparison.

[5] The antidumping and countervailing duty orders on standard welded carbon steel pipe and tube from Korea were revoked in October 1985.

[6] Petitioners withdrew petition pursuant to a VRA on similar measure (Taiwan maintained a unilateral restraint on exports to the United States).

Major Findings of the Case Studies

This section provides a case-by-case summary of industry findings as well as time series and CPE model results.

Frozen Concentrated Orange Juice

AD petitions were filed with Commerce and the Commission on behalf of Florida growers of round oranges and FCOJ extractors on May 9, 1986. The petitions alleged that imports of frozen concentrated orange juice (FCOJ) from Brazil were being sold in the United States at LTFV and that an industry in the United States is materially injured or threatened with material injury by reason of such imports. The Commission made a final affirmative determination on April 22, 1987. Commerce published its final AD margin of 1.96 percent on May 5, 1987. The AD order was applicable to all Brazilian FCOJ exporting companies, excluding Sucocitrico Cutrale S.A. (Cutrale).

The share of imports from Brazil in U.S. FCOJ availability[1] fell from 34 percent in 1985/86[2] to 23.2 percent in 1987/88 and averaged 21 percent during 1989/90-1993/94. The share of U.S. FCOJ production rose from 46 percent of U.S. FCOJ availability in 1985/86 to 60 percent in 1987/88 and averaged 62 percent during 1989/90-1993/94. The recovery of Florida FCOJ production from a number of freezes that occurred in the early to mid-1980s and a reduction in the quantity of imports from Brazil were responsible for these share changes (figure 6-1). Imports from Brazil also declined from 92 percent of total U.S. FCOJ imports in 1985/86 to 86 percent during 1989/90-1993/94. Producer sales prices for FCOJ rose from $1.11 per gallon in 1985/86 to 1.93 per gallon in 1987/88, fell in 1988/89, peaked at $2.03 per gallon in 1989/90 (a freeze year), and then declined to $1.13 per gallon in 1992/93. Unit value prices for FCOJ imports from Brazil followed a similar trend (figure 6-1).

A number of events likely affected U.S. FCOJ production and imports from 1985/86. First, the industry and downstream FCOJ purchasers agree that the AD order put a price floor on Brazilian exports to the U.S. market, because Brazilian exporters became unwilling to sell at prices that could be construed as LTFV after the remedy. In January 1987 the Brazilian Government changed its minimum export price for FCOJ by linking this price to a 20-day moving average FCOJ futures price on the New York Cotton Exchange.[3] Under the previous system, Brazilian exporters could offer long-term fixed-price contracts to buyers.

Second, according to the domestic industry, measures undertaken by Florida orange growers since 1986/87 aided the industry's recovery from the earlier freezes. Such measures included closure of unprofitable groves, movement of groves to southern areas of Florida where frost and freeze damage were greatly reduced, and development of disease-resistant and higher yielding trees and improved horticultural practices. According to the domestic industry, the 1987 AD order insulated growers from Brazilian imports while these competitive efforts were being undertaken. The industry also argues that the AD order shifted the interest of Brazilian exporters to other markets in Europe and Asia.

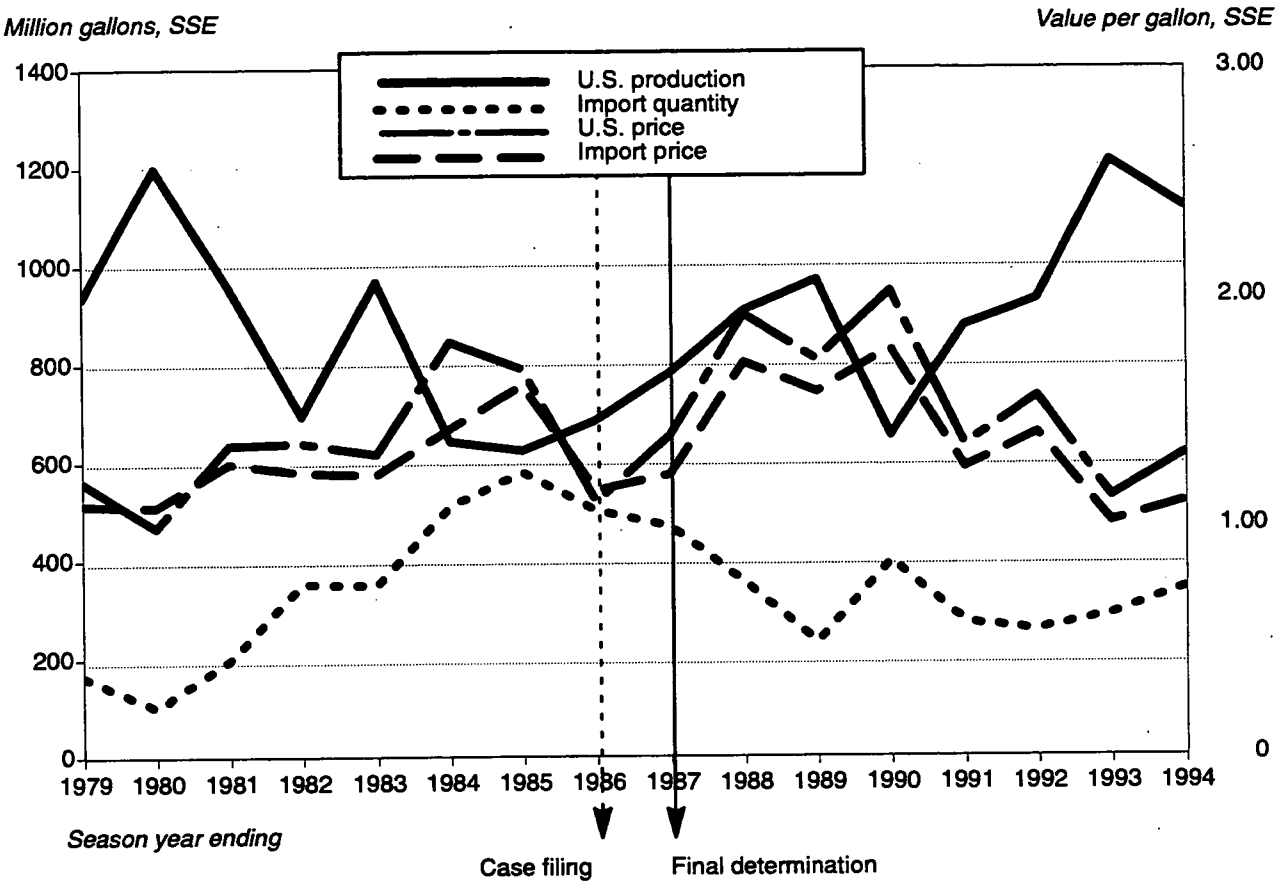
Time series analysis is used to examine the changes in consumption of domestic FCOJ and U.S. imports from Brazil following the AD order. The results indicate that imports from Brazil were 75 percent lower in the years after the remedy (1986/87-1993/94) compared with imports in earlier

[1] U.S. FCOJ availability is defined as U.S. production plus imports plus carryover stocks from the previous year.

[2] The split year refers to the marketing year for domestic FCOJ, December-November.

[3] Brazil's minimum export price for FCOJ is the minimum amount of U.S. dollars that a processor must deliver to the Brazilian foreign trade department (DECEX) in order to receive an export license for each export sale.

Figure 6-1
FCOJ: U.S. production and Brazilian imports by quantity and price, 1979-94



Note.—Quantities are in single strength equivalent (SSE).

Source: Compiled statistics of the U.S. Department of Commerce and U.S. Department of Agriculture.

years (1974/75-1985/86) and that consumption of domestic FCOJ was 28 percent higher in the years after the AD remedy compared with that in the earlier years. It is likely these results reflect the recovery of Florida FCOJ production and changes in Brazilian exporter behavior from 1986/87. The time series analysis was not able to isolate the impact of the AD order on FCOJ prices.

The CPE analysis shows that the FCOJ producer price, output, and revenue fell by .5, .6, and 1.2 percent, respectively, because of the dumping compared with their "fair" values and that employment fell by .5 percent. Imports from Brazil also rose by 2.1 percent, and the price of these imports fell by 1.5 percent. FCOJ consumers are shown to have benefited from the dumping by $19.0 million because of lower prices while producers lost $5.2 million. The net result was a net welfare gain of $13.8 million.

After the remedy, the FCOJ producer price, output, and domestic revenue remained .3 percent, .2 percent, and .5 percent, respectively, below their "fair" values. The remedy did not completely offset the effect of the dumping due to an incomplete pass through of the remedy to the price of Brazilian imports (the "terms of trade" effect). FCOJ producers continued to lose $2.5 million because of dumping that was not offset by the remedy. Consumers gained $8.3 million after the remedy and net national welfare rose $5.8 million. Compared to actual 1984/85 values, the domestic producer price, domestic output, and domestic revenue rose by 0.3, 0.4, and 0.7 percent respectively, and imports fell by 1.2 percent. Welfare of FCOJ consumers declined $10.6 million because of the remedy alone while producers gained $2.7 million. Net national welfare declined by $7.9 million from the 1984/85 value.

The effect of the AD order on the upstream industry is not included in this case study, because upstream sales of inputs to the FCOJ industry generally account for a negligible part of the sales of many of these suppliers and the same inputs are sold to other users. Prices paid for domestic and Brazilian FCOJ reported by downstream FCOJ purchasers responding to the Commission's questionnaire rose during 1987-88, fell in 1989, and rose in 1990. Most of the purchasers responding to the Commission's questionnaire stated that fluctuations in supply and the 1989 freeze were the most important determinants of FCOJ prices during this period.

Lamb Meat

On March 26, 1985, Commerce received a petition on behalf of the U.S. lamb meat industry alleging that New Zealand producers, processors, or exporters of lamb meat receive benefits that constitute bounties or grants under section 303 of the Tariff Act of 1930. Commerce determined that during June 25, 1985-March 31, 1990, certain New Zealand lamb imports into the United States were benefiting from such bounties and grants, which were initially determined to be NZ$0.3602/lb. or US$0.18/lb., and then imposed a CVD on these imports (hereafter subject imports). As of March 1995, seven final administrative reviews of the CVD order on New Zealand lamb meat had been completed by Commerce, with remedies decreasing for each annual review until the total bounty or grant was found to be *de minimis* for all firms for the review period April 1, 1990 through March 31, 1991. A subsequent final review for the period April 1, 1991, through March 31, 1992, also determined *de minimis* CVD amounts for all firms. On May 22, 1995, the eighth final DOC administrative review determination was published reporting that the subsidy for the period April 1, 1992 through March 31, 1993 was *de minimis* for all firms. In addition, DOC determined that the Government of New Zealand has abolished all subsidy programs for lamb meat for a period of three consecutive years, and announced they were revoking the countervailing duty order.

Despite the imposition of the CVD on subject imports during 1985, total U.S. lamb meat imports actually rose by 52 percent during 1984-86, leading to an increase in the import share of U.S. supply from 5 percent in 1984 to 8 percent in 1986. Figure 6-2 demonstrates that during much of the CVD period, the decline in subject U.S. imports from New Zealand was compensated for by a rise in nonsubject U.S. imports from Australia, while volatile monthly U.S. production seemed to trend gently downward.[4] Econometric results confirm this and suggest that during the CVD period, New Zealand imports were about 11 percent lower, while Australian imports, which increased from relatively low pre-CVD period levels (figure 6-2), were about 92 percent higher than during other periods in the sample.

Responses to questionnaires sent to meat packers suggest a number of trends occurred during the CVD period. During 1985-90, questionnaire data suggest that while industry employment levels rose 112 percent, total compensation rose by 105 percent, such that per-worker compensation rates declined by about 3 percent on an average hourly basis.

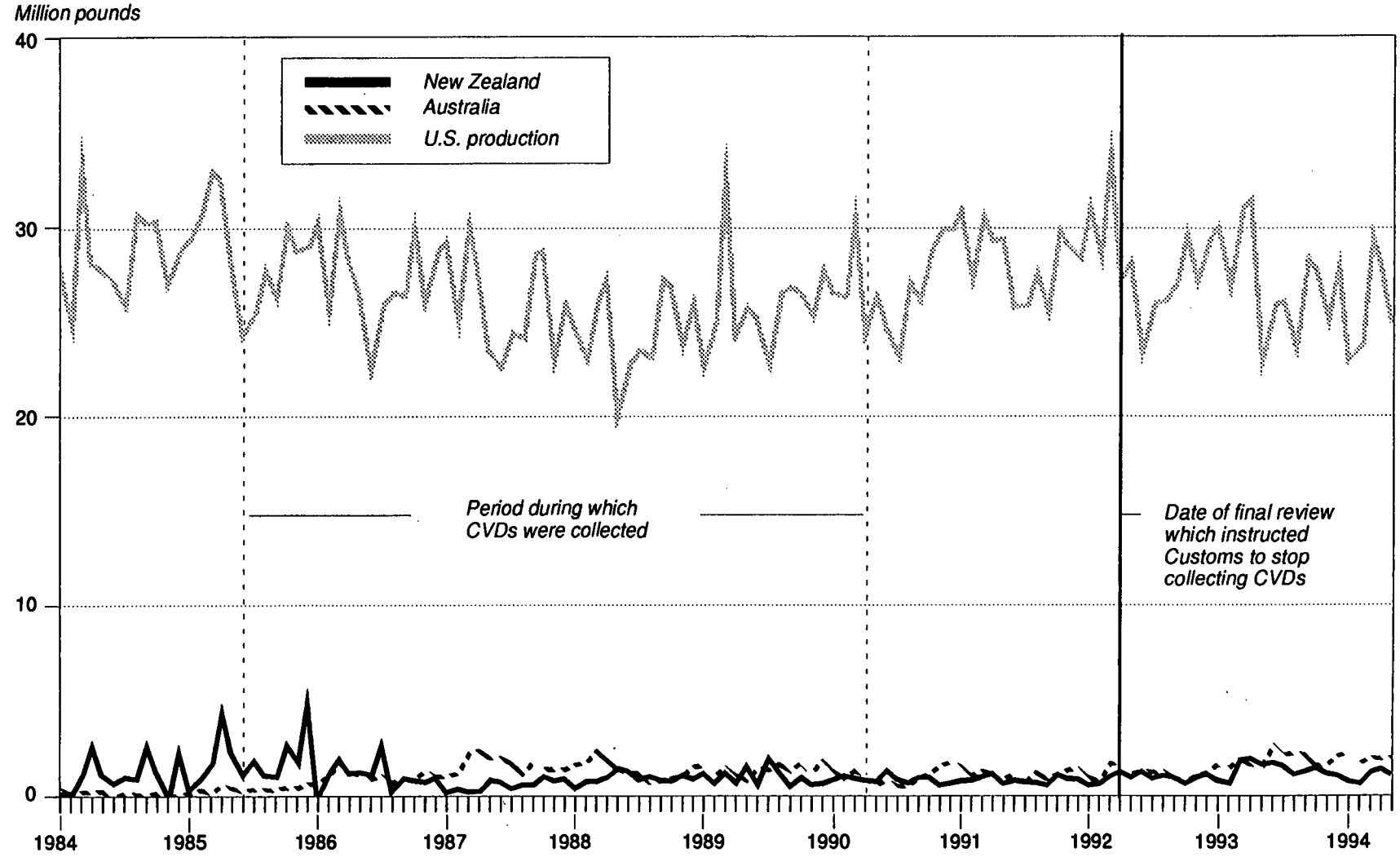
Trend and time series analyses find that the CVD period events did not greatly affect the market. One reason is evident from figure 6-2: imports account for minor shares of lamb available to the U.S. market. Further, this lack of market impact may also arise from two sets of possibly offsetting effects. First, U.S. domestic lamb price, found to be about 10 percent higher during the CVD period, was matched with a 3.5-percent drop in U.S. consumption of domestically produced lamb. And second, as already stated, the decline in subject U.S. lamb imports from New Zealand was offset by a concurrent rise in nonsubject U.S. imports from Australia.

The CPE analysis indicates that subject imports had little effect on the domestic industry, with domestic levels of price, output, revenue, and employment being less than 1 percent below levels that characterized conditions without subsidized imports (i.e., fair trade conditions). Compared with levels under fair trade conditions, subsidized imports from New Zealand were 26 percent higher in volume and 9 percent lower in price. Nonsubsidized imports from Australia were within 1 percent of fair trade levels in terms of price and volume. Compared with fair trade conditions, subsidized imports resulted in net welfare gains of $2 million, where consumer gains of $3 million were only partially offset by $1 million in producer losses.

Compared with fair trade conditions, the CPE model estimates that the remedy (CVD imposed on the subject subsidized imports) was successful in "bringing back" the U.S. domestic industry, import market, and welfare levels to fair trade positions. The

[4] Calculating percentage changes in monthly U.S. lamb production and imports over the June 1985-March 1990 CVD period is complicated (and distorted) by the "peaks" and "troughs" of the seasonal influences inherent in such data. Calculating an overall CVD period change in each of these lamb variables signifies less than would the movements in each of the monthly variable values from year to year, and across the CVD period.

Figure 6-2
Lamb meat, fresh, chilled, or frozen: U.S. production, subject New Zealand imports and non-subject Australian imports, by month, January 1984 to May 1994



Source: Compiled from official statistics of the U.S. Department of Commerce.

remedy resulted in domestic lamb price, output, revenue, and industry employment levels having increased to fair trade levels, and in prices, imported quantities, and revenues of subject and nonsubject lamb imports returning to fair trade levels. The remedy resulted in levels of consumer and producer benefits common to fair trade conditions, and thereby resulted in no net changes in welfare from fair trade levels.

The effect of the CVD order on the upstream industry (suppliers), which consists of such input suppliers as feed distributors, veterinarians, and machinery and equipment dealers, is not included in this case study, because upstream sales of inputs to the lamb industry generally account for a negligible part of these suppliers' sales. Moreover, lamb-related portions of these upstream sales are not easily identified, since the same inputs are sold to other "non-lamb" users. For the downstream industry (consumers), which includes grocery stores, hotels, restaurants, and institutions, the lamb-related portions of their purchases account for a small portion of total purchases, although such sales may be identified with the lamb industry. Responses from questionnaires sent to lamb purchasers demonstrate that quarterly prices fluctuated during 1989-91. Few price effects from the CVD order could be identified.

EPROMs

Erasable programmable read only memories (EPROMs) are a type of semiconductor integrated circuit (IC) designed to store information. In September 1985, major U.S. EPROM producers filed a petition with the Commission and Commerce alleging that the U.S. EPROM industry was materially injured and threatened with such injury by reason of LTFV imports of EPROMs from Japan. The Commission transmitted its affirmative preliminary determination to Commerce in November 1985. The Commission instituted its final AD investigation following Commerce's preliminary determination that imports of EPROMs from Japan were being sold in the United States at LTFV. In July 1986, Commerce entered into an agreement that suspended the AD investigation and the imposition of AD duties as part of the Semiconductor Arrangement, a broader agreement entered into by the Governments of the United States and Japan. The suspension agreement committed Japanese firms to cease selling EPROMs and other semiconductors in the U.S. and other markets at LTFV. Despite the suspension agreement, final determinations were required by Commerce and the Commission pursuant to a request to continue the investigation filed by the petitioners. The Commission made its final affirmative determination in December 1986. U.S. imports of EPROMs from Japan were subject to AD duties ranging from 60.1 to 188.0 percent.

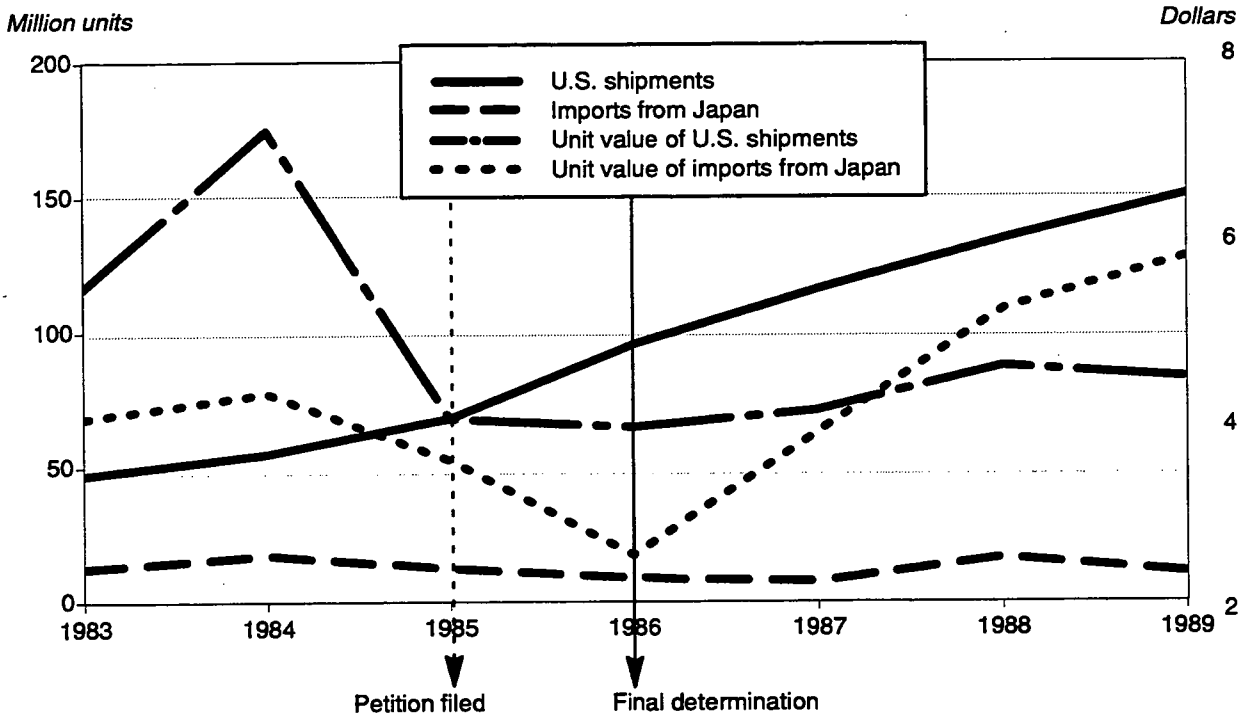
U.S. shipments accounted for 80 percent of the U.S. market in 1985, the year of the petition (figure 6-3). Japanese imports accounted for 19 percent of apparent U.S. consumption in that year. By 1986, U.S. shipments rose to 85 percent of the U.S. market with Japanese imports declining to 13 percent. Import penetration rose during 1987-89 as European producers became suppliers to the U.S. market, and U.S. producers began to shift production to more profitable ICs. Imports from Japan accounted for 9 percent of U.S. consumption in 1989.

U.S. shipments of EPROMs rose from $258 million in 1983 to $397 million in 1984, or by 54 percent. U.S. shipments fell to $274 million in 1985, representing a 31-percent decrease from those in the previous year, as demand and prices collapsed during the downturn of the business cycle in the IC industry. U.S. shipments recovered during 1986-89, rising to $677 million by the end of the period, representing an increase of 162 percent from 1983 to 1989. U.S. EPROM exports followed a similar pattern, rising from $70 million in 1983 to $103 million in 1984 before falling to $76 million; exports rose to $340 million by 1989, representing an increase of 386 percent over the period. U.S. EPROM producers reported operating losses in 1985, 1986, and 1987 as the effects of the industry slump lingered. Similarly, employment of production and related workers in the industry rose from 2,767 in 1983 to 3,810 in 1984 but then declined to 3,050 in 1985 as demand fell; employment of such workers rose to 3,504 by 1989, or by 27 percent over the period.

The econometric analysis of EPROM prices used a hedonic[5] price index to look at the rate of price decline of EPROMs during 1983-93. The hedonic price index indicated that price decline slowed after the investigation. The pure hedonic price index model was augmented to account for the semiconductor industry's business cycle and downstream demand among other factors. In a separate analysis, the movements of EPROM prices and quantities were compared with those of all ICs. The analysis shows that while EPROMs remained an almost constant portion of total IC unit shipments, EPROM revenue increased as a share of total IC revenue during 1987-89, indicating that the EPROM investigation may appear to have benefitted the industry.

[5] A hedonic index is based on characteristics of a product. In the case of EPROMs, the characteristic used is density.

Figure 6-3
EPROMs: U.S. shipments and subject imports, by quantity and price, 1983-89



Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

The dumping margins for EPROMs were quite large, ranging from 60.1 percent to 188.0 percent. The magnitude of the margins was such that the CPE model indicates that there would have been no imports of the subject product but for the dumping. The CPE model shows that the domestic price was 3.8 percent lower, domestic output was 11.0 percent lower, and domestic revenue was 14.4 percent lower than if there had been no LTFV imports. Nonsubject imports were 12.8 percent lower and nonsubject import revenue was 20.4 percent lower than if there had been no LTFV imports. The remedy in cases such as this is measured by taking the volume of subject imports and allocating this volume between the domestic producers and nonsubject imports in proportion to their relative sizes of apparent consumption.

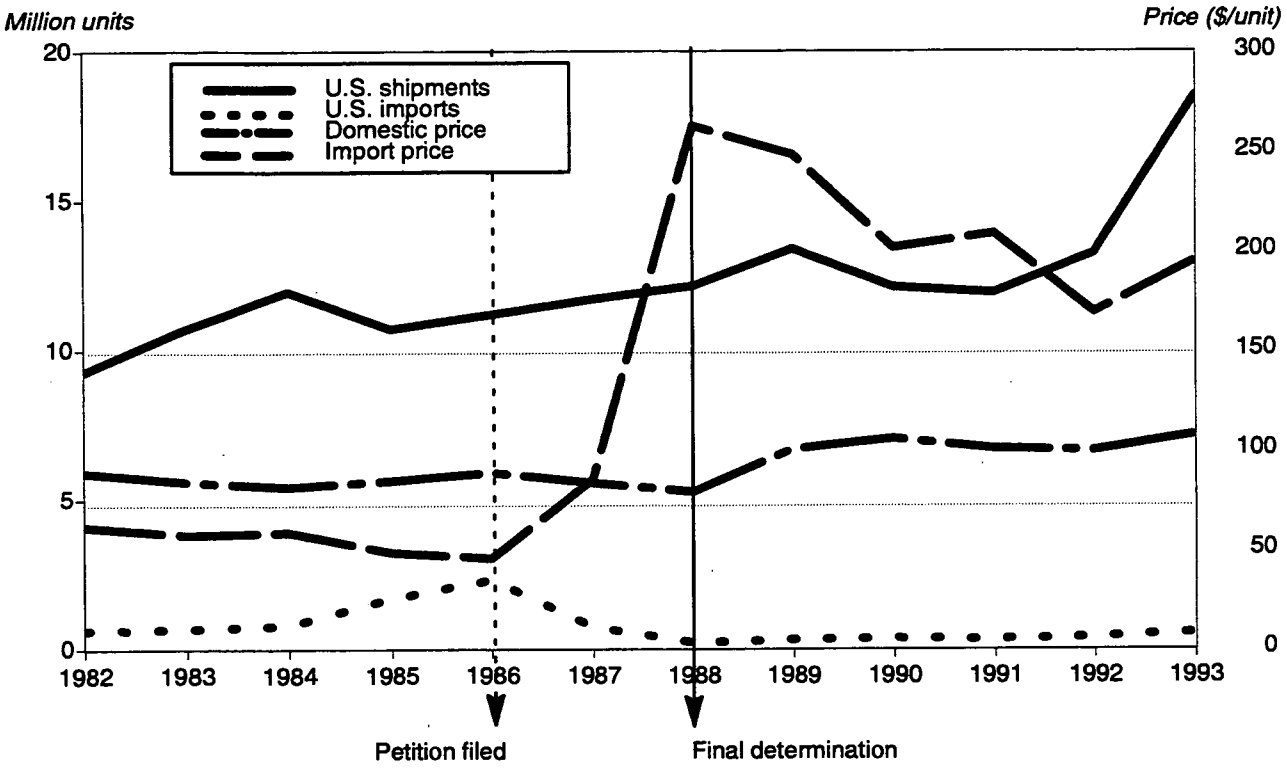
The CPE model estimates that EPROM producers and their upstream suppliers lost $11.0 million as a result of the dumping. The major upstream industries supplying the EPROM industry are the semiconductor manufacturing equipment and materials industries, the same upstream industries as those used to supply other types of ICs. Conversely, producers of computers, consumer electronic goods, telecommunications apparatus, and industrial machinery, the principal downstream industries, gained $16.7 million as a result of the dumping. According to the CPE model, net welfare increased by $5.7 million as a result of the dumping.

Color Television Picture Tubes

In November 1986, a petition was filed with the Commission and Commerce by counsel on behalf of unions representing workers in the color television picture tube (CPT) industry, alleging that the U.S. CPT industry was materially injured and was threatened with material injury by reason of LTFV imports of CPTs from Canada, Japan, Korea, and Singapore. As a result of its preliminary investigation, the Commission determined in 1987 that there was a reasonable indication of material injury by reason of such imports. The Commission made its final affirmative determinations in January 1988, which resulted in AD duty orders on color television picture tubes from Canada, Japan, Korea, and Singapore on January 7, 1988, ranging from less than 1 percent for Canadian producers to as much as 33.50 percent for certain Japanese producers.

As shown in figure 6-4, imports peaked at 2.3 million units in 1986, the year in which the case

Figure 6-4
CPTs: U.S. shipments and imports, by quantity and price, 1982-93



Source: Compiled from statistics of the U.S. Department of Commerce and the Electronic Industries Association.

was filed, declined to 732,000 units, or by 68 percent, the following year, then dropped off to 208,000 units in the year in which AD duties were imposed. Imports accounted for 18 percent of U.S. consumption in 1986, 6 percent in 1987, and less than 2 percent in 1988. The average value of imported CPTs rose from $46 in 1986 to $263 in 1988. In 1986, subject countries accounted for virtually 100 percent of U.S. imports of CPTs. By 1993, subject countries accounted for 30 percent of U.S. imports.

Prior to the case being filed in 1986, six U.S. producers of CPTs, of which only three were U.S. owned—General Electric, RCA, and Zenith—supplied 18 U.S. producers of CTVs, the major downstream industry. By the end of 1988, the year in which AD duties were imposed, Zenith was the last U.S.-owned company among seven U.S. producers of CPTs. Total U.S. employment in the CPT industry dropped by almost 10 percent from 1982 to 1986, the year in which the petition was filed, then rebounded to 11 percent above its 1982 level by 1993. A trend towards larger screen size CPTs led to greater automation in production, as labor cannot handle the larger, heavier CPTs without mechanical assistance. U.S. CPT producers contend that the decline in employment was due to attrition and automation, not to layoffs and competition by importers. (The general feeling among U.S. CPT producers was that the unfair trade practice and remedy had minimal effect on the industry.) While employment rose by 11 percent from 1982 to 1991, unit shipments rose by 29 percent and the value of shipments rose by 46 percent. Shipments per worker improved by 16 percent based on units and by 32 percent based on value.

Time series analysis showed no significant impact on the domestic supply of CPTs as a result of unfair trade practices or the AD remedy. The time series analysis did show a significant impact of the unfair trade practice and remedy on the domestic demand and the demand for imports; however, the effect was opposite of what was expected. As noted in chapter 5, a number of strategic responses by foreign firms, often with very different economic effects, may occur during the investigation process. Thus, the lack of a significant impact on domestic supply and the significant but unexpected impact on both domestic and import demand may reflect the influence of varying strategic responses over the course of the investigation. The trend analysis and the fieldwork

suggest that the filing of the case seemed to have had an impact on the imports of CPTs but not on domestic supply.

The CPE analysis shows that the domestic price was 2.8 percent lower, domestic output was 1.2 percent lower, and domestic revenue was 4.0 percent lower than "fair value" because of the unfair trade practice. Subject import price was 6.0 percent below "fair value," while subject import quantity and revenue were 26.9 and 19.2 percent higher, respectively, as a result of the unfair trade practice, according to the CPE model.

According to the CPE analysis, CTV producers gained $37.1 million as a result of dumping, while the producing and upstream (glass for CPTs) industries lost $29.1 million, resulting in a net gain of $8.1 million in total net welfare from the dumping. However, it is likely that the actual gain was small. All U.S. CPT manufacturers are integrated with U.S. CTV producers, although not all CTV producers are affiliated with a single CPT producer.[6] The decision as to how many CPTs to make is dependent upon each television set producer's estimate of how many sets the producer will sell. Affiliated producers would be expected to maximize profits of the combined operations. Any of these gains and losses appear insignificant when compared to apparent U.S. consumption in the CPT industry, which reached $1.6 billion in 1994.

The CPE analysis indicates that the remedy would have increased domestic price by 1.5 percent relative to the market price that existed in 1986. Similarly, with the remedy in place, domestic output would have been 1.1 percent greater and revenue would have been 2.7 percent greater than the corresponding values that existed in 1986. Estimates of the net welfare effects of the remedy relative to the actual market values for 1986 show that consumers would have paid $20.3 million more for CPTs if the remedy had been in place in that year. CPT producers would have received $15.2 million more for their output and there would have been a net welfare loss of $5.1 million.

U.S. exports of CPTs increased from 0.3 million units in 1982 to 4.9 million units in 1993. The primary reason for the increase was the establishment in Mexico of color television assembly plants by virtually every U.S. color television producer. U.S. exports of CPTs to Mexico increased from virtually nothing to over 75 percent of U.S. exports during this period. The move towards Mexico had begun before the CPT case was filed.

[6] The histories of the CPT and CTV industries are inextricably linked. The CTV would not have reached its 97-percent U.S. household penetration rate without the inexpensive CPT.

Solid Urea

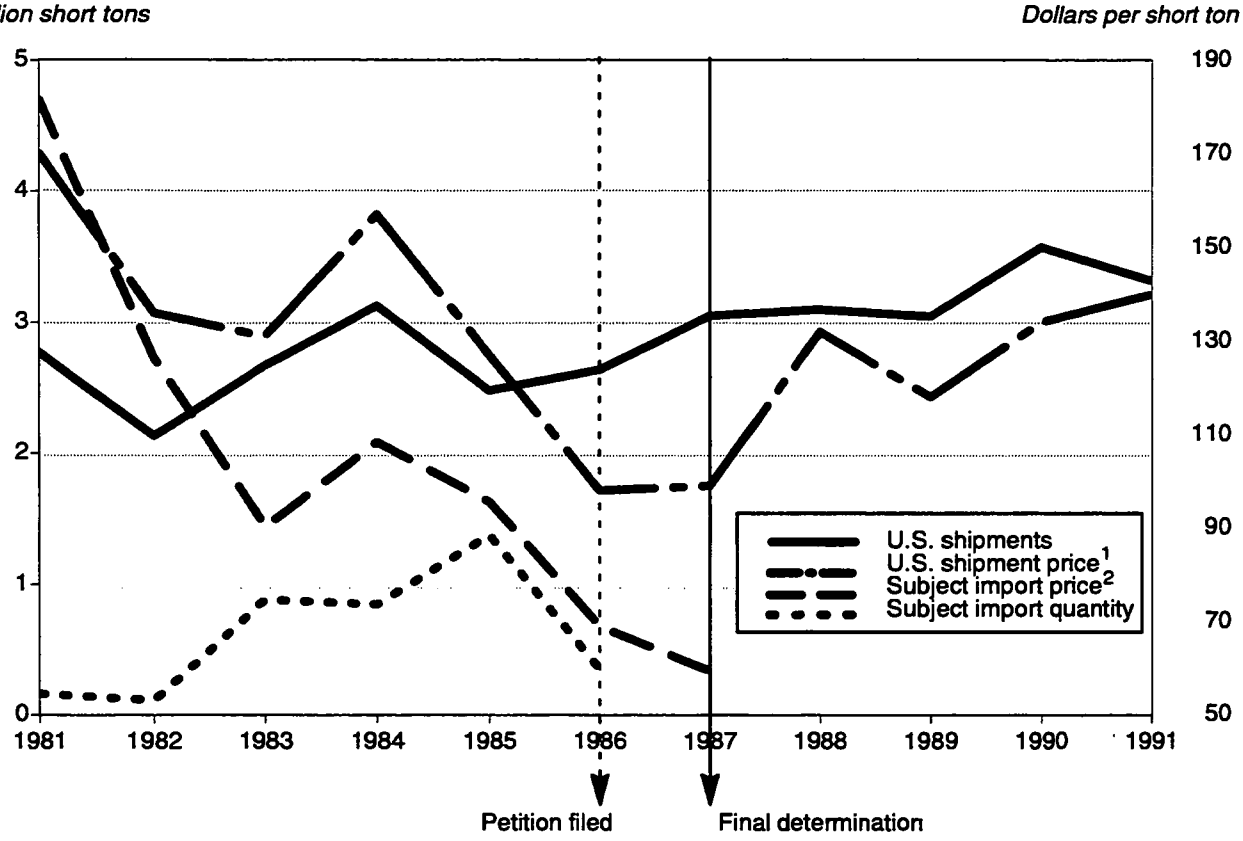
A petition was filed on July 16, 1986 by counsel on behalf of the Ad Hoc Committee of Domestic Nitrogen Producers alleging material injury and threat thereof by reason of imports from the German Democratic Republic (East Germany), Romania, and the Union of Soviet Socialist Republics (U.S.S.R.) of solid urea being sold in the United States at less than fair value.

Urea has the highest nitrogen content of solid nitrogen fertilizers. It is safe to store, easy to handle, and unlike some other nitrogen fertilizers, it can be backhauled in the same vessels used to transport bulk cargos such as grain. The U.S. industry producing urea developed from one producer in the early to mid-1930s to 31 producers in 1981, then became concentrated to 17 producers by 1991. Natural gas is the main upstream input required for urea production, which often occurs at highly integrated nitrogenous fertilizer plant site complexes. Four crops together account for the majority of solid urea consumption: corn, wheat, cotton, and rice. The farm prices of urea and substitute products affect acres planted, and resultant crop prices are measures of downstream urea demand.

Both U.S. solid urea shipment quantity and price fluctuated during 1981-91 (figure 6-5). The economic recession of the early 1980s depressed both U.S. shipment quantity and price before the economic recovery of 1984. During 1981-86, cumulative subject urea import quantity increased from 16,000 to 1.4 million short tons while respective import unit value decreased from $181 to $69 per short ton (approximately 62 percent), U.S. shipment quantity decreased from 2.8 to 2.6 million short tons (about 5 percent), and U.S. price decreased from $170 to $98 per short ton (approximately 42 percent). In 1987, coincident with remedy imposition, subject imports virtually ceased and U.S. solid urea shipment quantity increased to beyond the pre-recession level. U.S. shipment price increased to $132 per short ton (about 35 percent over 1986 price) during 1988.

Historically, Canada has been the principal source of total U.S. urea imports. Total import penetration of approximately 25-35 percent, cumulative subject import penetration of less than 5 percent, and domestic market share of 75-65 percent existed in the early-1980s. In the year of the petition (1986), total import penetration was almost 57 percent, cumulative subject import penetration almost 23 percent, and domestic market share about 43 percent. After the final Commission determination (1987), total import penetration fell to around 40 percent, subject imports ceased, and domestic market share approached 65 percent.

Figure 6-5
Solid urea: U.S. shipments and imports by quantity and price, 1981-91



[1] Average annual reported *Green Markets* quoted prices FOB Gulf Coast for granular urea which is approximately $10 per ton higher than prilled material.

[2] Unit value.

Source: Compiled from official statistics of the U.S. Department of Commerce and from *Green Markets*, McGraw-Hill, Co.

Time series results indicate that the petition and remedy had a positive effect on both shipments and prices for domestic producers. The petition quantity effect, about a 26-percent increase, and petition price effect, about a 3-percent increase, are not statistically significant. The remedy resulted in quantity increases of approximately 48 percent and price increases of about 19 percent. In addition, the remedy was a factor in increasing imports from Canada by approximately 38 percent.

The margins determined by Commerce are so large that the model calculates that there would be no imports from the subject country but for the unfair trade practice. The unfair trade practice led to decreases of about 3 percent in domestic price, 7 percent in domestic output, and 10 percent in domestic revenue. The remedy increased domestic prices by 3 percent, domestic output by 8 percent, domestic revenue by 11 percent, and employment by 5 percent. The welfare effects of the unfair trade practice manifested as a gain to domestic consumers of approximately $20 million and a loss to domestic producers of $11.7 million for an overall net welfare gain of $8.3 million. The remedy reversed these effects.

Because of the nature of the urea industry, the effects on downstream and upstream industries are relatively small. Effects on the main upstream natural gas industry, in such areas as employment, investment, and wages, were minimal because urea production constitutes less than 2 percent of total industrial natural gas use. While cumulative

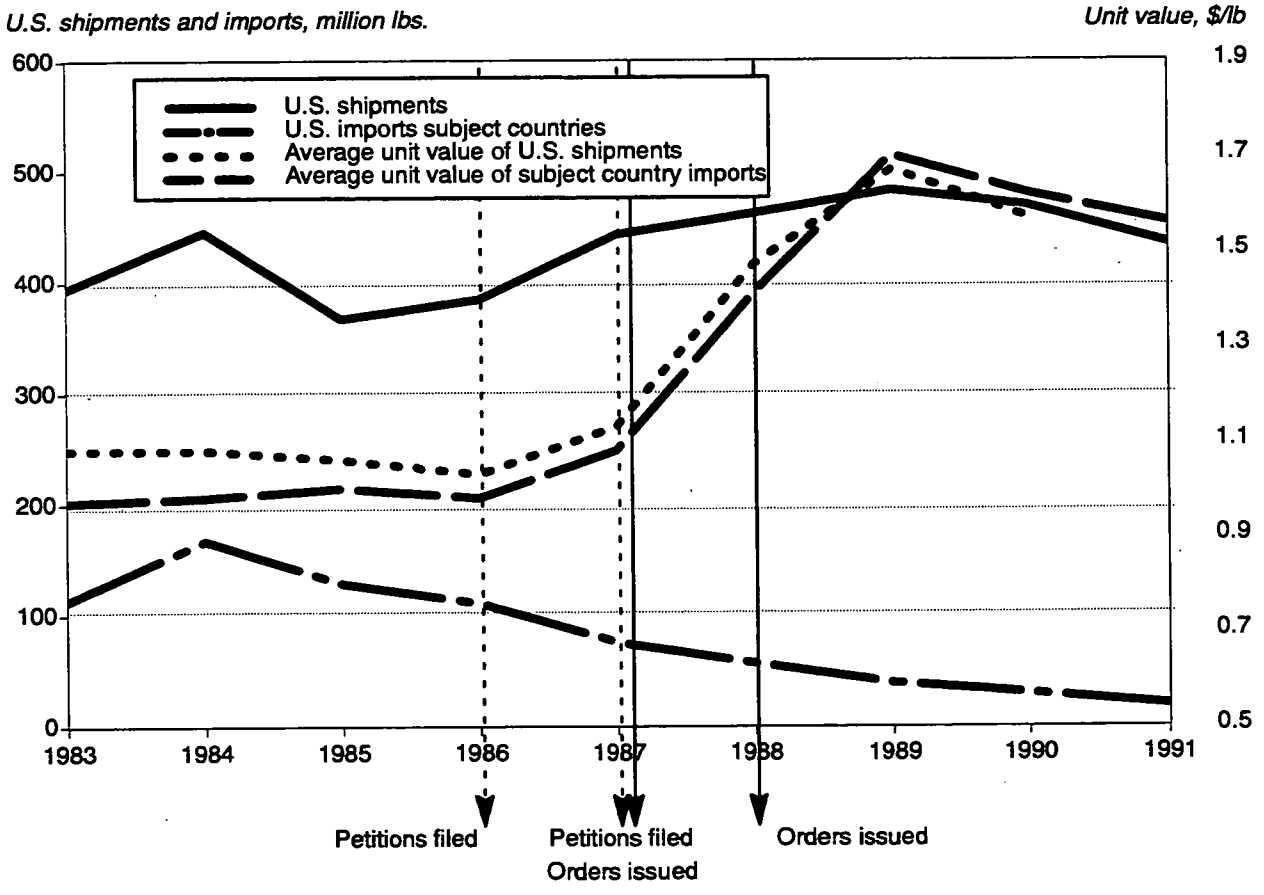
downstream effects are sizable, the main effect is on the cost of fertilizer to farmers with minimal effects on wages, employment, and/or investment in the downstream agricultural industry. In addition, since the agricultural sector is highly competitive, a large portion, if not all, of the lower costs associated with dumping, most likely should be passed on to final consumers.

Brass Sheet and Strip

Countervailing and antidumping duty orders were applied between January 1987 and August 1988 to imports of certain brass sheet and strip from nine countries (Brazil, Canada, France, Germany, Italy, Japan, Korea, the Netherlands, and Sweden). The remedy process appears to have had significant effects on the U.S. market. U.S. imports of brass sheet and strip from subject countries declined by 83 percent in quantity during the 5 years after 1986, when the first of the AD/CVD petitions was filed (figure 6-6). Total imports declined by 65 percent in quantity during the same period, from 25 percent of U.S. consumption in 1985 to 9 percent in 1991. U.S. market average unit values for both domestically produced and imported brass sheet and strip increased beginning in 1987, but this was mostly because of increased costs for metal raw materials; however, subject country unit values increased more than domestic unit values (figure 6-6).

The Commission analyzed trends in consumption, production, sales, costs, capital expenditures, and employment for the U.S. brass sheet and strip industry. Brass sheet and strip consumption fluctuated widely from year to year, typically in synchronization with demand of the major end users, the motor

Figure 6-6
Brass sheet and strip: U.S. shipments and imports by quantity and unit value, 1983-91



Note.—Certain data not shown to prevent disclosure of confidential information.

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission and from official statistics of the U.S. Department of Commerce.

vehicle and building construction industries. The primary uses include motor vehicle radiators, ammunition, builders' hardware (e.g., door knobs), electrical/electronic connectors, lamps, and fasteners. Because most brass sheet and strip markets are mature, the long-term trend for U.S. consumption has been flat to declining over the last 20 years. As a result, competition between producers has been intense.

The U.S. brass sheet and strip industry is composed of a small number of producers and has contracted and consolidated even with a substantial decline in imports since the imposition of remedies. Certain foreign producers decided to supply the U.S. market from U.S. operations rather than importing brass sheet and strip into the United States. As a result, there has been substantial foreign investment in U.S. brass sheet and strip production operations since the remedies were imposed.

The Commission's trend analysis showed that the U.S. industry successfully contained costs both before and after the petition filings. Except for costs of raw materials, costs per pound of production remained fairly constant during 1983-91. After the initial filings of petitions, net sales and operating income increased significantly. Also, capital expenditures increased substantially in step with the increase in operating income. Employment declined and productivity increased as operations were made more efficient.

Estimates from the Commission's time series analysis indicate, first, that domestic shipments were at least 34 percent higher by the end of 1991 than they would have been in the absence of trade remedies and, second, that subject imports were at least 73 percent lower. The Commission's CPE model estimates that domestic shipments rose 9 percent and subject imports declined 30 percent as a result of the remedies. The Commission's CPE model also estimates that, in 1985, the U.S. brass sheet and strip industry experienced approximately 1 percent lower prices and 10 percent lower shipments as a result of the unfair trade practices. According to the model, subject import prices were approximately 16 percent lower and the quantity of subject imports was approximately 48 percent greater as a result of the unfair trading practices. The model indicates that AD/CVD remedies mostly offset the effects of unfair imports on both domestic prices and shipments. As a result of strong domestic competition during the period of AD/CVD remedies, U.S. producers were in fact unable to raise prices during 1986-91, despite the lessening of foreign competition; however, U.S. producers were able to increase shipments significantly.

Product quality became an increasingly important competitive factor in the industry, driven by customers' demands for better brass sheet and strip. U.S. product quality improved, although reportedly products from certain foreign countries were of better quality.

The Commission's analysis indicated that the effect on upstream industries (the copper, zinc, and waste/scrap industries) was negligible because an increase in demand of metal raw materials by the foreign brass sheet and strip producers that engaged in unfair trade practices offset the reduction in demand by domestic producers. Unfair trade practices reduced costs for downstream industries and enabled them to reduce their prices in turn, resulting in a small increase in production, employment, income, investment, and exports. Trade remedies reversed most of these effects.

Standard Welded Pipe and Tube

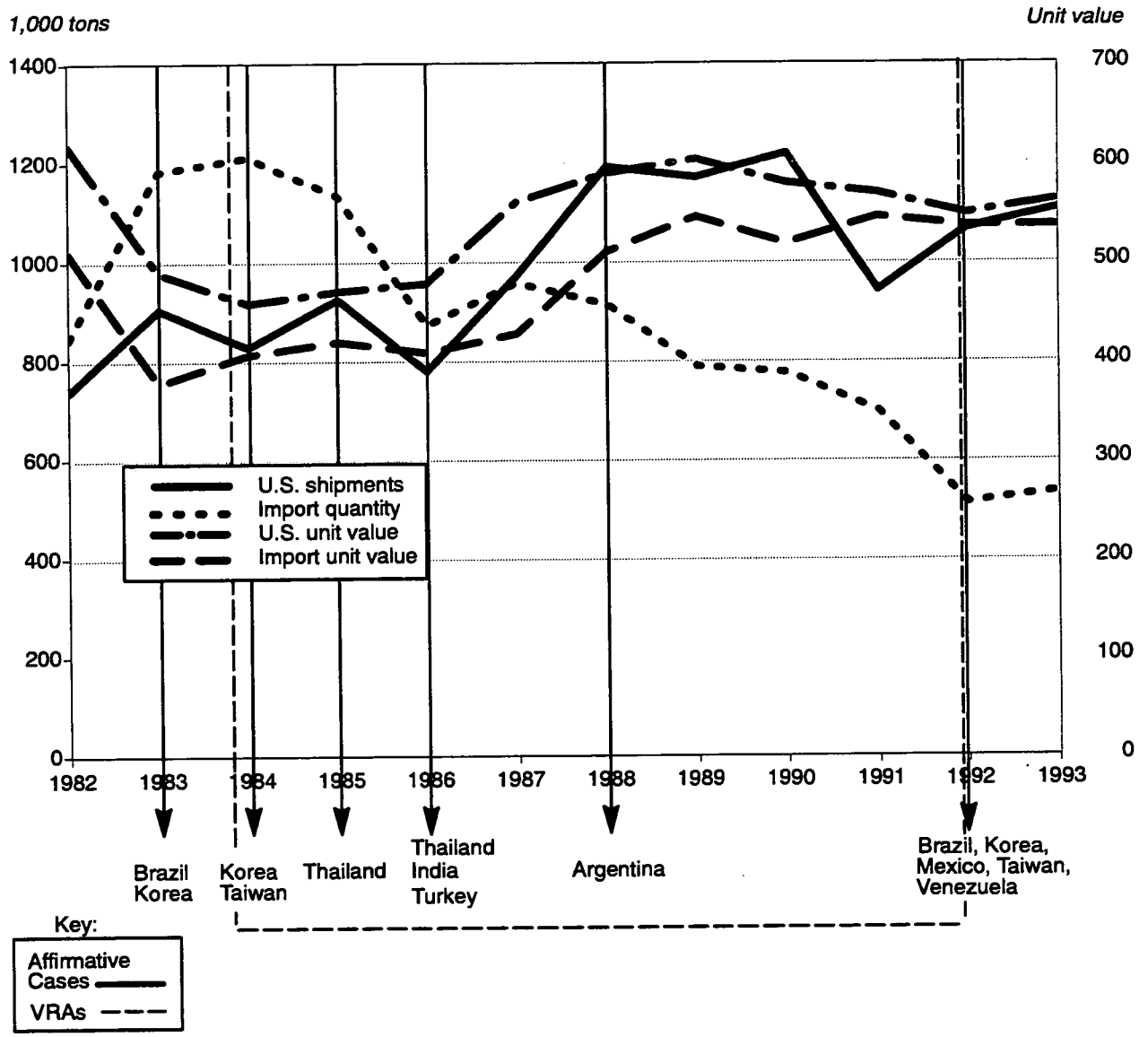
Since the first title VII petition filing in 1982, standard pipes have been the subject of 26 antidumping and countervailing duty investigations at the Commission. Three additional countervailing duty investigations were handled by Commerce alone. Standard pipe trade was also limited during 1984-92 by voluntary restraint arrangements (VRAs) on exports of steel products into the United States, under agreements negotiated with 19 countries and the European Union.

In general, imports of standard pipe declined since the first affirmative antidumping determinations in 1984 and the nearly simultaneous initiation of the VRAs, going from 1.2 million tons in 1984 to 534,000 tons in 1993 (figure 6-7). The share of imports during 1984-93 went from 59 to 33 percent. Unit values for domestic products remained higher than those for imported pipe, coming closest together in 1992 at the end of the VRA period and at the beginning of new AD orders on standard pipe imports.

During the same period, domestic shipments rose irregularly, going from 827,000 tons in 1984 to 1.1 million tons in 1993. Apparent consumption stayed relatively constant from 1984 through 1990 at roughly 2.0 million tons, then declined to 1.6 million tons in 1993. New construction, a major consumer of standard pipe, declined substantially in 1991 during a general economic slowdown.

Data on employment, productivity, profitability, and research and development in the standard pipe industry were available on a consistent basis only for

Figure 6-7
Welded standard pipe: U.S. shipments and imports by quantity and unit value, 1982-93



Source: The Preston Report and statistics of the U.S. Department of Commerce.

1989-91. Overall, capital expenditures decreased from $32 million in 1989 to $21 million in 1990 and $20 million in 1991; research and development spending went up, from just under $.5 million in 1989 to over $1 million in 1991. Productivity and employment peaked in 1990, coinciding with the peak in output, and operating income was at its highest during 1989 for the 3-year period.

An econometric analysis of data relating to the standard pipe industry indicates that the onset of various remedial actions (the affirmative antidumping and countervailing duty determinations in 1984 and the initiation of the VRAs) had generally the same effect as a price increase in the market. That is, demand decreased and supply increased as a result of the beginning of the VRAs and the title VII process. These effects are independent of the effects of any price increase that may actually have taken place, but only the effect on demand for the domestic product is highly significant statistically. On the supply side, the

result was of moderate significance (at the 90 percent level of confidence); the implied effect of the remedial actions was roughly equivalent to a price increase of 10 percent.

A computable partial equilibrium simulation of the likely effects of the unfair trade petitions filed in 1986 indicates that the dumping and subsidization found to be taking place had a negative effect on the domestic industry and may have caused an estimated 1.9 percent loss of revenue and reduced jobs in standard welded pipe production by an estimated 1.6 percent. The unfair trade practices caused subject import to be priced 13.6 percent below their fair value, and their volume to be 70.5 percent higher. The unfair trade prior to the 1986 investigations cost producers and their suppliers an estimated $948,000 per year. Consumers (purchasers) of standard pipe, however, benefited from the unfair practices by an estimated $4.7 million, for a net welfare gain of $3.8 million.

Using the CPE, remedies were estimated to have diminished the effects of the unfair practices. Domestic revenue loss was reduced to .2 percent, domestic output and employment were brought to within .1 percent of their fair values, while the domestic product price was essentially restored to its fair value. The price of unfairly traded imports was brought to within 1.1 percent of fair value, and their volume to within 6.2 percent of the fair value. The overall loss to producers was brought down from $948,000 to $82,000, the consumer benefit was reduced from $4.7 million to $431,000, and the overall gain to the economy thus was reduced from $3.8 million to $349,000.

Fluctuations in the demand or supply of standard pipe had no substantial effects on its immediate purchasers or suppliers; standard pipe is a relatively small customer of hot-rolled steel and also a small component of the products of most of its customers in the construction industry.

Bearings

In August 1986, the Timken Co., the largest U.S. producer of tapered roller bearings (TRBs), filed an AD petition covering imports of TRBs from Hungary, Italy, Japan, China, Romania, and Yugoslavia. As a result, during June-October 1987, Commerce issued AD orders on TRBs from all subject sources. AD duties ranged from 0.67 percent ad valorem to 124.75 percent ad valorem.

In March 1988, the Torrington Co, the largest U.S. producer of ball bearings, filed AD and CVD petitions covering imports of certain bearings, excluding TRBs. In May 1989, Commerce issued AD orders on imports of ball bearings (BBs) from all subject sources: Germany, France, Japan, Italy, Romania, Sweden, Singapore, Thailand, and the United Kingdom. Commerce also issued AD orders on cylindrical roller bearings (CRBs) and on spherical plain bearings (SPBs) from certain subject sources. Commerce issued CVD orders on BBs from Thailand and on most bearings covered by the petition from Singapore. AD/CVD margins ranged from 2.34 percent to 212.45 percent ad valorem. The Commission's analysis focuses on the economic effects of AD/CVD orders on the BB and TRB industries. Analysis is limited for CRB industry, and was not conducted at all on the SPB industry because of their small size and a lack of data.

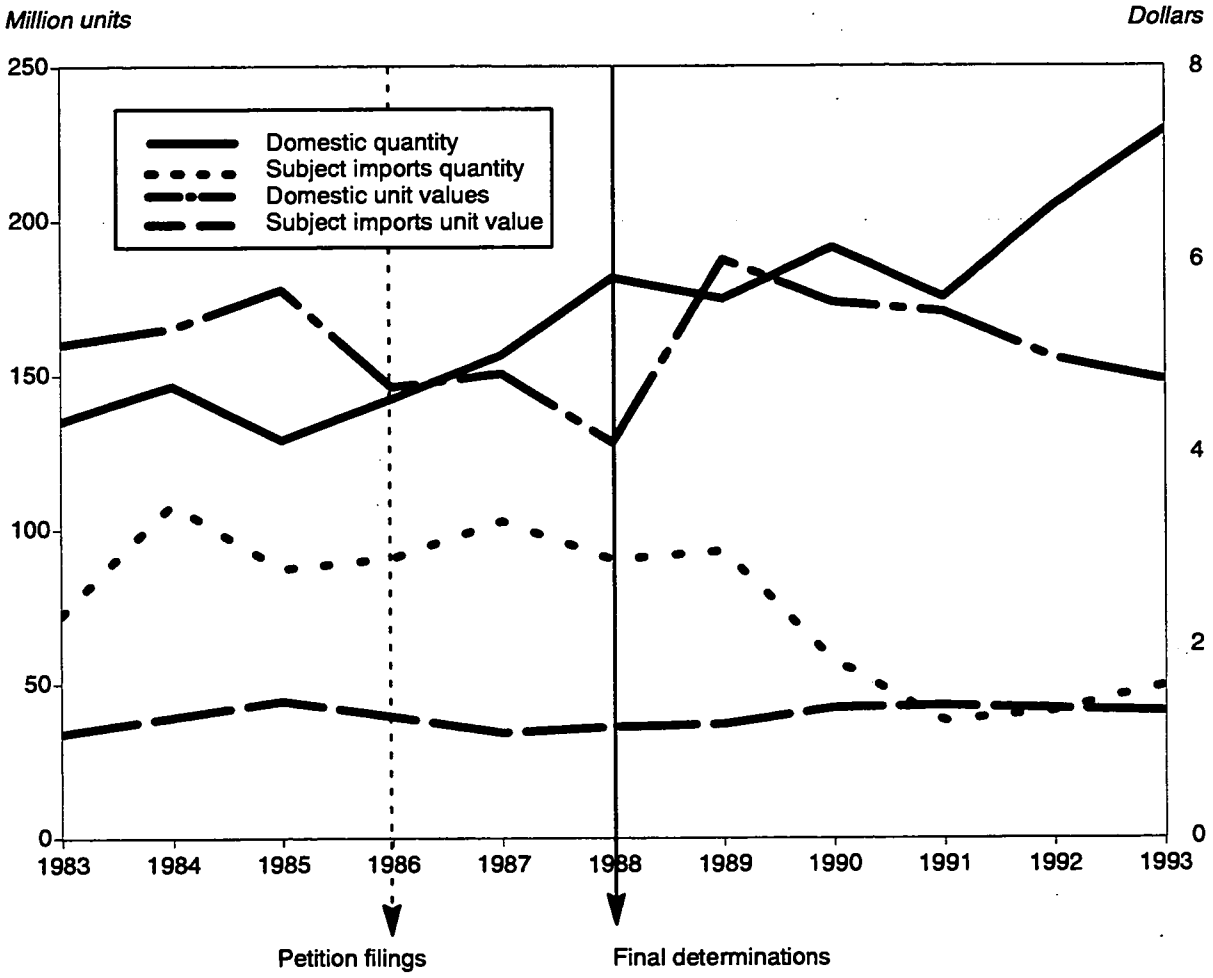
Since the mid-1980s, the major change in the U.S. TRB and BB industries has been the increase in foreign investment. According to some foreign-owned bearing producers, the AD/CVD orders accelerated foreign investment in the United States in the TRB and BB industries. The AD/CVD orders had negligible affects on overall employment levels and wages

Market share held by subject imports of TRBs fell from 14 percent of apparent U.S. consumption in 1985, the year before the filing of the petition, to 12 percent in 1988, the year after AD orders were issued. By 1991, market share held by subject imports had dropped to 5 to 6 percent, principally because Japanese TRB producers shifted production to the United States beginning in 1988. However, rising subject imports from China with low AD duty rates partially offset the decline in subject imports from Japan.

After the issuance of AD orders on TRBs in 1987, domestic shipments, by quantity (complete bearings), rose and subject import quantities fell principally because of Japanese investment in U.S. TRB production (figure 6-8). In 1988, unit values of domestic TRB shipments declined, in part, because of continued competition from subject imports. Unit values of domestic shipments rose in 1989 because of strong demand. The decline in domestic unit values during 1989-93 was due to rising imports from China as well as nonsubject sources and increased competition due to foreign investment in the U.S. TRB industry.

Market share held by subject imports of BBs rose from 19 percent in 1987, the year before the petitions, to 22 percent in 1989, when the duty orders were issued. During 1990-93, subject imports accounted for

Figure 6-8
Tapered roller bearings: U.S. shipments and subject imports by quantity[1] and unit values, 1983-93



[1] Complete (finished) bearings, excluding parts.

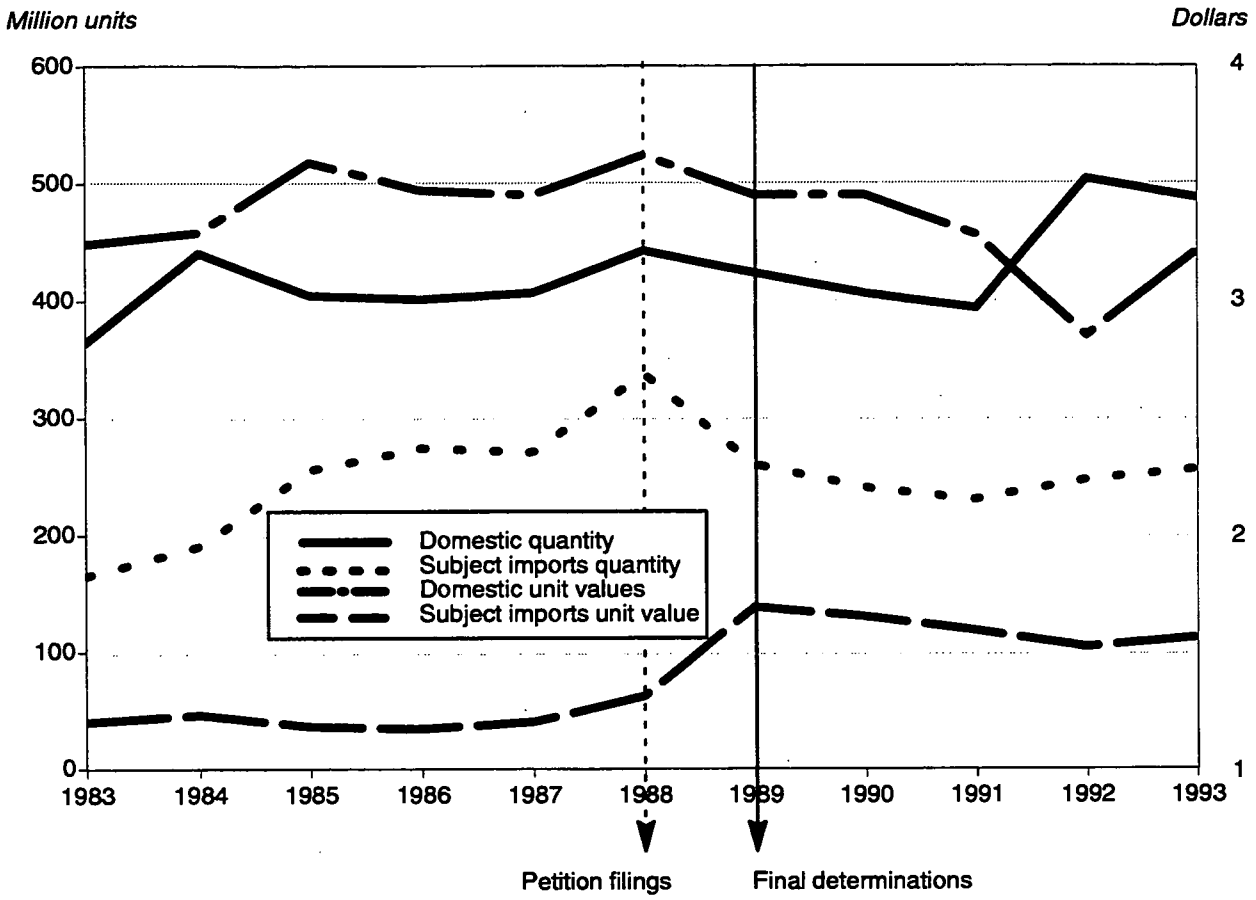
Source: Compiled from official statistics of the U.S. Department of Commerce.

21 percent of apparent U.S. consumption. This plateau in subject import market share was due in part to increased foreign investment in the U.S. BB industry and rising imports from nonsubject sources. The market share held by nonsubject imports rose from 3 percent in 1987 to 9 percent in 1993.

U.S. domestic shipments of BBs, by quantity (complete bearings), peaked in 1988, during the AFB investigations, and again in 1992 (figure 6-9). However, subject imports, by quantity, rose significantly in 1988, in part, because of limited U.S. production of small-sized BBs that were in high demand in 1988. After AD/CVD duties were imposed, increased foreign investment in the U.S. industry accounted for the decline and plateau in subject imports and also for much of the increase in U.S. domestic shipments of BBs after the 1990-91 recession.

In 1989, unit values of subject imports of BBs rose, coinciding with the imposition of AD/CVD duties. Importers raised prices to eliminate the dumping margins and shifted to importing higher value-added products. During 1989-92, domestic unit values fell, reflecting increased domestic competition due to foreign investment and weakened demand during the 1990-91 recession. The decline in unit

Figure 6-9
Ball bearings: U.S. shipments and subject imports by quantity[1] and unit values, 1983-93



[1] Complete (finished) bearings, excluding parts.

Source: Compiled from official statistics of the U.S. Department of Commerce.

values was also due in part to falling demand for specialized bearings from the aerospace and defense markets during 1990-93.

Time series analysis was used to test whether the investigation filings and determinations had an impact on the volume of domestically produced TRBs and BBs, subject imports, and nonsubject imports. The analysis was conducted on three types of TRB products and two types of BB products. In general, the TRB analyses provided modest support for the conclusion that subject and nonsubject imports were affected by the filings and the determinations. The strongest evidence of the determinations affecting TRB products was for the category of TRB cone assemblies; the results suggest that the volume of subject imports declined by 30 percent while nonsubject imports more than doubled. In most instances, the results obtained from the analyses of domestic TRBs, as well as those obtained from the analyses of the BB products, were inconclusive.

A CPE model was used to analyze the short-run effects of dumping and the corresponding remedies in both the markets for TRBs and BBs. The analysis for TRBs indicates that domestic prices were 4.8 percent lower than their "fair" value as a result of the dumping. Consequently, the estimated revenue loss to domestic producers was equal to 12.8 percent of fair-value revenue. As a result of dumping, domestic employment fell by 6.7 percent. The analysis for BBs indicates that the estimated loss to domestic revenue equaled 19 percent of fair-value revenue. The corresponding decline in the domestic price was 6.8 percent. Domestic employment in the BB industry was estimated to have fallen by 11.7 percent.

The CPE analysis also estimated the effects of the remedies for both TRBs and BBs in terms of actual market values. The effect of the remedy relative to actual market value in 1985 shows that domestic TRB prices increased by 2 percent while domestic output increased by 4 percent. As a result of the TRB remedy, domestic employment increase by 3 percent relative to actual value. In terms of actual value market in 1987, the analysis for BBs shows that domestic price and output increased by 5 percent and 9 percent, respectively, as a result of the BB remedy. In addition, domestic employment in the BB industry increased by 8 percent relative to actual value.

The Commission's CPE model was also used to obtain the net welfare effects of the dumping for both TRBs and all BBs, including parts. The overall net welfare gain to the economy as a result of dumping TRBs was $31 million. The increase in overall net welfare to the economy was $106 million as a result of dumping BBs.

In general, only a few of the results from the CPE analysis were consistent with the results that were obtained in the econometric analysis. For instance, in the econometric analysis, estimates of the effect of the AD remedy on TRBs suggested that subject imports of TRB cone assemblies declined by approximately 30 percent after the remedy was imposed. This estimate is similar in magnitude to the 1985 market-value estimates of the AD remedy that were obtained from the CPE analysis for overall TRBs.

Since the bearing industry is linked with many downstream industries (motor vehicle and motor-vehicle-related, general industrial, aerospace, and other machinery industries), a CGE model was used to measure the impact of the AD/CVD orders on the U.S. economy. In particular, potential economy-wide employment and production effects were examined. In general, potential changes in upstream (bearing-quality steel industry) and downstream sectors resulting from the dumping of TRBs and BBs, including parts, were negligible, with all changes to domestic production and employment in these sectors amounting to less than 0.1 percent. Employment and production effects of a similar magnitude were observed for all other sectors in the U.S. economy

The major upstream industry is the U.S. bearing-quality steel industry.[7] The AD/CVD orders had a small, positive impact on the bearing-quality steel industry. However, bearing-quality steel producers indicated that the effects of the AD/CVD orders are difficult to separate from other market factors, such as the steel VRAs during 1984-1992 and excess production capacity in the other steel products made by these companies.

The principal downstream industries are the motor vehicle and motor-vehicle-related, general industrial, aerospace, and other machinery industries. The AD/CVD had minor adverse effects on most downstream industries, because bearings account for a small share of the cost of final products. However, producers of intermediate products in which bearings account for a greater share of product cost, such as motor-vehicle parts and power handtools, were more adversely affected by price increases due to AD and CVD orders. Price increases were limited, however, by declining margins found in Commerce's administrative reviews, increased nonsubject imports, and foreign investment that increased domestic competition.

[7] Timken, the petitioner in the TRB investigations, is a major bearing-quality steel producer.

CHAPTER 7
Frozen Concentrated Orange Juice

History of Title VII Investigation

On May 9, 1986, Florida Citrus Mutual, a voluntary cooperative marketing association of citrus fruit, filed antidumping petitions with the Commission and with Commerce. The petitions received by Commerce and the Commission alleged that imports of frozen concentrated orange juice (FCOJ) from Brazil were being sold in the United States at LTFV and that an industry in the United States is materially injured or threatened with material injury by reason of such imports.

The Commission made a final affirmative determination on April 22, 1987 (investigation No. 731-TA-326).[1] Commerce published its final AD margin of 1.96 percent on May 5, 1987.[2] The AD order was applicable to all Brazilian FCOJ exporting companies, excluding Sucocitrico Cutrale S.A. (Cutrale).

In the final determination, one affirmative finding was that an industry in the United States was threatened with material injury by reason of LTFV imports of FCOJ from Brazil. This finding was based on a number of factors, which included[3] (1) increased market penetration by LTFV imports, (2) the decline in the price for FCOJ sold for manufacturing purposes (FCOJM) in the U.S. market from the beginning of 1985 through the middle of 1986 and the fact that the price for the Brazilian FCOJM was less than the price of domestic FCOJM during several months of this period, (3) significant inventories in the United States and Brazil, and (4) increased capacity among Brazilian extracting companies and an increase in the number of orange trees planted in Brazil.

[1] 52 F.R., 82, Apr. 29, 1987.

[2] 52 F.R., 86, May 5, 1987.

[3] USITC, *Frozen Concentrated Orange Juice from Brazil* (investigation No. 731-TA-326 (final)), USITC publication 1970, Apr. 1987, pp. 3-30.

Frozen Concentrated Orange Juice

AD Petition year (1986):	
Production *(million dollars)*	739
Import market share[1] by quantity *(percent)*:	
Total imports	37
Subject country imports	34
AD/CVD history:	
AD investigations *(number)*	1
CVD investigations *(number)*	1
AD order year	1987

[1] Share of available FCOJ.

A second affirmative finding was that the domestic orange juice industry was materially injured by reason of LTFV imports of orange juice from Brazil. A number of factors were cited in this decision, including (1) the decline in net income margin of growers in 1985/86 (a postfreeze year), (2) the decline in the processors' cost-of-goods-sold margin in 1985 and 1986 and the decline in processors' operating margin in 1986, (3) increased imports of FCOJ from Brazil, (4) the relationship between U.S. and Brazilian prices, and (5) the fact that the Brazilian price was below the domestic price during most of 1984 and 1986, and (5) the price sensitivity of the market.[4] It was also noted in this finding that imports from Brazil were becoming an integral part of the market at a time when the domestic industry was vulnerable because of the freezes that had occurred in earlier years.

During 1990-94, five administrative reviews of the AD order, covering the periods April 29, 1987, through April 30, 1992, have been conducted. Remedies decreased during the course of the annual reviews. The first review, covering ten Brazilian producers and/or exporters for April 29, 1987-April 30, 1988, determined AD margins of 1.96 percent for two firms, Citropectina and

[4] Ibid., pp. 31-46.

Quimicas,[5] and zero or *de minimis* for eight other firms.[6] The second through fourth reviews, which covered May 1, 1988-April 30, 1991, determined the margins to be zero or *de minimis* for the firms subject to review.[7] The third review also revoked the AD order with respect to four companies.[8] The fifth review determined that the margin during May 1, 1991-April 30, 1992, was zero or *de minimis* for three firms, Citropectina, Frutropic, and Branco Peres.[9] Commerce also revoked the order with respect to Frutropic.

In regard to other trade actions, petitions were filed with Commerce and the Commission on July 14, 1982, by Florida Citrus Mutual, on behalf of Florida citrus growers and processors, alleging that manufacturers, producers, or exporters of FCOJ in Brazil receive subsidies within the meaning of section 771(5) of the Tariff Act of 1930, as amended, and that these imports were materially injuring, or threatening to materially injure, a U.S. industry.[10] Commerce determined that subsidies were being provided to manufacturers, producers, or exporters of FCOJ in Brazil.

Effective March 2, 1983, Commerce suspended its investigation following the signing of a suspension agreement in which the Government of Brazil agreed to offset all benefits found by Commerce to constitute subsidies with an export tax on all FCOJ exports to the United States.[11] On March 21, 1983, counsel for the Government of Brazil requested Commerce and the Commission to continue the investigation.[12] On July 11, 1983, the Commission made a final affirmative determination (investigation No. 701-TA-184).[13] As a result, Brazil imposed an export tax of 3.51 percent of the f.o.b. value on FCOJ exports to the United States.

On May 31, 1984, the Commission received a request on behalf of three[14] Brazilian producers and exporters of FCOJ to review its affirmative injury determination in investigation No. 701-TA-184 in light of changed circumstances.[15] The petitioners alleged that a major freeze in Florida in December 1983 and the subsequent decline in the 1983/84 Florida crop, as well as a surge in demand for Brazilian juice, were sufficient to warrant a review. On December 21, 1984, the Commission determined that the revocation or modification of the suspension agreement would threaten the domestic industry with material injury (investigation No. 751-TA-10).[16]

On December 30, 1988, the U.S. Court of International Trade, after considering a request from a Brazilian FCOJ producer/exporter to examine the Commission's determination of threat in investigation No. 731-TA-326 (final) and, after having reviewed the investigation, entered a judgment remanding the determination of threat for reevaluation. In February 1989, after having reconsidered the evidence gathered in the investigation, the Commission reaffirmed its finding that an industry in the United States was threatened with material injury by reason of imports of FCOJ from Brazil.[17]

On March 1, 1990, and again on March 6, 1991, Commerce announced its intention to terminate the suspended countervailing duty investigation. Each announcement, however, was countered by an objection by Florida Citrus Mutual, and Commerce subsequently (October 25, 1990, and June 5, 1991, respectively) determined not to terminate its suspended investigation. On April 11, 1991, the Brazilian Government sent Commerce a letter stating it had eliminated the two programs cited in the suspended countervailing duty investigation and that it intended to reduce the offsetting export tax to zero as of that date.[18]

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[5] These two firms failed to respond to the Department of Commerce's antidumping duty questionnaire, and the best information available was used for assessment and cash deposit purposes. The two firms did not have sales to the United States during the review period.

[6] 55 F.R., 126, June 29, 1990.

[7] Ibid., 220, Nov. 14, 1990; 56 F.R., 203, Oct. 21, 1991, and F.R., 72, Apr. 14, 1992.

[8] Cargill Citrus Ltda., Citrosuco Paulista S.A., Coopercitrus Industrial Frutesp S.A., and Montecitrus Trading, S.A.

[9] 59 F.R., 203, Oct. 21, 1994.

[10] 47 F.R., 152, Aug. 6, 1982.

[11] The suspension agreement was signed on Feb. 24, 1983.

[12] 48 F.R., 109, June 6, 1983.

[13] Ibid., 145, July 27, 1983.

[14] Cargill Industries, Ldta., Citrusoco Paulista, S.A., and Sucocitrico Cutrale, S.A.

[15] The ITC instituted investigation No. 751-TA-10 to review its injury determination under investigation No. 701-TA-184 (final) on Aug. 21, 1984.

[16] 50 F.R., 2, Jan. 3, 1985.

[17] USITC, *Frozen Concentrated Orange Juice from Brazil* (views on remand in investigation No. 731-TA-326 (final)), USITC publication 1989, Feb. 1989.

[18] USITC staff conversation with Brazilian Embassy official, Jan. 5, 1995.

Scope of Investigation

Subject Products

FCOJ is concentrated orange juice with a degree of concentration of 20 degrees Brix[19] or higher, in a frozen state. FCOJ is made by extracting juice from round oranges,[20] removing water from the juice, and freezing the remaining concentrate. FCOJ is in the form of FCOJ for manufacturing (FCOJM), FCOJ for retail sale (FCOJR), or FCOJ-other.[21] FCOJM is a highly concentrated form of FCOJ (51 degrees Brix or higher) to which between six and seven units of water must be added to each unit to prepare reconstituted orange juice that can be used by the final consumer. FCOJM is an industrial product that is stored in bulk, usually in 55-gallon drums or in bulk tanks, for up to 3 years.[22]

FCOJR (usually 42 degrees Brix) is a consumer product that requires only three units of water be added to each unit in order to form reconstituted orange juice. All FCOJ can be distinguished from single-strength orange juice (SSOJ), which is a ready-to-drink consumer product with a Brix level of 9 to 19 degrees. Figure 7-1 shows various orange juice products that are produced by the different sectors of the orange juice industry.

In this case study, the subject product is FCOJM. Virtually all FCOJR is made using FCOJM as a raw material (although some FCOJR may be made by blending SSOJ with FCOJM). During the time period of this study, all imports of FCOJ are also believed to have been FCOJM, and the data are recorded on the basis of single-strength equivalents (SSE).[23]

[19] Brix degree is a measure of pounds of solids in a gallon of juice and the sugar content, with higher Brix degrees indicating higher concentration.

[20] Round oranges (also called sweet oranges) are grown primarily for orange juice production. They are to be distinguished from specialty oranges (such as mandarin oranges, tangerines, tangelos, and temples), which are grown primarily to be sold as fresh fruit. Orange juice produced in Florida may not contain more than 10 percent of juice from specialty oranges according to Florida regulations.

[21] FCOJ-other (20-39 degrees Brix) includes FCOJ other than FCOJM or FCOJR.

[22] Typically FCOJM is transported and stored at 65 degrees Brix. Because of its high sugar content FCOJM may be cooled well below freezing without solidifying. The term "bulk FCOJ" is also used to describe FCOJM.

[23] SSE refers to the volume of single strength orange juice that can be reconstituted from concentrated orange juice.

U.S. imports of FCOJ are classified in subheading 2009.11.00 in the *HTS*. Imports from Brazil and all other countries receiving the column 1 rate of duty[24] are dutiable at 9.02 cents per liter (34.14 cents per gallon, or 33.17 cents per pound solids[25]).[26] Additionally, processors that both import and export FCOJ are eligible to obtain a refund in the form of drawback[27] of certain import duties paid. Drawback can also be collected on other orange juice products and drinks provided that FCOJ (domestic or imported) was used in their manufacture. Certain rights to receive drawback payments may be assigned by the importer or manufacturer.[28]

Domestic Industry

In both the 1982-83 and 1986-87 investigations, the Commission defined the domestic industry to include both growers of round oranges and extractors involved in the production of FCOJ. The domestic industry in this case study also consists of growers of

[24] The rates of duty in col. 1 are most-favored-nation rates and are applicable to imported products from all countries except from those Communist countries and areas enumerated in general note 3(b) of the *HTS*, unless preferential tariff treatment is sought and granted.

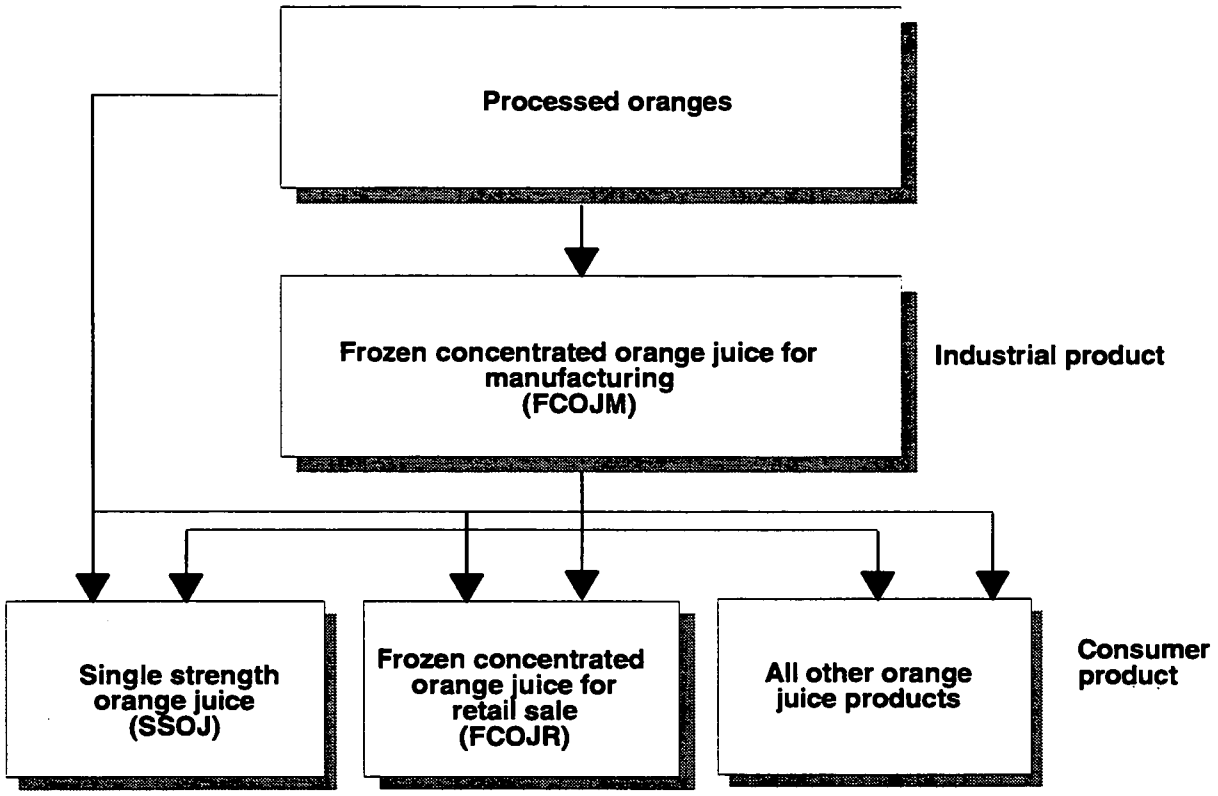
[25] The per-liter duty rate is applicable to juice in its natural unconcentrated form. For concentrated juice, the duty is calculated on the number of liters of reconstituted single-strength juice that can be made from a liter of the concentrate. A gallon of reconstituted single strength juice contains 1.029 pounds of solids at 11.8 degrees Brix.

[26] Imports from countries receiving the column 2 rate of duty are dutiable at 18 cents per liter, and those from Caribbean Basin Economic Recovery Act and Andean Trade Preference Act beneficiaries are eligible for duty-free entry. Imports from Canada are dutiable at 2.7 cents per liter and those from Mexico are dutiable at 4.625 cents per liter for the first 15,416,000 liters annually and at 8.787 cents per liter for additional amounts.

[27] Under section 313 of the Tariff Act of 1930 (as amended), a manufacturer that imports merchandise and then exports products produced with the imported merchandise is eligible to receive a refund of 99 percent of the duties, taxes, and fees paid on the imports, a program known as "manufacturing drawback." If both imported and domestic materials of the same kind and quality are used within a specified period to produce a product, some of which is exported, drawback equal to 99 percent of the duty paid on the imported material is payable upon that exportation. Under this provision, called substitution drawback, it does not matter whether the actual imported material or like domestic material was used to produce the exported article.

[28] To claim drawback, exports must occur within 5 years of the date of the importation, and the exported product must be produced during the first 3 of those years. Claims for drawback must be filed within 3 years of the date of exportation.

Figure 7-1
Processed oranges: Distribution, by types



Source: United States International Trade Commission staff.

round oranges and FCOJ extractors. The term "grower" is used in this report to denote individual proprietors of orange groves, and also other grower entities, such as corporations, partnerships, growers' associations, and cooperatives. Extractors are companies that extract orange juice from oranges and process it further into FCOJM, FCOJR, or SSOJ.

Description of Upstream Industry

The upstream industry includes firms that supply inputs such as machinery and equipment, fertilizer, labor, and grove care services to the orange-growing industry. Sales of these inputs to orange growers generally account for a negligible part of the total sales of many of these suppliers. Additionally, these suppliers usually provide these same inputs to many other industries. It is unlikely that the 1987 AD case affected sales and/or prices in this sector, and any probable effects on the upstream industry are not considered further.

Description of Downstream Industry

Downstream industries include reprocessors that reconstitute or repackage domestic and imported FCOJM into FCOJR, SSOJ, or blended juice (e.g., orange/grapefruit juice) and juice-flavored beverages for sale domestically to retailers, restaurants, and cafeterias, and/or for export. Additionally, these firms take bulk FCOJ, as well as FCOJR or SSOJ, and repackage it into retail- and institutional-size containers for domestic sale and export. The downstream industry includes FCOJM producers, as well as independent FCOJR producers, dairy processors that reconstitute FCOJM into SSOJ to complement their milk product lines, and supermarkets and vending machine companies.

FCOJM is also exported by producers and by other exporting firms.

Purchases of FCOJM may constitute a small share of total product purchases of downstream users. However, in contrast to the situation with the upstream industry, FCOJM purchases constitute a specific product line for downstream users. Thus, the effect of the 1987 AD case on the downstream industry is analyzed in this study.

Substitute Products

According to questionnaire data supplied by FCOJ producers and downstream purchasers, substitute products for FCOJ in consumption include other fruit juices, particularly apple juice, fruit juice blends, and soft drinks.[29] The questionnaire respondents also indicated that, in more recent years, SSOJ, particularly orange juice not made from concentrate (NFC),[30] has become an important substitute for FCOJR.[31]

Approach of Investigation

Methodology

The CPE and time series analysis described in chapter 5 have been applied to this case study to examine the effects of the 1987 AD order on U.S. imports, production, consumption, and prices of FCOJ. The economic analysis is supplemented with questionnaire data provided by growers, FCOJ extractors, downstream purchasers, and importers. In addition, a review of literature on the studies relevant to international trade and the FCOJ industry was conducted and is presented below.

Review of Literature

Several studies have to some extent examined the effect of AD and other import duties on the U.S. FCOJ industry. A study by Braga and Silber[32] argues that, although the remedies imposed on Brazilian FCOJ under the suspension agreement and the AD order were small, an important effect of both investigations was to encourage the "adoption of practices that promote oligopolistic coordination" among the Brazilian firms.[33] A study by Beilock, Crandall, and Hooks[34] looked at the competitive position of the U.S. and Brazilian industries in supplying U.S. markets. This study argued that the U.S. tariff on FCOJ is the most important factor, at least on a cost basis, affecting sales of Brazilian FCOJ in the U.S. market.[35] Studies by Monteiro Da Silva[36] and by McClain[37] used simulation models of the world FCOJ market to analyze the various trade and production effects of changes in the U.S. import tariff. These studies simulated the effects of reductions in the U.S. tariff on imports of FCOJ and found that the reduced duties would lower prices of FCOJ in the U.S. market, increase both imports and quantity demanded of FCOJ, and, over the longer run, reduce U.S. production.

Data Sources

Data have been obtained from publicly available sources and from industry questionnaires. Published data for this report generally cover the period from 1979, or 3 years prior to the initiation of the 1982 countervailing duty investigation, to 1994, the latest year in which published data are available for the FCOJ industry. Both the U.S. Department of Agriculture (USDA) and the Florida Citrus Processors Association (FCPA) have provided data on FCOJ producer prices, production, inventories, and use, and on production, area, yield, and use of round oranges.

[29] Responses to International Trade Commission questionnaires sent to producers and to purchasers/importers.

[30] Fresh single-strength orange juice that is not reconstituted from concentrated orange juice, not pasteurized, or otherwise preserved.

[31] Responses to International Trade Commission questionnaires sent to producers and to purchasers/importers, and USITC staff conversations with the Florida industry.

[32] Carlos Alberto Primo Braga and Simao Davi Silber, "Brazilian Frozen Concentrated Orange Juice: The Folly of Unfair Trade Cases," *Antidumping: How It Works and Who Gets Hurt*, ed. Michael Finger (Ann Arbor: The University of Michigan Press, 1993), pp. 83-102.

[33] Ibid., pp. 99-100. The authors cite the adoption of participation contracts between orange growers and processors in Brazil and the avoidance of price-discrimination practices in third markets.

[34] Richard Beilock, et. al., "The Influence of Tariffs, Import Taxes, and Fuel Costs on the U.S. Orange Juice Market," *Agribusiness*, vol. 4, No. 4 (1988), pp. 385-400.

[35] Ibid., p. 396. The study did not assess the impact of Brazilian export taxes or U.S. antidumping duties.

[36] Orlando Monteiro Da Silva, The International Market for Frozen Concentrated Orange Juice — Prospects for Brazil, unpublished dissertation, North Carolina State University, Raleigh, NC, 1990.

[37] Emily Ann McClain, A Monte Carlo Simulation Model of the World Orange Juice Market, unpublished dissertation, University of Florida, Gainesville, FL, 1989.

Data on U.S. FCOJ production, use, and prices are generally given on a marketing-year basis beginning December 1; data on the production of oranges are on a crop-year basis beginning November 1. All quantity data on FCOJ production and use are given in SSE gallons. The term "FCOJ" refers to FCOJ for manufacturing in the remaining sections of this chapter, unless otherwise noted.

Questionnaires covering crop years 1984/85 to 1989/90 (1 crop year prior to the May 1986 AD petition and 2 crop years after the April 1987 remedy) were sent to growers, extractors, importers, and purchasers (reconstitutors and blenders) of FCOJ to obtain industry data. These data included profit-and-loss, production and area, purchase prices for the FCOJ, and market and competition information. A total of 458 questionnaires were mailed out--385 to Florida growers, 31 to producers (extractors), and 42 to downstream purchasers[38] and importers.[39] Of these, 85 questionnaires (62 from growers, 12 from producers, 10 from downstream purchasers, and 1 from importers) were received with usable data reported for this study.[40]

Industry Profile and Structure

Brief Evolution of the Industry

World production of FCOJ is dominated by United States and Brazil. Until the 1983/84 season, the United States was the largest producer of FCOJ in the world; prior to that year, U.S. FCOJ production had consistently exceeded production in Brazil except in 1981/82. Despite being a major world producer, the United States is also a major importer. However, until the 1977/78 season, U.S. imports from Brazil remained relatively small, averaging about 28 million gallons and 20 percent of total U.S. FCOJ imports, during 1974/75-1976/77. As described below, a number of occurrences in the late 1970s and early 1980s allowed Brazil to expand its U.S. market share and overtake Florida as the world's largest producer of FCOJ.

Until the mid-to-late 1970s, FCOJ exports to the United States were offset mainly by exports by Florida citrus juice producers that claimed drawback benefits to receive tariff rebates on a variety of products containing orange juice that were reexported. For example, from 1965 to 1976, 60 percent of U.S. exports of FCOJ were made using drawback operations.[41] Researchers have noted that the price difference between Florida and Brazilian FCOJ became larger than the U.S. duties around 1977/78, however, and that Brazilian product began to displace U.S. production about that time.[42] During 1977/78-1979/80, U.S. imports from Brazil averaged about 132 million gallons per year, or 86 percent of total U.S. FCOJ imports.

Freezes in January of 1981, 1982, and 1985, and December 1983, severely damaged much of the Florida orange crop and killed orange trees. These freezes also resulted in great upheaval for the Florida industry and a tremendous turnover of grove ownership.[43] Because of declining domestic supplies, U.S. imports of FCOJ from Brazil rose from 197.9 million gallons in 1980/81 to 578 million gallons in 1984/85, when such imports constituted 98 percent of total U.S. imports.

Technological developments in transport (bulk shipping) and storage technology (tank farms) began to reduce transportation costs associated with imports and, consequently, the market power of Florida FCOJ producers in the U.S. market in the early 1980s. Bulk shipping resulted in a savings of 23 to 32 percent in transport costs; by 1988 such shipping accounted for over 60 percent of all imports, with the balance in 55-gallon drums. As a result, ports at Wilmington, DE, and Newark, NJ, which are not significantly further from Brazil than Florida ports, became important centers for imports, as well as for plants that store, blend, reprocess, and package orange juice.[44] In 1987/88, 249.9 million gallons of FCOJ, or 60 percent of imports, were entered through

[38] Downstream purchasers include firms that purchase only U.S. or U.S. and imported FCOJ for reprocessing.

[39] Importers include firms that only import FCOJ.

[40] Another 54 completed questionnaires were not used because of missing data, and 92 were returned indicating that no oranges had been grown or processed or that no FCOJ had been imported or purchased during the period of investigation. The remaining 227 questionnaires were not returned. In some of these cases, however, questionnaire recipients called or otherwise informed staff that records were not obtainable, orange information could not be separated from that of other crops, groves had changed ownership, grove owners were ill or deceased, or the deadline could not be met.

[41] Braga and Silber, "Brazilian Frozen Concentrated Orange Juice," p. 89.

[42] Ibid.

[43] According to USITC staff conversations with the Florida industry, of the growers who received ITC questionnaires during the 1980s, many are no longer in business, or the business has changed hands.

[44] Richard Beilock, et. al., "The Influence of Tariffs, Import Taxes, and Fuel Costs on the U.S. Orange Juice Market," *Agribusiness*, vol. 4, No. 4 (1988), pp. 385-400.

non-Florida ports compared with 22 million gallons, or 17 percent of total imports, in 1977/78.[45] These imports declined during 1988/89-1991/92 to approximately 38 percent of the quantity of U.S. imports, but the non-Florida ports still remain important distribution points for U.S. imports.

Industry Size and Structure

Growers

U.S. orange growers are located almost entirely in Florida, California, Texas, and Arizona. However, the majority of the oranges produced in California, Texas, and Arizona are for the fresh market. Virtually all of the oranges produced in Florida are used for processing.

According to the *Census of Agriculture*, there were 7,298 farms growing oranges in Florida in 1992.[46] In 1993/94 Florida growers had 653,351 acres in round oranges, of which 142,551 were not yet bearing fruit. A number of growers have groves of several thousand acres each; however, no individual grower accounts for a significant share of total production.

Growers may sell their fruit through a cooperative, a participation plan, or the cash market. Growers that are members of a cooperative deliver their crop to the cooperative processing plant, where it is processed and marketed, and they receive net proceeds that are based on the sale of the FCOJ. Under a "full participation plan," a nonmember of a cooperative delivers his crop to a cooperative or corporate processor, and his return is based on the final selling price of the FCOJM according to an agreed-upon formula. Under a "partial participation plan," the grower may be guaranteed a "floor-price" for the delivered crop. Some growers also sell fresh oranges directly to a processor or intermediate handler and receive a price based on the "cash" market.

The 62 growers responding to the Commission's questionnaire together had 36,105 acres in round oranges in 1989/90. These growers indicated that in 1989/90, 56 percent of their fruit for processing was sold under a participation contract, 27 percent to the cash market, and 17 percent to a cooperative.[47] These numbers were roughly the same before the initiation of the AD investigation, as the same growers indicated that, in 1984/85, 59 percent of their fruit for processing was sold under a participation contract, 26 percent, to the cash market, and 15 percent, to a cooperative.[48]

Extractors

According to the FCPA, there were 25 FCOJ extractor firms (producers) in Florida in 1992/93, down from 36 in 1982/83.[49] The decline in the number of firms largely reflects acquisitions and consolidations of firms, rather than closure of facilities. The five largest extractors have together accounted for over one-half of the output of FCOJ in Florida in recent years.[50]

FCOJ extractors include both cooperatives and corporations. Unlike cooperatives, which are viewed as extensions of their members' growing operations, corporations generally have more latitude to choose citrus product on the basis of price and quality considerations. U.S. corporations own operations in Brazil and Mexico, and they have helped set up processing plants in these countries. Most of the corporations and cooperatives that extract orange juice also import FCOJ.

Competitive Factors

An important competitive issue between U.S. and Brazilian FCOJ is the extent to which U.S. and Brazilian juice are complements or substitutes in the U.S. market. The different orange varieties that are grown in the United States and Brazil give rise to significant differences in the physical characteristics of the FCOJ produced from these oranges. These physical characteristics include solids content, color, clarity, and brix/acid ratio (sweetness). As a result, producers, reprocessors, and repackagers often blend domestic and imported juices to obtain finished retail or institutional products meeting contract specifications.

Brazilian and U.S. Industry Views

The Brazilian industry, as well as some U.S. producers and downstream purchasers, argue that Brazilian FCOJ serves a complementary role in the

[45] Data supplied by Florida Citrus Mutual.

[46] U.S. Department of Commerce, Bureau of the Census, *1992 Census of Agriculture*, vol. 1, Geographic Series, 1992, p. 40.

[47] Questionnaire data provided by Florida orange growers.

[48] Ibid.

[49] Additionally, there are a small number of extractor firms in California and Texas.

[50] Researchers from the University of Florida, conversation with ITC staff, Gainesville, FL.

U.S. FCOJ market for two reasons.[51] First, because of the strong, rich color of Brazilian FCOJ, U.S. producers and downstream purchasers blend Brazilian FCOJ with Florida FCOJ to enhance the overall quality of the Florida product. According to industry sources, Brazilian juice has many of the characteristics of Florida juice produced from valencias, a late-season orange. The Brazilian juice may improve color and taste, especially during the early Florida season, when color is not as good and the sugar/acid ratios from Florida FCOJ may be lower.[52]

Second, Brazilian exporters, as well as some downstream purchasers of FCOJ, argue that Brazil is a "residual supplier" of FCOJ to the U.S. market.[53] As a residual supplier, Brazilian exports increase during periods of reduced Florida production but decrease when Florida production is high.[54] Imports at the beginning of the processing year also reduce U.S. producers' exposure to inventory price fluctuations that occur from year-to-year changes in supply and demand. Some downstream purchasers also argue that the Brazilian FCOJ saved the U.S. orange juice industry, which would have lost market share to substitute products during the freezes of the early 1980s;[55] some U.S. growers and FCOJ producers concur with this view.[56]

The U.S. industry agrees that blending U.S. and Brazilian FCOJ helps meet consistency requirements for FCOJ, as well as to extend the supply of FCOJ. However, the U.S. industry argues that price is critical in the FCOJ market because FCOJ is a fungible product. The industry argues that the price of Brazilian FCOJ, whether or not it is used for blending, helps to determine the overall price for FCOJ in the U.S. market.[57]

In regard to Brazil's residual supplier status, some Florida growers and producers have indicated that Brazil took advantage of Florida's low production during the freezes of the 1980s to take market share away from Florida producers.[58] These growers and producers indicated that without the 1987 AD order, predatory pricing by Brazilian exporters would have driven down U.S. prices and forced U.S. growers and producers out of business. They also argue that the order changed the behavior of Brazilian exporters from predatory pricing in the U.S. market to shifting their interest to other markets in Europe and Asia.

Questionnaire Data and International Trade Commission Analysis

Questionnaire data supplied by FCOJ producers and downstream purchasers suggest that Brazilian and Florida-produced FCOJ tend to be substitutable in the U.S. market, at least to some degree. All 10 responding purchasers indicated that both Florida and Brazilian FCOJ have the same range of uses.[59] In regard to quality, two purchasers stated that the Brazilian FCOJ was of higher quality than Florida FCOJ and one purchaser stated that Florida FCOJ was of higher quality.[60] The remaining purchasers and the 12 responding producers stated there was no difference in the quality between Brazilian and Florida FCOJ.[61] Eight of the responding producers indicated that purchasers of FCOJ will switch between Florida and Brazilian FCOJ, depending on the price.[62] Six of the responding downstream purchasers indicated that they switch between Brazilian and Florida FCOJ on the basis of price differences.[63]

The time series analysis discussed later in this chapter suggests that the quantity of U.S. imports of Brazilian FCOJ is positively related and highly responsive to a change in the U.S. FCOJ price, indicating that Brazilian FCOJ is a substitute for domestic FCOJ. U.S. consumption of domestic FCOJ

[51] Posthearing brief filed on behalf of ABECitrus (the Brazilian Association of Citrus Exporters), Nov. 3, 1994; U.S. producers and purchasers, interviews by ITC staff, and questionnaire responses.

[52] USITC staff conversations with and questionnaire responses from downstream purchasers.

[53] ABECitrus, posthearing brief, Nov. 3, 1994, p. 4; downstream purchasers, interviews by ITC staff.

[54] ABECitrus.

[55] Staff interviews and questionnaire responses.

[56] Growers and FCOJ producers, interviews by ITC staff.

[57] Posthearing brief filed on behalf of Florida Citrus Mutual, Nov. 7, 1994, pp. 20-21.

[58] U.S. growers and FCOJ producers, interviews by ITC staff.

[59] Responses to ITC questionnaires from downstream purchasers of FCOJ.

[60] Ibid.

[61] Responses to ITC questionnaires from downstream purchasers and producers.

[62] Two producers did not respond, and two producers indicated that end users cannot tell the difference between Brazilian and U.S. FCOJ.

[63] Among the downstream purchasers stating they do not switch between Brazilian and Florida FCOJ, two firms indicated they have long-term relationships with Brazilian suppliers, whereas another firm indicated that it did not switch because it uses the Florida seal on its products and thus purchases only Florida-produced FCOJ. One firm indicated that it adjusts its purchases of U.S. fruit for processing, rather than the amount of imports, in response to price differences between Florida and Brazilian FCOJ.

is also shown in the time series analysis to be positively related and responsive to changes in the price of Brazilian FCOJ. These findings suggest that imports of Brazilian FCOJ and domestic FCOJ are overall substitutes in the U.S. market.

Industry Performance in World and U.S. Markets

The United States accounted for 1,116 million gallons, or 39 percent, and Brazil accounted for 1,504 million gallons, or 52 percent, of world FCOJ production in 1993/94 (table 7-1). Other producing countries, including Mexico, Belize, Costa Rica, and Honduras, accounted for the remaining 9 percent. Although production and production shares are highly dependent on weather conditions, the U.S. share of total world production rose slightly from 38 percent in 1986/87 to 39 percent in 1993/94.

Brazilian production also increased during the 1986/87-1993/94 period to a peak of 1,610 million gallons in 1991/92. The Brazilian share of world production, which is also highly weather-dependent, varied during 1986/87-1993/94 from 46 to 57 percent. The Brazilian share of world production has averaged 51 percent during the last 2 years as good weather in Florida, combined with increased bearing acreage from trees planted after the 1984/85 freeze, resulted in higher Florida production during those years.

U.S. exports of FCOJ have generally risen since 1986/87, reflecting the increase in production that occurred after that time (table 7-2). As noted earlier, a portion of the U.S. exports benefit from drawback of previously paid import duties. Industry sources, however, argue that little Brazilian FCOJ has been imported with the intent to reexport. These sources note that substantial duty drawback credits have gone unused each year with imports exceeding exports by a 3-to-1 or 4-to-1 ratio.[64]

Total Brazilian exports also increased, from 1,061 million gallons in 1987 to 1,638 million gallons in 1993. Exports to countries other than the United States have accounted for most of the increase in Brazilian exports since 1987 as the U.S. share of these exports declined from 43 percent in that year to 29 percent in 1993. Brazilian exports to the United States peaked in the same years or the year following a freeze in the United States: 1984, 1986, and 1990.

[64] Florida Citrus Mutual, information supplied to Commission staff.

Market Performance—Trend Analysis

Domestic Shipments and Prices

FCOJ Producer Prices and Shipments

The domestic producer price of FCOJ, shown in figure 7-2[65] along with U.S. FCOJ production, rose from $1.11 per gallon in 1985/86 (the year in which the AD petition was filed) to $1.93 per gallon in 1987/88, fell in 1988/89,and then peaked at $2.03 per gallon in 1989/90, a freeze year. The domestic producer price of FCOJ then fell between 1989/90 and 1992/93 to $1.13 per gallon before rising to $1.32 per gallon in 1993/94. Domestic production of FCOJ rose from 684 million gallons in 1985/86 to 970 million gallons in 1988/89. Increased domestic supply during this period reflected improved weather following the January 1985 freeze, the recovery of some Florida orange trees, and new plantings to replace trees that had been killed in the earlier freeze. A subsequent freeze occurred in 1989/90, resulting in a decline in production in that year, after which domestic production continued to move upward, peaking at 1,212 million gallons in 1992/93. Price declines between 1989/90-1992/93 reflected increased bearing acreage in round oranges and higher U.S. and world supplies of FCOJ during those years (see table 7-1).

Among the 11 downstream purchasers and importers who provided usable questionnaire data, two indicated that price increases for FCOJ in the U.S. market during 1985-90 were related, in part, to the AD order.[66] The remaining 9 respondents stated that fluctuations in supply and the 1989 freeze were more important determinants of price and that the AD order either had no effect or they were uncertain of its effect on prices.

[65] The FCOJ price shown in figure 7-2 is the card price or the base wholesale price at which Florida processors sell bulk FCOJ before discounts. This price may be an average price of U.S.-produced and imported FCOJ which has been blended with the U.S. product. FCOJ is also bought and sold on the New York Cotton Exchange through futures contracts. However, the futures price tends to exhibit greater instability as it is influenced by the expectations of traders and speculators.

[66] ITC questionnaire data supplied by purchasers/importers of FCOJ.

Table 7-1
FCOJ: World production, by specified sources, crop years 1978/79-1993/94

Crop year	United States	Brazil[1]	All other	Total	Percent of total	
					United States	Brazil
	Million gallons SSE					
1978/79	936.4	611.6	(2)	(2)	(2)	(2)
1979/80	1,199.3	693.1	(2)	(2)	(2)	(2)
1980/81	958.5	846.3	(2)	(2)	(2)	(2)
1981/82	694.2	868.8	(2)	(2)	(2)	(2)
1982/83	968.0	714.2	(2)	(2)	(2)	(2)
1983/84	641.7	1,102.2	(2)	(2)	(2)	(2)
1984/85	622.9	1,230.2	(2)	(2)	(2)	(2)
1985/86	684.4	847.8	247.7	1,779.9	38.4	47.6
1986/87	780.8	998.2	282.1	2,061.1	37.9	48.4
1987/88	907.3	994.0	267.8	2,169.0	41.8	45.8
1988/89	970.2	1,476.2	320.9	2,767.3	35.1	53.3
1989/90	652.3	1,213.3	365.5	2,231.1	29.2	54.3
1990/91	876.2	1,334.2	284.0	2,494.5	35.1	53.5
1991/92	930.0	1,609.7	282.0	2,821.7	33.0	57.0
1992/93	1,211.7	1,564.7	261.4	3,037.8	39.9	51.5
1993/94	1,116.1	1,504.3	280.5	2,900.9	38.5	51.9

[1] The Brazilian harvest usually starts in June and ends in February or March.
[2] Not available.

Source: *World Horticultural Trade and U.S. Export Opportunities*, various issues, U.S. Department of Agriculture, FAS.

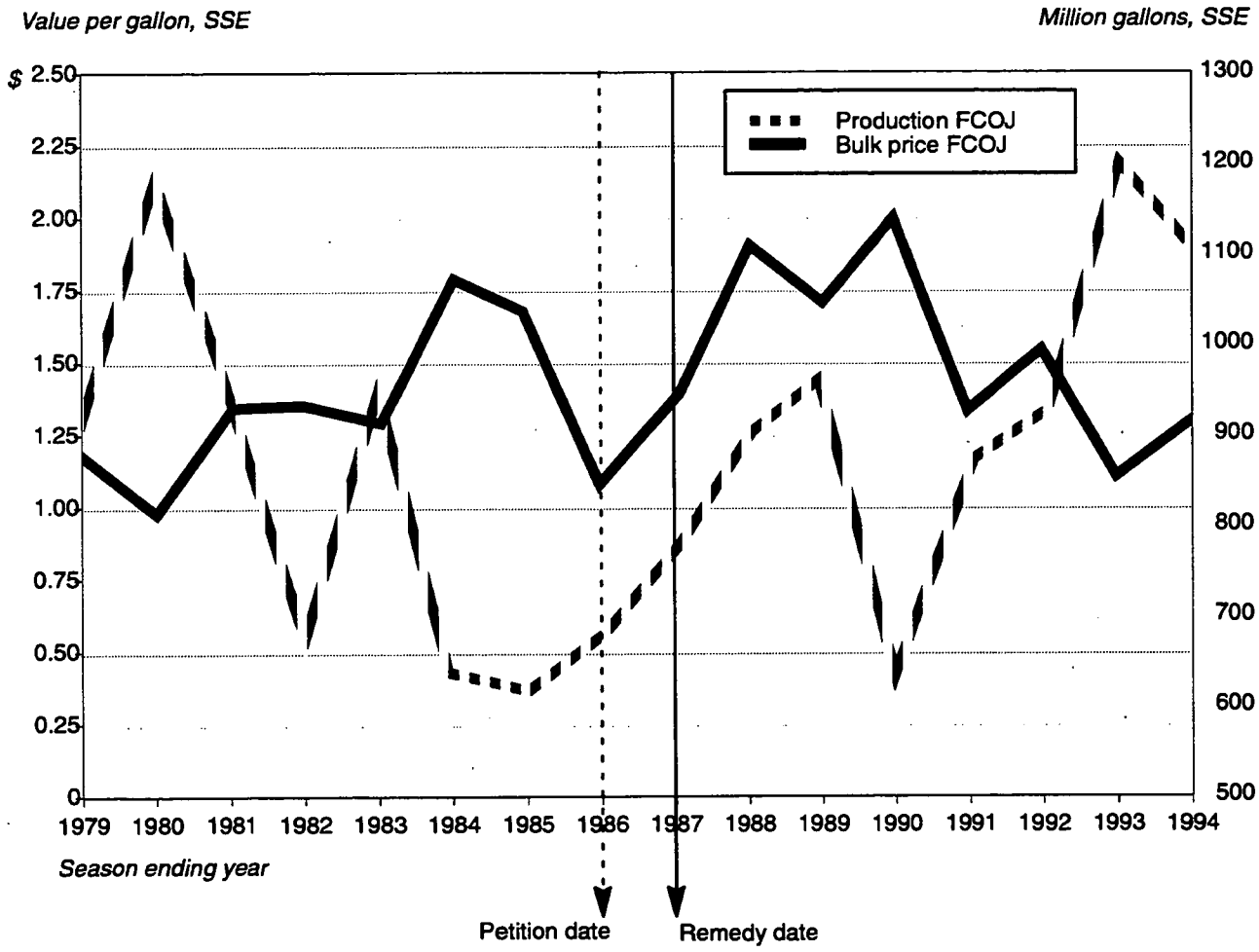
Table 7-2
FCOJ: U.S. and Brazilian exports, 1978/79-1992/93

Year	U.S. exports[1]	Brazilian exports[2]			U.S. share of Brazilian exports
		United States	All other	Total	
	Million gallons SSE				*Percent*
1978/79	67.2	102.7	308.1	410.8	25.0
1979/80	123.9	110.9	452.9	563.4	19.7
1980/81	89.8	364.8	533.6	898.4	40.6
1981/82	75.0	418.9	313.8	732.8	57.2
1982/83	83.2	360.2	417.3	777.5	46.3
1983/84	71.6	798.7	473.3	1,272.0	62.8
1984/85	57.5	402.8	278.7	681.5	59.1
1985/86	71.0	582.7	546.3	1,129.0	51.6
1986/87	73.0	461.0	600.4	1,061.4	43.4
1987/88	90.0	365.7	567.2	932.9	39.2
1988/89	73.5	359.5	659.1	1,018.6	35.3
1989/90	90.0	569.0	772.1	1,341.1	42.4
1990/91	96.4	450.6	852.2	1,302.8	34.6
1991/92	107.6	469.7	892.1	1,361.8	34.5
1992/93	114.1	471.1	1,167.1	1,638.2	28.8

[1] U.S. exports are on marketing-year basis beginning Dec. 1.
[2] Data are on a calendar-year basis that corresponds to the second split year.

Sources: U.S. exports—*World Horticultural Trade and U.S. Export Opportunities*, U.S. Department of Agriculture, Foreign Agricultural Service, various issues. Brazilian exports—Bank of Brazil/CACEX from 1979 to 1988 and DECEX from 1989 to 1993.

Figure 7-2
FCOJ: U.S. bulk prices and U.S. production, 1978/79-1993/94



Source: Bulk price, from Florida Department of Citrus and Economic Research. Production data, from U.S. Department of Agriculture, Foreign Agricultural Service.

Orange Production, Prices, and Profitability

It takes approximately 4 to 5 years for a new orange tree to produce fruit; thus, U.S.-produced FCOJ is largely a function of the bearing acreage that was planted in earlier years and the weather.[67] As shown in table 7-3 and figure 7-3, bearing acreage of Florida orange groves increased steadily from 1985/86 to 1989/90 and from 1991/92 to 1993/94. The average price received by Florida growers for processing oranges fell during 1985/86, then increased steadily through 1988/89, peaking in the latter year at $9.50 per 90-pound box. Data in table 7-3 indicate that nonbearing acreage of orange groves in Florida also jumped markedly in 1987/88 and peaked in 1989/90 at 165,300 acres, or 27 percent of total Florida orange acreage in that year. These data indicate a strong intention of the domestic industry to expand production. The high proportion of acres with nonbearing trees reflects both replacement of freeze-damaged trees and expansion of orange acreage, primarily farther south in the State.[68]

According to testimony by the U.S. industry, the AD order was a major factor in the recovery of the

[67] There are some activities that growers can do to alter their yields in the short run. These largely include cultural practices, such as use of fertilizer, spraying, etc.

[68] In contrast, a USDA survey found that 96 percent of the orange acres in California had trees bearing fruit. See Boyd M. Buxton, *Costs of Producing Oranges in California and Florida, 1988/89.*

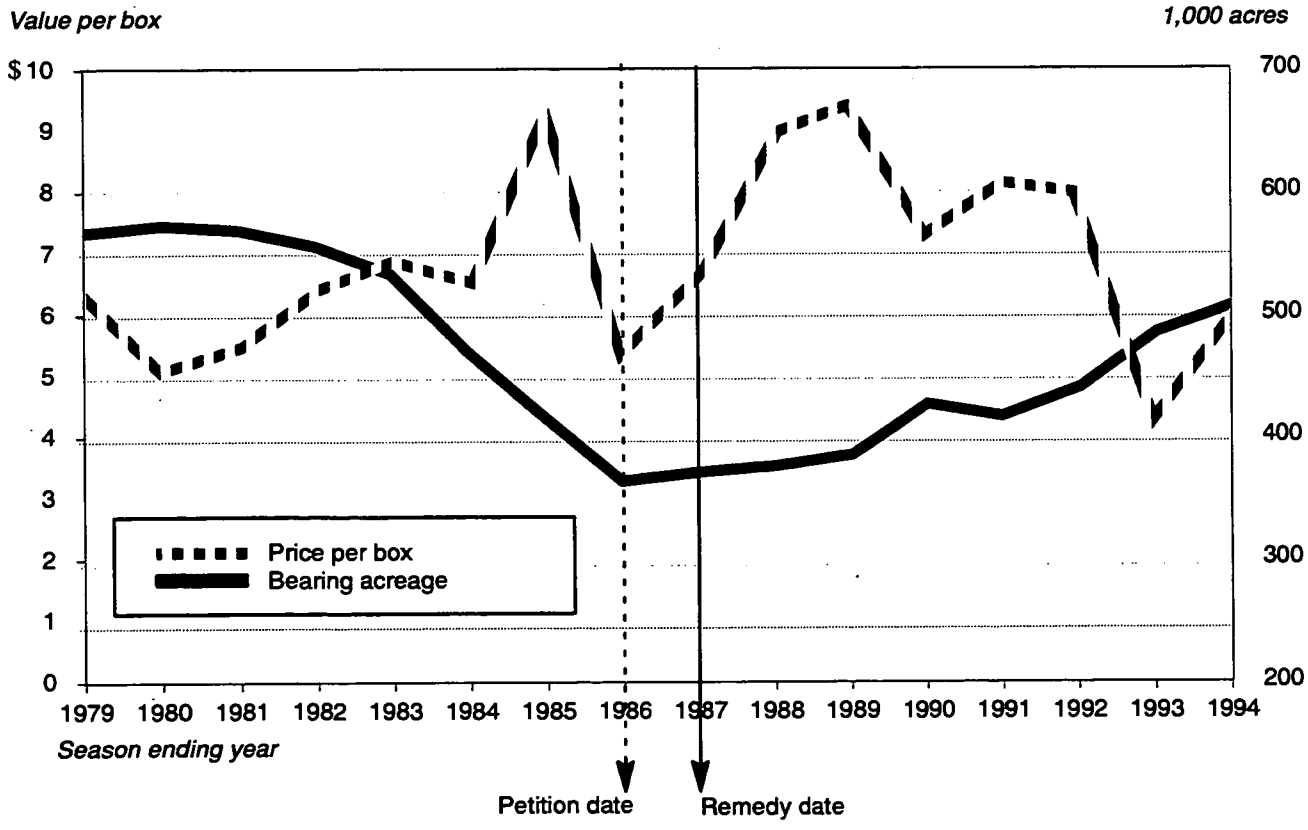
Table 7-3
Florida oranges: Bearing and nonbearing acreage and yield per acre, crop years 1978/79-1993/94

Crop year	Bearing acreage	Nonbearing acreage	Yield in boxes per acre[1]	Price[2] per box
1978/79	571,500	28,200	(3)	$6.42
1979/80	576,600	33,700	(3)	5.16
1980/81	573,400	39,800	(3)	5.55
1981/82	560,200	52,000	225	6.49
1982/83	536,800	64,400	260	6.95
1983/84	474,200	88,000	246	6.62
1984/85	420,100	95,800	247	9.51
1985/86	367,600	98,700	324	5.50
1986/87	375,400	(3)	319	6.74
1987/88	380,200	156,600	363	9.04
1988/89	388,700	(3)	377	9.50
1989/90	431,400	165,300	255	7.40
1990/91	420,900	(3)	360	8.23
1991/92	444,400	164,200	315	8.06
1992/93	489,200	(3)	381	4.44
1993/94	510,800	142,551	341	6.08

[1] 90-pound boxes.
[2] Season average.
[3] Not available.

Source: U.S. Department of Agriculture, Statistical Reporting Service, *Citrus Fruits*, various issues.

Figure 7-3
Oranges: Bearing acreage for Florida oranges and average price for oranges used in FCOJ, 1978/79-1993/94



Source: Bearing acreage data, from U.S. Department of Agriculture. Price data from Florida Citrus Processors Association, *Statistical Summary 1993-94 Season.*

domestic FCOJ production after 1986/87.[69] According to the industry, a number of measures undertaken by U.S. growers of round oranges after 1986/87 improved the competitive position of the industry. These measures included closure of unprofitable groves, the movement of groves to southern areas of Florida where frost and freeze damage were greatly reduced, development of disease-resistant and higher yielding trees, and development of programs to improve horticultural practices.[70] The AD order benefited the growers, according to the industry, because it insulated the growers from the Brazilian imports while these competitive efforts were being undertaken.[71] Acreage data submitted by respondents to the Commission's grower questionnaire also showed an upward trend, as shown in the following tabulation:

Crop year	Bearing	Nonbearing
1984/85	28,328	2,179
1985/86	29,077	3,064
1986/87	29,313	3,834
1987/88	29,373	10,103
1988/89	31,148	9,581
1989/90	36,105	8,609

Despite the increase in acreage, the profitability of growers providing financial data was very erratic during 1984/85-1989/90. Total proceeds[72] from sales of round oranges declined from $49 million in 1984/85 to $46 million in 1985/86, a freeze year. Total proceeds then increased steadily to a peak of $75 million in 1987/88. Total proceeds declined to $71 million in 1988/89 and further to $54 million in 1989/90, another freeze year.

Operating income before taxes followed the same trend as total proceeds, declining from $14 million in 1984/85 to $8 million in 1985/86, but then increasing to $17 million in 1986/87 and peaking at $33 million in 1987/88. Operating income declined thereafter to a low of $6 million in 1989/90. However, the changes in operating income were more erratic than changes in total proceeds, because growing and operating expenses increased steadily over the period, as shown in the following tabulation *(million dollars)*:

Crop year	Total proceeds	Growing and operating expenses	Operating income before income taxes
1984/85	49.2	35.3	13.9
1985/86	45.7	37.5	8.2
1986/87	56.2	38.7	17.4
1987/88	75.0	41.7	33.3
1988/89	71.0	46.6	24.4
1989/90	53.9	47.8	6.1

Quantity and Prices of Subject Imports

Imports of FCOJ from Brazil peaked at 578 million gallons in 1984/85, a freeze year, and then fell steadily through the 1988/89 crop year (figure 7-4). Imports from Brazil rose in 1989/90, another freeze year, and then fell to a level of 288 million gallons in 1992/93. The decline in imports, starting in 1986/87, coincided with rising unit values (c.i.f. plus duty) of Brazilian FCOJ. The average Brazilian unit value price rose from $1.23 per gallon in 1986/87 to $1.78 in 1989/90 and then fell to $1.02 per gallon in 1992/93, reflecting increased supplies of FCOJ in both Brazil and the United States (table 7-1).

During 1984/85, the peak year for total U.S. FCOJ imports, Brazil supplied 98 percent of U.S. imports (figure 7-5). This share fell irregularly through the 1989/90 marketing year, following the 1985 freeze. Brazil's market share rose irregularly thereafter. During 1989/90-1993/94, imports from Brazil made up, on average, about 86 percent of total U.S. FCOJ imports.

Both U.S. industry sources and downstream purchasers have indicated that after the institution of the AD investigation and the imposition of the remedy, Brazilian FCOJ exporters became more price-conscious in the U.S. market in order to avoid further accusations of dumping and to avoid payment of AD duties.[73] Changes in U.S. bulk (card) prices and import unit values for Brazilian FCOJ, shown in figure 7-6, indicate that starting around late 1986, Brazilian and U.S. bulk prices started moving very closely together.[74]

[69] Bobby F. McKown, Florida Citrus Mutual testimony, before the U.S. International Trade Commission, Sept. 29, 1994, p. 7.

[70] Ibid., p. 7.

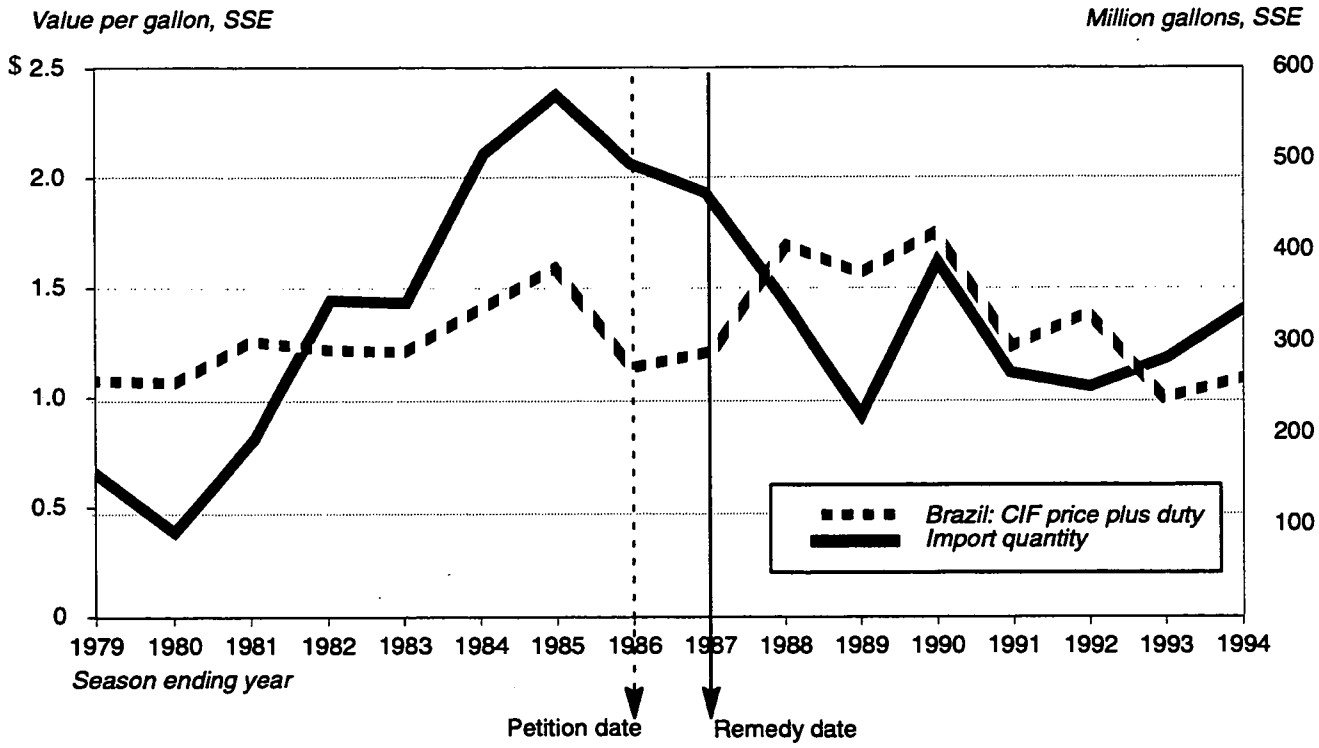
[71] Ibid., pp. 7-8.

[72] Total proceeds include sales of round oranges for juice processing and to all other outlets. Growers were not able to separately break out growing expenses for sales to juice processing and other outlets. Sales to other outlets accounted for less than 10 percent of total sales during 1984/85 to 1989/90.

[73] U.S. FCOJ producers and FCOJ purchasers, interviews by ITC staff.

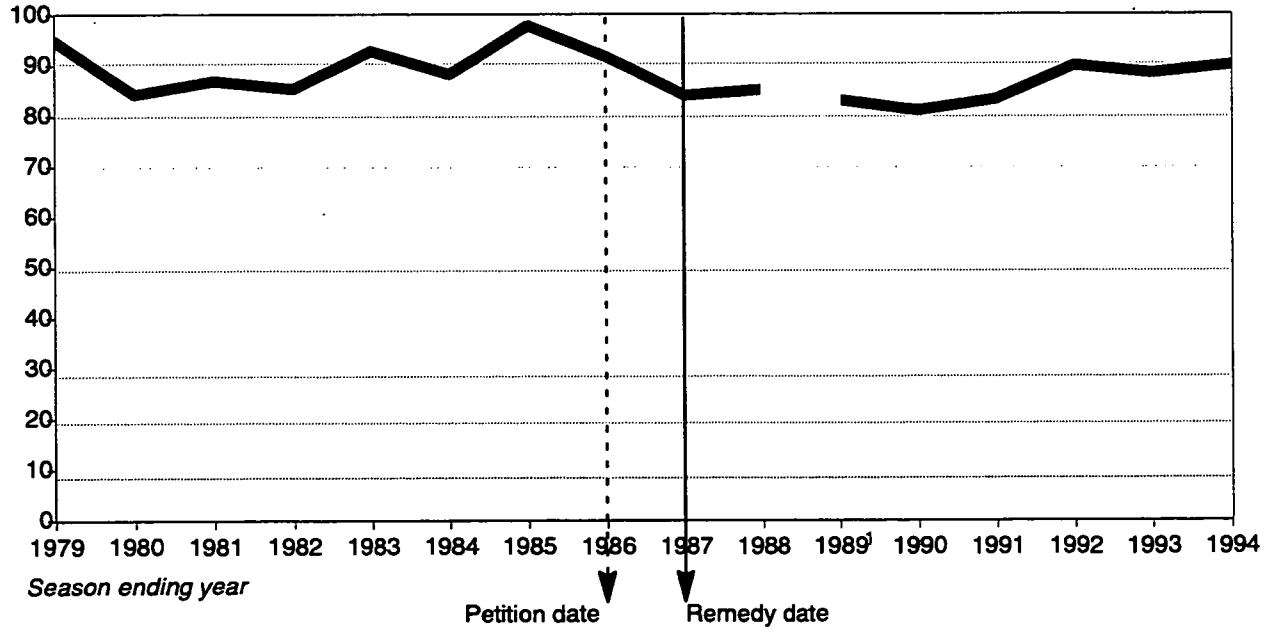
[74] The U.S. card price will not necessarily be the same as the Brazilian import price since the former includes some additional transportation costs.

Figure 7-4
FCOJ: U.S. imports from Brazil, 1978/79-1993/94



Source: U.S. Department of Commerce.

Figure 7-5
FCOJ: U.S. imports from Brazil as a share of total quantity of U.S. imports, 1978/79-1993/94

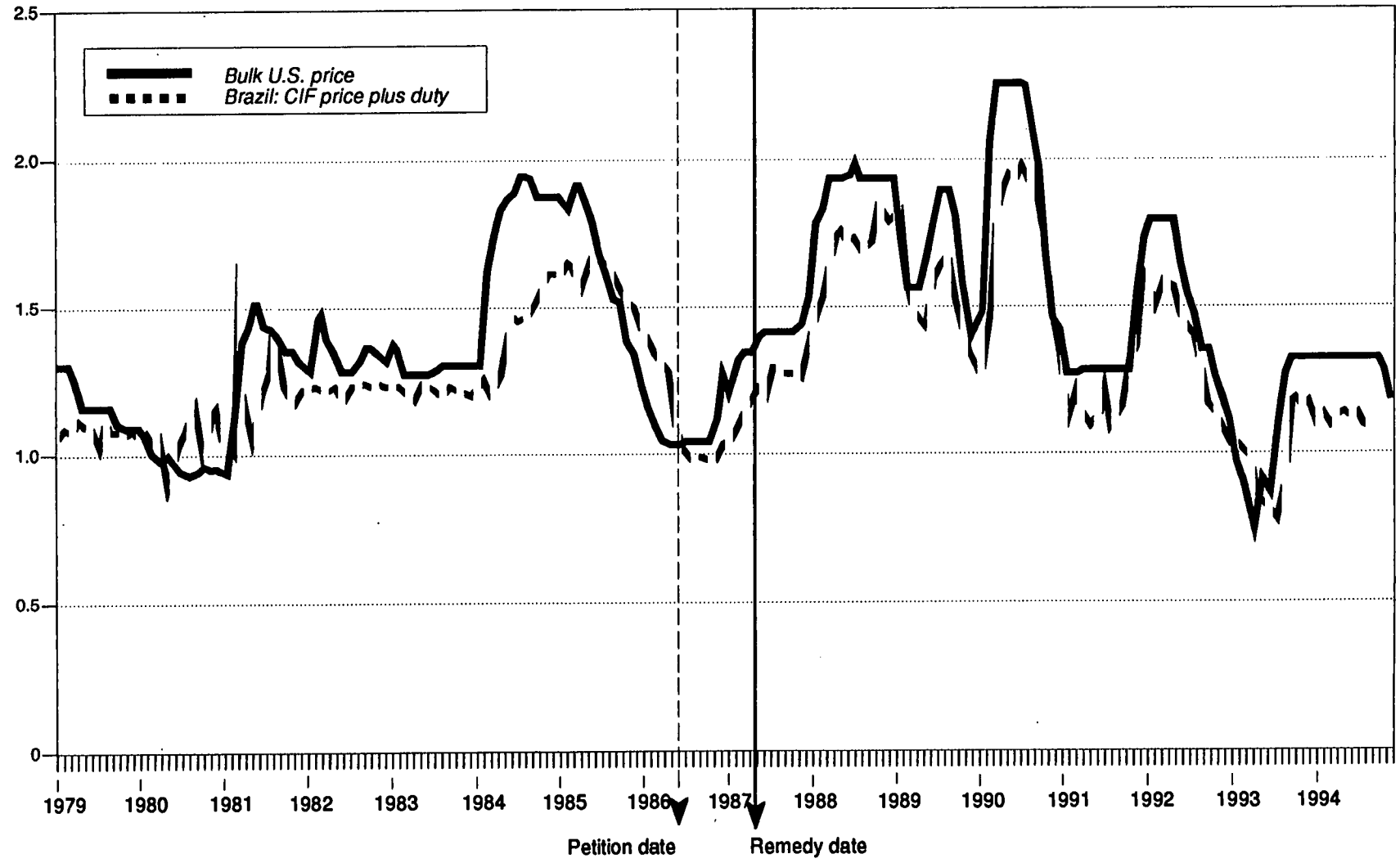


[1] Data for 1988/89 are not reliable because of conversion to HTS. Total imports data may include other orange juice.

Source: Calculated by the staff of the U.S. International Trade Commission on the basis of U.S. Department of Commerce data.

Figure 7-6
FCOJ: U.S. bulk domestic price and U.S. import price from Brazil, 1979 to 1994

Dollars per gallon, SSE



Source: Bulk prices, from Florida Department of Citrus and Economic Research. Brazil prices, from U.S. Department of Commerce.

The price data shown for Brazil reflect the change in Brazil's method for establishing its minimum export price for FCOJ in January 1987.[75] Brazil's minimum export price for FCOJ is the minimum amount of U.S. dollars that must be delivered by the processor to the Brazilian foreign trade department (DECEX) in order to receive an export license for each export sale.[76] Under the new system, DECEX determines an export price by reference to a 20-day moving average of settlement prices for FCOJ futures on the New York Cotton Exchange.[77] Under the previous system, FCOJ exports could be preregistered, allowing exporters to offer long-term fixed-price contracts to buyers.[78]

U.S. industry sources and downstream purchasers agree that the AD order has tended to put a price floor on Brazilian exports to the U.S. market, because Brazilian exporters are unwilling to sell at prices that could be construed as LTFV.[79] According to U.S. industry sources, Brazil's pricing mechanism also makes it difficult for Brazilian exporters to be charged with making LTFV sales in the United States.[80] The U.S. industry has also suggested that the minimum export price may exert some pricing discipline upon Brazilian exporters during periods of rapidly falling prices, since the 20-day moving average will generally remain above the most recent futures price during periods of severe price declines.[81] Because of the price lag, Brazilian exporters might be reluctant to lower their export prices, since they would still need to pay DECEX the amount of the minimum export price.[82]

[75] U.S. industry officials argue that the changes in the Brazilian pricing mechanism came about because of the dumping petitions and the antidumping order. Importer sources argue that the changes were necessary to correct flaws in Brazil's minimum export price scheme and would have been made anyway.

[76] ABECitrus, posthearing brief, Nov. 3, 1994, p. 7.

[77] The reference price nets out the amount of the U.S. tariff, the Florida FETAX, a standard 4-percent commission, ocean freight to the United States, marine insurance, and port handling fees.

[78] Florida Department of Citrus, *The 1994-95 Situation and Outlook for the Brazilian Citrus Industry*, working paper series 94-3, p. 7.

[79] U.S. producers and downstream purchasers, interviews by ITC staff.

[80] Florida Citrus Mutual official, interview by ITC staff.

[81] Florida Citrus Mutual, information provided to Commission staff.

[82] The U.S. industry also argues that Brazil's minimum price mechanism can lead to considerable market price instability because it is based on the New York Futures price—a price which tends to be highly variable and which is influenced by Brazil's production, since Brazil is a major producer and exporter of FCOJ.

U.S. Industry Market Share

The Commission's report on the final FCOJ dumping investigation noted that because FCOJ is both exported from and imported into the U.S. market, and because no statistics exist on the portion of the exported product that consists of imports, the usefulness of traditional "market share" estimates (the ratio of domestic shipments to apparent U.S. consumption) in the case of FCOJ is unclear.[83] Thus, in this section the U.S. industry market share is calculated as the U.S. production of FCOJ divided by total available FCOJ (U.S. production plus imports plus carryover stocks from the previous year).[84]

On the basis of this type of calculation, the data in figure 7-7 indicate that the U.S. share of available FCOJ increased from 46 percent in 1985/86 to 62 percent in 1988/89. The increase in the U.S. share of total available FCOJ reflects higher U.S. production of FCOJ and reduced imports as shown by the decline in Brazil's share of available FCOJ. The U.S. share fell in 1989/90, reflecting a freeze, but then rose steadily to 71 percent in 1992/93. Brazil's share of available FCOJ fell from 34 percent in 1985/86 to 15 percent in 1988/89, rose in 1989/90, and then fell to 17 percent in 1992/93.

U.S. Consumption

U.S. consumption of FCOJ[85] rose irregularly from 1,146 million gallons in 1984/85 to 1,259 million gallons in 1988/89, then fell in 1989/90, and remained at lower levels (compared with consumption in the earlier years) until 1992/93 (figure 7-8 and appendix table F-7-1). Total FCOJ consumption reached a high of 1,386 million gallons in 1993/94. The producers and purchasers/importers responding to the Commission's questionnaire indicated that the most important factor affecting consumption of FCOJ during 1984/85-1989/90 was the increase in consumption of NFC orange juice and blended juice drinks. Retail prices (as reported through supermarket and grocery store scanner data) for a variety of products made from FCOJ, including FCOJR, SSOJ,

[82]—*Continued*

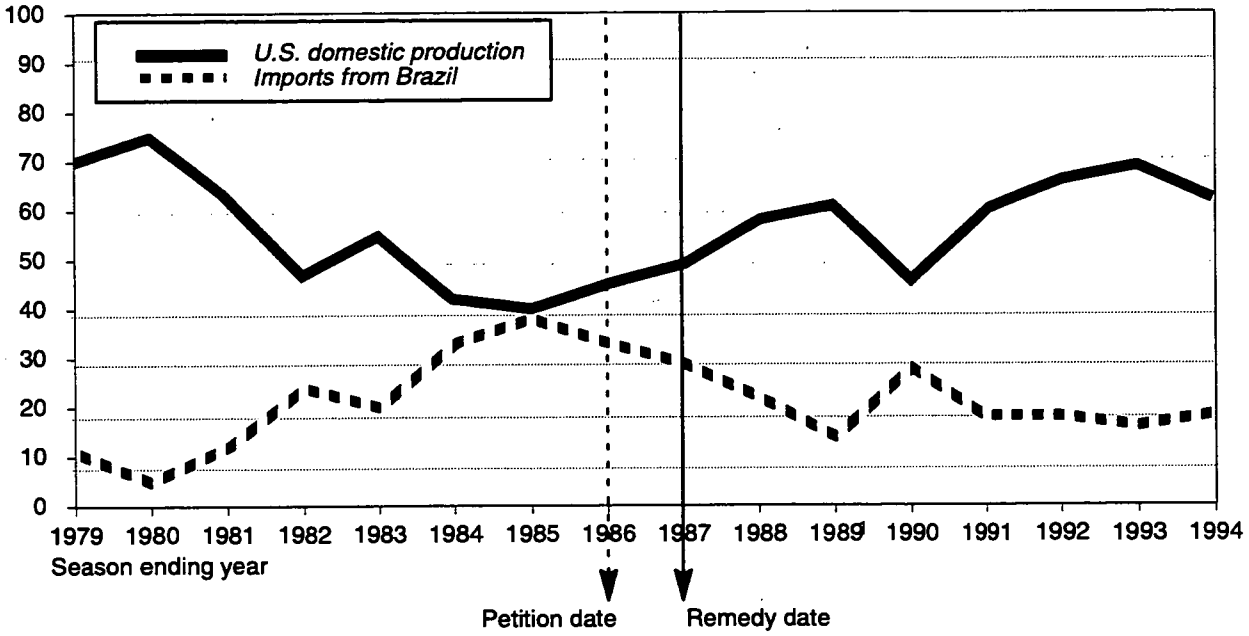
[83] USITC, *Frozen Concentrated Orange Juice From Brazil* (investigation No. 731-TA-326 (final)), USITC publication 1970, Apr. 1987.

[84] See appendix table F-7-1 for basic data on FCOJ availability and use.

[85] U.S. consumption is defined as U.S. production plus imports, minus exports, and plus or minus any stock change.

Figure 7-7
FCOJ: U.S. domestic production and imports from Brazil as a share of total availability, 1978/79-1993/94

Percent

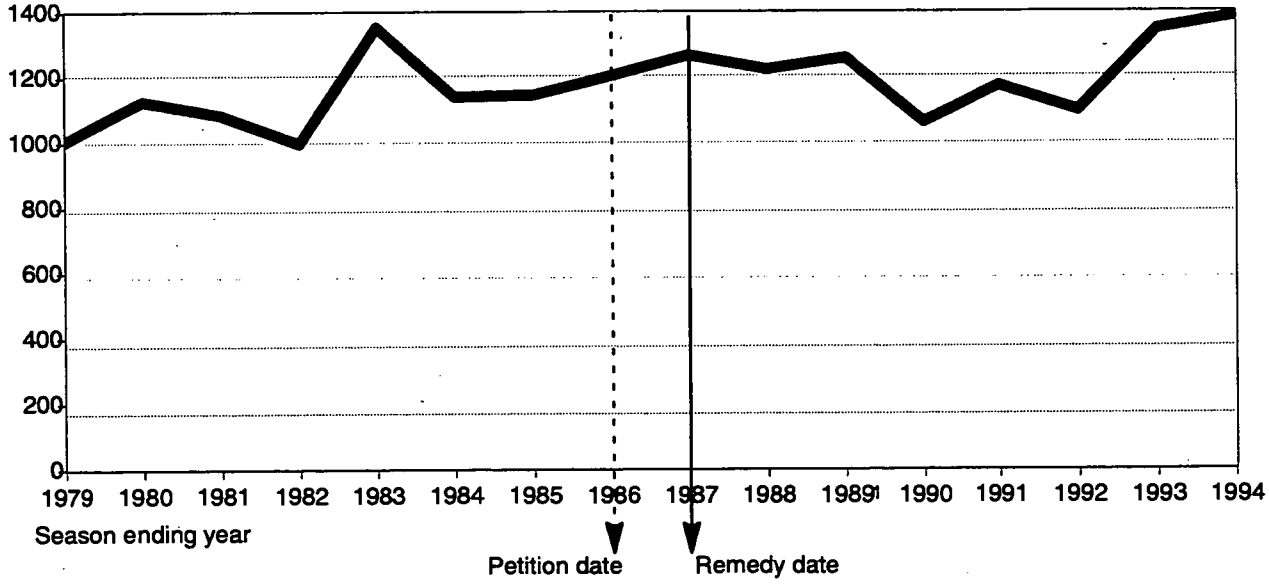


[1] Total import data may include imports of other orange juice in this year.

Source: Compiled from official statistics fo the U.S. Department of Agriculture, Foreign Agricultural Service. Market share was calculated as U.S. production divided by total availability (production, plus imports, plus carry-in stock.)

Figure 7-8
FCOJ: Total U.S. consumption, 1978/79-1993/94

Million gallons, SSE



[1] Total U.S. consumption for 1988/89 may include imports of other orange juice.

Source: Calculated by the staff of the U.S. International Trade Commission on the basis of statistics from the U.S. Department of Agriculture, Foreign Agricultural Service.

and pasteurized orange juice products, rose in both real and nominal terms from January 1987 through mid-1988, stayed constant through early 1990, rose again in early 1990, and then fell through late 1991 as shown in figure 7-9. Retail prices then rose in early 1992 and fell again through early 1993.

Employment, Capacity, and Costs of Producers and Downstream Purchasers

Questionnaires were used to collect information on employment and production capacity of producers and downstream purchasers. Of the 12 producers responding to the Commission's questionnaire, six stated that they had increased the number of workers and/or compensation for workers employed in FCOJ production during 1984/85-1989/90, one noted a decrease, and five did not respond.[86] Three of the producers stated that they had increased their production capacity for FCOJ over the same period, seven maintained their capacity, and two producers did not respond.[87] Among purchasers, eight responded that they did not cut costs or lay off workers because of the AD duty, and two did not respond.[88]

Prices paid for both bulk domestic and Brazilian FCOJ as reported by six purchasers/importers responding to the Commission's questionnaire generally fell from 1985 to 1986 (before the AD order), rose during 1986-1988, fell in 1989, and rose in 1990.[89] Reported purchase prices for Brazilian FCOJ were lower than the domestic prices over the entire period. Three of the purchasers responding to the Commission's questionnaire indicated that the AD order did not affect their costs during 1985-90, one indicated the AD order had affected cost, and six were uncertain of any effect.[90] As noted earlier, most of the purchasers/importers responding to the Commission's questionnaire stated that fluctuations in supply and the 1989 freeze were the most important determinants of their purchase prices for FCOJ during 1985-90.

[86] Responses to Commission questionnaires by producers of FCOJ.

[87] Ibid.

[88] Responses to Commission questionnaires by purchasers of FCOJ.

[89] Ibid.

[90] Ibid.

Estimates of Economic Effects

Time Series Analysis

Hypotheses Tested

The time series analysis tests whether the final determination applied to imports of FCOJ from Brazil had an impact on consumption of U.S.-produced FCOJ or on U.S. imports of FCOJ from Brazil over time as shown in chapter 5. It tests the hypothesis that the consumption of the domestic product will increase while the quantity of Brazilian imports will decrease after the final determination.

To examine the impact of the AD order, the time series data on FCOJ consumption and imports are partitioned into two time periods: pre-determination and postfinal determination. In the FCOJ case, a binary variable with 1=1986/87-1993/94, and 0=1974/75-1985/86 is included in each regression to test whether consumption of domestic FCOJ and FCOJ imports from Brazil was higher or lower after the AD order. The binary (remedy) variable is defined as 1 over the entire period the AD order has been in effect, despite the fact that AD duties actually paid on Brazilian FCOJ have been zero in most years, to test whether changes in Brazilian price and export policies allegedly due to the AD order had any impact on the U.S. market.[91] The estimated coefficients for the price variables in each equation also provide empirical evidence as to the substitutability of U.S. and Brazilian FCOJ in the U.S. market.

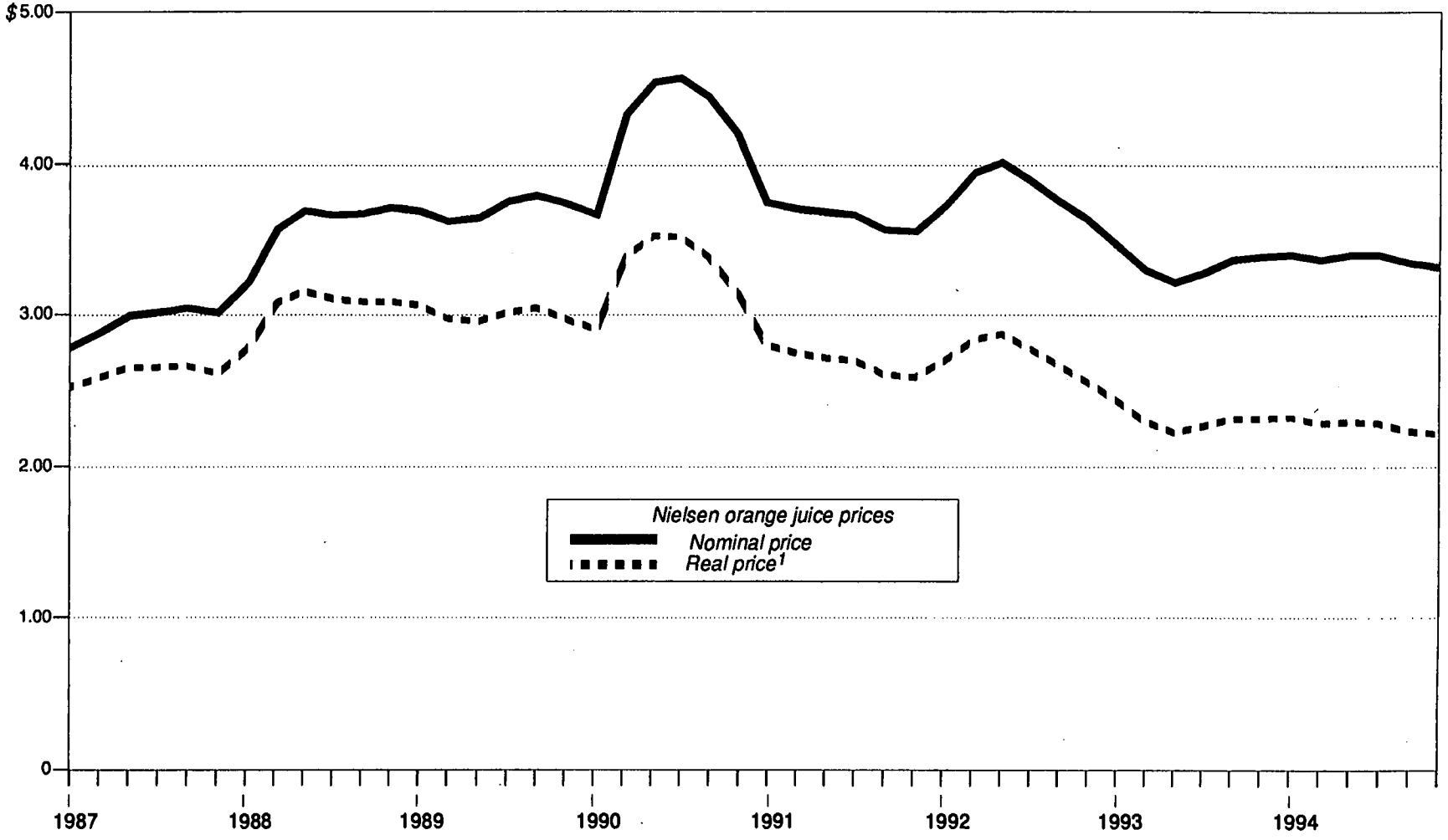
A variable representing the petition was considered for inclusion in the equations. However, it was not possible to isolate the months between the petition filing and the remedy using annual data. Therefore, a petition variable was not tested in the estimated equations.

For estimation purposes, the six-equation framework described in chapter 5 collapses into the following two annual demand (or consumption) equations for the U.S. FCOJ industry: (1) U.S. consumption of domestically produced orange juice,

[91] Since the actual duties paid were minimal in this case, the remedy variable is not likely to pick up the effects of the AD duty on consumption of the domestic product or imports. This is because price variables, which account for increases or decreases in U.S. or Brazilian prices, are also in the equations. Rather, the remedy variable will likely pick up the effects of any changes in behavior on the part of market participants.

Figure 7-9
Monthly retail orange juice scanner prices, 1987-94

Value per gallon, SSE



[1] Real price is scanner price divided by consumer price index.

Source: A.C. Nielson.

and (2) U.S. consumption of Brazilian orange juice.[92] Equations for nonsubject imports were not estimated because of the large share of U.S. FCOJ imports supplied by Brazil. Domestic and Brazilian supply equations were not estimated for two reasons. First, because FCOJ is produced from a perennial crop (oranges), the supply can be considered exogenous in the short to medium run. Second, estimation of a long-term supply function is difficult in that the supply depends on bearing acreage planted in earlier years, the age distribution of existing trees, as well as the weather.[93]

The following two equations were estimated:

(1) Quantity of domestic FCOJ consumed= f (remedy variable, price of domestic FCOJ, price of Brazilian FCOJ, prices of substitutes, and personal income)

(2) Quantity of Brazilian imports= f (remedy variable, price of domestic FCOJ, price of Brazilian FCOJ, prices of substitutes, personal income, and data discrepancy variable)

In addition to the prices for domestic and imported FCOJ, the producer prices for grapefruit juice and apple juice are included in the equations to account for other substitutes.[94] Personal income is included to account for the effects of income on consumption of FCOJ over time and to pick up any other trend effects. The remedy variable is included to account for any change in FCOJ imports from Brazil or change in consumption of domestic FCOJ after the AD remedy was introduced, holding all other variables constant. The data discrepancy variable is a binary variable (=1, 1988/1989 and 0, all other years) that accounts for any data discrepancies in the import data in 1989 due to conversion to the HTS. Since the time series analysis examines the impact of the AD remedy on FCOJ demand, the price and income variables are deflated by the consumer price index.[95] The equations were estimated using the "seemingly unrelated" regression (SUR) technique.[96]

Data for the time series analysis were obtained from Commerce, USDA, and the Department of Labor. The equations were estimated using annual data for crop years 1974/75-1993/94. The data were modeled in natural logarithms, rendering regression coefficient estimates in elasticity form. The equations are estimated at the wholesale level to account for the fact that the imports from Brazil and U.S.-produced FCOJ need further processing into consumer-ready products.

Results

The estimated results, shown in table 7-4, provide evidence that FCOJ imports from Brazil and U.S. FCOJ are substitutable in the U.S. market. Consumption of U.S.-produced FCOJ and imports of Brazilian FCOJ are shown to be responsive to movements in Brazilian and U.S. FCOJ prices. The estimated results show that a 1-percent increase (decrease) in the U.S. price results in a 1.5-percent decrease (increase) in U.S. consumption of domestic FCOJ, whereas a 1-percent increase (decrease) in the Brazilian price results in a 0.6-percent increase (decrease) in consumption of domestic FCOJ (column 1).[97] The results indicate that U.S. demand for Brazilian imports is more sensitive to price movements than the demand for the domestic product. The results show that a 1-percent change in Brazilian price translates into a 3.5-percent change in Brazilian import quantity, all other things held constant, while a 1-percent change in the U.S. price leads to a 6.0-percent change in imports from Brazil (column 2).

As substitutes for FCOJ in its consumer-ready forms, the coefficients for the grapefruit juice and apple juice prices should be positive in the U.S. FCOJ equation. The estimated coefficient on the apple juice price is positive in the domestic product equation, but statistically insignificant, indicating that when the price of apple juice goes up, consumption of U.S. FCOJ goes up, and vice versa.[98] On the other hand,

[92] In this framework, the Brazilian and U.S. prices are considered exogenous. Thus, the impact of the AD order on prices is not examined.

[93] There are no empirical econometric estimates of FCOJ supply known to Commission staff. The study by McClain estimated a function to predict new plantings of trees by Florida farmers.

[94] The Brazilian import price and the apple juice price are the CIF import unit values plus duty paid.

[95] The FCOJ demands modeled here are derived demands for orange juice products at the consumer level. Monteiro Da Silva also used the CPI as a deflator in his estimated FCOJ demand equations. See Monteiro Da Silva, *The International Market for Frozen Concentrated Orange Juice*.

[96] The SUR approach involves systems estimation which accounts for correlation in the error terms across equations.

[97] Technical Note: Due to the specification of the variables in logarithmic form, coefficients for non-binary variables in table 7-4 can be interpreted as elasticity estimates. An elasticity is the percentage change in the dependent variable (quantity) that results from a 1 percent change in an explanatory variable.

[98] The term "statistically insignificant" means there is a relatively large chance that variables do not have an impact on the behavior of quantities being estimated.

Table 7-4
FCOJ: Case model coefficients of demand for U.S.-produced FCOJ and for imports from Brazil

Explanatory variable	U.S. FCOJ	Brazilian FCOJ
Remedy variable	.247* [1](2.147)	-1.402** (-3.380)
Price of domestic FCOJ	-1.456** (-2.957)	6.054** (3.454)
Price of Brazilian FCOJ	.603 (1.755)	-3.496** (-2.868)
Price of grapefruit juice	-.205 (-.676)	-.162 (-.149)
Price of apple juice	.146 (1.138)	-.614 (-1.342)
Personal income	-1.041 (-1.346)	11.648** (4.248)
Discrepancy variable	[2] [2]	-.604 (-1.266)
Constant	23.372** (3.435)	-127.160** (-5.271)
R-square bar	.46	.68
Durbin-Watson statistic	2.47	1.99
Number of observations	20	20

[1] T-values in parentheses.
* Estimated coefficient is statistically significant using a two-tailed test at the 90-percent confidence level.
** Estimated coefficient is statistically significant using two-tailed test at the 95-percent confidence level or higher.
[2] Not applicable.

Note.—All variables entered in logarithms except for the binary variables—the remedy variable and the discrepancy variable. Durbin-Watson tests for serial correlation either rejected or were inconclusive as to serial correlation.

Source: Estimated by the staff of the U.S. International Trade Commission.

the estimated coefficient on the grapefruit juice variable is negative, but statistically insignificant in the U.S. FCOJ equation.

The estimated coefficients for the remedy variable in the U.S. FCOJ and Brazilian import equations indicate that the AD remedy had an effect on raising consumption of domestic FCOJ and on reducing imports from Brazil. The positive coefficient for the remedy variable in the equation for U.S. FCOJ demand indicates that, on average, consumption of U.S.-produced FCOJ was higher during 1986/87-1993/94 (the period during which the AD remedy has been in place) compared with average consumption of the U.S. product during 1974/75-1985/86. The increase in consumption likely reflects the increased availability of U.S.-produced FCOJ after the AD remedy was introduced. This availability reflects the recovery of the Florida industry from the freezes of the early 1980s--a recovery that the domestic industry argues was helped in part by the AD order.[99] The estimated coefficient on the remedy variable suggests that domestic consumption of the domestic product was approximately 28^{100} percent higher after the AD remedy than it was during 1975-86.

[99] As noted earlier, the domestic industry argues that the AD order benefited the domestic industry by insulating growers of round oranges from imports from Brazil while a number of long-term investments to improve the industry's competitive position took place.

[100] Technical note: Coefficients of binary variables in logarithmic equations may be transformed into estimated percentage changes by raising *e*, the base of the natural logarithm, to the power of the coefficient, subtracting one, and multiplying by 100. See R. Halvorsen and R. Palmquist, "The Interpretation of Dummy Variables in Semilogarithmic Equations," *American Economic Review*, vol. 70, No. 3 (1980), pp. 474-475.

The negative coefficient for the remedy variable in the Brazilian import demand equation indicates that imports from Brazil were lower on average during 1986/87-1993/94, holding all other factors constant, compared with the average level of imports prior to this period. These lower imports could be attributable to such factors as the long-term recovery of the Florida crop. The lower imports could also be due to increased Brazilian interest in exporting to other markets, or increased price consciousness of Brazilian exporters in not making sales at prices that could be construed as LTFV following the implementation of the AD order. The estimated coefficient on the remedy variable in the Brazilian import equation suggests that FCOJ imports from Brazil were approximately 75 percent lower after the AD remedy compared with those during 1975-86.

Computable Partial Equilibrium Analysis

In contrast to estimating the economic effects of the remedy over time as done by the time series analysis, the partial equilibrium analysis estimates economic effects of the unfair trade practice (dumping) and the remedy for a given base year. In this case, the base year for the CPE analysis is 1984/85, the crop year prior to the filing of the AD petition in May 1986. The partial equilibrium effects are measured, as described in chapter 5, by applying a CPE model.

Three CPE simulations are analyzed. The first examines the effect of dumping relative to the conditions that would have occurred if the dumping had not taken place (fair-trade conditions). The second examines the impact of the remedy relative to fair-trade conditions. The third simulation analyzes the impact of the remedy relative to actual market conditions in 1984/85, the base year of the CPE. The third simulation estimates the effects of the remedy alone and is more comparable to the time series analysis.

The CPE results may be overstated because the CPE model uses all FCOJ imports from Brazil and does not separate out imports from Cutrale, the one company found not to be dumping FCOJ in the U.S. market. Results may also be overstated because the base year of the CPE model was a year of extremely low U.S. FCOJ production and the peak year for U.S. FCOJ imports.

In the view of the domestic industry, however, the CPE analysis may understate the effects of dumping and the remedy. According to Florida Citrus Mutual, the price discipline and surveillance that resulted from the imposition of the AD order were far more important than any actual calculated AD margin.[101] In the view of the domestic industry, the benefit of the remedy was that it "forced the [Brazilian exporters] to keep pricing within boundaries set by cost, rather than engage in indiscriminate fight for market share."[102]

The CPE remedy effects on consumption of domestic FCOJ and imports from Brazil in the second and third simulations are also much lower than the time series effects. This is most likely due to the fact that the CPE analysis accounts for only the price effect of the AD margin. The time series analysis likely is picking up any changes in Brazilian exporter behavior due to the remedy as well as the long-term recovery of the Florida industry.

Effects of Unfair Trade Practices

The economic effects of dumping FCOJ in the U.S. market using the CPE model depend primarily on (1) the elasticity of aggregate demand for FCOJ, (2) the elasticity of substitution between Brazilian and U.S. FCOJ, (3) the elasticity of domestic supply of FCOJ, (4) base-year market shares, and (5) the margin of dumping. The data parameters are shown table 7-5.

Price Elasticity of Aggregate Demand

Estimates of the aggregate price elasticity of demand for FCOJ at the wholesale level have been provided by Monteiro Da Silva[103] and by McClain.[104] Monteiro Da Silva econometrically estimated an aggregate U.S. price elasticity of demand for FCOJ in the U.S. market of -0.707 during 1965-88. McClain, after reviewing the economic literature on FCOJ demand, used an aggregate U.S. wholesale demand elasticity of -0.6618 in the development of a dynamic simulation model of the world FCOJ market.[105] Both of these price elasticities are smaller than estimates of

[101] Florida Citrus Mutual, *Responses to Follow-up Questions From Commissioners and Staff*, Nov. 7, 1994, p. 19.

[102] Ibid.

[103] Monteiro Da Silva, The International Market for Frozen Concentrated Orange Juice.

[104] McClain, A Monte Carlo Simulation Model.

[105] This elasticity was previously calculated by L.J.M. Irias, An Econometric Model of International Trade of Frozen Concentrated Orange Juice, unpublished Ph.D. dissertation, University of Florida, Gainesville, FL, 1981.

Table 7-5
FCOJ: Assumed values for computable partial equilibrium analysis, crop year 1984/85

Input variable	Minimum	Maximum
Dumping margin *(percent)*	1.96	(1)
Values for U.S. market *(1,000 dollars)*:		
Domestic value	943,621	(1)
Subject value	930,794	(1)
Nonsubject value	31,342	(1)
Exports	103,500	
U.S. market elasticities *(absolute value)*:		
Substitution:		
Domestic/subject	2.0	4.0
Domestic/nonsubject	2.0	4.0
Subject/nonsubject	2.0	4.0
Aggregate demand	.7	.7
Supply:		
Domestic	1.0	2.0
Subject	1.0	3.0
Nonsubject	1.0	3.0

[1] Not applicable.

Source: Compiled by the staff of the U.S. International Trade Commission.

-1.355[106] and -1.391[107] that have been made for all orange juice at the household level.[108] In the CPE analysis, an aggregate wholesale price elasticity of demand of -0.7 is used.[109]

Elasticity of Substitution

Using econometric techniques, Monteiro Da Silva found that U.S. and Brazilian FCOJ are substitutes, but his estimated elasticities of substitution were low, in the range of 1.0 to 1.6. The price elasticities for Brazilian imports estimated in the previously reported time series analysis suggest that the elasticity of substitution may be higher than the range estimated by Monteiro da Silva. A range of 2.0 to 4.0 is used in the CPE analysis.

[106] Jonq-Ying Lee, "Demand Interrelationships Among Fruit Beverages," *Southern Journal of Agricultural Economics*, vol. 16 No. 2 (Dec. 1984) pp. 135-143.

[107] Mark G. Brown, "The Demand for Fruit Juices Market Participation and Quantity Demanded," *Western Journal of Agricultural Economics*, vol. 11 No. 2 (Dec. 1986), pp. 179-183.

[108] For agricultural products, Waugh notes that, because of price spreads, retail prices tend to be more price elastic and less flexible than prices at the earlier stages of the marketing chain. See Frederick V. Waugh, *Demand and Price Analysis: Some Examples from Agriculture*. U.S. Department of Agriculture, Technical Bulletin No. 1316, 1964, reprint 1990.

[109] As expected, the aggregate price elasticity of demand is also lower than the price elasticities calculated for U.S. demand for Brazilian and U.S. FCOJ in the time series analysis.

Elasticity of Domestic Supply

The elasticity of supply of U.S.-produced FCOJ depends upon the production of round oranges, which in any one year is fixed by the number of bearing trees and their yield, as well as by the alternative marketing opportunities for U.S. round oranges, which include production of NFC juice.[110] There has been little research on the elasticity of supply of FCOJ, and the studies that do exist have examined the elasticity of supply of FCOJ from the response of orange production to supply price.[111] Because of the lag time between the investment decision to plant orange trees and production of fruit, the elasticity of supply of oranges is generally considered to be close to zero in the short to medium run.[112] Estimates of the long-run elasticity of supply, on the basis of the response of Florida bearing tree numbers to price changes, range from 0.16 (over 10 years) to 0.90

[110] Carryover stocks, which are fixed at the beginning of each season, are also a source of supply. These stocks are based on the previous year's production. Changes in demand for stocks based on prices are included in the aggregate elasticity of demand.

[111] See McClain, A Monte Carlo Simulation Model and Monteiro Da Silva, The International Market for Frozen Concentrated Orange Juice.

[112] Ibid. Although it takes 4 to 5 years for a tree to produce fruit, it could take 6 to 7 years for production of fruit from the point that the investment decision is made because of the time required for a grower to procure the necessary environmental permits and to make capital expenditures.

(over 20 years).[113] The fact that round oranges can be diverted to production of NFC will tend to raise the elasticity of supply of FCOJ from an elasticity based solely on the production response of bearing trees. The CPE analysis uses a U.S. supply elasticity range of 1.0 to 2.0.

Economic Effects of Unfair Trade Practices

The estimated effects of dumping shown in column 1 of table 7-6 are the results of the Commission's CPE model using the midpoint values of the parameter ranges in table 7-5. The CPE results indicate that the domestic producer price, domestic output, and producer revenue from FCOJ fell by 0.5 percent, 0.6 percent, and 1.2 percent, respectively, because of dumping from their fair values in 1984/85. Imports from Brazil are shown to increase because of dumping by 2.1 percent. The dumping also appears to have caused a 0.5-percent decline in employment. The CPE results indicate an overall net welfare gain for the nation from the dumping. FCOJ consumers gained $19.0 million through lower prices for FCOJ; this consumer gain outweighed the $5.2 million adverse impact on producers. The net national welfare gain was $13.8 million.

Effects of Remedy

The economic effects of the AD remedy depend upon the same parameters as those in the dumping analysis, as well as an estimate of the elasticity of FCOJ supply from Brazil.

Elasticity of Import Supply

There are few studies that provide estimates of the elasticity of FCOJ supply from Brazil. McClain[114] provides estimates, on the basis of the simulated response of bearing tree numbers in Brazil to changes in Brazilian price, that range from 0.3 (over 10 years) to 0.8 percent (over 20 years). However, Brazil, as the largest exporter of FCOJ, has exportable supplies that could be diverted from or to the United States. The existence of these supplies will raise the elasticity of import supply above that on the basis of production response alone. A range of 1.0 to 3.0 is used for the elasticity of import supply from Brazil.

Economic Effects of the Remedy

The CPE results shown in column 2 of table 7-6 calculate the effects of the remedy by comparing prices, output, industry revenue, and imports with the remedy to what these values would be had the dumping not occurred (i.e., the fair values). These results use the midpoint values of the parameter ranges in table 7-5. The CPE analysis indicates that the AD remedy benefited the U.S. domestic industry, but the remedy did not completely offset the effect of the dumping, resulting in net welfare gains to consumers. The CPE analysis in chapter 5 suggests that Brazilian FCOJ exporters could have eliminated dumping without raising average U.S. prices by the full Commerce margin. As explained in this chapter, this terms-of-trade effect results in an incomplete pass-through of the remedy.[115]

In column 2, the domestic FCOJ price and the Brazilian import price remained 0.3 percent and 0.6 percent, respectively, below their estimated fair values after the remedy. Imports from Brazil also remained 0.9 percent above the fair-value level. As a result, FCOJ producers continued to lose $2.5 million because of dumping that was not offset by the remedy. Because the AD duty did not offset the dumping, consumers gained $8.3 million and net national welfare rose by $5.8 million.

CPE estimates were also obtained for the effects of the AD remedy relative to actual market values in 1984/85 rather than the fair values. These estimates are shown in column 3 of table 7-6. These CPE results indicate that the domestic FCOJ price, domestic output, and domestic revenue rose by 0.3, 0.4, and 0.7 percent, respectively, from their actual 1984/85 values after the remedy. Imports from Brazil were also reduced by 1.2 percent from the 1984/85 level and the import price rose by 0.8 percent. FCOJ consumers were $10.6 million "worse off" by the remedy alone because of the higher FCOJ prices. FCOJ producers gained $2.7 million and net national welfare declined $7.9 million from the 1984/85 value.

[113] Ibid. Production response may be slightly different because tree yields vary with the age of the tree.

[114] Ibid.

[115] See pp. 5-41 to 5-45 for the description of the terms of trade effect.

Table 7-6
FCOJ: Results of computable partial equilibrium analysis (estimated effect on U.S. market of unfair trade practices and remedies), base year 1984/85[1]

Item	Unfair trade practice	Unfair trade practice and remedy	Remedy relative to actual market values in 1984/85
	(Change from fair value)[2]		*Change from actual value)[3]*
Impact on industry *(percent)*:			
Domestic price	-0.5	-0.3	0.3
Domestic output	-.6	-.2	.4
Domestic revenue	-1.2	-.5	.7
Domestic employment	-.5	-.2	.4
Impact on imports *(percent)*:			
Subject import price	-1.5	-.6	.8
Subject import quantity	2.1	.9	-1.2
Subject import revenue	.6	.2	-.4
Nonsubject import price	-.5	-.2	.3
Nonsubject import quantity	-.8	-.3	.5
Nonsubject import revenue	-1.3	-.5	.8
Welfare effects (*1,000 dollars*):			
Gain to consumers	18,979	8,346	(10,593)
Benefit to producers	(5,195)	(2,511)	2,685
Net welfare effects	13,784	5,834	(7,907)

[1] The estimated effects reported are the results of the Commission's CPE model using the midpoint values of parameter ranges listed in table 7-5. This model accounts only for the short-term effect of unfair practices and remedies of cases with affirmative determinations in the base year, as discussed in the text.

[2] The "fair values" are the values estimated by the model to have been in place without the effect of the unfair trade practice.

[3] The "actual values" are the market values during the base year, 1984/85.

Source: Estimated by the staff of the U.S. International Trade Commission.

CHAPTER 8
Lamb Meat[1]

History of Title VII Investigations

On March 26, 1985, Commerce received a petition which alleged that producers, processors, or exporters of lamb meat in New Zealand receive benefits that constitute[2,3] bounties or grants within the meaning of section 303 of the Tariff Act of 1930. On April 15, 1985, Commerce initiated its investigation. No injury determination by the Commission was required in this investigation, because it was conducted under section 303 of the Tariff Act of 1930. Under this section of U.S. law, imports are not entitled to an injury test in a CVD investigation unless the imports are from countries that are signatories to the GATT Subsidies Code,[4] except in cases where the imports enter duty-free. In this case, New Zealand was not a "country under the Agreement" within the meaning of section 701(b) of the Tariff Act as it then existed, and the merchandise subject to investigation was dutiable.

Lamb Meat

First petition year (1981):	
Shipments *(million pounds)*	321
Import market share by quantity *(percent)*:	
Total imports	9
Subject imports	8
AD/CVD history:	
AD investigations *(number)*	2
CVD investigations *(number)*	5
First petition year	1981
First AD/CVD order year	1985
Most recent petition year	1985

On September 17, 1985, Commerce published a final determination that certain benefits that constitute bounties or grants within the meaning of the countervailing duty law were provided to producers, processors, or exporters of lamb meat in New Zealand. Commerce cited the following programs: Meat Producers Board Price Supports Scheme; Supplementary Minimum Prices Scheme; Export Market Development Taxation Incentive; Export Performance Taxation Incentive; Export Suspensory Loan Scheme; Regional Development Suspensory Loan Scheme; and the Livestock Incentive Scheme. The net bounty or grant was determined to be NZ$0.3602/lb, or about US$0.18/lb.[5]

As of March 1995, seven final administrative reviews of the CVD order on lamb meat from New Zealand had been completed by Commerce. Table 8-1 provides a chronology of events (including

[1] In general, the term "sheep" refers to mature animals, and "lambs" to immature animals, usually under 14 months of age. The meat derived from immature sheep is referred to as lamb meat, and the meat derived from mature sheep is referred to as mutton.

[2] During the 1980s the domestic lamb industry filed three petitions with the U.S. International Trade Commission and the Department of Commerce alleging that imports of lamb meat from New Zealand were being subsidized and/or were being sold in the United States at less than fair value. Results of these petitions are explained below. A fourth petition, in which the Commission did not participate, alleging that imports of lamb meat were being subsidized by the Government of New Zealand, was filed with Commerce in 1985. This petition ultimately resulted in a countervailing duty order on imports of lamb meat from New Zealand starting in Sept. 1985. In addition, the U.S. International Trade Commission instituted an investigation on Oct. 20, 1988, pursuant to Section 1937 of the Omnibus Trade and Competitiveness Act of 1988, to monitor and investigate U.S. imports of fresh, chilled, or frozen lamb meat. The investigation was conducted under Section 332(g) of the Tariff Act of 1930 (19 U.S.C. 1332(g)). See U.S. International Trade Commission. *U.S. Imports of Lamb Meat: Interim Monitoring Report* (investigation No. 332-264), USITC publication 2261, Feb. 1990, and USITC, *U.S. Imports of Lamb Meat: Final Monitoring Report* (investigation 332-264), USITC publication 2345, Dec. 1990.

[3] The petitioners on behalf of the U.S. lamb meat industry were the American Lamb Company, the Denver Lamb Company, and the Iowa Lamb Corporation.

[4] Or they have assumed substantially equivalent obligations to those under the Code.

[5] "Final Affirmative Countervailing Duty Determination and Countervailing Duty Order; Lamb Meat from New Zealand," 50 F.R. 180, Sept. 17, 1985.

Table 8-1
Lamb meat from New Zealand: Chronology of events related to U.S. Department of Commerce (ITA) countervailing duty investigation—Final results of countervailing duty administrative review

Date	Event	Review period	Bounty or grant found	Firms/shipments
1985:				
Mar. 26	Petition filed with ITA	-	-	-
Apr. 15	Investigation initiated	-	-	-
Sept. 17	Final affirmative determination by ITA (50 F.R. 37708)	4-1-84 through 3-31-85[1]	NZ$0.3602/lb (US$0.18/lb)	All shipments
1988:				
June 10	Final results of CVD admin. review (53 F.R. 21882)	6-25-85 through 3-31-86	NZ$0.31/lb (US$0.21/lb)	All shipments
1989:				
May 8	Final results of CVD admin. review (54 F.R. 19590)	4-1-86 through 3-31-87	NZ$0.21/lb (US$0.13/lb)	All shipments
1990:				
July 9	Final results of CVD admin. review (55 F.R. 28077)	4-1-87 through 3-31-88	26.01% 3.90%	Taumaranui All other firms
Oct. 23	Final results of CVD admin. review[2] (55 F.R. 42750)	4-1-88 through 3-31-89	16.25% 11.31% 0.47%[3] 0.38%[3] 2.74%	Waitaki Richmond Weddel Crown Lamb Gourmet All other firms
1991:				
Aug. 13	Final results of CVD admin. review (56 F.R. 38423)	4-1-89 through 3-31-90	10.17% 0.41%[3] 0.30%[3] 0.26%[3] 1.48%	Melville Development Ltd. (Lamb Gourmet) Fortex Weddel New Zealand Alive Exports and Lowe Walker All other firms
1992:				
Aug. 20	Final results of CVD admin. review (57 F.R. 37772)	4-1-90 through 3-31-91	0.20%[3]	All firms
1993:				
Aug. 26	Final results of CVD admin. review (58 F.R. 45097)	4-1-91 through 3-31-92	0.11%[3]	All firms
Sept. 30	Request for revocation of the CVD order from the NZ Government (59 F.R. 29985)	-	-	-
Oct. 18	Initiation of CVD admin. review (58 F.R. 53710)	4-1-92 through 3-31-93	0.0013[3]	All firms

See footnotes at end of table.

Table 8-1—*Continued*
Lamb meat from New Zealand: Chronology of events related to U.S. Department of Commerce (ITA) countervailing duty investigation—Final results of countervailing duty administrative review

Date	Event	Review period	Bounty or grant found	Firms/shipments
1995:				
Mar. 1	Preliminary results of CVD admin. Review (58 F.R. 53710)	4-1-92 through 3-31-93	.0013[3]	All firms
May 22	Revocation of CVD (60 F.R. 27082)	-		-

[1] Countervailing duties not assessed against imports during this period.

[2] The ITA also reported that New Zealand had terminated one of the major subsidy programs, the Export Market Development Taxation Incentive, effective Apr. 1, 1990, thus reducing the total estimated bounty or grant to 0.38 percent ad valorem, a rate which is de minimis. Therefore, the ITA will instruct the U.S. Customs Service not to collect cash deposits of estimated countervailing duties on any shipments of the subject merchandise entered, or withdrawn from warehouse, for consumption on or after Oct. 23, 1990. Cash deposits could be reinstituted following subsequent reviews.

[3] In accordance with CFR 355.7, any rate less than 0.50 percent ad valorem is de minimis.

Note.—Percent equals ad valorem.

Source: *Federal Register*, various notices, as referenced.

administrative reviews) relating to the lamb CVD investigation (Commerce Case No. C-614-503). Remedies decreased from NZ$0.31/lb for shipments during the review period (June 25, 1985-March 31, 1986) to NZ$0.21/lb for April 1, 1986-March 31, 1987. It appears that the remedies (which shifted from a specific rate to an ad valorem rate) continued to decrease for each annual review.[6] The total bounty or grant was found to be *de minimis* for all firms for the review period April 1, 1990, through March 31, 1991. A subsequent final review for the period April 1, 1991, through March 31, 1992 also determined *de minimis* CVD amounts for all firms. On May 22, 1995, Commerce published a notice of its final determination that the subsidy for the period April 1, 1992 through March 31, 1993 was *de minimis* for all firms. In the same notice, Commerce reported its final determination that New Zealand had met the requirement for revocation of the CVD order and reported that the preliminary CVD order would be revoked.

A CVD petition was filed before Commerce on April 23, 1981, by the National Wool Growers Association, Inc., and the National Lamb Feeders Association, Inc., and before the Commission on September 21, 1981,[7] which alleged that imports of lamb meat were being subsidized.[8] In its affirmative determination of November 8, 1981, the Commission cited increasing imports (both in quantity and as a share of the U.S. market) and price underselling by imports. The Commission also noted declining consumption of lamb meat in the United States and declining profitability in the live lamb sector. The Commission also found threat of injury, citing New Zealand's "large capacity to produce sheep," the "stated intent to significantly expand sales in the U.S.," and the "potential domestic vulnerability."[9]

On November 30, 1981, Commerce announced its preliminary affirmative countervailing duty determination, estimating a net subsidy of 6.19 percent of the f.o.b. value of lamb meat exports to the United States.[10] However, shortly thereafter the petitioners requested that the petition be withdrawn.[11]

[6] The bounty increased for one firm during review period April 1, 1988, through March 31, 1989.

[7] USITC, *Lamb Meat from New Zealand* (investigation No. 701-TA-80 (Preliminary), USITC publication 1191, 1981.

[8] On Sept. 17, 1981, the USTR announced that New Zealand had become "a country under the Agreement." Thus, the USITC instituted a preliminary CVD investigation on Sept. 21, 1981.

[9] See USITC publication 1191 and 46 F.R. 222, Nov. 18, 1981.

[10] 46 F.R. 229, Nov. 30, 1981.

[11] On Dec. 23, 1981, the USITC was notified by the petitioners by letter that they desired to withdraw the petition. On Jan. 4, 1982, the USITC terminated the final investigation.

On April 18, 1984, CVD and AD petitions were filed with the Commission[12] and Commerce by the American Lamb Co., the Denver Lamb Co., and the Iowa Lamb Corp. on behalf of sheep ranchers, lamb feedlot operators, and lamb meat packing and processing companies. The petitions alleged that imports of lamb meat from New Zealand were being subsidized and were being sold in the United States at LTFV.

On June 4, 1984, the Commission found no reasonable indication of injury to the domestic industry as a whole and stated that even if the domestic industry were experiencing difficulties, it found no reasonable indication that imports from New Zealand are a cause of these problems. The Commission also cited a decline in the volume and share of consumption accounted for by imports. The Commission found no threat of injury, citing a decline in the volume and share of consumption accounted for by imports, a reduction of New Zealand's inventory of lamb meat in the United States, and a decline in the share in New Zealand's exports of lamb that were destined for the United States. The Commission also cited the termination of New Zealand's voluntary restraint agreement with the EC and an increase in exports of lamb meat to other markets.[13]

Scope of Investigation

Subject Products

Lamb meat is derived from an immature sheep (ovine), usually under 14 months of age. It is light red in color, compared with the dark red color of the meat (mutton) of mature sheep. White or yellowish fat covers much of the lamb carcass, and some fat is dispersed throughout the meat. The great bulk of U.S.-produced lamb meat is sold fresh or chilled, whereas the bulk of imports consists of frozen primal cuts.[14] U.S. lamb carcasses on average weigh about 65 pounds compared with New Zealand lamb carcasses, which average about 33 pounds, and Australian carcasses, which average about 40 pounds. All New Zealand and Australian lamb is grass-fed (in the United States, it is a common practice for lambs to be grain-fed). Some consumers contend that the meat of grass fed lamb is stronger in flavor and aroma.

No definition of like product was provided by the Commission in the 1985 case since an injury test was not required. However, in the 1981 investigation, the Commission concluded that fresh domestic lamb meat is "like" or "most similar in characteristics and uses with" the imported lamb meat from New Zealand under investigation.[15] The definition of the like product was also adopted by the Commission in its 1984 investigation on lamb meat from New Zealand.[16]

Substitute Products

Substitute products for lamb meat include beef, pork, and poultry. Three of the lamb purchasers that responded to Commission questionnaires reported that other products (mutton, beef, veal, pork, and poultry) could be substituted for lamb meat. Seven of the purchasers reported that there were no substitutes; the distinct flavor of lamb meat was given as the reason for the lack of substitutes. Respondents indicated that price was not a factor in the substitutability of lamb and other meats.

Domestic Industry

The domestic industry, as defined by the Commission in both its 1981 and 1984 investigations, was determined to consist of the grower segments of the lamb industry and the lamb meat packers and processors.[17] Lamb growers include sheepherders that maintain purebred and commercial flocks of sheep for the production of lambs. Feedlot operators maintain feedlots where lambs are fed on grain or other concentrates until they reach slaughter weight. Lamb packers are companies that slaughter live lambs, regardless of whether or not they process lamb meat.[18] Lamb meat processors fabricate carcasses into primal, subprimal, or retail cuts.

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[12] USITC, *Lamb Meat From New Zealand* (investigation Nos. 701-TA-214 (preliminary) and 731-TA-188 (preliminary)), USITC publication 1534, June 1984.

[13] Ibid.

[14] Primal cuts include wholesale cuts such as the shoulder, rib, breast, loin, and leg.

[15] American Meat Institute, *Financial Review of the Meat Packing Industry, 1982*, Sept. 1983, p. 1.

[16] See USITC publication 1534, p. 19.

[17] Ibid.

[18] See USITC publication 1191, pp. 3-6, 19. The Commission adopted this same definition of the domestic industry for its 1984 investigation.

In including the grower segments of the lamb industry in its definition of the domestic industry for the purpose of the 1981 and 1984 investigations, the Commission specifically referred to the legislative history of the Trade Agreements Act of 1979. The Commission noted the Senate Committee on Finance's statement in the Committee report on the Trade Agreements Act of 1979 that—

> Because of the special nature of agriculture,. . . , special problems exist in determining whether an agricultural industry is materially injured. For example, in the livestock sector. . . gross sales and employment in the industry producing beef could be increasing at a time when economic loss is occurring, i.e., cattle herds are being liquidated because prices make the maintenance of the herds unprofitable.[19]

Thus, the Commission, in its discussion of the domestic industry, stated that—

> It is clear that Congress recognized the highly interdependent nature of the livestock sector of the economy, and did not intend the statutory definition of industry to preclude an assessment of material injury to an adversely impacted segment of a meat producing industry. For these reasons, we find the domestic industry to be comprised of packers, processors, growers, and feeders.[20]

Description of Upstream Industry

For the purpose of this case study, the upstream industry could be defined as consisting of equipment suppliers, feed distributors, veterinarians, and other suppliers of inputs to the lamb industry. However, these product lines and services are not product-specific to lambs, and sales of these inputs to the lamb industry generally account for a negligible part of the total sales of these upstream suppliers. Therefore, not only is it unlikely that the countervailing duty greatly affected sales and/or prices in this sector, such impacts on veterinary service suppliers and feed distributors cannot be identified with the lamb segment of the red meat industry. Consequently, the impact of the CVD on the upstream sector cannot be, and is not, further discussed in this case study.

Description of Downstream Industry

The downstream industry may be viewed as consisting of retailers (mostly grocery stores) and hotels, restaurants, and institutions (HRI) that prepare food for consumption. These establishments purchase lamb meat from wholesalers, breakers[21], or distributors; alternatively, the meat may be sold directly to retailers. The impact of the CVD on the downstream sector is estimated in this case study, because unlike the upstream industries, downstream product lines (such as supermarkets and restaurant menu items) may be clearly identified with lamb, such that effects of the CVD can be assessed.

Approach of Investigation

This report generally covers 1982-93 (years which include the period before the 1985 countervailing duty case was initiated), the period during which duties were collected as a result of Commerce's 1985 determination, and 1991-93, when no duties were collected.

Methodology

The CPE and time series analyses described in chapter 5 have been applied to this case study to examine the effects of the CVD on U.S. imports, production, and consumption of lamb meat. In the case of the CVD, the petition was filed March 26, 1985; the investigation was initiated April 15, 1985; and Commerce ultimately determined that during June 25, 1985-March 31, 1990, certain (subject) U.S.

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[19] S. Rept. No. 96-249, 96th Cong., 1st Sess. 88 (1979). Although the concept was discussed under the legislative history of subsection 771(7), the definition of the term "material injury," the report unquestionably evidences congressional awareness of unique problems that could be confronted in providing relief under the statute for certain agricultural commodities.

[20] USITC, *Lamb Meat from New from New Zealand*, Inv. No. 701-TA-80 (Preliminary), USITC Pub. 1191 (1981), pp. 3-6 and 19.

[21] Breakers cut carcasses into primal, subprimal, and individual cuts for resale to retail stores and food service outlets. Sheep Industry Development Program, Inc., *Sheep Production Handbook*, 1988, pp. MKT-8.

lamb imports from New Zealand benefited from bounties and grants, and imposed CVDs on those imports (table 8-1). This left a compressed 4-month period of March 26, 1985-June 24, 1985 (hereafter petition period) over which a binary variable could be used to discern whether the petition had any effect.

Staff did not include the petition variable in the final model because evidence from alternative model estimations suggested that the March-June 1985 petition period was too compressed for the monthly model to register or isolate effects attributed to the petition.[22] Staff therefore included one binary variable (the remedy variable) to generate the combined effects of subsidized imports and the CVD remedy. The remedy variable cannot be used to discern separate effects of the subject imports and of the CVD. This is because Commerce determined that the subject imports and the CVD imposed on them were to *concurrently* occur over the CVD period of June 25, 1985-March 31, 1990. So as defined, the remedy variable is used to discern the net effects, and not the separate effects, of the subject imports and the remedy. The information obtained in the economic analysis is supplemented by questionnaire data provided by lamb meat producers and purchasers.

[22] Staff estimated two model versions: one with the remedy and petition binary variables, and the other with the remedy variable included and the petition variable excluded. Econometric results presented and discussed later suggest that the model with both variables generated little or no evidence of effects that were attributable to the petition during the compressed Mar.-June 1985 period. In addition to the petition variable having been statistically insignificant, the remedy variable generated basically the same coefficient estimates as generated by the model that included only the remedy variable. As noted in chapter 5, excessively compressed petition periods often preclude the model's ability to generate petition-attributed effects through the use of a binary variable. This evidence may indicate that the petition variable may be irrelevant and extraneous, and may not "belong in or add to" the equation specifications. Including irrelevant and extraneous variables can cause problems of distorted t-values, and hence compromise the indicated significance levels of, and inference on, the coefficient estimates for the other relevant variables in the regressions. To avoid these problems, USITC staff chose to exclude the petition variable from the final model estimations. For a discussion of the problems of including irrelevant and extraneous variables in econometric estimations, see J. Kmenta, *Elements of Econometrics* (New York: Macmillan Publishing Co., 1971), pp. 396-98.

Data Sources

Data were obtained from public and private sources, Commission staff field work, and industry questionnaires. Both the U.S. Department of Agriculture and the American Sheep Industry Association (ASIA) have provided data on producer prices, production, and use of lamb meat. Questionnaires were sent to lamb meat producers (packers) and downstream purchasers to obtain information on the financial situation, employment, capacity utilization, and purchase prices for lamb meat. Questionnaires were sent to seven packers, of which five provided usable data for this case study. Twenty-nine questionnaires were sent to downstream purchasers, 10 of which provided usable data.

Industry Profile and Structure

Brief Evolution of the Industry

The U.S. sheep and lamb industry has generally been in a long-term decline since World War II. The U.S. population of sheep and lambs declined from 29.8 million animals in 1950 to 13.0 million in 1982, generally reflecting the introduction of artificial fibers to compete against wool and a general decrease in consumer preference for lamb meat and mutton.[23]

A number of trade and industry sources report that the Wool Incentive Program has been an important source of stability for the domestic industry and that its recent termination will contribute to a decline in the number of producers.[24] In addition, labor cost and labor availability have been cited as important factors leading to a decline in sheep numbers and the conversion from sheep enterprises to cattle enterprises, which are less labor-intensive.[25]

[23] U.S. Sheep Industry, Market Situation Report 1987/88, pp. 1-2.

[24] During a Commission staff interview on Oct. 12, 1994, Steve LeValley, Extension sheep and wool specialist, Colorado State University (CSU), supplied the USITC with a recent report, *Economic Impacts of Incentive Payments and Public Land Policies on Colorado Sheep Ranches*, that supports this contention.

[25] Government Accounting Office (GAO), *Congressional Decisions Needed on Necessity of Federal Wool Program*, CED-82-86. Washington, DC, Aug. 1982, and Whipple and Menkhaus, "Supply Response," 1989, pp. 126-135.

Some domestic interests also contend that the industry suffers from a declining infrastructure: fewer market outlets and packers, a declining transportation system, and diminishing market and price information. Also, shortage of skilled industry workers, such as herders and shearers, has been cited as a long-term industry problem.[26] Predators, primarily coyotes but also bears, cougars, eagles, dogs, and wolves, have been identified as a serious cause of economic injury to the domestic industry.[27] Some domestic interests contend that growers in the United States face relatively greater sheep and lamb losses to predators than do producers in New Zealand and Australia, in part because of government restrictions on predator control in the United States.

Industry Size and Structure

The structure of the lamb industry as defined for this case study is shown in figure 8-1. Of the 98,230 U.S. operations[28] with sheep as of January 1, 1993, 41 percent were located in the Corn Belt;[29] 39 percent were in the Western States;[30] and the remaining operations were primarily in the northeastern states and border regions of the southeastern United States.[31] A large share of the U.S. sheep population in the Western Rangelands is grazed on public lands administered by the U.S. Forest Service (FS) or the Bureau of Land Management (BLM). Some domestic interests contend that FS and BLM regulations have long contributed to make grazing on public lands an economically marginal activity. They further contend that some proposed increases in rates to be charged for grazing on public lands would make such grazing economically impossible.

[26] Commission staff interview with John Etchepare, president, Warren Livestock Co., Cheyenne, WY, Oct. 13, 1994.

[27] USITC staff interview with John M. Olson, executive director, American Sheep Industry Association, Inc., Denver, CO, and with officials and members of the Wyoming Wool Growers Association, Cheyenne, WY, Oct. 12, 1994.

[28] An operation is defined by the USDA as any place having one or more sheep on hand at any time during the year.

[29] The Corn Belt States are Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, Ohio, and Wisconsin.

[30] The Western States are Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, North Dakota, Oklahoma, Oregon, South Dakota, Texas, Utah, Washington, and Wyoming.

[31] U.S. Department of Agriculture, National Agricultural Statistics Service (NASS), *Sheep and Goats*, Jan. 28, 1994, p. 6.

The number of companies slaughtering sheep and lambs declined from 184 in 1982 to 130 in 1990.[32] The share of commercial sheep and lamb slaughter accounted for by the four largest companies collectively increased from 43.6 percent in 1982 to 78 percent in 1992.[33]

Growers

U.S. sheep growers may be divided into two categories: (1) sheepherders, which maintain flocks of sheep for the production of lambs, and (2) feeders, which maintain feedlots where lambs are fed on grain or other concentrates until they reach slaughter weight. Some growers engage in both activities, and not all lambs are placed in feedlots. Some lambs go directly to slaughter from pasture, where they may or may not have been provided with grains to supplement their diets of forage and milk.

Although lamb-growing operations are found throughout the United States, 78 percent of the January 1, 1993, U.S. sheep population was found in the Western United States on operations averaging 202 sheep. About 16 percent of the January 1, 1993, sheep population was concentrated in the Corn Belt on smaller operations averaging 40 sheep.

In the United States, sheep are kept mainly for the production of lambs for meat. Mature sheep are usually sold only when farmers and ranchers cull their flock of animals no longer useful for breeding. However, important byproducts of sheep production include wool and pelts, which provide additional income to the grower.[34] According to a Sheep Industry Development bulletin "every $1 change in pelt value moves live prices 91 cents per cwt on a 110 pound lamb."[35] Wool may account for as much as 40 percent of growers' annual income,[36] although the national average in recent years was between 15 and 20 percent.[37]

[32] U.S. Department of Agriculture, *Packers and Stockyards Statistical Report 1990 Reporting Year, Nov. 1992*, p. 4, and USITC phone conversation with USDA official, Sept. 12, 1994.

[33] American Meat Institute, *Meat & Poultry Facts, 1994*, p. 28, and *MeatFacts*, 1983, July 1983, p. 13.

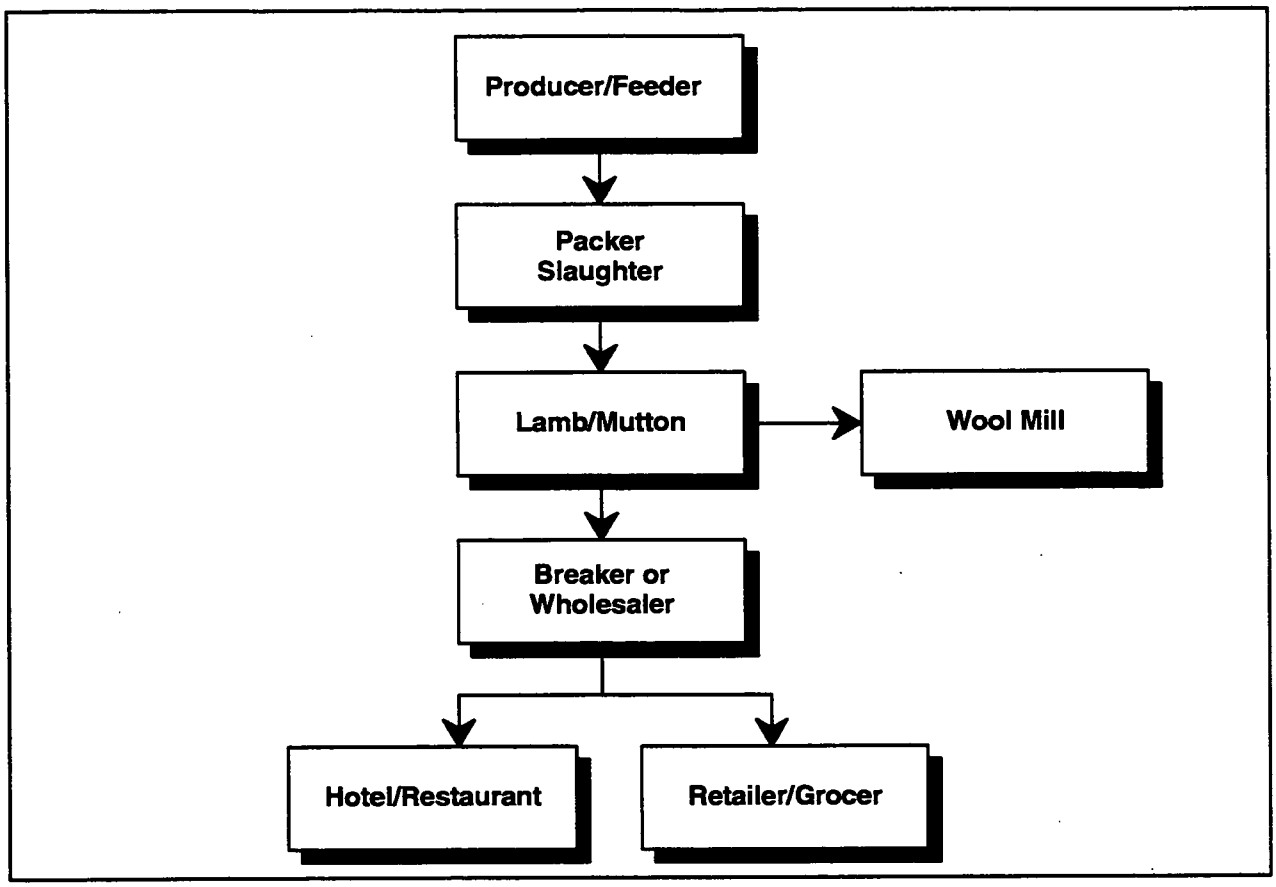
[34] The bulk of U.S. wool production is derived from mature sheep: those ewes and rams kept for breeding purposes (although some production is derived from lambs). Shearing is the removal of the wool from the sheep, generally done once a year.

[35] R.M. Taylor. "Resurgence in Leather Strengthens Lamb Pelt Market," *Agweek Magazine*, Oct. 31, 1994.

[36] USITC publication 2345, p. 6-1.

[37] U.S. Department of Agriculture, Economic Research Service, *Costs of Production-Livestock and Dairy*, 1989, Aug. 1990, p. 72.

Figure 8-1
Sheep and meat of sheep: Structure of the U.S. Industry



Source: U.S. International Trade Commission staff.

Decisions made by sheep growers largely determine the supply of domestic lamb meat in the U.S. market. Each year producers must decide if ewe (female) lambs will be sold for slaughter or retained for breeding purposes. The decision to retain ewe lambs for breeding suggests producer optimism and plans for increased production of lambs in the future. The decision to sell the lambs for slaughter suggests a declining capacity utilization. Most ewes are bred when they are 18 to 19 months of age and have their first lambs when they are about 2 years old.[38]

[38] The quantity of lambs sold for slaughter may decline in response to an increase in lamb price in the short run if producers decide to retain lambs to build up the breeding stock. However, Whipple and Menkhaus found the price elasticity of lamb supply in the short run to be highly inelastic, but positive (0.01). Longer run elasticities, applicable for 3 to 30 years, were found by Whipple and Menkhaus to range from 0.68 to 11.38. G. Whipple and D. Menkhaus, "Supply Response in the U.S. Sheep Industry," *American Journal of Agricultural Economics*, vol. 71, No. 1, (1989), pp. 126-135.

Packers

Lamb packers are companies that slaughter live lambs, regardless of whether or not they process lamb meat.[39] The lamb-packing sector is the most concentrated sector in the sheep industry, with the four largest firms having serviced 78 percent of the U.S. commercial slaughter of sheep and lambs in 1992.[40] Lamb meat production is somewhat seasonal, with production tending to be highest during the last quarter (October-December) and the first quarter (January-March).

Most lambs are born in the spring. Some lambs, especially those that have had access to high-quality grazing and supplemental grain, are suitable for slaughter in the fall, at the end of the grazing season. Lambs that are not suitable for slaughter are sent to

[39] American Meat Institute, *Financial Review of the Meat Packing Industry, 1982*, Sept. 1983, p. 1.

[40] American Meat Institute, *Meat & Poultry Facts*, p. 28.

feedlots where they are grown to proper slaughter weights, which typically occurs prior to the end of the first quarter.

Some vertical integration exists in the lamb industry since certain packers operate lamb feedlots. Packer feeding of lambs include sheep and lambs fed by, or for, meat packers and transferred from feedlots for slaughter. Some packers contend that they are vertically integrated to assure an adequate supply of lambs at what they believe to be competitive prices in order to continue operating their plants efficiently.[41] The *Packers and Stockyards' Administration Statistical Report, 1990 Reporting Year* shows that packer feeding of sheep and lambs increased steadily from the equivalent of 16 percent of total slaughter in 1982 to 30 percent in 1988 and then declined slightly to 28 percent in 1990. Some growers contend that packers can time the slaughtering of the lambs they feed to exert maximum price influence.[42] Thus, when market prices for live lambs rise, packers who feed lambs can temporarily reduce purchases but continue to operate their slaughter plants using lambs they have fed.

Production Costs and Profitability

Lamb Meat Packers

Live animals are the largest cash cost of production item for lamb meat packers.[43] During 1982-93, carcass lamb prices were generally highest during 1985 through early 1988, but then trended downward from mid-1988 through 1990 (figure 8-2). Lamb meat prices generally followed a similar trend (figures 8-3 and 8-4). The lamb slaughtering and packing sector experienced significant volatility during the mid- and late-1980s, with a number of companies entering and exiting from the business. In general, it appears that there was excess slaughter and packing capacity during the mid-1980s and that packers may have bid-up live lamb prices to unsustainably high levels in order to remain in business. By late 1987 to mid-1988 the packing sector seemed to have reduced capacity and stabilized, and lamb prices declined.

[41] Commission staff interview with officials from Monfort of Colorado, Oct. 1994.

[42] Commission staff interview with officials from the National Lamb Feeders Association, Oct. 1994.

[43] American Meat Institute, *Annual Financial Review of the Meat Packing Industry*, 1983, Sept. 1984, p. 5.

The econometric evidence suggests that wages are an important influence on the U.S.-supply price of lamb.[44] Wage rates are discussed in a later section of this report titled "Employment and Labor Use in the Packing Sector."

Lamb meat processors that responded to Commission questionnaires provided their perceptions on factors that affect their profitability. The most important factors cited included price/performance, market share, relations with customers, health of the domestic upstream industry, turnover of skilled labor, and industry structure. The least important factors cited included exchange rates, export controls, the research and development tax writeoff schedule, and the business cycle.

Live Lamb Sector

A USDA study[45] shows that total cash expenses for growers generally increased during 1982-89 from a low of $39.25 per ewe in 1983 to a high of $43.85 in 1989. Feed costs were the largest single cash cost for growers, and such costs fluctuated from a low of $12.05 in 1987 to a high of $14.95 in 1989. Hired labor, another leading cost, increased irregularly from $6.05 in 1982 to $6.99 in 1989. Interest was another cost that fluctuated, from $5.32 in 1983 to $7.43 in 1986.

Net cash receipts on a dollar per ewe basis fell within the relatively low $2.25-$3.04 range during 1981-83, because feed costs and sheep inventories were high.[46] After 1983, net cash receipts sharply increased, and remained within the $15-$25 range per ewe during 1985-89. This increase arose because excess slaughter capacity may have resulted in packers having bid-up slaughter lamb prices, and because higher 1984 levels of lamb and wool receipts more than offset feed cost increases.

Competitive Factors

Most U.S.-produced lamb meat is sold fresh or chilled. Consumer preference for lamb meat peaks in the spring and early summer, responding to holiday traditions and consumer desire for spring lamb.[47] Most of the lamb meat imported from New Zealand and Australia is frozen, and the longer shelf life is a particular advantage in the HRI sector, where demand

[44] Confirmation of this is provided in the time series analysis below.

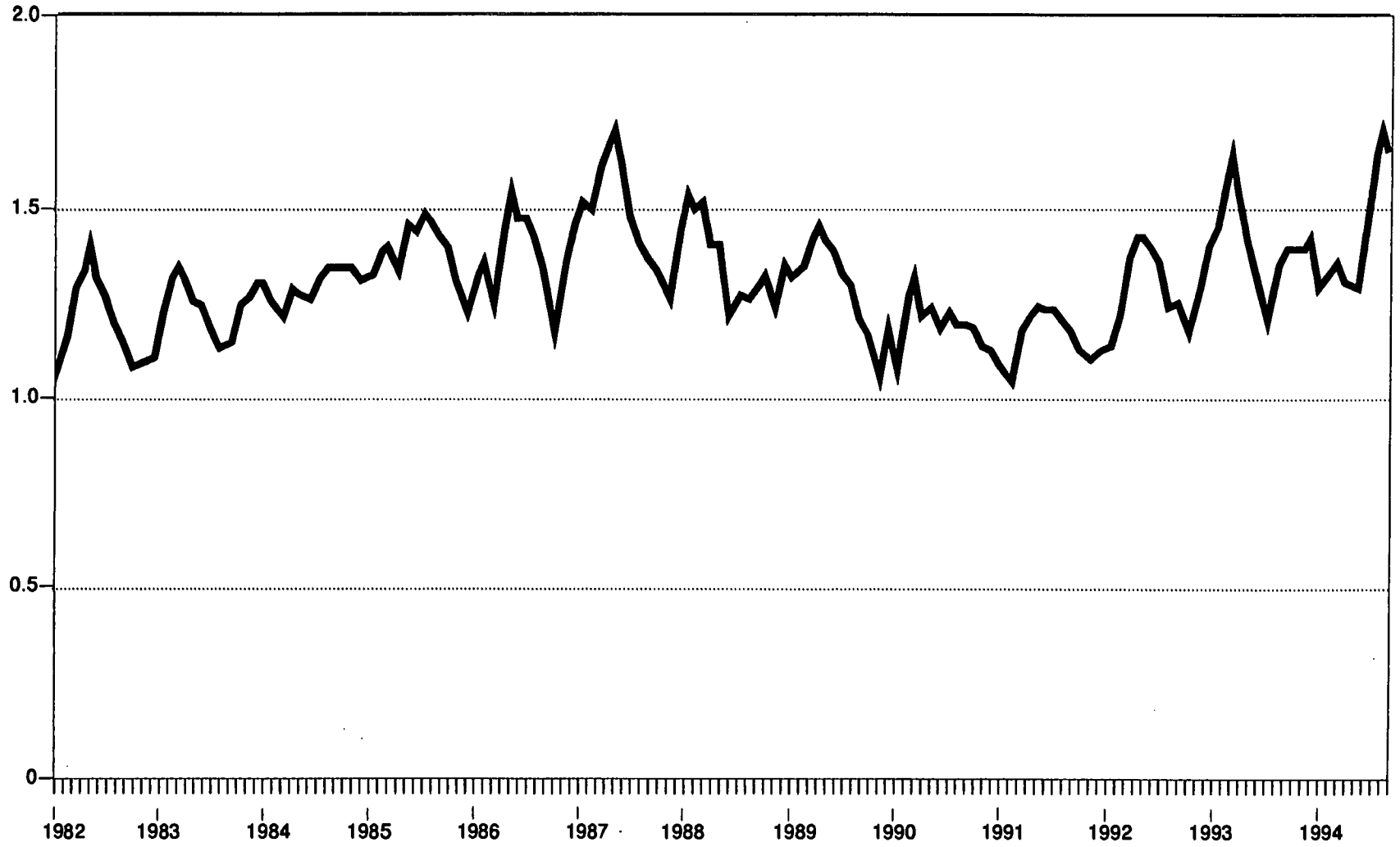
[45] USDA, ERS, *Costs of Production—Livestock and Dairy, 1989*, Aug. 1990, p. 72.

[46] Ibid., Data for 1989 are the most recent available.

[47] Sheep Industry Development Program, Inc., *Sheep Production Handbook*, 1988, pp. MKT 3-4.

Figure 8-2
Choice/prime lamb carcass price by month, January 1982-September 1994

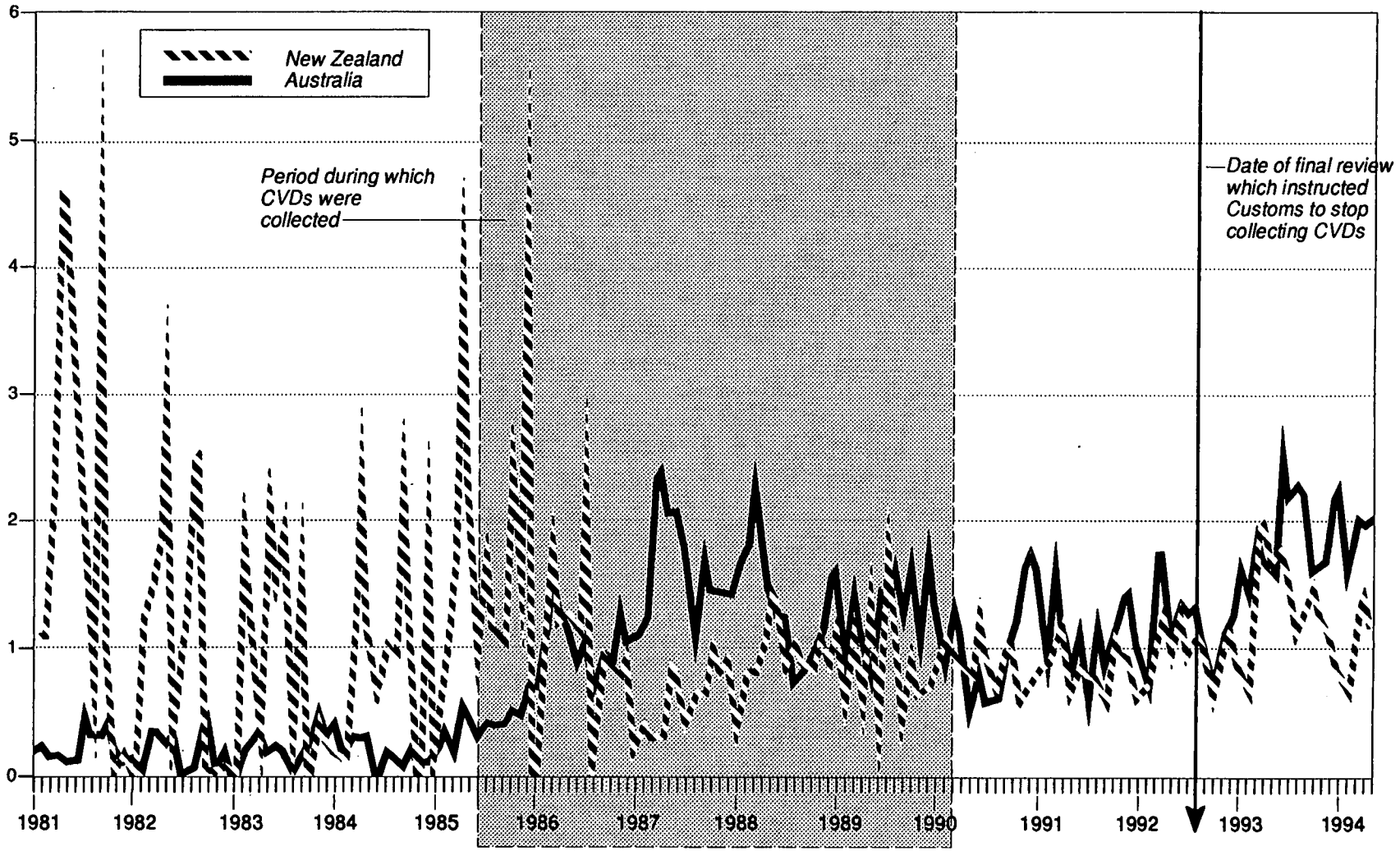
Dollars per pound



Source: U.S. Department of Agriculture, Economic Research Service, *Livestock and Meat Statistics* 1970-92 and *Livestock, Dairy, and Poultry Situation and Outlook*, various issues.

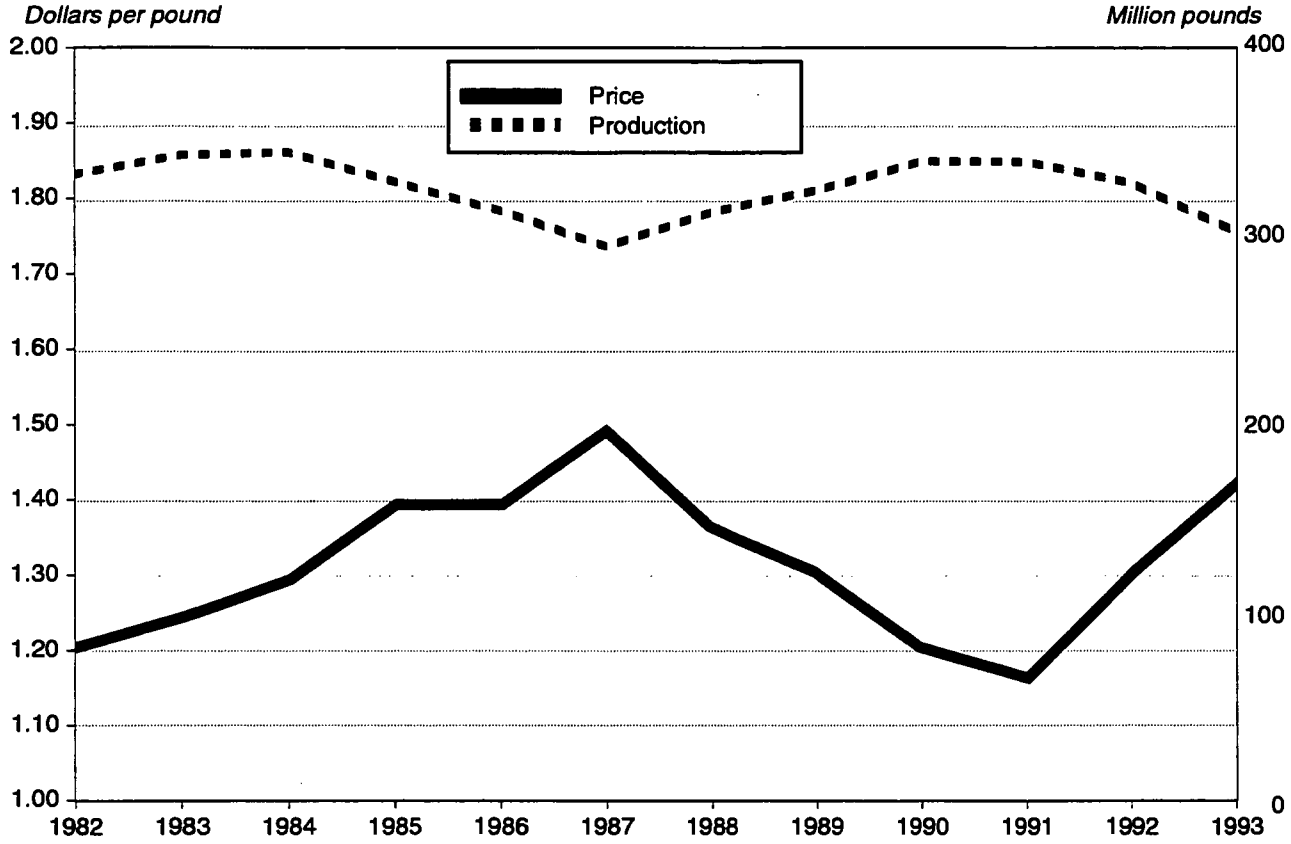
Figure 8-3
Lamb meat, fresh, chilled, or frozen: U.S. imports from Australia and New Zealand, by months, January 1981—May 1994

Million pounds



Source: Compiled from official statistics of the U.S. Department of Commerce.

Figure 8-4
U.S. lamb meat: Average annual production and choice lamb carcass price, 1982-93



Note.—Lamb meat production follows right axis, annual average choice lamb carcass price follows left axis.
Source: Compiled from official statistics of the U.S. Department of Agriculture.

is unpredictable. Freezing significantly extends the shelf life of lamb meat. Industry and Government officials indicate that frozen lamb meat, if properly handled, is still suitable for human consumption after 1 year, or even longer.

Certain cuts of lamb imported from New Zealand and Australia are preferred by consumers in certain circumstances. For instance, representatives of the New Zealand Meat Producers Board (NZMPB) report that the cuts derived from New Zealand lambs are smaller than those derived from domestic lambs and that these smaller cuts, especially racks, are better sized for restaurant meals than are domestic cuts. New Zealand lamb carcasses average about 33 pounds, compared with an average of 65 pounds for domestic carcasses. New Zealand lambs are typically slaughtered at a younger age than U.S. lambs, and the most common New Zealand breeds of sheep are smaller than most U.S. breeds. Australian interests make similar contentions concerning their product; Australian lamb carcasses average about 40 pounds each.

According to purchasers that responded to Commission questionnaires, the most important factors affecting purchases include quality, availability, price, and range of a supplier's product line. The least important factors included prearranged contracts and traditional supplier relationships.

Purchasers of imported lamb meat reported that the competitive position of Australian lamb meat compared with U.S. lamb meat generally was superior in terms of quality and price, comparable in terms of service, variety, and availability, and inferior in terms of delivery speed. The position of New Zealand lamb meat compared with that of U.S. lamb meat generally was superior in terms of price, comparable with respect to credit terms and variety, and inferior in terms of quality, delivery speed, and service.

Purchasers of U.S. lamb meat reported the competitive position of Australian lamb meat compared with that of U.S. lamb meat generally was superior in terms of price, comparable with respect to credit terms, variety, and availability, and inferior in terms of quality, delivery speed, and service. The position of New Zealand lamb meat vis-à-vis U.S. lamb meat generally was superior in terms of price, comparable with respect to credit terms and availability, and inferior in terms of quality, delivery speed, and service.

Industry Performance In U.S. and World Markets

U.S. Lamb Meat Production

Prior to the imposition of the CVD, U.S. commercial lamb meat production ranged from 335 million to 347 million pounds during 1982-84 (table 8-2). During 1985, the year that the CVD became effective, such production began declining and reached 297 million pounds in 1987, before beginning to trend upward through 1990. Annual production remained at 305 million pounds or more after 1990.

U.S. lamb meat production reflects both the commercial lamb slaughter and the average carcass weight of lambs slaughtered. The data in table 8-2 indicate that the number of lambs slaughtered generally declined during 1982-93, while the average carcass weight increased by about 16 percent to 65 pounds per animal during 1982-93. The increase in average carcass weight may reflect both a trend toward genetically larger animals or moderate grain prices that encourage feeding to heavier weights. Alternatively, it could reflect feeding to excessive weights as growers retain animals beyond optimum slaughter weights, hoping for generally higher lamb prices.

Limited data are available concerning capacity utilization in the lamb meat sector. One study[48] commissioned by the American Meat Institute found that in 1987 the average percentage utilization per hour for surveyed sheep and lamb plants[49] was 80.3 percent.

During 1982-93, the number of federally inspected plants reporting the slaughter of sheep and lambs declined steadily from 1,016 to 711. During 1982-93, the relative percentage or rate of decline in the number of plants slaughtering sheep and lambs exceeded the percentage or rate of decline in the number of animals slaughtered. This suggests that

[48] C.E. Ward, *Estimated Industry Capacity for Livestock Slaughtering and Boxed Beef Production*, Nov. 1988.

[49] The surveyed plants accounted for 42 percent of sheep and lamb slaughter in that year.

Table 8-2
Lamb: U.S. commercial lamb slaughter, average carcass weight, and lamb meat production, 1982-93

Year	U.S. lamb slaughter	Average carcass weight	U.S. lamb meat production
	1,000 animals	*Pounds*	*1,000 pounds*
1982	5,985	56	335,180
1983	6,127	56	345,380
1984	6,225	56	346,954
1985	5,752	58	331,316
1986	5,315	59	315,985
1987	4,919	60	296,920
1988	4,991	63	315,116
1989	5,122	64	326,624
1990	5,321	64	342,015
1991	5,379	64	341,778
1992	5,178	64	330,623
1993	4,877	65	304,575

Note.—Lamb meat production may be less than the product of number of animals slaughtered multiplied by the average carcass weight. This is because carcasses and parts are sometimes condemned by the U.S. Department of Agriculture in the inspection process.

Source: U.S. lamb slaughter and average carcass weight, compiled from official statistics of USDA, ERS, *Livestock and Meat Statistics*, 1970-92, and *Livestock Slaughter*, annual issues; U.S. lamb meat production, estimated by the staff of the U.S. International Trade Commission.

capacity utilization in the packing sector increased during this period. Various factors may have contributed to the decline in the number of plants, including labor problems, industry concentration for economies of scale, packer/grower contractual arrangements, a decline in the number of sheep slaughtered, as well as competition from imports.[50] Some domestic lamb producers contend that as packer concentration increases, marketing options for growers become more limited and less competitive, as additional costs such as transportation must be factored into growers' marketing considerations.[51]

U.S. Lamb Production

The number of lambs born during the year, or the lamb crop,[52] generally declined during 1982-93 (table 8-3). During the period the CVD was in effect (1985-90), the lamb crop was relatively stable.

Lamb production, as shown in table 8-3, depends on the number of ewes that are 1 year or older and kept for breeding purposes and the number of lambs born per ewe (lambing rate). The lambing rate varied with no clear trend during 1982-93.[53] However, the number of ewes 1 year or older kept for breeding purposes generally declined over this period. The decline in the January 1 inventory of ewes kept indicates declining capacity utilization among lamb growers and a reduction in the capital stock available for future lamb production.

A comparison of the January 1 inventory of ewe lambs kept for breeding purposes and the previous year's lamb crop also suggests that utilization in the live lamb sector was low and generally declining between 1982 and 1993. During 1982-93, the ratio of the January 1 inventory of ewe lambs and the previous year's crop declined irregularly from 21 percent to 15 percent.[54]

World Production

U.S. production of lamb meat accounted for between 2 and 3 percent of world production in 1993.[55] Australia and New Zealand combined

[50] USITC staff interview with officials of Monfort of Colorado, Greeley, CO, Oct. 13, 1994.

[51] Commission staff interview with officials and members of the Wyoming Wool Growers Association, Cheyenne, WY, Oct. 12, 1994.

[52] In some States, especially the Western States, the lamb crop is estimated when the young lambs (about 2 weeks of age) are "worked", i.e. when the lambs have their tails removed (docked) and when the ram lambs are castrated. In years with adverse weather, many lambs may die before they are "worked" and thus are not included in the lamb crop.

[53] Adverse weather, either during the breeding season or when the lambs are born, contributes to reduced lambing rates. If a large share of the January 1 inventory consists of ewes kept for breeding purposes that are more than 1 year old but not 2 years old and not bred, the lambing rate during the year will be lower than if the January 1 inventory consists of a larger share of bred ewes.

[54] On average about one-half of the lamb crop consists of rams (males), a relatively few of which are retained for breeding purposes. Also, some ewe lambs must be retained to replace mature ewes that are no longer suitable for breeding purposes.

[55] Commission staff estimate based on U.S. Department of Agriculture, Foreign Agricultural Service, *Livestock: World Markets and Trade*, (FL&P 2-94), Mar. 1994, p. 70.

Table 8-3
Sheep and lambs: U.S. ewes kept, lambing rate, and lamb crop, Jan. 1 of 1982-93

Year	Ewes kept	Lambing rate[1]	U.S. lamb crop
	(1,000 animals)	*(Per 100 ewes)*	*(1,000 animals)*
1982	8,811	98	8,580
1983	8,343	99	8,209
1984	7,874	99	7,788
1985	7,233	103	7,412
1986	6,817	108	7,356
1987	6,847	104	7,190
1988	7,348	99	7,206
1989	7,187	108	7,725
1990	7,609	102	7,704
1991	7,425	103	7,644
1992	7,090	102	7,216
1993	6,415	99	6,314

[1] Number of lambs born per ewe.

Source: U.S. Department of Agriculture, ERS, *Livestock and Meat Statistics*, 1970-92, Statistical Bulletin #874, Jan. 1994, p. 92 and USDA, NASS, *Sheep and Goats*, Jan. 28, 1994, p. 3.

accounted for another 20 percent. Lamb meat production tends to be larger in volume in the southern hemisphere when production in the northern hemisphere tends to be smaller, owing to the seasonality associated with the industry.

Australia and New Zealand appear to have a competitive advantage in the production of lamb, because they have large areas of highly productive and relatively low-cost grazing land. In 1993, for example, Australia and New Zealand together accounted for an estimated 85 percent of the world's total exports of lamb meat.[56] During the late 1980s, New Zealand's meat-processing industry was generally restructured: at least two meat-processing plants were closed, ownership changes took place, outdated multifunctional plants were replaced with modern single-function plants, and capacity utilization increased.[57]

Market Performance—Trend Analysis

Domestic Prices

Reported prices for livestock and meat (including live lambs and lamb meat) tend to be volatile, because agricultural products tend to be fungible and supply responses are lagged by biological constraints. During 1982-87, the annual average price for lamb carcasses[58] rose by about 23 percent to a peak of $150.41 per 100 pounds in 1987 (table 8-4). The rise in price corresponded to an overall, but not year-to-year, decline in lamb meat production, which fell from 335 million pounds in 1982 to 297 million pounds in 1987 (table 8-2). After peaking in 1987, the annual average price decreased steadily, and these price declines coincided with an increase in lamb meat production of about 9 percent to 342 million pounds during 1988-91. In 1992, prices increased to $131.66 as production continued to decline. In addition to these annual patterns, lamb carcass prices displayed seasonal patterns (figure 8-2).

Monthly data in table 8-4 can be divided into three subperiods: the pre-CVD period of January 1981-May 1985, the CVD period of June 1985-March 1990, and the post-CVD period of April 1990-May 1994. The CVD period's average monthly price was about 10 percent above the average price of the pre-CVD subperiod and about 7 percent above the average price of the post-CVD subperiod. Time series and CPE analyses below address whether these higher CVD period price levels may be attributed to the remedy. Further, price's variability rose after the pre-CVD period.[59]

Although lamb meat prices increased for 2 years after the CVD, whether or not the increase was due to the CVD is not clear. At the Commission's hearing on the investigation, a representative of the American Sheep Industry Association, Inc., noted that "The period while the duty was being collected, 1985 through 1989 also corresponded with much stronger lamb markets for American producers."[60] Posthearing briefs submitted on behalf of the NZMPB and the AMLC contend that the only discernible effect of the CVD was a decline in U.S. lamb meat imports from New Zealand and an offsetting increase in imports from Australia. Thus, while New Zealand sales declined in the U.S. market, sales of Australian lamb meat increased.[61] The posthearing brief of the AMLC also noted that domestic lamb prices tend to be positively correlated with lamb imports, and that lamb imports as well as carcass lamb prices rose between 1983 and 1988.[62]

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[56] USDA, FAS, *Livestock: World Markets and Trade*, (FL&P 2-94), Mar. 1994, p. 50.

[57] Commission staff interview with Roger Berlinger, New Zealand Administrator of Agriculture, Nov. 21, 1994. For a more detailed discussion of changes in the New Zealand meat packing and processing sector see USITC publication 2345, p. 8-1.

[58] Carcasses graded Choice-Prime, East Coast, 55-65 lb., as reported by the USDA.

[59] See D. Pierce, *The Dictionary of Modern Economics* (Cambridge, MA: The MIT Press, 1983), p. 69, for the definition of the coefficient of variation or CV, which measures, here for each of the three periods, price's variability around its mean. The CV for price is the standard error divided by the sample mean for each of the three periods. The CV rose from 0.084 during the pre-CVD period to within the 0.09-0.10 range for the CVD and post-CVD periods. So over the sample, price dispersion around its mean rose from 12 to 19 percent after the pre-CVD period.

[60] Transcripts of Commission's hearing on investigation No. 332-344, Sept. 29, 1994, at p. 315. Staff notes that the CVD was collected on certain New Zealand imports through Mar. 31, 1990.

[61] See posthearing submission of the New Zealand Meat Producers Board, Nov. 4, 1994, and the posthearing submission of the Australian Meat and Live-Stock Corp., Oct. 14, 1994.

[62] Posthearing submission of the Australian Meat Livestock Corporation, Oct. 14, 1994. Although the AMLC refers to rising lamb carcass and slaughter prices during 1983-88, the data presented in the graphs in their submission are consistent with the USITC data in that these prices actually declined from 1987 to 1988. As noted in a later section, domestic prices remained high until early 1988.

Table 8-4
Lamb carcass price, choice-prime, East Coast, 55-65 lbs., by months, January 1981-September 1994, and annual average

(Dollars)

Month	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
January	$108.12	$109.41	$123.83	$131.25	$133.80	$133.62	$153.96	$156.88	$133.75	$112.25	$109.05	$114.83	$145.72	$131.19
February	113.06	116.75	132.75	126.50	139.50	138.58	151.46	151.25	135.88	127.81	106.50	122.75	157.75	134.00
March	113.56	129.60	136.80	123.38	141.62	129.00	161.25	153.37	142.60	135.25	118.97	137.38	168.25	137.05
April	122.20	134.50	132.71	130.00	136.50	145.30	167.40	141.25	147.06	123.38	122.00	143.72	154.00	131.19
May	137.75	144.12	126.67	128.73	147.70	158.08	173.00	141.38	142.35	125.25	125.25	143.13	142.75	130.25
June	142.75	132.97	125.80	127.50	145.50	148.75	162.00	124.00	139.31	120.25	124.25	140.00	133.00	146.25
July	137.30	127.62	119.08	132.50	150.60	148.50	148.25	128.75	133.03	124.88	124.55	136.08	124.63	164.06
August	127.75	120.10	114.40	135.00	147.00	142.50	141.00	127.00	130.75	120.25	121.25	125.47	135.88	173.05
September	115.90	115.37	115.00	135.00	143.75	134.70	137.60	130.50	121.44	120.00	118.25	126.40	140.25	165.25
October	113.34	109.75	125.00	135.00	140.00	122.50	134.56	134.12	117.69	119.85	113.38	120.75	140.25	154.25
November	109.00	110.25	127.00	135.00	131.75	136.25	129.56	127.70	109.65	114.75	111.31	129.14	140.75	153.65
December	106.42	111.90	131.25	132.00	125.06	146.00	144.90	137.50	122.72	113.75	113.25	140.25	144.35	151.25
Annual average	120.60	121.86	125.86	130.99	140.23	140.32	150.41	137.81	131.35	121.47	117.33	131.66	143.97	146.04

Source: Compiled from official statistics of the U.S. Department of Agriculture.

In April 1985, the month after the petition was filed, lamb carcass prices averaged $136.50 per 100 pounds, down 3.6 percent from March. Prices averaged $150.60 per 100 pounds in July 1985, the month after the imposition of the International Trade Administration CVD order (June 25, 1985), up 3.5 percent from June. As shown in table 8-1, Commerce's administrative review determinations were announced well after imports entered the United States; thus, it is not clear that the announcements affected prices. However, all imports on and subsequent to April 1, 1990, have been found to have received a *de minimis* subsidy. The data in figure 8-3 suggest that after early-1990, quantities of New Zealand and Australian lamb imports converged more closely than in the previous subperiods. Lamb carcass prices in April 1990, at $123.38, averaged 8.8 percent less than March 1990 average.

Imports: Quantity and Prices

The United States has long been a large net importer of lamb meat. Almost all imports have been supplied by Australia and New Zealand. The quantity of U.S. imports of lamb meat averaged 20 million pounds annually during 1982-84 as domestic prices increased gradually (table 8-5 and figure 8-5). Imports averaged about 30 million pounds annually during 1985-89 as prices rose to a peak in 1987 and then gradually declined. During 1990-92 imports declined to an annual average of 26 million pounds concomitant with generally declining domestic prices.

U.S. imports of lamb meat from New Zealand began declining from 26 million pounds in 1985, and reached 11 million pounds in 1991, before rising to 17 million pounds in 1993 (table 8-5). According to a report, "Meat Industry Restructuring and Closures" (U.S. Department of Agriculture FAS AGR No. NZ4027, Aug. 25, 1994) the New Zealand meat industry is in a far better position than it was during the mid-1980s. Reportedly inefficient plants have been closed while others have been modernized and new smaller efficient plants have been opened. Also, significant gains reportedly have been made in productivity, with per-head processing costs declining.

The ratio of imports to consumption, 5 percent in 1982, fluctuated within the range of 6.8 to 8.9 percent during 1985-92 and was 11.8 percent in 1993 (table 8-5 and figure 8-6). Lamb meat processors that responded to Commission questionnaires indicated that the most important factors included price/performance, relations with customers, health of the domestic upstream industry, industry structure, and profitability. The least important factors included exchange rates, export controls, and the research and development tax writeoff schedule.

Employment and Labor Use in Packing Sector

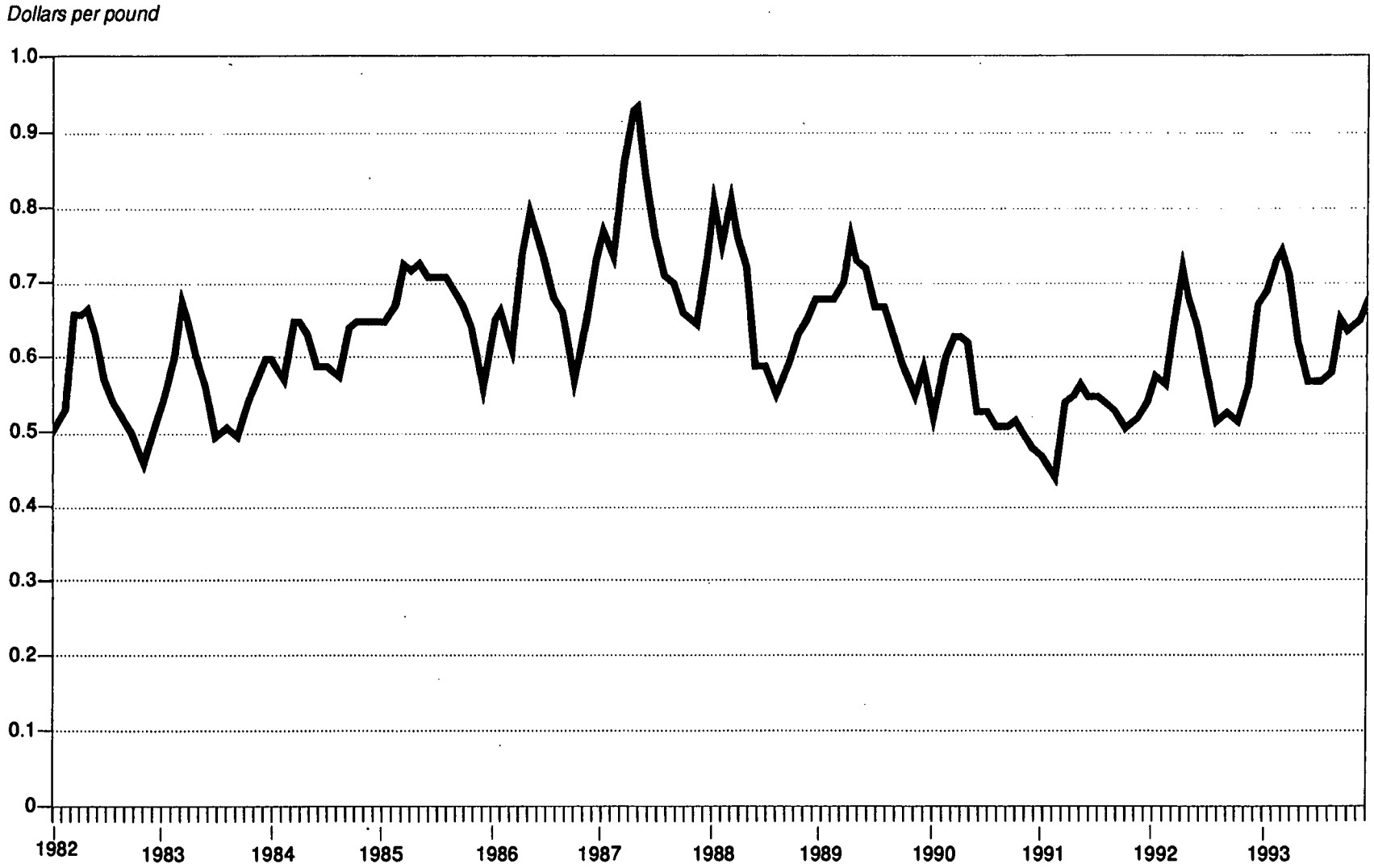
U.S. lamb meat packers reported data on employment and wages during 1984-91 (table 8-6). U.S. packers' employment, total hours, average hours,

Table 8-5
Fresh, chilled, or frozen lamb meat: U.S. production, imports for consumption, and apparent U.S. consumption, 1982-93

Year	Carcass-weight equivalent					
	U.S. production	U.S. imports	U.S. imports from Australia	U.S. imports from New Zealand	Apparent U.S. consumption	Ratio of imports to consumption
	(Million pounds)					(Percent)
1982	335	19	3	16	354	5.4
1983	345	18	3	15	363	5.0
1984	347	20	3	16	367	5.4
1985	331	32	5	26	363	8.8
1986	316	28	13	14	344	8.1
1987	297	29	21	8	326	8.9
1988	315	30	17	12	345	8.7
1989	327	31	17	13	358	8.7
1990	342	25	13	12	367	6.8
1991	342	26	15	11	368	7.1
1992	331	27	15	13	358	7.5
1993	305	41	24	17	346	11.8

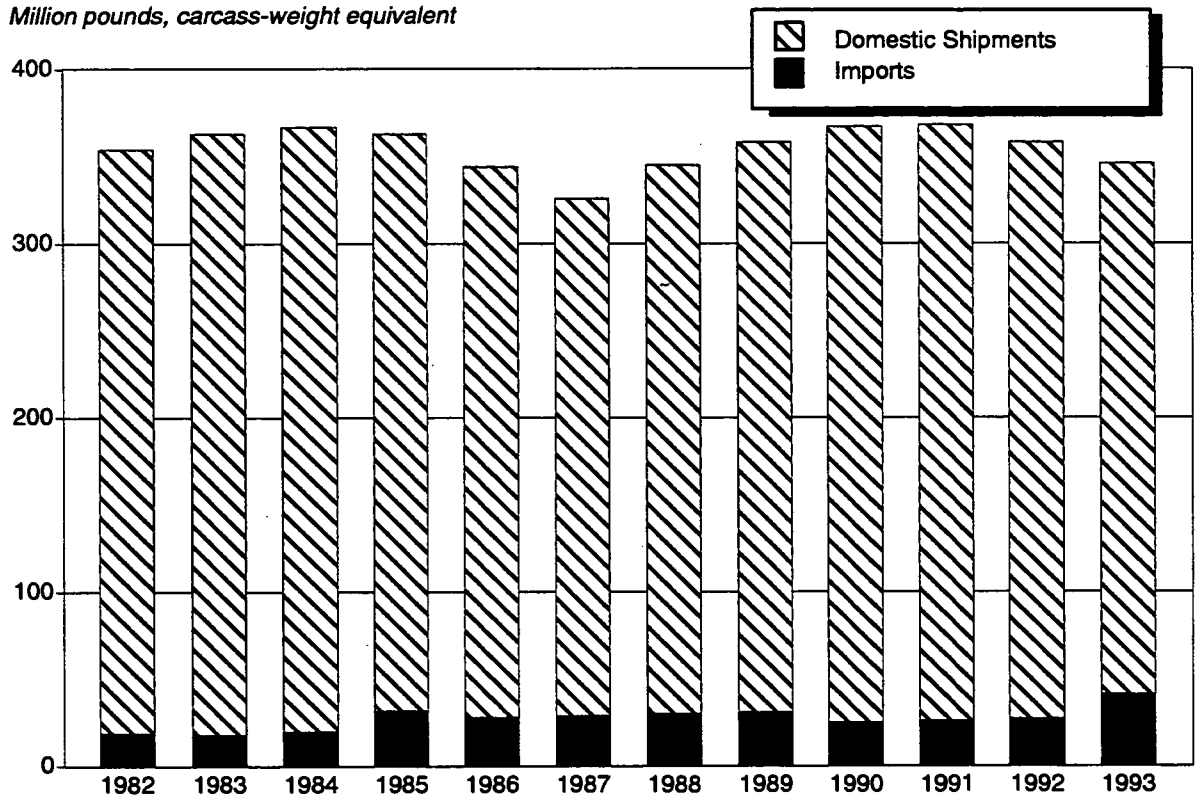
Source: Production, estimated by the staff of the U.S. International Trade Commission. Imports, compiled from official statistics of U.S. Department of Commerce (converted to carcass-weight equivalent on the basis of factors used by U.S. Department of Agriculture); consumption, derived by combining production and imports, inasmuch as exports are negligible and inventories are small relative to production and do not change much.

Figure 8-5
Choice slaughter lamb price, San Angelo, by month, 1982-93



Source: U.S. Department of Agriculture, Economic Research Service, *Livestock and Meat Statistics* 1970-92 and *Livestock, Dairy, and Poultry Situation and Outlook*, various issues.

Figure 8-6
Lamb meat: U.S. apparent consumption by imports and domestic shipments, 1982-93



Source: Production estimated by the staff of the USITC, imports compiled from official statistics of U.S. Department of Commerce (converted to carcass-weight equivalent on the basis of factors used by USDA); consumption is derived by combining production and imports inasmuch as exports are negligible.

Table 8-6
Lamb meat packers: Average number of production and related workers in U.S. establishments, hours worked and compensation paid to such employees, 1984-91

Item	1984	1985	1986	1987	1988	1989	1990	1991
Average number of production and related workers	220	383	381	524	498	530	650	769
Total hours worked by such workers (*thousands*)	393	673	702	851	978	1,082	1,429	1,687
Average hours worked by such workers (*number*)	1,786	1,757	1,843	1,624	1,964	2,042	2,199	2,194
Total compensation to such workers (*1,000 dollars*)	4,489	6,961	7,625	8,223	9,457	10,864	14,244	16,863
Average hourly compensation to such workers	$11.42	$10.34	$10.86	$9.66	$9.67	$10.04	$9.97	$9.99

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

and total compensation all increased significantly during the period under review. However, the average hourly compensation generally declined, largely reflecting wage concessions by unionized labor.

The labor requirement in the U.S. lamb-packing industry during 1984-91, as measured by the number of man-hours required to process a lamb, is shown in the following tabulation (calculated on the basis of data provided by respondents to questionnaires of the U.S. International Trade Commission on the basis of a conversion factor of 50.8 pounds of lamb meat per animal):

Year	Man hours
1984	0.26
1985	0.20
1986	0.21
1987	0.22
1988	0.30
1989	0.31
1990	0.35
1991	0.36

The general increase in labor requirement during the period does not reflect a decline in productivity. Rather, the rise arose from packers having extended their range of processing, largely from producing carcasses to producing boxed cuts. This increased level of processing embodies more labor per animal.

Impact On Downstream Industry

Usable quarterly data from questionnaires sent to lamb purchasers were limited to purchases of Australian lamb meat during parts of 1989-91, and indicate that prices fluctuated with no apparent trend over this period. Respondents reported that supply of lamb meat from Australia and New Zealand showed no unusual fluctuations during 1984-91; most respondents could not determine the price effects of the countervailing duty imposed in September 1985.

Estimates of Economic Effects

Time Series Analysis

Hypotheses tested

The time series analyses test whether the filing of the petition and the final determination of the countervailing duty (CVD) had an impact on domestic lamb production, domestic lamb price, and the levels of subject and non- subject lamb imports.[63] The analyses test the hypotheses that there were differences in U.S. lamb production, prices of U.S.-produced lamb, and levels of U.S. lamb imports during the periods preceding, during, and after the CVD period. The hypotheses are tested by using a binary variable that partitions the data's sample period into these three time periods.

For reasons already stated, staff chose to omit the 4-month petition variable from, and to include the remedy variable (defined as a binary variable over the CVD period) in, the model ultimately estimated. As previously stated, the remedy variable included in the model measures the net effect of the subsidized imports and the CVD imposed on these imports, and cannot indicate the specific and separate effects of these two concurrent events.

Data Sources

Data for the U.S. domestic lamb demand and supply equations are available monthly from the early 1980s. Monthly or quarterly data are not available to estimate the New Zealand and Australian lamb supplies. The six-equation system described in chapter 5 is consequently reduced to the following four-equation system: a price-dependent supply for domestically produced U.S. lamb (equation 1), a U.S. demand for domestically produced lamb (equation 2), the U.S. import demand for New Zealand lamb (equation 3), and the U.S. demand for Australian lamb (equation 4).

(1) U.S. lamb price = f(remedy variable, U.S. lamb produced/consumed, wages, electricity price, time trend, seasonal binary variables, and a constant).

(2) U.S. lamb produced/consumed = f(remedy variable, U.S. lamb price, personal income, chicken price, beef price, pork price, New Zealand lamb import price, Australian lamb import price, time trend, seasonal binary variables, and a constant).

[63] The unavailability of necessary data precluded the estimation of the supply conditions in foreign markets. Consequently, the Commission staff was not able to econometrically model the effects of subject lamb imports and of the CVD on prices of lamb imported into the United States.

(3) U.S. imports of New Zealand (subject) lamb = f (remedy variable, New Zealand lamb import price, Australian lamb import price, U.S. lamb price, personal income, chicken price, beef price, pork price, seasonal binary variables, and a constant).

(4) U.S. imports of Australian lamb = f(remedy variable, Australian lamb import price, New Zealand lamb import price, U.S. lamb price, personal income, chicken price, beef price, pork price, seasonal binary variables, and a constant).

Data are modeled in natural logarithms, rendering regression coefficient estimates in elasticity form for the nonbinary variables. Further, data were corrected for serial correlation (see appendix D). Given the wholesale level of this analysis, price and income variables for equations 2, 3, and 4 and the price variables in the price-dependent supply relation of equation 1 are deflated by the producer price (PPI) index for all items published by the U.S. Department of Labor's Bureau of Labor Statistics.[64]

Because the U.S. lamb market's prices and quantities are subject to seasonal variation,[65] a series of 11 monthly binary variables were included in each equation. The Commission[66] reported declining trends in U.S. domestic lamb consumption and production since World War II. To account for these declining trends, Commission staff included a time trend in the price-dependent U.S. lamb supply equation (equation 1) and the U.S. demand for domestically produced lamb (equation 2).

The U.S. domestic lamb price is the U.S. wholesale lamb price for Choice/Prime, East Coast carcasses of 55-65 pounds.[67] Quantities of U.S.-produced lamb consumed and supplied are reflected by the commercial lamb and yearling slaughter. The quantity variable was constructed for each month by multiplying commercial lamb and yearling slaughter[68] (number of animals) times the average dressed weight per head (in pounds).[69]

The Bureau of Labor Statistics (BLS)[70] publishes a monthly PPI for commercial electric power, used as an input price in the supply curve. Wages, another domestic meat-packing input price, are modeled with the average hourly earnings in meat-packing plants obtained by month.[71] Personal income, published monthly by the Department of Commerce, Bureau of Economic Analysis[72] serves as the income variable in the U.S. demand functions for domestic lamb, for New Zealand lamb, and for Australian lamb.

Wholesale prices of other (substitute and complement) meats are useful in modeling the three demands. Staff chose the BLS PPIs for beef and veal, fresh whole chicken, and pork as alternative meat prices.[73]

As confirmed during staff's field work at Texas A & M University,[74] the only available lamb import prices are the deflated monthly unit values for New Zealand and Australian imports.[75] Unit values for each country result from dividing the value of lamb imports from a country by the quantity imported from that country, where value and quantity import data are based on official Commerce statistics.[76] Commerce's

[64] U.S. Department of Labor, Bureau of Labor Statistics (BLS), *Producer Price Indexes*, relevant monthly issues.

[65] Commission publication 2345, p. 4-4.

[66] Ibid., chapters 4-5.

[67] U.S. Department of Agriculture, Economic Research Service, *Red Meats Yearbook*, 1994, Statistical Bulletin No. 885, table 86, p. 88, for June 1980-Dec. 1993. The 1994 data were obtained from USDA, ERS *Cattle and Sheep Outlook*, various issues.

[68] Ibid., table 9, p. 11, for Jan. 1980-Dec: 1993 data. The 1994 data were obtained from USDA/National Agricultural Statistical Service (NASS), *Livestock Slaughter*, various monthly issues.

[69] USDA, NASS *Livestock Slaughter*, various annual summaries and monthly issues.

[70] BLS, *Producer Price Indexes*, relevant monthly issues.

[71] Department of Commerce, LABSTAT data base, National Industry, Employment, Hours, and Earnings Survey.

[72] Department of Commerce, Bureau of Economic Analysis (BEA), *National Income and Product Accounts*, vol. 2, 1959-88, pp. 81-83 for the Jan. 1980-Dec. 1988 data. BEA published the Jan. 1989-May 1994 data in the *Survey of Current Business*, July 1994, pp. 68-69.

[73] BLS, *Producer Price Indexes*, relevant monthly issues.

[74] Interviews with members of the TAMRC Lamb Study Team during field work conducted at Texas A & M University ,Nov. 7, 1994.

[75] Monthly (or even quarterly) U.S. import prices for New Zealand and Australian lamb are not available with enough historical observations with which to build the econometric model explained above.

[76] These unit values may vary from month-to-month from changes in the mixes of differently valued primal cuts. For example, one month's shipments may generate a high unit value because of a high proportion of high-valued racks, while another month's unit value may be lower because of a high percentage of lower valued cuts (e.g. shoulders). However, any such monthly variation that is systematically recurring may be captured

quantity series for New Zealand and Australian lamb imports are used as the dependent variable for the two import demand equations.

Estimation Method

The four equations were estimated as a single system using systems estimation techniques. The two simultaneous equations, the supply and demand for U.S.-produced lamb, were estimated with three-stage lease squares. The U.S. import demands for New Zealand lamb and Australian lamb were estimated with Zellner's seemingly unrelated regression. Reasons for, and the econometric considerations involved in, choosing these estimators are provided in the technical appendix D.

Results

Econometric estimates are provided in table 8-7.[77] Analyses of the remedy variables are provided first. Analyses on other coefficients follow.

Analysis of the Events of June 1985-March 1990

During the CVD period, Commerce determined that certain volumes of New Zealand lamb benefited from bounties or grants and imposed countervailing duties on these imports. Four effects of the events of the CVD period emerge from the econometric results on the remedy variable reported in table 8-7. Two of the effects focus on the domestic demand and supply equations (columns 1 and 2), and two, on the import demand equations of the model (columns 3 and 4).

The econometric results in table 8-7 indicate that the remedy variable was statistically significant[78] and positive on the U.S. domestic supply equation and suggests that during the CVD period, U.S. domestic lamb price was generally higher, by about 10 percent, than levels during other subperiods during the January 1981-May 1994 sample period (column 1).[79] This result is supported by data in table 8-4, which generate a higher average monthly price during the CVD period. The negative and statistically significant coefficient estimate on the U.S. domestic demand equation's remedy variable (column 2) suggests that during the CVD period, the quantity demanded of U.S.-produced lamb was about 3.5 percent lower than during other periods.

The events of the CVD period coincided with a decline in New Zealand imports at just about the same time as Australian imports increased (late 1985 to early 1986), as suggested from the data of such imports shown in figure 8-3. Patterns in figure 8-3 suggest that at least part of the drop in New Zealand lamb imports coincided with a rise in Australian lamb imports for roughly the CVD period's duration (late 1985/early 1986 through early 1990). These trends are supported by two sources of statistical evidence from econometric results in table 8-7 concerning the remedy variable coefficient estimates in the New Zealand and Australian equations. First, the estimated coefficient on the remedy variable in the New Zealand equation (column 3) suggests that imports from New Zealand during the CVD period were at generally 11.3 percent lower levels than during other subperiods of the January 1981-May 1994 sample, although this coefficient estimate is statistically insignificant. Second, the statistically significant and positive coefficient estimate on the remedy variable in the Australian equation (column 4) suggests that imports from Australia during the CVD period were 92 percent higher than during other subperiods of the January 1981-May 1994 sample period. This may be a case of trade diversion, discussed in chapter 3, where U.S. importers divert or switch purchases from subject New Zealand imports to nonsubject Australian imports.

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[76]—*Continued*
by the seasonal binary variables in each equation. Further, these unit values do not reflect added values that accrue to the lamb imports from processing carcasses into primal cuts, transportation costs within the United States, and importer profits. Nonetheless, the unit values are the only monthly proxies for lamb import prices available with enough observations with which to conduct econometric analysis.

[77] *Technical note.*—Due to the specification of the variables in logarithmic form, coefficients for non-binary variables in table 8-7 can be interpreted as elasticity estimates. An elasticity is the percentage change in the dependent variable that results from a one-percent change in an explanatory variable.

[78] The terms "significant" and "significance" here mean statistically significant and imply that there is relatively large probability, for example, 90 or more in 100, that the estimated effects of the variables labeled as significant would not have occurred by chance.

[79] *Technical note.*—Coefficients of binary variables in logarithmic equations may be transformed into estimated percentage changes by raising e, the base of the natural logarithm, to the power of the coefficient, subtracting one, and multiplying by 100. See R. Halvorsen and R. Palmquist, "The Interpretation of Dummy Variables in Semilogarithmic Equations," *American Economic Review*, vol. 70 (1980), pp. 474-75.

Table 8-7
Lamb meat: Economic coefficient estimates of supply and demand, with related T-Statistics[1]

Independent variable	Price-dependent U.S. domestic lamb supply	U.S. demand, domestic lamb	U.S. demand, New Zealand lamb imports	U.S. demand, Australian lamb imports
Remedy variable	0.099*	-.036*	-.12	.65*
	(7.6)	(-1.97)	(-.9)	(7.5)
Quantity, U.S. lamb	.352*	(2)	(2)	(2)
	(6.7)	(2)	(2)	(2)
Wages	.479*	(2)	(2)	(2)
	(3.10)	(2)	(2)	(2)
Price of electricity	1.06*	(2)	(2)	(2)
	(5.65)	(2)	(2)	(2)
Price, U.S.-produced lamb	(2)	-.78*	2.20*	-1.69*
		(-3.4)	(3.4)	(-4.0)
Personal income	(2)	1.76*	.80*	2.87*
		(11.9)	(2.5)	(13.5)
Chicken price	(2)	-.06	-.09	-.05
		(-1.1)	(-.18)	(-.17)
Beef price	(2)	-.15	3.97*	48
		(-.8)	(3.0)	(.56)
Pork price	(2)	-.65	-2.29*	.74
		(-.8)	(-3.0)	(1.56)
Price, New Zealand imports	(2)	.017	-.08	.49*
		(.68)	(-.33)	(3.4)
Price, Australian imports	(2)	-.016	-.63	-1.14*
		(-.3)	(-1.5)	(-4.25)
Time trend	-.0008*	-.006*	(2)	(2)
	(-4.7)	(-9.47)	(2)	(2)
Constant	.278	1.02*	-2.65	-1.77
	(.8)	(3.10)	(-.9)	(-.9)
Number of observations	161	161	161	161
R-square estimate	(3)	(3)	(3)	(3)
Durbin-Watson statistic[4]	1.06	1.86	1.49	1.86

[1] Student t-statistics of the coefficient estimates are in parentheses. Data were modeled in natural logarithms. "*" indicates the estimated coefficient is statistically significant using a 2-tailed test at the 95-percent confidence level or higher.

[2] Values for these variables are not relevant.

[3] The R^2 is not well defined for system equation techniques (here three-stage least squares and Zellner's seemingly unrelated regression), and hence are not reported. G. Judge, W. Griffiths, R.C. Hill, and T.C., Lee, *The Theory and Practice of Econometrics* (New York: John Wiley & Sons, 1980), pp. 251-57.

[4] The properties and critical values of the Durbin-Watson (DW) statistics generated under three-stage least squares and Zellner's seemingly unrelated regression estimation frameworks are unknown. Such DW properties and critical values are known under ordinary least squares (OLS) estimation frameworks. Because of these problems, these DW values were generated by the OLS versions of the estimated equations, following the advice of T.C. Lee on November 11, 1994. These DW values indicate that evidence was sufficient or inconclusive to suggest that the residuals in each of the four equations were serially correlated.

Source: Econometric estimations and analyses of U.S. International Trade Commission staff.

In summary, the CVD period had four effects on the market. The higher domestic supply price during the CVD period coincided with lower levels of consumption of domestically produced lamb. Overall U.S. lamb import levels were not greatly influenced by the CVD imposed on the subject New Zealand imports, because New Zealand's losses in the U.S. import market were at least partially offset with concurrent gains in U.S. imports of Australian lamb.

Before the examination of the other results in each equation (table 8-7), a number of comments are made concerning the coefficient estimates generated by U.S. lamb price, chicken price, beef price, pork price, and the prices of New Zealand and Australian lamb imports (hereafter the six meat prices). Not surprisingly, from three to five of these meat price coefficients appear statistically insignificant across the three demand equations. A likely reason for the apparent insignificance may be that all or most of these prices do not vary independently of each other, but rather vary together over time. Such interdependence, called collinearity, precludes valid interpretation of these six coefficients *individually*.[80] Nevertheless, staff chose to include these six prices, because economic theory suggests that prices of meat alternatives are important to lamb demand and because inclusion of these theoretically important variables is needed for an adequate fit.[81]

U.S. Supply of Domestically Produced Lamb

The econometric estimates for the price-dependent U.S. supply relation are provided first in table 8-7. Wages and electricity generated statistically significant coefficient estimates with the expected positive signs. These results suggest that wages and electricity costs are important input costs for packing house operations at the lamb industry's wholesale level. The negative and statistically significant coefficient estimate on the time trend supports the Commission's findings of generally decreasing trends in U.S. lamb production over the last three decades.[82]

[80] Collinearity among these six meat prices can also result in unreliable t-values on the meat prices' coefficient estimates so that the statistical significance levels of these coefficients are not clear. See P. Kennedy, *A Guide to Econometrics* (Cambridge, MA: MIT Press, 1985), pp. 146-156.

[81] That is, inclusion of theoretically important variables that are collinear does not compromise fit, and is required for unbiased estimates. See Kennedy, 1985, pp. 146-156.

[82] Commission publication 2345, pp. 3-2 through 3-3.

The price elasticity of supply estimate of about 2.8 has the expected positive sign and is statistically significant.[83] Staff acknowledges that this price elasticity of supply may be high by some standards of the literature, although the estimate does fall within the literature's range for farm-level parameter estimates 0.01-2.8 for time horizons of 10 years or less.[84]

U.S. Demand for Domestically Produced Lamb

The estimated own-price elasticity of demand for domestically produced lamb, -0.78, is strongly significant, takes on the expected negative sign, and falls within the literature's ranges of comparable elasticity estimates.[85] The 1.76 income elasticity of demand is statistically significant and of the expected positive sign and suggests that income is an important factor in the U.S. demand for domestically produced lamb.[86] The statistically significant coefficient

[83] This price elasticity of supply is approximated as the inverse of the "price-flexibility" coefficient on the quantity regressor of the price-dependent supply. See G. Whipple and D. Menkhaus, "Welfare Implications of the Wool Act," *Western Journal of Agricultural Economics*, vol. 15, No. 1 (1990), pp. 33-44.

[84] Whipple and Menkhaus, "Supply Response for Sheep," p. 133; and Whipple and Menkhaus, "Welfare Implications," p. 38.

[85] The literature provides ranges of estimates for the price elasticity of U.S. lamb demand. Wholesale estimates range from -0.3 to -1.52 as reported by G. Whipple and D. Menkhaus, "An Econometric Investigation of the Demand for Lamb," *Sheep Industry Development Research Journal*, vol. 5, No. 1 (1989), pp. 7-11. Retail-level estimates range from -0.62 to -3.96. The -0.62 estimate was reported by the Texas Agricultural Marketing Research Center (TAMRC), Lamb Study Team, *Assessment of Marketing Strategies to Enhance Returns to Lamb Producers*, TAMRC Commodity Market Research Report CM-1-91, Texas A&M University, College Station, TX, Dec. 1991. The -3.96 estimate was published by Whipple and Menkhaus, "An Econometric Investigation."

[86] Staff's 1.76 estimate falls within the literature's reported range of 0.13-2.22. The 0.13 retail level estimate was provided by E.B. Peterson and R. Jones, "Implications of U.S.-Mexico Tariff Reductions Under NAFTA for the U.S. Sheep Industry," *Sheep Industry Development Research Journal*, vol. 11, No. 1, forthcoming 1995. The 2.22 farm level estimate was provided by D. Anderson, "An Econometric Model of the U.S. Sheep and Mohair Industries for Policy Analysis," unpublished Ph. D. dissertation, Texas A&M University, College Station, TX, June 1994. Anderson also provided other elasticity estimates implied by his model and simulations, but not reported in the dissertation, in an Oct. 13, 1994, memorandum to Commission staff.

estimate on the time trend has the expected negative sign, and reinforces the previous Commission finding of a declining trend in U.S. lamb consumption since the 1960s.[87]

U.S. Demands for New Zealand and Australian Lamb

In the U.S. demand equations for lamb imports from New Zealand and Australia, income elasticities (coefficients on personal income) have the expected positive sign, range from 0.80 to 2.87, and are statistically significant.[88] These results suggest that income is an important factor in determining U.S. demand for imported lamb.

The estimated own-price elasticity of U.S. demand for New Zealand lamb is -0.09, has the expected negative sign, but is both highly inelastic and statistically insignificant. On the other hand, the larger estimated own-price elasticity of U.S. demand for Australian lamb (-1.14) is statistically significant. Therefore, U.S. imports of Australian lamb seem more responsive to their price than are U.S. imports of New Zealand lamb to their price. Such a result may be due to a segment of the U.S. lamb import market preferring New Zealand product over the Australian product. This market segment may tend to place a lesser weight on New Zealand lamb price when demanding New Zealand lamb than on Australian lamb price when demanding Australian lamb. Two effects, jointly considered, support this hypothesis. First, the smaller and statistically weaker own-price elasticity in the New Zealand equation (column 3) suggests that imports from New Zealand are less sensitive to own-price fluctuations than are imports from Australia. And second, the *positive* and statistically significant New Zealand price coefficient in the Australian equation (column 4) suggests that there may be some complementarity of U.S. demand for Australian and New Zealand lamb. That is, there is some evidence that increases in U.S. imports of Australian lamb have been positively correlated with the New Zealand price, and therefore, with New Zealand shipments of lamb to the United States.[89]

[87] See USITC publication 2345, Dec. 1990.

[88] This range overlaps substantially with the literature's estimate range formed by Peterson and Jones' lower end estimate of 0.13 and Anderson's higher end estimate of 2.22. See Peterson and Jones, 1994, p. 23; and D. Anderson, 1994.

Computable Partial Equilibrium Analysis

Estimated Impact on the Affected Domestic Industry and Import Markets

To estimate the partial equilibrium economic effects of the subject imports that benefited from bounties or grants and the combined effects of the remedy and the subject imports, staff used the previously reviewed literature and econometric estimates above to choose a range of estimates that represent price-supply, price-demand, and product substitution relationships (i.e., supply elasticity, demand elasticity, and substitution elasticity estimates) in the U.S. lamb wholesale meat industry. Three CPE simulations are analyzed. The first discerns the market impacts of the subject subsidized imports relative to conditions without subsidies on the imports (hereafter fair-trade conditions). The second discerns the combined impacts of the subsidized imports and the CVD relative to fair-trade conditions. The third discerns the impact of the subsidized imports and the CVD relative to market conditions prevailing at the time the CVD was imposed during the 1985 base year.

Conditions in 1985 are assumed for the baseline of each simulation, because the Department of Commerce determined that certain New Zealand lamb imports benefited from grants and bounties and imposed a remedial CVD on these imports beginning in mid-1985. Table 8-8 provides the assumed parameter values from the literature and the other required information for the CPE model simulations. Simulation results reported below reflect CPE model runs using midpoints of the value ranges assumed in table 8-8.

Price Elasticity of U.S. Supply

The domestic supply elasticity for lamb meat measures the sensitivity of quantity supplied by U.S. packers at the wholesale level to a change in the U.S. market price, and depends on, among other things, the overall rate of capacity utilization in the lamb meat

[89] Table 8-7's results concerning certain cross-price coefficient estimates suggest that evidence is mixed on whether U.S. and imported lamb are complements or substitutes.

Table 8-8
Partial equilibrium analysis for lamb: Assumed values of input variables, 1985

Input variable	Minimum	Maximum
Subsidy margin	21.0	(1)
Average U.S. tariff rate	0.4	(1)
Quantities for U.S. market *(million pounds)*:		
Domestic quantity	337	(1)
Subject quantity	26	(1)
Nonsubject quantity	6	(1)
Values for U.S. market *(million dollars)*:		
Domestic value	457	(1)
Subject value	27	(1)
Nonsubject value	5	(1)
Domestic employment *(number of workers)*	1,300	(1)
U.S. market elasticities *(absolute value)*:		
Substitution:		
Domestic/subject	2	3
Domestic/nonsubject	2	3
Subject/nonsubject	2	3
Aggregate demand	0.6	1.7
Supply:		
Domestic	1	2.8
Subject	1.5	inf.[2]
Nonsubject	1.5	inf.[2]

[1] There are no minimum/maximum value ranges for these items. The actual value was placed in the column labeled "minimum."
[2] The term "inf." denotes infinity.

Source: Commission staff obtained this information from various sources detailed in the text.

packing industry. Whipple and Menkhaus[90] generated a wide simulation-based range of price elasticities of farm supply that range from 0.01 for the 1-year horizon (the very short-term horizon) to a far larger 11.38 at the 30-year horizon.

This range is too wide for practical use. In more recent work, Whipple and Menkhaus[91] generate a price elasticity of farm supply of 1.7 as a general estimate for horizons of up to 5 years, thereby suggesting a short-to-intermediate-run estimate higher than the very low estimates and lower than the very high estimates provided by the earlier Whipple and Menkhaus study.[92] Ward[93] estimates the lamb industry's capacity utilization rate at 80.3 percent in 1987. With price elasticities of supply being negatively correlated with an industry's capacity utilization rate, this nearly 20 percent of unused capacity in the lamb industry may support price elasticity of supply estimates that are above the lower end, farm-level estimates of the Anderson/Whipple-Menkhaus range. Given these considerations, staff assumes a range of 1.0 to 2.8 for the price elasticity of wholesale supply, with the Commission staff econometric estimate (table 8-7) serving as the upper bound.

Own-Price Elasticity of U.S. Demand

The own-price elasticity of U.S. demand for lamb meat at the wholesale level measures the sensitivity of the overall quantity demanded of lamb meat to a change in the U.S. wholesale market price.[94] At the retail level, the own-price demand elasticity for lamb was estimated at -0.3 by Anderson,[95] at -0.62 by the TAMRC Lamb Study Team,[96] at -0.7 by Peterson

[90] See Whipple and Menkhaus, "Welfare Implications," and Whipple and Menkhaus, "Supply Responses for Sheep," 1989.

[91] G. Whipple and D. Menkhaus, "Welfare Implications, pp. 33-34.

[92] Whipple and Menkhaus, "Supply Response for Sheep," 1989.

[93] C.E. Ward, *Estimated Industry Capacity for Livestock Slaughtering and Boxed Beef Production*, American Meat Institute, Nov. 1988. More updated estimates were not in the literature.

[94] J. Gould and C. Ferguson. *Microeconomic Theory* (Homewood, IL: Richard D. Irwin Inc., 1980), pp. 99-100.

[95] Anderson, 1994.

[96] TAMRC Lamb Study Team, 1991.

and Jones,[97] and at -1.7 by Whipple and Menkhaus.[98] At the wholesale level, the U.S. own-price elasticity of U.S. demand is reported at -1.5 by Whipple and Menkhaus.[99] Staff's -0.78 econometric estimate of the price elasticity of wholesale demand falls within the literature's range of retail and wholesale estimates. Staff assumes the own-price elasticity of wholesale demand to range from -0.6 to -1.7, and ignores the lower end estimates, because the literature's wholesale range of estimates, those of most relevance to this investigation, begin at ranges higher than the estimates at the retail level.

Substitution Elasticities

The substitution elasticity is a measure of the degree to which domestically produced and imported lamb are substitutable in response to changes in relative imported/domestic price. The substitution elasticity is negatively related to the degree of differentiation among domestically produced and foreign lamb. Peterson and Jones[100] provided the only lamb-related substitution elasticity estimates located in the literature: about 2.0 for the U.S. substitution elasticity for domestically produced and foreign lamb supplies and 3.0 for the rest-of-the-world (ROW) substitution elasticity for non-U.S. and U.S. lamb supplies. However, the Texas Agricultural Market Research Center's Lamb Study Team[101] and Commission staff have encountered evidence and opinions that imported lamb, which is mostly frozen, and domestically produced lamb, which is mostly fresh, may not be perfectly substitutable. U.S. importers and consumers may also differentiate U.S. and imported lamb on the basis of taste, aroma, size of cuts and carcasses, and fat content.[102] Consequently, staff estimates a range of substitution elasticities of 2.0 through 3.0 for the following three U.S. elasticities of substitution needed for this investigation's study on lamb meat: between domestic lamb and subject subsidized imports; between domestic lamb and nonsubject imports; and between subject and nonsubject lamb imports.

[97] Peterson and Jones, 1995.

[98] Whipple and Menkhaus, "Welfare Implications," p. 38.

[99] Ibid.

[100] Peterson and Jones, 1995.

[101] TAMRC, Lamb Study Team, 1991.

[102] USITC publication 2345, pp. 2.3-2.4

Own-Price Elasticity of Import Supply

Lamb imports have historically constituted a small proportion (about 10 percent or less) of U.S. lamb consumption, leading staff to conclude that each foreign lamb import supply to the U.S. market is highly (perhaps infinitely) elastic. Whipple and Menkhaus'[103] own-price elasticity of U.S. lamb import supply, was estimated above unity at 1.5. Staff therefore assumed a range of 1.5 to infinity, with the literature's estimate serving as this range's lower bound, for the price elasticity of import supply for subject and nonsubject imports.

Shares and other CPE input information

The subsidy margin for 1985 was calculated at 21 percent. The Commission[104] reported the ad valorem equivalent rate of duty for lamb meat imports at 0.4 percent for 1985-88. Domestic production or shipments as well as subject and nonsubject meat imports are needed in quantity and value terms by the CPE model. Domestic shipments amounted to 337.1 million pounds in 1985.[105] Values of domestic shipments were not published, and staff estimated the 1985 value as $456.6 million.[106] Subject imports (from New Zealand) amounted to 26.3 million pounds and were valued at $26.8 million in 1985.[107] Nonsubject imports amounted to 5.6 million pounds and were valued at $5.0 million in 1985.[108]

A 1985 employment estimate for the lamb-related portions of the meat- packing industry is needed for the CPE model. Staff approximated a lamb meat industry employment estimate, because such an estimate is not specifically published for the lamb segment of the entire industry. The American Meat Institute[109] estimates 1985 employment in the meat-packing industry at 141,700. The USDA[110]

[103] Whipple and Menkhaus, "Welfare Implications."

[104] USITC publication 2345, Dec. 1990, p. 3.1.

[105] Ibid., pp. 5.8-5.10.

[106] USITC staff assumed the 1985 figure equal to the 1986 figure since the average carcass price and quantity shipments were virtually unchanged over the 1985-86 period.

[107] Ibid., pp. 7.2-7.3.

[108] Ibid., pp. 7.2-7.3.

[109] American Meat Institute, *Meat Facts, 1987 Edition* (Washington DC), p. 37.

[110] U.S Department of Agriculture, Economic Research Service. *Livestock and Meat Statistics, 1970-92*, Statistical Bulletin 874, Jan. 1994.

estimates that lamb and mutton constituted about 0.9 percent of the meat-packing industry's quantity of output in 1985. Staff estimated that 0.9 percent of 141,700 employees, or about 1,300 individuals, were employed in the lamb-related portions of the industry in 1985.

Effects of Subject 1995 Subsidized Imports (from New Zealand) Relative to Fair-Trade Conditions

The CPE model was simulated under conditions where subject imports benefited from bounties or grants (hereafter the subsidy run or simulation) and model results are reported in table 8-9. Compared with levels that would have occurred had subject imports not been subsidized (i.e., under fair-trade conditions), domestic prices were lower by 0.2 percent; domestic output was lower by 0.4 percent; domestic revenue was lower by 0.6 percent; and domestic industry employment was lower by 0.4 percent.

The CPE results suggest that the subject subsidized imports influenced the U.S. import market. Compared with levels generated under fair-trade conditions, subject import prices were 9 percent lower; subject import volumes were 25.5 percent higher; and subject import revenue was 14.1 percent higher. Compared with levels generated without subsidized imports, nonsubject import price was lower by 0.2 percent; nonsubject import quantities were lower by 0.6 percent; and nonsubject import revenue was down by 0.7 percent.

The subject subsidized imports, according to the CPE model, had mild effects on the national economy. Under conditions with subsidized imports, welfare levels were $2 million higher than levels under fair-trade conditions, because consumer benefits from the subsidized imports amounted to $3 million, while producer burdens from the subsidized imports amounted to $1 million.

Table 8-9
Lamb meat: Results of computable partial equilibrium analysis (estimated effect on U.S. market of unfair trade practices and remedies), base year 1985[1]

Item	Unfair trade practice	Unfair trade practice and remedy	Remedy relative to actual market values in 1984/85
	(Change from fair value)[2]		*(Change from actual value)[3]*
Impact on industry *(percent)*:			
Domestic price	-0.2	0.0	0.2
Domestic output	-0.4	.0	0.4
Domestic revenue	-0.6	.0	0.7
Domestic employment	-0.4	.0	0.4
Impact on imports *(percent)*			
Subject import price	-9.0	.0	9.9
Subject import quantity	25.5	.0	-20.3
Subject import revenue	14.1	.0	-12.4
Nonsubject import price	-0.2	.0	0.2
Nonsubject import quantity	-0.6	.0	0.6
Nonsubject import revenue	-0.7	.0	0.7
Welfare effects *(1,000 dollars)*:			
Gain to consumers	3,000	0	-3,000
Benefit to producers	-1,000	0	1,000
Net welfare effects	2,000	0	-2,000

[1] The estimated effects reported are the results of the Commission's CPE model using the midpoint values of parameter ranges listed in table 8-8. This model accounts only for the short-term effect of unfair practices and remedies of cases with affirmative determinations in the base year, as discussed in the text.

[2] The "fair values" are the values estimated by the model to have been in place without the effect of the unfair trade practice.

[3] The "actual values" are the market values during the base year (1985).

Source: Estimated by the staff of the U.S. International Trade Commission.

Effects of the Remedy Placed on Subject Subsidized Imports Relative to Fair Trade Conditions

As discussed in chapter 5, for a countervailing duty case such as the lamb case, the effects of subsidized imports and the CVD remedy are expected to offset market imbalances from conditions characterizing fair-trade conditions. Relative to fair trade conditions, the CPE simulation with subsidized imports, and the CVD placed on such subject imports, resulted in domestic lamb price, production, revenue, employment, and welfare levels that characterized fair-trade conditions. Subject and nonsubject import prices, quantity, and revenue levels were also brought back to fair-trade levels.

Effects of the Remedy Placed on Subject Subsidized Imports Relative to Prevailing Base Year Conditions

The CPE model was simulated under combined conditions of (1) the existence of subject subsidized imports and (2) a remedy (countervailing duty) imposed on the subject subsidized imports (hereafter, the remedy run or simulation). Table 8-9 (column 3) provides the CPE model's results for the remedy simulation against conditions that actually prevailed during 1985 when the CVD was imposed.

According to the CPE model, the remedy applied to the subject subsidized imports was effective to varying degrees in bringing price, quantity, and value levels more in line with levels that would have occurred under base year conditions. Compared to base year levels, the remedy resulted in domestic price that was 0.2 percent higher, domestic output that was 0.4 percent higher, domestic revenue levels that were 0.7 percent higher, and a domestic industry employment level that was 0.4 percent higher.

The CPE model suggests that the remedy was generally successful in eliminating the subject import and export price imbalances that characterized conditions prevailing during 1985. Compared with actual 1985 base year conditions, the remedy increased subject import prices to levels that were 9.9 percent higher, decreased subject import quantities to levels that were 20.3 percent lower, and decreased subject import revenues to levels that were 12.4 percent lower. The remedy also increased nonsubject import price to levels 0.2 percent above, increased nonsubject import quantities to levels 0.6 percent above, and raised nonsubject import revenues to levels 0.7 percent above base year levels. These CPE results concerning subject and nonsubject import quantities are supported by the trend analysis of the data and the econometrics. Import trends in figure 8-3 suggest that during much of the CVD period, subject New Zealand imports fell while nonsubject Australian imports into the United States increased. In table 8-7, the remedy variable coefficient estimates suggest that during the CVD period, U.S. imports of Australian lamb were higher, and U.S. imports of New Zealand lamb were lower, than during other subperiods of the January 1981-May 1994 sample period.

The remedy resulted in welfare levels that fell to levels $2 million below base year levels. Under the remedy, consumers lost $3 million in benefits, while producers gained $1 million in benefits.

CHAPTER 9
Erasable Programmable Read Only Memories

History of Title VII Investigation

On September 30, 1985, a petition[1] was filed with the Commission and Commerce alleging that an industry in the United States was materially injured and was threatened with material injury by reason of LTFV imports of EPROMs[2] from Japan provided for in *HTS* subheadings 8542.11.80.58 to 8542.11.80.60.[3]

Following a preliminary determination by Commerce that imports of EPROMs from Japan were being sold in the United States at LTFV,[4] the Commission instituted AD investigation No. 731-TA-288 (Final).[5] On July 30, 1986, Commerce entered into an agreement with Japanese EPROM producers/exporters that suspended the AD investigation pursuant to section 734 of the Act.[6] This agreement was reached as part of the Semiconductor Arrangement (the Arrangement), which was a broader agreement entered into a month later by the Governments of the United States and Japan. The investigation was suspended because the Japanese firms accounting for substantially all of the known subject imports from Japan agreed to revise their prices to eliminate sales in the United States at LTFV.

EPROM Industry	
Petition year (1985):	
Shipments, (*million dollars*)	274
Import market share by quantity (*percent*)	22
AD history:	
AD investigations (*number*)	1
Petition year	1985
AD order year	1986

Despite the suspension agreement, U.S. producers filed a request on August 26, 1986, as provided for in section 734(g)(2) of the Act, to continue the investigation. On October 30, 1986, Commerce published notice of its final determination[7] that EPROMs were being sold in the United States at LTFV.[8] Commerce's final investigation covered the period April 1, 1985-September 30, 1985. Fair value comparisons were made for four Japanese firms that together accounted for more than 90 percent of exports of EPROMs to the United States during that period. Commerce determined that the final weighted-average LTFV margins were as follows (*percent*):

Firm	LTFV margin
Hitach	85.2
Fujitsu	103.0
Toshiba	60.1
NEC	188.0
All other	93.9

[1] The petition was filed by Intel Corp. (Intel), Santa Clara, CA; Advanced Micro Devices, Inc. (AMD), Sunnyvale, CA; and National Semiconductor Corp. (National), Santa Clara, CA, on behalf of all U.S. producers.

[2] An EPROM is a type of semiconductor integrated circuit (IC). For additional information on EPROMs see subject product section.

[3] In response to the filing of the petition, the Commission instituted its preliminary investigation (50 F.R. 41230, Oct. 9, 1985) and Commerce initiated its preliminary investigation (50 F.R. 43603, Oct. 28, 1985).

[4] 51 F.R. 9087, Mar. 17, 1986.

[5] 51 F.R. 11358, Apr. 2, 1986.

[6] 51 F.R. 28253, Aug. 6, 1986. Accordingly, effective Aug. 6, 1986, the Commission gave notice of the suspension of its antidumping investigation involving EPROMs from Japan (51 F.R. 29708, Aug. 20, 1986).

[7] 51 F.R. 39680, Oct. 30, 1986.

[8] Publication of Commerce's affirmative final determination, notice of the continuation of the Commission final investigation and a hearing to be held in connection therewith was given by posting copies of the notice in the Office of the Secretary to the

The Commission determined that the U.S. industry was materially injured, and its final determination was transmitted to Commerce on December 15, 1986.[9] As a result of negotiations and subsequent to the final determinations by the Commission and Commerce, the suspension agreement was to remain in force until August 1991; no AD duty order was issued, on the condition that the terms of the agreement were met. No AD duties were imposed on EPROMs. Effective August 1, 1991, Commerce revised the agreement suspending the AD investigation,[10] and if there is no evidence of dumping, Commerce expects to terminate the suspended investigation and agreement by August 1996.

In September 1986, the Governments of Japan and the United States entered into the Arrangement.[11] In the Arrangement, the Government of Japan agreed to monitor the costs and prices of Japanese semiconductor exports to the United States and third countries. The monitoring was designed to prevent these exports from being sold at LTFV. In addition, the Government of Japan agreed in the Arrangement to improve foreign access to the Japanese semiconductor market. Also, in a side letter, the Government of Japan recognized "the U.S. semiconductor industry's expectation that semiconductor sales in Japan of foreign-affiliated companies (would) grow to at least slightly above 20 percent" by the time the Arrangement was scheduled to expire in September 1991.[12]

Besides the AD investigation on EPROMs, two other related AD investigations involving ICs were initiated in the United States in 1985. In June 1985, Micron Technology Inc., of Boise, ID, filed a petition concerning 64K dynamic random access memories (DRAMs) from Japan, and, in December 1985, Commerce, on its own motion, initiated an investigation on 256K and above DRAMs from Japan.[13] An additional investigation was instituted by USTR in June 1985 under section 301 of the Trade Act of 1974 at the request of the Semiconductor Industry Association (SIA). In its petition, the SIA requested that the U.S. Government adopt policy objectives that would lead to a dramatic increase in U.S. sales of semiconductors to Japan and to a reduction in the potential dumping of semiconductors in the U.S. market.

Scope of Investigation

Subject Product

An EPROM is a type of semiconductor IC designed to store information. It belongs to a class of memory ICs known as nonvolatile memories[14] that retain information indefinitely, even after their electrical power is removed. The first EPROM was introduced in 1970. It had a density of 2,048 bits (2K), enough to store the contents of about one half of a double-spaced typed page. About every 18 months since EPROMs were invented, technological advances have roughly doubled the number of bits that an EPROM can store. By 1994, the density of commercially available EPROMs was over 16,000,000 bits, or enough memory to store the contents of about 4,000 pages. As EPROM densities rise, access times fall because the distance electronic signals need to travel falls.

8—*Continued*
Commission and by publishing the notice in the *Federal Register* (51 F.R. 41028, Nov. 12, 1986).

9 51 F.R. 46943, Dec. 29, 1986.

10 56 F.R. 37523, Aug. 7, 1991. Corrected, 56 F.R. 43648, Sept. 3, 1991.

11 Arrangement between the Government of Japan and the Government of the United States of America Concerning Trade in Semiconductor Products, Office of the United States Trade Representative, Washington, DC, Sept. 1986.

12 "Text of Secret Semiconductor Letter," *Inside U.S. Trade*, vol. 6, No. 46 (Nov. 18, 1988).

13 Like the EPROM, the DRAM is a memory IC and was invented by Intel Corp. in the early 1970s. It is the most pervasive type of memory IC and during the 1980s accounted for over 50 percent of memory IC consumption; EPROMs accounted for less than 20 percent. Both are commodity products whose manufacture was abandoned by many U.S. producers during the early-1980s, including major EPROM producers. By 1986, there were only two significant U.S. DRAM producers, and the market for these products was dominated by five Japanese producers. It is argued by some that Japanese producers gained leadership in the production of DRAMs through predatory business practices, such as dumping in the U.S. and third-country markets, and by virtue of having the Japanese market protected from imports. Others argue that DRAMs had become uninteresting to U.S. producers because they had become a commodity product with low-profit margins.

14 Nonvolatile memories contrast with DRAMs and other volatile memories that are more suitable for applications in which information changes quickly. Information in volatile memories can be erased and replaced relatively quickly and inexpensively but is lost when the power is turned off.

Like Product

Commerce's 1986 investigation on EPROMs included products of all different densities.[15] On May 30, 1991, petitioners Intel, AMD, and National requested a product scope clarification to include flash memory devices based on EPROM semiconductor technology. In its final scope ruling effective April 6, 1992, Commerce ruled that certain flash memory devices based on EPROM semiconductor technology are later-developed products, and, hence, within the scope of the suspended investigation and suspension agreement on EPROMs from Japan.[16]

Flash memories, which appeared on the market in the late 1980s, are displacing other EPROMs as they are generally less costly to produce, and they can be reprogrammed more quickly. In 1993, flash memories accounted for about one-third of the EPROM market and were expected to account for 85 percent of this market by 1998.[17]

Substitute Products

Besides EPROMs, there are two principal types of nonvolatile memory ICs: read only memories (ROMs) and electronically erasable programmable read-only memories (EEPROMs). These differ from EPROMs primarily in their cost, ability to be reprogrammed, and speed.

EPROMs produced by different manufacturers are generally interchangeable. Nonetheless, EPROMs of different memory capacities and speeds are not physically interchangeable. Electronic systems incorporating EPROMs need to be redesigned to take advantage of the higher capabilities of improved EPROMs.

In the short to mid term (i.e., up to 2 years), substitution among different types of nonvolatile memory ICs has generally been low. In the long term, there is some substitution among these products, particularly as the price of those devices with more desirable features has fallen. During the first part of the 1980s, as EPROM prices fell in relation to prices for ROMs, ROM users increasingly switched to EPROMs and EEPROMs (figure 9-1).

[15] 57 F.R. 11599, Apr. 6, 1992.

[16] Commerce also included "one-time" programmable EPROMs in the scope of the investigation. These products do not have the window for reprogramming and are encased in plastic, rather than ceramic.

[17] Integrated Circuit Engineering Corp. (ICE), *Status 1994*, ICE Scottsdale, AZ, 1994, p. 6-47.

Description of Upstream Industries

The primary suppliers to the EPROM industry are producers of semiconductor manufacturing equipment and materials. The equipment and materials used to manufacture EPROMs are the same as those used in manufacturing other types of ICs. Fabrication requires many compounds and elements. By far the most significant of these inputs is the silicon used as the substrate or base on which the EPROM is built. EPROM manufacturers usually purchase their silicon as wafers from chemical producers.

Description of Downstream Industries

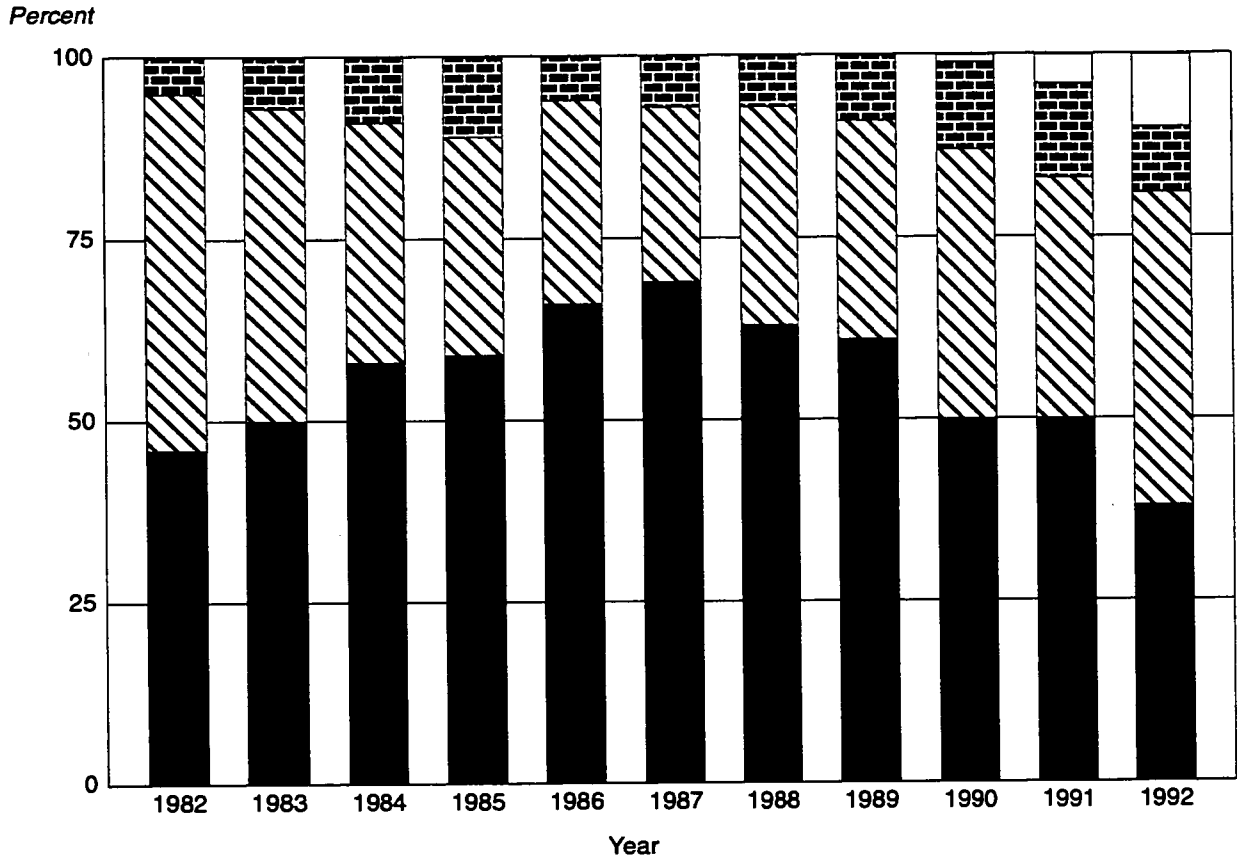
The downstream industries that consume EPROMs are those producing electronic products, principally computers, consumer electronic goods, telecommunications apparatus, and industrial machinery. Figure 9-2 shows EPROM consumption by downstream industry for 1986. This distribution did not change noticeably during 1986-89. All computers, computer peripherals, and digital telecommunications equipment use EPROMs primarily to store the programs needed to start this equipment. The close relationship between shipments of EPROMs and computers is shown in figure 9-3.[18]

Approach of Investigation

The case study focuses on the period 1983-89 to include the 3 years prior to the 1986 investigation on EPROMs and the 3 years after the investigation. The case study also makes references to periods prior to and after 1983-89 to explain trends that are more apparent through long-term analyses. Pricing trends are analyzed using data for 1983-93.

[18] The two kinks in the curve, 1984-85 and 1991-92, illustrate two features of EPROMs. First, because EPROM production has high fixed costs, EPROM makers would maintain current levels of production to keep costs as low as possible even though demand may be slumping. This is what happened in 1984-85. As the demand for computers slowed and computer shipments actually fell, EPROM production continued to increase. Second, EPROMs are a maturing product. The drop in EPROM production in 1991-92 is attributable, at least in part, to the introduction of flash EPROMs in 1989. Flash EPROMs could perform the same functions as a regular EPROMs but had the advantage of being reprogrammable without having to be removed from the device in which they were installed.

Figure 9-1
EPROMs: Nonvolatile MOS[1] memory product market shares, by types, 1982-92

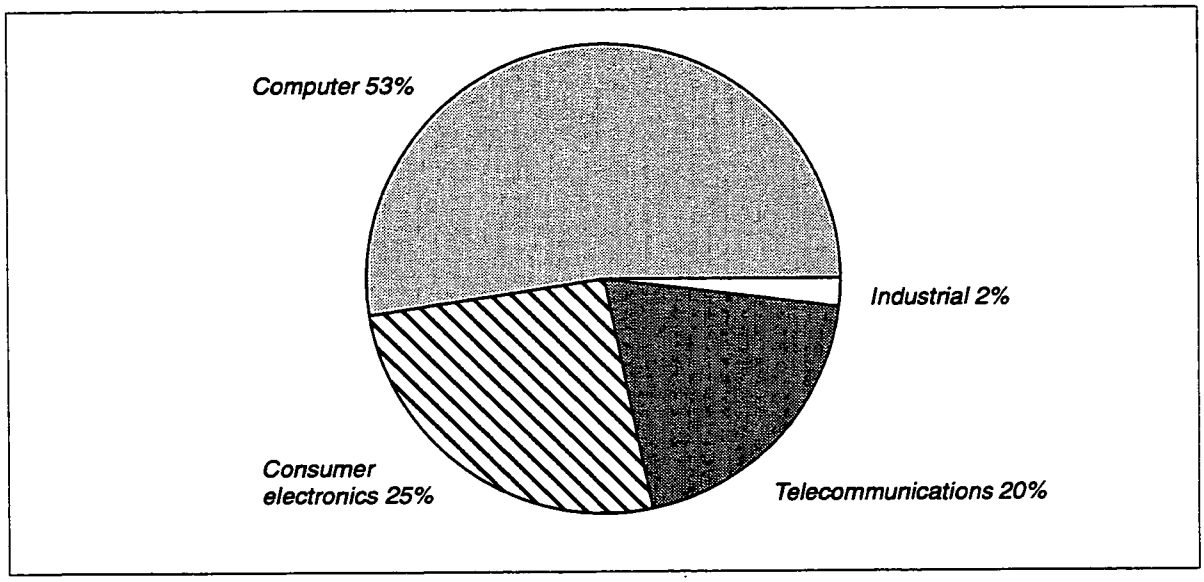


	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
EPROM	46%	50%	58%	59%	66%	69%	63%	61%	50%	50%	38%
ROM	49%	43%	33%	30%	28%	24%	30%	30%	37%	33%	43%
EEPROM	5%	7%	9%	11%	6%	7%	7%	9%	12%	13%	9%
FLASH	0%	0%	0%	0%	0%	0%	0%	0%	1%	4%	10%

[1] MOS, or metal oxide semiconductor, is a manufacturing process used in producing almost all memory ICs.

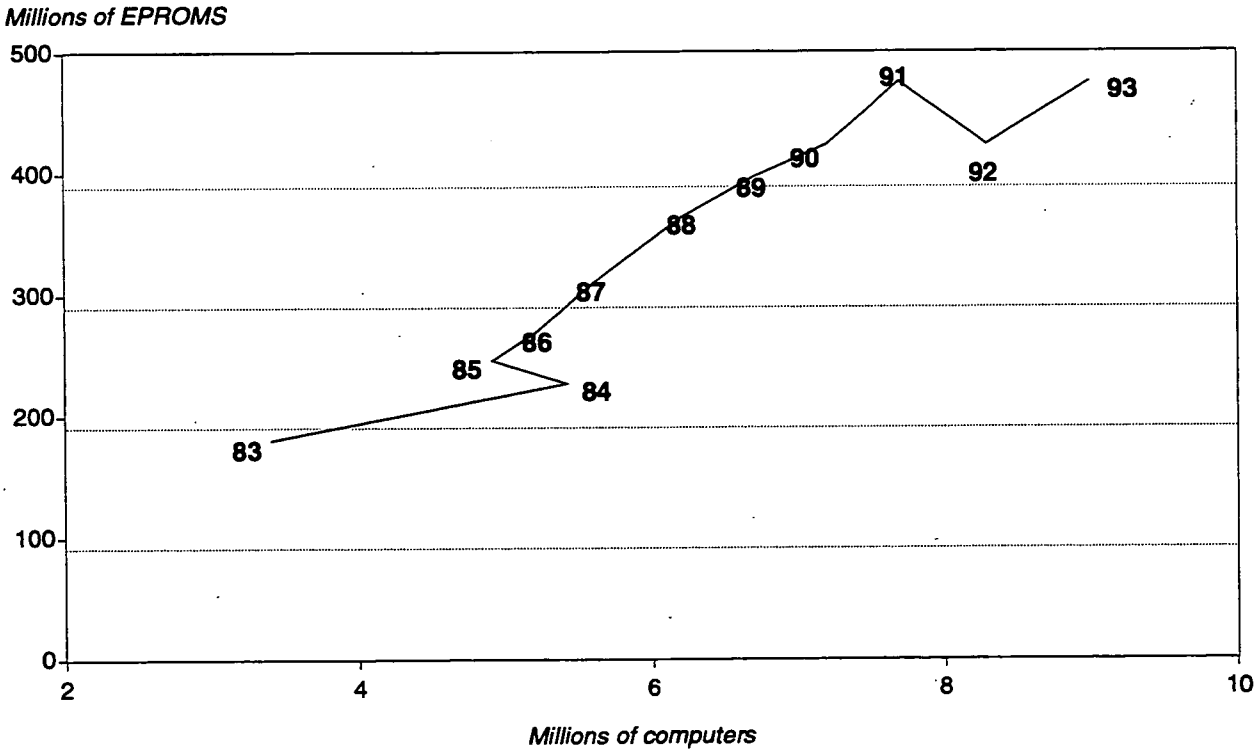
Source: Integrated Circuits Engineering Corp.

Figure 9-2
EPROMs: Principal U.S. markets, by end-user sectors, 1986



Source: Estimated by the staff of the U.S. International Trade Commission.

Figure 9-3
EPROMs: EPROM and computer shipments, 1983-93



Source: Dataquest and Computer and Business Equipment Manufacturers Association.

Methodology

The unavailability of the necessary data precluded the application of the time series methodology described in chapter 5 to estimate the economic effects of the unfair trade practice and remedy on the EPROM industry. The required data include information on the costs of the specific inputs used in producing EPROMs, information on the level of activity of the specific downstream users of EPROMs, and information on the prices of both domestic and imported EPROMs. For example, data needed to estimate the supply equation described in chapter 5 include such elements as the cost of the silicon wafers purchased by domestic EPROM producers, labor rates for workers making EPROMs, and U.S. domestic shipments and prices of EPROMs. These data need to be available on a quarterly basis for at least 6 years to provide a sufficient number of observations to conduct a statistical analysis. To estimate import and domestic demand equations, in addition to the data on U.S. domestic shipments and prices, data are needed on the prices and quantities of imported EPROMs and on the level of economic activity in the downstream industries, such as the computer and telecommunications industries. Such data were either not available or not available at a sufficient level of disaggregation for a long enough period of time to allow use of the methodology described in chapter 5. Therefore, the supply-demand model could not be constructed to estimate the effects of the title VII case on EPROMs.

An analysis of EPROM pricing is used to examine the impact of the AD investigation in place of the supply-demand model described in chapter 5. The price analysis starts with a hedonic[19] price index to track EPROM prices during 1983-93. Hedonic price indexes control for the introduction of new products, features, and technologies. In the economic effects section below, the hedonic price index is subsequently modified to include other factors that are important to the analysis of EPROM prices, such as the learning curve[20] for EPROMs, concentration in the EPROM industry, the business cycle in the semiconductor industry, and a measure of demand by downstream industries. In addition to the hedonic price analysis, a trend analysis of such factors as shipments, imports, and consumption before, during, and after the AD investigation was conducted.

The 1983-93 time period is divided into 3 parts—prefiling, postfiling, and postfinal determination—to determine through analysis if there are differences in price changes over the investigation process. Binary variables are used in the analysis to examine differences in pricing during the three periods related to the title VII process.

A CPE analysis provides an estimate of the impact that the unfair trade practice had on the EPROM industry for 1985. The CPE analysis uses the dumping margins to measure the differences between the price of the subject imports and a "fair value" price. The CPE analysis also provides estimates of the impact the unfair trade practice had on the upstream and downstream industries. The CPE model does not provide an analysis of the remedy, the Semiconductor Arrangement. The remedy provided by the Semiconductor Arrangement was that the Government of Japan agreed to monitor the prices and costs of Japanese semiconductors, and no AD duties would be imposed on those memory devices which had been the subject of AD investigations, including EPROMs. The nonimposition of AD duties precluded the quantitative

[19] *Technical note.*—A hedonic index is based on the characteristics of a product. For example, in developing the quality-adjusted price index for computer equipment, the Department of Commerce used characteristics such as capacity and data transfer speed in its hedonic price index for disk drives and processing speed and memory capacity for its hedonic price index for computer processors. See Rosanne Cole, et. al., "Quality-adjusted Price Indexes for Computer Processors and Selected Peripheral Equipment," *Survey of Current Business*, Jan. 1986, pp 41-50. In the case of EPROMs, the characteristic used for the hedonic price index is density.

[20] *Technical note.*—The theory of the learning curve is that the cost of producing a commodity falls as more are made, and as costs decline, prices decline as well. The learning curve is an important element in semiconductor production, and its importance is discussed further in the OTHER COMPETITIVE FACTORS section below. Briefly, a learning curve relates how costs fall as cumulative output increases through a functional form such as Costs = (Cumulative output)^b where b is the learning elasticity. The learning elasticity is related to the slope of the learning curve by the formula Slope = 2^bx100. A learning curve with a 75-percent slope indicates that costs fall by 25 percent as cumulative output doubles. Three studies that examine the learning curve for semiconductors are Harald Gruber, *Learning and Strategic Product Innovation: Theory and Evidence for the Semiconductor Industry*, (Amsterdam: North-Holland, 1994); Douglas A. Irwin, and Peter J. Klenow, "Learning-By-Doing Spillovers in the Semiconductor Industry," manuscript, University of Chicago, Graduate School of Business, 1994; and Naran D. Udayagiri and Srinivasan Balakrishnan, "Learning Curves and Knowledge Spillovers: The Case of Semiconductor Memories," Reginald H. Jones Center for Management Policy, Strategy, and Organization Working Paper 93-07, University of Pennsylvania, The Wharton School, 1993.

estimation of the impact of the remedy in this case study.

Staff mailed questionnaires to U.S. EPROM producers, importers, and purchasers requesting data on the quantity and value of shipments, imports, and purchases. U.S. producers were also asked for financial and employment data for the period. Staff received questionnaire responses from seven U.S. EPROM producers that together accounted for more than 95 percent of U.S. production during 1983-89 and from eight importers of EPROMs that accounted for about 90 percent of U.S. imports during the period. The U.S. producers and importers, along with 20 purchasers, also provided qualitative information concerning the market for EPROMs and the effects of the AD investigation and the Semiconductor Arrangement on the market.

Industry Profile and Structure

Brief Evolution of the World Industry

Table 9-1 presents a time line summarizing the major events that shaped the world industry during its first two decades.

Five U.S. producers together accounted for more than 95 percent of U.S. EPROM production during the 1980s. These producers are highly globalized and among the world's largest IC manufacturers. EPROM production accounts for only a small fraction of the total IC output of these firms. In the late 1970s and early 1980s, U.S. producers lost significant share of the global EPROM market to Japanese producers that had invested significantly in the production of DRAMs, EPROMs, and other commodity semiconductors.

During 1983-89, technology became more widespread and less crucial to maintaining industry leadership. The capital costs required to remain in the industry soared, however. The import share of the U.S. market rose from 29 percent to almost one-half. By the end of the decade, most imports were produced for U.S. firms which had outsourced low-value items to third country producers.

During 1983-93, world shipments both in terms of units and value roughly doubled. The number of units shipped grew at an average annual rate of 12 percent, and the value of shipments, at an average annual rate of 11 percent. The world industry's growth was particularly impressive in terms of bits shipped. Output of bits rose from about 1.4 trillion bits per quarter to 115.6 trillion bits per quarter during 1983-93 (figures 9-4, 9-5, and 9-6).

U.S. Industry Size and Structure

The principal U.S. EPROM producers during the 1980s, and currently, are Intel, Texas Instruments (TI), AMD, and National. Except for TI, the principal U.S. EPROM manufacturers are not vertically or horizontally integrated, concentrating almost exclusively on the production of ICs. TI is also a major producer of scientific instruments, military electronic systems, and telecommunications equipment.

Several smaller U.S. specialty firms also participate in the industry to a limited degree. Among such firms, Seeq Technology, Inc. stands out as having become a notable player during the mid-1980s, but abandoned the market in 1987 to pursue advanced EEPROMs. Other small EPROM specialty firms are Microchip Technology Corp., Waferscale Corp., Cypress Semiconductor, and Atmel Corp. These firms offer leading-edge products in limited quantities. Some Japanese firms assembled EPROMs in the United States during 1983-89. However, no foreign firm conducted wafer fabrication in the United States during this period.

Industry Performance in U.S. and World Markets

Table 9-2 shows the EPROM industry's world market leaders and their respective global market shares for 1983, 1986, 1989, and 1992. Intel held about one-fifth of the global market in terms of unit production (about one-third in value terms) until the end of the decade, when it began reducing its participation in the nonflash EPROM market in favor of microprocessors, flash EPROMs, and other product lines with higher profit margins.

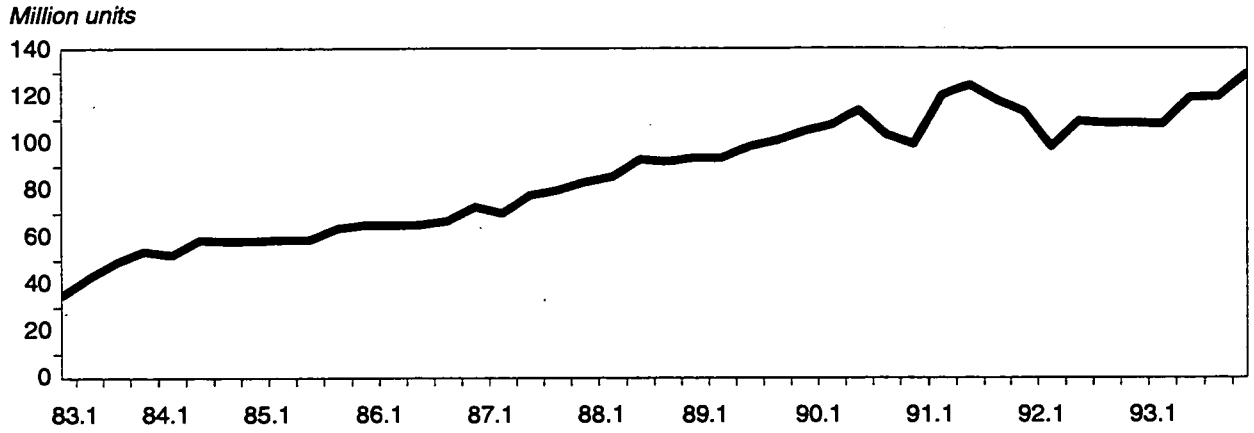
After Intel, the largest EPROM producers in the early 1980s were primarily Japanese firms, which greatly reduced their participation in the U.S. market starting in 1985 and in the world market starting in 1987. By 1989, Fujitsu Ltd., the largest Japanese EPROM producer, ranked no more than seventh among the world's leading EPROM producers. U.S. producers and the European SGS-Thomson accounted

Table 9-1
EPROMs: World industry time line, 1971-present

Year	Event
1971	Intel invented the EPROM, microprocessor, and DRAM.
1977	5-volt power supply (vcc) EPROM technology became available, greatly diminishing the complexity of using EPROMs.
1980	World EPROM sales reached $500 million.
1983	Plastic packaging of EPROMs became readily available, significantly reducing EPROM costs.
1984	World EPROM sales reached over $1 billion, surpassing the market for ROMs, up to then the market's principal nonvolatile memory. For the first time, Japanese EPROM output surpassed U.S. output.
1985	The world's IC market entered its greatest downturn in a decade, causing a 13-percent fall in IC unit sales and a 5-percent fall in IC average selling prices. EPROM unit sales continued to grow modestly, but dollar sales fell by 34 percent as prices plummeted by more than 50 percent.
1985	On Sept. 30, Intel, AMD, and National petitioned, on behalf of U.S. EPROM producers, an AD investigation concerning EPROMs from Japan.
1986	On July 30, Commerce suspended the EPROM investigation and two related investigations as part of the Semiconductor Arrangement entered between the U.S. and Japanese Governments.
	On Aug. 26, petitioners of the EPROM investigation requested the finalization of the EPROM investigation. On Oct. 30, Commerce published a final affirmative determination of sales at LTFV. In December, the Commission determined that the EPROM industry was materially injured by reason of LTFV EPROM imports from Japan.
	U.S. firms began to regain world EPROM market share after 2 years of losses.
1987	The President of the United States imposed sanctions on certain U.S. imports from Japan in retaliation for alleged continued dumping of semiconductors in third markets and lack of progress in increasing foreign participation in the Japanese semiconductor market. By the end of the year, a partial lifting of these sanctions took place when dumping was reported to have ceased.
	U.S. EPROM output surpassed that of Japan.
1987	Seeq invented flash memory, which by the end of the decade began to displace other EPROMs from the market.
1988	The value of world EPROM shipments reached a historical high of $1.9 billion.
1989	Intel, the industry's dominant firm, announced that it was reducing its participation in the nonflash segment of the EPROM market to concentrate on market's quickly growing flash memory segment.
1994	Sales of flash memories surpassed $1 billion, accounting for about one-half the world's EPROM market.

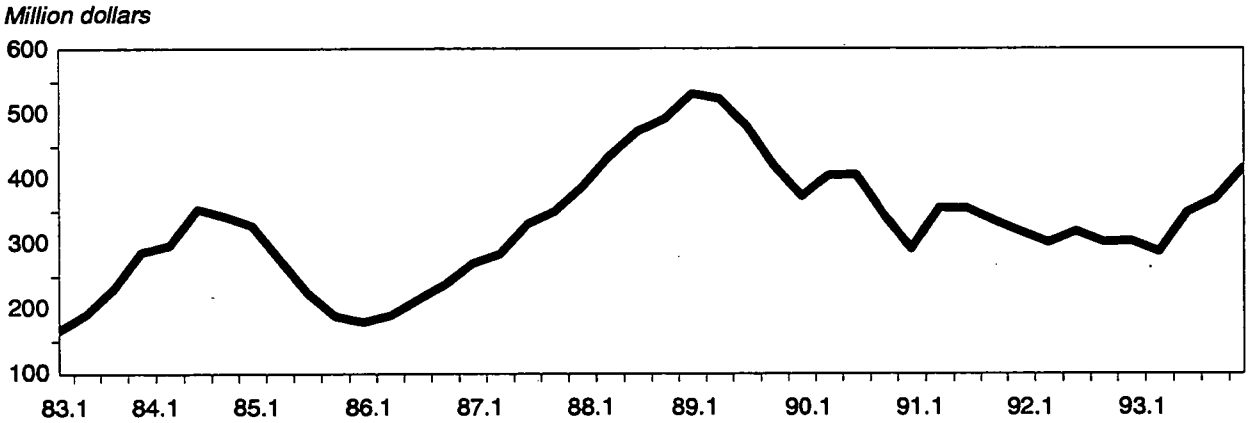
Source: Compiled by the staff of the U.S. International Trade Commission from interviews.

Figure 9-4
EPROMs: Quantity of world shipments, by quarters, 1983-93



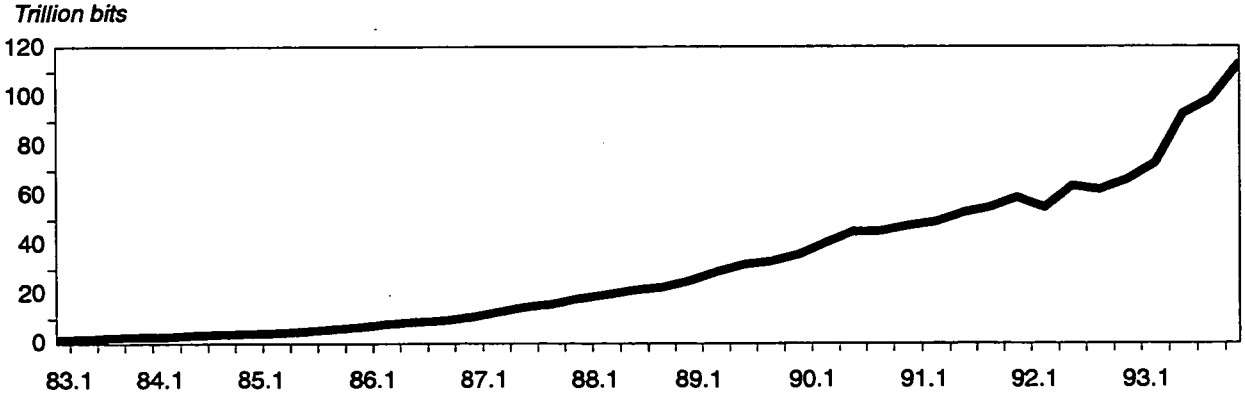
Source: Dataquest.

Figure 9-5
EPROMs: Value of world shipments, by quarters, 1983-93



Source: Dataquest.

Figure 9-6
EPROMs: Quantity (in bits) of world shipments, by quarters, 1983-93



Source: Dataquest.

Table 9-2
EPROMs: World-leading EPROM producers, and shares of unit production, 1983, 1986, 1989, and 1992[1]

(Percent)

Company	Headquarters	1983	1986	1989	1992
Intel	United States	17	20	19	13
Hitachi	Japan	15	15	3	2
TI	United States	14	6	13	14
NEC	Japan	11	9	3	2
Fujitsu	Japan	10	9	9	3
Mitsubishi	Japan	10	15	6	4
National	United States	8	3	9	10
AMD	United States	8	7	10	17
SGS-Thomson	Europe	3	6	11	18
Toshiba	Japan	2	6	5	2
All other		3	4	14	17
Total		100	100	100	100

[1] Excludes flash EPROMs.

Note.—Because of rounding, figures may not add to the totals shown.

Source: Dataquest.

for the remaining top industry positions.[21] Japanese firms continued to lose world EPROM market share thereafter, with no Japanese firm accounting for more than 4 percent of the global market by 1993.

The principal Japanese EPROM producers during the 1980s were Hitachi, NEC, Fujitsu, Mitsubishi, and Toshiba, which together accounted for more than 90 percent of Japan's EPROM production. These firms are highly integrated and account for most of Japan's production of electronic equipment and machinery. Smaller Japanese producers include the U.S.-based TI.

Other Competitive Factors

Life Cycle for Each EPROM Generation

Market shares, concentration ratios, trade patterns, and other industry characteristics and trends vary significantly over the life cycle of demand for each EPROM generation; this is also the case with DRAMs and other ICs. This life cycle reflects the fact that as higher density EPROMs become less costly to produce, they become more attractive substitutes for lower density devices. Higher density EPROMs replace the previous generation in the marketplace as the newer EPROMs become less expensive on a per bit basis. This process repeats itself about every 2 years as a new generation of EPROMs appears on the market. Figure 9-7 illustrates the succession of EPROM generations.

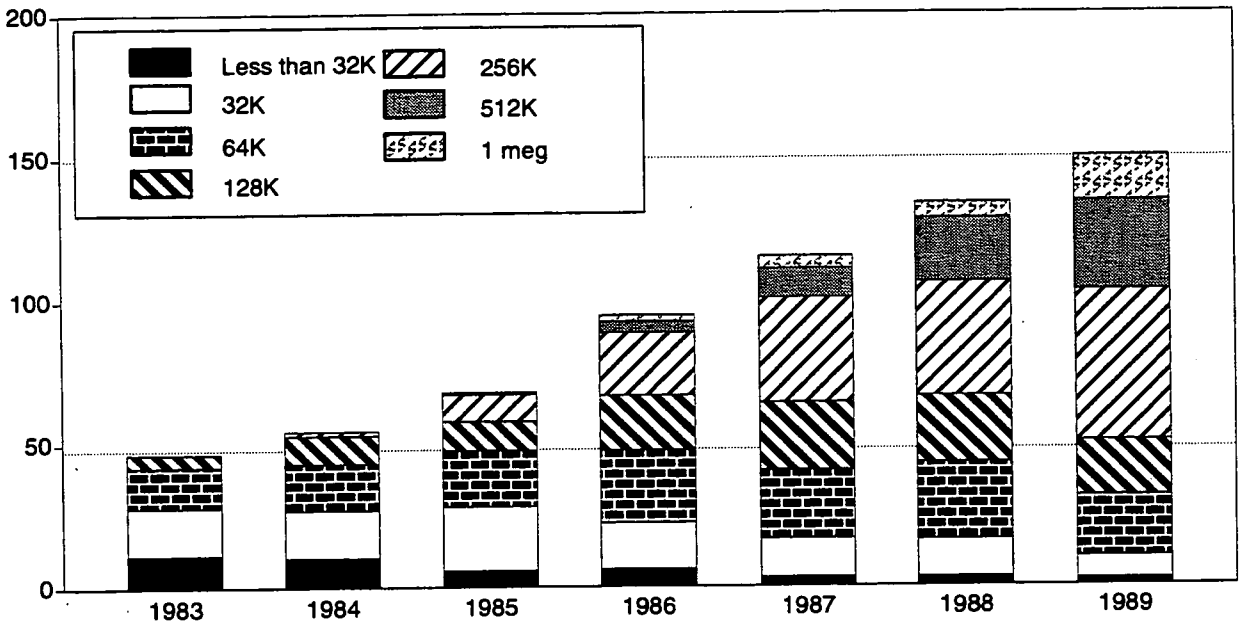
Five periods characterize the life cycle of a generation of EPROMs: (1) introduction, (2) growth, (3) maturity, (4) saturation, and (5) decline or obsolescence. In the introduction period, market leaders face limited competition and enjoy high profit margins. This is a short-lived period, because other firms quickly enter the market and prices decline rapidly. Price competition decreases in the maturity, saturation, and decline periods. About 90 percent of the industry's revenues for a given generation are obtained during the growth, maturity, and saturation periods, which correspond roughly to the second to fifth year of the product's life.

Until the introduction of the 1-megabit (Meg) EPROM in 1986, U.S. firms had been historical leaders in the introduction of new EPROM generations. This leadership guaranteed U.S. firms the predominant share of the world market during the introduction and growth periods of each EPROM generation. After 1982, this leadership became less important to maintaining market share, because most major producers were introducing their own version of the latest generation device within months of each other. Throughout the 1980s, the U.S. industry also showed some gains in world market share following the saturation period of each EPROM generation (figure 9-8).

[21] For the purposes of these data, U.S. producers are defined by their country of affiliation. As a result, the data do not reflect that some of the EPROM production of firms headquartered in the United States takes place in Japan and other foreign locations.

Figure 9-7
EPROMs: U.S. EPROM shipments by densities, 1983-89

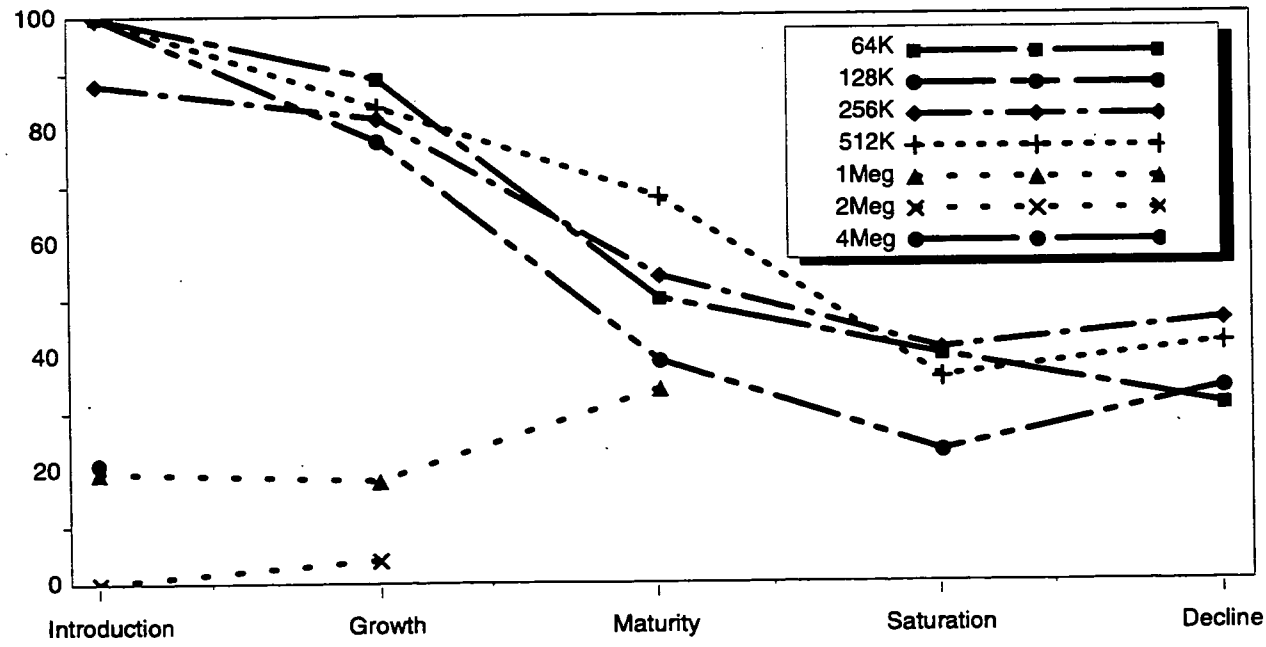
Thousands



Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Figure 9-8
EPROMs: U.S. firms' shares of world production, by product generation and by life cycle periods

Percent of world market



Source: Compiled by the staff of the U.S. International Trade Commission on the basis of Dataquest data.

During the first part of the 1980s, a number of factors determined the advantage U.S. firms had during the introduction and growth periods of each EPROM generation. Most notably, U.S. firms had technological capabilities and organizational flexibility superior to Japanese firms, whose primary strength was volume manufacturing. U.S. producers also had an advantage over foreign producers in leading-edge EPROMs, because these devices were used primarily in computers, the production of which was largely based in the United States during the 1980s. In contrast, Japanese and European producers focused more on consumer and industrial electronic products, which are less EPROM-intensive.[22]

Until 1987, Japanese firms were dominant market players only in the maturity and saturation periods of each EPROM generation. These firms had an advantage during these periods because technological advantages and learning economies are less significant competitive factors during these stages. Japanese firms' ability to produce high volumes at a low cost became increasingly important during the later periods of each EPROM generation. Japanese firms' manufacturing strength became a less important competitive advantage as demand fell in the decline period of each generation. Consequently, Japanese participation generally fell during that period. As technological leadership became less important during the late 1980s, Japanese firms increased their participation in the market in the introduction and growth periods.

Industry Concentration

Concentration in the EPROM industry is generally low, particularly in the United States. As figure 9-9 illustrates, the Herfindahl-Hirschman indexes[23] have quickly fallen after the introduction of each EPROM generation. The indexes generally remained between 0.1 and 0.2 during the period when the cumulative production of each EPROM generation ranged from 20,000 to 200,000 units. This period encompassed the growth, maturity, and saturation phases of each of these generations. The Herfindahl-Hirschman index is highest in the introduction segment of the life cycle, particularly when a single producer introduces a new generation of EPROM; prices are also highest in this stage. Prices fall in the growth, maturity, and saturation phases for two reasons: (1) more producers begin manufacturing the new generation, increasing the level of competition, which leads to a decrease in price, and (2) producers become more efficient as they make the new generation and are able to reduce costs, which translates into lower prices. In the decline phase of each generation, the Herfindahl-Hirschman index has risen as firms left the market in an effort to diversify their production in newer product generations.[24] As the Herfindahl-Hirschman index rises, prices have also risen.

Barriers to Entry

Cost barriers and learning or technological barriers have been the principal barriers to entry into the EPROM industry. During 1983-89, cost barriers to entry were high and increased notably, whereas technological barriers to entry became less notable.

The production of EPROMs requires large capital investments, which have grown as the devices have become more dense and complex. Producers typically manufacture several generations of EPROMs with the same equipment. However, the cost of a typical manufacturing plant rose from about $25 million in the late 1970s to about $200 million by the end of the 1980s.[25]

EPROM fabrication processes involve high-purity materials, minute circuit dimensions, and other exacting conditions that make measurement and control difficult. As a result, EPROM manufacturing is characterized by a steep learning curve and is subject to an initially high ratio of defective EPROM chips. The yield[26] of nondefective chips can be considerably increased through knowledge and control of the production process. This yield is also largely a function of experience, research, and development efforts. Yields of working chips typically range from 25 percent for new, complex devices to more than 90 percent for mature products. For ICs in general, constant dollar manufacturing costs per unit fall by 30 percent with each doubling of the cumulative unit volume produced.[27]

[22] Robert Ristelhueber, "Setting Sun: The Slide of Japanese Semiconductors," *Electronic Business Buyer*, Apr. 1994, pp. 53-54.

[23] A useful measure of industry concentration is the Herfindahl-Hirschman index. This index ranges from nearly 0 in a perfectly competitive market with a large number of producers to 1 in a monopolistic market.

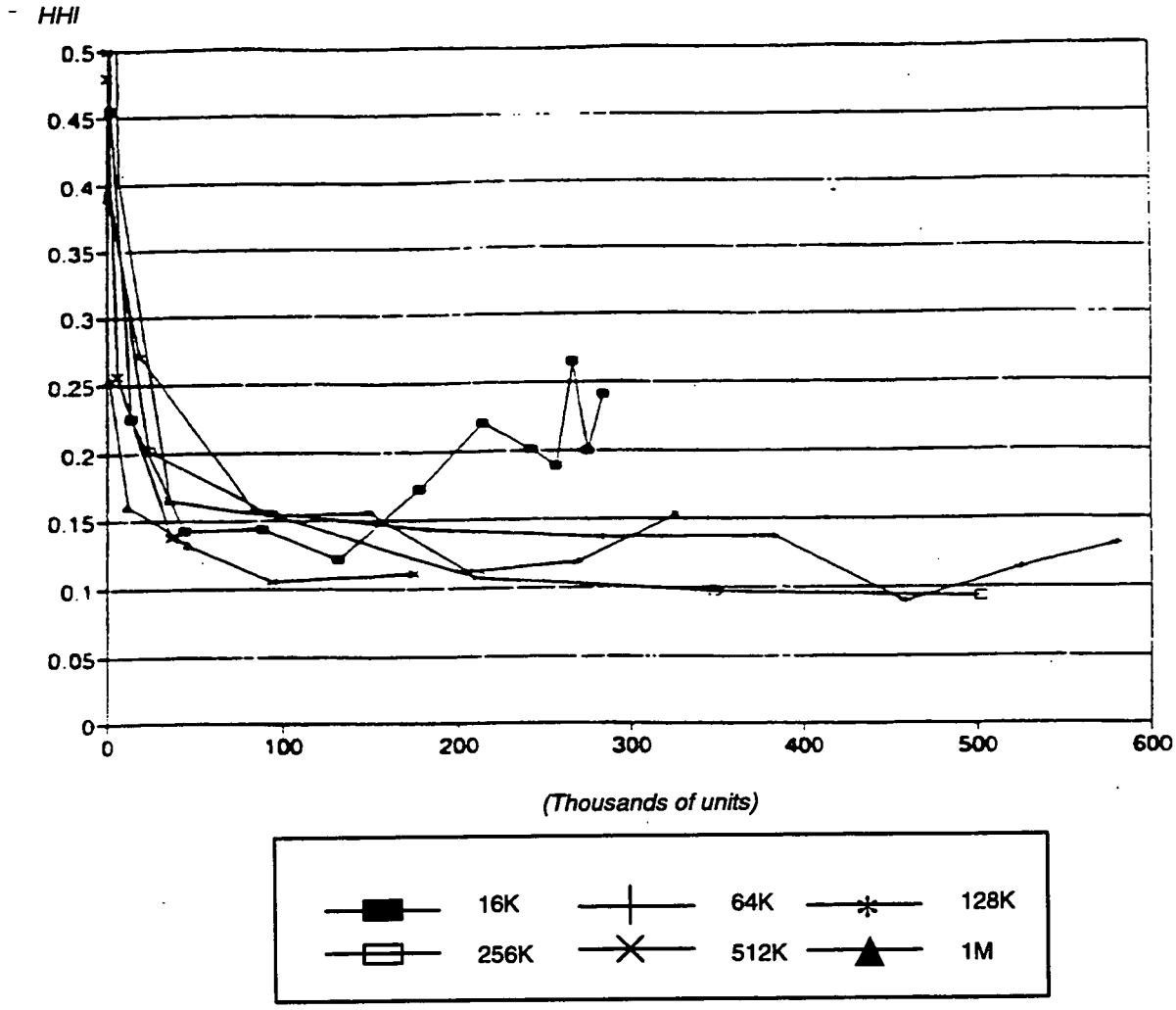
[24] Kenneth Flamm, Mismanaged Trade [preliminary draft], The Brookings Institution, Aug. 1993, ch. 4, pp. 16-17.

[25] Integrated Circuit Engineering Corp., *Status 1993*, ICE, 1993, p. 2-71.

[26] Yields represent the number of working chips produced on a wafer as a percent of the total number of chips fabricated on the wafer.

[27] Staff estimated that the cost per bit to manufacture EPROMs during 1983-89 fell by 27 percent with a doubling in the number of bits produced, based on data submitted in response to questionnaires.

Figure 9-9
EPROMs: Herfindahl-Hirschmann indexes for world industry



Source: Dataquest and the Brookings Institution.

The existence of these learning economies gives established EPROM firms a major advantage over potential entrants that must sustain considerable losses to gain the experience needed to bring down unit costs.[28] Early entry in the market allows pioneering firms to progress further down their learning curve before others begin competing. By underpricing the competition, the market leader can assure itself a large market share and enjoy more of the learning-by-doing economies and, therefore, hold a continuing cost advantage.[29] In addition, producers have an incentive to expand production, because the structure of EPROM manufacturing is one of high fixed costs and low variable costs. The learning curve is a particularly strong barrier to firms seeking leadership in the industry, as the cost reductions obtained from learning by doing diminish with time.

[28] Harald Gruber, *Learning and Strategic Product Innovation* (Amsterdam: North Holland, 1994), ch. 3.

[29] F. M. Scherer, *Industrial Market Structure and Economic Performance* (Boston: Houghton Mifflin, 1980), pp. 250-251.

The coexistence of several generations of EPROMs with different capabilities allows for a high degree of product differentiation in the EPROM market.[30] Each of these generations at different times draws on different competitive strengths. During the introduction and growth periods of a given generation, producers benefit more from their technological design abilities. In the later stages of the product's life, when price competition is more intense, the ability to keep production costs down becomes a more important competitive factor. This fragmentation compounds the depth and breadth of competitive strengths needed to enter the EPROM industry.

During the 1980s, the ability to innovate and move down the learning curve became a less important barrier to entry in the world EPROM industry. The know-how for manufacturing EPROMs became more widespread, and all major world firms were introducing their own version of the latest generation device within months of each other. However, as the density of EPROMs rose and the market expanded, the volume of capital needed to maintain a market presence increased significantly.

The changing business structure of the world EPROM industry during the 1980s followed a pattern typical of advanced technology industries whose products turn from noncommodities to commodities. Compared with commodity items, noncommodity products have high profit margins and smaller markets. These products are also based on technological know-how that, either because it is specialized or enjoys patent protection, is inaccessible to most producers in the industry. Commodity ICs compete primarily on a cost basis, enjoy relatively large markets, and are based on technological know-how that is accessible to major producers in the industry.

The changing business structure of the U.S. EPROM industry during the 1980s appears to have stopped during 1986-88. In particular, EPROM prices appear to have increased significantly more than expected during this period. Competition decreased rather than increased as is customary in an industry whose products are becoming commodities.

Market Performance

Shipments and Prices

Data on U.S. domestic shipments of EPROMs are presented in table 9-3. The value of shipments fluctuated but grew by 162 percent over the period. Units shipped increased each year, growing by 222 percent over the period. The average unit value of domestic shipments of EPROMs rose by 32 percent as demand strengthened between 1983 and 1984. The average unit value fell by 2 percent between 1985, the year of the petition, and 1986 as demand weakened. Average unit values increased slightly over the remainder of the period as demand rebounded, but remained below the levels of 1983-84.

Price competition in the EPROM market is similar to that in other segments of the IC industry. New products command high prices that quickly drop with the introduction of competing or improved products. Producers generally lower the prices of their current generation of EPROMs as more advanced EPROMs enter the market. Each new generation of EPROMs exerts downward price pressures on previous generations. Price variations are common between different geographical regions, except in the spot market, where prices have remained roughly equalized.[31]

Prices for EPROMs are under constant downward pressure as technological advances improve the product's capabilities and new generations displace existing ones. Price trends based on Dataquest data are shown in figure 9-10. These trends include a weighted-average price for all EPROMs (with the weighting based on each generation's share of total shipments) and a hedonic price index for all EPROMs. The weighted-average price is on a price-per-chip basis. The hedonic price index shows the pure price decline in the price per chip after adjusting for quality change over 1983-93.

The trend displayed by the hedonic price index is similar to that displayed by the weighted-average price per chip; both show changes in the rate of price decline at about the same time. The level portion of the hedonic price index between 1986-89 indicates that the quality-adjusted price per chip was changing very little during the period. The hedonic price index began declining again after 1989, and it was during this latter period that the newly developed flash EPROMs were becoming an important substitute for regular EPROMs.

Both measures of EPROM prices show a substantial change after the filing of the petition in 1985. However, because the semiconductor business cycle started an upturn at about the same time as the petition, it would be inappropriate to attribute the change in prices to the investigation without further

[30] Gruber, ch. 3.

[31] Flamm, ch. 4, p. 41.

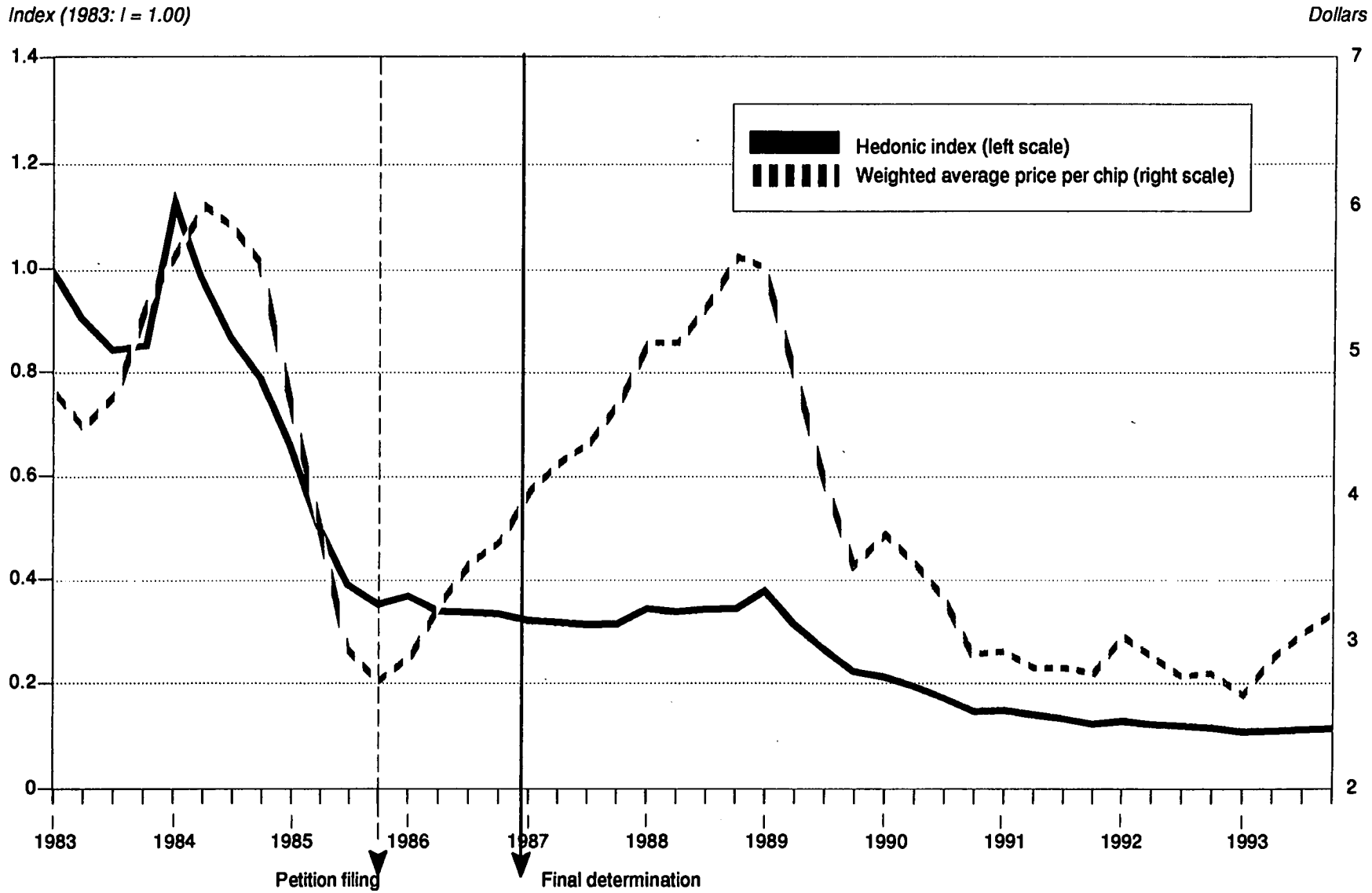
Table 9-3
EPROMs: U.S. domestic shipments, exports, imports, and apparent consumption, 1983-89

Year	Domestic shipments	Exports	Imports from—			Consumption	Import penetration—		Ratio of exports to shipments
			Japan	All other	Total		From Japan	Total	
							Percent		
	Quantity (*1,000 units*)								
1983	46,949	11,757	12,337	1,946	14,283	49,475	24.9	28.9	25.0
1984	54,808	12,885	17,042	1,239	18,281	60,204	28.3	30.4	23.5
1985	67,850	18,836	12,144	1,711	13,855	62,869	19.3	22.0	27.8
1986	95,241	37,710	8,636	2,179	10,815	68,345	12.6	15.8	39.6
1987	115,867	44,190	7,224	12,284	19,508	91,186	7.9	21.4	38.1
1988	134,227	69,895	16,229	41,426	57,655	121,987	13.3	47.3	52.1
1989	150,793	82,831	10,643	43,075	53,718	121,680	8.7	44.1	54.9
	Value (*$1,000*)								
1983	257,578	69,780	49,789	7,854	57,643	245,440	20.3	23.5	27.1
1984	396,682	102,736	73,602	5,351	78,953	372,899	19.7	21.2	25.9
1985	273,642	75,604	43,319	6,104	49,423	247,460	17.5	20.0	27.6
1986	375,431	155,041	21,675	5,749	27,424	247,815	8.7	11.1	41.3
1987	478,966	164,445	28,098	35,853	63,951	378,472	7.4	16.9	34.3
1988	620,619	277,773	85,210	117,053	202,263	545,109	15.6	37.1	44.8
1989	677,005	340,422	62,091	119,145	181,236	517,820	12.0	35.0	50.3
	Unit value								
1983	$5.49	$5.94	$4.04	$4.04	$4.04	$4.96	(1)	(1)	(1)
1984	7.24	7.97	4.32	4.32	4.32	6.19	(1)	(1)	(1)
1985	4.03	4.01	3.57	3.57	3.57	3.94	(1)	(1)	(1)
1986	3.94	4.11	2.51	2.64	2.54	3.63	(1)	(1)	(1)
1987	4.13	3.72	3.89	2.92	3.28	4.15	(1)	(1)	(1)
1988	4.62	3.97	5.25	2.83	3.51	4.47	(1)	(1)	(1)
1989	4.49	4.11	5.83	2.77	3.37	4.26	(1)	(1)	(1)

[1] Not applicable.

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Figure 9-10
EPROMs: Price Indexes for EPROMs, 1983-93



Source: Compiled by the staff of the U.S. International Trade Commission on the basis of Dataquest data.

analysis. The effects of the business cycle and the investigation are estimated econometrically below.

A way of separating the semiconductor business cycle from the effect of the investigation is to compare EPROM unit shipments and revenues to the total for all ICs. This relative comparison controls for the business cycle in ICs, the periods of overcapacity and undercapacity in the industry, and the Semiconductor Arrangement. Figure 9-11 shows a downward trend in EPROM revenues as a percentage of all IC revenues. The trend is best characterized by the periods 1983-86 and 1990-93, which appear to be on a smoothly declining curve. Such a trend is indicative of the increasing maturity of EPROMs relative to other ICs that incorporate newer technologies and features. However, while EPROM unit shipments remained an almost constant percentage of all IC units shipped throughout 1983-93, EPROM revenues as a share of all IC revenues stopped declining after 1986 and rose until 1988. EPROM revenues as a share of all IC revenues did not return to the 1983-86 trend until 1990. The increase in EPROM revenues as a share of all IC revenues coincides with the AD investigation time period. Because the figure presents the data in relative terms, the effects of the semiconductor business cycle, the periods of overcapacity and undercapacity in the industry, and the Semiconductor Arrangement are controlled for, and there appears to be a differential impact on EPROMs during the period following the investigation.

EPROM pricing is affected by the distribution channel the product goes through to the end user. Three channels of distribution are used to sell EPROMs: (1) original-equipment manufacturers (OEMs), on a contract basis, (2) distributors, and (3) spot-market purchasers, which may include OEMs and distributors. Contract sales to OEMs account for most EPROM sales and are generally subject to price renegotiations at the purchaser's option. Sales to distributors account for approximately one-third of EPROM sales. The spot market emerges only for short periods when product shortages arise.

EPROM producers generally adjust prices on distributor sales on a "meet-competition basis" to enable sales of in-stock product at competitive prices without a distributor selling below cost.[32] The spot market consists primarily of brokers and those engaged in arbitrage. OEMs and distributors occasionally enter this market to reduce their excess inventories.[33]

Prices can vary significantly among the channels of distribution even though long-term contracts with large customers provide price protection and distributors receive protection from losses on inventoried EPROMs. Contract prices generally fluctuate less but are higher than distributor and spot-market prices, because such contracts typically make price less flexible.

Purchasers make long-term contracts with EPROM suppliers because it is expensive to qualify new suppliers and test their products. Besides, large purchasers are usually more concerned with ensuring adequate supplies than with the price of the devices.[34] Respondents to the Commission's purchaser questionnaire more often rated current availability and quality of product as "very important" rather than price. Generally, spot-market prices and, to a lesser extent, distributor prices rise above contract price levels when markets are tight and fall below those levels when demand is slack.

Imports

Subject imports accounted for approximately 86 percent of the total by quantity in 1983, according to questionnaire data (table 9-3). Subject import penetration increased in 1983 and 1984, the 2 years before the petition. In 1985 and 1986, subject imports declined to 88 and 79 percent, respectively, of the total quantity of imports. Subject imports fell to their lowest level in 1987, 2 years after the case was filed, when they represented approximately 44 percent of the total value of imports. Nonsubject imports exceeded subject imports during 1987-89 as U.S. producers began to source EPROMs from offshore. The average unit value of subject imports declined to a period low in 1986, the year after the petition was filed. The average unit value of subject imports then increased each year after 1986. The average unit value of nonsubject imports generally declined over 1983-89.

Exports

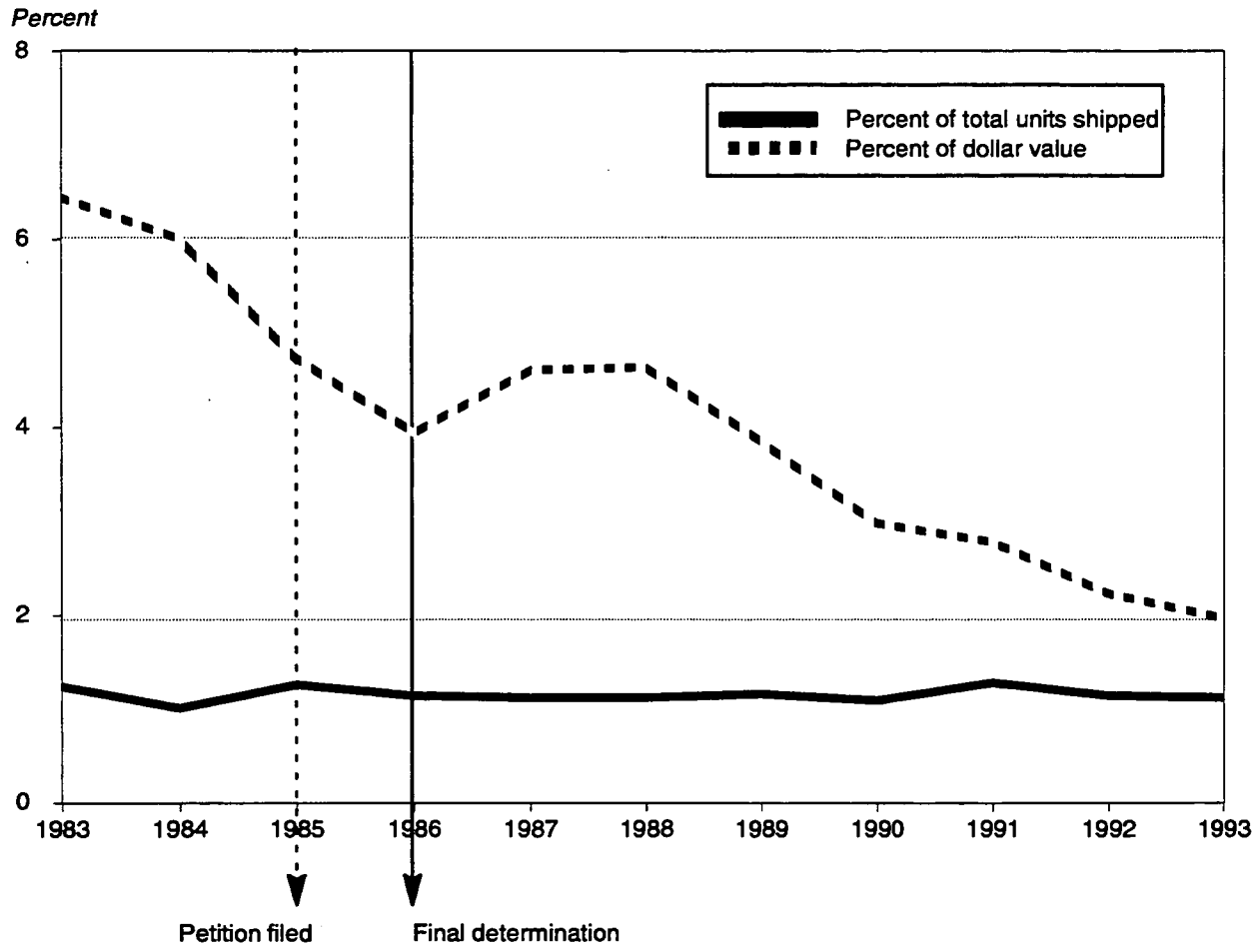
Units exported increased during 1983-89 by over sevenfold (table 9-3). The value of exports increased between 1983 and 1984 but declined in 1985 as slackening demand caused prices to fall worldwide. The ratio of exports to shipments generally rose over the period.

[32] That is, manufacturers usually assume the price uncertainty risk, providing their distributors with credits for losses incurred because of falling prices USITC, *Erasable Programmable Read Only Memories From Japan* (investigation No. 731-TA-288 (final)), USITC publication 1927, Dec. 1986.

[33] Flamm, ch. 5, p. 6.

[34] Flamm, ch. 5, p. 7, and app. 5-A.

Figure 9-11
EPROMs: EPROM shipments as a share of all IC shipments, by units and by dollars, 1983-93



Source: Compiled by the staff of the U.S. International Trade Commission on the basis of data provided by ICE Corp. and Dataquest.

The ratio of exports to domestic shipments rose as the Asian Pacific basin became a major market. The countries there became major producers of electronic equipment during this period. Part of the Semiconductor Arrangement dealt with the elimination of dumping in third-country markets. The growth of the Asian Pacific basin market highlights the importance of this aspect of the Semiconductor Arrangement since the countries of the region became important markets for U.S. EPROM manufacturers.

The average unit value of exports increased between 1983 and 1984. The average value of exports then fell in 1985 and fluctuated during the rest of the period. With the exception of 1986, the average value of exports was below the average value of domestic shipments after 1985. Export unit values are below domestic unit values because the exported product usually does not include a wholesaler's markup and because the exported product has not been subjected to the same level of quality control used on products shipped domestically.[35]

Consumption

The number of EPROMs consumed rose each year during the period; the increase between 1983 and 1989 was 146 percent. However, the value of consumption fell in 1985 and remained at that level in 1986 before increasing in 1989. The decline in the value of consumption reflects the fall in price as

[35] USITC staff interviews with U.S. industry officials, Jan. 1995.

demand for EPROMs fell in 1985-86. The average value for EPROMs consumed increased between 1983 and 1984 before declining in 1986.

The ratio of subject imports to consumption was 25 percent by quantity and 20 percent by value in 1983. Import penetration on a quantity basis rose in 1984 but remained level on a value basis. In 1985, the year the petition was filed, import penetration on a quantity basis fell to 19 percent and on a value basis fell to 18 percent. After the investigation, import penetration declined until 1987, when it reached its lowest level for both quantity and value. Subject import penetration was 9 percent by quantity and 12 percent by value in 1989.

Profitability

Profitability in the EPROM industry is highly cyclical. During periods of high demand, profits are significantly above those obtained in many other manufacturing industries. During downturns in the market, prices plummet and firms incur significant losses. EPROM producers seek to minimize these losses by diversifying their product lines to include other ICs and upstream products. In addition, these producers strive to maintain strong positions in various markets around the world. Producers also pursue noncommodity IC product lines with prices shielded from swings in demand.

The profitability of U.S. EPROM manufacturers fell severely during the 1984-85 downturn in the industry. During this period, unit growth rose in the U.S. market, these producers' primary market, but the market declined in value terms as prices fell. U.S. EPROM producers' gross profit margins averaged 35 percent in 1983 and increased to 46 percent in 1984 (table 9-4). However, as demand weakened in 1985, the year of the petition, the gross profit margin fell to 7 percent. Gross profit margins were a negative 6 percent in 1986 and began increasing in 1987, and rose from 15 to 30 percent by 1989. For comparison, the ratio of gross profits to net sales of all U.S. producers' IC operations fell from 42 percent in 1983 to a negative 47 percent during the first part of 1986.[36] Intel reported a negative income for the first time in its history, and most other IC firms also sustained large losses during 1985 and 1986.

[36] USITC, *Erasable Programmable Read Only Memories From Japan*, USITC publication 1927, Dec. 1986, table 14.

Capital Expenditures and Research and Development

Capital expenditures in the industries producing EPROMs and other ICs are critical to maintaining competitiveness. Annual capital expenditures in these industries together almost tripled during 1983-89, rising from $4.1 billion to $11.6 billion as the costs of new plants rose dramatically.[37] Nonetheless, the long-term ratio of expenditures to industry sales fell slightly.

While the IC industry's long-term capital spending trends did not change substantially, year to year fluctuations were considerable. Producers repeatedly increased their spending during periods of high demand and decreased this spending during periods of decreasing demand.

U.S., Japanese, and European capital expenditures all increased dramatically during the 1983-84 upturn in the world semiconductor market. This increase contributed to the significant overcapacity experienced in the industry in 1985-86, when demand slumped.

Capital expenditures reported by U.S. EPROM producers in response to questionnaires rose over fourfold between 1983 and 1989 (table 9-5). As a share of sales, capital expenditures ranged from 10 to 20 percent of sales and averaged 17 percent over the period.

During the early 1980s, producers wanted to lead in innovation since EPROMs that faced little competition commanded relatively higher prices. A newly introduced EPROM could pay its producer substantial profits. A late market entry could cost its producer any recouped upfront expenses for design development or startup production.

In 1977, the founder of Intel, Robert N. Noyce said:

> *"In an industry whose product declines in price by 25 percent a year, the motivation for doing R&D is clearly high. A year advantage in introducing a new product or new process can give a company a 25 percent cost advantage over a competing company; conversely, a year's lag puts a company at a significant disadvantage with respect to its competitors.... In a constant price environment one could say that investment for R&D buys an annuity paying $2.50 per year for each dollar invested."*[38]

[37] Integrated Circuit Engineering Corp., *Status 1993*, ICE, 1993, p. 2-71.

[38] Robert N. Noyce, "Microelectronics," *Scientific American*, Sept. 1977, p. 63.

Table 9-4
EPROMs: U.S. producers' combined sales; cost of goods sold; gross profit; selling, general, and administrative expenses; and operating income, 1983-89

(1,000 dollars)

Item	1983	1984	1985	1986	1987	1988	1989
Sales	293,384	421,343	359,716	356,224	474,604	608,474	720,816
Cost of goods sold	189,603	226,707	333,955	376,158	402,245	472,162	503,840
Gross profit	103,781	194,636	25,761	(19,933)	72,358	136,311	216,975
Selling, general, and administrative expenses	74,709	97,304	92,635	107,894	114,384	130,157	167,204
Operating income	29,072	97,332	(66,874)	(127,828)	(42,026)	6,154	49,771

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Table 9-5
EPROMs: U.S. producers' capital expenditures and research and development expenses, 1983-89

(1,000 dollars)

Item	1983	1984	1985	1986	1987	1988	1989
Capital expenditures	26,978	73,449	62,376	72,713	77,665	100,067	117,428
R&D expenses	22,411	29,362	42,181	63,707	57,835	63,067	67,049

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Consequently, the EPROM industry has among the highest ratios of research and development (R&D) expenditures to sales of any industry. During 1983-89, R&D expenditures almost tripled (table 9-5). The ratio of R&D expenditures to sales ranged from 7 to 17 percent and averaged 11 percent for the whole period, according to responses to questionnaires. In contrast, this ratio was only 3 percent for U.S. manufacturing industries as a whole. Maintaining leadership or even remaining long term in the industry requires a high commitment of R&D expenditures. As the industry has grown, rising R&D expenditure requirements have increasingly presented a formidable barrier to entry.

Capacity Utilization

Periods of overcapacity closely follow periods of undercapacity in the industries producing EPROMs and other ICs. Capacity utilization in the IC industry during 1984 was 98.5 percent, while in the recessionary year of 1985, capacity utilization dropped to 51.6 percent.[39] Several factors contribute to these capacity swings. Most notably, forecasting EPROM demand beyond a few months is highly uncertain, and periods of demand start and end abruptly.

The early periods of high growth in EPROM demand are characterized by undercapacity. During periods of low demand, there is little incentive to add production capacity, as EPROM manufacturing has a high fixed-cost structure. When demand picks up, it historically has done so quickly and unexpectedly. Since it takes 18 months to build a new fabrication plant, industry capacity can be below demand.

During the last quarter of 1983, orders in the IC industry as a whole rose by 147 percent over those in the corresponding period of the previous year, but producers were capable of increasing deliveries by only 47 percent.[40] Established customers of certain chips were getting timely deliveries of only one-third as many components as they were ordering. New customers had to wait 6 months or more to obtain any product, if they could get on the waiting lists.[41]

During periods of high growth, there is a great incentive to add manufacturing capacity, as demand generally greatly outstrips supply. However, since these periods of high demand are short, capital spending plans generally outlive the life of the boom.

Periods of waning demand occur quickly, because customers tend to double-order items during periods of high demand to insulate themselves from shortages. Customers later cancel the excess orders as the

[39] USITC, *Erasable Programmable Read Only Memories From Japan*, USITC publication 1927, Dec. 1986, p. A-13.

[40] "A Second Wind for Semiconductors," *Financial World*, Mar. 20, 1984, p. 96.

[41] "The Coming Glut of Semiconductors," *Fortune*, Mar. 19, 1984, domestic edition, p. 125.

industry enters a downturn, causing a crisislike atmosphere as order rates plummet.[42]

During periods of waning demand, firms have no incentive to cut back on plant capacity. Such a cutback would require idling fixed plant investments, eliminating any chance of amortizing these investments. Also, such a cutback would involve laying off highly skilled workers and leave these firms less prepared to reap the high profits that come once the demand picks up again. Consequently, there is an incentive to keep production lines operating during periods of waning demand. This practice has contributed to significant inventory buildups and steeply falling prices.

Capacity utilization rates vary from plant to plant, depending on their technological capabilities. Older technology plants can have low capacity utilization rates, even in times of high growth, as they generally have higher costs per unit, and demand for older generation products manufactured in these older plants wanes over time. In 1988, a "boom" year in the global industry, U.S. IC manufacturing plants using the latest technology (i.e., feature sizes below 1 micron) reported capacity utilization rates averaging 105 percent. Some older technology fabrication lines (i.e., those with capability for 3-micron-and-greater feature size) were running at an average of 60 percent of capacity.

Employment

The number of production and related workers (PRWs) employed in the U.S. EPROM industry rose from 2,767 persons in 1983 to 3,810 persons in 1985, according to questionnaire responses. PRW employment declined to 3,050 persons in 1986 before rising to 3,504 persons by 1989. The number of hours worked per year by PRWs averaged 2,073 hours for 1983 but declined to 1,827 hours in 1986. PRW hours worked rose to 2,060 hours in 1987 but declined to 1,810 hours by 1989.

Estimates of Economic Effects

Hedonic Price Index Analysis

Hypotheses Tested

Hedonic price indexes provide a way of measuring how the quality-adjusted price of a product changes over time as both price and the characteristics of the product change. The hedonic price analysis examines EPROM prices to determine whether there were any differences in price decline during 1983-93. Of particular interest are any differences found in the rate of price decline for the time period before the filing of the petition compared with such price decline in the periods after filing and after the final determination. The hedonic price analysis examines whether prices were falling faster during the earlier period and if their decline slowed during the period after the final affirmative determination based on the hypothesis that the unfair trade practice was occurring in the first time period and that the remedy was counteracting the effects of the unfair trade practice in the second and third periods. Since the rate of price decline for EPROMs is the same for each generation, the rate of price decline should be fairly constant over time. The effect of the investigation on EPROM prices can be reflected by a change from rapidly declining prices before the investigation to more slowly declining prices after the investigation. The change in price decline between periods is measured by variables that cover the time of the preliminary and final investigations; the first is called the PETITION variable and the second is called the REMEDY variable.

The general form for the estimated hedonic price equation is:

> *PRICE = f(PETITION variable, REMEDY variable, HERFINDAHL-HIRSCHMAN INDEX, TIME, BUSINESS CYCLE, DOWNSTREAM DEMAND, binary variables for the different generations of EPROMs designated by density, i.e., 16K, 32K, 64K, and so forth)*

PRICE in the above equation is the quarterly price per chip for each generation of EPROM. The PETITION variable is included for the filing of the case (which takes effect beginning with the fourth quarter of 1985). The REMEDY variable is included for the period after the final determination (which takes effect beginning with the first quarter of 1987). In this case, the Semiconductor Arrangement is the remedy since no AD duties were imposed. The Herfindahl-Hirschman index measures industry concentration; as concentration increases, price is expected to increase. The prices of older generation EPROMs actually rise as fewer producers continue to make them.

[42] "Chip Outlook Not so Rosy," *Computerworld*, Jan. 21, 1985, p. 79.

The hedonic price index analysis also tests for evidence of a learning curve in EPROM production. Traditional learning curves show up as a negative relationship between costs and cumulative output.[43] Data on costs are not available, so price is used in its place; most studies of the learning curve in the semiconductor industry use price data for this reason. Cumulative production data for EPROMs are not available, so TIME is used in its place.[44] A BUSINESS CYCLE variable is included to account for the effects of the semiconductor business cycle on EPROM prices. As the semiconductor business cycle turns up or down, the prices of all ICs move sharply. The DOWNSTREAM DEMAND variable is included to capture the effect of changes in demand by the downstream industries on EPROM prices. As demand increases, the price of EPROMs is expected to rise, other things held constant.

The characteristic used in the present hedonic analysis is the density for each generation of EPROM.[45] Each new generation of EPROM offers a higher density, and the relationship between the density variables and price is expected to be positive. Binary variables are used to distinguish between the different generations of EPROMs that were made during 1983-93.

[43] For example, see Armen Alchian, "Reliability of Progress Curves in Airframe Production," *Econometrica*, vol 31, No 4 (Oct. 1963), 679-693 and Pankaj Ghemawat, "Building Strategy on the Experience Curve," *Harvard Business Review*, vol 63. No 2 (Mar.Apr. 1985), 143-149.

[44] In investigation No. 731-TA-556, *DRAMs of One Megabit and above*, the petitioner used a model that had price as a function of cumulative output while the respondents used a model that had price as a function of time. Staff conducting investigation No. 731-TA-556 found that both models fit the data well and found no strong theoretical or empirical basis for preferring one over the other. See Economic Memorandum, DRAMs of One Megabit and above from the Republic of Korea, Investigation No. 731-TA-556 (final), EC-Q-042.

[45] Flamm points out that all desirable characteristics of DRAMs are positively correlated with cost per bit and that virtually all technological improvements in DRAMs are embodied in new generations of chips rather than as improvements to existing ones. See "Measurement of DRAM Prices: Technology and Market Structure," in *Price Measurements and Their Uses*, M. F. Foss, et. al., ed., (Chicago: University of Chicago Press, 1993), p. 159. Because of their similar nature, EPROMs likely have the most significant technological changes occurring with a new generation.

Data Availability and Sources

Publicly available data on EPROMs are limited.[46] Dataquest Inc. of San Jose, CA, is the leading market research firm covering the semiconductor industry, and almost all researchers analyzing the semiconductor industry rely on Dataquest data. Staff obtained quarterly data from Dataquest on EPROM prices and quantities shipped worldwide during 1983-93. The data used in the pricing trend analysis are the average selling price (ASP) and the number of EPROMs shipped for each generation of EPROM, by quarter, from 1983 to 1993.

The data on the HERFINDAHL-HIRSCHMAN INDEX, TIME, BUSINESS CYCLE, and DOWNSTREAM DEMAND variables[47] are in logged form; the PETITION, REMEDY, and binary variables for each generation are not logged. All regressions are estimated using ordinary least squares.[48] In the pure hedonic price index regression presented below, only binary variables for each quarter from the second quarter of 1983 through the fourth quarter of 1993 and the binary variables for each generation are included. The actual hedonic index is constructed from these quarterly binary variables.[49] The hedonic price index is presented in figure 9-10.

[46] Commercially available data on EPROMs do not include flash EPROMs. The data in this report compiled from questionnaires include flash EPROMs but data from Dataquest and ICE do not. The absence of flash memories from some of the report's data is not significant because flash memories represented a negligible portion of the EPROM market until after 1990.

[47] The data for the BUSINESS CYCLE variable come from various issues of Integrated Circuits Engineering's *Status* annual report and are for total IC revenues. The DOWNSTREAM DEMAND variable uses the production index for computers and other office machines maintained by the Board of Governors of the Federal Reserve. The HERFINDAHL-HIRSCHMAN INDEX is calculated from the firm-level data on EPROM shipments provided by Dataquest.

[48] *Technical note.*—The Durbin-Watson statistics in all regressions are quite low; however, OLS is the method used in calculating the hedonic price indexes published by the Department of Commerce. See Cole, and see Ernst Berndt, *The Practice of Econometrics*, (Reading: Addison-Wesley, 1991), ch 4. Also, there are different numbers of observations for several of the EPROM generations produced during 1983-93. Difficulties with estimating time series-cross section data with an unequal number of observations and correcting for serial correlation are discussed in G. Judge, et. al., *The Theory and Practice of Econometrics*, 2nd ed., (New York: John Wiley, 1985), pp. 480-483.

[49] *Technical note.*—There is one quarterly binary variable for each quarter except the first. The actual hedonic price index is constructed by taking the antilog of

Results

The estimates of the price equations are presented in table 9-6. The pure hedonic price index model shows the results for the generational binary variables. As can be seen, each new generation of EPROM chip is more expensive; this is the meaning of the increasing value of the coefficients in the pure hedonic price index model. The values of the binary variables for the 43 quarters that were used to derive the hedonic price index presented in figure 9-10 are not reported.

The results for the Base model present the values of the variables for 1983-93. The results for the Effects model show the differences between the whole 1983-93 period and the three separate periods by using the PETITION and REMEDY variables. For example, TIME has a value of -0.077 in the Base model and is statistically significant.[50] This value indicates that the average rate of price decline per quarter during 1983-93 was 7.7 percent. TIME in the Effects model has a value of -0.1299. This value indicates that the rate of price decline during the period prior to the filing of the petition was 13 percent per quarter. As can be seen, prices were falling at a faster rate before the petition than for the whole time period.

The impact of the investigation on price decline is measured with the PETITION and REMEDY variables. The values for these variables are added to the value for the TIME variable to obtain the rate of price decline for each time period. The PETITION variable is positive, as expected, and statistically significant. The rate of price decline during the investigation is found by adding the values of TIME and the PETITION variable, or [-.1299 + .0978 = -.0321]. So, prices were falling by 3.2 percent per quarter during the investigation. Similarly, to find the rate of price decline for the period after the investigation, the values of TIME, the PETITION, and the REMEDY variables are added together. Thus, [-.1299 + .0978 - .0531 = -.0852], or prices were declining by 8.5 percent per quarter after the investigation.

[49]—*Continued*
each quarterly binary variable. The first quarter is considered to be the base period and is normalized to be 1.

[50] The terms "significant" and "significance" in this study mean statistically significant and imply that there is a relatively large chance, for example, 90 or more in 100, that the variables labeled as being significant have an impact on the behavior of prices or quantities being estimated.

The hedonic price analysis shows that prices were declining rapidly prior to the investigation, but that prices declined more slowly after the petition was filed. Prices began to decline somewhat more quickly after the investigation was completed but not nearly as rapidly as they had declined prior to the petition. The three time periods are clear in figure 9-10. This confirms the hypothesis that prices declined less rapidly with the remedy, the Semiconductor Arrangement, in place.

The results for the other variables generally have the expected signs and are significant. The HERFINDAHL-HIRSCHMAN INDEX is positive and significant, indicating that concentration does appear to affect the pricing of EPROMs, as expected. The BUSINESS CYCLE variable is positive and significant, also as expected. EPROM prices fluctuate with the semiconductor business cycle almost on a one-for-one basis. DOWNSTREAM DEMAND is not significant in either the Base or the Effects models and has an unexpected sign in the Base model. The lack of significance may be due to using only one of the downstream industries, computers, as a proxy for demand. Also, the negative sign on TIME is consistent with a learning curve for the production of EPROMs.

Computable Partial Equilibrium Analysis

The CPE analysis is designed to measure the impact of the dumping and the relief on the U.S. EPROM industry. However, no AD duties were imposed on EPROMs, because the resolution of the EPROM investigation was part of the Semiconductor Arrangement. Because no AD duties were imposed on EPROMs, the quantitative measurement of the effects of the remedy are precluded. Hence, an estimate of the impact on the U.S. industry that the relief provided cannot be made using the CPE analysis, and only the estimate of the impact of dumping is provided.

The inputs used in the CPE model come from responses to questionnaires, staff interviews, and the economics memorandum[51], and are shown in table 9-7. The base year for the information used in this analysis is 1985, because the petition was filed in September of that year, and Commerce used April 1-September 30 as the period for determining margins.

[51] USITC, Office of Economics, (Investigation No. 731-TA-288 (Final)), *Erasable Programmable Read Only Memory (EPROMs)*, transmittal memorandum EC-J-462, Dec. 9, 1986.

Table 9-6
EPROMs: Coefficients of hedonic price equations and related statistics

Independent variable	Pure hedonic price index	Base model	Effects model
Petition variable	-	-	.0978 (3.59)***
Remedy variable	-	-	-.0531 (-3.41)***
Intercept	1.88 (6.45)***	3.92 (6.49)***	2.27 (2.42)**
Time	-	-.077 (-13.80)***	-.1299 (-6.66)***
Herfindahl-Hirschman Index	-	1.06 (30.4)***	1.07 (30.93)***
Business cycle	-	1.20 (9.15)***	.95 (6.21)***
Downstream demand	-	-.16 -(1.15)	.29 (1.23)
16K	.304 (1.48)	1.16 (11.59)***	1.14 (11.43)***
32K	.346 (1.69)*	1.43 (13.86)***	1.40 (13.77)***
64K	.349 (1.71)*	1.82 (16.78)***	1.80 (16.80)***
128K	.612 (2.99)***	1.89 (17.88)***	1.86 (17.87)***
256K	1.11 (5.42)***	2.45 (23.04)***	2.43 (23.12)***
512K	1.54 (7.35)***	2.61 (24.62)***	2.59 (24.68)***
1 MEG	2.06 (9.35)***	3.14 (28.86)***	3.10 (28.60)***
2 MEG	2.36 (9.96)***	2.97 (26.22)***	2.95 (26.26)***
4 MEG	3.08 (12.99)***	3.78 (32.75)***	3.76 (32.91)***
Test statistics:			
Number of observations	344	342	342
Adjusted R^2	.68	.92	.93
Durbin-Watson	30	.45	.48

Note.—t-statistics are in parentheses with significance as follows:

* = significant at the 90-percent level
** = significant at the 95-percent level
*** = significant at the 99-percent level

Source: Estimated by the staff of the U.S. International Trade Commission.

Table 9-7
EPROMs: Computable partial equilibrium analysis for EPROMs, assumed values of input variables, 1985

Input variable	Minimum	Maximum
Dumping margin (*percent*)[1]	93.9	(2)
Values for U.S. market (1,000 *dollars*)		
Domestic value	273,642	(2)
Subject value	43,319	(2)
Nonsubject value	6,104	(2)
U.S. market elasticities (*absolute value*):[3]		
Substitution:		
Domestic/subject	5	10
Domestic/nonsubject	5	10
Subject/nonsubject	5	10
Aggregate demand	0	1
Supply:		
Domestic	1	5
Subject	1	5
Nonsubject	1	2

[1] The margin used is the "All Other" margin calculated by Commerce in its final investigation.
[2] Not applicable.
[3] Elasticities are based on estimates in Commission Memorandum EC-J-462 and staff interviews.

Source: Compiled by the staff of the U.S. International Trade Commission.

The domestic, subject, and nonsubject values all came from responses to questionnaires. The estimates for the elasticity of substitution between the domestic product, the subject imports, and the nonsubject imports are all high because EPROMs are a commodity product. The domestic product and the imported product, subject and nonsubject, have virtually identical physical characteristics and are marketed through the same channels of distribution to the same purchasers for use in similar end products.

The estimate for the elasticity of aggregate demand is low. The cost of an EPROM is only a fraction of the cost of the end product that uses it, so lower prices do not stimulate demand. Also, in a number of applications, EPROMs are used in a fixed ratio. For example, a computer needs one EPROM to store the instructions necessary for restarting the computer when it is turned on. Therefore, increased demand for computers would do more to stimulate demand for EPROMs than would a lower price.

The elasticity of supply for the domestic product is estimated to be high. As previously noted, U.S. producers were operating well below capacity during 1985 and could increase production rapidly. The elasticity of supply for the subject product is also estimated to be high. The ability of Japanese producers to supply the U.S. market stems from their substantial increase in capacity for MOS memory production during 1983-84 coupled with the low growth in demand for EPROMs; this resulted in excess capacity in the Japanese market.

Effects of Unfair Trade Practice

The results of the CPE model are shown in table 9-8. The estimates in this table are based on the midpoints of the parameter ranges given in table 9-7. The model generates a series of scenarios on the basis of a range of elasticities. The effects on prices, output, and revenue for the domestic product, subject imports, and nonsubject imports are reported as a share of the fair value that would have existed had the dumping not occurred.

The effects presented in table 9-8 are for the existence of the unfair imports. The margins determined by Commerce are so large that the model calculates that there would be no imports from the subject country but for the unfair trade practice. Therefore, no effects are shown for subject imports in table 9-8 other than such imports would cease; the effects are for the domestic industry and for nonsubject imports.[52]

[52] The column headed "Unfair trade practice and remedy" in table 9-8 is empty because the margins are so high that there would be no imports but for the dumping; any remedy would effectively remove all imports from the U.S. market. The column headed "Remedy" reflects a complete return by the industry to a pre-unfair-trade-practice state. For example, if U.S. output declined from

Table 9-8
EPROMs: Results of computable partial equilibrium analysis (estimated effect on U.S. market of unfair trade practices and remedies), base year 1985[1]

Item	Unfair trade practice	Unfair trade practice and remedy	Remedy
	— (*Change from fair value*)[2] —		(*Change from actual value*)[3]
Impact on industry *(percent)*:			
Domestic price	-3.8	0	4.0
Domestic output	-11.0	0	12.4
Domestic revenue	-14.4	0	16.8
Domestic employment	-8.0	0	8.7
Impact on imports *(percent)*:			
Subject import price	(4)	0	0
Subject import quantity	(4)	0	-100.0
Subject import revenue	(4)	0	-100.0
Nonsubject import price	-8.7	0	9.5
Nonsubject import quantity	-12.8	0	14.6
Nonsubject import revenue	-20.4	0	25.6
Welfare effects (*1,000 dollars*):			
Gain to consumers	16,689	0	-16,689
Benefit to producers	-11,006	0	11,006
Net welfare effects	5,683	0	-5,683

[1] The estimated effects reported are the results of the Commission's CPE model using the midpoint values of parameter ranges listed in table 9-7. This model accounts only for the short-term effect of unfair practices and remedies of cases with affirmative determinations in the base year, as discussed in the text.

[2] The "fair values" are the values estimated by the model to have been in place without the effect of the unfair trade practice.

[3] The "actual values" are the market values during the base year.

[4] The margins determined by Commerce are so large that the model calculates that there would be no imports from the subject country but for the unfair trade practice.

Source: Estimated by the staff of the U.S. International Trade Commission.

The price of EPROMs in the domestic market was 3.8 percent below what it would have been had there been no LTFV imports. Domestic output was 11.0 percent below what it would have been, and domestic revenue was 14.4 percent below what it would have been with no LTFV imports. On the import side, subject imports would not exist without the unfair trade practice, according to the model. The price of nonsubject imports was 8.7 percent below what it would have been without the LTFV imports. Nonsubject import quantity was 12.8 percent below what it would have been and nonsubject import revenue was 20.4 percent below what it would have been without LTFV imports.

Effects of Remedy

The estimated effects of an AD remedy as a share of the actual market values for 1985 are shown in the third column ("Remedy") of table 9-8. The estimated effects are hypothetical, because the actual remedy, the Semiconductor Arrangement, did not result in duties being imposed. The model calculates that subject imports would go to zero. Domestic price would increase by 4.0 percent, domestic output, by 12.4 percent, and domestic revenue, by 16.8 percent. Nonsubject import price would increase by 9.5 percent, nonsubject import quantity, by 14.6 percent, and nonsubject import revenue, by 25.6 percent. All of these values reflect a complete counteracting of the effects of the unfair trade practice.

In 1985, the unit value of EPROMs imported from Japan was 11 percent below the unit value of U.S. shipments of EPROMs. Import penetration by Japan in that year was 19.3 percent on a unit basis. If U.S.

[52]—*Continued*
100 to 90, this would be a 10-percent decline. To raise U.S. output back to 100 would require an increase of 11.1 percent. The percentages in the "Unfair trade practice" column and the "Remedy" column merely reflect the same change in absolute terms.

producers had shipped an additional number of EPROMs equivalent to the number imported from Japan (12,144,000 units from table 9-3) and had received the average unit value for U.S. shipments ($4.03 from table 9-3) for the additional shipments, then U.S. producers' revenues would have been 18 percent larger (12,144,000 x $4.03 = $48,940,320) than they were ($273,642,000) in 1985. This figure represents an upper bound on the impact of the unfair trade practice on the U.S. industry compared to the 14.4 percent estimate provided by using the midpoint values from table 9-7 in the CPE model. The estimated impact provided by the CPE model for nonsubject imports is harder to gauge, since nonsubject imports did not become substantial until 1987, primarily because of the limited production capacity for EPROMs in countries other than the United States and Japan.

Net Welfare Effects

The welfare effects of the unfair trade practice are divided between the downstream industries using EPROMs, which gain, and the producing industry and upstream industry (semiconductor manufacturing equipment and materials industries), which lose. Table 9-8 shows that downstream industries gained $16.7 million as a result of the LTFV imports. The producing and upstream industries lost $11.0 million as a result the unfair imports. The change in net welfare was a gain of $5.7 million.

CHAPTER 10
Color Television Picture Tubes

History of Title VII Investigations

On November 26, 1986, a petition was filed with the Commission and Commerce by counsel on behalf of the petitioners.[1] The petition alleged that an industry in the United States was materially injured and was threatened with material injury by reason of LTFV imports of color television picture tubes (CPTs) from Canada, Japan, Korea, and Singapore. In response to the petition, the Commission instituted investigations Nos. 731–TA–367–370 (preliminary) under section 733(a) of the Act and, on January 12, 1987, determined that there was a reasonable indication of material injury by reason of such imports. Commerce made its preliminary affirmative LTFV determinations on June 30, 1987, and the Commission instituted its final investigations.

Commerce made its final LTFV determinations on November 18, 1987, and the Commission made its final affirmative determinations on January 4, 1988, which resulted in AD duty orders on color television picture tubes from Canada, Japan, Korea, and Singapore on January 7, 1988. The weighted–average dumping margins were as follows (percent):

[1] The U.S. petitioners in these investigations were the International Association of Machinists & Aerospace Workers; the International Brotherhood of Electrical Workers; the International Union of Electronic, Electrical, Technical, Salaried & Machine Workers, AFL-CIO-CLC; the United Steelworkers of America, AFL-CIO; and the Industrial Union Department, AFL-CIO.

Color Picture Tube Industry

First petition year (1986):	
Shipments, (*million dollars*)	994
Import market share by value (*percent*)	10
AD/CVD history:	
AD investigations (*number*)	18
First petition year	1986
First AD/CVD order year	1988
Most recent petition year	1986

Country and firm	LTFV margin
Canada:	
Mitsubishi Electronics Industries Canada, Inc.	[1].65
All other	[1].65
Japan:	
Hitachi Ltd	22.29
Matsushita Electronics Corp	32.91
Mitsubishi Electric Corp	[1]1.34
Toshiba Corp	33.50
All other	30.02
Korea:	
Samsung Electron Devices Co., Ltd	[1]1.91
All other	[1]1.91
Singapore:	
Hitachi Electronic Devices (Singapore) Pte., Ltd.	5.33
All other	5.33

[1] The URAA changed the *de minimis* margin to less than 2.0 percent from the prior 0.5 percent. Firms with the *de minimis* margin would have been excluded from the AD order if it had been imposed under the current law.

The Commission's determinations were based on the poor condition of the domestic industry producing CPTs, as evidenced by adverse trends in the level of production, shipments, inventories, employment, and the financial indicators, and a cumulative assessment of the volume and effects of the imports from the four countries.

The Commission conducted two previous investigations concerning CPTs. The first case, investigation No. AA1921–104, Color Television

Picture Tubes From Japan, was conducted by the U.S. Tariff Commission in 1972 under the Antidumping Act, 1921. In that investigation, the Commission unanimously determined that an industry in the United States was not injured and was not likely to be injured, or prevented from being established, by reason of the importation of color television picture tubes from Japan sold at LTFV.

In the second case, investigation No. TEA-W-136, conducted in 1972 under section 301(c)(2) of the Trade Expansion Act of 1962, the Commission unanimously determined that articles like or directly competitive with the television picture tubes produced by the RCA Corp. were not, as a result in major part of concessions granted under trade agreements, being imported into the United States in such increased quantities as to cause, or threaten to cause, the unemployment or underemployment of a significant number or proportion of the workers of such company or appropriate subdivision thereof.

Related to the above two cases, Zenith Electronics alleged in 1990 that Japanese, Korean, and Taiwan television and picture tube producers were evading U.S. AD penalties by exporting color television receivers (CTVs) through Mexico and Malaysia to the United States and petitioned Commerce to open an investigation of CTV imports from Mexico and Malaysia. The ITA monitored imports for one year to determine whether Japanese, Korean, and Taiwan producers were attempting to evade U.S. AD penalties on CTVs and determined that there was insufficient evidence to justify an investigation.[2]

Also in 1990, the Committee to Preserve American Color Television (COMPACT) petitioned Commerce to impose dumping duties on picture tubes entering the United States in color televisions assembled in Mexico, noting that tube exports to Mexico from Canada, Japan, and Korea had increased dramatically since the dumping finding, and exports of complete TVs from Japan and Korea to Mexico had increased from negligible to substantial. The petition argued that few if any tubes and sets were designed for Mexican consumption. According to COMPACT, sophisticated multinationals have circumvented the orders, the U.S. subsidiaries of the foreign producers and exporters have absorbed AD and countervailing duties, and the administering authority and the U.S. Customs Service have been unable to ensure and record that all estimated and finally assessed AD and countervailing duties are in fact being timely paid and collected.[3] COMPACT criticized Commerce for not being receptive to preliminary requests by picture tube manufacturers to initiate diversion investigations and for having dismissed Zenith's petition to open dumping proceedings against Mexico and Malaysia.[4] COMPACT noted that enforcement of orders under the unfair trade laws has not been nearly strong enough and that the consequence has been a significant undercutting of the relief afforded domestic industries by the orders.

In August 1990, Commerce initiated an anticircumvention inquiry to determine whether Canada, Japan, Korea, and Singapore were circumventing the AD duty orders on color television picture tubes by importing them into the United States from countries not covered by the AD order. Commerce also investigated the U.S. industry's allegation that production of color television picture tubes was being moved from Japan, Korea, and Singapore to other Southeast Asian countries not covered by the AD order.[5] A preliminary negative determination of circumvention was reached on December 19, 1990, and a final negative determination was made on March 7, 1991.[6]

There were over 25 separate investigations of the television and parts industries, alleging harm by importers of television receivers, television picture tubes, and other parts of television receivers from 1968 through 1987. In 1971, Japanese producers were found to be dumping color and monochrome televisions in the United States.[7] In 1977, President Carter signed an Orderly Marketing Agreement (OMA) with the Government of Japan limiting the number of Japanese color television receivers to be shipped to the United States from Japan for 3 years. The agreement also encouraged Japan to invest in productive U.S. plants, which would require substantial levels of U.S. labor to complete and assemble semifinished imports.[8] By 1979, OMAs had been concluded with Korea and Taiwan.[9]

[2] *Television Digest*, May 28, 1990, p. 14.

[3] Posthearing submission from COMPACT.

[4] *Television Digest*, Aug. 20, 1990, p. 9.

[5] USITC staff interviews with representatives of Zenith Electronics Co., Dec. 1994.

[6] 56 F.R. 9667.

[7] U.S. International Trade Commission, *Television Receiving Sets from Japan* (investigation No. AD-66), TC publication 367, 1971.

[8] Presidential Proclamation No. 4511, "Implementation of Orderly Marketing Agreement On Certain Color Television Receivers," 42 F.R. 123.

[9] Presidential Proclamation No. 4634, "Implementation of Orderly Marketing Agreements and the Temporary Quantitative Limitations on the Importation Into the United States of Color Television Receivers and Certain Subassemblies Thereof," 3 CFR 4 (1979 compilation).

The first administrative review of the AD duty order on CPTs from Japan was initiated by Commerce on March 8, 1989, covering Toshiba Corp., for the review period June 30, 1987–December 31, 1988. The final determination, with a changed margin of 23.10 percent, was issued on September 14, 1990.

The first administrative review of the AD duty order on CPTs from Korea was initiated on February 28, 1990, covering Samsung Electronic Devices Co. and Goldstar Co., for the review period January 1, 1989–December 31, 1989. The final determination, with a changed margin of *de minimis* percent for Samsung and 1.91 percent for Goldstar, was issued on April 25, 1991. On June 26, 1991, Commerce published a correction of the rate for Goldstar to zero percent.[10]

Scope of Investigation

Subject Products

CPTs are cathode ray tubes (CRTs)[11] that convert a video signal into a visual color display, suitable for use in the manufacture of CTVs or other color entertainment display devices intended for television viewing. CPTs are produced in various screen sizes, from 1–1/2 inches to over 40 inches in diagonal measurement. In 1994, picture tubes produced in the United States ranged from 19 to 35 inches in viewable measurement. No CPTs smaller than 19 inches have been produced in the United States since the early 1980s. The U.S. industry is moving toward larger tubes (25–inch and over) and away from smaller sizes in which the import competition has been more pronounced (see figure 10–1).

The color picture tube produced by Sony, known as the "Trinitron" tube, differs markedly from, and is not interchangeable with, conventional tubes. Differences include the electron gun, the color selection mechanism (aperture grille instead of shadow mask), and the shape of the faceplate (cylindrical rather than convex).[12]

The most important factor in demand for picture tubes is the retail consumer's preference in screen size. The increasing demand for larger screen size tubes means a greater demand for glass, as more glass is used in making larger tubes. Seventy percent of the cost of producing a color television picture tube is materials and labor, and glass constitutes about two–thirds of material costs. The demand for increased resolution also adds to the cost.[13]

Substitute Products

Domestically produced CPTs tend to be similar in characteristics and uses with imported tubes. In general, all picture tubes are made of the same materials, perform the same function, and have a similar production process. Currently there are no economically viable substitutes for color television picture tubes.[14]

Description of Upstream Industry

Glass is the major upstream industry for CPTs, representing upwards of 60 percent of the cost of materials of tubes produced in the United States.[15] Glass represents a larger percentage of the value of a CPT as tube size increases.

There are three glass producers in the United States: Corning–Asahi, Techneglas, and Thomson Consumer Electronics (TCE). For years before the

[10] Because Goldstar had not been included in the initial LTFV investigation in the first administrative review and had not shipped during the time periods examined, Commerce had no basis to establish an AD rate for Goldstar. Accordingly, it received the new shipper rate of zero percent.

[11] CPTs are a major subset of CRTs. CRTs are also used for computer and video monitors, industrial and military displays, television camera tubes, image converters, and intensifiers.

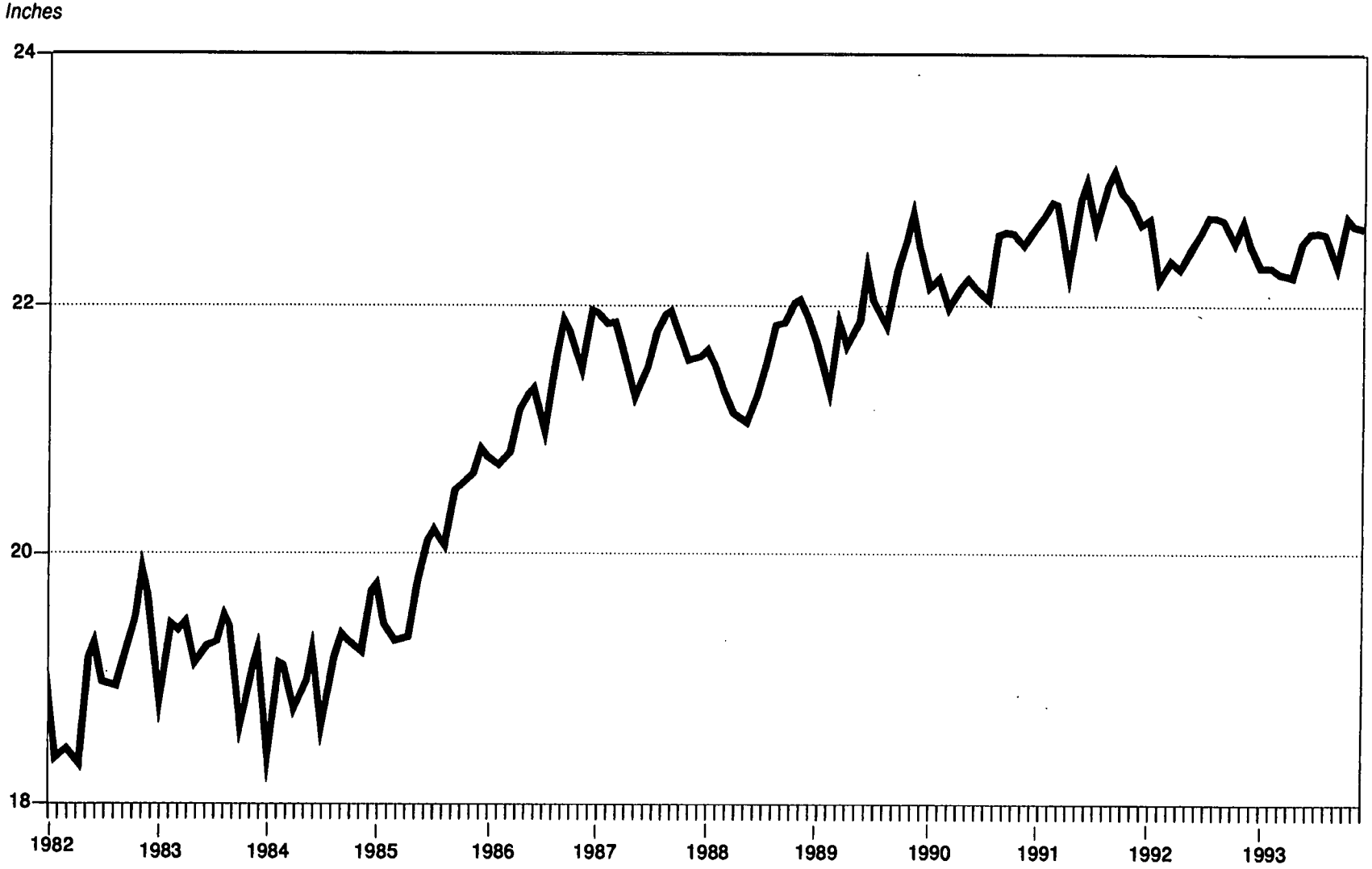
[12] The basic elements of a CPT are the envelope, electron gun, and phosphor screen. The envelope, made of glass, serves as a vacuum enclosure, substrate for the phosphor screen, and support for the electron gun. As tube size is increased, the thickness of the glass must be increased to withstand the atmospheric pressure exerted on the tube that contains a vacuum.

[13] In addition to screen size and resolution, tube consumers specify a tube by deflection angle; whether the front panel is flat or curved; whether the front panel is glare-resistant or not; aspect ratio; type of phosphors; type of electron gun; type of funnel coating; and type of mounting system.

[14] Liquid crystal displays (LCDs) are being used in small-screen color and monochrome television receivers but are limited in size to 4 inches diagonal measurement or less. The low yield in production of large LCDs makes them prohibitively expensive for use in larger screen television receivers at this time.

[15] USITC staff interviews with representatives of Sony, Thomson, and Zenith, Dec. 1994, and results of survey.

Figure 10-1
Average screen size of domestic CPTs, 1982-93



Source: Electronic Industries Association.

filing of this case, these three companies or their antecedents were the only U.S. producers of glass for picture tubes. While Corning–Asahi and Techneglas sell to any CPT producer, Thomson sells glass only to Thomson's CPT operations.

U.S. producers of glass for picture tubes have been operating at capacity since the late 1980s and remain unaffected by the AD finding.[16] Glass production for picture tubes is constrained by the total mass of glass that can be processed. As larger screen tubes consume more glass than smaller tubes, fewer large–screen tubes can be built on a given production line than smaller screen tubes. For example, a shift from a 19–inch screen to a 31–inch screen requires a 230–percent increase in the weight of the glass required (15 pounds versus 50 pounds).[17] The current trend towards larger screen sizes means that glass for fewer tubes can be produced. There has also been an increase in the number of sizes of tubes and of other characteristics of the glass (curve of faceplate and light transmission characteristics) that lead to a further decrease in capacity. Production time is lost as molds are changed and as a tank of molten glass with one light transmission factor is flushed out and replaced with glass of a different light transmission factor. A report by the Electronic Industries Association (EIA)[18] discusses the effects of the proliferation of screen sizes and greater product differentiation on the ability of the glass industry to supply tube producers.

Past attempts by the glass producers to raise prices have been very strongly fought by tube manufacturers, because price increases by tube manufacturers are fought so strongly by television receiver manufacturers. The demand for television receivers is highly elastic, and a small difference in price is reflected by a dramatic difference in demand.

Description of Downstream Industry

The color television receiver industry is the major industry downstream from the color television picture tube industry, and their histories are inextricably linked. All CPT producers are affiliated with CTV producers; however, there are CTV producers that are unaffiliated with CPT producers. It is considered necessary for CTV producers to be present in all screen size categories.[19] In times of limited supply, the affiliates are assured of a supply of tubes ahead of nonaffiliated set producers. To meet the demand for CPTs not produced by their U.S. affiliates, CTV manufacturers either import the tubes they need from affiliated plants in other countries or buy tubes from other U.S. CPT builders. The affiliation and integration of CPT and CTV producers should insulate the CPT producers to a degree from the vagaries of the marketplace in that CTV producers must buy CPTs—there are no substitutes—and the parent corporation would be expected to maximize the profits of the entire integrated operation.

In 1982, there were 16 U.S. color television producers, 5 of which were U.S. owned.[20] By 1986, when the petition was filed, there were 17 U.S. producers, of which 4 were U.S.–flag companies. In 1993, 16 domestic producers, only 1 of which was U.S. owned, produced a combined 12.0 million color television receivers, valued at $3.6 billion.[21]

The major CTV producers in the United States in 1994 were Thomson, Philips, Zenith, Sony, and Matsushita. Combined, these companies accounted for about 60 percent of the U.S. market.[22] All these companies except Sony also produce private–label color television receivers.[23] All of these companies produce color television picture tubes in the United States.

Television receiver manufacturers strongly oppose any increase in the cost of inputs, especially CPTs, which may constitute one–half the materials cost of a television receiver. In 1987, the cost of the picture tube accounted for roughly 30 percent of the total unit cost of a finished color television;[24] the CPT now represents one–half of the total unit cost of a finished color television.[25]

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[16] USITC staff interviews with representatives of Techneglas and Thomson, Dec. 1994.

[17] USITC staff interviews with representatives of Thomson, Dec. 1994.

[18] Electronic Industries Association, *Issues Impacting CRT and Glass Production in North America: TV Size/Type Proliferation*, 1994.

[19] USITC staff interviews with representatives of Sony, Thomson, and Zenith, Dec. 1994.

[20] In 1982, Harvey Industries bought the manufacturing facilities of Curtis-Mathes. The two companies were not producing simultaneously.

[21] Estimated by USITC staff based on EIA data.

[22] *Television Digest*, Jan. 31, 1994, p. 11.

[23] Goods produced by one company for sale by another, with a brand name different from that of the producer.

[24] U.S. International Trade Commission, *Liquid Crystal Display Television Receivers from Japan* (inv. No. 751-TA-14), USITC pub. 2042 (Dec. 1987), p. A-14, table 1.

[25] USITC staff interviews with industry representatives.

The United States market for color television receivers has been moving towards larger screen sizes (figure 10–2). In 1985, 19–inch and smaller color televisions accounted for 86 percent of portable color television sales to dealers in the United States.[26] By 1993, those sizes accounted for 43 percent of sales to dealers. Portable color televisions 20 inches and larger in size accounted for only 14 percent of sales of portable televisions to dealers in 1985; such sets accounted for 57 percent of sales to dealers in 1993. The same trend has held true for console color televisions. Consoles under 26 inches accounted for 66 percent of 1986 sales to dealers,[27] while consoles under 27 inches accounted for only 44 percent of 1993 sales to dealers.[28]

[26] Electronic Industries Association, *Color Television Activity Report.*

[27] The first year for which console activity by screen size is available.

[28] The screen sizes reflected in the EIA color television activity reports change year to year, so that it is difficult to achieve an exact comparison. The trend discussed here remains true in spite of the variation in screen sizes.

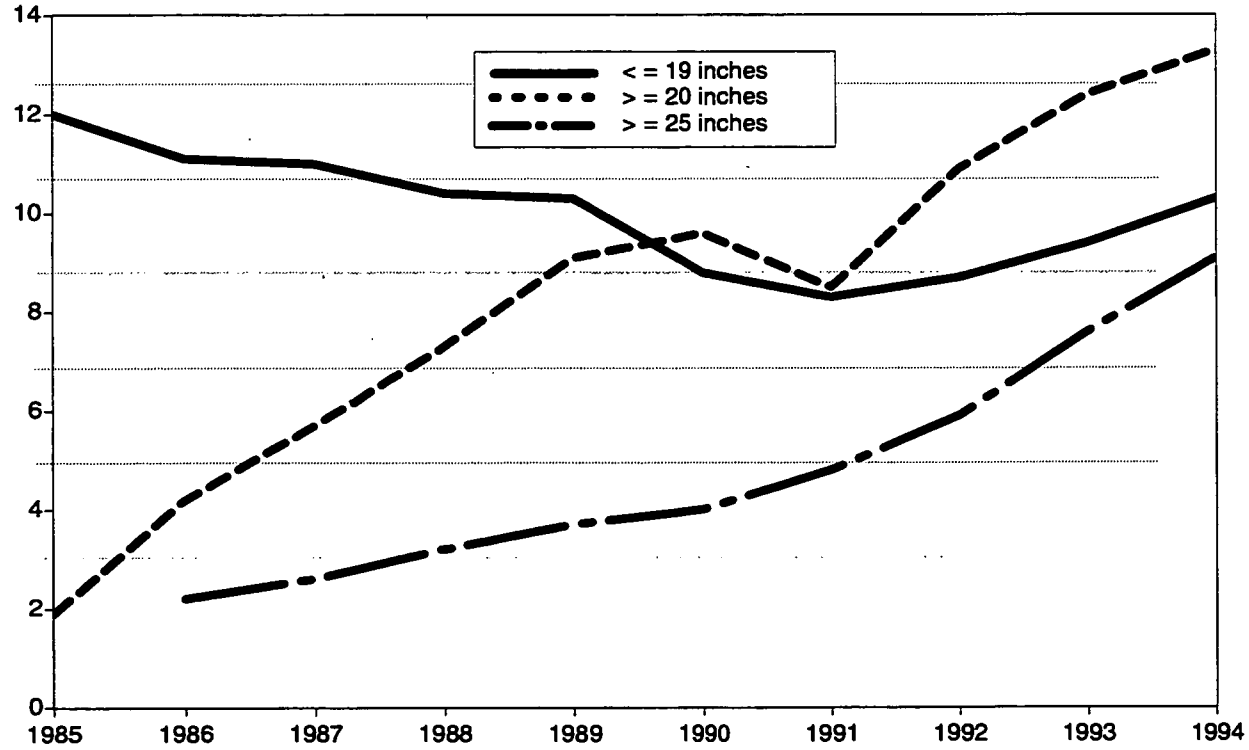
According to COMPACT, "Glass and tube production is the anchor holding CTV production in North America. The assembly of CTV sets is not capital–intensive and can easily migrate to other locations in pursuit of cheap labor or cheap components."[29] The long–term viability of the U.S. color television industry remains questionable unless new investments in tube and glass facilities are made.[30] In its prehearing report, COMPACT asserted that "The enforcement history of the antidumping law in the television industry provides little comfort for producers that are being asked to invest hundreds of millions of dollars in the next generation of color picture tubes and glass or for workers whose jobs are vulnerable to unfairly priced imports."[31]

[29] Prehearing brief of COMPACT on the Economic Effects of Antidumping and Countervailing Duty Orders and Suspension Agreements, Sept. 13, 1994, p. 4.

[30] COMPACT, prehearing brief, p. 4.

[31] COMPACT, prehearing brief, p. 4.

Figure 10-2
Sales to dealers of portable CTVs, by screen size, 1985-94
Million units



Source: Electronic Industries Association.

Approach of Investigation

Methodology

In developing and applying the methodology proposed in chapter 5 of this report, staff conducted a review of the literature to identify studies relevant to this case. No studies directly applicable to the CPT industry were identified. The literature that does exist focuses on the color television receiver industry.

The time period being considered to determine the effect of the subject imports and the remedy on the CPT industry is 1982–93. A trend analysis of such factors as shipments, imports, and consumption before, during, and after the AD investigation was conducted. A time series analysis of the type described in chapter 5 was used to estimate the impact of the unfair trade practice and remedy on the CPT industry within a demand and supply framework.

The CPE analysis provides an estimate of the impact of dumping and relief on the CPT industry for a base year. The CPE analysis uses the dumping margins to measure the difference between the price of the subject imports and a "fair value" price. The CPE analysis also provides estimates of the impact of dumping and relief on the upstream and downstream industries. Estimates of the elasticities of supply and demand for CPTs in the U.S. market were derived from the time series analysis and have been used in the CPE analysis.

Data Sources

Staff obtained monthly data on sales of color television picture tubes and color television receivers and on production[32] of color television receivers, for the period under study from the Electronic Industries Association. Monthly import and export data for color television picture tubes were collected from official statistics of the U.S. Department of Commerce; data on wage rates and producer price indexes were obtained from the Department of Labor. Other data measuring the production of color television receivers were obtained from the Board of Governors of the Federal Reserve.

[32] The production figures that appear in the EIA reports *Color Television Activity* do not separate imports from domestic production. An estimate of domestic production of CTVs can be derived by subtracting U.S. imports, as published by Commerce, from the EIA "production" number.

Data similar to that collected in the original investigation, but for the period 1987–91, were collected through questionnaires sent to CPT producers, importers, and consumers. Questionnaires were sent to 7 CPT producers and 14 major CPT purchasers, of which 5 CPT producers and 10 purchasers responded. Data collected via the questionnaire concerned information on employment, costs of production, profitability, capital expenditures, and research and development expenditures. Staff also conducted field interviews with CPT producers, television set producers, and glass producers to examine the impact of the unfair trade practice on the upstream and downstream industries as well as on the target industry.

Industry Profile

In 1982, there were seven U.S. producers of CPTs, of which three were U.S. owned, supplying 16 color television manufacturers, of which five were U.S. owned.[33] By 1986, when the case was filed, two of seven U.S. producers of CPTs were U.S. owned, supplying 17 U.S. producers of CTVs, of which only four were U.S. owned. By the end of 1988, only one of seven U.S. producers of CPTs and only three U.S. producer of CTVs were U.S. owned.

It is the contention of some industry representatives that the "lucky" TV producers are those that exited from the market.[34] Zenith, the last U.S. owned producer of CTVs, attempted to sell out in the late 1980s, but could find no takers. One industry representative stated that he had never seen the price of TVs lower anywhere in the world than in the United States, where only 0.19 percent of disposable income was spent on televisions.[35]

Size And Structure of Industry

There are seven color picture tube producers in the United States. Hitachi, Matsushita, Sony, and Toshiba are Japanese owned companies; Philips is Dutch owned; and Thomson is French owned. Zenith is the only U.S.–owned color picture tube producer in the United States. Picture tube plants now producing for Philips, Thomson, and Toshiba were once owned

[33] In 1982, Harvey Industries bought the manufacturing facilities of Curtis-Mathes. The two companies were not producing simultaneously.

[34] USITC staff interviews with representatives of Zenith, Dec. 1994.

[35] USITC staff interviews with representatives of Zenith, Dec. 1994.

by U.S. producers. Philips bought the television receiver and picture tube business of Magnavox, a U.S. company, in the 1970s, and Thomson bought the television receiver and tube business of RCA/GE in the 1980s. Toshiba went into partnership with Westinghouse in its picture tube business. The other Japanese picture tube producers built plants in the United States.[36] All these tube producers are also color television producers, although not all color television producers in the United States produce tubes here (figure 10–3). Thomson and Zenith are estimated to be the largest CPT producers in the United States, on the basis of their shares of the U.S. CTV market.[37]

CPTs manufactured by U.S. producers are shipped on a transfer basis to their affiliated television receiver production operations and are shipped on a commercial basis to the commercial market. U.S. producers' commercial sales are to unrelated color television manufacturers, including manufacturers that import CPTs. Most imports of CPTs are consumed by U.S. television–receiver–manufacturing operations that are related to foreign CPT producers; such imports are essentially captive transfers. Virtually all sales are on a contract basis, rather than spot transactions, with a typical contract being for 12 months.[38]

Demand for large–screen (25–inch and over) direct–view CTVs is increasing worldwide, leading to a shortage of large–screen picture tubes. Of 23 million direct–view CTVs sold in the United States in 1993, 19 percent were over 26 inches in diagonal measurement, up from 10 percent in 1989.[39] There are no U.S. CPTs and no U.S. CTVs being produced smaller than 19 inches in viewable diagonal measurement.

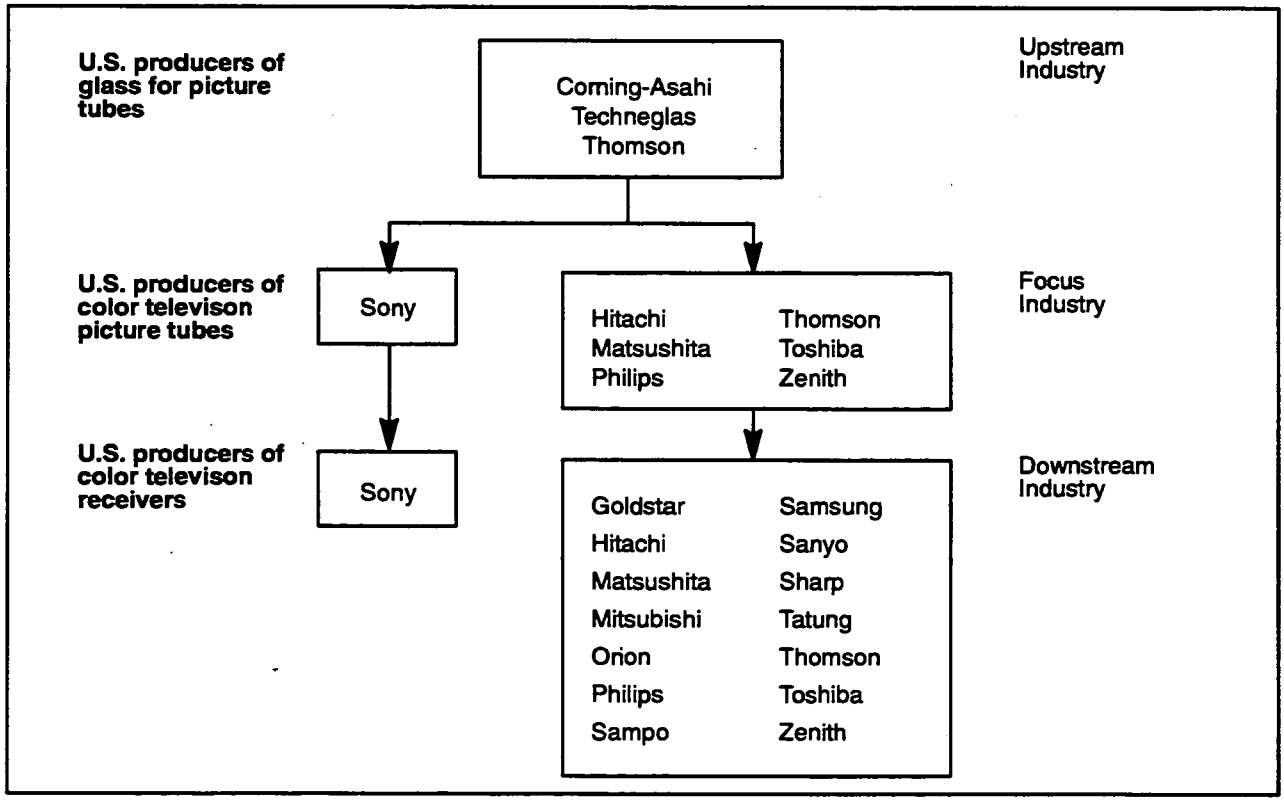
[36] Mitsubishi, another Japanese company that produces color television sets in the United States, operates a picture tube plant in Canada formerly owned by RCA.

[37] *Television Digest*, various volumes.

[38] Data submitted in response to USITC questionnaires.

[39] Electronic Industries Association, *Color Television Activity Report*, various issues.

Figure 10-3
Structure of U.S. color television picture tube industry



Source: U.S. International Trade Commission.

The extremely competitive U.S. CTV market led to the exodus of U.S. CTV producers in the 1960s and 1970s, as U.S.–flag producers were unable to compete with producers whose protected home markets gave them a competitive advantage. As U.S. CTV producers dropped out, CPT producers were obliged to shut their doors as well. The AD order on CTVs led to the increasing establishment of U.S. production by foreign producers, which for the most part were able to supply themselves with imported tubes and tubes produced in existing U.S. plants.[40]

Employment

Total employment in the electron tube industry (SIC 3671), of which color television picture tubes is a subset, declined from 35,500 in 1982 to 22,100 in 1991, or by 38 percent. On the basis of data provided by five survey respondents, the number of production and related workers in the CPT industry dropped from 8,800 in 1982 to about 8,100 in 1986, the year the petition was filed, then subsequently increased to 10,200 in 1991. The trend in the U.S. market towards large screen TV sets requiring large screen CPTs has led to greater automation in the production and handling of CPTs, because the physical size of tubes prohibits manual handling.[41] Greater automation leads to fewer employees producing more tubes.

Some U.S. tube manufacturers claim that the reduction in employment in the mid–1980s resulted from attrition, while others contend that unfair competition from imports at LTFV led to reduced employment.[42] In 1987, then–President Reagan imposed tariffs on CTV imports from Japan, as part of the enforcement of the 1986 Semiconductor Trade Agreement with Japan, and following rejection by the U.S. Supreme Court of an antitrust investigation of Japanese television company practices. It is likely that this accelerated the movement of CPT production to the United States, when combined with antidumping duties on CPTs. CPT plants opening in the United States after the determination resulted in the hiring of production workers that more than offset the earlier decline.

[40] USITC staff interviews with industry representatives of Sony, Thomson, and Zenith, Dec. 1994.

[41] USITC staff interviews with representatives of Sony, Thomson, and Zenith, Dec. 1994.

[42] Staff interviews with representatives of Sony, Thomson, and Zenith in Dec. 1994.

Industry Performance in U.S. and World Markets

The value of the world market for CRTs[43] in 1993 was about $12 billion,[44] of which Japan accounted for about 36 percent, Europe, for about 22 percent, the United States, for about 18 percent, and Korea, for about 14 percent. These figures include color television picture tubes, monochrome picture tubes, computer monitor tubes, and CRTs for other uses such as industrial instruments, avionics, or medical electronics.

Market Performance

Domestic Shipments and Prices

U.S. shipments of color television picture tubes doubled from 1982 to 1993 (table 10–1), while the value of shipments increased by 144 percent. Shipments declined from 1982 to 1983, prior to the economy's recovery from the recession. Starting in 1984, shipments rebounded and showed no major increases or declines until 1992–93, when CPT shipments increased substantially to meet the increased demand for television sets.

The average value of a color television picture tube (value of shipments/number of units shipped) increased by 21 percent from 1982 to 1993. Among the reasons for an increase in the average value has been a trend in demand for larger screen sizes and greater product differentiation between models of television receivers, the downstream industry. This differentiation is based to a large degree on characteristics of the picture tube and includes not only screen size, but contour and light–transmission attributes of the faceplate.

Subject Imports; Quantity and Prices

U.S. imports of CPTs increased by 266 percent from 1982 through 1986, the year the case was filed (table 10–2). Imports immediately dropped by 68 percent in 1987 after the Commission's final affirmative determination and dropped further in 1988 before beginning to increase (figure 10–4). By 1993, imports of CPTs had increased to 87 percent of their 1982 volume. Unit imports from the subject countries

[43] Comparable data for CPTs is not available on a worldwide basis; therefore CRT activity is used as a proxy.

[44] *Yearbook of World Electronics Data*, Elsevier Science Publishers, Ltd.

Table 10-1
Color picture tubes: U.S. shipments, imports, exports, and apparent consumption, 1982-93

Year	Shipments	Exports	Imports	Apparent consumption	Ratio *(percent)* of imports to consumption	Ratio *(percent)* of exports to shipments
	Quantity *(1,000 units)*					
1982	9,275	298	628	9,605	6.5	3.2
1983	10,737	317	674	11,094	6.1	2.9
1984	11,975	347	793	12,421	6.4	2.9
1985	10,720	434	1,701	11,987	14.2	4.0
1986	11,212	463	2,322	13,070	17.8	4.1
1987	11,716	513	732	11,935	6.1	4.4
1988	12,153	1,564	208	10,797	1.9	12.9
1989	13,388	1,626	297	12,058	2.5	12.1
1990	12,115	2,192	362	10,285	3.5	18.1
1991	11,925	2,988	333	9,270	3.6	25.1
1992	13,243	3,491	396	10,148	3.9	26.4
1993	18,524	4,866	547	14,205	3.8	26.3
	Value *(1,000 dollars)*					
1982	820,758	25,745	38,602	833,615	4.6	3.1
1983	902,274	29,588	38,640	911,325	4.2	3.3
1984	974,389	32,378	46,473	988,484	4.7	3.3
1985	906,791	40,084	82,499	949,205	8.7	4.4
1986	993,577	44,881	105,908	1,054,604	10.0	4.5
1987	977,580	48,829	62,449	991,200	6.3	5.0
1988	959,488	127,323	54,685	886,849	6.2	13.3
1989	1,343,354	163,684	73,745	1,253,415	5.9	12.2
1990	1,280,461	243,050	72,835	1,110,246	6.6	19.0
1991	1,198,630	335,799	69,526	932,358	7.5	28.0
1992	1,318,769	378,811	66,858	1,006,816	6.6	28.7
1993	1,994,430	541,899	106,587	1,559,118	6.8	27.2
	Average value *(per unit)*					
1982	$88.50	$86.47	$61.44	$86.79	[1]	[1]
1983	84.03	93.43	57.33	82.14	[1]	[1]
1984	81.37	93.30	58.62	79.58	[1]	[1]
1985	84.59	92.46	48.50	79.18	[1]	[1]
1986	88.62	96.94	45.62	80.69	[1]	[1]
1987	83.44	95.16	85.36	83.05	[1]	[1]
1988	78.95	81.41	262.79	82.14	[1]	[1]
1989	100.34	100.64	248.25	103.95	[1]	[1]
1990	105.69	110.89	201.38	107.95	[1]	[1]
1991	100.51	112.39	208.54	100.57	[1]	[1]
1992	99.58	108.50	168.99	99.22	[1]	[1]
1993	107.67	111.36	194.96	109.76	[1]	[1]

[1] Not applicable.

Source: Shipments, EIA; imports and exports, official statistics of the U.S. Department of Commerce.

dropped from virtually 100 percent of total U.S. imports in 1982 to 30 percent in 1993.[45]

[45] Color television picture tubes also enter the United States as kits, containing all parts necessary for assembly into complete receivers, and incomplete receivers imported with a picture tube. Under the *Tariff Schedules of the United States (TSUS)*, imports of CPTs were recorded under three separate subheadings: bare picture tubes (*TSUS* 687.3512-20); complete unassembled receivers ("kits")(*TSUS* 684.9655); or incomplete receivers imported with a picture tube (*TSUS* 684.9656-60). When the *HTS* was adopted in 1989, there were no subheadings for kits or incomplete receivers with tubes. Instead, products formerly imported under those subheadings were imported under the subheadings for complete color television receivers. For the sake of consistency and in light of the unavailability of data from 1989 onward, discussion of trade in CPTs excludes kits and incomplete receivers except where otherwise noted.

Table 10-2
Color picture tubes: U.S. imports by specified countries, 1982-93

Year	Canada	Japan	Singapore	Korea	All other	Total
			Quantity *(1,000 units)*			
1982	24	583	17	2	2	628
1983	7	485	72	99	11	674
1984	106	351	83	151	102	793
1985	229	501	153	776	42	1,701
1986	328	311	183	1,494	5	2,322
1987	218	147	46	269	51	732
1988	80	95	(1)	15	18	208
1989	71	122	0	22	82	297
1990	2	147	2	34	176	362
1991	48	109	(1)	6	169	333
1992	31	109	2	8	246	396
1993	38	109	2	12	385	547
			Value *(1,000 dollars)*			
1982	1,963	35,646	755	134	103	38,602
1983	457	28,695	3,332	5,561	595	38,640
1984	7,596	22,651	4,297	7,123	4,805	46,473
1985	15,532	27,786	7,174	29,735	2,272	82,499
1986	21,882	21,476	8,003	54,207	339	105,908
1987	15,506	31,247	1,917	10,667	3,112	62,449
1988	9,119	43,201	13	935	1,417	54,685
1989	9,060	56,385	(2)	1,272	7,027	73,745
1990	398	53,855	109	3,145	15,330	72,835
1991	5,711	46,264	27	385	17,139	69,526
1992	3,861	47,805	139	548	14,505	66,858
1993	2,994	46,411	115	705	56,363	106,587
			Average unit value			
1982	$80.37	$61.15	$44.28	$59.31	$62.75	$61.44
1983	62.95	59.19	46.21	56.00	56.49	57.33
1984	71.53	64.62	51.80	47.08	47.20	58.62
1985	67.70	55.50	47.02	38.31	53.91	48.50
1986	66.64	69.08	43.83	36.28	62.01	45.62
1987	71.23	211.86	41.53	39.62	61.04	85.36
1988	113.82	455.75	88.32	62.41	78.45	262.79
1989	128.18	461.04	(2)	58.09	85.52	248.25
1990	166.47	367.31	47.68	91.22	87.13	201.38
1991	118.18	422.65	103.63	63.34	101.26	208.54
1992	122.78	439.07	76.32	72.36	58.98	168.99
1993	78.02	425.43	60.94	59.14	146.24	194.96

[1] Less than 500 units.
[2] Not applicable.

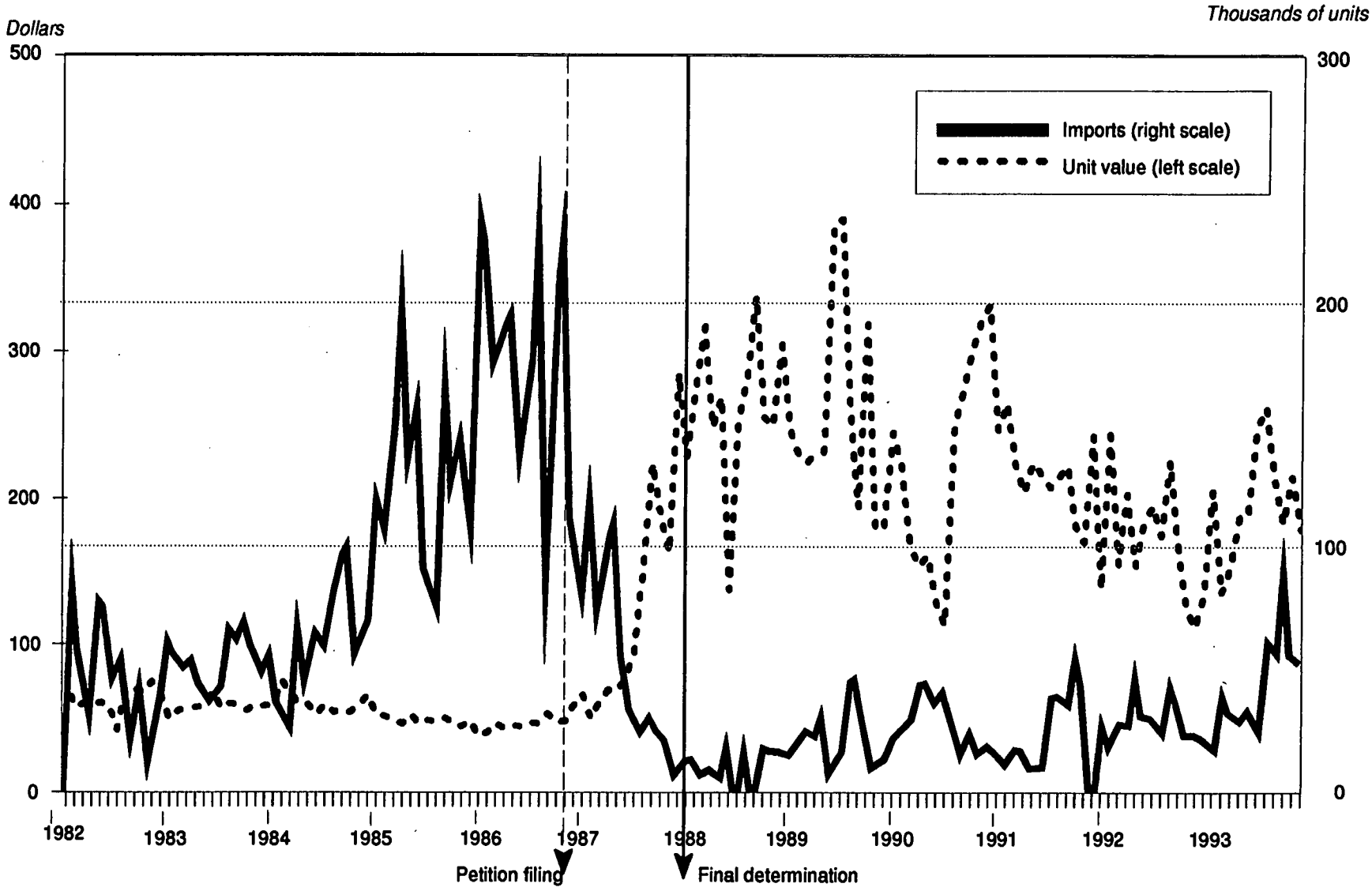
Source: Official statistics of the U.S. Department of Commerce.

The value of imports from the subject countries also dropped from a virtual 100 percent of total U.S. imports in 1982 to 47 percent in 1993 (see figure 10–5). The average value of imported CPTs rose from $61 in 1982 to $263 in 1988, the year in which the AD duties were imposed. The average value has recently fluctuated around $200 (figure 10–4).

The impact of the dumping investigation on import quantity and unit value is evident from figure 10–4. During 1987, prices rose substantially and quantity imported fell significantly. Such major changes are not evident in domestic CPT shipments and prices.

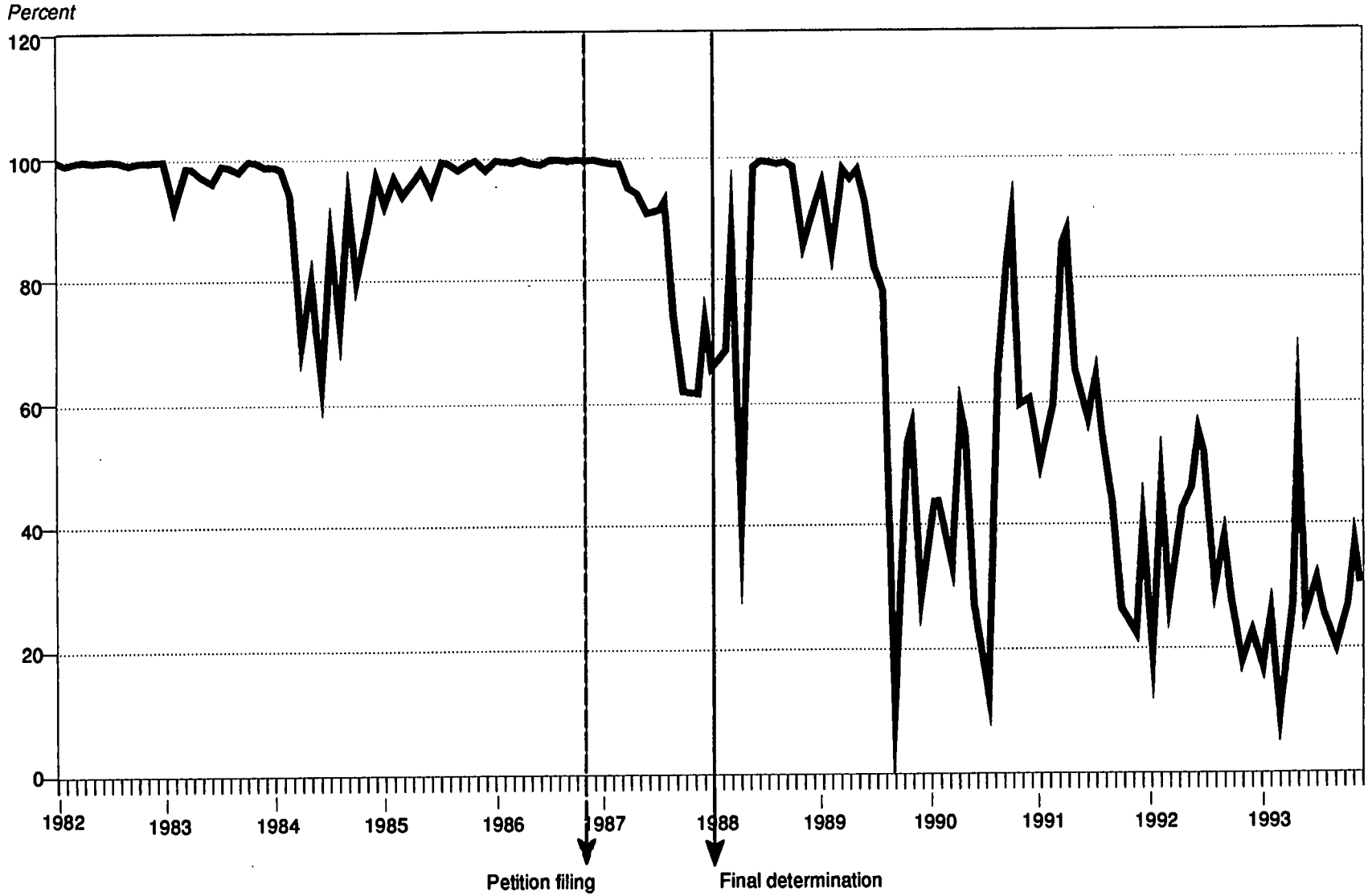
The major sources of CPTs during 1982–93 were Japan and Korea, which each supplied over 30 percent of U.S. imports, and Canada, which supplied 13 percent. Imports from Japan exceeded imports from all other countries during every year of this period except 1985–87, when Korea was the leading source, and 1992–93, when Taiwan was the top supplier. Japan supplied 93 percent of U.S. imports in

Figure 10-4
Quantity and average unit value for imported CPTs, 1982-93



Source: Official statistics of the U.S. Department of Commerce.

Figure 10-5
CPTs: Subject imports as a percent of total imports, 1982-93



Source: Official statistics of the U.S. Department of Commerce.

1982, but by 1993 it supplied only 20 percent. As the cost of labor in Japan increased, production was moved offshore. And as the demand for larger screen CTVs increased, Japanese producers built factories in the United States and other major markets.

Imports from Korea grew rapidly from less than 1 percent in 1982 to a peak of 64 percent of U.S. imports in 1986, the year in which this case was filed, then fell back to 2 percent in 1993. Taiwan's share increased from less than 1 percent in 1986 to 26 percent by 1993.

U.S. Exports

U.S. exports of CPTs increased dramatically from 1982 through 1993, from less than 300,000 units to 4.9 million units (table 10–3). Exports to Mexico, currently the largest foreign market, increased even more dramatically, from less than 400 in 1982 to 3.7 million in 1993, to the point that exports to Mexico represent over 75 percent of U.S. exports of CPTs. The reason for the dramatic increase in exports to Mexico was the establishment of color television assembly plants in that country by virtually every U.S. color television producer.

Domestic Consumption and Downstream Demand

Apparent U.S. consumption of CPTs increased from 9.6 million units, valued at $834 million, in 1982 to 14.2 million units, valued at $1.6 billion, in 1993 (table 10–1). In 1982, U.S. production of color picture tubes accounted for 95 percent of the value of U.S. consumption. By 1986, when the AD investigation was initiated, U.S. production had fallen to 90 percent of U.S. consumption. By 1993, U.S. production accounted for 93 percent of U.S. consumption.

CPT producers contend that they have been operating at capacity for a number of years, and while the AD order has led to a reduction in imports of CPTs, it has in turn led to the establishment of a number of additional CPT producers in the United States. Now, instead of competing with importers, U.S. CPT producers are competing with other domestic producers.[46]

[46] Information supplied in response to USITC questionnaires.

Estimates of Economic Effects

The time series analysis examines the CPT industry during 1982–93 to assess the effects of the unfair trade practice. The CPE analysis looks at 1986 to assess the effects of the unfair trade practice and remedy on the industry.

Time Series Analysis

Hypotheses Tested

The time series analysis tests the hypothesis that there are differences in the quantity demanded or supplied of CPTs before the filing of the petition, after the filing but before the final determination, and after the final determination. This hypothesis is tested by using binary variables that partition the data into the three relevant time periods. The binary variables are expected to indicate that the performance of the U.S. industry improved during the second and third time periods, on the basis of the assumption that the unfair trade practice was occurring during the first time period and domestic output or price or both were suppressed below levels associated with imports at fair value. The binary variables are included for the filing of the petition (0 before December 1986, 1 thereafter) and the final affirmative determination (0 before January 1988, 1 thereafter) in all estimated equations. The first is termed PETITION variable and the second is termed REMEDY variable in the results reported below.[47]

The hypothesis is tested within a structural demand–supply model similar to the one described in chapter 5. In the analysis for this case, the six–equation model presented in chapter 5 is adapted to estimate three equations: domestic supply, domestic demand, and import demand. These equations examine the impact of the unfair trade practice and remedy on domestic shipments and imports in terms of quantity, so, the binary variables are expected to show that the unfair trade practice and remedy had an impact on industry output of CPTs and on imports.

The quantity of CPTs supplied is modeled as an increasing function of CPT price and a decreasing

[47] *Technical note.*—The binary variables are constructed so that the REMEDY variable measures the incremental impact of the final affirmative determination over and above the impact captured by the PETITION variable.

Table 10-3
Color picture tubes: U.S. exports to Mexico and all other countries, 1982-93

Year	Mexico	All other	Total
	Quantity *(1,000 units)*		
1982	([1])	297	298
1983	3	314	317
1984	2	345	347
1985	19	414	434
1986	101	362	463
1987	195	318	513
1988	777	787	1,564
1989	1,088	538	1,626
1990	1,498	694	2,192
1991	1,911	1,077	2,988
1992	2,621	871	3,491
1993	3,686	1,181	4,866
	Value *(1,000 dollars)*		
1982	70	25,674	25,745
1983	403	29,185	29,588
1984	268	32,110	32,378
1985	1,877	38,207	40,084
1986	10,107	34,774	44,881
1987	16,215	32,614	48,829
1988	49,280	78,044	127,323
1989	102,260	61,423	163,684
1990	142,359	100,692	243,050
1991	189,538	146,261	335,799
1992	246,340	132,471	378,811
1993	359,588	182,311	541,899
	Average unit value *(per unit)*		
1982	$186.24	$86.34	$86.47
1983	143.79	92.98	93.43
1984	114.70	93.15	93.30
1985	97.18	92.24	92.46
1986	99.62	96.19	96.94
1987	83.09	102.56	95.16
1988	63.42	99.18	81.41
1989	93.99	114.09	100.64
1990	95.04	145.13	110.89
1991	99.20	135.79	112.39
1992	94.00	152.18	108.50
1993	97.57	154.42	111.36

[1] Less than 500 units.

Source: Official statistics of U.S. Department of Commerce.

function of the costs of production, such as the prices of material inputs or labor rates. The quantity of CPTs supplied is expected to increase as CPT prices increase and to decrease as the costs of production increase. U.S. producers' shipments of CPTs are used as a measure of the quantity supplied. The price of CPTs is measured by the average unit value of U.S. producers' shipments. The costs of production are measured by wages and glass prices. As discussed earlier, during 1982–91, glass made up two–thirds of the cost of materials, and wages and the cost of materials together accounted for more than 70 percent of the value of shipments for SIC 3671, the SIC that covers CPTs, according to official statistics. Data on the average wage paid to production and related workers in SIC 3671 and the producer price index for glass are used as measures of the cost of production. The average screen size of domestically produced CPTs is used since a number of sizes were produced during 1982–93. The larger screen sizes use more glass per CPT and are thus more expensive to produce. A domestic set production index is included because all of the CPT producers are part of larger CTV manufacturing firms, and CTV producers are expected to optimize their operations so that the various elements (CPT

production or CTV production) are producing at the most jointly profitable level. The estimated supply equation is as follows:

> Quantity supplied = f(PETITION variable, REMEDY variable, WAGES, GLASS PRICES, U.S. PRICE, AVERAGE SCREEN SIZE, SET PRODUCTION INDEX).

The coefficients on the PETITION variable and the REMEDY variable are of particular interest, since they measure whether the unfair trade practice and remedy had an impact on the quantity supplied. These variables are expected to be positive, indicating that the quantity of CPTs supplied during the second and third time periods was larger than the quantity supplied during the first time period, when the unfair trade practice occurred, other factors held constant.

Demand for CPTs is split into domestic demand and demand for imports. Domestic demand is demand for U.S. producers' domestic shipments, which is U.S. producers' total shipments less exports of CPTs. Domestic demand is a function of downstream activity (television set production), domestic CPT prices, and prices of imported CPTs. Downstream activity is measured by the set production index maintained by the Board of Governors of the Federal Reserve. Domestic CPT prices are measured as previously described, and the price of imported CPTs is measured by the average unit value for imported CPTs. The estimated domestic demand equation is:

> Domestic demand = f(PETITION variable, REMEDY variable, SET PRODUCTION INDEX, U.S. PRICE, IMPORT PRICE).

Again, the PETITION and REMEDY variables are included to measure the impact of the unfair trade practice and remedy.

Import demand is a function of downstream activity, the price of domestic CPTs, and the price of imported CPTs. As was shown in figure 10–5, imports from the four subject countries, Japan, Korea, Canada, and Singapore, accounted for almost 100 percent of total imports during 7 of the 12 years covered in this case study and accounted for 85 percent of all imports during the period. A single demand equation is estimated for total imports rather than for subject imports and nonsubject imports separately, since subject imports accounted for the majority of imports during the period. The estimated import demand equation is:

> Import demand = f(PETITION variable, REMEDY variable, SET PRODUCTION INDEX, U.S. PRICE, IMPORT PRICE).

The PETITION and REMEDY variables are defined as before.

Data Sources

Staff obtained monthly data on sales of color television picture tubes and color television receivers and on production[48] of color television receivers for the period under study from the Electronic Industries Association. Monthly import and export data for color television picture tubes were collected from official statistics of the U.S. Department of Commerce; data on wage rates and producer price indexes were obtained from the Department of Labor. Other data measuring the production of color television receivers were obtained from the Board of Governors of the Federal Reserve.

The data for all variables except the PETITION and REMEDY variables are in logged form.[49,50] The nominal variables—wages, price of domestic CPTs, and price of imported CPTs—are divided by the producer price index for all electronic equipment to obtain real values. The regression equations are estimated using 3–stage least squares.[51] The results are presented in table 10–4.

[48] The production figures that appear in the EIA reports *Color Television Activity* do not separate imports from domestic production. An estimate of domestic production of CTVs can be derived by subtracting U.S. imports, as published by Commerce, from the EIA "production" number.

[49] Technical note: Coefficients of binary variables in logarithmic equations may be transformed into estimated percentage changes by raising e, the base of the natural logarithm, to the power of the coefficient, subtracting one, and multiplying by 100. See R. Halvorsen and R. Palmquist, "The Interpretation of Dummy Variables in Semilogarithmic Equations," *American Economic Review*, vol. 70 (1980), pp. 474-475.

[50] Technical note: Due to the specification of the variables in logarithmic form, coefficients for non-binary variables in table 10-4 can be interpreted as elasticity estimates. An elasticity is the percentage change in the dependent variable (quantity) that results from a one-percent change in an explanatory variable.

[51] Technical note: Diagnostic tests, such as the Durbin-Watson test for serial correlation, and summary statistics, such as the R^2, are not well defined for system equation techniques and are not reported below. See G. Judge, W. Griffiths, R.C. Hill, and T.C. Lee, *The Theory and Practice of Econometrics* (New York: John Wiley & Sons, 1980), p. 251-57 and confirmed with T.C. Lee on November 11, 1994.

Table 10-4
Color picture tube case model: Coefficients of supply and demand and related t-statistics

Independent variable	Supply	Demand for—	
	U.S. producers' total shipments	Domestic production	Imports
Petition variable	-.04 (-.20)	-.17 (-2.62)***	.15 (.87)
Remedy variable	.03 (.49)	-.24 (-2.87)***	.02 (.10)
Intercept	14.27 (3.58)***	12.78 (7.84)***	9.74 (2.25)**
Wages	.85 (.35)	(1)	(1)
Glass prices	-.30 (-.23)	(1)	(1)
U.S. price	-.55 (-.53)	-.65 (-1.90)*	.63 (.69)
Average screen size	-.66 (-1.70)*	(1)	(1)
Set production index	.75 (10.49)***	.68 (10.15)***	.91 (5.12)***
Import price	(1)	.17 (2.38)**	-1.33 (-7.11)***
Number of observations	144	144	144

1 Not applicable.

Note.—t-statistics are in parentheses with significance as follows:

* = significant at the 90 percent confidence level
** = significant at the 95 percent confidence level
*** = significant at the 99 percent confidence level

Source: Compiled by the staff of the U.S. International Trade Commission.

Results

The results for the supply equation do not support the hypothesis that the unfair trade practice and remedy had a significant effect on the supply of CPTs during 1982–93. In the domestic supply regression, both binary variables are not significant. The petition variable is negative, which is not expected; however, it is not significant. The REMEDY variable is positive as expected but is not significant, indicating that the final determination did not have a significant effect on CPT supply. The lack of significance of both of the binary variables indicates that there was no statistical difference among the three time periods, prefiling, postfiling, and postfinal, in terms of the quantity of CPTs supplied during 1982–93, other variables held constant. Although the binary variables do not conform to expectations, their results do accord with industry views. Industry representatives told staff that there had been no noticeable change in operations in CPT production during the time when the case was filed,[52] so the lack of statistical significance for the binary variables corresponds with the information obtained from industry sources.[53]

The regression results for AVERAGE SCREEN SIZE show it as being negative and significant. Since it takes more glass to make the larger sizes, this accords with expectations. The results for the

[52] USITC staff interviews with industry representatives Nov. and Dec. 1994.

[53] As noted in chapter 5, a number of strategic responses by foreign firms, often with very different economic effects, may occur during the investigation process. Thus, the lack of statistical significance for the PETITION and REMEDY variables in the supply equation may reflect the influence of varying strategic responses over the course of the investigation.

SET PRODUCTION INDEX show it as being positive and highly significant, as expected. The results for U.S. PRICE and WAGES do not have the expected signs but are not significant. GLASS PRICES have the expected sign, but are not significant.

The results for the domestic demand equation show all variables as having the expected signs except for the PETITION variable and the REMEDY variable. Domestic demand would be expected to increase as AD duties were placed on imported CPTs, making foreign CPTs more expensive, so the binary variables should have positive signs. However, the results show negative signs for the binary variables, indicating that they have an opposite effect from what was expected. Also, both the PETITION variable and the REMEDY variable are significant. The coefficient for SET PRODUCTION INDEX was significant. This result matches the expectation that the demand for CPTs increases as more televisions are produced. The coefficients for U.S. PRICE and IMPORT PRICE have the expected signs and were significant.

The results for the import demand equation again show that the PETITION variable and the REMEDY variable both have the incorrect sign; however, they are not significant. The positive signs on the binary variables indicate that the demand for imported CPTs increased after the filing of the case, other factors held constant, even though demand was expected to fall because of the higher prices of imported CPTs. The other results that show that the demand for imported CPTs is negatively related to the IMPORT PRICE and positively related to the U.S. PRICE of CPTs for which the imports would substitute accord with expectations, although the coefficient on U.S. PRICE is not significant. Import demand is positively related to the SET PRODUCTION INDEX, the downstream activity variable.

In general, the results for the binary variables do not correspond with expectations. In only one equation (quantity supplied) does a binary variable have the expected sign, and even there, it is not significant. In the two demand equations, the binary variables have unexpected signs and are significant two of four times.[54] The results for the traditional supply and demand variables, especially the demand variables, accord with expectations better than the results for the binary variables. The unexpected signs might be the result of the integrated nature of the CPT and CTV industries in the United States.[55] Production and consumption decisions of CPT and television set makers might have been influenced to a much larger degree by the demand for television sets by the public rather than by the circumstances surrounding the AD investigation.

Computable Partial Equilibrium Analysis

The CPE analysis is designed to measure the impact of the dumping and the relief on the U.S. color picture tube industry for a year when the unfair practice was occurring. The base year for the information used in the present CPE analysis is 1986, because the petition was filed in November of that year and Commerce determination of the margins was based on June 1, 1986–November 30, 1986.

The inputs used in the CPE model, shown in table 10–5, are based primarily on the report from the dumping investigation,[56] fieldwork, discussions with industry experts, and the economic memorandum[57] for the case. The value of the margin of dumping used in the CPE model is a weighted average of the "All Other" margins for the four subject countries.[58] The domestic value in table 10–5 is the value of shipments reported by EIA for 1986. The subject value is calculated by taking the customs value of imports from Japan, Canada, Korea, and Singapore

[54] As noted in chapter 5, a number of strategic responses by foreign firms, often with very different economic effects, may occur during the investigation process. Thus, the unexpected results for the PETITION and REMEDY variables in the demand equations may reflect the influence of varying strategic responses over the course of the investigation.

[55] Regressions which separated the demand for imports into a demand for subject imports and a demand for nonsubject imports were also estimated. The results of these regressions did not differ substantially from the single regression for import demand reported in table 10-4. Notably, the coefficients for the PETITION and REMEDY variables remained positive, contrary to expectations. Regressions were also estimated with AVERAGE SCREEN SIZE included in the demand equations. The results for the AVERAGE SCREEN SIZE variable in the separate import demand equations were not significant, thus, the AVERAGE SCREEN SIZE was retained only in the supply equation. However, with the inclusion of AVERAGE SCREEN SIZE in the import demand equations, the PETITION variable became statistically significant.

[56] USITC, *Color Picture Tubes From Canada, Japan, the Republic of Korea, and Singapore*, inv. No.731-TA-367 through 370 (final), Dec. 1987, USITC publication 2046.

[57] USITC Economics memorandum EC-K-471, Dec. 11, 1987.

[58] The "All Other" margins are listed on page 10-1.

Table 10-5
Computable partial equilibrium analysis for color picture tubes: Assumed values of input variables, 1986

Input variable	Minimum	Maximum
Dumping margin[1]	7.63	(2)
Values for U.S. market (*1,000 dollars*):		
Domestic value	993,577	(2)
Subject value	125,763	(2)
Non-subject value	433	(2)
U.S. market elasticities (absolute value):[3]		
Substitution:		
Domestic/subject	5	10
Domestic/nonsubject	5	10
Subject/nonsubject	5	10
Aggregate demand	-.25	-.75
Supply:		
Domestic	0.5	1
Subject	5	10
Nonsubject	1	5

[1] Trade-weighted average dumping margin for subject countries. The average is based on "All Other" margins calculated by Commerce in its final investigation.
[2] Not applicable.
[3] Elasticities are based on estimates in Economics Memorandum EC-K-471, field work, and staff interviews.
Source: Compiled by the staff of the U.S. International Trade Commission.

and adding to that figure the 15–percent *ad valorem* duty for CPTs and an additional 4 percent to cover estimated transportation costs.[59] The nonsubject value is calculated in a similar manner.

The estimated values for the elasticity of substitution between the domestic product, subject imports, and nonsubject imports are all high. The economics memorandum noted a study that gave the elasticity of substitution between domestic color television sets and imported television sets as 9.392 and indicated that the elasticity of substitution between domestic and imported tubes would be at least as high. Color television sets have some brand name recognition and loyalty, but color picture tubes of the same screen size are undifferentiated products; this would indicate that the elasticity of substitution for CPTs should be higher than that for sets. However, CPTs can vary as to whether they are "flat–square" or have some other configuration and whether they have standard or dark tint glass. These factors would mitigate the substitutability of CPTs; hence, the range of 5 to 10 is selected for the elasticity of substitution, which bounds the value noted above for set substitutability.

The range used for the elasticity of demand is –.25 to –.75. The results of the time series analysis showed the elasticities for domestic and import demand as being –.65 and –1.33, respectively. The elasticity for the total demand for CPTs is less than any of the parts because, for example, an imported CPT could be substituted for a domestic CPT and vice versa.[60]

Discussions with CPT producers and purchasers and with glassmakers indicate that CPT production has been running near capacity since 1984. Since CPT production is capital–intensive, each producer wants to keep capacity utilization high to cover costs. Further, all CPT producers are integrated into set production, and the decision as to how many tubes to make is not made independently of each television set producer's estimate of how many sets they will sell. These factors and the time series results indicate that CPT output will not change substantially with a change in price, so a range of .5 to 1 is used as the estimate of domestic supply.[61]

[59] Transportation costs are estimated by using the ratio of CIF value to customs value for imports that gives the 4-percent figure.

[60] The economics memorandum provided an estimated range for the elasticity of demand for CPTs of -1.5 to -2.5, which was derived from an elasticity of demand for color television sets. The range of elasticity estimates from the time series analysis are lower than those of the economics memorandum but are preferred because they are based on actual CPT data rather than being derived from an elasticity estimate of the downstream product.

[61] The elasticity of domestic supply was described as being high in the economics memorandum; however, the results of the time series analysis did not corroborate this estimate.

The elasticity of supply for the subject countries is estimated to range between 5 and 10.[62] Two of the subject countries, Japan and Korea, were the two largest producers of CRTs in the world in 1992. Together, they accounted for about 73 percent of world CRT production, indicating that they have ample capacity to supply world markets.

The elasticity of supply for the nonsubject countries is estimated to be lower than that for the subject countries, ranging from 1 to 5. The capacity available for CRT production in the nonsubject countries is much less than that available in the subject countries. Taiwan, the largest nonsubject supplier of CPTs to the U.S. market, is emphasizing computer monitor production, because it is more profitable than color television set production, further limiting the supply available from nonsubject sources.

[62] The economics memorandum indicated that the elasticity might range from 5 to 15. The subject countries had developed alternative markets and could shift exports between these markets in response to price.

Effects of Unfair Trade Practice

The results of the CPE model for the effect of the dumping and the remedy are presented in table 10–6. The estimates in this table are based on the midpoints of the parameter ranges given in table 10–5. The model generates a series of scenarios on the basis of a range of elasticities. The effects on prices, output, and revenue for the domestic product, subject imports, and nonsubject imports are reported as a percent of the fair value that would have existed had the dumping not occurred.

For the effect of the unfair trade practice, the price in the U.S. market was 2.8 percent below what it would have been if there had been no LTFV imports. Domestic output was 1.2 percent lower and domestic revenues were 4.0 percent lower. Employment in the domestic industry was 1.0 percent lower than if there had been no LTFV imports. The CPE analysis shows that subject import price was 6 percent below fair value, subject import quantity was 26.9 percent above what it would have been in the absence of the unfair trade practice, and subject import revenue was

Table 10-6
CPTs: Results of computable partial equilibrium analysis (estimated effect on U.S. market of unfair trade practices and remedies), base year 1986[1]

Item	Unfair trade practice	Unfair trade practice and remedy	Remedy
	—(*Change from fair value*)[2] —		(*Change from actual value*)[3]
Impact on industry *(percent)*:			
Domestic price	-2.8	-1.4	1.5
Domestic output	-1.2	-.0	1.1
Domestic revenue	-4.0	-1.4	2.7
Domestic employment	-1.0	0.0	1.0
Impact on imports *(percent)*:			
Subject import price	-6.0	-2.2	4.0
Subject import quantity	26.9	7.0	-15.7
Subject import revenue	19.2	4.6	-12.3
Nonsubject import price	-2.2	-1.1	1.2
Nonsubject import quantity	-5.6	-2.2	3.7
Nonsubject import revenue	-7.8	-3.2	4.9
Welfare effects (*1,000 dollars*):			
Gain to consumers	37,145	16,276	-20,302
Benefit to producers	-29,087	-13,451	15,246
Net welfare effects	8,058	2,825	-5,057

[1] The estimated effects reported are the results of the Commission's CPE model using the midpoint values of parameter ranges listed in table 10-5. This model accounts only for the short term effect of unfair practices and remedies of cases with affirmative determinations in the base year, as discussed in the text.

[2] The "fair values" are the values estimated by the model to have been in place without the effect of the unfair trade practice.

[3] The "actual values" are the market values during the base year.

Source: Estimated by the staff of the U.S. International Trade Commission.

19.2 percent greater than it would have been in theabsence of the unfair trade practice.

Effects of Remedy

The CPE model estimates the effects of the AD duty remedy in two ways (table 10–6): (1) the combined effect of both the unfair trade practice and the remedy, relative to the fair value that would have existed in the absence of both, and (2) the effect of trade remedy alone relative to the actual market values experienced in the base year, 1986. The CPE analysis shows that with the unfair trade practice and remedy both in place, the domestic price would have been 1.4 percent below fair value.[63] Domestic output would have been almost unchanged; this corresponds to information gathered in interviews with industry officials who said that output had not varied significantly since 1984. Domestic revenue would have been 1.4 percent below fair value. Domestic employment would have returned to a level approximately equal to the one that existed prior to the unfair trade practice. Subject import price would have been 2.2 percent below, subject import quantity would have been 7.0 percent above, and subject import revenue would have been 4.6 percent above the fair value levels.

The third step of the analysis looks at the impact of the remedy relative to actual market conditions that existed in 1986. The CPE analysis indicates that the remedy would have increased domestic price by 1.5 percent relative to the market price that existed in 1986. Similarly, with the remedy in place, domestic output would have been 1.1 percent greater and revenue would have been 2.7 percent greater than the corresponding values that existed in 1986. For purposes of comparison, the unit value of domestic CPTs in 1986 was $88.62 (table 10–1), 4 percent below the 1982–93 average of $92.19. Similarly, shipments were 8 percent below and revenues were 12 percent below their 1982–93 averages. Subject import price would have been 4.0 percent above the 1986 value had the remedy been in place. Also, subject import quantity and revenue would have been lower by 15.7 and 12.3 percent, respectively. Again, for comparison, the unit value of CPT imports from the subject countries was $45.58 in 1986, or 50 percent of the average for 1982–93. The number of CPTs imported from the subject countries in 1986 was 3.6 times the average of 1982–93, and revenues were 82 percent greater than the 1982–93 average.

[63] The fact that domestic prices remained 1.4 percent below fair value is a terms-of-trade effect reflecting an incomplete pass through of the AD duty. As a result, the remedy would not have restored the price of domestic products and the output and revenues of the domestic industry fully to the levels resulting from fair-valued imports. This was explained in chapter 5. Subject product exporters could have eliminated the practice of dumping (having different prices in the home and export markets) without raising average U.S. prices by the full Commerce margin if they lowered the home market price and raised the export price until they were equal. The results suggest that the antidumping remedy would have suppressed foreign home market prices by about 2.2 percent as product was diverted from the U.S. market.

Net Welfare Effects

The welfare effects of the dumping and AD remedy are divided between the downstream industry and the upstream and producing industries. Table 10–6 indicates that television set producers, the downstream industry, gained $37.1 million as a result of the dumping, because they could obtain CPTs at lower cost. The producing and upstream industries, CPT producers and glass makers, lost an estimated $29.1 million, because they were unable to get a fair price for their outputs as a result of the dumping. These estimates likely overstate any losses to the upstream industry, however, since glass producers have been operating at capacity throughout most of the period. The estimated change in net welfare as a result of the dumping was a gain of about $8.1 million.

With the unfair trade practice and the remedy both in place, the gain to consumers would have been smaller than with the unfair trade practice alone. The CPE model estimates that the gain was $16.3 million. Similarly, the loss in revenue to the producing and upstream industries would have been smaller, $13.5 million according to the CPE model. The net welfare gain would have been $2.8 million according to the CPE model, a smaller gain than existed with the unfair trade practice alone.

The CPE analysis for the remedy relative to the actual market values for 1986 estimates that consumers would have paid $20.3 million more for CPTs if the remedy had been in place in that year. CPT producers would have received $15.2 million more for their output. There would have been a net welfare loss of $5.1 million if the remedy had been in place in 1986.

The CPT industry is integrated forward into the color television set industry; all CPT manufacturers are affiliated with set producers. Thus, even though the CPE model shows that there is a net gain from the dumping, the size of any gain is likely to be small, because integrated CPT and CTV producers could be expected to maximize profits of the combined operations. Therefore, any gain to consumers or changes in net welfare from dumping are likely to be small.

CHAPTER 11
Case Study: Urea

History of Title VII Investigations

On July 16, 1986, a petition was filed with the Commission and Commerce by counsel on behalf of the Ad Hoc Committee of Domestic Nitrogen Producers.[1] The petition alleged that an industry in the United States was materially injured and was threatened with material injury by reason of imports from the German Democratic Republic (East Germany), Romania, and the Union of Soviet Socialist Republics (U.S.S.R.) of solid urea, provided for in former TSUS item 480.30, which were being sold in the United States at LTFV.

The Commission determined, pursuant to section 735(b) of the Tariff Act of 1930 (19 U.S.C. § 1673d(b)), that an industry in the United States was materially injured by reason of imports from East Germany, Romania, and the U.S.S.R. of solid urea, provided for in former TSUS item 480.30, that had been found by Commerce to be sold in the United States at LTFV.[2] The Commission's determinations were transmitted to Commerce on July 1, 1987[3] and were based on several factors: diminished performance of the domestic industry; significant and increasing subject import market penetration; and adverse effect of subject imports on price of domestic product during the period under investigation.

Urea Industry

First petition year (1986):	
Shipments, (*million short tons*)	2.6
Import market share by quantity (*percent*)	57
AD/CVD history:	
AD investigations (*number*)	3
CVD investigations (*number*)	0
First petition year	1986
First AD/CVD order year	1987
Most recent petition year	1986

[1] The Ad Hoc Committee of Domestic Nitrogen Producers, the U.S. petitioners in the title VII investigations, was composed of the following firms: Agrico Chemical Co., Tulsa, OK; American Cyanamid Co., Wayne, NJ; CF Industries, Long Grove, IL; First Mississippi Corp., Jackson, MS; Mississippi Chemical Corp., Yazoo City, MS; Terra International, Inc., Sioux City, IA; and W.R. Grace & Co., New York, NY. In a letter dated Sept. 5, 1986, the Commission was informed that Farmland Industries, Inc., Kansas City, MO, was no longer a member of the Ad Hoc Committee of Domestic Nitrogen Producers.

[2] Effective May 26, 1987, Commerce determined that urea from East Germany, Romania, and the U.S.S.R. was being, or was likely to be, sold in the United States at LTFV (52 F.R. 19549). The weighted-average dumping margins were as follows (*percent*):

Source	LTFV margin
East Germany	44.80
Romania	90.71
U.S.S.R.:	
Sojuzpromexport	68.26
Philipp Brothers	53.23
All other	64.93

[3] In general, there appear to have been few actions with respect to the antidumping orders regarding imports of solid urea from East Germany, Romania, and the U.S.S.R. or from successor countries. Significant actions are summarized below.

On Feb. 12, 1992, Commerce published a notice in the *Federal Register* (57 F.R. 5130) of the initiation of a "changed circumstances antidumping administrative review" because of the unification of East Germany and the Federal Republic of Germany (West Germany) into a single jurisdiction of the Federal Republic of Germany (Germany).

On June 29, 1992, Commerce published a notice in the *Federal Register*(57 F.R. 28828) transferring the antidumping order on solid urea from the former U.S.S.R. to the Commonwealth of Independent States (CIS) and the Baltic States (Armenia, Azerbaijan, Belarus, Estonia-Baltic, Georgia, Kazakhstan, Kyrgyzstan, Latvia-Baltic, Lithuania-Baltic, Moldova, Tajikistan, Turkmenistan, Ukraine, Uzbekistan, and Russia). The substance of the new order did not change from the original order and the cash deposit rate remained in effect for each new independent state.

On July 9, 1993, Commerce published a notice in the *Federal Register* of its intent to revoke the antidumping duty orders on solid urea from Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Moldova,

Scope of Investigations[4]

Subject Products

The article subject to these investigations is solid urea provided for in subheading 3102.10.00 of the HTS.[5] Urea is a high-nitrogen-content fertilizer produced by reacting ammonia with carbon dioxide. The general urea production process yields 70 to 87 percent urea in an aqueous solution, which may be purified and dried to solid urea or used directly to make urea-ammonium nitrate (UAN) solutions. Solid urea is produced and sold in the United States in two forms, prills and granules. The subject imports were virtually all in prilled form. Prilled and granular urea are chemically identical, though there are some physical differences between them, e.g., unit size, crushing strength, and abrasion resistance. Generally, the prilled product has a lower crushing strength and is smaller in size than the granular product, which makes granular urea preferred in some applications such as for blending with other solid fertilizers for field applications. Both, however, are used alone and blended. Moreover, when used in aqueous solution, the prilled and granular forms of urea are fungible.[6]

3—*Continued*
Tajikistan, Turkmenistan, Ukraine, Uzbekistan, Romania, and Russia but, on July 22, 1993, a domestic interested party, the AD Hoc Committee of Domestic Nitrogen Producers, objected and Commerce did not revoke the orders (58 F.R. 51058, Sept. 30, 1993).

[4] USITC, *Urea From the German Democratic Republic, Romania, and the Union of Soviet Socialist Republics*, (investigation Nos. 731-TA-338 through 340 (final)), USITC publication 1992.

[5] Until the close of Dec. 31, 1988, imports of urea were classified in former TSUS item 480.30, irrespective of whether the urea was in solid form or alone in an aqueous solution. TSUS schedule 4, note 2(b) stated that the term "*compounds*," as used in that schedule, include a solution of a single compound in water. Urea was considered a compound as defined in former TSUS schedule 4 headnote 2(a).

On Jan. 1, 1989, the HTS went into effect. Imports of urea are classified in HTS subheading 3102.10.00, irrespective of whether the urea is in solid form or is alone in an aqueous solution. HTS chapter 31, note 2(a)(viii) states that heading 3102 applies to urea, whether or not pure, provided it is not put up in the forms or packages described in heading 3105. Imports under former TSUS item 480.30 and HTS subheading 3102.10.00 have all been free of duty since 1930 regardless of country of origin.

[6] USITC, *Urea From the German Democratic Republic, Romania, and the Union of Soviet Socialist Republics*, USITC publication 1992, p. 4.

Like product

In both preliminary and final determinations, the Commission found the uncontested, single like product to consist of solid urea, and the domestic industry to consist of the producers of this like product.[7]

Substitute Products[8]

Several nitrogenous fertilizers may be substituted for solid urea, each with its own advantages and disadvantages. Anhydrous ammonia, which contains 82.2 percent nitrogen, has the highest nitrogen content of all the nitrogen fertilizers, and, per unit of nitrogen, is the lowest cost nitrogen fertilizer. However, physical characteristics preclude ammonia use by many end users: at ambient temperature and atmospheric pressure ammonia is a toxic gas; storage and distribution are expensive, because ammonia must either be cooled to a liquid by refrigeration or stored and transported in high-pressure containers; application is expensive because special plows are required that inject the ammonia, as a gas, deep in the soil; and soil conditions must be such that ammonia will be retained until it is nitrified by soil microorganisms.

Urea, the subject of the case study, has the highest nitrogen content (46.6 percent) of the solid nitrogen fertilizers, is safe to store and easy to handle, and has a transportation advantage in that it can be shipped, or back-hauled, in the same vessels used to transport bulk cargos, such as grain.

Urea quality can be a factor in purchase decisions. Many purchasers reported that foreign prilled urea was inferior to domestic prilled urea in that the foreign products had a higher proportion of fines and were softer, lumpier, and less uniform in particle size than the domestic prilled urea; purchasers rated urea imported from the subject countries as having lower quality. Such undesirable characteristics of imported urea reportedly resulted in particle segregation in bulk blends and uneven spreading in direct application.[9] Domestic and subject import prilled urea, while close, are not considered perfect substitutes because of cited perceived quality differences.

Ammonium nitrate contains 35.0 percent nitrogen and is marketed as prills and granules that look very much like those of urea. However, ammonium nitrate

[7] Ibid., p. 4.

[8] Of the three primary crop nutrients (nitrogen, phosphorus, and potassium) nitrogen is the leading plant nutrient applied by farmers in the United States.

[9] Purchasers' questionnaire responses concerning competition between domestic and imported urea.

is very hygroscopic and can present fire or explosion hazards.[10] Ammonium nitrate's principal advantage is that part of its nitrogen content is in the form of nitrate that can be immediately utilized by crops.

Nitrogen solutions are aqueous mixtures, usually of urea and ammonium nitrate, the temperature sensitive nitrogen content of which usually ranges from 28 to 32 percent. UAN solutions are easy to handle, simply by pumping, can be more uniformly applied to the soil than solid fertilizers, can be metered into irrigation water to provide nitrogen to growing crops, are less costly than ammonia to transport and store, and direct production from urea and ammonium nitrate reactor solutions eliminates prilling or granulating costs. However, lower UAN nitrogen content increases shipping costs per unit of nitrogen and different equipment is required for application than used to apply dry fertilizers.

Description of Upstream Industry

The U.S. nitrogenous fertilizer industry uses natural gas as the primary input raw material, along with nitrogen from the atmosphere, for all nitrogenous fertilizer production.[11] Approximately 7 percent of total annual industrial natural gas use in the United States goes to total nitrogenous fertilizer production, with about one-fourth of this amount, or 2 percent, to urea production. Natural gas accounts for more than 80 percent of all input costs to urea production. The primary nitrogenous fertilizer product produced from natural gas is ammonia,[12] which in turn is both an end-use nitrogenous fertilizer product and a primary input, along with carbon dioxide (also obtained from ammonia production) and energy,[13] for urea production.

Description of Downstream Industry

Data from the Department of Commerce suggest that about 92 percent of the urea produced in the United States is used as fertilizer both as an end product and in the downstream production of other solid and liquid fertilizers.[14] The principal end use for urea fertilizer is in crop production. Four crops together account for the majority of solid urea consumption: corn, wheat, cotton, and rice. The farm prices of urea and substitute products affect acres planted, and resultant crop prices are measures of downstream urea demand.

Approach of Investigation

The analytical framework that was used to assess the economic effects of the unfair trade practice and the remedy process on the U.S. solid urea market is presented in chapter 5 of this report.[15] The time series analysis, the comparative statics analysis, and the welfare effects analysis are each applied to the solid urea market to examine the effects of the unfair trade practice and remedy on producers and consumers. Some adjustments were made to the time series analysis because of the nature of the industry.

The time series analysis is an econometrically based approach that looks at the effects of the dumping decision on prices and quantities of U.S. suppliers and foreign suppliers of solid urea during the period under consideration, 1981-91. Quarterly data are available for estimating most industry parameters and permitted selecting a period of 3 years before the petition was filed (i.e. 1981-83), and four years after the investigation determination (i.e., 1988-91), to determine the economic effects of unfair trade practices and the remedy process. The time period considered affected by the investigations included 1984-86 and 1987, as the final investigation determinations occurred in July 1987. The data required for the time series analysis came primarily

[10] Much of the ammonium nitrate produced in the United States is used in explosives and blasting agents.

[11] The U.S. nitrogenous fertilizer industry exhibits a high degree of vertical integration with ammonia, urea, UAN, and ammonium nitrate often produced by the same company at the same production site.

[12] The cost of producing ammonia is largely determined by the price of natural gas; in 1991, the cost of producing ammonia at the large U.S. plants averaged about $87 per ton. At a natural gas cost of $1.80 per million metric cubic feet (MMCF), that gas constituted 72 percent of the total cost to produce ammonia. However, many overseas competitors enjoyed lower gas costs. If gas is priced at a collection value of about $1 per MMCF (which is commonly done in countries where gas is readily available), the cost of ammonia production drops from $87 to $59 per ton and gas constitutes 59 percent of the total cost of production. The ability to compete in world nitrogenous fertilizer markets, therefore, depends mainly on the relative price of natural gas.

[13] Electrical production process energy may be obtained from several conventional sources, including natural gas.

[14] The remainder is used in making urea-formaldehyde resins, plastics, and adhesives; as a protein supplement in animal feeds; and for several other miscellaneous applications.

[15] A case-specific review of the literature saw no economic studies relevant to the urea industry.

from the Departments of Commerce and Agriculture. A total of 49 questionnaires were mailed and approximately 71 percent were returned.[16]

The partial equilibrium analysis examines effects of the unfair trade practice and remedy for a given year. The analysis referred to as computable partial equilibrium in chapter 5 of this report uses the same data collected for use in the time series analysis on imports and domestic sales, as well as dumping margins and estimates of price and substitution elasticities from the questionnaires and the time series analysis. This analysis generates the range of effects of dumping and remedy on prices and quantities of the petitioning, downstream, and upstream industries. The base year selected is 1985, the year prior to petition filing.

Industry Profile and Structure

Brief Evolution of the Industry

In 1922, Germany was the first country to institute commercial urea production; the United States followed in 1932, and England, in 1935. The U.S. industry producing urea developed from one producer in the early- to mid-1930s to 31 producers in 1981, then fell to 17 producers by 1991.[17] Table 11-1 presents U.S. urea industry capacity acquisitions and closures during 1981-91. The number of U.S. producers specific to solid urea fell from 15 in 1988 (the earliest period for which shipment data by firm were available) to 10 in 1991.[18] The majority of this consolidation may be accounted for through Arcadian Corp.'s acquisition of the solid urea capacity of four individual producers during 1989.

[16] Although the majority of domestic urea producers responded to the Commission's questionnaires, relatively few producers were able to provide data covering the full time period under consideration, therefore, actual usable response rate varied by question and was smaller. Factors such as industry exit, ownership changes, corporate records retention policies, floods, fires, and explosions were cited among reasons for partial responses.

[17] Producers are listed in U.S. International Trade Commission, *Synthetic Organic Chemicals: U.S. Production and Sales*, (1981-91).

[18] Ibid.

Industry Size and Structure

U.S. Production

U.S. production of urea fluctuated during the period under consideration, exhibiting downturns in the early-1980s and again during 1985-86 (figure 11-1) (table D-2, in appendix D). The early 1980s production decline was influenced by the world economic recession, U.S. drought, and competition from imports. In addition, the 1983 farm acreage reduction programs of the Federal Government encouraged farmers to reduce land under cultivation, further reducing demand.[19] In 1984, the economy improved, and with this improvement came an increase in urea production. The poor farm market of 1985 combined with use of less costly imports during 1985-86 contributed to the decrease in U.S. urea production during those years. The downcycle of urea production ended in 1986, as demand fundamentals gradually improved throughout the remainder of the decade. Duties on U.S. imports of urea from East Germany, Romania, and the former U.S.S.R., combined with increased U.S. exports of farm products and Federal subsidies, which added to farm income, bolstered urea production from 1987 onward.[20] U.S. share of world urea production varied significantly during 1981-91, from a high during 1981 to a low during 1986, before remaining relatively constant during 1988-91.

Construction of a typical urea plant is estimated to cost about $75 million, and the accompanying ammonia plant may cost as much as $210 million.[21] Urea production processes are mature and well understood. Technology advances are in areas such as increased process efficiencies, computerized controls, and emissions compliance rather than the process itself. Therefore, research and development expenditures in the area of urea technology advancement may be considered minimal.

Concentration Ratios[22]

On the basis of the U.S. producers' sales of solid urea, the four-firm concentration ratio increased from

[19] U.S. Department of the Interior, Bureau of Mines, *Nitrogen*, (Annual 1984-91) by Charles L. Davis (1981-86), William F. Stowasser (1987), Raymond L. Cantrell (1988-91) (Washington, DC).

[20] Ibid.

[21] The World Bank, *World Nitrogen Survey*, prepared by Kurt M. Constant and William F. Sheldrick, World Bank Technical Paper No. 174 (Washington, DC) 1992.

[22] Concentration ratios measure the amount of the market share held by a certain number of firms. For example, the four-firm ratio shows the combined market share held by the largest four firms in a given market.

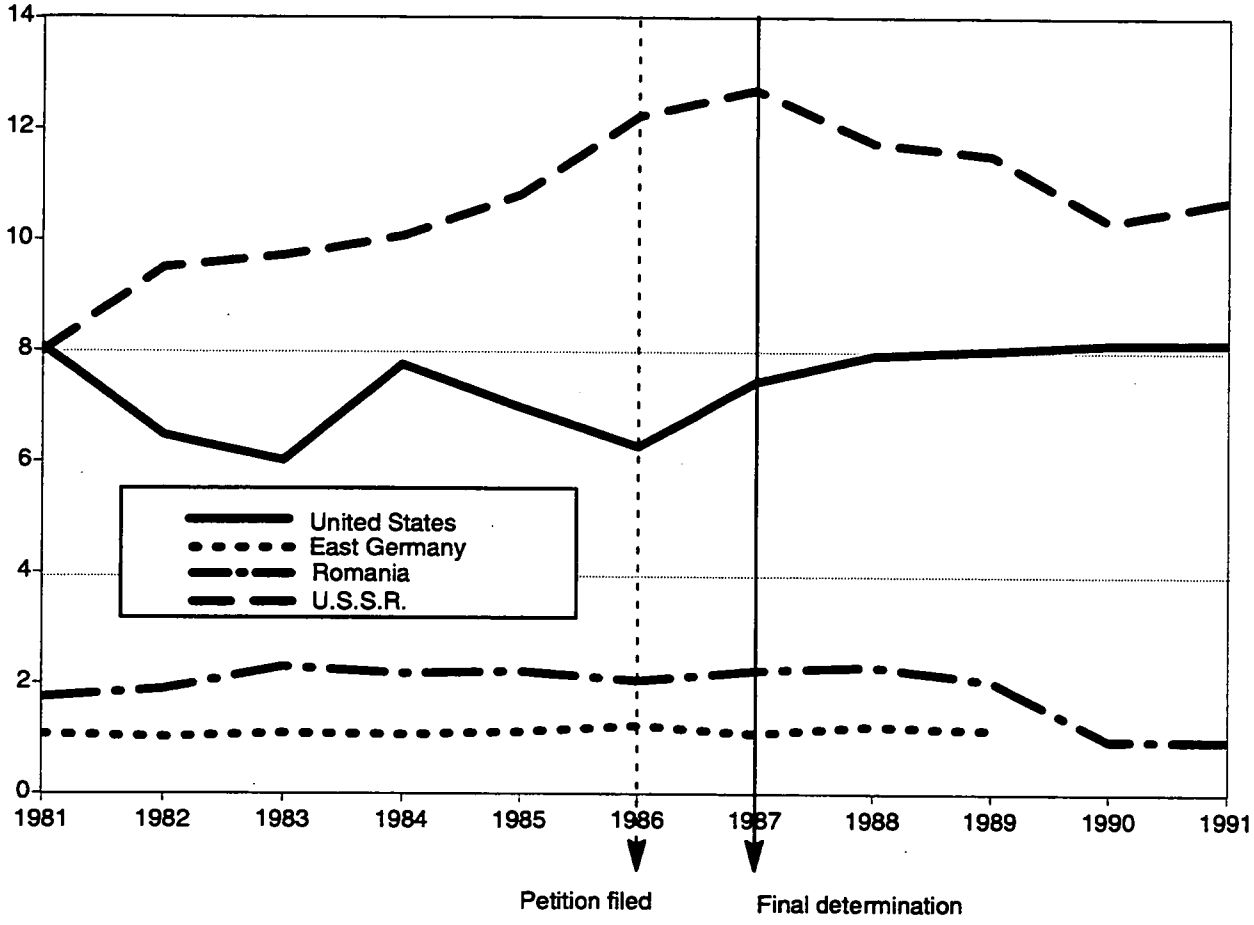
Table 11-1
Urea: U.S. industry acquisitions and closures, 1981-91

Year	Company	Action	Target	Annual capacity	Location
				1,000 short tons	
1981	Chevron Chemical Corp.	Acquired	Farmland Industries, Inc.	70	Fort Madison, IA
1982	CF Industries	Closed		20	Fremont, NE
				165	Tunis-Ahoskie, NC
				45	Tyner, TN
	Kaiser Ag Chemicals	Closed		100	Savannah, GA
	J.R. Simplot	Closed		155	El Centro, CA
1983	Agway, Inc.	Closed		63	Olean, NY
1984	Arcadian Corp.	Acquired	Allied Corp.	132	LaPlatte, NE
				306	Geismer, LA
	Farmland Industries, Inc.	Acquired	Chevron Chemical Corp.	70	Fort Madison, IA
1985	Cepex, Inc.	Acquired	Phillips Pacific Chemical	43	Kennewick, WA
			Phillips Petroleum	58	Beatrice, NE
			Reichhold Chemicals	110	St. Helen's, OR
	Kaiser Ag Chemicals	Closed		180	Pryor, OK
1986	Atlas Chemical Co.	Closed		70	Joplin, MO
	Chevron Chemical Corp.	Acquired	Cepex, Inc.	110	St. Helen's, OR
				43	Finley, WA
	Estech Branded Fertilizer Inc.	Closed		80	North Bend, OH
	Farmland Industries	Closed		70	Fort Madison, IA
	Goodpasture, Inc.	Closed		24	Dimmit, TX
	LaRoche Industries	Acquired	USX Corp.	96	Cherokee, AL
	N-Ren Corp.	Closed		170	Lake Charles, LA
1987	Nitrex	Acquired	W.R. Grace & Co.	400	Woodstock, TN
	Phoenix Chemical Co.	Acquired	N-Ren	125	East Dubuque, IL
	Wil-Grow Fertilizer	Acquired	N-Ren	27	Pryor, OK
1988	Farmland Industries, Inc.	Acquired	Cepex, Inc.	58	Beatrice, NE
1989	American Cyanamid	Closed		145	Fortier, LA
	Arcadian Corp.	Acquired	Columbia Nitrogen Corp.	450	Augusta, GA
			Hawkeye Chemical	61	Clinton, IA
			Nitex Corp.	400	Woodstock, TN
			Olin Corp.	170	Lake Charles, LA
	Agricultural Minerals, Corp.	Acquired	Agrico Chemical (FMRP)	600	Vendigris, OK
	Agricultural Minerals, Corp.	Acquired	Agrico Chemical (FMRP)	375	Blytheville, AR
	Chevron Chemical Corp.	Closed		70	Kennewick, WA
	Tennessee Valley Authority	Closed		109	Muscle Shoals, AL
	Unocal Corp.	Closed		120	Brea, CA

Source: Compiled by the staff of the U.S. International Trade Commission from data submitted in response to questionnaires of the U.S. International Trade Commission and from North American Fertilizer Capacity Data, National Fertilizer Development Center, Tennessee Valley Authority, Muscle Shoals, AL, (Oct. 1986, pp. 4-5; Oct. 1987, pp. 19-20; Oct. 1988, pp. 6-7; Jan. 1991, pp. 11-12; Dec. 1991, pp. 9-10); North American Fertilizer Capacity (May 1994), International Fertilizer Development Center, Muscle Shoals, AL, pp. 7-8; J.R. Douglas, Situation Assessment: U.S. Agriculture and Fertilizer, (March 1994), Douglas Associates, Florence, AL, p. C-6.

Figure 11-1
Urea: United States, East Germany, Romania, and U.S.S.R. production, 1981-91

Million short tons



Source: Compiled from official statistics of the International Fertilizer Industry Association and the U.S. Department of Commerce.

about 71 percent in 1988 to almost 87 percent in 1991.[23] Despite the increasing concentration of U.S. producers, the U.S. solid urea market was not dominated by any one supplier as U.S. producers competed among themselves and with foreign suppliers of solid urea, primarily in Canada, but also in Trinidad and Tobago, Mexico, and Venezuela.

[23] The Herfindahl index is the sum of the squared market shares (in decimal form) of the firms in an industry. It equals one for an industry comprised of a single monopolist, and approaches zero as the number of firms in the industry becomes very large. The Herfindahl index for solid urea increased from 0.154 in 1988 to 0.209 in 1991 indicating higher industry concentration during this period.

World Production

World production of urea increased irregularly during 1981-91, exhibiting downturns during 1982 and 1991 (table D-2).

East German urea production remained relatively constant during 1981-89 with a slight general increase during the early to mid-1980s (figure 11-1) (table D-2). Romanian production of urea rose during the early-1980s, then remained relatively constant through 1989, and dropped significantly for 1990-91. Urea production in the former Soviet Union increased steadily during 1981-87, then decreased steadily from 1987-90, and increased slightly in 1991.

A worldwide proliferation of proposals for new urea projects began in 1985. Countries with abundant state-owned, relatively inexpensive natural gas feedstocks constructed high-capacity plants with product destined for export. Operation Desert Storm, the United Nations initiative to liberate Kuwait from Iraqi occupation, resulted in severe damage to nitrogen plants in both Kuwait and Iraq during January and February 1991. The breakup of the former Soviet Union in December 1991 idled a significant portion of world urea capacity, which in turn affected overall world production of urea.[24]

Industry Performance in U.S. and World Markets

Trade Patterns

The United States maintained a positive trade balance in urea during 1981 and 1982 (figure 11-2) (table D-3). In 1983, the U.S. trade balance in urea turned negative and began a steady deterioration until 1986, with exports decreasing irregularly while imports increased steadily. Although still negative, the U.S. trade balance in urea recovered irregularly from 1987 to 1991 with imports of urea declining steadily while exports increased irregularly during this period.

Import Penetration

In the aggregate, subject imports[25] accounted for an increasing percentage of total U.S. imports during 1981-83, before peaking at approximately 40 percent during 1984-86 (table D-3). The Commission reached an affirmative determination in July 1987, and subject imports accounted for about 1 percent of total U.S. imports during 1987. There were minimal subject imports of urea during 1988-91.

The aggregated ratio of subject imports to apparent consumption increased to about 23 percent during 1981-86 before sharply falling to less than 1 percent during 1987 and becoming minimal thereafter.

Total urea imports (subject plus nonsubject) accounted for about 24 percent of U.S. consumption in 1981. With the exception of a slight drop in 1984, total urea imports then commanded an ever-increasing share of U.S. consumption to reach approximately 57 percent during 1986. A decline in the ratio of urea imports to apparent consumption began during 1987 and continued through 1991. This decrease is partially attributable to the virtual cessation of subject imports after the 1987 remedy imposition.

Capacity Utilization

Overall, U.S. annual urea capacity remained relatively constant during 1981-91 (table 11-2). Although this capacity changed little during the period, slight declines in 1983, 1986, and 1989 were due to plant closures.

It is not cost effective to start up and shut down urea plants; urea plants must run continuously and operate at a capacity utilization rate of at least 80 percent to maintain the reaction process.[26] Capacity utilization rates fell to approximately 75 percent during 1982-83 and 79 percent during 1986. For all other years during 1981-91, capacity utilization was above 85 percent, reaching approximately 100 percent for 1989-91. Unused capacity during the mid-1980s allowed producers to increase supply after the dumping remedy was in place.

Selected Costs of Production And Profitability

Financial Experience of U.S. Producers

Seven producers together accounting for approximately 30 percent of U.S. production of urea in 1986 provided income-and-loss data on their operations producing urea for the fiscal years 1981 through 1991.

Operations on Urea

Net sales values for the seven producers, as shown in table 11-3, decreased from 1981 to 1983, increased in 1984, and then decreased through 1986. Net sales values for the seven producers increased from 1987 to 1989, decreased in 1990, and then increased in 1991. The reporting producers realized combined operating income in each period, which trended

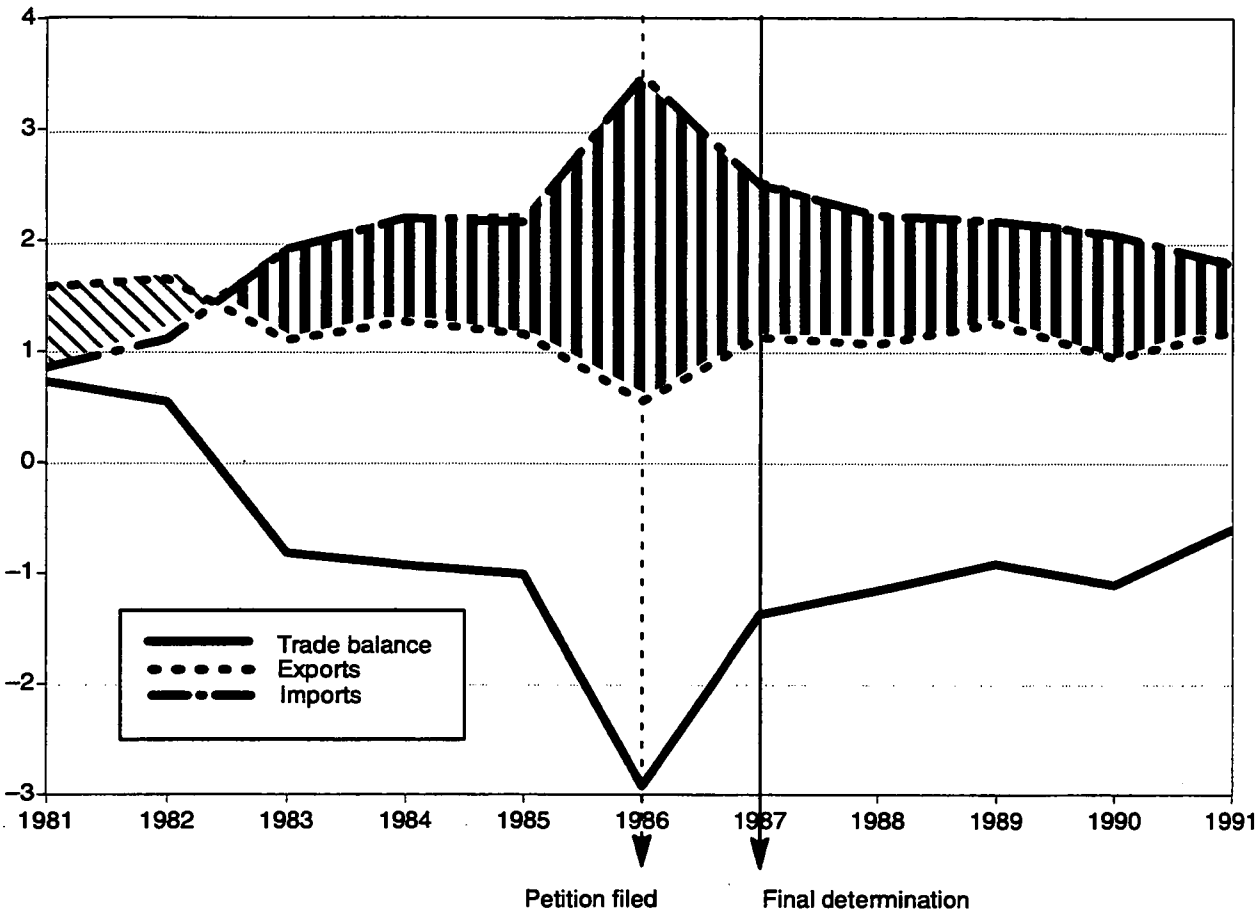
[24] U.S. Dept. of Interior, *Nitrogen*, 1991, p. 7.

[25] Virtually all urea shipped internationally is in solid form. By contrast, liquid UAN is imported under *HTS* subheading 3102.80.00.

[26] Interviews with staff of Arcadian Corp. and CF Industries during plant visits, Nov. 1994.

Figure 11-2
Urea: U.S. exports, imports, and trade balance, 1981-91

Million short tons



Source: Compiled from official statistics of the U.S. Department of Commerce.

Table 11-2
Urea: U.S. capacity, production, and capacity utilization, 1981-91

Year	Capacity[1]	Production	Capacity utilization
	1,000 short tons		*(Percent)*
1981	8,295	8,062	97.2
1982	8,608	6,470	75.2
1983	7,983	6,013	75.3
1984	8,093	7,752	95.8
1985	8,129	6,975	85.8
1986	7,959	6,264	78.8
1987	7,852	7,433	94.7
1988	8,039	7,914	98.4
1989	7,993	8,004	100.1
1990	8,163	8,120	99.5
1991	8,211	8,133	99.1

[1] On a dry, 100-percent urea basis.

Source: Compiled from official statistics of the U.S. Department of Commerce and the Tennessee Valley Authority.

Table 11-3
Urea: Operations and selected costs of producers, accounting years 1981-91

Item	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Net sales:											
Quantity[1] (*short tons*)	2,305,012	2,303,252	2,324,844	2,577,245	2,271,771	2,258,477	2,766,065	2,744,888	2,769,933	2,686,639	2,694,988
Value (*1,000 dollars*)	385,221	316,743	285,348	354,390	293,895	214,455	245,573	310,295	318,820	313,272	351,034
Cost of goods sold (*1,000 dollars*)	210,065	210,389	162,323	219,766	202,964	160,446	205,840	227,017	245,693	234,123	235,423
Gross profit or (loss) (*1,000 dollars*)	175,156	106,354	123,025	134,624	90,931	54,009	39,733	83,278	73,127	79,149	115,611
General, selling, and administrative expenses (*1,000 dollars*)	26,921	22,212	24,984	25,312	21,622	21,855	20,353	21,270	22,202	21,388	28,925
Operating income or (loss) (*1,000 dollars*)	148,235	84,142	98,041	109,312	69,309	32,154	19,380	62,008	50,925	57,761	86,686
Ratio to net sales of (*percent*):											
Cost of goods sold	54.5	66.4	56.9	62.0	69.1	74.8	83.8	73.2	77.1	74.7	67.1
Gross profit	45.5	33.6	43.1	38.0	30.9	25.2	16.2	26.8	22.9	25.3	32.9
General, selling, and administrative expenses	7.0	7.0	8.8	7.1	7.4	10.2	8.3	6.9	7.0	6.8	8.2
Operating income	38.5	26.6	34.4	30.8	23.6	15.0	7.9	20.0	16.0	18.4	24.7
Sales unit value	$167.12	$137.52	$122.74	$137.51	$129.37	$94.96	$88.78	$113.04	$115.10	$116.60	$130.25
Operating income unit value	$64.31	$36.53	$42.17	$42.42	$30.51	$14.24	$7.01	$22.59	$18.38	$21.50	$32.17
Number of firms reporting:											
Operating losses	0	2	2	3	3	2	2	0	0	0	0
Data	7	7	7	7	7	7	7	7	7	7	7

[1] On a dry 100 percent urea basis.

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

downward from 1981 to 1987 and then trended upward through 1991. Individually, two or three producers incurred operating losses in each of the years 1982-87; however, none of the reporting producers incurred operating losses in 1981 or 1988-91. The average per-short-ton sales value fluctuated, reaching a low of $88.78 per short ton in 1987 and a high of $167.12 in 1981. The operating income on a per-short-ton basis fluctuated from a high of $64.31 in 1981 to a low of $7.01 in 1987.

Employment

The average number of production and related workers producing urea for the 8 producers that provided full 1981-91 employment figures decreased irregularly from 503 in 1981 to 493 in 1985 and rose to 511 in 1986 before decreasing irregularly from 1986 to 1991 (table 11-4). The number of hours worked by production and related workers producing urea fluctuated during 1981-91, while hourly wages rose steadily during the period.

Market Performance—Trend Analysis

Domestic Shipments and Prices

Trends in prices

Solid urea prices in the U.S. market, reported by *Green Markets*[27] FOB U.S. gulf, and shown on a quarterly basis in figure 11-3 and table D-4, fluctuated during 1981-91. During this period, solid urea prices were highest in 1981 and lowest in 1986. Rising natural gas costs and competitively priced imports brought pressure on the domestic urea market in 1981. By 1982, low prices for farm commodities, high interest rates, and competition from imported product contributed to the depression of urea prices. The payment-in-kind program[28] and summer drought contributed to urea price declines in 1983.[29]

The urea price rebound in 1984 was partially attributable to improvements in the economy that fostered increased fertilizer use. Although the effects of the dumping and remedy are difficult to isolate from the price trends alone, petitioners asserted that price depression and declines in U.S. production of solid urea began in 1985 as a result of imports from East Germany, Romania, and the U.S.S.R.[30] Industry sources indicated that international markets hold the key to U.S. fertilizer industry health in that fertilizer is traded in a world commodity market in which wild swings in demand and prices can occur from one year to the next.[31] Further, industry sources explained that international market gyrations prompted the 1986 filing of the antidumping petitions against solid urea from East Germany, Romania, and the U.S.S.R. because India and China significantly reduced their combined solid urea imports from all sources in 1985, but the supplying East Bloc countries maintained their urea production levels. As a result, about 2 million to 3 million metric tons of low-priced urea landed in the United States during 1985-86.[32]

The preliminary antidumping duties on urea from the subject countries imposed by Commerce in January 1987 reportedly played a role in raising solid urea prices in the U.S. market during the first quarter of 1987. According to an industry source, trade protection actions have a limited effect on prices if surpluses exist; urea capacity and demand were forecast to come into balance by the mid-1990s, but until then, urea profit margins were expected to be weak.[33] The increase in nitrogen fertilizer prices, including prices of solid urea, in the U.S. market during the first quarter of 1987 were not observed as being backed with increased demand. Cold weather and rains delayed fertilizer use in some parts of the United States during the spring of 1987. There was more than enough urea capacity to meet world demand, which indicated that the price increases would not be sustained beyond the spring of 1987.[34] A spokesman for The Fertilizer Institute indicated that the preliminary antidumping duties altered the U.S. solid urea import suppliers but not the volume, as solid urea imports from Canada increased.[35] Contrary to prediction, urea prices increased in 1988 as the year progressed.

[27] *Green Markets—Fertilizer Market Intelligence Weekly* (New York: McGraw-Hill, Inc., 1981-June 1991; Pike and Fisher, Inc., July 1991 onward).

[28] A program to make sharp cuts in commodity production, reduce Government stocks, and pay farmers not to produce.

[29] U.S. Dept. of Interior, *Nitrogen*, 1983, p. 1.

[30] International Trade Reporter, vol. 3, No. 30 (1986) p. 945.

[31] Alice Agoos and Theo Mullen, "Urea Sales are Up, but the Future Isn't any Brighter," *Chemical Week*, vol. 140, No. 14 (Apr. 15, 1987), p. 33.

[32] Ibid., p. 34.

[33] Ibid., p. 34.

[34] Ibid., p. 33.

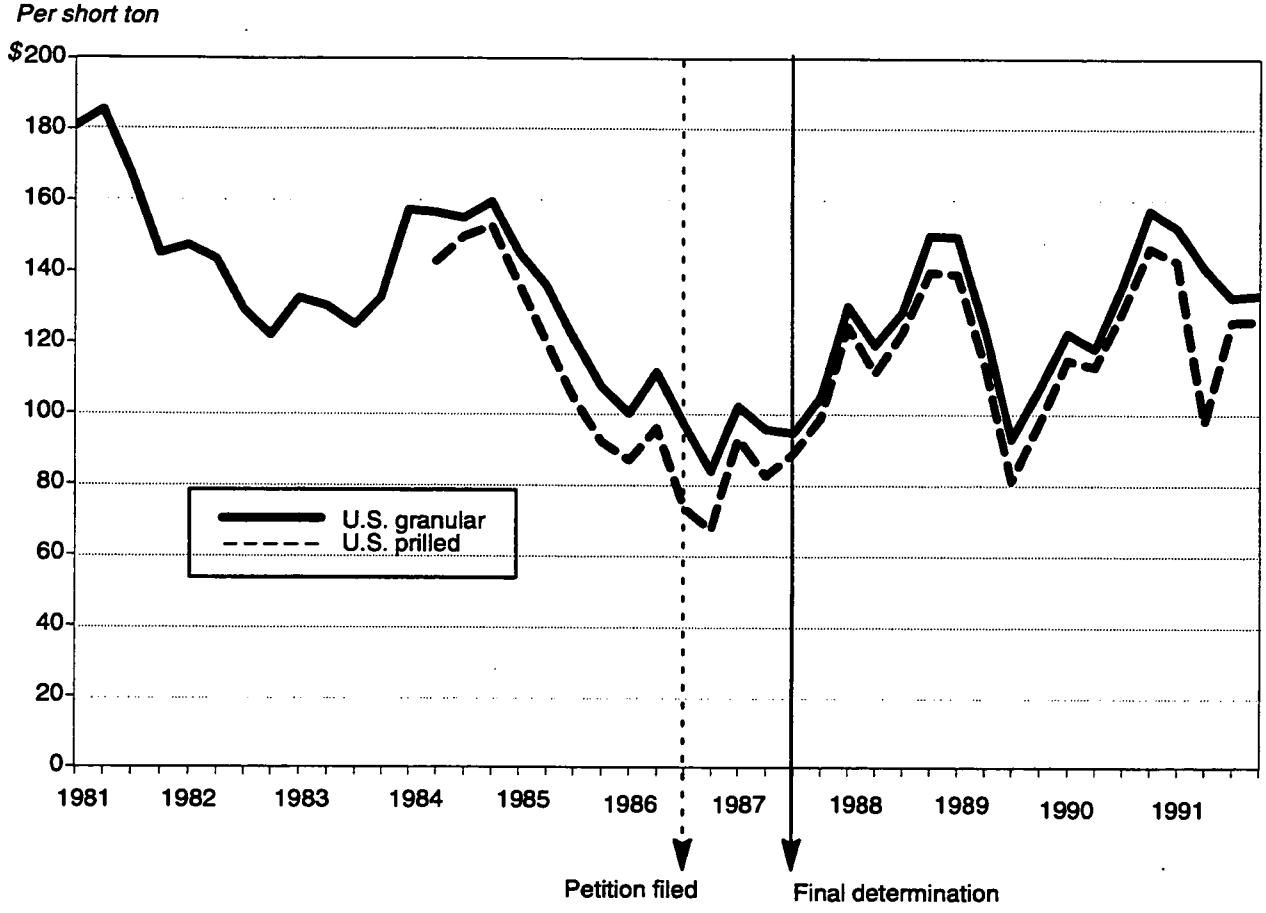
[35] Ibid., p. 34.

Table 11-4
Average number of production and related workers employed in U.S. establishments in which urea is produced, hours worked, wages paid, and hourly wages, 1981-91

Item	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Production and related workers producing urea	503	515	483	495	493	511	488	507	490	471	442
Hours worked by production and related workers producing urea (*1,000 hours*)	1,127	1,149	1,086	1,152	1,104	1,147	1,099	1,139	1,094	988	829
Wages paid to production and related workers producing urea (*1,000 dollars*)	17,282	17,536	17,373	19,155	18,704	20,256	20,236	21,511	20,698	20,604	20,354
Hourly wages for production and related workers producing urea	$15.33	$15.26	$15.99	$16.63	$16.94	$17.66	$18.41	$18.89	$18.92	$20.85	$24.55
Number of responses	8	8	8	8	8	8	8	8	8	8	8

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Figure 11-3
Solid urea: U.S. prices, quarterly, January 1981-December 1991



Source: *Green Markets*, McGraw-Hill Co.

The Iraqi invasion of Kuwait in August 1990 also affected urea prices because this action removed export-oriented material produced in the Persian Gulf from the world market.[36]

Trends in Shipments

Solid urea fertilizer shipment decreases during the early 1980s may be partially attributable to the period world recession (figure 11-4) (table D-5). Solid urea fertilizer shipments increased in 1983-4 because of improvement in the economy. However, even as domestic urea prices again turned downward in 1985, domestic product shipments dropped as reduced crop acreage and increased low-priced imports decreased demand for domestically produced product. Domestic solid urea shipments rebounded in 1987 as farm income increased, farm debt continued its steady decline since 1982, and crop demand improved.[37] Domestic solid urea shipments increased irregularly during 1987-91 to exceed 1981 levels.

Subject Imports: Quantity And Prices

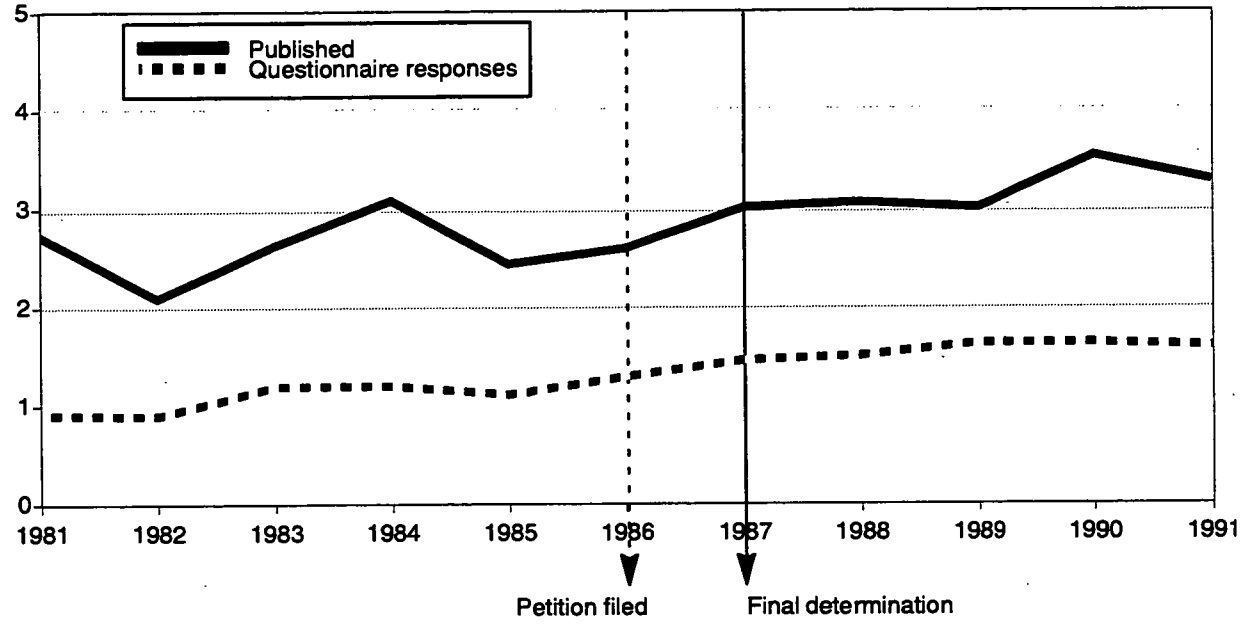
Urea imports increased during 1981-86, before a steady decline during 1987-91 (figure 11-5) (table D-6). Historically, Canada has been the primary source of U.S. urea imports, with significant amounts

[36] U.S. Dept. of Interior, *Nitrogen*, 1991, p. 7.

[37] U.S. Dept. of Interior, *Nitrogen*, 1984-87.

Figure 11-4
Solid urea: Domestic shipments, annually, published source and questionnaire responses,[1] 1981-91

Million short tons material

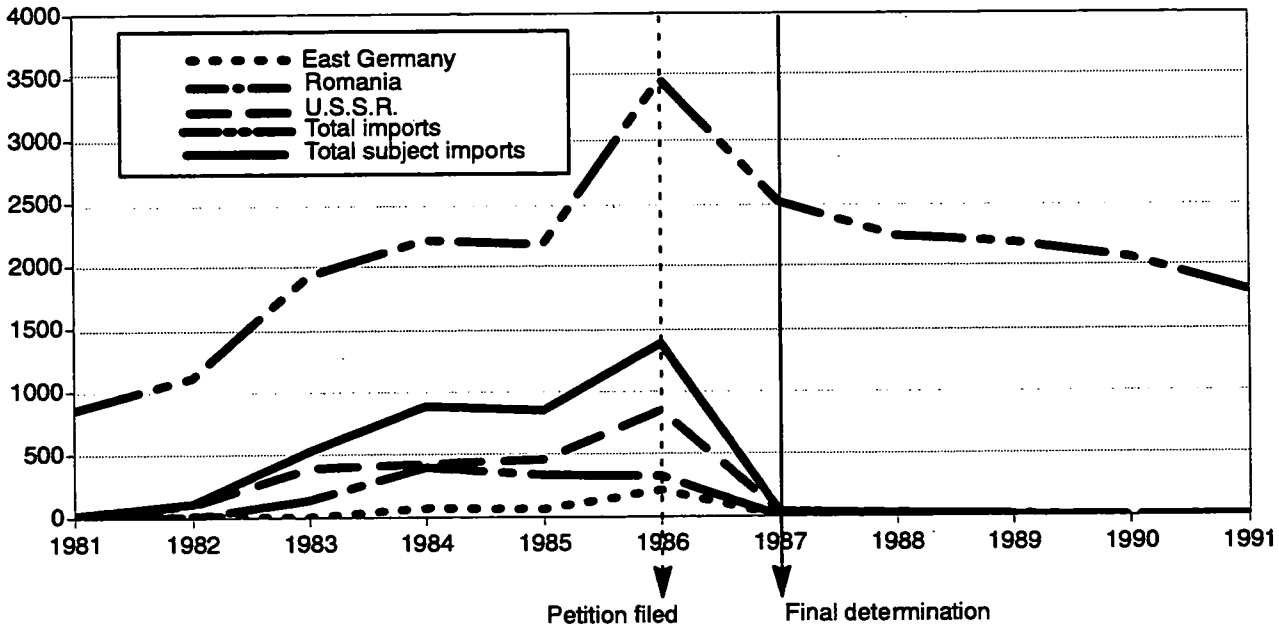


[1] Based on responses that reflect prilled and granular shipments of 7 producers accounting for approximately 45 percent of domestic urea capacity as of Jan. 1, 1992.

Source: Compiled from U.S. Department of Commerce, *Current Industrial Reports: Fertilizer Materials,* MA28B (Annual 1981-91) and from data submitted in response to questionnaires of the U.S. International Trade Commission.

Figure 11-5
Urea: U.S. import quantity from East Germany, Romania, U.S.S.R., total subject imports, and total imports, 1981-91

1,000 short tons



Source: Compiled from official statistics of the U.S. Department of Commerce.

also from the Netherlands, Trinidad and Tobago, Mexico, and Venezuela.

Imports of urea from Romania first began to appear in the United States in 1981, increased rapidly during 1982-84, decreased slightly during 1985-86, and ceased entirely thereafter (figure 11-5) (table D-6). The first imports of urea from East Germany and the former U.S.S.R. are on record in 1982. Urea imports from East Germany increased irregularly during 1982-86, then virtually ceased during 1987-91. Urea imports from the former U.S.S.R. rose during 1982-86, decreased sharply in 1987, and virtually ceased during 1988-91.

As U.S. import volumes rose, overall import unit values declined from 1982 to 1987. Unit values of East German and Romanian urea fell from 1982 to 1986, and urea from the former U.S.S.R., from 1982 to 1987 (table D-6).

Commerce reported in its 1992 *U.S. Industrial Outlook* that U.S. imports of nitrogenous fertilizers will continue to grow as old U.S. ammonia plants are shut down, squeezed by inefficient energy use and the high cost of natural gas compared with the cost in Canada, Mexico, and the U.S.S.R.[38]

U.S. Industry Market Share

The combination of the steady decline of domestic solid urea shipments and concurrent steady rise in both subject and other urea imports resulted in a significant reduction in U.S. market share held by U.S. producers during 1981-86 (figure 11-6) (table D-7). During 1987-91, an irregular increase in domestic solid urea shipments, combined with virtual cessation of subject imports and a steady decline in total urea imports, resulted in the United States recapturing much of the market previously lost.

Substitute Products: Quantity and Prices

Solid urea is one of several single-nutrient fertilizers used as a source of nitrogen for crops. Three other nitrogenous fertilizers—anhydrous ammonia, ammonium nitrate, and UAN solutions—substitute for solid urea on the basis of relative price changes among the various fertilizers. Soils do not retain nitrogen from year to year; therefore, nitrogen fertilizer must be added during each planting season to ensure optimum growth and yield conditions. According to an industry source, solid urea prices in the United States fell more rapidly than prices of anhydrous ammonia during the 1985/86 fertilizer year and led to increased consumption of solid urea at the expense of decreased consumption of anhydrous ammonia.[39] Concerns regarding the safety and environmental effects of anhydrous ammonia and ammonium nitrate also resulted in some switching to solid urea and UAN solutions.[40] Differences in weather, temperature, and soil conditions can also result in switching from one type of nitrogenous fertilizer to another. Long-term price and consumption trends of the major single-nutrient nitrogenous fertilizers are presented in figures 11-7 and 11-8 and tables D-8 and D-9.

Downstream Demand and Domestic Consumption

Domestic Consumption

In the period under consideration, urea consumption exhibited lows during 1982-83 and highs during 1986 and 1990 (figure 11-8) (table D-9). High interest rates and relatively low crop prices were factors in the decrease in urea consumption of 1982-83. Urea consumption then rose in 1984, partially because of increasing availability of low-cost imports that commanded a significant portion of overall consumption,[41] and partly because of economic recovery. The 1985 farm market decline resulted in slightly lower urea consumption that year. Low-cost imports in 1986 fueled an overall increase in urea consumption[42] accompanied by a concurrent decrease in consumption in anhydrous ammonia, nitrogen solutions, and ammonium nitrate. The July

[38] Feedstock costs and energy costs are the major factors that drive production costs for nitrogenous fertilizers, including production costs for solid urea. Improved process control by more extensive application of computer and microprocessor control also can affect production costs of urea. In addition, pollution control technology has been a cost factor in urea production. (*Nitrogen*, July 1990).

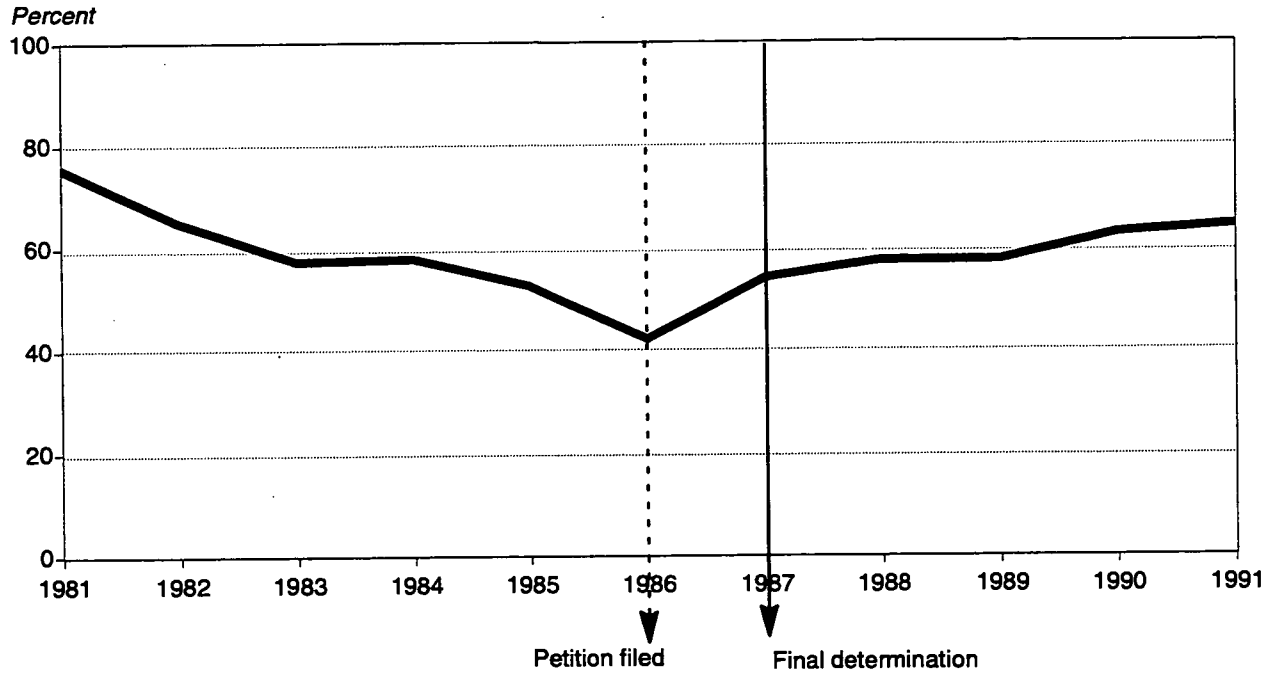
[39] Agoos and Mullen, "Urea Sales are Up," p. 34.

[40] John Douglas, a fertilizer consultant, indicated that the U.S. nitrogen industry is gradually shifting from ammonia and ammonium nitrate to solid urea and UAN solutions, as insurance costs and environmental costs in the production and use of ammonia and ammonium nitrate have increased significantly since 1986 (*Chemical Marketing Reporter*, May 20, 1991).

[41] U.S. Dept. of Interior, *Nitrogen*, 1981-1983.

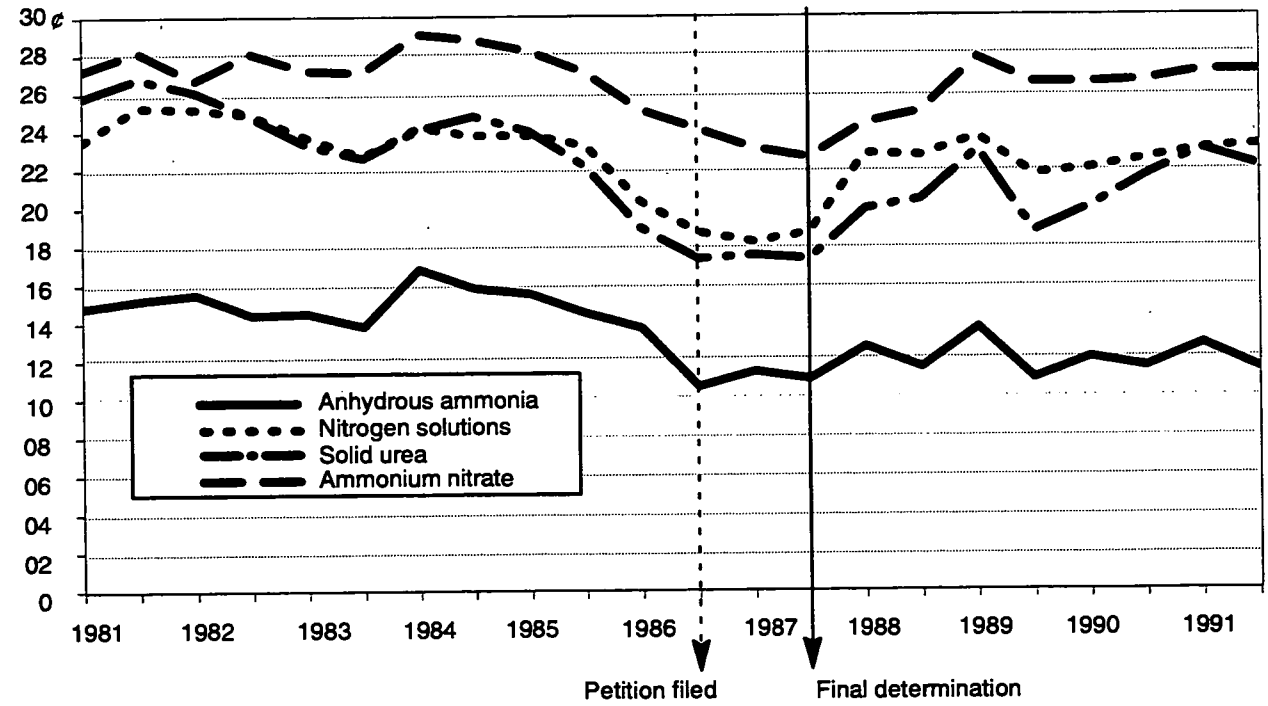
[42] U.S. Dept. of Interior, *Nitrogen*, 1984-86.

Figure 11-6
Solid urea: U.S. industry market share, 1981-91



Source: Calculated from official statistics of the U.S. Department of Commerce.

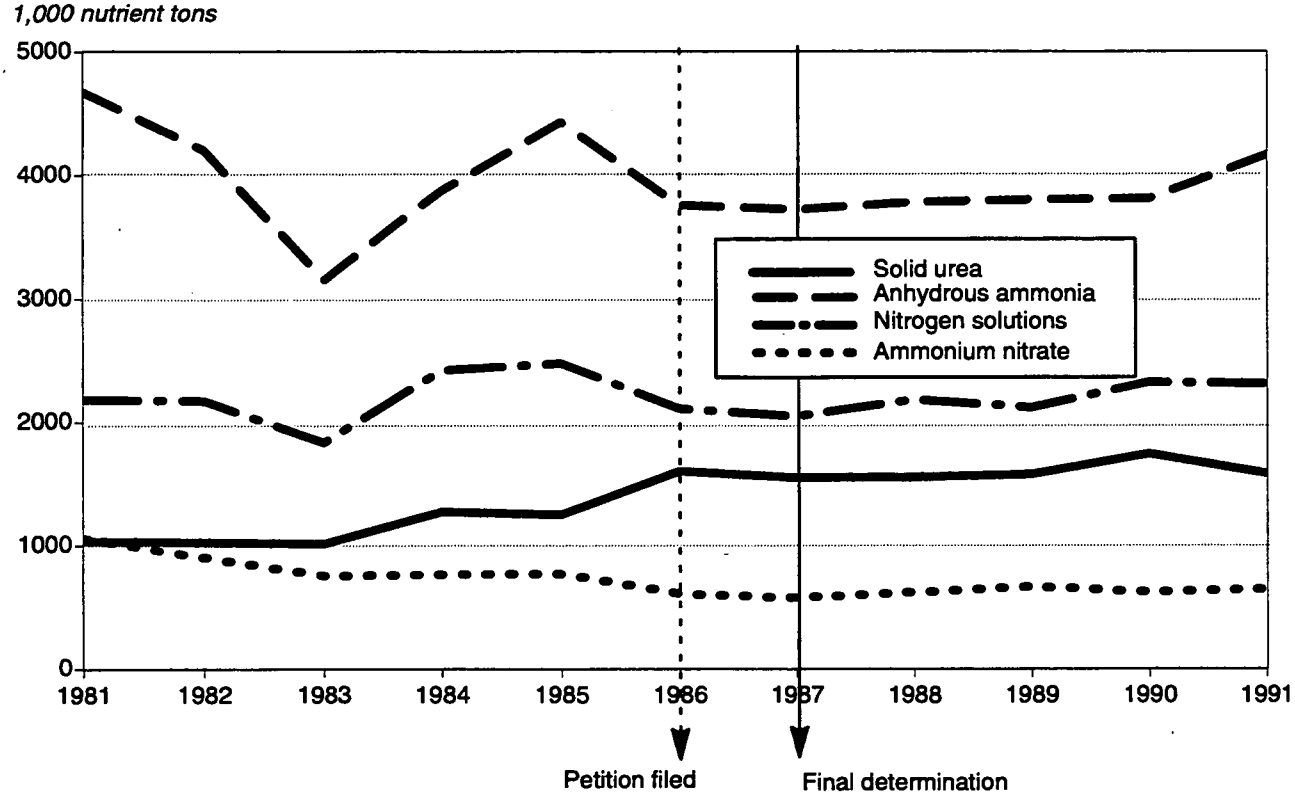
Figure 11-7
U.S. farm prices of the major nitrogenous fertilizers, semiannually, March 1981-October 1991
Per pound of contained nitrogen



Note.—The major nitrogenous fertilizers are anhydrous ammonia, nitrogen solutions, solid urea, and ammonium nitrate. U.S.-produced and imported products are included.

Source: Compiled from data of the U.S. Department of Agriculture, *NASS, Agricultural Prices.*

Figure 11-8
U.S. consumption of the major nitrogenous fertilizers, annually, 1981-91



Source: Compiled from data of the U.S. Department of Agriculture, *Commercial Fertilizers.*

1987 Commission determination was accompanied by urea price rises and consumption declines during 1987. Highest urea consumption for 1981-91 was during 1990.

Downstream Demand for Agricultural Crops

U.S. fertilizer demand in general is derived from the downstream demand for crops. In the case of nitrogenous fertilizers in general, and urea in particular, corn, wheat, cotton, and rice crops require heavy annual nitrogen usage to assure high yield. Thus, more acres planted and higher crop prices typically mean greater demand for fertilizer and hence for solid urea. Table 11-5 presents acres planted, and figure 11-9 and table D-10 present prices of the major nitrogen-using crops.[43]

Crop reduction programs of the Department of Agriculture during 1983 and low crop prices during 1986 may have partially accounted for the fewer acres planted over the 1983 and 1986-89 periods and, hence, reduced total demand for nitrogenous fertilizers. However, the quantity of solid urea demanded fell only slightly during 1983 and rose during 1986, as its price fell relative to prices of substitute nitrogenous fertilizers such as anhydrous ammonia.[44]

[43] Based on data in tables 11-5 and D-9, the correlation between acres planted and consumption of nitrogenous fertilizers, in nutrient tons, averaged 0.693 during 1981-91.

[44] Demand for solid urea has also been influenced by environmental and safety concerns in the use of anhydrous ammonia and ammonium nitrate that have led some farmers to switch to solid urea and UAN solutions.

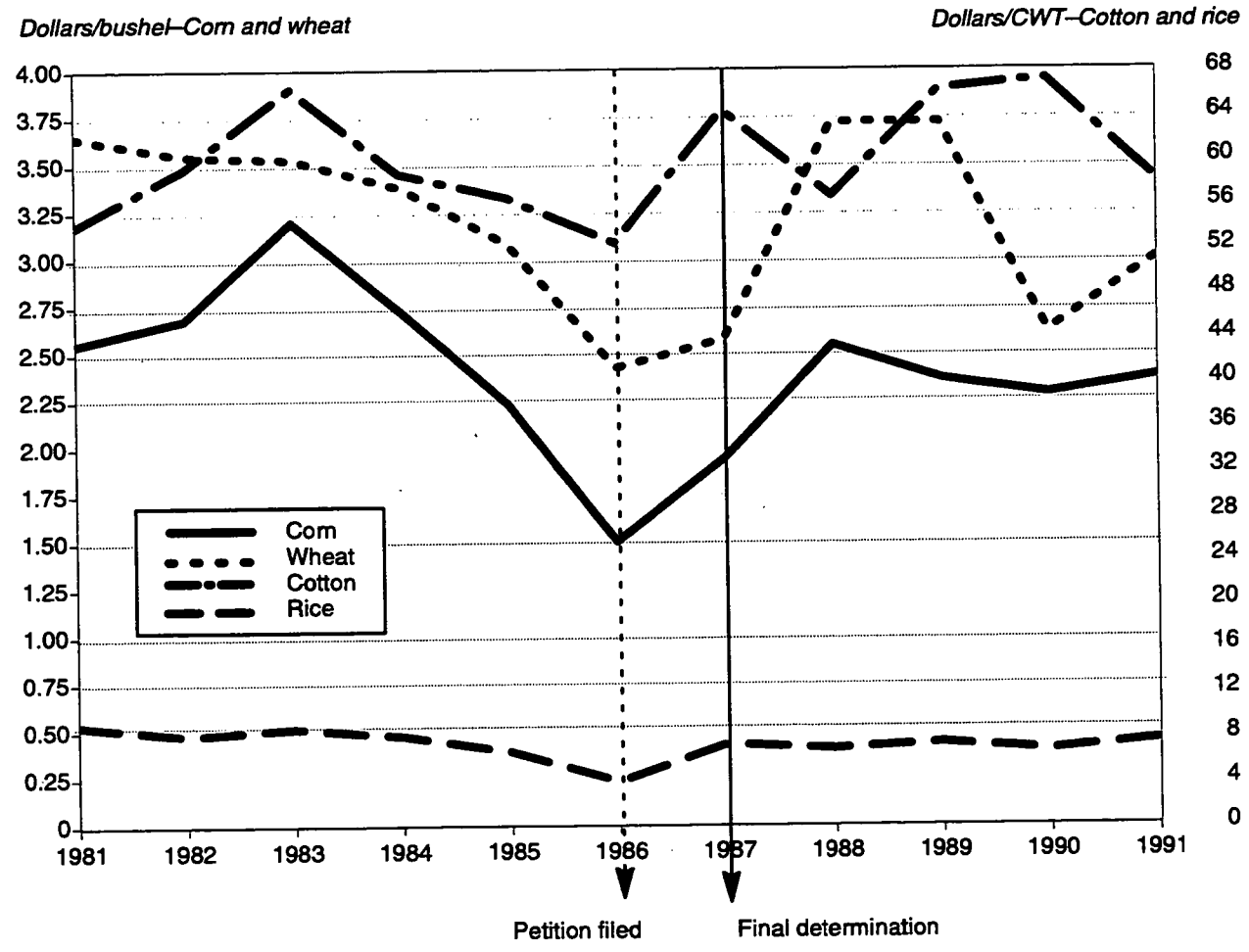
Table 11-5
Total acres planted for corn, wheat, cotton, and rice, 1981-91

(1,000 acres)

Year	Corn	Wheat	Cotton	Rice	Total
1981	84,097	88,251	14,330	3,827	190,505
1982	81,857	86,232	11,345	3,295	182,729
1983	60,217	76,419	7,926	2,190	146,752
1984	80,543	79,213	11,145	2,830	173,731
1985	83,448	75,575	10,685	2,512	172,220
1986	76,674	72,068	10,045	2,381	161,168
1987	66,200	65,829	10,397	2,356	144,782
1988	67,717	65,529	12,515	2,933	148,694
1989	72,296	76,615	10,587	2,731	162,229
1990	74,171	77,241	12,348	2,897	166,657
1991	75,951	69,906	14,052	2,857	162,766

Source: Compiled from data of the U.S. Department of Agriculture, *Commercial Fertilizers.*

Figure 11-9
U.S. farm prices of corn, wheat, cotton, and rice, annually, 1981-91



Source: Compiled from data of the U.S. Department of Agriculture, *NASS, Agricultural Prices.*

Estimates of Economic Effects

Time Series Analysis

Hypothesis Tested

The time series analysis tests whether the filing of the petition and the final determination had a significant impact on the prices and shipments of domestic product, subject imports, and nonsubject imports. It tests the hypotheses that the quantity and price of urea will increase while the quantity of subject imports will decrease and the price of subject imports will increase due to the case filing and final determination. The hypotheses are tested by using binary variables that partition the data into these three time periods: pre-petition, investigation, and postfinal determination. As was mentioned in chapter 5, the economic effects of unfair trade practices (dumping/subsidy) have not been estimated for the urea industry, since it was not possible to identify the starting date for dumping/subsidization.

The series of equations explained in chapter 5, which lay out the basic time series analysis, required modification in this case. Because of the absence of subject imports after the remedy was put in place, estimating a demand curve for subject imports was not possible. The six-equation model given in chapter 5 reduces to a four-equation model: a supply equation for domestically produced urea, a demand equation for domestically produced urea, a demand equation for imports from Canada, and a demand equation for other nonsubject imports. The equations are given below.

Domestic product supply:

(1) U.S. shipments = f(petition variable, remedy variable, U.S. price, GDP, natural gas price, quarter 2, quarter 3, quarter 4)

Domestic product demand:

(2) U.S. price = g(petition variable, remedy variable, U.S. shipments, crop acreage, GDP, price of UAN solution, world price of urea, unit value of Canadian imports, unit value of other imports, quarter 2, quarter 3, quarter 4)

Canadian import demand:[45]

(3) Canadian shipments = h(petition variable, remedy variable, unit value of Canadian imports, crop acreage, GDP, price of UAN solution, world price of urea, unit value of other imports, quarter 2, quarter 3, quarter 4)

Other nonsubject import demand:

(4) other shipments = i(petition variable, remedy variable, unit value of Canadian imports, crop acreage, GDP, price of UAN solution, world price of urea, unit value of other imports, quarter 2, quarter 3, quarter 4)

Data Sources

The data used in the analysis are quarterly from 1981-91. There were 44 observations for each equation. U.S. import data were obtained from official Commerce statistics. U.S. urea shipment data, in short tons, are only available publicly on a total shipment annual basis. Therefore, quarterly U.S. domestic shipment data were derived from monthly production, export, and inventory data published by Commerce. The U.S. prices of urea and of UAN solution, a substitute product, were collected from *Green Markets*. Prices of natural gas, the main input into urea production, came from the U.S. Department of Energy, *Natural Gas Monthly*.

As discussed earlier, the main downstream market for urea is in agriculture. Because three of the four main nitrogen-intensive crops are planted only in the spring, quarterly measures of downstream demand are unavailable. U.S. Department of Agriculture annual data on the planting of corn, wheat, cotton and rice were collected and aggregated so that one planting number could be used to proxy the changes in annual fertilizer demand.

[45] Canada, accounting for approximately 71 percent of total U.S. urea imports in 1991, is the largest exporter of urea to the United States.

Unit value, used as proxy for import price, was calculated from Commerce statistics on import FOB value divided by import quantity. The world urea price is taken as the Fertecon quarterly Eastern Europe urea price. Measures of GDP came from issues of the *Economic Report of the President.*

The petition variable is a binary variable whose value is one between the third quarter of 1986 through the second quarter of 1987. This is the period between the filing of the petition and the final determination. The remedy variable is a binary variable whose value is one between the third quarter of 1987 and the end of the data series. This is the period when antidumping duties were in place in the data sample.

Results

Table 11-6 presents results of the time-series analysis.[46] Before discussing the results equation by equation, there are a number of important conclusions derived from looking at the system in total. Overall, the results show a significant[47] increase in shipments and prices for domestic producers and an increase in shipments for Canadian producers. The model also shows that the remedy period had larger effects on prices and quantities with smaller effects generated during the petition period. The petition effects were in the same direction as the remedy effects. The weighted R-squared for the system is 0.90. This means that the system explains approximately 90 percent of the variation present. Diagnostic tests, such as the Durbin-Watson test for serial correlation, and summary statistics for individual equations such as the R^2 are not well defined for system equation techniques and hence not reported below.[48]

The coefficients of the petition and remedy binary variables in the domestic supply equation show the quantity effects for the petition and remedy period of the antidumping process. Both the petition period and the remedy period show that quantities increased. The petition period shows an increase of U.S. shipments of 25.9 percent.[49] The remedy period shows an increase of 47.7 percent from the original level of shipments. The magnitude of the remedy effect is consistent with the raw data given in table D-3. The supply elasticity, the coefficient on the U.S. price, shows that for a 1-percent increase in price, supply increases by 0.30 percent.[50] This result reflects the capacity and production concerns stated earlier in the chapter, that urea plants need to be run at peak capacity to be efficient. Therefore, this is more of a production elasticity than a supply elasticity. The price of natural gas does not show a significant relationship to urea supply. This is not particularly surprising since as pointed out earlier in the chapter, urea production accounts for a small percentage of total industrial natural gas use. The quarterly effects shown by those variables is what was expected.[51]

Since in the demand equation price is the dependent variable, the coefficients on the binary variables for the petition and remedy will show price effects. The petition variable shows a 3.0-percent increase in prices, but is insignificant. The remedy variable shows a 18.5-percent increase in prices, which is statistically significant. The downstream demand measure, crop acreage, shows the expected positive relationship, but was not significant.

The Canadian equation shows imports from Canada increasing because of the antidumping remedy. The effect on the remedy is just significant at the 90 percent confidence level. The estimates show a 37.7-percent increase in imports. Another interesting result of this equation is that imports from

[46] *Technical note.*—Due to the endogenity of prices and quantities, the first two equations are estimated using two-stage least squares. Since equations three and four are not simultaneous with one and two, but are related, they can be seen as seemingly unrelated to the first two equations. Therefore, three-stage least squares was used to estimate this system. All independent variables, were used as instruments. In order to mitigate the effects of autocorrelation, the dependent variables lagged one period were also used as instruments.

[47] The terms "significant" and "significance" here mean statistically significant and imply that there is a relatively large probability, for example, 90 or more in 100, that the variables labeled as significant would not have occurred by chance.

[48] G. Judge, W. Griffiths, R.C. Hill, and T.C. Lee, *The Theory and Practice of Econometrics* (New York: John Wiley & Sons, 1980), pp. 251-57 and confirmed with T.C. Lee on November 11, 1994.

[49] *Technical note.*—Coefficients of binary variables in logarithmic equations may be transformed into estimated percentage changes by raising e, the base of the natural logarithm, to the power of the coefficient, subtracting one, and multiplying by 100. The antilog of the coefficient minus one gives the percentage change. See Halvorsen and Palmquist, "The Interpretation of Dummy Variables in Semilogarithmic Equations," *American Economic Review*, vol. 70 (1980), pp. 474-475.

[50] *Technical note*—Due to the specification of the variables in logarithmic form, coefficients for non-binary variables in table 11-6 can be interpreted as elasticity estimates. An elasticity is the percentage change in the dependent variable that results from a one-percent change in an explanatory variable.

[51] Most of the shipments occur in the first and second quarters, with the third quarter being the period of least activity.

Table 11-6
Urea: Coefficients of regressions and related T-statistics,[1] quarterly, 1981-91

Independent variable	Supply, U.S. shipments[2]	Demand U.S. price[2]	Demand Canadian shipments[2]	Demand other shipments[2]
Petition variable	0.23 (1.55)	0.03 (.61)	-0.05 (-.23)	-0.02 (-.04)
Remedy variable	.39** (2.50)	.17** (2.52)	.32* (1.67)	-.16 (-.31)
U.S. urea price[2]	.30* (1.70)	([3])	-1.90 (-1.45)	.48 (.17)
U.S. urea shipments[2]	([3])	.12 (.24)	([3])	([3])
Canadian unit value[2]	([3])	.07 (.78)	-.22 (-.59)	-.91 (-1.14)
Other import unit value[2]	([3])	-.06 (-1.89)	-.10 (-.88)	.18 (.69)
Quarter 2	.03 (.30)	-.07** (-2.35)	-.22 (-1.605)	-.19 (-.62)
Quarter 3	-.20** (-2.28)	-.03 (-.76)	-.60** (-4.17)	-.71** (-2.23)
Quarter 4	.16* (1.94)	-.01 (-.19)	-.23* (-1.78)	-.14 (-.48)
World price[2]	([3])	.43** (5.96)	1.00 (1.43)	-.75 (-.49)
UAN solution[2]	([3])	.64** (4.36)	.66 (.91)	.48 (.17)
Crop acreage[2]	([3])	.07 (.40)	-.37 (-.59)	-1.84 (-.69)
GDP[2]	.59** (2.00)	.01 (.10)	1.13** (2.69)	.14 (.16)
Constant	4.63* (1.71)	.84 (.35)	12.91* (1.66)	38.22** (2.23)
Number of observations	44	44	44	44

[1] t-statistics in parenthesis.
[2] Data entered in logarithms.
[3] Not applicable.
* Significant at the 90% level.
** Significant at the 95% level.

Source: Estimated by the staff of the U.S. International Trade Commission.

Canada closely follow the U.S. gross domestic product. For a 1-percent increase in U.S. GDP, there is a 1.13-percent increase in shipments of urea from Canada. In addition, the Canadian shipments to the United States are related to the world price of urea. The seasonal adjustments are very significant, with most imports coming in the first quarter.

There were no significant effects of the antidumping case on other imports. Neither the petition nor the remedy variable are significant. The quarterly effects show a similar pattern to those in the Canadian demand equation. All the other parameter estimates are not significant, probably because of the

data aggregation from many importers over a number of countries.

In total, the results show the price and quantity of sales of U.S. producers of urea increased as a result of the antidumping process. Because urea is a commodity, the quantity effects were larger than the price effects. Imports from Canada showed an increase in quantity while unit values remained unchanged. Imports from other countries showed no significant change in either unit values or quantities.

Computable Partial Equilibrium Analysis

In contrast with estimating the economic effects of unfair trade practice and remedy over time as done by the time series analysis presented above, the partial equilibrium analysis estimates economic effects of the dumping and remedy for a given base year, in this case 1985, a year before the petition was filed. The partial equilibrium effects of dumping and remedy are measured, as described in chapter 5, by applying a computable partial equilibrium (CPE) analysis. Effects of dumping and the remedy are calculated on the basis of aggregate imports of urea from East Germany, Romania, and the U.S.S.R. The results discussed below focus on a range of effects of the unfair practice and remedy on price, output, and revenue for the domestic, subject, and nonsubject producers.

The solid urea antidumping petition was filed in July 1986, and the preliminary determination by the Department of Commerce was in January 1987. For this reason, 1985 is used as a base year in this analysis. The inputs used in the CPE analysis are presented in table 11-7. The dumping margin of 64.5 percent is the average of the dumping margins found by Commerce weighted by the share of imported value for each country in 1986. Production and trade data came from official Commerce statistics and the final Commission report (*Urea from the German Democratic Republic, Romania, and the Union of Soviet Socialist Republics* (investigations Nos. 731-TA-338 through 340), USITC publication 1992, July 1987). Employment in the urea industry, as well as the estimate of foreign transportation costs, was also based on data collected in the original urea investigation. The remaining necessary inputs are the elasticities of demand, supply, and substitution. Questionnaire results and a posthearing submission by the Ad Hoc Committee of Domestic Nitrogen Producers[52] (Ad Hoc Committee Report) were reviewed with regard to the elasticity estimates.

There is general agreement that demand for urea is relatively inelastic. As stated in the industry review, nitrogen fertilizers must be applied each year. The elasticity of demand used was -0.5 percent. This is the midpoint of the assumed range of -0.3 to -0.8 and is in agreement with the demand elasticity used by the Federal Trade Commission (FTC) of -0.45 percent.[53]

[52] November 4, 1994, comments on behalf of the Ad Hoc Committee of Domestic Nitrogen Producers, Akin, Gump, Strauss, Hauer and Feld.

[53] See Morris Morkre and Kenneth Kelly, *Effects of Unfair Imports on Domestic Industries: U.S. Antidumping and Countervailing Duty Cases, 1980-1988*, FTC Bureau of Economics Staff Report, 1994, p. 108.

Table 11-7
Partial equilibrium analysis for urea: Assumed values of input variables, 1985

Input variable	Minimum	Maximum
Dumping margin[1]	64.5	(2)
Values for U.S. market (*1,000 dollars*):		
Domestic value	457,632	(2)
Subject value	87,726	(2)
Nonsubject value	174,754	(2)
U.S. market elasticities (*absolute value*):		
Substitution:		
Domestic/subject	5.0	7.0
Domestic/nonsubject	7.0	10.0
Subject/nonsubject	5.0	7.0
Aggregate demand	.3	.8
Supply:		
Domestic	2.0	4.0
Subject	5.0	10.0
Nonsubject	5.0	10.0

[1] Trade-weighted average dumping margin for subject countries. See page 11-2 for individual country margins.
[2] Not available.

Source: Compiled by the staff of the U.S. International Trade Commission.

There is disagreement concerning the elasticities of supply and substitution for domestic urea, subject imports, and nonsubject imports. While the substitution elasticities used in the Ad Hoc Committee Report classify all three goods, domestic, subject, and nonsubject urea, as perfect substitutes, some producers and most purchasers said urea from subject countries was of lower quality or required a 15-percent price premium to get consumers to switch. As mentioned earlier, subject imported urea is prilled while most domestic production is granular. Therefore, urea from subject countries is a close, but not perfect, substitute for domestic or nonsubject imported urea.

There is general agreement that the elasticity of supply for the subject and nonsubject countries is high. Support for this is found in the trend analysis, where both subject and nonsubject countries were able to increase urea production in a very short span of time. The degree to which U.S. producers can change supply in response to price changes is disputed. While the process for producing urea entails substantial shutdown costs, and production is most efficient when plants are run at or near full capacity, U.S. producers were able to increase production substantially in the late 1980s (see table D-2). This increase was possible even with higher industry concentration during this period as shown in the concentration ratio section. The elasticities used in the analysis are shown in table 11-7.

Effects of Unfair Trade Practices

The estimated effects of the unfair trade practice are presented in table 11-8. The estimates in this table are based on the midpoints of the parameter ranges given in table 11-7. The model generates a series of scenarios on the basis of a range of elasticities. The effects on prices, output, and revenue of domestic product and imports from subject and nonsubject countries are reported as a percent of the fair value that would have existed had the dumping not occurred.

Table 11-8
Urea: Results of computable partial equilibrium analysis (estimated effect on U.S. market of unfair trade practices and remedies), base year 1985[1]

Item	Unfair trade practice	Unfair trade practice and remedy	Remedy
	—(*Change from fair value*)[2] —		(*Change from actual value*)[3]
Impact on industry *(percent)*:			
Domestic price	-2.5	0	2.5
Domestic output	-7.3	0	7.8
Domestic revenue	-9.6	0	10.6
Domestic employment	-5.1	0	5.4
Impact on imports *(percent)*:			
Subject import price	(4)	(4)	(4)
Subject import quantity	(4)	0	-100.0
Subject import revenue	(4)	0	-100.0
Nonsubject import price	-2.7	0	2.8
Nonsubject import quantity	-18.7	0	23.0
Nonsubject import revenue	-20.9	0	26.5
Welfare effects *(1,000 dollars)*:			
Gain to consumers	20,021	0	-20,021
Benefit to producers	-11,669	0	11,669
Net welfare effects	8,352	0	-8,352

[1] The estimated effects reported are the results of the Commission's CPE model using the midpoint values of parameter ranges listed in table 11-7. This model accounts only for the short term effect of unfair practices and remedies of cases with affirmative determinations in the base year, as discussed in the text.

[2] The "fair values" are the values estimated by the model to have been in place without the effect of the unfair trade practice.

[3] The "actual values" are the market values during the base year. In this case, actual value equals fair value.

[4] The margins determined by Commerce are so large that the model calculates that there would be no imports from the subject country but for the unfair trade practice.

Source: Estimated by the staff of the U.S. International Trade Commission.

The model estimates show there would not have been subject country imports except for the dumping. Because of dumped imports, the model shows a 2.5-percent domestic price decrease, a 7.3-percent domestic quantity decrease, and a 9.6-percent domestic revenue decrease; these are percentage decreases from prices, quantities, and revenues that would have prevailed had dumping not occurred.

The effect on imports from nonsubject countries was greater than the effect on domestic product. Nonsubject imports decreased by 18.7-percent, with price and revenue decreases of 2.7- and 20.9-percent respectively.

Domestic employment in the urea industry was estimated to be 5.1 percent lower as a result of the dumping. With approximately 500 workers in the urea industry, as shown on table 11-4, this would mean a loss of 25 to 26 workers.

Effects of Remedies

The estimated effects of the remedy are shown in the third column of table 11-8. The estimates for the effect of the remedy are given in terms of percent of actual value.[54] Basically, the estimates show by how much the remedy affected prices, quantities, revenues, and so forth from the prevailing value during the period of dumping. In total, the results show subject imports going to virtually zero[55] (i.e., dropping by 100 percent), and the earlier estimated effects of dumping being strongly counteracted. Specifically, the estimates show a 2.5 percent increase in domestic urea price, a 7.8 percent increase in domestic quantity, and a 10.6 percent increase in domestic revenue. These are somewhat smaller effects than those obtained from the time series analysis. In addition, CPE results show that employment in the industry increased by 5.4 percent because of the remedy. As mentioned in chapter 5, the CPE analysis looks at just the effects of the imposition of the duty, while the time series analysis may pick up other factors, such as behavioral changes.

The price of nonsubject imports increased by 2.8 percent and quantities increased by 23.0 percent. This corresponds to econometric analysis results which show the remedy had a smaller effect on nonsubject import price and a larger impact on quantity. The time series analysis estimate of import quantity increase from Canada was approximately 38 percent.

[54] In this case, because subject imports virtually ceased, actual value and fair value are equivalent.

[55] Official Commerce statistics show minimal amounts of urea from certain individual subject countries entering the United States during 1987, 1989, and 1990.

Net Welfare Effects

The results of the net welfare calculations discussed in chapter 5 of this report are reported at the bottom of table 11-8. The net welfare effect of dumping shows a net welfare increase, because the gain to U.S. consumers outweighed the impact on U.S. producers.

Since the upstream industry for urea is natural gas, the main effect on production sectors concerns urea producers themselves.[56] Anything affecting the urea market is very unlikely to have upstream effects because of the small percentage of natural gas production (approximately 2 percent of total annual industrial use) accounted for by urea production. The downstream effects start with the farmers purchasing fertilizer and end with final consumers of agricultural products. The effect of dumping on consumers is a positive transfer of approximately $20 million from the producers and foreign suppliers. The effect of dumping on the U.S. producers is a negative transfer of $11.7 million to U.S. consumers. With the U.S. consumers and U.S. producers effects taken together, the dumping caused a net welfare gain of $8.3 million. In other words, the effect of fertilizer price decrease received by consumers of agriculture products produced with urea is greater than the effect of revenue loss to U.S. producers.

Because the analysis of the dumping remedy showed that subject urea imports essentially stopped, the welfare effects of the remedy are the opposite of the dumping effect. Because of remedy imposition and the resulting increased prices, U.S. consumers had a welfare loss of $20 million, and U.S. producers had a welfare gain of $11.7 million. Therefore, the net result of remedy imposition was an $8.3 million welfare loss.

[56] Due to the nature of this industry, the effects on downstream and upstream industries are relatively small. Effects on the main upstream natural gas industry production, in such areas as employment, investment, and wages were minimal because urea production accounts for less than 2 percent of total annual industrial natural gas use. While cumulative downstream effects are sizable, the main effect is on the cost of fertilizer to farmers, with minimal resultant effects on wages, employment, and/or investment in the downstream agricultural industry. In addition, since the agricultural sector is highly competitive, a large portion, if not all, of the savings should be passed on to the final consumers.

CHAPTER 12
Brass Sheet and Strip

History of Title VII Investigations

The petitioners in this case study represented several companies in the brass mill industry that produce certain brass sheet and strip products.[1] Producers, a trade association, and unions joined together in the petition process.[2]

In two separate actions, the petitioners alleged subsidization and less-than-fair-value sales of imports from nine countries. Table 12-1 shows key dates in these actions. The petitioners alleged that an industry in the United States was materially injured and threatened with material injury by reason of imports from Brazil and France of certain brass sheet and strip that were subsidized by the Governments of Brazil and France. In addition, the petitioners alleged that an industry in the United States was materially injured and threatened with material injury by reason of imports from Brazil, Canada, France, Italy, Japan, Korea, the Netherlands, Sweden, and West Germany of certain brass sheet and strip that were being sold in the United States at LTFV.

Brass Sheet and Strip Industry

Pre-petition year (1985):	
Shipments (*million dollars*)	264
Number of primary producers	10
Subject import market share by quantity (*percent*)	25
Total import market share by quantity (*percent*)	27
AD/CVD history:	
AD investigations (*number*)	9
CVD investigations (*number*)	2
First petition year	1986
First AD/CVD order year	1987
Most recent petition year	1987

The Department of Commerce determined that benefits that constitute subsidies were being provided to manufacturers, producers, or exporters of certain brass sheet and strip in Brazil and France. Commerce further determined that certain brass sheet and strip from Brazil, Canada, France, Italy, Japan, Korea, the Netherlands, Sweden, and West Germany were being, or were likely to be, sold in the United States at LTFV.

The Commission determined that a U.S. industry was materially injured by reason of imports from Brazil, Canada, France, Italy, Korea, Sweden, and West Germany, citing the deteriorating condition of the domestic industry, significant market penetration by imports, and the adverse impact of imports on prices for the domestic product during the period of investigation as the basis for the affirmative decision.[3]

[1] Brass is an alloy of copper in which zinc is the principal alloying element, with or without small quantities of other elements, but not including copper-nickel-zinc alloys. Companies in the brass mill industry produce a variety of copper and copper alloy semifabricated shapes, usually grouped as (1) flat products (plate, sheet, strip, and foil); (2) rod, bars, and profiles; and (3) tubes and pipes. A brass mill company typically specializes in the production of only one of these groups of products.

[2] The petitioning producers were American Brass, Buffalo, NY; Bridgeport Brass Corp., Indianapolis, IN; Chase Brass & Copper Co., Solon, OH; Hussey Copper Ltd., Leetsdale, PA; The Miller Co., Meriden, CT; North Coast Brass & Copper Co., Cleveland, OH; Olin Corp. (Brass Division), East Alton, IL; and Revere Copper Products, Inc., Rome, NY. These companies were all members of the Copper & Brass Fabricators Council, Inc., a trade group that represented brass mill companies, which fully supported the petitions. Several trade unions were also petitioners.

[3] U.S. International Trade Commission (USITC), *Certain Brass Sheet and Strip from Brazil, Canada, and the Republic of Korea* (investigation Nos. 701-TA-269 (final) and 731-TA-311, 312, and 315 (final)), USITC publication 1930, Dec. 1986; and USITC, *Certain Brass Sheet and Strip from France, Italy, Sweden, and West Germany* (investigation Nos. 701-TA-270 (final) and 731-TA-313, 314, 316, and 317 (final)), USITC publication 1951, Feb. 1987.

Table 12-1
Brass sheet and strip: Key dates in trade cases[1]

Action/date	Brazil (S)	Brazil (D)	Canada (D)	France (S)	France (D)	Italy (D)	Japan (D)	Korea (D)	Netherlands (D)	Sweden (D)	West Germany (D)
Petitions filed:											
Mar. 10, 1986	X	X	X	X	X	X		X		X	X
July 20, 1987							X		X		
Commerce preliminary determination:											
June 9, 1986	X			X							
Aug. 22, 1986		X	X		X	X		X		X	X
Feb. 1, 1988							X				
Feb. 8, 1988									X		
Commerce final determination:											
Nov. 10, 1986	X	X						X			
Dec. 9, 1986			X								
Jan. 9, 1987					X	X				X	X
Jan. 12, 1987				X							
June 21, 1988 ...							X				
June 22, 1988 ...									X		
Commission final determination:											
Dec. 22, 1986	X	X	X					X			
Feb. 19, 1987				X	X	X				X	X
July 29, 1988							X		X		

[1] (S) signifies a subsidy case; (D) signifies a dumping (less-than-fair-value) case.

Source: *Federal Register* notices.

With regard to Japan and the Netherlands, the Commission also determined that a U.S. industry was materially injured by reason of imports, citing declines in production capacity, wages, employment, investment, and research and development expenditures and the poor financial condition of the industry throughout the period of investigation as the basis for the affirmative decision.[4] Subsequently, Commerce issued countervailing and antidumping duty orders as remedies (table 12-2).

Table 12-3 shows Commerce's reviews of the countervailing and antidumping orders. In addition, Commerce has also reviewed two circumvention complaints regarding brass sheet and strip imports from West Germany and Canada.[5]

[4] USITC, *Certain Brass Sheet and Strip from Japan and the Netherlands* (investigation Nos. 731-TA-379 and 380 (final)), USITC publication 2099, July 1988.

[5] In the West German case, it was alleged that during January 1986-January 1989, Wieland-Werke was exporting brass sheet and strip with a minor alteration in composition that could be used as a substitute for the brass subject to the antidumping order. Commerce determined that the alloy was not a minor alteration and that no circumvention was occurring. In the Canadian case, it was alleged that Wolverine Tube Inc. was exporting brass plate from Canada to the United States, where it was rolled down into brass sheet and strip of the type included in the antidumping order during

Scope of Investigation

Subject Products and Manufacturing Process

The product is wrought[6] sheet and strip of brass, of solid rectangular cross-section over 0.006 inch but not over 0.188 inch in gauge (thickness),[7] in coils or cut to length, whether or not corrugated or crimped, but not cut, pressed, or stamped into nonrectangular shape.[8] The brass composition specifications

[5]—*Continued*
September 1, 1990-September 30, 1991. Commerce determined that circumvention was occurring and expanded the antidumping order to include Canadian brass plate.

[6] The term "wrought" refers to products that have been rolled, forged, drawn, or extruded, and also refers to cast or sintered products that have been machined or processed other than by simple trimming, scalping, or descaling.

[7] Gauges of 0.006 inch and below are considered to be foil, and gauges over 0.188 inch are considered to be plate.

[8] Under the *Harmonized Tariff Schedule* (*HTS*), imports of the C20000-series brass sheet and strip are classified in *HTS* subheadings 7409.21.00 and 7409.29.00, and are reported for statistical purposes under reporting

Table 12-2
Brass sheet and strip: Countervailing and antidumping duty orders

Case, country, and firm	Order date	Subsidy or LTFV margin
		Percent
Subsidy cases:		
Brazil (all firms)	Jan. 8, 1987	3.47
France (all firms)	Mar. 6, 1987	7.24
LTFV cases:		
Brazil:		
Eluma Corp.	Jan. 12, 1987	40.62
All other firms	Jan. 12, 1987	40.62
Canada:		
Arrowhead	Jan. 12, 1987	2.51
Noranda	Jan. 12, 1987	11.54
All other firms	Jan. 12, 1987	8.10
France (all firms)	Mar. 6, 1987	42.24
Italy (all firms)	Mar. 6, 1987	[1]12.08
Japan:		
Nippon Mining Co., Ltd.	Aug. 12, 1988	57.98
Sambo Copper Alloy Co., Ltd.	Aug. 12, 1988	13.30
Mitsubishi Shindoh Co., Ltd.	Aug. 12, 1988	57.98
Kobe Steel	Aug. 12, 1988	57.98
All other firms	Aug. 12, 1988	45.72
Korea:		
Poongsan Metal Corp.	Jan. 12, 1987	7.17
All other firms	Jan. 12, 1987	7.17
Netherlands:		
Metallverken Nederland, B.V.	Aug. 12, 1988	16.99
All other firms	Aug. 12, 1988	16.99
Sweden (all firms)	Mar. 6, 1987	9.49
West Germany:[2]		
Wieland-Werke AG	Mar. 6, 1987	5.31
Metallwerke Schwarzwald GMBH	Mar. 6, 1987	5.31
Langenberg Kupfer- und Messingwerke GMBH	Mar. 6, 1987	15.94
All other firms	Mar. 6, 1987	8.87

[1] Amended to 9.74 percent on Apr. 8, 1987.
[2] Amended to 3.81 percent for Wieland, 16.18 percent for Langenberg, and 7.30 percent for all other firms on Sept. 23, 1987, after remand order from the Court of International Trade.

Source: Federal Register notices.

meet the Unified Numbering Systems for Metals and Alloys (UNS) C20000-series or the Copper Development Association (CDA) 200-series.[9] The generally accepted industry distinction between sheet and strip is that strip consists of brass that is coiled or wound on reels, and sheet consists of brass that has been cut to length and is no longer coiled.

During the AD/CVD investigations, the Commission determined that the like product consisted of all domestically produced C20000-series brass sheet and strip, including products for reroll.[10]

The manufacturing process for brass sheet and strip consists of casting, rolling, and finishing operations. Prior to casting, copper, zinc, and other metal raw materials (in unwrought or scrap form) are acquired by purchase or through a "tolling" arrangement whereby customers provide the raw

[8]—*Continued*
numbers 7409.21.0050, 7409.21.0075, and 7409.21.0090 (for material in coils), and 7409.29.0050, 7409.29.0075, and 7409.29.0090 (for material not in coils).

[9] There are three general categories of brasses: copper-zinc alloys (brasses) covered by the UNS C20000-series, copper-zinc-lead alloys (leaded brasses) covered by the UNS C30000-series, and the copper-zinc-tin alloys, covered by the UNS C40000-series. The UNS C20000-series represents the bulk (approximately 90 percent in 1985) of U.S. production of brass sheet and strip.

[10] Reroll is medium- to heavy-gauge sheet and strip that is sold by a mill to an independent finisher that rolls the material to smaller gauges. One importer argued that 48-inch wide Muntz metal (a certain type of C20000-series sheet and strip) be considered a separate like product because no U.S. producer could supply the material in this width. The Commission determined that no separate like product existed. USITC, *Certain Brass Sheet and Strip from Japan and the Netherlands*, USITC publication 2099, p. a-5.

Table 12-3
Brass sheet and strip: Department of Commerce countervailing duty and antidumping administrative reviews[1]

Case, country, and firm	Period(s)	Final margin
		Percent
Countervailing duty cases:		
Brazil (all firms)	Jan. 1, 1990-Dec. 31, 1990	0
Antidumping cases:		
Canada:		
Arrowhead	Aug. 26, 1986-Dec. 31, 1987	5.70
Noranda/Wolverine[2]	Aug. 26, 1986-Dec. 31, 1987	21.32
	Jan. 1, 1990-Dec. 31, 1990	21.32
Ratcliffs[3]	Aug. 26, 1986-Dec. 31, 1987	.04
	Jan. 1, 1988-Dec. 31, 1988	0
	Jan. 1 1989-Dec. 31, 1989	.46
All other firms	Jan. 1 1989-Dec. 31, 1989	0
Italy (LMI)	June 26, 1986-Feb. 29, 1988	9.49
	Mar. 1, 1989-Feb. 28, 1990	4.70
	Mar. 1, 1991 - Feb. 29, 1992	9.49
Korea (Poongsan)	Aug. 22, 1986-Dec. 31, 1987	7.34
Netherlands (Metallverken/Outokumpu[4])	Feb. 8, 1988-July 31, 1989	9.25
	Aug. 1, 1989-July 31, 1990	10.54
Sweden (Metallverken/Outokumpu[4])	Aug. 22, 1986-Feb. 29, 1988	3.39
	Mar. 1, 1988-Feb. 28, 1989	4.36
	Mar. 1, 1989-Feb. 28, 1990	13.76
West Germany:		
Wieland Group	Aug. 22, 1986-Feb. 29, 1988	23.49
Prym	Aug. 22, 1986-Feb. 29, 1988	19.59
Schwermetall	Aug. 22, 1986-Feb. 29, 1988	7.30

[1] No reviews completed to date concerning Brazil, France, and Japan.
[2] Wolverine bought Noranda's production facilities in Canada.
[3] Ratcliffs' antidumping duty order was revoked by the Department of Commerce on Nov. 8, 1991.
[4] Outokumpu bought Metallverken's production facilities in the Netherlands and Sweden.

Note.—Table includes all final reviews (with amendments) conducted to date on original respondents and other foreign manufacturers or exporters.

Source: *Federal Register* notices.

materials and pay a fee for converting the materials into sheet and strip.

In the most common casting process, the raw materials are melted in a furnace and then cast into an ingot measuring roughly 5 to 7 inches thick, 26 to 30 inches wide, and 25 feet long, and weighing over 10,000 pounds. Rolling consists of reducing the material's thickness by a succession of passes through heavy steel rollers. The product may undergo a number of finishing operations, such as cleaning, slitting (cutting to smaller widths), or coating. It is then packed and shipped, usually in coiled form, although it may be cut to length.

Description of Upstream Industry

The unwrought copper and zinc industries and the metal waste and scrap industry are the major upstream industries that supply the brass sheet and strip producers. Commission staff computations, based on data from the CDA, indicate that brass sheet and strip producers consume 150,000 to 200,000 short tons of refined copper and 50,000 to 75,000 short tons of slab zinc annually.[11] This accounts for approximately 8 to 10 percent of U.S. refined copper consumption and 5 to 8 percent of U.S. slab zinc consumption, according to U.S. Bureau of Mines consumption figures. The sheet and strip producers also consume roughly 150,000 to 200,000 short tons of copper in scrap (in the form of copper or brass scrap) and 50,000 to 75,000 short tons of zinc in scrap.

Description of Downstream Industry

C20000-series brass sheet and strip is used in a wide variety of products, such as ammunition (for

[11] Copper Development Association, *Annual Data 1994: Copper Supply and Consumption, 1973-1993* (New York, 1994).

casings), motor vehicle radiators (including automobiles, trucks, and off-highway vehicles), builders' hardware (e.g., door knobs), bathroom accessories (e.g., towel racks), electrical and electronic connectors, jewelry, fasteners, and lamp bases and sockets. The chief characteristics of C20000-series brass are ease of manufacture because of excellent forming and drawing properties, attractive surface appearance, fair electrical conductivity, good corrosion resistance, and good strength. The typical process used by downstream industries to fabricate products from brass sheet and strip is stamping, whereby the material is punched with a die that forms it into the desired shape.

The brass sheet and strip industry sells products directly to users (usually large customers) and to distributors, which serve primarily smaller customers. There are a wide variety of industries that use brass sheet and strip in their operations. Industries that supply original and replacement equipment to the automobile and other motor vehicle companies are major customers. For example, the Harrison Radiator Co. (a GM subsidiary) makes radiators for GM automobiles and Modine Manufacturing Co. makes radiators for the replacement market. Packard Electric and Augat Co. are examples of companies that make brass connectors for automobile electrical terminals. Other important end-use sectors are electronic connectors (e.g., AMP Co. and Molex), builders' hardware (e.g., Kwikset Co. and Schlage Co. make door knob and lock sets), ammunition (e.g., Winchester, Remington, and Federal Cartridge), and nonautomobile electrical goods (e.g., Leviton and General Electric make light socket sets, wall plates, and plug prongs). The Chemart Co. makes brass ornamental products for the jewelry and decorative industries.

Substitute Products

Other metal and metal alloys are the primary potential substitutes for brass in most end uses. Substituting for brass involves a tradeoff between the cost of the material and its performance/fabrication characteristics. For example, aluminum has made significant inroads into some traditional markets of brass sheet and strip in automobile radiator applications, because it is less expensive and lighter (weight is a major consideration in automobile design). However, aluminum does not conduct heat as well and is harder to fabricate than brass.

Purchasers and importers of brass sheet and strip were asked if there were other products that could be substituted for C20000-series brass sheet and strip.[12] Of the 13 respondents that answered this question, 7 stated that there are no adequate substitutes. The balance responded that aluminum could be substituted for brass in heat-exchange uses; stainless steel and low-carbon steel, in building product applications; and other copper alloys, in electrical and electronic applications. It was noted that other copper alloys are generally more expensive than brass, which discourages substitution. However, one producer of automotive electrical terminals stated that increasing performance requirements by their downstream customers has forced some substitution of better-performing copper alloys for brass.

It appears that substitution of other products for brass sheet and strip in heat-exchange and electrical applications occurs as a long-term process related primarily to technical considerations rather than as a response to short-term fluctuations in the relative price of brass and other products. Only in building and consumer products is there much scope for substitution on the basis of price shifts; even there, many customers are willing to pay a substantial price premium for brass, and thus are unlikely to raise or reduce consumption to a large extent in response to price shifts.

Approach of Investigation

Methodology

This case study examines the brass sheet and strip industry during the period from 1983, 3 years before the filing of the first petition seeking relief from unfair imports, through 1991, 3 years after the last affirmative determination. Industry trends during this period are analyzed to discern the effects of both unfair imports and the trade remedy process on such key industry variables as U.S. prices, domestic shipments, imports, profitability, employment, and investment. Time series statistical analysis addresses the effects of trade remedies on domestic shipments and imports. In addition, the Commission's CPE model yields estimates of the partial equilibrium effects of both the unfair trade practices and the trade remedy process on the brass sheet and strip industry, on downstream industries, and on the U.S. economy as a whole.

[12] Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Data Sources

Information for this case study came from U.S. industry participants (producers, purchasers, and importers), other observers, and public data sources.[13] The largest source of data was two sets of questionnaires submitted by producers, importers, and purchasers. The first set, submitted during the AD/CVD investigations, covered 1983-87, and the second, submitted during the present investigation, covered 1987-91. The new producer questionnaire was completed by four firms; one minor producer did not respond.[14] Fifteen firms submitted completed purchaser/importer questionnaires, of which seven identified themselves as importers, five as purchasers, and three as distributors.[15]

Several producers that provided data to the Commission for 1983-87 ceased operations in later years and could not provide questionnaire responses for this case study. Since all but one of these companies were minor producers, together accounting for less than 5 percent of shipments, Commission staff determined that excluding data for these producers for 1983-91 would not affect the analysis. However, one large producer ceased operations in early 1990; it was necessary for Commission staff to estimate data for this company for 1988-90. This estimate was based on previous years' data and on conversations with industry representatives.

The questionnaire responses were supplemented by information gathered from a public hearing, site visits by Commission staff, telephone interviews, and data from public sources, including the U.S. Bureau of Mines and the U.S. Department of Commerce.

Industry Profile and Structure

Industry Evolution and Structure

Two types of companies produce brass sheet and strip—primary brass mills and rerollers. Primary brass mills cast ingots and roll these ingots into intermediate-gauge products (referred to as "reroll products") and final-gauge products (referred to as "finished products"). Companies or facilities that acquire intermediate gauge sheet and strip products and roll them to finished gauges are called rerollers.[16] Domestic brass sheet and strip producers are also the major producers of copper and other copper alloy flat products. In terms of quantity, brass products account for most of the industry's production.

During 1983-91, the major U.S. primary producers of C20000-series brass sheet and strip were Olin Corp., American Brass (Outokumpu American Brass beginning in 1990), Chase Brass & Copper Co. (the main production facilities of this company were sold to its employees and renamed North Coast Brass & Copper Co. in 1988), Bridgeport Brass Corp. (purchased by Olin in 1988), and Revere Copper Products, which according to industry estimates together account for over 90 percent of capacity.[17] Other primary producers during this period included Hussey Copper, MRM Industries, the Miller Co., Plume & Atwood, and United Technologies.

The structure of the U.S. brass sheet and strip industry changed significantly both before and after the petition filings in terms of the number of producers and ownership (table 12-4). During 1983-93, many brass producers were spun-off as independent entities as parent companies either changed their business focus or became disenchanted with the profitability of the brass business. One large producer and several small producers ceased operations; this occurred after the imposition of remedies and indicates the intense competition in the industry. Foreign investment also was evident after the remedies were imposed, as an existing U.S. operation was purchased and a new plant was built by foreign-based producers.

Industry Size

Little information is available on the size of the brass sheet and strip industries in the world. However, the World Bureau of Metal Statistics does provide production data[18] for all copper alloy semifabricates (which include plate, sheet, strip, foil, rod, bar, profile, tube, and pipe products of brass

[13] No previous studies are known regarding the effects of unfair trade practices and trade remedies on the brass sheet and strip industry.

[14] Five additional firms that received the questionnaire claimed not to be producers.

[15] Nineteen additional firms were sent the questionnaire. Six firms claimed they did not purchase or import during the time period and thirteen did not respond.

[16] The discussion and analysis in this case study is focused on the primary brass sheet and strip mills.

[17] This does not include the new PMX Industries brass sheet and strip plant in Cedar Rapids, IA, which did not commence production until 1992.

[18] These data do not include any information on China and the former Soviet Union countries.

Table 12-4
Restructuring in primary brass mill industry, 1983-93[1]

Company	Main location(s)	Year	Activity
American Brass	Buffalo, NY	1985	Sold by ARCO to private investors
		1990	Bought by Outokumpu
Chase Brass & Copper	Cleveland, OH	1988	Sold to employees and renamed North Coast Brass & Copper
	Shelby, NC	1990	Ceased operations
Hussey Copper	Leetsdale, PA	1984	Bought by private investor
MRM Industries	Sikeston, MO	1990	Ceased operations
North Coast Brass & Copper	Cleveland, OH	1990	Ceased operations
Olin Corp. (Brass Division)	East Alton, IL	1988	Purchased Bridgeport Brass
		1991	Purchased A.J. Oster Co. (a distributor)
Plume & Atwood	Thomaston, CT	1993	Ceased operations
PMX	Cleveland, OH	1990	Purchased North Coast Brass & Copper facility and renamed it Great Lakes Metals (a reroller only; casting equipment was sold)
	Cedar Rapids, IA	1992	Began production at new plant
Revere Copper Products	Rome, NY	1989	Spun-off as private entity by parent company
United Technologies	Quincy, MA	1992	Ceased operations

[1] Certain events outside the time period considered in the case study included to show trends.

Source: Compiled by the staff of the U.S. International Trade Commission.

and all other copper alloys), as shown in the following tabulation (for 1985):

	Production (*million pounds*)	Percent of total
Japan	1,344	23
United States	1,324	23
Germany	1,027	18
Italy	601	10
United Kingdom	366	6
France	331	6
All other	815	14
Total	5,808	100

Some individual country data for brass sheet and strip production were gathered during the Commission's AD/CVD investigations (table 12-5). These data, in combination with the World Bureau of Metal Statistics data, indicate that Germany was the largest C20000-series brass sheet and strip producer in the world (although brass sheet and strip production data for Italy were not available).

Competitive Factors

Brass sheet and strip products from different suppliers and different countries compete in terms of price, product quality, and customer service. The relative importance of these three factors varies substantially by the end use of the product.

Historically, many, if not most, brass sheet and strip products were considered commodity items (i.e., competing almost exclusively on the basis of price). However, brass sheet and strip producers have been able to charge a price premium for superior quality for some specialty products, such as certain electronic alloys, certain building construction products where surface finish is especially important, and certain ordnance products.

In the commodity segments of the industry, and to a lesser extent in other segments, price competition among producers has been intense and, as a result, profit margins have been low. To maintain or improve profit margins, U.S. producers have attempted to develop niche end-use markets (such as the automobile radiator market or certain electronics markets), invested in equipment to reduce operating costs, and increased worker productivity by combining jobs and introducing incentive programs.

Since the mid-1980s, it appears some brass sheet and strip products have become less of a commodity, depending on the type of downstream processing and the requirements of consumers, because of quality considerations. As a result, brass sheet and strip quality is an increasingly important competitiveness issue.[19] Consumers claim that the better quality

[19] Brass sheet and strip quality is measured by such factors as composition uniformity, tolerances (e.g.,

Table 12-5
Brass sheet and strip: Japanese, German, and U.S. production, 1983-87

(1,000 pounds)

Country/product	1983	1984	1985	1986	1987
Japan:					
All brass sheet and strip[1]	(2)	454,737	428,223	438,596	440,745
Germany:					
C20000-series sheet and strip	533,225	572,798	546,921	(2)	(2)
United States:					
C20000-series sheet and strip	411,929	455,783	382,206	404,681	462,286

[1] Data for C20000-series brass sheet and strip are not available.
[2] Not available.

Source: U.S. International Trade Commission, *Certain Brass Sheet and Strip from France, Italy, Sweden, and West Germany* (investigations Nos. 701-TA-270 (final) and 731-TA-313, 314, 316, and 317 (final)), USITC publication 1951, Feb. 1987; and *Certain Brass Sheet and Strip from Japan and the Netherlands* (investigations Nos. 731-TA-379 and 380 (final)), USITC publication 2099, July 1988.

material allows them to make better and more consistent products and results in less downtime on equipment.[20] Purchasers and importers were asked to rank factors important in their decisions on obtaining brass sheet and strip. Of the 11 respondents that answered this section of the questionnaire, the factor ranked as very important by the most respondents was quality (price and current availability were the next most common factors cited).

Most U.S. producers claim that their quality is as good as foreign material, although one U.S. producer did state that certain foreign producers have better quality material. Also, most U.S. producers claim that quality differences between their products and imported brass sheet and strip were not a significant factor in sales.[21]

U.S. consumers have mixed opinions regarding the relative quality of domestic and foreign brass sheet and strip. In the purchaser/importer questionnaire, nine respondents claimed there was no difference in quality; five respondents claimed foreign brass sheet and strip is of better quality, as did other consumers contacted for this study.[22] Japan, Germany, the Netherlands, and Sweden were specifically mentioned as sources of better quality brass sheet and strip. Certain consumers have claimed that domestic producers' quality has improved since the mid-1980s but is still not as good as the quality of certain foreign producers.

Domestic producers appear to have competitive advantages over imports in the domestic market in several types of services offered and the length of lead time for orders. U.S. producers offer toll arrangements and scrap buy-back plans to U.S. customers; these services are rarely offered by foreign producers. Lead times for orders from U.S. producers are shorter, ranging from 3 to 8 weeks compared with an average of 12 weeks for Japanese and Dutch products.

Foreign producers appear to have competitive advantages over domestic producers in several other areas. U.S. producers rank certain foreign producers as superior in providing credit, availability of special products, and the variety of products.[23] Certain foreign producers offer sheet and strip widths not available from U.S. producers.

Domestic Consumption Factors

Most brass sheet and strip markets are mature, and consumption has generally been flat or even declined in the United States over the last 20 years. The long-term decline in consumption has been caused by substitution of other materials, such as aluminum and steel, and by increased imports of finished products (such as automobiles) that contain brass sheet and

[19]—*Continued*
consistency of gauge and width), surface finish, formability variations, presence of imperfections like burrs and tin spots, cleanliness, and tightness of coil.

[20] U.S. industry officials, interviews by Commission staff, Nov. 6-7, 1994.

[21] Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

[22] U.S. industry officials, interviews by Commission staff, Nov. 6-7, 1994; transcript of the public hearing on investigation 332-344 before the Commission, Sept. 29-30, 1994, Washington, DC (TR), pp. 263-268.

[23] Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

strip. There are markets, however, where brass sheet and strip consumption is growing. In the electronics sector, brass for connectors is growing because of strong growth in demand for electronic devices of all types. Consumption for brass sheet and strip from year to year can vary significantly in response to the health of downstream industries.

The motor vehicle industry is a major user of brass sheet and strip, and developments in this industry strongly affect overall consumption trends. Downsizing and automobiles of lighter weight have reduced consumption. In original-equipment radiators, there is a strong trend that began in the early 1980s and accelerated in the last 3 to 4 years to substitute aluminum for brass; this trend is much less evident in the replacement radiator market for automobiles. Trucks and off-highway vehicles also have not converted away from radiators made of brass sheet and strip. Several factors have countered the decline in automobile consumption. Foreign-owned automobile production in the United States has grown—these companies obtain domestic parts that contain U.S.-made brass sheet and strip. Also, the greater use of electrical systems in automobiles has increased brass sheet and strip consumption for electrical connectors and wiring harnesses.

Building construction practices have also affected brass sheet and strip consumption. Newer homes tend to have more bathrooms that use more brass sheet and strip in plumbing systems and decorative accessories.

Greater consumption of electronics products has also increased brass sheet and strip consumption. The increased usage of computers for telecommunications, personal use, and so forth, and other electronic equipment over the past 10 to 15 years have caused significant consumption growth for connectors that are typically made out of brass sheet and strip.

Brass sheet and strip consumption closely follows the activity trends in the motor vehicle, building construction, and machinery and computer industries. Figure 12-1 shows activity indexes for these industries for 1983-91 and an index of brass sheet and strip consumption for 1983-91. Except for 1985, the consumption index changed with roughly the same pattern as the changes in the industry activity indexes. The aberration in 1985 may have been caused by the buildup of inventory at the downstream companies in 1984, which was partly caused by anticipation of supply problems due to the surge in demand and the threat of production disruption (labor contracts for several brass mills expired in 1984, and one producer experienced a short strike by its workforce).[24] A change in inventory management techniques by many consumers also contributed in part to reduced consumption in 1985 (just-in-time inventory practices were adopted by many consumers in this time period).[25] Since inventories were large by the end of 1984 and the labor situation at the brass mills was settled, customers purchased less in 1985 even though production increased.

Market Performance—Trend Analysis

Domestic Shipments and Prices

Domestic shipments of C20000-series brass sheet and strip by quantity increased substantially in the years following the initial petition filings (figure 12-2 and table 12-6).[26] However, fabrication values (price net of metal value) did not show an increasing trend.

The two major unit value series for C20000-series brass sheet and strip are toll unit values, which include only a fabrication component, and nontoll unit values, which include fabrication and metal value components. The average domestic unit value for toll shipments of reroll products varied within a small range with no discernible pattern during 1983-91 (table 12-6).[27] The average domestic unit value for toll shipments of finished products also varied with no discernible pattern during 1983-87, but remained fairly constant during 1988-91. The average domestic unit value for nontoll shipments of all products showed an increasing trend during 1983-91 (table 12-6 and figure 12-3), but this appeared to be mostly because of increasing metal costs. A Commission staff-estimated metal composite cost is also shown in figure 12-3, which indicates the fabrication component has remained fairly constant.

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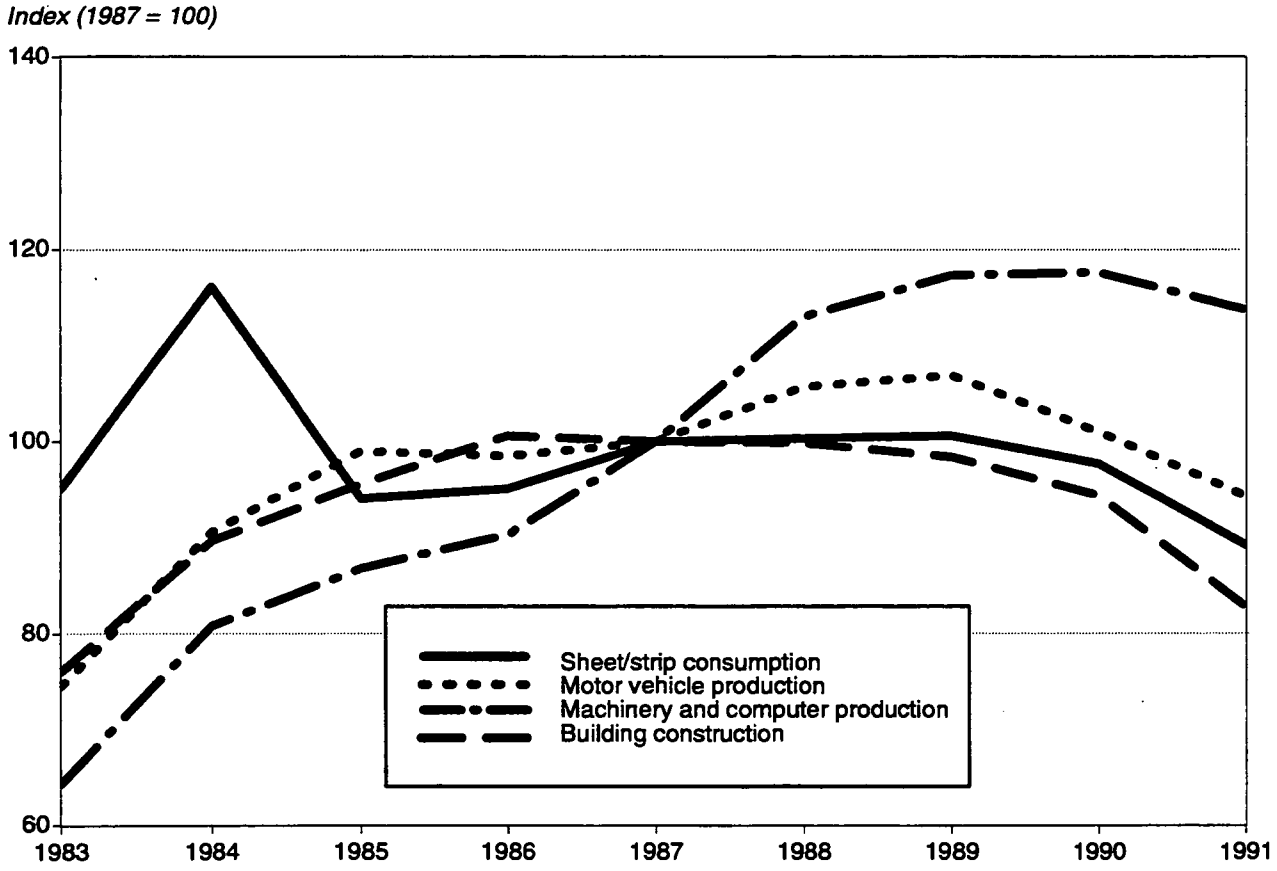
[24] U.S. industry officials, telephone interview by Commission staff, Feb. 21 and Feb. 23, 1995.

[25] Ibid.

[26] Export shipments were minor, averaging less than 1 percent (in quantity terms) of total shipments during 1983-91.

[27] All unit values in this paragraph were compiled from data submitted in response to questionnaires of the U.S. International Trade Commission. Average unit values were calculated by dividing shipment values by shipment quantities.

Figure 12-1
Brass sheet and strip, C20000-series: Indexes of U.S. consumption, motor vehicle production, machinery and computer production, and building construction, 1983-91



Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission and the Economic Report of the President.

Comparing average unit values does not reveal true trends, because these values do not account for changes in product mix. Unit value data on 13 different product categories for nontoll sales were collected for 1983-91 to make individual comparisons.[28] These data indicate that fabrication values show increasing, decreasing, and constant trends depending on the product category, but the weighted average for all product categories is a constant to slightly decreasing trend.

Domestic producers claim that fabrication values generally remained constant during 1983-91, and the data tend to support this in most cases.[29] U.S. producers also claim that excess capacity in the U.S. brass sheet and strip industry has had a depressing effect on prices.[30] Data do indicate that even though imports have declined significantly since 1984 (see next section), domestic producers have for most years operated significantly below capacity. Capacity utilization was at a low of 66 percent in 1985 and increased to 90 percent in 1988.[31] In 1990, with the

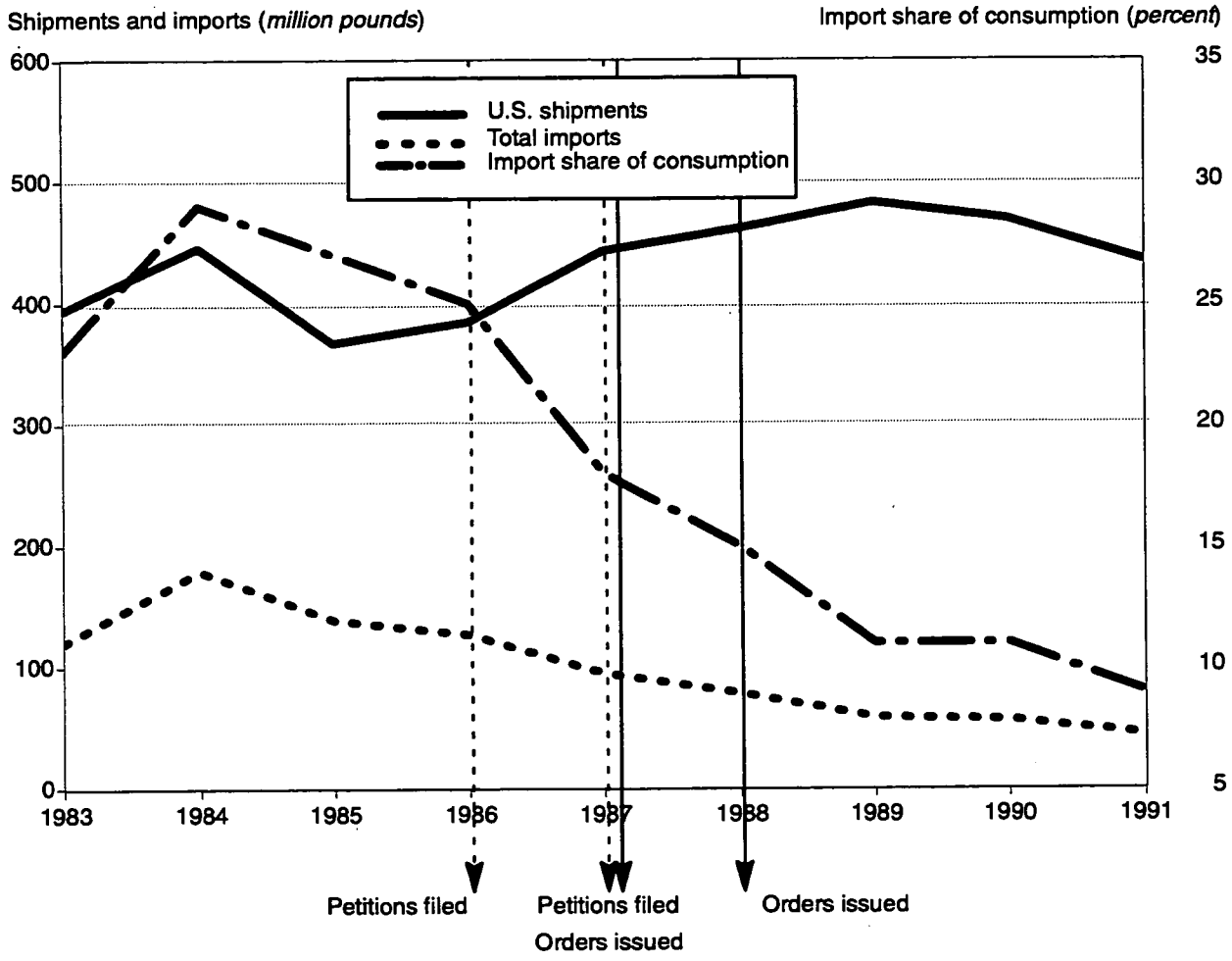
[28] Included are one category of builders' hardware, two of slitting stock, three of communications and electronics, two of reroll, three of automotive electrical, one of automotive nonelectrical, and one of lamp shells and sockets. For a complete description of product categories, see USITC, *Certain Brass Sheet and Strip from Japan and the Netherlands*, USITC publication 2099, p. a-39.

[29] TR, pp. 256-259.

[30] TR, pp. 259-263.

[31] Capacity utilization compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Figure 12-2
Brass sheet and strip, C20000-series: U.S. shipments, total imports, and import share of consumption, 1983-91



Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission and from official statistics of the U.S. Department of Commerce.

closing of one of the major producers (Chase Brass & Copper Co.), capacity utilization jumped to 97 percent before dropping to 89 percent in 1991. However, pressure on U.S. producers to restrain price increases may still have been evident because of new capacity construction that began in 1990 (the new PMX mill in Iowa, which began production in 1992). This mill's capacity, according to industry sources, is greater than the capacity of the old Chase facility.

Subject Imports; Quantity and Prices

Imports by quantity of brass sheet and strip during 1983-91 are shown in table 12-7 and figure 12-2.[32]

[32] Official U.S. trade figures show imports for all brass sheet and strip. During the Commission's AD/CVD investigations, it was found that about 96 percent of the total quantity of imports was C20000-series brass sheet and strip during 1983-85. Since no other information was available, it was assumed that this percentage remained constant for 1986-91, although it is likely that the AD/CVD duties decreased the relative portion of C20000-series imports.

Table 12-6
Brass sheet and strip, C20000-series: Apparent U.S. consumption, domestic shipments, U.S. producers' share of apparent U.S. consumption, and average unit values of domestic shipments, 1983-91

Item	1983	1984	1985	1986	1987	1988	1989	1990	1991
	Quantity *(1,000 pounds)*								
Apparent U.S. consumption	513,839	624,862	506,014	511,507	537,985	540,323	541,242	525,512	479,973
Domestic shipments:									
Toll products:									
Reroll[1]	139,599	177,731	151,119	147,647	168,697	197,588	198,401	180,587	172,374
Finished	83,453	100,129	72,034	87,107	98,041	93,869	99,030	87,967	84,799
Nontoll products[2]	170,923	167,835	144,080	149,925	176,260	170,465	185,287	200,498	177,954
Total	393,975	445,695	367,233	384,679	442,998	461,922	482,718	469,052	435,127
	Percent of total quantity								
U.S. producers' share of apparent U.S. consumption	77	71	73	75	82	85	89	89	91
	Unit value *(per pound)*								
Average unit values of domestic shipments:									
Toll products:									
Reroll	$0.25	$0.25	$0.26	$0.25	$0.23	$0.23	$0.23	$0.23	$0.25
Finished	.53	.49	.50	.47	.44	.46	.46	.46	.47
Nontoll products[2]									
Total	1.08	1.08	1.06	1.03	1.13	1.47	1.63	1.57	(3)
Fabrication value[4]	.43	.47	.48	.46	.45	.48	.49	.51	(3)

[1] Transfer shipments included in this category to prevent disclosure of confidential information.
[2] Includes reroll and finished products.
[3] Data not shown to prevent disclosure of confidential information.
[4] These values were calculated by subtracting a metal composite value from the total price.

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission and from official statistics of the U.S. Department of Commerce.

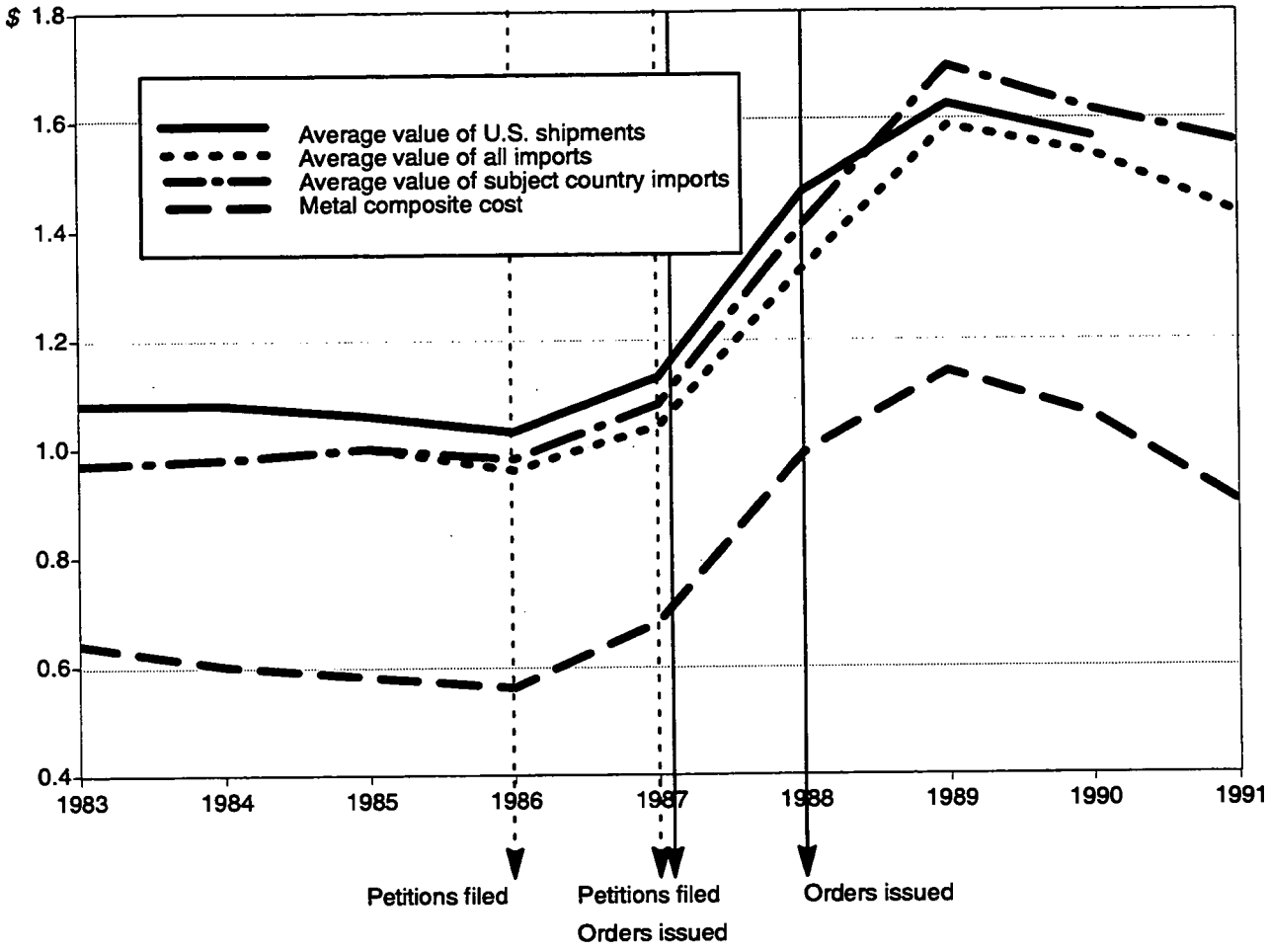
In the 5-year period after the initial petition filing in 1986, imports from subject countries declined by 83 percent, and overall imports declined by 65 percent. Imports from Brazil, Korea, and Japan decreased by over 80 percent from levels in the quarter before Commerce's preliminary AD/CVD ruling to the quarter after the ruling. Imports from other subject countries declined over a longer period of time. Importers cited the cost of AD and CVD duties as the reason for the decline in imports.[33] Certain other importers cited the uncertainty of AD and CVD costs as the reason for reducing sales in the U.S. market.[34] Exchange rates, which moved unfavorably for almost all the subject countries during 1985-91, were also a contributing factor to the decline in imports. Certain foreign producers decided to invest in U.S. operations and supply the U.S. market from these operations rather than by importing material.

Certain other factors likely caused imports from subject countries to decline less dramatically than might have been expected after the imposition of remedies. One foreign producer continued to import until it established its U.S. operation (it then supplied the U.S. market from this plant). Also, given the quality concerns of some U.S. consumers, it took time to establish new supplier relationships with U.S. producers.

[33] Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.
[34] TR, pp. 263-268.

Figure 12-3
Brass sheet and strip, C20000-series: Average unit value of nontoll U.S. shipments, average landed, duty-paid unit value of imports, and average unit metal composite cost, 1983-91

Per pound



Note.—Certain data not shown to prevent disclosure of confidential information.

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission, from official statistics of the U.S. Department of Commerce, and from the U.S. Bureau of Mines.

Two unit value series for imported C20000-series brass sheet and strip were used for this case study. One series was the average value of imports based on official statistics of the U.S. Department of Commerce. The landed, duty-paid value from these statistics is used as an indicator of the price of imports in the United States. Since toll arrangements between domestic consumers and foreign producers are rare, the import values were compared with the domestic nontoll unit value series. The average landed duty-paid value of C20000-series brass sheet and strip imports for all countries and for all the subject countries is shown in table 12-8 and figure 12-3 (the average unit value of nontoll U.S. shipments is also shown for comparison). On the basis of these values, the average unit value of all imports was below the U.S. domestic producers' unit value during 1983-91, but the gap decreased significantly starting in 1989. However, the unit value for all subject country imports was above the U.S. unit value starting in 1989. The relative increase in the unit value of subject country imports was likely due to a greater proportion of higher valued products and changes in pricing practices in order to avoid AD and CVD duties.

Table 12-7
Brass sheet and strip, C20000-series: Apparent U.S. consumption, U.S. imports, and import share of apparent U.S. consumption, 1983-91

Item	1983	1984	1985	1986	1987	1988	1989	1990	1991
	Quantity *(1,000 pounds)*								
Apparent U.S. consumption	513,839	624,862	506,014	511,507	537,985	540,323	541,242	525,512	479,973
U.S. imports from—									
Brazil	9,532	15,371	7,273	5,806	628	188	83	124	130
Canada	9,328	12,997	7,188	3,855	6,550	7,446	5,565	1,917	2,805
France	7,718	22,378	11,263	7,995	45	91	76	1	3
Germany	50,087	67,669	46,828	42,460	28,216	27,854	17,105	12,344	9,802
Italy	3,622	8,219	10,017	6,750	2,983	778	204	403	382
Japan	20,511	17,455	18,392	22,002	19,169	1,823	1,094	1,175	1,437
Korea	1,732	6,118	7,780	5,233	1,061	1,485	8	5	0
Netherlands	9,305	15,213	14,762	14,323	14,739	13,722	11,424	10,059	1,106
Sweden	728	1,625	4,960	2,188	1,762	3,123	3,108	3,715	3,585
Total, subject countries	112,563	167,046	128,462	110,612	75,153	56,510	38,667	29,743	19,249
All other countries	7,301	12,121	10,319	16,216	19,835	21,891	19,856	26,717	25,597
Grand total	119,864	179,167	138,781	126,828	94,987	78,401	58,523	56,460	44,846
	Percent of total apparent U.S. consumption								
All imports	23	29	27	25	18	15	11	11	9
Imports from subject countries	22	27	25	22	14	10	7	6	4
Imports from other countries	1	2	2	3	4	4	4	5	5

Note.—Import data estimated by staff of U.S. International Trade Commission on the basis of official statistics of the U.S. Department of Commerce.

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission, except as noted.

The other unit value series for imports used in this case study was a series of unit values for individual product categories (the same categories discussed in the previous section). These data, provided from the purchaser/importer questionnaires, enabled only a small number of direct comparisons,[35] but the data showed the same trend as the average value series for subject country imports for most product categories.

U.S. Industry Market Share

U.S. industry share of U.S. brass sheet and strip consumption increased significantly after the initial petition filings (table 12-6). This share increased steadily from 73 percent in 1985 to 91 percent in 1991. The import share of consumption of the subject countries declined significantly during this time period (from 25 percent in 1985 to 4 percent in 1991); this was offset partially by an increase in the share of consumption of imports from nonsubject countries from 2 percent in 1985 to 5 percent in 1991.

All U.S. producers claim that the AD/CVD duties have provided the relief sought by the industry.[36] Specific effects cited include import price increases, withdrawal of some foreign producers from the U.S. market, and the prevention of further price erosion. These producers rated dumping as a "very important" or "important" factor hindering their efforts in maintaining or increasing U.S. market share. One producer stated that only one U.S. producer would remain in operation today if it were not for the AD/CVD duties.[37] Also, U.S. producers claim that

[35] This occurred because of the low response rate from the purchasers and importers. Also, some purchasers and importers who did submit questionnaires were not able to provide product-category-specific unit value data because of a lack of detail in their records.

[36] Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

[37] TR, pp. 259-263.

Table 12-8
Brass sheet and strip, C20000-series: Average unit value of domestic shipments of U.S. producers and average landed, duty-paid unit value of U.S. imports, 1983-91

(Per pound)

Item	1983	1984	1985	1986	1987	1988	1989	1990	1991
Average unit value for domestic shipments of U.S. producers[1]	$1.08	$1.08	$1.06	$1.03	$1.13	$1.47	$1.63	$1.57	(2)
Average landed, duty-paid unit value of U.S. imports from—									
Brazil	.87	.88	.89	.83	.89	1.17	1.23	1.54	$1.45
Canada	1.04	1.02	1.01	.95	1.08	1.38	1.57	1.38	1.29
France	.83	.83	.85	.89	.91	.97	1.25	(3)	2.56
Germany	.98	.98	1.02	1.01	1.07	1.37	1.70	1.59	1.56
Italy	.91	.96	1.05	.94	1.03	1.40	2.30	1.89	1.81
Japan	.98	1.04	1.03	.97	1.07	1.72	1.87	1.72	1.65
Korea	.98	1.06	.86	.88	.93	1.22	2.64	1.46	(4)
Netherlands	1.09	1.11	1.11	1.08	1.14	1.47	1.73	1.63	1.61
Sweden	1.26	1.10	1.02	1.15	1.21	1.54	1.71	1.77	1.71
Average, subject countries	.97	.98	1.00	.98	1.08	1.41	1.70	1.62	1.56
All other countries	.93	.95	.94	.84	.91	1.11	1.39	1.46	1.33
Average, all imports	.97	.98	1.00	.96	1.04	1.33	1.59	1.54	1.43

[1] Nontoll shipments of reroll and finished products.
[2] Data not shown to prevent disclosure of confidential information.
[3] Not meaningful.
[4] No imports.

Note.—Import data estimated by staff of U.S. International Trade Commission on the basis of official statistics of the U.S. Department of Commerce.

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission, except as noted.

they could not compete in the domestic marketplace in the future unless AD and CVD duties continued.

Certain U.S. consumers criticize the effects of the AD/CVD duties. They claim that these duties have caused many foreign suppliers to leave the U.S. market, which has reduced options for sources.[38] This problem is exacerbated by the declining number of U.S. producers (see "Industry Evolution and Structure" section). Also, they claim certain products (such as wide sheet and strip) are no longer available in the U.S. market.

Sales, Costs, Profitability, Capital Expenditures, and Employment

The financial results of the U.S. producers improved markedly after the initial filings (table 12-9). Net sales increased substantially starting in 1987, and although most of this increase was due to an increase in metal values, it was also due to increased shipments. Costs per unit of production, except for raw materials, did not increase significantly after the filings. Profits and capital expenditures increased after the filings, and employment decreased as U.S. operations became more efficient.

U.S. producers claim that they have controlled costs by investing in new equipment. Financial data appear to support this (table 12-9). Raw material costs increased considerably after 1986 because of an increase in metal prices (for example, the price of copper increased from an average of $0.66 per pound in 1986 to over $1.30 per pound in 1989), but these costs generally cannot be controlled by the producers since they must pay market rates. However, other costs of goods sold have remained stable, varying within a narrow range during 1983-91 with no discernible pattern. Selling, general, and administrative costs per pound of production remained fairly constant during 1985-91. During 1983-91, the

[38] U.S. industry officials, interviews by Commission staff, Nov. 6-7, 1994.

Table 12-9
Brass sheet and strip, C20000-series: Financial results and capital expenditures, 1983-91

Item	1983	1984	1985	1986	1987	1988	1989	1990	1991
	Value *(1,000 dollars)*								
Net sales	291,205	308,681	263,722	260,941	332,216	433,583	504,512	(1)	(1)
Cost of goods sold:									
Raw materials	145,237	142,262	122,058	116,610	167,319	251,923	313,348	(1)	(1)
All other	113,326	127,330	119,030	114,326	127,630	130,390	145,174	137,140	(1)
Total	258,563	269,592	241,088	230,936	294,949	382,313	458,522	(1)	(1)
Gross profit	32,642	39,089	22,634	30,005	37,267	51,270	45,990	60,510	55,857
SG&A expenses	20,693	19,853	21,081	22,127	24,823	25,602	27,187	28,753	28,501
Operating income	11,949	19,236	1,553	7,878	12,444	25,668	18,803	31,756	27,356
Capital expenditures	(1)	(1)	5,897	7,840	8,061	(1)	(1)	(1)	(1)
	Unit value *(per pound produced)*								
Net sales	$0.73	$0.69	$0.71	$0.67	$0.75	$0.92	$1.03	(1)	(1)
Cost of goods sold:									
Raw materials	.37	.32	.33	.30	.38	.53	.64	(1)	(1)
All other	.29	.29	.32	.29	.29	.28	.30	$0.29	(1)
Total[2]	.65	.60	.65	.59	.67	.81	.93	(1)	(1)
Gross profit	.08	.09	.06	.08	.08	.11	.09	.13	$0.13
SG&A expenses	.05	.04	.06	.06	.06	.05	.06	.06	.06
Operating income	.03	.04	(3)	.02	.03	.05	.04	.07	.06

[1] Data not shown to prevent disclosure of confidential information.
[2] Because of rounding, figures may not add to the totals shown.
[3] Less than $0.005 per pound.

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission and from official statistics of the U.S. Department of Commerce.

producer price index increased by over 20 percent,[39] so it appears domestic producers have been able to maintain cost increases at or below the rate of inflation.

Largely as a result of cost containment efforts, but also because of increased sales, operating income for the U.S. producers increased substantially during 1986-91 (table 12-9). After bottoming out in 1985 (the year before the first AD/CVD cases), operating income trended upward to a period high in 1990 before decreasing slightly in 1991. U.S. producers rate product price as the most important factor affecting profitability, followed by unfair trading practices (dumping, subsidized imports, and other practices), relations with customers, availability of capital, and the business cycle.[40]

Domestic producers claim that they have made capital investments to lower costs and remain competitive since the AD/CVD duties were imposed. The data indicate that the industry has reinvested profits. Compared with these in 1985, capital expenditures by the domestic industry increased in step with the increase in operating income (table 12-9).

U.S. producers also claim they have made improvements to control labor costs and improve productivity (trends in employment and related information for production workers are shown in table 12-10). The data support this, as total compensation per hour increased by only 12 percent from 1983 to 1991 (during this same time period, total compensation for all manufacturing increased by 55 percent[41]). To lower employment and improve productivity, domestic producers have restructured their work force through early retirements and combining jobs, incentive programs, and team-based production. These improvements occurred both before and after the initial filings as productivity increased in every year except 1989.

[39] Based on the producer price index for finished goods from The Office of the President, *Economic Report of the President, Transmitted to the Congress February 1994* (Washington, DC: GPO, 1994), p. 341.

[40] Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

[41] Based on employment cost index for manufacturing from The Office of the President, *Economic Report of the President*, p. 321.

Table 12-10
Brass sheet and strip, C20000-series: Domestic employment and related information for production workers, 1983-91

Item	1983	1984	1985	1986	1987	1988	1989	1990	1991
Number of workers	1,592	1,665	1,327	1,249	1,350	1,310	1,499	1,287	1,228
Hours worked (*1,000 hours*)	3,301	3,579	2,707	2,709	2,969	2,885	3,237	2,863	2,675
Total compensation (*1,000 dollars*)	50,735	55,114	43,854	45,835	49,753	45,598	51,653	47,630	46,182
Total compensation (*per hour*)	$15.37	$15.40	$16.20	$16.92	$16.76	$15.81	$15.96	$16.64	$17.26
Productivity (*pounds per hour*)	120	125	137	143	149	164	152	166	167

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Estimates of Economic Effects

The previous section noted several trends in the U.S. brass sheet and strip market that followed the filing of petitions and institution of trade remedies. Among other developments, U.S. industry shipments and operating income rose, imports from subject countries declined substantially, and U.S. fabrication value, or unit value net of materials costs, fluctuated without a clear trend. This section uses time series statistical analysis in an effort to establish the extent to which these trends were the result of trade remedies rather than other factors. In addition, this section uses CPE analysis to estimate the effects of dumping and subsidies on industry prices, shipments, and other variables. Finally, it uses CPE analysis to consider the effects of dumping, subsidies, and trade remedies on other industries and the U.S. economy as a whole.

Time Series Analysis

Hypotheses Tested

The time series analysis tests the hypotheses that domestic shipments and nonsubject imports increased while subject imports decreased as a result of the remedy process. For technical reasons it was not possible to test for possible effects of the petition filings separately from effects of the remedies.[42] The hypotheses were tested by using binary variables that partition the data into periods before and after remedies were imposed in each of the two investigations[43] and also a third variable designed to reflect delayed responses to the imposition of the remedies. As was mentioned in chapter 5, this analysis does not directly consider the effects of the unfair trade practices themselves, as it was not possible to establish when these practices began. Also, it was not possible to estimate equations for supply relationships.[44] The analysis uses quarterly data for 1983-91.

The estimated equations treat U.S. demands for domestic products, subject imports, and nonsubject imports as functions of trade remedies, prices, activity in downstream U.S. industries, and certain other variables. The equations and variables are as follows:[45]

[42] Technical note: Because the analysis considers two separate investigations, and there was little difference in time between the filings and remedies, the use of variables for all of these events introduced substantial multicollinearity that made it difficult to distinguish the effects of the different events.

[43] In contrast to the methodology discussed in chapter 5, the effects of the remedies are dated from Commerce's preliminary determinations of dumping in each of the two investigations. At these dates, subject imports became subject to antidumping duties. (Technical note: Also, the fit of the estimated equations, as measured by adjusted R-square, was substantially better using the preliminary rather than the final determination. It was not possible to use variables for both sorts of determination because there was substantial multicollinearity among these variables.)

[44] Commission staff attempted to estimate equations for both domestic and import supply responses, but they did not obtain statistically significant results for any major explanatory variable other than, in some specifications, one of the remedy variables. This negative result may reflect either insufficient data on industry costs, other than metal costs, or an imperfect modeling of the industry's price-setting process in the context of imperfect competition.

[45] Technical note: The equations were estimated in logarithmic functional form. The two-stage least squares estimation method was used in order to correct for the endogeneity of prices as explanatory variables.

Domestic product demand:

Domestic shipments = f (remedy 1, remedy 2, time since remedy, domestic price, subject import and nonsubject import price, aluminum price, downstream activity, 1983/84 indicator, time trend, seasonal indicators).

Subject import demand:

Subject imports = f (remedy 1, remedy 2, time since remedy, subject import price, domestic product and nonsubject import price, aluminum price, downstream activity, 1983/84 indicator, time trend, seasonal indicators).

Nonsubject import demand:

Nonsubject imports = f (remedy 1, remedy 2, time since remedy, nonsubject import price, domestic product and subject import price, aluminum price, downstream activity, 1983/84 indicator, time trend, seasonal indicators).

Shipments and imports are defined in terms of quantity (pounds). The explanatory variables are defined and derived as follows:

Remedy variables:

Remedy 1	A binary indicator variable that takes the value 0 for the period before Commerce's preliminary determination in the first investigation and 1 thereafter.
Remedy 2	A binary indicator variable that takes the value 0 for the period before Commerce's preliminary determination in the second investigation and 1 thereafter.
Time since remedy	Number of quarters after Commerce's preliminary determination in the first investigation; the variable takes the value 0 before that determination.

Price variables:

Domestic product	Average value per pound.
Subject import	Average landed, duty-paid value per pound.
Nonsubject import	Average landed, duty-paid value per pound.
Aluminum	Price per pound.
Downstream activity	An index based on U.S. automotive production, industrial electronics and computer production, and building construction.
1983/84 indicator	A binary variable that takes the value of 1 for 1983 through the first quarter of 1985.
Time trend	Number of quarters since beginning of period.
Seasonal indicators	3 binary variables that take values of 1 for the first, second, and third quarters, respectively.

The binary remedy variables are dated to Commerce's preliminary affirmative determinations, when imports became subject to antidumping and countervailing duties. The third remedy variable indicates elapsed time since the first remedy came into force.[46] This variable accounts for the delayed effects of the remedies discussed above—for example, purchasers' changes in sources of supply as long-term contracts expired and U.S. suppliers developed an ability to meet purchasers' specifications.

A quarterly average price series for domestic products was not available, so a series was constructed using annual average values and a product-specific quarterly price series that closely matched the annual series.[47] For technical reasons it was problematic to use all three brass prices—domestic product price, subject import price, and nonsubject import price—in the estimated

[46] Technical note: It was not possible to use separate time-since-remedy variables for the two remedies because doing so substantially increases the multicollinearity of the estimated equations.

[47] Producer questionnaires yielded complete quarterly price series for four narrowly defined products. These series were converted into annual average series and compared to the annual average unit value series for all finished, nontoll U.S. brass sheet and strip products. A series for slitting stock, a product used in a variety of applications, proved to have the highest correlation, over .99, with the annual series. Therefore, the quarterly series for slitting stock was used to adjust the annual series in order to develop a proxy series for average quarterly prices.

equations.[48] Thus, each equation uses the price of the product in question plus a weighted average of the other two prices.

The price of aluminum is included because aluminum is the principal substitute product for brass in heat-exchange applications. The index of downstream activity is intended to reflect the usage of brass in three industries. It was not possible to determine beforehand what relative weights would be most appropriate, but experimentation with different weights had little effect on the results.

The 1983/84 indicator reflects the apparent shift in U.S. demand that was noted above in the discussion of figure 12-1. The seasonal (quarterly) indicators and time trend variable are included in order to correct for recurring and long-term shifts in demand. Use of the time-trend variable also helps to assure that the time-since-remedy variable does not simply reflect a trend unrelated to the remedy.

Data Sources

Domestic shipments data were supplied by an industry source in the form of an index of quarterly shipments, taking the value of 100 in the first quarter of 1983. Because the equation uses the data in logarithmic form, the resulting estimates for this variable are the same as if data were in nonlogarithmic form (i.e., pounds).[49] Domestic price data were constructed from questionnaire responses.

Import quantities and unit values are from U.S. Customs Service data. The price of aluminum is from the U.S. Bureau of Mines. The downstream activity variable was constructed from official statistics of the U.S. Department of Commerce and from an authoritative industry source.[50]

Results

Results of the time series analysis are presented in table 12-11.[51] The results support the hypotheses that trade remedies raised demand for domestic brass sheet and strip and reduced demand for subject imports, and that the effects of the remedies were partly immediate and partly delayed.[52] However, the results do not support the hypothesis that trade remedies raised demand for nonsubject imports.

In the domestic product and subject import equations, the two variables remedy 1 and time since remedy both have the expected signs, and both are statistically significant.[53,54] The variable remedy 2 has the expected sign but is not statistically significant.[55] Estimates from these two equations

[48] Technical note: The reason for this was the high mutual correlation among the three price variables, leading to substantial multicollinearity and imprecise coefficient estimates.

[49] Technical note: However, the coefficients of the intercept are different in the two cases.

[50] Ward's Automotive Yearbook (Southfield MI: Ward Communication, various years).

[51] Technical note: A substantial amount of multicollinearity among explanatory variables was associated with the variable for downstream activity. As a solution to this problem, Commission staff imposed the assumption that the true value for the coefficient is 1 in each equation—that is, that demand for brass sheet and strip is directly proportional to activity in downstream industries. As indicated in a note to table 12-11, in both the domestic and subject import demand equations, the coefficient for downstream activity was estimated to be close to 1 and significantly different from 0. Thus, this procedure had little impact on estimated coefficients for other variables in these two equations, although it did have some impact in the third equation.

This procedure reduced the standard error of coefficient estimates for several variables, especially time since remedy, time trend, and the intercept. In the domestic demand equation, time since remedy became statistically significant as a result of the reduction of this variable's standard error, whereas the variable was not statistically significant in the general specification. No other variables of interest gained or lost statistical significance as a result of this procedure, although the intercept or one of the seasonal indicators did so in some equations.

The procedure used to restrict the downstream demand coefficient value to 1 was to use a new dependent variable constructed as the difference between the original dependent variable and the downstream activity variable.

[52] In technical terms, the results "fail to reject" these hypotheses. They do not rule out the possibility that other, concurrent factors were a cause of the shifts in demand. However, the estimated equations were designed to account for the effects of factors likely to be important.

[53] The term "statistically significant" means that there is relatively large probability, for example, 90 or more in 100, that the estimated effects of the variables labeled as significant would not have occurred by chance.

[54] Technical note: Inclusion of the time trend variable in the equations assures that the coefficients for time since remedy do not simply reflect trends that began earlier. If the time trend variable is excluded from the equations, the coefficients for time since remedy are lower in absolute value in both the domestic product and subject import equations. However, the standard errors of these coefficient estimates are also substantially lower, so that t-statistics are not as greatly affected.

[55] Technical note: The lack of statistical significance for remedy 2 may be partially explained by the fact that the determination of dumping in the second investigation covered a smaller proportion of subject imports than the first determination, so that any immediate effect of the

Table 12-11
U.S. brass sheet and strip market demand: Time series estimates of coefficients and related t-statistics[1]

Explanatory variable or test statistic	Domestic product demand[2]	Subject import demand[2]	Nonsubject import demand[2]
Remedy variables:			
Remedy 1	.19 (3.10)***	-.43 (-3.20)***	.25 (1.19)
Remedy 2	.14 (1.33)	-.39 (-1.70)	-.11 (-.36)
Time since remedy	.03 (3.31)***	-.09 (-5.08)***	-.03 (-1.02)
Price variables[3]:			
Own price[4]	.07 (.20)	.69 (.81)	-.88 (-1.03)
Other brass price[5]	-.81 (-2.02)*	-.14 (-.20)	.70 (.65)
Aluminum price	.11 (1.18)	.25 (1.36)	-.06 (-.22)
1983/84 indicator	.12 (1.81)*	.42 (3.06)***	.52 (2.32)**
Time trend	-.02 (-2.08)**	.03 (1.71)	.07 (2.74)**
Seasonal indicators:			
Quarter 1	.13 (4.25)***	-.03 (-.45)	-.01 (-.06)
Quarter 2	.08 (2.63)**	-.14 (-2.05)*	.05 (.45)
Quarter 3	.06 (2.02)*	-.01 (-.21)	.05 (.54)
Intercept	-3.77 (-33.06)***	1.75 (7.57)***	-1.56 (-3.70)***
Test statistics:			
R-square	.805	.977	.842
Adjusted R-square	.716	.966	.770
Durbin-Watson statistic	2.249	2.075	1.696
Number of observations	36	36	36

[1] T-statistics presented in parentheses below corresponding coefficients. "*" indicates statistical significance at a 90-percent confidence level, "**" at a 95-percent level, and "***" at a 99-percent level.
[2] Dependent variables are quantities, entered as logarithms, minus the logarithm of the variable downstream activity. This is equivalent to restricting the value of the coefficient for downstream activity to 1. Without this restriction, coefficients and t-statistics for the variable downstream activity in the three equations are .88 (3.51)***, 1.09 (2.03)*, and -.35 (-.45) respectively.
[3] Variables entered as logarithms.
[4] Price of the dependent variable in the equation.
[5] Weighted average of the other two brass prices.

Source: Estimated by the staff of the U.S. International Trade Commission.

indicate, first, that domestic shipments were at least 34 percent higher by the end of 1991 than they would have been in the absence of trade remedies and, second, that subject imports were at least 73 percent lower.[56,57]

In the nonsubject import equation, remedy 1 has the expected sign, the other two remedy variables do not, and none of these variables are statistically significant. Although, as discussed above, nonsubject imports increased substantially after trade remedies were imposed, it is not possible statistically to distinguish between the effects of the remedies and the strong trend of increasing imports that was already under way when remedies were imposed.

The most inconclusive results in each of the equations are those for prices, as none of the coefficients for these variables are statistically significant.[58] The expected sign of each own-price variable is negative, and the expected sign of each other-price variable is positive. These signs are reversed in the domestic demand equation, which may indicate that the other-price variable is capturing much of the effect of the own-price variable.[59]

Coefficients for the price of aluminum are of the expected sign but statistically insignificant in both the domestic-product and subject-import equations. Thus this analysis offers no support for short-run substitutability of brass and aluminum.

The variable downstream activity was deleted as an explanatory variable in these equations for technical reasons.[60] However, in separate equations in which the variable was considered, it was statistically significant in both the domestic-product equation and the subject-import equation.[61] In both of these equations the coefficient was close to 1, suggesting that demand for brass products is directly proportional to activity in downstream industries.

The statistically significant results for the 1983/84 indicator in the two import-demand equations support the hypothesis that there was a shift in demand between that period and the later period.[62] The positive sign for this variable in the domestic demand equation is consistent with such a shift, but the coefficient is not statistically significant. Results for the remaining variables, time trend, the seasonal indicators, and the intercept, are not of great interest to this study.

Computable Partial Equilibrium Analysis

The CPE model for the U.S. brass sheet and strip market yields estimates both of the effects of dumping and subsidies and of the effects of antidumping and countervailing duties. In each case, 1985 was used as the base year, as it was the last full year before the first filing of an investigation for the industry. The model focuses on effects on market participants in the "medium" term, defined as the period after U.S. and foreign producers and consumers have had time to

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55—*Continued*
remedy was less easily distinguishable from statistical noise. Any delayed effect of the second determination was captured by the variable time since remedy.

56 Technical note: These are minimum estimates, based on the lowest magnitude within the 95-percent confidence intervals for the two statistically significant variables in each equation. Midpoint estimates, based on the coefficients for all three remedy variables, are 154 percent higher and 94 percent lower, respectively.

57 Technical note: Coefficients of binary and time variables in logarithmic equations may be transformed into estimated percentage changes by raising e, the base of the natural logarithm, to the power of the coefficient, subtracting one, and multiplying by 100. The resulting estimate for time variables is a percentage change per period. See R. Halvorsen and R. Palmquist, "The Interpretation of Dummy Variables in Semilogarithmic Equations," *American Economic Review*, vol. 70 (1980), pp. 474-475.

58 Technical note: Due to the specification of the variables in logarithmic form, coefficients for prices in table 12-11 can be interpreted as elasticity estimates. An elasticity is the percentage change in the dependent variable (quantity) that results from a one-percent change in an explanatory variable.

59 Technical note: This explanation is suggested by the fact that when the own-price variable is used alone, without an other-price variable, it is both negative in sign and statistically significant. The best "fit" to the equation, as measured by adjusted R-squared, is found when the other-price variable is used alone. Apparently, import price is a better proxy for domestic price than is the constructed variable for domestic price. These specification changes have little effect on the

59—*Continued*
coefficient values for the remedy variables, and no effect on their statistical significance. In the two import demand equations, deletion of the other-price variables has no effect on the statistical significance of the own-price variables.

60 See footnote 51 on the treatment of multicollinearity.

61 These other equations used all the explanatory variables in table 12-11. The estimated coefficients (and t-statistics) for downstream activity in the domestic, subject import, and nonsubject import equations were .88 (3.51), 1.09 (2.03), and -.35 (-.45), respectively.

62 Technical note: There were five intervening quarters between the period covered by this variable and the period covered by the remedy 1 variable, enough time to distinguish the effects of the variables.

adjust their levels of shipments and purchases and renegotiate contracts in response to price shifts, but before U.S. producers can enter or leave the market or make any long-term adjustments in their production capacity.[63]

The principal inputs into the model are the antidumping and countervailing duty margins determined by Commerce, the values of U.S. domestic shipments[64] and imports in 1985, and estimates of economic parameters (elasticities) that indicate how suppliers and purchasers respond to price changes (table 12-12).[65] The model uses trade-weighted averages of the country-specific margins.

[63] The effects of unfair trade practices and trade remedies on investment in, exit from, and entry into the market should thus be considered in addition to the model results.

[64] The value of U.S. domestic shipments used here is calculated by valuing reroll as finished product and adding metal value to toll value. This makes the treatment of U.S. shipments comparable to that of imports. Transfers within firms are valued at prices charged to unrelated parties.

[65] Other inputs include the physical quantities of shipments to the U.S. market, by supplier country (table 12-6), the value of U.S. exports (about $6.5 million), and the ratio of transport costs to product value for imports (approximately 5 percent).

Elasticity estimates are based primarily on considerations discussed in previous sections.[66] Total U.S. demand is estimated to be highly inelastic for two reasons. First, brass has few close substitutes in most uses. As a result, downstream industries have little tendency to switch between brass and other products on the basis of variations in the price of brass.[67] Second, brass sheet and strip makes up a small part of the cost of most products containing it.[68]

[66] The time series analysis did not yield estimates of the relevant elasticities. Furthermore, the elasticity estimates used here are more precise than those used in the original Commission investigations because they are based on more specific information about the brass sheet and strip industry ("Economic Memorandum, Brass Sheet and Strip from Japan and the Netherlands," EC-L-238, July 27, 1988).

[67] As discussed above, there is a long-term trend to switch from brass to aluminum in heat-exchange applications, but little short-term substitution between the two materials on the basis of price. The time series analysis rejected the hypothesis of short-term substitutability.

[68] The principal exceptions to this are ornamental products such as bathroom fixtures. For brass radiators, the relevant comparison is to the price of the car or truck, not the price of the radiator, as the radiator is essential to the operation of the vehicle.

Table 12-12
Brass sheet and strip industry: Values of principal input variables for computable partial equilibrium analysis

Variable	Value
Antidumping duty margin[1] (*percent*)	19.5
Countervailing duty margin[1] (*percent*)	.7
Shipments to the U.S. market, 1985 (*million dollars*):	
Domestic products	[2]391.7
Subject imports	128.5
Nonsubject imports	9.7
Elasticities for the U.S. market[3] (*absolute values*):	
Total U.S. demand for brass sheet and strip	.2 to .5
Substitution in U.S. demand:	
Domestic shipments vs. subject imports	2 to 4
Domestic shipments vs. nonsubject imports	2 to 4
Subject vs. nonsubject imports	2 to 4
Supply to U.S. market:	
Domestic shipments	5 to 10
Subject imports	10 to 20
Nonsubject imports	10 to 20

[1] Trade-weighted average margin for the nine subject countries, using each country's "all other" margin as presented in the final determinations by Commerce.

[2] Value of domestic shipments calculated for value of finished products, inclusive of metal value, as if sold to unrelated parties.

[3] The ranges of assumed values for elasticities reflect the ranges of uncertainty concerning the true value.

Source: Compiled by the staff of the U.S. International Trade Commission.

As a result, variations in the price of brass do not have a large effect on demand by end users for products containing brass.

Elasticities of substitution among products of different countries are assumed to be in the moderate range of 2 to 4. This reflects an average between, first, downstream industries for which product quality differences make them reluctant to switch between U.S. and foreign suppliers,[69] suggesting a low elasticity in the range of 0 to 2 and, second, other downstream industries that treat brass sheet and strip as a commodity product and switch freely on the basis of price, indicating a high elasticity of 4 or more.

The high elasticity of supply for domestic shipments reflects the lack of capacity constraints and the eagerness of U.S. producers to expand production in response to improved market conditions during the period in question. The higher elasticities for supply of imports reflects that suppliers of imports have a choice of supplying their output to the United States or to other markets, whereas U.S. suppliers serve the domestic market almost exclusively.

[69] Also included within this category are transfers within brass sheet and strip firms that perform downstream operations.

Effects of Unfair Trade Practices

The CPE model's estimates of the impact of dumping, subsidies, and trade remedies are presented in table 12-13. These estimates use the midpoint values of the parameter ranges in table 12-12. The model estimates the effects of unfair trade practices relative to the fair value that would have existed in the absence of these practices.

The analysis indicates that foreign subsidies and dumping, together, resulted in a decline of a little over 1 percent in the price of domestic products, as domestic suppliers cut their prices in response to unfair competition. This competition also reduced the output of the U.S. industry by approximately 10 percent and the U.S. industry's revenue by 11 percent, as U.S. purchasers switched to these unfair imports. U.S. employment in the industry declined by approximately 9 percent.

Table 12-13
Brass sheet and strip industry: Results of computable partial equilibrium analysis (estimated effect on U.S. market of unfair trade practices and remedies), base year 1985[1]

Item	Unfair trade practices	Unfair trade practice and remedies	Remedies
	—(*Change from fair value*)[2] —		(*Change from actual value*)[3]
Impact on industry *(percent)*:			
Domestic price	-1.3	-.2	1.2
Domestic output	-9.6	-1.2	9.2
Domestic revenue	-10.8	-1.3	10.5
Domestic employment	-9.4	-1.2	9.1
Impact on imports *(percent)*:			
Subject import price	-16.3	-2.1	16.9
Subject import quantity	47.5	4.7	-29.6
Subject import revenue	23.8	2.5	-17.3
Nonsubject import price	-.8	-.1	.7
Nonsubject import quantity	-11.1	-1.4	10.9
Nonsubject import revenue	-11.8	-1.5	11.6
Welfare effects (*1,000 dollars*):			
Gain to consumers	26,164	3,281	-22,426
Benefit to producers	-5,082	-669	4,829
Net welfare effects[4]	21,082	2,612	-17,597

[1] The estimated effects reported are the results of the Commission's CPE model using the midpoint values of parameter ranges listed in table 12-12. This model accounts only for the medium-term effects of unfair practices and remedies according to conditions in the base year.

[2] The "fair values" are the values estimated by the model to have been in place without the effect of the unfair trade practice.

[3] The "actual values" are the market values during the base year.

[4] Omits gain to the Government in antidumping and countervailing duties collected.

Source: Estimated by the staff of the U.S. International Trade Commission.

The price of subject imports was approximately 16 percent below what it would have been in the absence of unfair trade practices. These practices also led to a substantial increase in the quantity of subject imports and to a smaller but still substantial increase in revenues received by foreign suppliers. However, it led to decreases in the price, quantity, and value of nonsubject imports, as U.S. purchasers switched from nonsubject sources to the subject ones.

Effects of Trade Remedies

The CPE model estimates the effects of antidumping and countervailing duty remedies in two ways (table 12-13): (1) the combined effect of both unfair trade practices and trade remedies, relative to the fair value that would have existed in the absence of both, and (2) the effects of trade remedies alone relative to the actual values experienced in the base year, 1985. The model estimates that, if the remedies had been imposed in 1985, they would have raised subject import prices by 17 percent and reduced quantity imported by 30 percent. Additionally, the results suggest that the antidumping remedy would have suppressed foreign home-market prices by about 2 percent as product was diverted from the U.S. market.[70] For this reason, subject product exporters could have eliminated the practice of dumping without raising average U.S. prices by the full Commerce margin. As a result, the remedy would not have restored the price of domestic products and the output and revenues of the domestic industry fully to the levels resulting from fair-valued imports.

Net Welfare Effects

As expected, the CPE model indicates that, while the U.S. brass sheet and strip industry suffered a loss as a result of subsidies and dumping, downstream industries and end users gained an even greater amount as a result of lower prices for the brass products that they used. Thus, net national welfare appears to have increased as a result of unfair imports. Trade remedies offset most of the effects of unfair imports.

Effects on the Brass Sheet and Strip Industry and Upstream Industries

According to the model, the industry's annual loss as a result of unremedied unfair trade practices was approximately $5.1 million. It appears that little, if any, of this loss was passed on to upstream industries, because lower U.S. demand for copper, zinc, and scrap metal was likely offset by increased demand for these materials by foreign suppliers to the U.S. brass sheet and strip market.[71] Thus, the effect of these practices on upstream industries' employment, wages, income, production, prices, and investment was negligible. However, unfair trade practices led to higher exports and lower imports of upstream products as usage of these materials shifted from the U.S. to the foreign brass sheet and strip industry.[72]

Although a substantial portion of the industry's loss as a result of unfair trade practices appears to have been passed on to employees in the form of wage reductions and reduced wage increases, much of it probably took the form of reduced profits for U.S. brass sheet and strip producers. The model indicates that trade remedies restored over 90 percent of the loss to the industry.

The estimated effects of unfair trade practices and remedies on the brass sheet and strip industry are large relative to the industry's operating income both before and after the imposition of AD and CVD remedies (table 12-9).[73] The remedies appear to have been responsible for a substantial share of reported operating income between 1987 and 1991. As operating income is itself greater than net profits,[74]

[70] This terms-of-trade effect is discussed in chapter 5.

[71] Copper, zinc, and brass scrap are commodity products in a well-developed world market. Because unfair trade practices reduced the U.S. price of brass products while having an uncertain effect on brass prices in other countries, these practices may even have led to increased worldwide brass consumption and greater usage of these input materials.

[72] The United States is both an exporter and an importer of upstream products, largely due to differing regional patterns of production and consumption of these products.

[73] The short-run effects on the industry were probably substantially greater than the estimates provided by the CPE model. According to industry officials, brass sheet and strip is a high-fixed-cost industry in which incremental unit costs (short-run marginal costs) are substantially below average costs and prices (Revere Copper Products, prehearing submission; U.S. brass sheet and strip industry officials, telephone interviews by Commission staff, Feb. 27 to Mar. 10, 1995). For such an industry, the CPE model's estimates of industry gains or losses apply to the longer rather than the shorter term, and short-term gains or losses are greater.

[74] Net profit is operating income minus interest and certain other expenses. The Commission has little information on net profits of the brass sheet and strip operations of U.S. producers.

the remedies may have made the difference between profits and losses for the industry. In any case, by raising the rate of return on investment, remedies increased the incentive of U.S. producers to reinvest in the industry and may have prevented more U.S. producers from exiting from the industry.

As noted above, the effects on the U.S. industry of investment shifts, entry into, or exit from the brass sheet and strip industry are in addition to the effects given by CPE analysis. The firms that exited from the industry during 1983-91 did so after remedies were in place, so it is likely that they would have left the industry even if there had been no unfair practices. However, if the remedies prevented further exit, stimulated reinvestment, and led to foreign direct investment in the U.S. industry, then the long-term effects of both the unfair practices and the remedies on the U.S. industry's shipments, revenues, employment, and profitability are greater than those presented by the CPE model.

Effects on Downstream Industries and End Users

The estimated gain from the unfair trading practices to downstream industries and end users was the result of lower prices for both domestic and imported brass. As a result of substantial competition in downstream industries, it is likely that most of the downstream benefit was passed on in the form of lower prices to end users. Nevertheless, these lower prices likely resulted in a small increase in the quantity demanded of U.S. products containing brass[75] in both domestic and foreign markets, leading to a small increase in production, employment, income, investment, and exports. To the extent that the lower prices were not passed on to end users, they may also have resulted in an increase in downstream industries' wages. Trade remedies reversed most of these effects.

[75] As noted above, the price of brass sheet and strip accounts for a small part of the price of most products containing it, so the quantity demanded of these products changes only a small amount in response to changes in brass price.

CHAPTER 13
Standard Welded Steel Pipes and Tubes

History of Title VII Investigations

The petitioners in the Commission's antidumping and countervailing duty investigations on standard welded pipes and tubes (standard welded pipes) have been U.S. producers of the subject product that represented the bulk of U.S. production at the time the particular petitions were submitted.[1]

Standard welded pipes of carbon steel and certain alloys have been the subject of 26 previous Commission investigations—18 AD investigations and 8 CVD investigations (table 13–1). The investigations spanned the years 1982 to 1992 and involved 15 countries. Many of the investigations were terminated or suspended before final AD or CVD orders were issued, and the orders issued for others were subsequently revoked, after the subject country entered into a voluntary restraint arrangement (VRA) with the United States.

In addition to the investigations listed in table 13-1, conducted jointly by the Commission and Commerce, Commerce unilaterally conducted the following countervailing duty investigations:

Country	Countervailing duty investigation	Determination	Date
Thailand	C–549–501	Affirmative	08–14–85
Argentina	C–357–801	Affirmative	09–27–88
Venezuela	C–307–806	Affirmative	09–17–92

[1] Repeat petitioners include Allied Tube & Conduit Corp., Harvey, IL; American Tube Co., Phoenix, AZ; Bull Moose Tube Co., Gerald, MO; Century Tube Corp., Pine Bluff, AR; Cyclops Corp., Sharon, PA; Laclede Steel Co., St. Louis, MO; Maruichi American Corp., Santa Fe Springs, CA; Sharon Tube Co., Sharon, PA; Western Tube & Conduit Corp., Long Beach, CA; and Wheatland Tube Co., Collingswood, NJ.

Standard Welded Pipe Industry

First petition year (1982):	
Shipments, (*million dollars*)	454
Import market share by quantity (*percent*)	53
AD/CVD history:	
AD investigations (*number*)	18
CVD investigations (*number*)	11
First petition year	1982
First AD/CVD order year	1983
Most recent petition year	1991

Thailand, Argentina, and Venezuela were not signatories to the GATT Subsidies Code at the time of the investigation and thus were not entitled to an injury investigation by the Commission.

At present, AD or CVD orders are in effect for nine countries—Argentina, Brazil, India, Korea, Mexico, Taiwan, Thailand, Turkey, and Venezuela. Table 13–2 shows the AD and CVD margins applicable to those countries for which orders remain in effect. Table 13–3 shows the AD and CVD duties actually collected during 1991–93 as a share of the value of subject imports entering the United States. Some AD and CVD margins may have influenced trade shifts away from certain countries and companies subject to high–margin orders.

Factors considered in the Commission's determinations of material injury or threat of material injury included poor financial performance; declining production, shipments, and employment (or rates of increase in these variables that were below that for apparent consumption); price suppression or depression; underselling; lost sales; lost revenues; and increased import shares or volumes in the market.

Between October 1, 1984, and March 31, 1992, imports of steel products (including the products subject to the above AD/CVD investigations from Brazil, China, the European Union, Korea, Mexico, Romania, Venezuela, and the former Yugoslavia) were subject to quantitative limitations under the Voluntary Restraint Agreements (VRAs) negotiated with 19

Table 13-1
Standard welded pipes: Commission antidumping and countervailing duty investigations, by subject countries

Country	Investigation No.	Commission determination	*Federal Register* publication date
Antidumping investigations:			
Korea	731-TA-131(F)[1]	Affirmative[2]	05-09-84
Taiwan	731-TA-132(F)[1]	Affirmative	05-09-84
Brazil	731-TA-197(F)[1]	Terminated[3]	03-27-85
Spain	731-TA-198(F)[1]	Terminated[3]	02-08-85
Venezuela	731-TA-212(F)	Terminated[3]	10-28-85
Thailand	731-TA-252(F)	Affirmative	03-03-86
India	731-TA-271(F)	Affirmative	05-07-86
Turkey	731-TA-273(F)	Affirmative	05-07-86
Yugoslavia	731-TA-274(F)	Terminated[3]	04-16-86
China	731-TA-292(F)	Negative	09-04-86
Philippines	731-TA-293(F)	Negative	11-13-86
Singapore	731-TA-294(F)	Negative	11-13-86
Brazil	731-TA-532(F)	Affirmative	11-04-92
Korea	731-TA-533(F)	Affirmative	11-04-92
Mexico	731-TA-534(F)	Affirmative	11-04-92
Romania	731-TA-535(F)	Negative	11-04-92
Taiwan	731-TA-536(F)	Affirmative	11-04-92
Venezuela	731-TA-537(F)	Affirmative	11-04-92
Countervailing duty investigations:			
Brazil	701-TA-165(F)	Suspended[4]	12-27-82
Italy	701-TA-167(P)	Negative	10-29-82
Korea	701-TA-168(F)	Affirmative[5]	02-15-83
Spain	701-TA-220(F)[1]	Terminated[3]	02-11-85
Venezuela	701-TA-242(F)	Terminated[3]	11-13-85
India	701-TA-251(F)	Terminated	01-15-86
Taiwan	701-TA-252(F)	Terminated[3]	01-15-86
Turkey	701-TA-253(F)	Affirmative	03-03-86

[1] Subject products were small-diameter, welded standard pipe, up to 4.5" in outside diameter.
[2] Order revoked on Oct. 21, 1985.
[3] Petitioner(s) withdrew petition pursuant to VRA or similar measure (Taiwan maintained a unilateral restraint on exports to the United States).
[4] Petitioners withdrew petition pursuant to an agreement (terminated in 1985) with the Government of Brazil to offset subsidies with an export tax.
[5] Order revoked on Oct. 29, 1985.

Source: U.S. International Trade Commission, Office of Investigations.

foreign governments and the European Union.[2] Under the VRAs, governments agreed to limit steel exports to the U.S. market over specified time periods. Most VRAs limited exports to a certain share of U.S. consumption.

The VRAs were authorized by the Steel Import Stabilization Act (title VIII of the Trade and Tariff Act of 1984),[3] which also contained requirements that the steel industry modernize, retrain workers, and take actions to improve its international competitiveness.

As part of the program to bring the VRAs into effect, U.S. producers withdrew pending unfair trade petitions, and the U.S. Government suspended AD/CVD duties on covered products.

On July 25, 1989, the President announced a Steel Trade Liberalization Program, under which the VRAs were extended through March 31, 1992.[4] The President directed the United States Trade Representative to negotiate new VRAs at an overall restraint level of 18.4 percent of U.S. consumption

[2] There was no VRA with Taiwan. The Coordination Council for North American Affairs (CCNAA), in letters to the American Institute in Taiwan, established unilateral restraints on steel exports to the United States.

[3] Public Law 98-573, Oct. 30, 1984, 98 Stat. 3043. This authorization followed an investigation (under section 201 of the Trade Act of 1974) in which the Commission found that increased imports of certain steel products were a substantial cause of serious injury, or threat thereof, to certain domestic industries and recommended that the President provide relief in the form of tariffs and quotas.

[4] Later incorporated into the Steel Import Stabilization Act as amended (Public Law 101-221, Dec. 12, 1989, 103 Stat. 1886).

Table 13-2
Standard welded pipes: Outstanding AD and CVD orders for determinations and administrative reviews

(Percent ad valorem)

Case	Type	Country/Firm	Investigation	Reivew 1	Review 2	Review 3
		Argentina:				
C-357-801	CVD	All Producers	5.77			
		Brazil:				
731-TA-532	AD	Persico	103.38			
		All other	103.38			
		India:				
701-TA-251	CVD	All producers	.42			
731-TA-271	AD	TISCO	7.08			
		Zenith	.00			
		Gujarat	.00			
		TATA		77.32	87.39	37.65
		Jindal		77.32		
		All other	7.08			
		Korea:				
731-TA-533	AD	Hyundai	6.86			
		Korea	6.21			
		Masan	11.63			
		Pusan	4.91			
		All other	6.37			
		Mexico:				
731-TA-534	AD	HYLSA	32.62			
		All other		32.62		
		Taiwan:				
731-TA-536	AD	Kao Hsing Chang		19.46		
		Yieh Hsing	27.65			
		All other	23.56			
		Thailand:				
C-549-501	CVD	All producers		1.79	1.64	2.86
731-TA-252	AD	Saha Thai		15.69	.49	.48
		Thai Steel	15.60	15.80		
		Siam Steel		38.51	29.89	
		Thai Hong			38.51	29.89
		Thai Union	38.51	29.89		
		All Other	15.67	38.51	29.89	
		Turkey:				
701-TA-253	CVD	All Producers	18.81	12.67		
731-TA-273	AD	Borusan	1.26	.03	.11	
		Mannesman	23.12			
		Erkboru	23.12	28.28		
		Yucel Boru		28.28		
		All other	14.74			
		Venezuela:				
C-307-806		All producers	.78			
731-TA-537	AD	Conduven	52.51			
		All other	52.51			

Source: *Federal Register*, various issues.

Table 13-3
Standard welded pipes: AD and CVD duties collected as a share of subject imports, 1991-93

(Percent ad valorem)

Country	Case type	1991	1992	1993
India	AD	7.1	0	0
Korea	AD		4.5	6.3
Mexico	AD		30.6	32.7
Taiwan	AD	.2		
Thailand	CVD			2.9
Turkey	AD	1.1	0	0
Turkey	CVD	2.7	7.3	7.3

Source: Compiled from official statistics of the U.S. Customs Service.

(the 1988 VRA import penetration level). Also, the President authorized negotiations allowing up to an additional 1–percent import penetration to countries that entered into bilateral consensus agreements (BCAs) on tariffs, subsidies, and other nontariff measures.[5]

It is difficult to state how "binding" the VRAs were on the subject products' importation because the VRA subcategory "standard pipe and tube" includes seamless pipes, pipes larger than 16 inches in diameter, and other pipe products not subject to these investigations. The effect of the VRAs, in combination with the introduction of trade cases, was taken into account in the formulation of the econometric model developed for this case (see "Estimates of Economic Effects" section). Petitioners argued that the actions and the resulting higher market prices saved them from possible extinction.[6] Respondents, however, argued that the combination of trade and VRA actions not only did not eliminate unfair trade, but also had the effect of barring high–quality competition from the U.S. market.[7]

[5] When the VRAs were extended in 1989, the United States sought to address the causes of unfair trade and reduce subsidization and overcapacity in the steel industry. The BCAs were commitments by countries (including Brazil, Korea, and Mexico) to eliminate most subsidies, tariffs and nontariff trade barriers in steel products and incorporate a binding arbitration mechanism. The BCAs were to have been multilateralized within the GATT through the Multilateral Steel Agreement (MSA) that was being negotiated with most major steel-producing countries. However, the MSA negotiations have not yet concluded.

[6] Transcript of public hearing on this investigation (investigation 332-344) before the Commission, Sept. 29-30, 1994, Washington, DC (TR), p. 292.

[7] Submission of Morrison and Foerster on behalf of the Korean Iron and Steel Association, p. 2.

Scope of Investigations

Subject Products

The pipe and tube products that are the subject of these investigations are circular welded steel pipes and tubes not more than 406.4 mm (16 inches) in outside diameter, regardless of wall thickness, surface finish (black, galvanized or painted), or end finish (plain end, beveled end, threaded, or threaded and coupled).[8] Stainless steel products are not included.

Products subject to these investigations are included in the category of products known commonly in the industry as "standard" pipes and tubes; they are intended for the low–pressure conveyance of water, steam, natural gas, air, and other liquids and gases in plumbing and heating systems, air–conditioning units, automatic sprinkler systems, and other related uses. They may carry fluids at elevated temperatures and pressures but must not be subjected to external heat. Subject products may also be used for light load–bearing applications, such as for fence tubing.[9]

[8] The trade cases have used various product definitions. However, for purposes of consistency, this investigation will include small-diameter standard pipe but will exclude pipe blanks for all years. This will enable tracking of the vast majority of the subject products.

[9] Imports of the subject pipes are reported under *HTS* statistical reporting numbers 7306.30.1000, 7306.30.5025, 7306.30.5032, 7306.30.5040, 7306.30.5055, 7306.30.5085, and 7306.30.5090. Due to changes in the tariff schedules, the subject imports were also previously reported under *HTS* statistical reporting numbers 7306.30.5030, 7306.30.5050, 7306.30.5060, 7306.30.5065, 7306.30.5070, 7306.30.5075, and 7306.30.5080 in 1989 and former TSUSA items 610.3231, 610.3232, 610.3234, 610.3241, 610.3242, 610.3243, 610.3244, 610.3247, 610.3254, and 610.4925 during 1982-88.

Several organizations publish standards and specifications for the production of steel pipes, including the American Society for Testing and Materials (ASTM), the American Society of Mechanical Engineers (ASME), and the American Petroleum Institute (API). Subject products intended for low–pressure service in steam, water, and gas lines are customarily inspected and tested hydrostatically, in accordance with ASTM specification A–53. Subject pipes intended for coiling, bending, flanging, or other special purposes are subject to tensile, bending, and flattening tests, as well as hydrostatic tests, in accordance with ASTM A–53 or related ASTM specifications.[10]

Substitute Products

In addition to the standard welded pipes subject to this case study, more expensive products, such as seamless pipes, or substitute materials such as stainless steel, copper, plastics, or other advanced materials can be used in certain applications. Pipes of plastic materials are growing in importance although their lighter weight and lower cost are sometimes offset by terrain, temperature, and pressure restrictions.

In steel products, line pipe is a particularly important substitute. Used for the transportation of gas, oil, and water, generally in pipeline or utility distribution systems, line pipe is produced to meet different specifications than "standard" pipes (API rather than ASTM), and a large share of line pipe is produced in wider diameters. Nevertheless, some line pipe and standard pipe are made on the same equipment, meet both line pipe and standard pipe specifications, and are "dual–stenciled" with both ASTM and API specification numbers.[11] Line pipe imports, including dual–stenciled products,[12] are covered by separate *HTS* statistical reporting numbers and petitioners argue that imports of the highly substitutable dual–stenciled pipe are increasingly being entered into the United States under line pipe import numbers in order to circumvent the AD/CVD orders on standard pipe.[13] Respondents argue that dual–stenciled pipe was specifically excluded from the scope of recent trade cases on standard welded pipe, so their actions are not circumvention.[14]

Description of Upstream Industry

Standard welded pipes are made from flat hot–rolled steel—sheet or strip, usually in coil form. In 1991, domestic shipments, imports, and consumption of the upstream hot–rolled coil decreased significantly from 1990 levels (table 13–4).

The upstream flat hot–rolled steel industry is composed of a wide diversity of firms, products, technologies, and markets. Companies can range from small operations that convert slabs into hot–rolled coil, to large integrated mills that also produce molten steel and slabs. Approximately 25 firms together employ almost 18,000 workers that produce some type of flat hot–rolled steel. Standard welded pipe AD/CVD investigations would be expected to have a small effect on this upstream industry, as only about 2 percent of total hot–rolled production is used to produce welded standard pipe.

Description of Downstream Industry

The construction industry is the major user of standard welded pipe. Activity in the pipe industry tracks construction fairly well from 1982 to 1992 (figure 13–1). During this period, the lowest level of total new construction was in 1982, at $260.6 billion, while the highest was in 1989 ($443.6 billion). A sharp but temporary drop occurred in 1991 when construction fell from $442.1 billion to $403.4 billion.

The low in new construction in 1982 coincides with a year of relatively low domestic shipments of pipe, while the late 1980s were strong years for both pipe and construction. As noted in the time series analysis below, new construction was found to be an important variable in the demand for domestically

[10] American Iron and Steel Institute (AISI), *Steel Products Manual: Carbon Steel Pipe, Structural Tubing, Line Pipe, Oil Country Tubular Goods*, Washington, DC, Apr. 1982, p. 20.

[11] According to a recent survey by the Commission (*USITC, Certain Circular, Welded Non-Alloy Steel Pipes and Tubes from Brazil, the Republic of Korea, Mexico, Romania, Taiwan and Venezuela*, USITC Publication 2564, 1992), 15.5 percent of the producers' 1991 U.S. shipments of subject pipes and tubes were multiple-stenciled.

[12] Dual- or triple-stenciled pipes that meet the API specifications for line pipe are classified as line pipe and assessed duties accordingly. Staff telephone conversation with Customs Service official, Aug. 24, 1992.

[13] TR, p. 306.

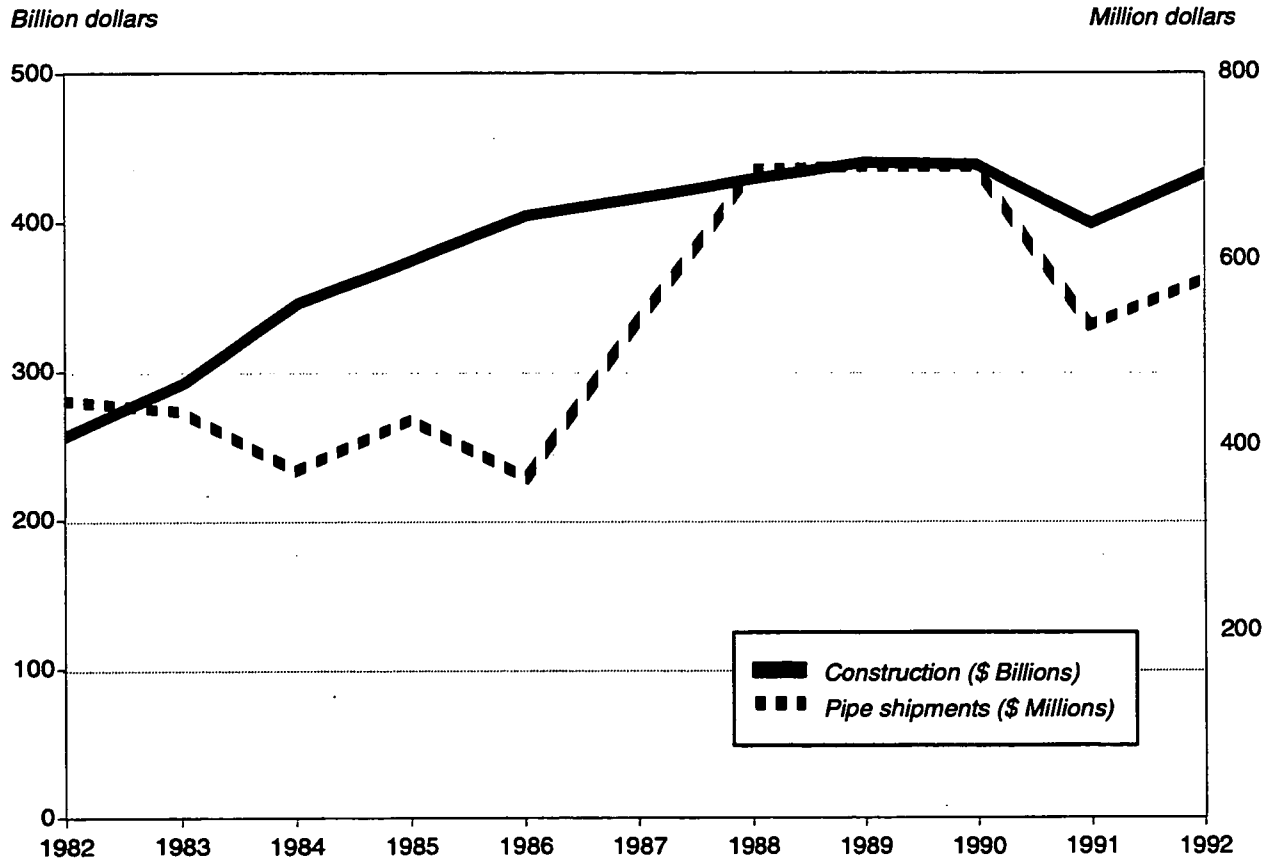
[14] Submission of Morrison and Foerster on behalf of the Korean Iron and Steel Association, pp. 10-15.

Table 13-4
Carbon steel flat hot-rolled products, total market, 1990-91

	1990	1991
	Quantity *(1,000 short tons)*	
U.S. producers' domestic shipments	48,683	41,917
U.S. imports	2,886	2,618
U.S. exports	993	2,215
Apparent consumption	51,569	44,535
	Value *(million dollars)*	
U.S. producers' domestic shipments	14,239	12,129
U.S. imports	1,070	930
U.S. exports	383	623
Apparent consumption	15,309	13,059

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission (U.S. International Trade Commission, *Certain Flat-Rolled Carbon Steel Products from Argentina, Australia, Austria, Belgium, Brazil, Canada, Finland, France, Germany, Italy, Japan, Korea, Mexico, the Netherlands, New Zealand, Poland, Romania, Spain, Sweden, and the United Kingdom*, USITC publication 2778, 1993) and from official statistics of the U.S. Department of Commerce.

Figure 13-1
New construction and domestic standard pipe shipments, 1982-92



Source: Economic Report of the President, 1994, table B-53 and Preston Report.

produced pipe. Standard welded pipe AD/CVD investigations would be expected to have a very small impact on this downstream industry, as pipe represents a very small portion of construction cost.

Approach of the Investigation

Methodology

In general, the analytical approach to the analysis of the standard welded pipe industry in this case study is that which is described in chapter 5, using publicly available data for 1982 through 1993. Data were also compiled from Commission questionnaires for 1982 through 1991 (although a sufficiently high response of usable questionnaire data was received only for 1989–91).

An analysis was conducted of the trends of key quantitative variables, including domestic output, imports and exports, prices, and profits. Following this, an econometric time series analysis was employed to determine the influence on imports and production of variables (such as steel prices, the growth of demand as measured by housing and other construction starts, and the onset of the VRAs and title VII standard welded pipe cases) that describe the economic environment in which pipe imports and production move. The results of the time series analysis were primarily two sets of key parameters. The first included estimates of the variables representing the direct effect of the VRAs and title VII cases on domestic production and imports, and the second included other estimates relating prices and output that provide information for the construction of key elasticities for the CPE analysis. The CPE analysis simulates the effects of imposing a title VII action on imports in order to measure the likely effects of such actions on the petitioning industry as well as the upstream suppliers and downstream customers.

A review of literature was also conducted. However, relatively little literature is available on the economic impact that AD/CVD duties have had on the steel industry in general or on the standard welded pipe industry specifically.[15]

[15] In one of the few studies to specifically identify effects of the AD and CVD practices on the standard pipe industry, Morkre and Kelly conducted a survey of publicly available data from AD and CVD decisions made by the Commission between 1980 and 1988 along with an examination of 174 of 221 cases decided by the

Data Sources

Industry associations such as the American Iron and Steel Institute and private data providers such as the Preston Reports company provided historically consistent data for the products under consideration, as well as for the most significant substitutes (principally seamless pipe and line pipe).[16] Public data gathered during previous investigations on standard pipe (USITC publication 2564) and flat–rolled steel products (USITC publication 2664) were also utilized. For the present investigation, questionnaires were sent to 22 producers and 44 purchasers or importers. Of these, 3 producers and 7 purchasers/importers were no longer in business or did not work with the subject products. However, usable data were received from 17 of the remaining 19 producers and 20 of the remaining 37 purchasers/importers. Additional information was gathered through field interviews. Trade data were obtained from official statistics of Commerce.

Industry Profile and Structure

Brief Evolution of the Industry

The pipe and tube industry originated in England in the mid–1820s when a method for manufacturing a whole length of pipe in one operation (by drawing long flat strips of hot–rolled steel through a die) was developed. In the United States, the industry began in

[15]—*Continued*
Commission (including standard pipe cases). For the standard pipe industry, injury level was estimated by the study at up to 1.09 percent of revenue for the 1986 CVD cases, with the low level being mostly attributed to the small market share of subsidized imports. For standard pipe AD cases during 1984-87, injury was estimated at up to 4.31 percent of revenue. Morkre, E. & Kelly, H., "Effects of Unfair Imports on Domestic Industries", Bureau of Economics Staff Report to the Federal Trade Commission, Washington, DC.: U.S. Government Printing Office, 1994.

[16] In the Preston Pipe surveys, the classification of products into standard pipe or line pipe shipments was made by producers providing data and may not match precisely the scope of the various investigations. In the Commission investigations on standard pipe, some covered a limited size range whereas others had a wider scope. Data in the Commission's 1992 investigations (investigation 731-TA-532-537), for example, included structural pipes.

the early 1830s when the butt–weld process[17] was developed by the Pascal Iron Works, Philadelphia, PA. Further developments included the standardization of pipe sizes, as described by their outside diameters, wall thicknesses, and threads per inch; the use of Bessemer steel[18] and the invention of the rotary–piercing method for making seamless pipe. Technology and efficiency developments in the 20th century, including the development of continuous butt–welding and electric resistance welding processes,[19] have been sparked by an intense rivalry for market share between seamless and welded pipe.

In the 1940s, about one–half of all pipe products produced were seamless, a peak for the seamless products, before the lower–cost welded pipes began to increase in popularity as firms have developed higher quality, specialized welded products. A decline in total standard steel pipe consumption occurred during the 1970s as a significant portion of the residential construction market changed from steel pipe to plastic (PVC) pipe.[20] By 1991, as shown in the following tabulation based on data from the Preston Report company, U.S. producers' shipments of welded steel pipe to the domestic market accounted for 79 percent total domestic standard pipe shipments (in tons):

Welded standard pipe (subject products)	940,829
Seamless standard pipe	248,641
Total	1,189,470

Industry Size and Structure

As of the end of 1991, there were 21 firms known to produce circular welded pipes and tubes in the United States. These firms together operated 33 plants, of which 17 were in the eastern part of the country, 10 in central States, and 6 in the west. More than one–half of U.S. output was produced by the top five firms.

Table 13–5 shows U.S. producers' shipments, imports, exports, and apparent consumption by quantity and value. By quantity, U.S. consumption of welded steel pipes and tubes increased by 1.6 percent between 1989 and 1990, declined by 18.0 percent the following year, and then remained roughly stable between 1991 and 1993. U.S. producers' shipments by quantity increased by 4.2 percent between 1989 and 1990, but then declined by 22.7 percent during the 1991 economic downturn. During 1991–93, the quality of U.S. producers' shipments rose by 17.5 percent. During the same period, the economy improved in general, new construction rose, and affirmative trade case determinations (filed in 1991 and reaching final determinations in 1992) resulted in AD duties on pipe imports from several major suppliers.

The market for the subject products is supplied by a large number of producers and even a larger number of importers and purchasers. According to questionnaire data, the vast majority (over 80 percent) of the subject products are sold to distributors. Master distributors sell the subject pipes to smaller distributors of plumbing and heating equipment, fire protection equipment, and fencing, and to steel service centers. Distributors, in turn, sell to various contractors and industrial end users.

Competitiveness Factors

A firm's ability to compete over the long term depends on its ability to obtain inexpensive raw materials, acquire investment capital for modernization and efficiency–improving assets, and develop technical competence, among other factors. In terms of obtaining raw materials to make pipe (i.e., hot–rolled coil), there are two kinds of firms: integrated and nonintegrated.

Integrated and Nonintegrated Companies

Integrated pipe producers transfer hot–rolled coil (the upstream product) from affiliated hot–rolling mills to affiliated pipe mills. As seen in table 13–6, nonintegrated firms had higher operating incomes and, during 1990–91, had a much higher return on net sales.

[17] In the butt-weld process, pipe is made by drawing steel sheet through a cone-shaped die that transforms the flat steel into a cylinder. Simultaneously, the die brings the longitudinal edges of the sheet together with sufficient mechanical pressure to forge-weld the butt joint.

[18] The Bessemer steelmaking process was the first large-scale process by which pig iron could be rapidly and cheaply refined and converted to liquid steel.

[19] In electric resistance welding, the heat generated by the resistance of the steel to the flow of an electric current is confined to a narrow band along the edges of the steel. While hot, the two edges are forced together by pressure, creating a weld.

[20] Posthearing submission of Schagrin Associates on behalf of the Committee on Pipe and Tube Imports, Nov. 4, 1994, p. 2.

Table 13-5
Standard welded pipes: U.S. producers' shipments, U.S. imports, U.S. exports, apparent consumption, and importers' share, 1982-93

Year	Producers' shipments	U.S. imports	U.S. exports	Apparent consumption	Importers' share of consumption
	Quantity *(1,000 short tons)*				*(Percent)*
1982	737	844	(1)	1,581	53
1983	904	1,182	(1)	2,086	57
1984	827	1,211	(1)	2,038	59
1985	924	1,133	(1)	2,057	55
1986	778	871	(1)	1,649	53
1987	971	957	(1)	1,928	50
1988	1,192	913	(1)	2,105	43
1989	1,169	788	3	1,954	40
1990	1,218	775	7	1,986	39
1991	941	698	10	1,629	43
1992	1,065	511	13	1,563	33
1993	1,106	534	14	1,626	33
	Value *(million dollars)*				
1982	454	437	(1)	891	49
1983	442	453	(1)	895	51
1984	379	501	(1)	880	57
1985	434	483	(1)	917	53
1986	372	362	(1)	734	49
1987	543	417	(1)	960	43
1988	702	473	(1)	1,175	40
1989	705	436	5	1,136	38
1990	705	411	8	1,108	37
1991	536	386	10	912	42
1992	584	278	13	849	33
1993	622	292	12	902	32

[1] Export data not available, but believed to be minimal.

Source: "The Preston Report, Data Report for USITC, 1994," and official statistics of the U.S. Department of Commerce.

Table 13-6
Standard welded pipes: U.S. producers' sales, operating income, and ratio of operating income to sales, by types of firms, 1989-91

Item	1989	1990	1991
	Value *(1,000 dollars)*		
Net sales:			
Integrated	265,194	282,088	197,551
Nonintegrated	507,609	515,032	502,507
Total	772,803	797,120	700,058
Operating income or (loss):			
Integrated	21,028	1,444	(3,364)
Nonintegrated	32,272	38,025	35,817
Total	53,300	39,469	32,453
	Ratio to net sales *(percent)*		
Operating income or (loss):			
Integrated	7.9	0.5	-1.7
Nonintegrated	6.4	7.4	7.1
Average	6.9	5.0	4.6

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

During title VII investigations on pipe, foreign producers argued that nonintegrated firms were at a competitive advantage because they were able to purchase hot–rolled coil on the open market. They argued that nonintegrated losses in the total pipe industry were due to losses incurred by integrated producers in their hot–rolled coil operations (rather than being due to unfair pipe imports) as evidenced by the difference in profitability.[21]

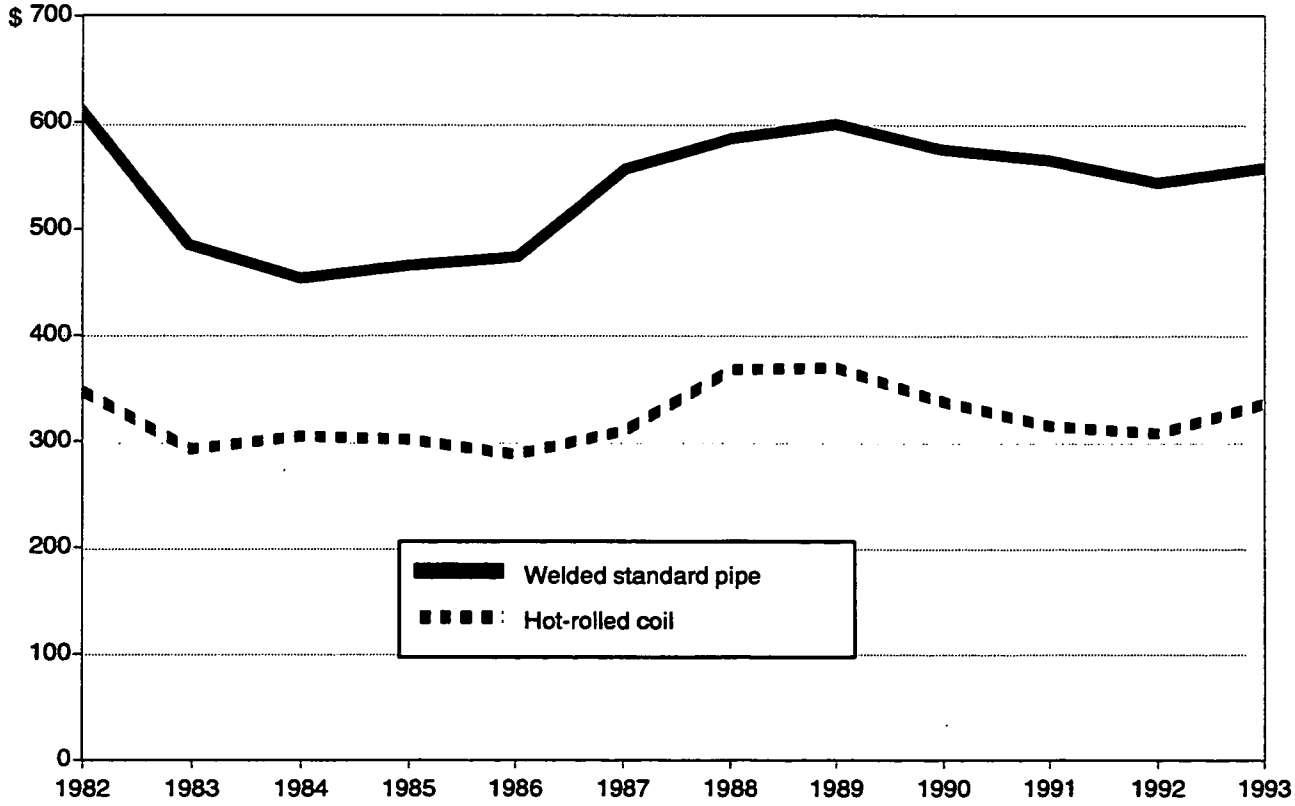
Effect of Upstream Product Prices on Profitability

Standard pipe producers have indicated in the past that upstream raw material prices were the primary cost factor affecting their profitability and price competitiveness. In 1992–94 the standard pipe industry faced price increases on hot–rolled coil because of increased demand for steel–intensive consumer goods (e.g., automobiles and appliances) that increased the demand for all flat–rolled steel products. Additionally, the dumping and subsidy determinations for flat–rolled steel, which increased the cost of imported corrosion–resistant steel, also increased the demand for domestic corrosion resistance products and the hot– and cold–rolled steel used to make them. Figure 13–2 shows the relationship between the open–market price of hot–rolled coil steel (the primary raw material, purchased by nonintegrated producers), and the unit value of total U.S. standard welded pipe shipments. Although the trends are similar, the gap between the input prices and unit prices of the final pipe is marginally greater in the 1990s, indicating that the cost of raw materials was less of a determinant of the final value of the product in the latter years.

[21] Submission of Shearman and Sterling on behalf of HYLSA, S.A., and Tuberia Nacional, S.A., Mexican pipe producers, Sept. 2, 1992, pp. 9-20.

Figure 13-2
Unit value of domestic shipments of welded standard pipe and hot-rolled coil, 1982-93

Per ton



Source: The Preston Report; Data Report for USITC, 1994.

Fifty–five percent of the importers and purchasers responding to the Commission's questionnaire in this case study were 35 percent or more owned by a foreign firm.[22] According to petitioners, U.S. producers have been unable to pass along price increases in hot–rolled coil to their pipe customers in part because of continued dumping and subsidization and in part because of the absorption of AD and CVD duty costs by importers related to foreign suppliers.[23] According to respondents of a recent AD investigation on the upstream raw materials (hot–rolled coil), imposition of AD orders is not intended to restore prices of the subject goods in U.S. markets to a presumed fair level, and part of the duties, as a general case, may be expected to be absorbed by the importer or foreign producer if warranted by market conditions. They argue that this is not an unfair practice, even when the producer and the importer are related parties and that the AD duty should not be considered a cost of production in determining a product's fair market value.[24]

In posthearing briefs in this case study, major purchasers of hot–rolled steel indicated that the U.S. industry cannot supply the steel needed to meet demand and that trade cases on flat–rolled steel have resulted in raising market prices for hot–rolled steel consumers such as standard pipe producers.[25] Additionally, according to AIIS, the principal cause of increased trade in steel is not dumping, but rather specialization, niche markets, freight savings, supply shortfalls, and steel market instability caused by volatile exchange rates and worldwide recessions.[26]

[22] Similarly, over 40 percent of the domestic producers reported being 35- percent-or-more owned by a foreign firm.

[23] TR, p. 303.

[24] Submission of Powell, Goldstein, Frazer and Murphy on behalf of Hoogovens Groep BV of the Netherlands, Feb. 14, 1995, pp. 2-6 and 11-17.

[25] Submissions of General Motors Corp., Nov. 4, 1994, p. 2; Steel Service Center Institute, Nov. 4, 1994, p. 5; and American Institute for International Steel (AIIS), Nov. 4, 1994, p. 7.

[26] AIIS, pp. 1-10.

Investment and Research

Twelve producers reported research and development expenses, and 14 firms reported capital expenditures meant to increase competitiveness. As shown in table 13–7, several years after the 1986 AD investigations and 1 year after the 1988 CVD investigations, research and development expenditures increased substantially from a low level, whereas capital expenditures declined during the economic downturn in 1991. According to petitioners, however, recent affirmative determinations on trade cases have enabled them to make investments in capital equipment, which have resulted in increased productivity and reduced manufacturing costs.[27]

Market Performance—Trend Analysis

Domestic Shipments

Data currently available show that domestic standard welded pipe output has been at a fairly constant or slightly rising level since 1982. Domestic shipments[28] of the subject product and its principal substitutes (figure 13–3) (often produced by the same firms) have generally varied in a parallel pattern, indicating that demand may not be showing a significant secular tendency to favor one product over another.

In 1993 plants were operating at a rate below the peak of 20 shifts per week, which was reached in 1980–81 (essentially the maximum possible, since there are 21 8–hour shifts in a week and 1 shift per week is for maintenance). They have maintained a

[27] Posthearing submission of Schagrin Associates on behalf of the Standard Pipe Subcommittee of the Committee on Pipe and Tube Imports, Nov. 4, 1994, p. 4.

[28] Data include standard, line, and seamless pipe that is not more than 16 inches in outside diameter only.

Table 13-7
Standard welded pipes: Capital expenditures and research and development, 1989-91

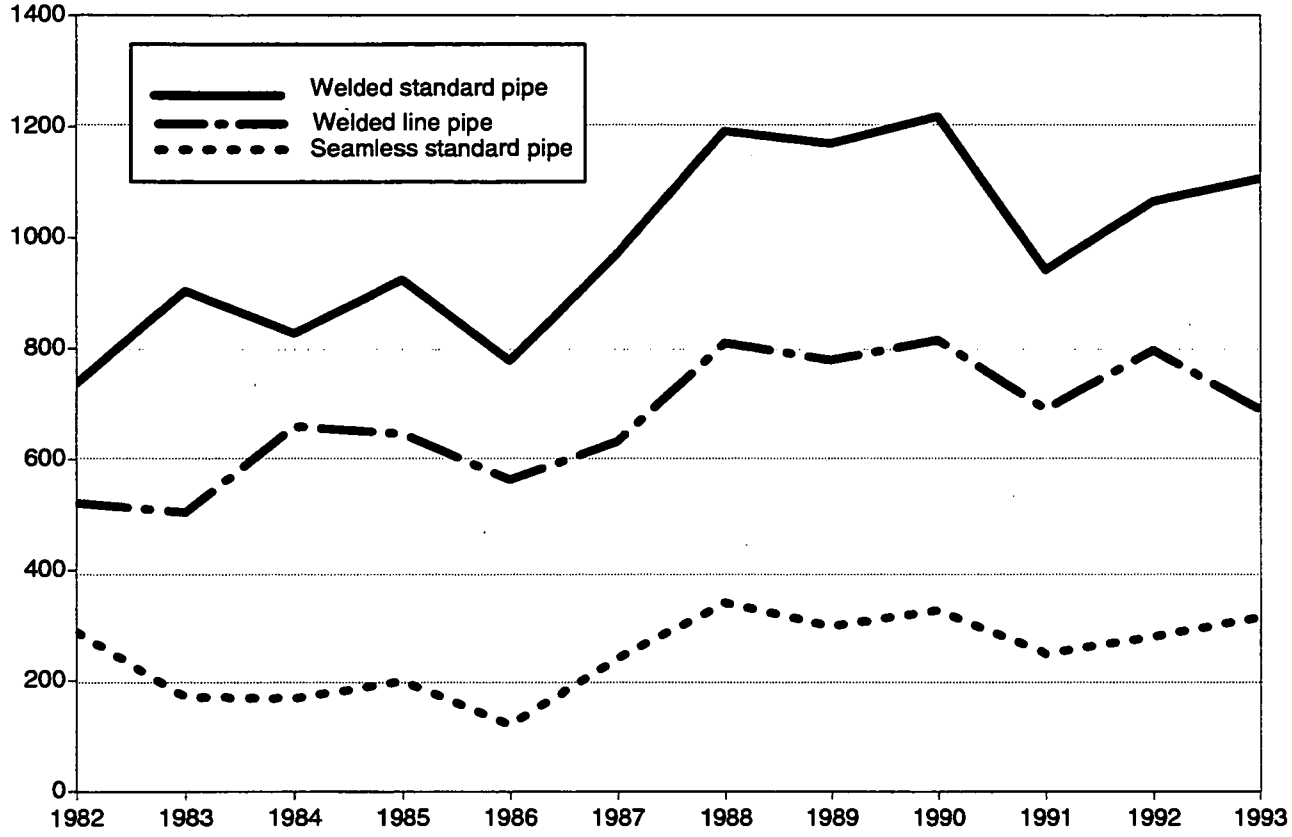
(1,000 dollars)

Item	1989	1990	1991
Capital expenditures	31,951	20,807	19,564
Research and development expenditures	496	594	1,056

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Figure 13-3
Welded standard pipe and substitutes: Domestic shipments, 1982-93

1,000 net tons



Source: Data Report for USITC, The Preston Report.

rate of 15 to 19 shifts per week since 1987, with the exception of a low in 1991 (figure 13–4). This corresponds to earlier Commission findings[29] that showed capacity utilization rates of 69 percent in 1989, 68 percent in 1990, and 61 percent in 1991.

Imports and Exports

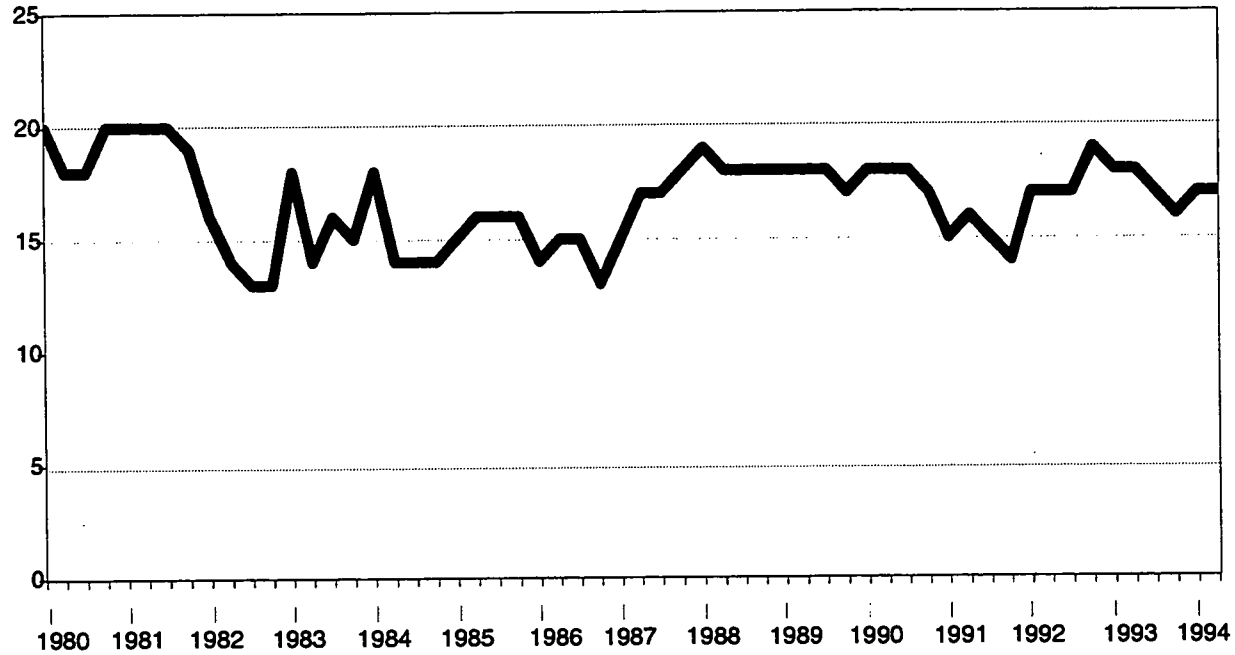
In 1993, U.S. firms imported 534,000 tons of standard pipe, of which the 218,000 tons of standard pipe from Korea (the largest source) totaled over 16 times more than the total reported volume of U.S. pipe exports. During the same year, U.S. firms exported 13,600 short tons of standard pipe, mostly to Canada (9,300 tons), Mexico (4,000 tons), and China (less than 300 tons). Although the U.S. standard pipe industry is a relatively minor player outside North America, U.S. exports to Canada and Mexico have grown by more than 300 percent over 1989 levels. The unit value of U.S. exports is generally higher than that of the imports; exports had an average unit value of $872 per ton (f.o.b.) in 1993, whereas imports (from all sources combined) had a unit value of $536 per ton (c.i.f.).

Imports from selected countries (Korea, Mexico, Brazil, and Taiwan) peaked in the early 1980s and generally declined after that (figure 13–5), even as unit prices of imports rose from a low point in 1983 (figure 13–6). This import peak coincides with the first affirmative antidumping cases, which were against Brazil and Korea (1983) and Korea and

[29] USITC, *Certain Circular, Welded, Non-Alloy Steel Pipes and Tubes*, USITC publication 2564.

Figure 13-4
Welded standard pipe: Domestic operating rate by quarters, 1980-94

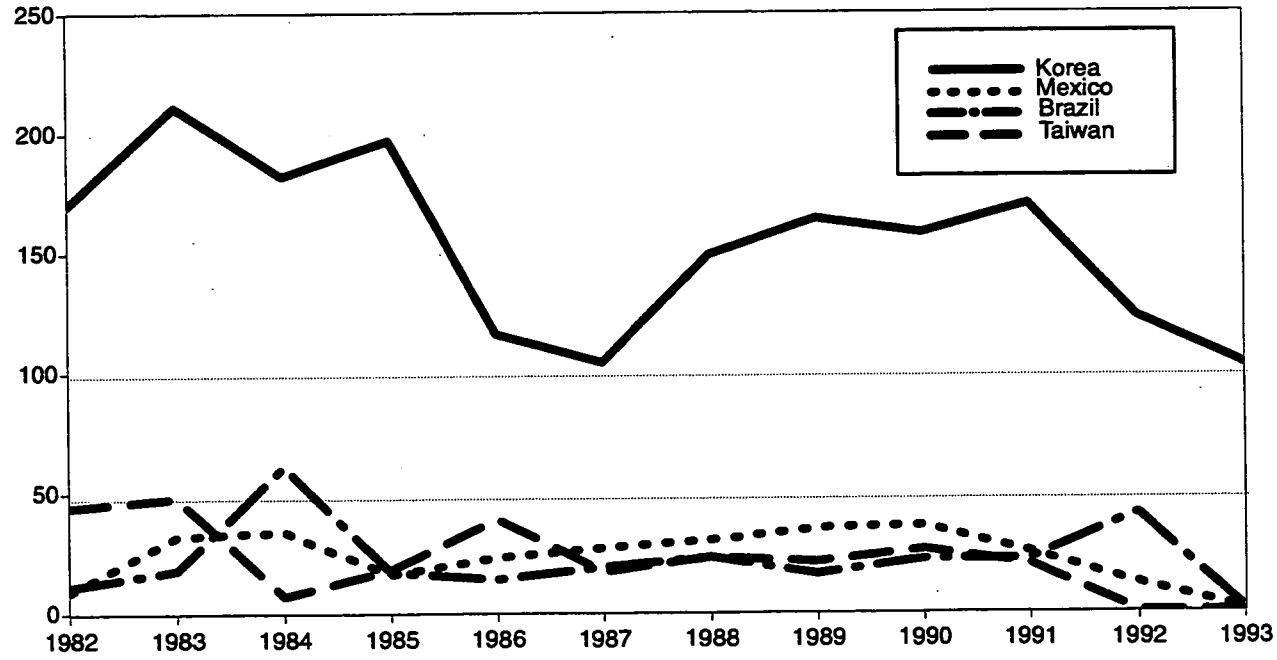
Average 8-hour shifts per week



Source: Data Report for USITC, The Preston Report.

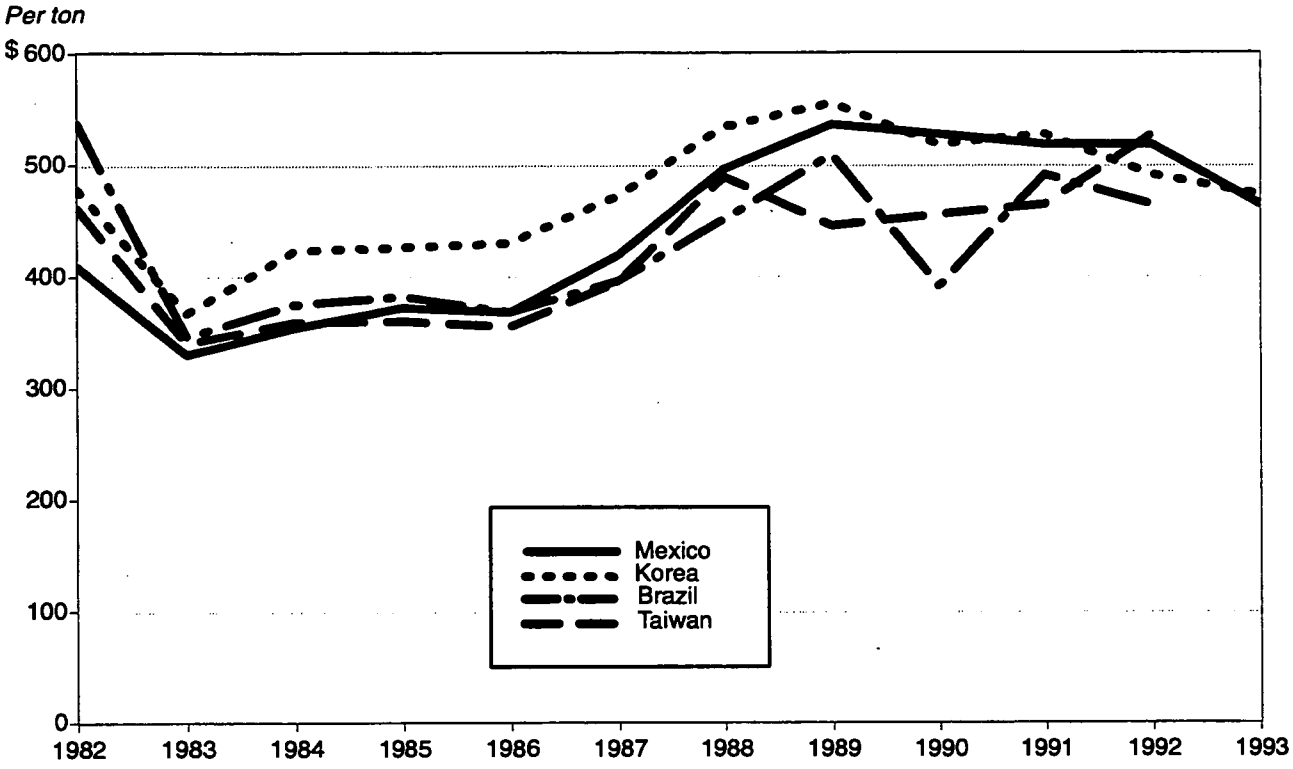
Figure 13-5
Welded standard pipe: U.S. imports from selected sources, by value, 1982-93

Millions of dollars



Source: Official statistics of the U.S. Department of Commerce.

Figure 13-6
Welded standard pipe: U.S. imports froms selected sources, by unit values, 1982-93



Source: Offical statistics of the U.S. Department of Commerce.

Taiwan (1984) and the start of the VRAs in late 1984. Declines from the peak coincide with the inclusion of eight additional countries into the VRA program or similar arrangements during 1985–86.[30]

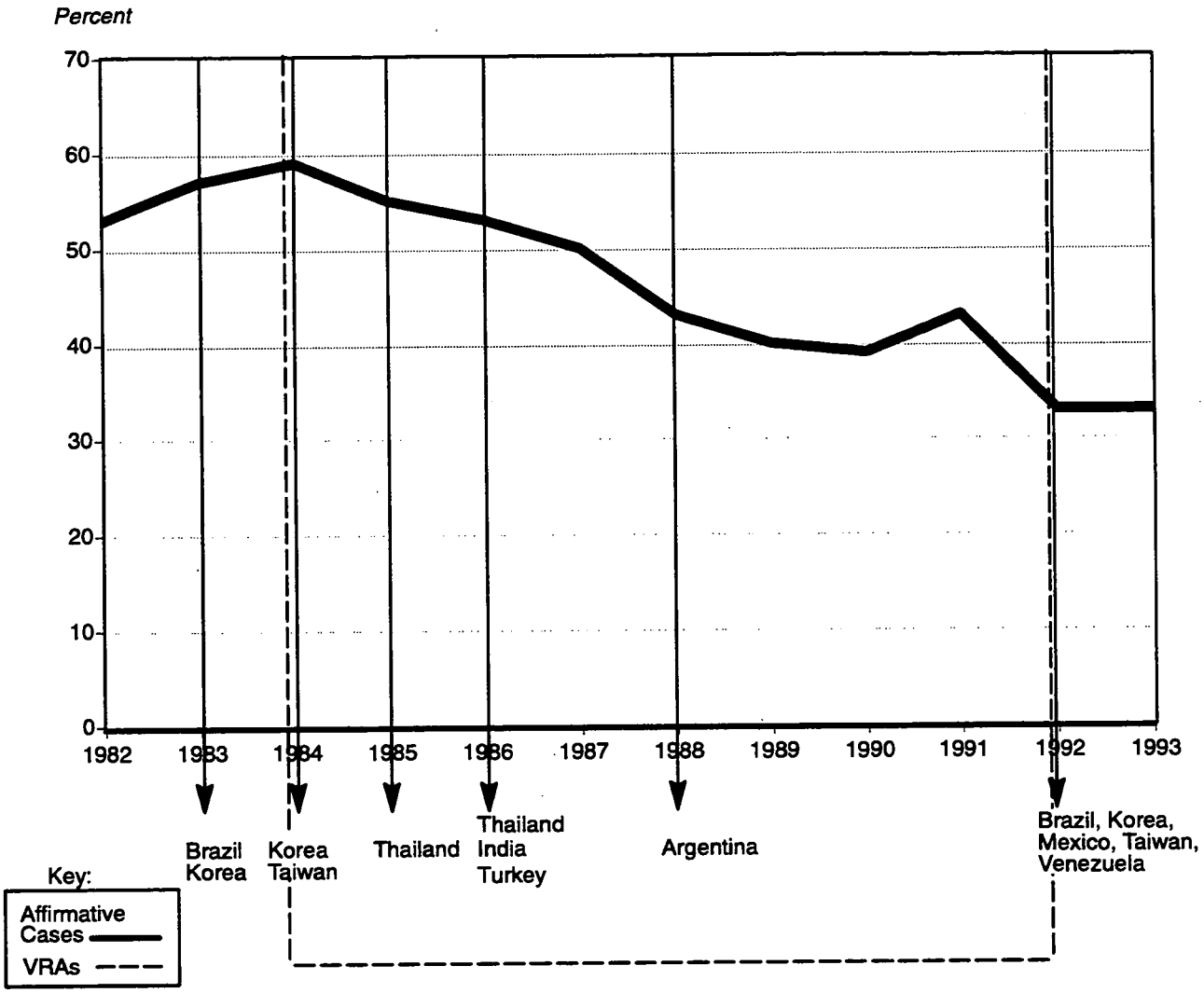
Total imports, both from subject and nonsubject countries, held 33 percent of the U.S. standard pipe market in 1993 by quantity, down from their peak penetration rate of 59 percent in 1984 (figure 13–7). There was a jump in the penetration rate from 39 percent in 1990 to 43 percent in 1991, when AD/CVD petitions were filed on standard pipe imports from Brazil, Korea, Mexico, Taiwan, and Venezuela. In 1992, imports dropped back to a 33–percent share. Generally, with the exception of 1991, the import penetration rate has declined in every year since 1984.

[30] Due to concerns about prices and product availability after the VRA program curtailed the amount of foreign pipe in the U.S. market, one purchaser/importer reported that it purchased a domestic pipe manufacturer.

Subject Import Prices

Import prices, as reflected by unit values, have been relatively constant in recent years (1988–93) in current dollar terms (figure 13–8). The highest unit value on an annual average basis was reached in 1982, at $616 per ton. Values declined rapidly after 1982, down to $458 in 1984, and then slowly recovered to $602 by 1989. This was followed by a moderate decline in unit values over the next 3 years and a slight increase in 1993. Value fluctuations may be due to changes in product mix, as well as changes in the market price, AD/CVD orders, or VRA restrictions. Although import prices generally remained lower than domestic prices, the difference narrowed in 1992 at the end of the VRA period. At that time, because of a combination of market conditions and increases in the VRA ceilings, the quantitative limits on foreign trade became less restrictive.

Figure 13-7
Welded standard pipe: U.S. importers' share of domestic consumption, by quantity, 1982-93



Source: The Preston Report and Official Statistics of the U.S. Department of Commerce.

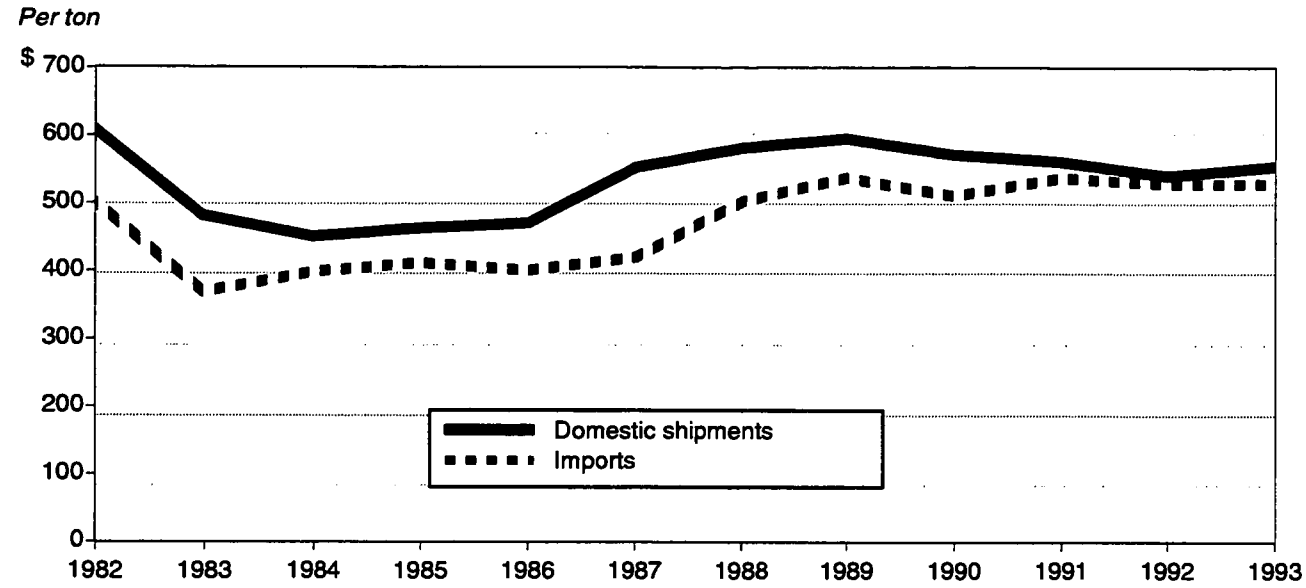
U.S. Industry Market Share

U.S. producers accounted for 67 percent of the U.S. market in quantity terms in 1993, up from 47 percent in 1982 and 41 percent in 1984. Until 1987, imported standard pipe held over one-half of the U.S. domestic market; since that year, U.S. production has held the largest part of the market, and its share has been growing (figure 13–9). Domestic shipments fluctuated around the 800,000-ton level from 1982 through 1986, before increasing (by over 50 percent) in the next 2 years to almost 1.2 million tons in 1988. It stayed at about that level for the next 2 years, until an economic slump in 1991 that also affected the level of imports. The moderate recovery in domestic shipments in the following year was not enjoyed by imports, which continued to decline. Import penetration peaked in 1983 and 1984, the years of the first affirmative antidumping cases.

Substitute Price Trends

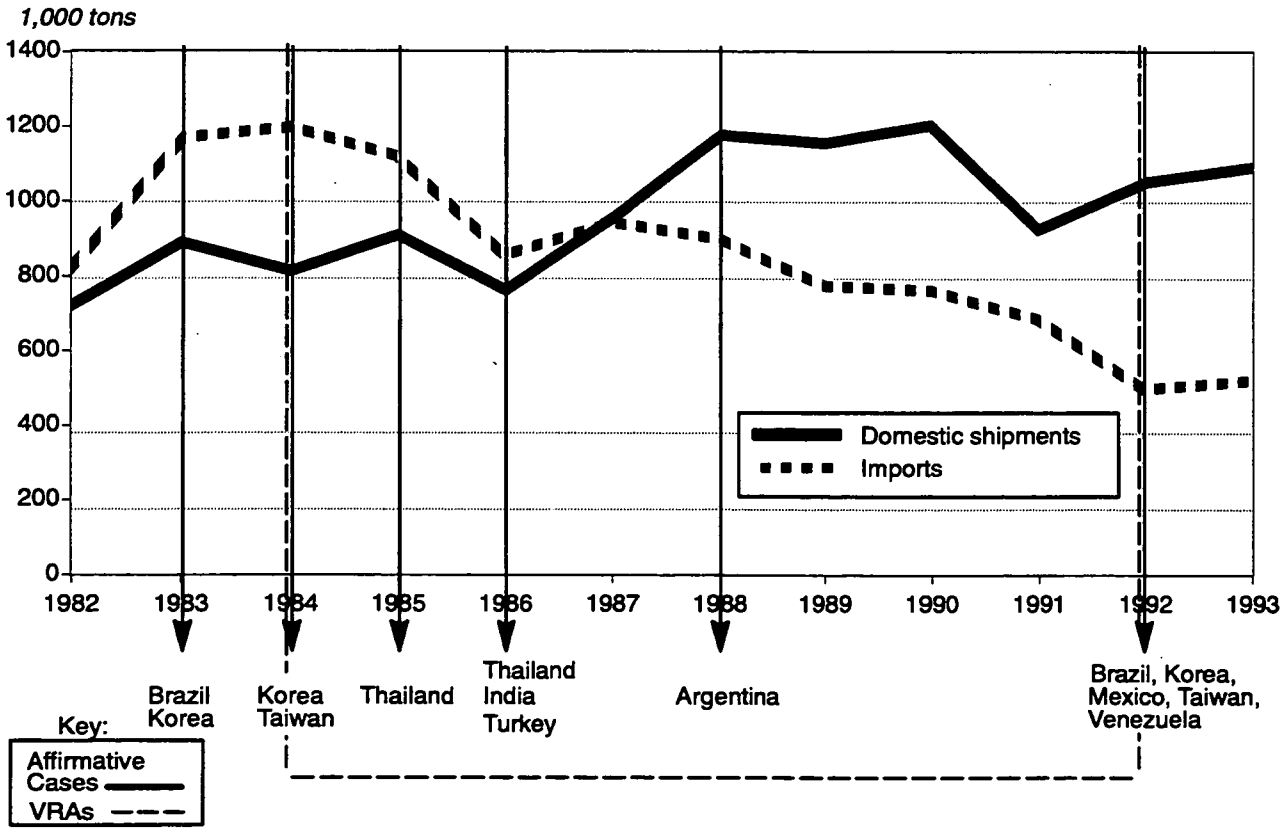
Unit values of domestic line and standard pipe shipped in the past 12 years have been quite close (figure 13–10). Line pipe has usually been lower in

Figure 13-8
Welded standard pipe: Unit value of domestic shipments and U.S. imports, 1982-93



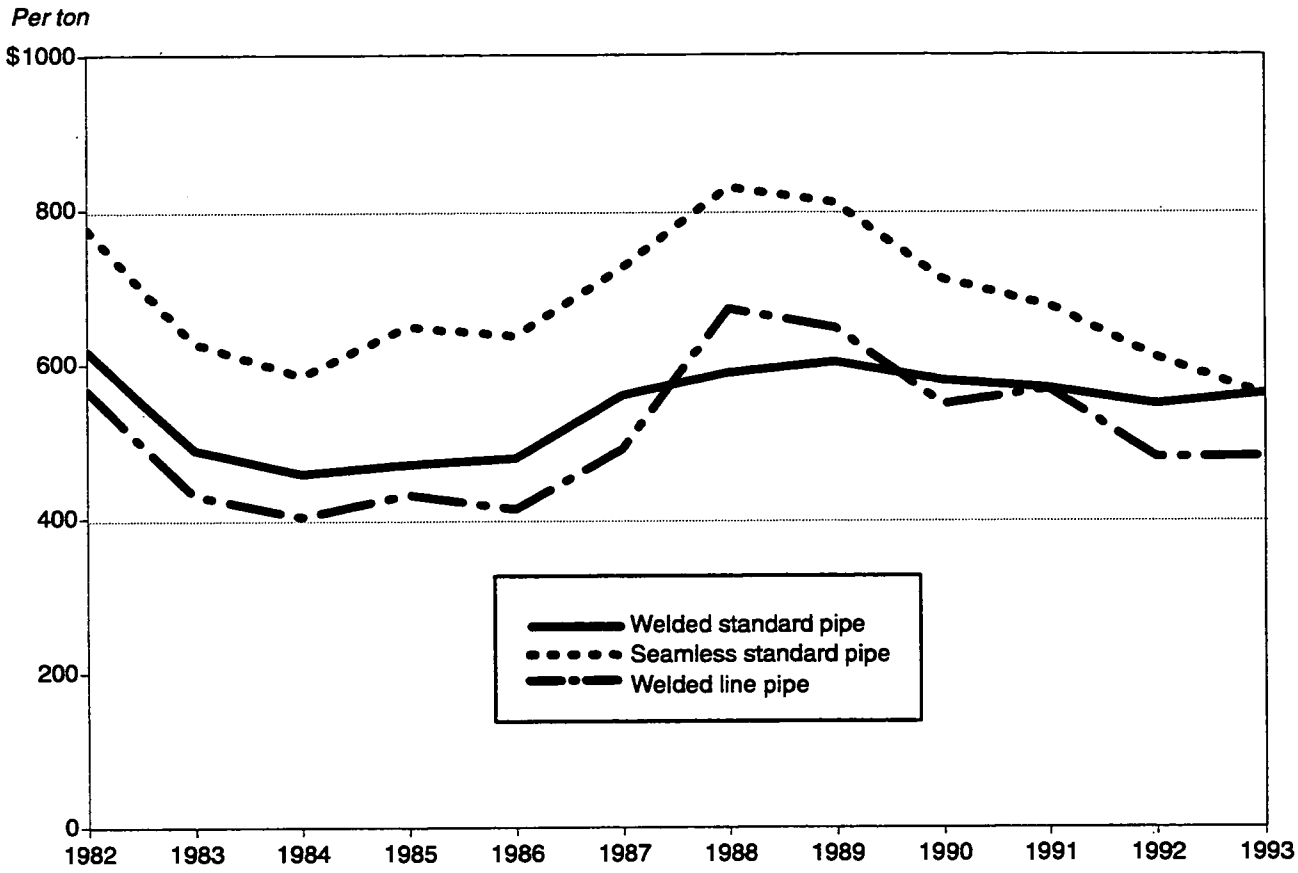
Source: The Preston Report and official statistics of the U.S. Department of Commerce.

Figure 13-9
Welded standard pipe: Domestic shipments and U.S. imports, by quantity, 1982-93



Source: The Preston Report and statistics of the U.S. Department of Commerce.

Figure 13-10
Welded standard pipe and substitutes: Unit value of U.S. domestic shipments, 1982-93



Source: Data Report for USITC, The Preston Report.

price than standard pipe and sold in much larger volumes. However, the practice of dual–stenciling (with both ASTM standard pipe and API line pipe specification numbers) is growing, and there is evidence of a possible future convergence of specifications into a single "standard/line pipe" technical specification.

Seamless pipe is considerably more expensive than welded pipe. Seamless pipe can withstand higher pressures, and (but for its price) could technically be used in place of welded pipe in most applications.

PVC pipe gained a significant portion of the residential pipe market during the 1970s. In response to the Commission questionnaire, 9 pipe producers (out of 10 expressing an opinion) indicated that PVC pipe continued to be either highly or moderately substitutable for standard pipe. Several firms indicated that the use of PVC pipe is growing for housing, plumbing, and sprinkler applications.

Profitability

As seen in table 13–8, for 3 years after the 1986 AD cases used in the model, standard pipe sales continued to decline, decreasing by 9 percent in value during 1989–91 and with net operating income declining by 39 percent, reflecting the drop in sales prices during the 3–year period. This may be due in part to the slump in new construction activity in 1991, which sharply reduced the demand for standard pipe. Petitioners stated that unfair import sources had merely shifted and therefore filed additional AD petitions in September 1991.

Table 13-8
Standard welded pipes: U.S. producers' financial information, 1989-91

Item	1989	1990	1991
Net sales:			
Quantity *(tons)*	1,205,039	1,312,029	1,197,298
Value *(1,000 dollars)*	772,803	797,120	700,058
Unit value	$641	$608	$585
Cost of goods sold *(1,000 dollars)*	670,473	704,115	618,559
Gross profit or (loss) *(1,000 dollars)*	102,330	93,005	81,499
Selling, general, and administrative expenses *(1,000 dollars)*	49,030	53,536	49,046
Operating income or (loss) *(1,000 dollars)*	53,300	39,469	32,453
Income/sales *(percent)*	6.9	5.0	4.6

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

In questionnaire responses, 40 percent of the firms producing standard pipe indicated that they manufactured both standard and line pipe in 1991. Standard pipe products appear to be more profitable than line pipe produced by firms that produce both products (table 13–9), an incentive for firms to shift future production and sales into the standard pipe market.

Employment Compensation and Productivity

Seventeen firms reported employment data to the Commission. As reported, the number of production and related workers in the U.S. standard welded pipe industry rose from 3,358 to 3,413 between 1989 and 1990, followed by a drop to 3,365 in 1991. Total compensation to these workers rose by 2 percent during the 3–year period from 1989 to 1991. According to the questionnaire data, productivity increased by 2 percent during 1989–90, then declined by 11 percent the following year.[31] This could in part be explained by the decline in output and unit values that occurred in 1991; output and revenues declined more rapidly than capacity and labor costs.

[31] Productivity was measured by the ratio of domestic sales to production workers. Production figures were not used due to the inability of several producers, as stated in their questionnaire responses, to determine if production would be standard pipe or line pipe until it was sold.

Estimates of Economic Effects

Time Series Analysis

Hypothesis Tested

The time series analysis tests whether the beginning of title VII petitions (and associated trade restrictions such as the imposition of VRAs on imports of steel and steel products) had an effect on the demand for standard pipe, and on the domestic supply of that product. That is, it tests the alternative hypothesis that these actions had effects on the demand for fair imports, for unfair imports, and domestic products, and for the supply of the domestic product against the hypothesis that there were no such effects. The analysis divides the historical data into a "pre–remedy period" in 1982 and 1983, and a "post–remedy period", 1984 and later. Further, the lack of necessary data on foreign production precludes the estimation of the supply relationships in the foreign market.[32]

In order to determine and quantify the factors affecting the demand and supply of standard welded pipe, particularly the effect of the unfair trade practices and their remedies, a multiple equation regression analysis was performed. In this analysis, the demand for standard pipe is composed of four components: the demand for domestically produced pipe, the demand for imports from Korea (by far the largest source of imports, and the first country to be subject to AD or CVD remedies), the demand for

[32] This affects the interpretation of parameters in the import equations as demand and supply elasticities.

Table 13-9
U.S. standard pipe producers' sales and operating income for welded standard steel pipe and line pipe, 1989-91

Item	1989	1990	1991
	Value *(1,000 dollars)*		
Net sales:			
Standard pipe	772,803	797,120	700,058
Line pipe	110,033	115,821	106,617
Total	882,836	912,941	806,675
Operating income or (loss):			
Standard pipe	53,300	39,469	32,453
Line pipe	65	(3,461)	(7,093)
Total	53,365	36,008	25,360
	Ratio to net sales *(percent)*		
Operating income or (loss):			
Standard pipe	6.9	5.0	4.6
Line pipe	.1	(3.0)	(6.7)
Average	6.0	3.9	3.1

Note.—The line pipe figures above include only line pipe that is produced by producers of standard pipe.

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

imports from other subject countries, and the demand for non–subject imports (imports from countries not subject to AD/CVD remedies). In addition to the four demand equations, a fifth equation models the supply of domestically produced pipe.[33]

> The general form of the four demand equations can be written as:
>
> Quantity demanded = f(Remedy–1984, Domestic pipe unit value, Korean import unit value, Other subject import unit value, Nonsubject import unit value, Line pipe unit value, Seamless pipe unit value, New construction).

[33] See chapter 5 for a description of the economic model. In the pipe model, the names of the dependent variables (quantities of pipe demanded or supplied) appear at the top of the columns of coefficients in table 13-10. Note that the supply equation has a slightly different set of explanatory variables than do the demand equations. For all equations the dependent variable is the log of the quantity supplied (or demanded) in kilograms. Among the explanatory variables, those indicated by the superscript 2 (in table 13-10) are also in logs. This five-equation model is estimated using a three-stage least squares technique (3SLS). The endogenous variables are the four quantities, and the price of the domestic product. This endogenous domestic price is entered as a right-hand variable.

The explanatory variables in each equation include the variable Remedy–1984. This is a binary variable, equal to 1 for observations in 1984 and later, and equal to zero for 1982 and 1983. The Remedy–1984 variable is an attempt to capture the effect of title VII actions on the market for standard pipe. In 1984, the first affirmative determination was reached in an antidumping case on this product; it was also the year when VRAs began on various steel products, including pipe. These VRAs were initiated at least in part because of the filing of antidumping petitions and can thus (at least in part) be interpreted as elements of suspension–type agreements. Because of the temporal and statistical simultaneity of these actions, and the almost continuous filing of AD/CVD petitions in the 10–year period beginning with 1984, it has not been possible to econometrically isolate further effects of the AD/CVD process. In particular, the filing of the first petition occurred too close to the beginning of the data series to have a discernable effect. Moreover, the imposition of remedies for the 1984 cases occurred against the background of the ongoing VRAs and the filing of new petitions, so that the specific remedy effects for particular cases and for the imposition of VRAs could not be isolated.

The demand equations also include all of the unit values of the subject product from its various sources (per kilogram), as well as the unit value of line pipe and seamless pipe, which are substitutes for the subject pipe in many demand applications and are

produced by the same factories in many cases. Unit values are used as proxies for prices, since data are generally available in this form. The value of new construction in billions of dollars in the United States is included, since new construction is an important downstream user of standard pipe.

The supply equation is of the form:

Quantity supplied = f(Remedy–1984, Domestic pipe unit value, Korean import unit value, Other subject import unit value, Nonsubject import unit value, Line pipe unit value, Seamless pipe unit value, Steel unit value, Shift rate, Manufacturing cost).

On the supply side, the shift rate (average number of shifts worked per week), the unit value of hot–rolled steel (per ton), and the manufacturing wage rate are included as measures of capacity utilization and production costs.

The estimation method was three–stage least squares. For each coefficient reported in the table, a t–statistic is reported to test the standard null hypothesis that the coefficient is zero. With 144 monthly observations, a t–statistic value of about 1.98 or greater indicates that the coefficient is different from zero at the 5–percent level of significance. Diagnostic tests, such as the Durbin–Watson test for serial correlation, and summary statistics such as the R–squared, are not well defined for system equation techniques and hence are not reported.[34]

Data Sources

The data are monthly observations of the various series from 1982 through 1993 (144 observations). Data on the domestic industry (deliveries of standard welded pipe, seamless pipe, and line pipe, their unit values, and the factory shift rate) were obtained from a special data run provided to the Commission by The Preston Report company, an industry reporting service. Import quantities and values were taken from official statistics of the U.S. Department of Commerce, as was the value of new construction in the United States. Data on the value of hot–rolled steel are from Paine Webber's *World Steel Dynamics*, various issues. Finally, the manufacturing wage rate is the average hourly earnings in manufacturing, reported by the U.S. Department of Labor, Bureau of Labor Statistics.

[34] G. Judge, W. Griffiths, R.C. Hill, and T.C. Lee, *The Theory and Practice of Econometrics* (New York: John Wiley and Sons, 1980), p. 251-257.

Results

The econometric analysis of data relating to the standard pipe industry, reported in table 13–10, indicates that the onset of various remedial actions (the affirmative antidumping and countervailing duty determinations in 1984 and the initiation of the VRAs) had generally the same effect as a price increase in the market.[35] Demand for the domestic product decreased while its supply increased as a result of the beginning of the VRAs and the title VII investigations. These effects are independent of the effects of any price increase that may have taken place, but only the effect on demand for the domestic product is highly significant statistically. On the supply side, the result was of moderate significance[36] (at the 90–percent level of confidence); the implied effect of the remedial actions was roughly equivalent to a price increase of 10 percent. This variable has the effect that one might expect, given its interpretation as "the onset of AD/CVD and VRA import restrictions." Such restrictions act to stimulate an increase in domestic supply and a decrease in demand for each component or source of the steel pipe, independently of the effect of the restrictions on prices.

Other results are indicated by these estimates. The demand for domestic pipe is much more elastic than the demand for imported pipe.[37] Domestic pipe's own–price elasticity is –4.99, compared with about –0.59 for imports from Korea, –1.04 for other subject imports, and –0.30 for nonsubject imports. (Throughout this discussion, "price" and "price effects" are used to describe results relating to measured unit values, the best available proxy for prices.) The supply of domestic pipe also seems quite elastic (6.89), but fails to be statistically significant. New construction has no discernable

[35] Technical note: Coefficients of binary variables in logarithmic equations may be transformed into estimated percentage changes by raising e, the base of the natural logarithm, to the power of the coefficient, subtracting one, and multiplying by 100. See R. Halvorsen and R. Palmquist, "The Interpretation of Dummy Variables in Semilogarithmic Equations," *American Economic Review*, vol. 70 (1980), pp. 474-475.

[36] The term "significance" here means statistical significance and implies that there is a relatively large probability, for example 90 percent, that the estimated effects would not have occurred by chance.

[37] Technical note: Due to the specification of the variables in logarithmic form, coefficients for non-binary variables in table 13-10 can be interpreted as elasticity estimates. An elasticity is the percentage change in the dependent variable (quantity) that results from a one-percent change in the explanatory variable.

Table 13-10
Standard welded pipe: Results of time series analysis (coefficients of demand and supply)[1]

Independent variable	Demand quantity				Supply quantity, domestic product[2]
	Domestic product[2]	Imports from Korea[2]	Other subject imports[2]	Non-subject imports[2]	
Remedy-1984	-0.35* (-2.06)	-0.44 (-1.53)	-0.41 (-1.81)	-0.39 (-1.59)	0.60 (1.70)
Domestic subject product unit value[2]	-4.99* (-2.44)	-7.12* (-2.07)	-6.77* (-2.46)	-6.20* (-2.09)	6.89 (1.56)
Korea imports unit value[2]	-.10 (-.23)	-.59 (-.80)	.61 (1.04)	2.44* (3.81)	-.91 (-1.90)
Other subject imports unit value[2]	.05 (1.30)	.15* (2.20)	-1.04* (-19.27)	.12* (2.07)	-.05 (-1.34)
Nonsubject imports unit value[2]	1.40* (2.07)	1.78 (1.56)	1.12 (1.23)	-.30 (-.31)	-1.43 (-1.61)
Domestic line pipe unit value[2]	1.17* (2.97)	1.11 (1.67)	.85 (1.60)	0.61 (1.07)	-.33 (-.84)
Domestic seamless unit value[2]	1.94 (1.92)	2.91 (1.72)	3.47 (2.56)*	1.59 (1.09)	-3.96 (-1.62)
New construction	.33E-2* (3.25)	-.28E-3 (-.16)	.11E-2 (.78)	.10E-3 (.07)	[3] [3]
Steel unit value[2]	[3]	[3]	[3]	[3]	.94 (1.90)
Shift rate	[3]	[3]	[3]	[3]	.12* (5.82)
Manufacturing wage	[3]	[3]	[3]	[3]	-.34 (-1.52)
Constant	16.60* (32.46)	16.03* (18.65)	13.34* (19.40)	16.35* (22.02)	14.04* (13.22)
Observations	144	144	144	144	144

[1] T-statistics noted in parentheses. "*" indicates statistical significance at the 95 percent confidence level.
[2] Variable entered as a logarithm.
[3] Not applicable.

Source: Compiled by the staff of the U.S. International Trade Commission.

effect on the demand for imported pipe, but a significant effect on the demand for domestic product. The price (or unit value) of domestic pipe also has a significant negative relationship with the demand for imported pipe; this may be due to an unmeasured collinearity.

In the domestic supply equation, the other variables that were analyzed were the wage rate in manufacturing and the price of hot–rolled steel, as important components of the cost of manufacturing, and the shift rate measured as the average number of 8–hour shifts operated per week, up to a maximum of 20. The shift rate is a measure of capacity utilization and is strongly related to output. The manufacturing wage rate was negatively related to output, but of borderline significance.[38] The price of hot–rolled steel is positively related to standard welded pipe supply, indicating that the demand for standard welded pipe and for hot–rolled steel follows the same trends. In the absence of a supply model for hot–rolled steel, one cannot infer a causal relationship between the price of steel and the output of pipe. As discussed earlier, the standard welded pipe industry is a relatively small customer of the hot–rolled steel industry; therefore, changes in the pipe industry itself due to unfair practices and their remedies are not expected to have significant effects on the supplying steel industry. (Note, however, that among these remedies were a set of VRAs that applied to the steel industry as well as to the pipe industry.) Similarly, for its largest customers such as the construction industry, pipe is a relatively small input and not likely to have a significant effect. As the next section will show, however, there are quantifiable downstream effects when "downstream" is taken to mean the whole range of customers for standard welded pipe as well as the final consumers of the products made by these customers.

Computable Partial Equilibrium Analysis

This section provides aggregate simulations of the effect of a set of unfair practices and remedies on the standard welded pipe industry and its suppliers and customers, but does not attempt to isolate these small effects into wage, price, or investment effects for the related upstream and downstream industries. In order to get an estimate of the overall effect of the various standard welded pipe antidumping and countervailing duty investigations for which the Commission issued an affirmative finding, a comparative statics quantification was conducted as described in chapter 5. An attempt was made to model a situation in which all of the 1986 dumping cases on standard welded pipe are assumed to have taken place simultaneously. These consist of the AD cases involving imports from India, Thailand, and Turkey and the CVD case involving imports from Turkey. The 1984 cases were omitted, because the orders are no longer outstanding and the countries subject to these orders were investigated again in 1992 and placed under different orders. The 1992 cases were left out because they occurred during the ending year of the VRAs, although the elasticities estimated for those cases were applied to the present analysis. Individual country margins reported in table 13–2 were weighted by trade volumes to obtain an overall dumping margin of 15.78 percent and an overall subsidy margin of 6.58 percent. The import and domestic values and quantities were assumed to be those prevailing in 1985. Data on dumping margins, market shares, and elasticities used for the CPE analysis are reported in table 13–11.

Elasticities applied to the model were those that were estimated to prevail during the 1992 antidumping investigations,[39] which generally agreed with the qualitative descriptions of elasticities used in the 1986 case record. Factors used to evaluate these elasticities include the existence of alternative sources of product, excess manufacturing capacity, and alternative markets for supply elasticities. For demand elasticities, investigators look into the share of final product (such as new construction) accounted for by the subject product, the demand for the final product, the availability of substitutes for the subject product, and the business cycle. For elasticities of substitution, factors such as relative quality, availability, and length of purchase commitments are considered. Note that the elasticity of aggregate demand is assumed to lie between –0.5 and –0.75, while the demand elasticities of the individual pipe products in table 13–10 are much higher. This is consistent; demand for pipe from a particular source will be highly responsive to a change in the price of pipe from that source only, since most buyers have the option of buying pipe from other sources. If the price of pipe from all sources changes at once, demand will be much less responsive. The supply elasticity for

[38] Data for total employment and wages for the pipe industry itself were unavailable for the full 12-year period. Thus their effects on supply are not measured, nor are effects on employment and wages of changes in the market inferred. Note, however, that the next section describes changes in employment due to unfair practices and remedies in a partial equilibrium simulation.

[39] U.S. International Trade Commission, *Certain Circular, Welded Non-Alloy Steel Pipes and Tubes from Brazil, the Republic of Korea, Mexico, Romania, Taiwan, and Venezuela*, USITC publication 2564, 1992.

domestically produced pipe listed in table 13–10 is 6.89; this fits well inside the range of 5–10 given for this elasticity in table 13–11. Table 13–12 reports results from the use of elasticities at the midpoint of the ranges listed in table 13–11.

Effects of Unfair Trade Practices

As presented in table 13–12, the results of this analysis show the effects that could be considered to have resulted from the unfair practices that were found to exist in the AD/CVD investigations. The unfair pricing or subsidization is estimated to have caused prices of the domestic product to have been 0.2 percent lower than they otherwise would have been; output was 1.6 percent lower, and total revenue 1.9 percent lower as a result of the unfair market behavior. Domestic employment, assumed proportional to output, was reduced by 1.6 percent.

The 15.78–percent dumping margin and (trade weighted) 6.58–percent subsidy margin resulted in U.S. market prices for the unfair imports being 13.6 percent lower than they otherwise would have been. Quantities imported from these sources were an estimated 70.5 percent higher as a result, and their revenues were 48.7 percent higher. Imports from other sources (fair imports) were down by 1.6 percent, their revenues had fallen by 1.9 percent, and their prices were suppressed by 0.2 percent. Note, from table 13–11, that subject imports constitute a fairly small share of the market (less than 5 percent), so that changes in their price will have an attenuated effect on domestic and fairly imported products. In this simulation wages are not modeled. They can be assumed to be unchanged.

Effects of Remedies

The CPE model estimates the effects of antidumping and CVD remedies in two ways (table 13–12): (1) the combined effect of both unfair trade practices and remedies, relative to the fair values that would have existed in the absence of both, and (2) the effects of trade remedies alone relative to the actual values experienced in the base year, 1985. The model estimates that, if the remedies had been imposed in 1985, they would have raised subject import prices by 13.8 percent and reduced their import quantity by 44 percent. Additionally, the results suggest that the remedy would have suppressed foreign home–market prices, as pipe was diverted from the U.S. market. (This is the terms of trade effect discussed in chapter 5.) Thus, the remedy would not have restored the price of domestic products and the output and revenue of the domestic industry to the fair value levels.

In this model, when the effects of the remedy are added to the effects of the unfair practice and

Table 13-11
Standard welded pipes: Computable partial equilibrium analysis; assumed values of input variables, 1986

Input variable	Minimum	Maximum
Subsidy margin[1] (*percent*)	6.58	[2]
Dumping margin[1] (*percent*)	15.78	[2]
Average U.S. tariff rate (*percent*)	2.0	[2]
Transportation ratio (*percent*)	10.0	[2]
Quantities for U.S. market:		
Domestic quantity (*tons*)	923,896	[2]
Subject quantity (*tons*)	85,104	[2]
Nonsubject quantity (*tons*)	1,047,830	[2]
Values for U.S. market:		
Domestic value (*$1,000*)	434,025	[2]
Subject value (*$1,000*)	33,981	[2]
Nonsubject value (*$1,000*)	440,940	[2]
U.S. market elasticities (*absolute values*):		
Substitution:		
Domestic/subject	3	5
Domestic/nonsubject	3	5
Subject/nonsubject	3	5
Aggregate demand	0.5	0.75
Supply:		
Domestic	5	10
Subject import	5	10
Nonsubject import	5	10

[1] Trade-weighted average for subject countries.
[2] Not applicable.

Source: Compiled by the staff of the U.S. International Trade Commission.

Table 13-12
Standard welded pipes: Results of computable partial equilibrium analysis (estimated effect on U.S. market of unfair trade practices and remedies), base year 1986[1]

Item	Unfair trade practice	Unfair trade practice and remedy	Remedy
	—(*Change from fair value*)[2]—		(*Change from actual value*)[3]
Impact on industry *(percent)*:			
Domestic price	-0.2	0.0	0.2
Domestic output	-1.6	-.1	1.5
Domestic revenue	-1.9	-.2	1.7
Domestic employment	-1.6	-.1	1.5
Impact on imports *(percent)*:			
Subject import price	-13.6	-1.1	13.8
Subject import quantity	70.5	6.2	-44.0
Subject import revenue	48.7	4.3	-33.7
Nonsubject import price	-.2	0	.2
Nonsubject import quantity	-1.6	-.1	1.5
Nonsubject import revenue	-1.9	-.2	1.7
Welfare effects (*1,000 dollars*):			
Gain to consumers	4,728	431	-4,436
Benefit to producers	-948	-82	889
Net welfare effects	3,780	349	-3,548

[1] The estimated effects reported are the results of the Commission's CPE model using the midpoint values of parameter ranges listed in table 13-11. This model accounts only for the short term effect of unfair practices and remedies of cases with affirmative determinations in the base year, as discussed in the text.

[2] The "fair values" are the values estimated by the model to have been in place without the effect of the unfair trade practice.

[3] The "actual values" are the market values during the base year.

Source: Estimated by the staff of the U.S. International Trade Commission.

compared with the fair value, domestic prices (which had changed by –.2 percent as a result of the unfair practices) are left, after the remedy, at essentially the fair market value. Subject imports, 13.6 percent lower after the unfair practices, are returned by the remedy to a level 1.1 percent below the fair value.

Net Welfare Effects

The CPE model also produces estimates of the effect of the dumping activity on the national economy (table 13–12). The simulated cost of unfair trade (prior to the 1986 investigations) to producers and their suppliers was about $948,000 per year, as mentioned above. Consumers (purchasers) of standard pipe, however, benefited from the lower prices of the unfair imports by an estimated $4.7 million. However, as a result of the AD and CVD remedies' impact on prices and quantities, the consumers gain would be reduced to $431,000, while the loss to producers would be reduced to $82,000.

By making an intermediate product available to downstream producers at a lower price, dumping and subsidization will generally increase national income to the benefit of consumers and at the expense of the domestic producers of the product. In these estimates, the net effect on national income was about $3.7 million per year. Again, the cost to producers of standard pipe was about $948,000, offsetting the benefit to consumers of about $4.7 million. The cost to producers is shared by producers of standard pipe, and their suppliers (steel makers, equipment makers, and others). Consumers are considered to be all purchasers of the product, including construction firms, other intermediate users, and the final users of the pipe and the products in which pipe is used. Note that these are all partial equilibrium effects and do not account for indirect effects of the unfair prices on different sectors of the economy. The imposition of remedies for unfair trade practices will reduce but not eliminate the effects of the practices on the economy.

It is unlikely that fluctuations in the demand or supply of standard pipe had substantial effects on its immediate purchasers or suppliers; standard pipe is a relatively small customer of hot–rolled steel, and also a small component of the products of most of its customers, principally in the construction industry.

CHAPTER 14
Case Study: Bearings

History of Title VII Investigations

This case study covers duty orders on tapered roller bearings (TRBs) and ball bearings (BBs), a subset of bearings covered in the investigations on antifriction bearings (other than tapered roller bearings) (AFBs).[1] Both Commerce and the Commission used the term "AFBs" to describe the group of bearings other than TRBs covered in their investigations. AFBs consist of the following:

- Ball bearings (BBs)
- Spherical roller bearings (SRBs) (not included in duty orders, except order on Singapore)
- Cylindrical roller bearings (CRBs)
- Needle roller bearings (NRBs) (not included in duty orders, except order on Singapore)
- Plain bearings (included in the preliminary investigations, but not in the final investigations or in the duty orders)
- Spherical plain bearings (SPBs)
- Slewing rings (not included in the duty orders)

This case study does not analyze bearings other than TRBs and BBs either because the Commission made negative injury determinations with respect to those bearings and therefore they were not covered by duty orders (SRBs, NRBs, plain bearings, and slewing rings) or because U.S. production is relatively small and a complete series of data is not available (CRBs[2] and SPBs). The title VII investigations covered by this case study, as well as the products subject to duty orders are shown in table 14-1.

Tapered Roller Bearings Industry

First petition year (1986):	
Shipments *(million dollars)*	778
Import market share by value *(percent)*	19
AD/CVD history:	
AD investigations *(number)*	9
CVD investigations *(number)*	0
First petition year	1986
First AD/CVD order year	1987
Most recent petition year	1986

Ball Bearings Industry

First petition year (1988):	
Shipments *(million dollars)*	1,838
Import market share by value *(percent)*	26
AD/CVD history:	
AD investigations *(number)*	23
CVD investigations *(number)*	3
First petition year	1988
First AD/CVD order year	1989
Most recent petition year	1991

On August 25, 1986, Timken filed a petition[3] with the Commission and Commerce alleging that the TRB

[1] The petitioner in the investigations TRBs was The Timken Co. (Timken), of Canton, OH. Timken is not only the largest U.S. producer of TRBs, but also a producer of specialty and bearing-quality steel for the production of bearings. The petitioner in the investigations on AFBs was the Torrington Co. (Torrington), of Torrington, CT, the largest U.S. producer of ball bearings (BBs). Torrington is a subsidiary of Ingersoll-Rand Co., which has bearing production facilities of its own.

[2] Selected trend data for CRBs collected in response to the Commission's questionnaires are presented throughout this case study.

[3] Timken filed its 1986 petition, in part, because the company believed an earlier 1976 AD order on TRBs from Japan was ineffective in providing relief. The 1976 order was limited to TRBs having an outside diameter of

Table 14-1
Tapered roller bearings and antifriction bearings (other than tapered roller bearings) investigations covered by the case study, by sources, 1986 and 1988

Category/source	Commission investigation No.	Type of order	Products[1] subject to duty order
TRBs (initiated in August 1986):			
Hungary	731-TA-341(F)	AD	TRBs
Italy	731-TA-342(F)	AD	TRBs
Japan	731-TA-343(F)	AD	TRBs over four inches in outside diameter
China	731-TA-344(F)	AD	TRBs
Romania	731-TA-345(F)	AD	TRBs
Yugoslavia	731-TA-346(F)	AD	TRBs
AFBs (initiated in April 1988):			
Germany	731-TA-391(F)	AD	BBs, CRBs, and SPBs
France	731-TA-392(F)	AD	BBs, CRBs, and SPBs
Italy	731-TA-393(F)	AD	BBs and CRBs
Japan	731-TA-394(F)	AD	BBs, CRBs, and SPBs
Romania	731-TA-395(F)	AD	BBs
Singapore	731-TA-396(F)	AD	BBs
Sweden	731-TA-397(F)	AD	BBs, CRBs, and SPBs
Thailand	731-TA-398(F)	AD	BBs
United Kingdom	731-TA-399(F)	AD	BBs, CRBs, and SPBs
Singapore	303-TA-19(F)	CVD	BBs, SRBs, CRBs, NRBs and SPBs
Thailand	303-TA-20(F)	CVD	BBs

[1] All products include parts thereof.

Source: Compiled by the staff of the U.S. International Trade Commission from Commission records and notices from the *Federal Register.*

industry was materially injured and was threatened with material injury by reason of LTFV imports from Hungary, Italy, Japan, China, Romania, and Yugoslavia.[4] The Commission made final affirmative determinations with respect to imports of TRBs from Hungary, Romania, and China in June 1987; from Italy and Yugoslavia in August; and from Japan in September.[5] The factors cited by the Commission in its determinations included deteriorating performance indicators (declining production, shipments, capacity utilization, employment, and profitability) and a significant volume and penetration of imports that increased or remained constant.[6] After the final determinations, the Commission issued a negative remand determination on TRBs from Hungary that was later reversed.[7] In 1990, the Commission declined to

[3]—*Continued*
4 inches or less, and excluded parts. Commerce revoked the order on one large exporter and did not determine preliminary LTFV margins on two other major exporters until March 1989. The Timken Co., official submission to the USITC, Sept. 13, 1994, p. 9. In addition, during 1983-84, the Commission conducted AD investigations Nos. 731-TA-120 through 122 on imports of freightcar journal TRBs from Germany, Italy, and Japan; Commerce made a negative LTFV determination on imports from Germany and the Commission made negative injury determinations on imports from Italy and Japan.

[4] 51 F.R. 33283-33286.

[5] 52 F.R. 22399, 29902, and 36847.

[6] U.S. International Trade Commission (USITC), *Tapered Roller Bearings and Parts Thereof, and Certain Housings Incorporating Tapered Rollers From Hungary, the People's Republic of China, and Romania* (investigations Nos. 731-TA-341, 344, and 345 (final)), USITC publication 1983, 1987, pp. 3, 10, 12, 14, and 16; USITC, *Tapered Roller Bearings and Parts Thereof, and Certain Housings Incorporating Tapered Rollers From Italy and Yugoslavia* (investigations Nos. 731-TA-342 and 346 (final)), USITC publication 1999, 1987, pp. 4 and 18; and USITC, *Tapered Roller Bearings and Parts Thereof, and Certain Housings Incorporating Tapered Rollers From Japan* (investigation No. 731-TA-343 (final)), USITC publication 2020, 1987, pp. 4, 11, and 12.

[7] On Dec. 21, 1989, the Commission made a unanimous negative remand determination on TRBs from Hungary because in July 1989, the U.S. Court of International Trade (CIT) reversed the Commission's earlier cumulative injury determination. However, the AD orders remained in place because the U.S. Court of Appeals for the Federal Circuit reversed the CIT's remand decision on Nov. 20, 1990. See Marsuda-Rodgers International vs. the United States, vol. 923, F.2d 871 (table).

institute a 751(b) review under the Act on TRBs from Romania.[8]

During June-October 1987, Commerce issued AD orders on TRBs from the subject sources.[9] Margins from those orders are shown in table 14-2. In general, the administrative reviews conducted by Commerce resulted in the imposition of lower margins relative to the original ones. Commerce conducted few reviews of the AD orders on Italy, Romania, and Yugoslavia[10] and delayed review determinations of AD orders on China.

On March 31, 1988, Torrington filed petitions with the Commission and Commerce alleging material injury and the threat of material injury by reason of subsidized imports of AFBs from Singapore and Thailand and by LTFV imports of AFBs from Germany, France, Italy, Japan, Romania, Singapore, Sweden, Thailand, and the United Kingdom.[11] Prior to the AFB investigations, in July 1987, Commerce initiated an investigation under section 232 of the Trade Expansion Act of 1962, as amended,[12] that required the agency to report to the President if imports of antifriction bearings threatened the national security. In January 1989, the President decided that no action was necessary to adjust the level of imports.[13] During the AFB investigations, in August 1988, the Department of Defense (Defense) implemented a Defense Federal Acquisition Regulation Supplement (DFARS) restricting purchases of antifriction bearings to those wholly manufactured in the United States or Canada.[14]

In the final AFB investigations, the Commission determined that there were six separate like products and six separate industries producing those products.[15] On May 8, 1989, the Commission made affirmative determinations on imports of BBs from all subject sources and on imports of CRBs and SPBs from certain subject sources.[16] In its affirmative determinations, the Commission cited the following factors: (1) a consistent decline in the profitability of the BB, CRB, and SPB industries; (2) evidence of underselling in the BB industry; (3) evidence of price depression by subject imports in the CRB industry; (4) significant and increasing volume of subject imports; and (5) rising market penetration by subject imports.[17]

On May 15, 1989, Commerce issued AD and CVD orders[18] for the AFBs that were covered by the Commission's affirmative final determinations (table 14-3). Earlier, on May 3, 1989, Commerce issued a CVD order on imports of BBs, SRBs, CRBs, NRBs, and SPBs from Singapore since no injury determination was required by the Commission.[19] In the final CVD order on BBs from Thailand, the AD cash deposit rate of 18.77 percent, was adjusted by subtracting the CVD margin of 21.54 percent, resulting in a cash deposit rate of zero.[20] The first three administrative reviews[21] conducted by Commerce on the AFB duty orders resulted in a decline in the margins from those in the original orders.

On February 13, 1991, Torrington petitioned for further relief on ball bearings. The petition alleged LTFV imports from Argentina, Austria, Brazil, Canada, Hong Kong, Hungary, Mexico, China, Poland, Korea, Spain, Taiwan, Turkey, and Yugoslavia (investigations Nos. 731-TA-498-511 (preliminary)) and countervailable imports from Turkey

[8] On Feb. 28, 1990, the Commission stated that insufficient "changed circumstances" existed to warrant an investigation. 54 F.R. 53380-53381.

[9] AD orders on TRBs from China were issued on June 15, 1987 (52 F.R. 22667); from Hungary on July 1 and from Romania on June 9 (52 F.R. 23319-23321); from Italy and Yugoslavia on Aug. 14 (52 F.R. 30417); and, from Japan on Oct. 6 (52 F.R. 37352-37353).

[10] In mid-1993, Commerce announced its intent to revoke the AD order on TRBs from Yugoslavia, and in mid-1994, to revoke the AD order on TRBs from Romania, because in both instances no reviews had been requested during the previous four administrative reviews. However, the orders were not revoked because of objections from the U.S. industry.

[11] 53 F.R. 15073-15083.

[12] 19 U.S.C. 1862.

[13] 54 F.R. 1974.

[14] 53 F.R. 29333. See also 48 C.F.R. 225.70.

[15] Each like product included parts thereof.

[16] 54 F.R. 21488-21490.

[17] U.S. International Trade Commission, *Antifriction Bearings (Other Than Tapered Roller Bearings) and Parts Thereof From the Federal Republic of Germany, France, Italy, Japan, Romania, Singapore, Sweden, Thailand, and the United Kingdom* (investigations Nos. 303-TA-19 and 20 (final) and 731-TA-391 through 399 (final)), USITC publication 2185, 1989, pp. 67-72.

[18] 54 F.R. 19130-19137 and 20900-20912.

[19] Under section 303 of the Act, the Commission was required to make an injury determination on countervailable imports from Singapore that were eligible for duty free treatment. However, on Jan. 1, 1989, Singapore lost its eligibility for duty-free treatment under the Generalized System of Preferences. The Commission was thus not required to make an injury determination. 54 F.R. 19127.

[20] 54 F.R. 20909. Article VI.5 of the GATT provides that no product shall be subject to both AD and CVD duties and is implemented in the United States under section 772(d)(1)(D) of the Act. 56 F.R. 31767.

[21] The results of the fourth final administrative review were published in the *Federal Register* on Feb. 28, 1995 (60 F.R. 10900-10968).

Table 14-2
Final AD order and final administrative review cash deposit rates for tapered roller bearings, by sources, May 1987-January 1994

Country/Commission investigation, date rates published,[1] and original respondent	Duty order margins	Administrative reviews					
		No. 1	No. 2	No. 3	No. 4	No. 5	No. 6
Hungary (731-TA-341):							
Date published	May 1987	May 1990	Nov. 1990	Aug. 1991	Sept. 1993	Jan. 1994	Jan. 1994
Magyar Gördülöcsapágy Müvek (MGM)[2] *(percent)*	7.42	5.36	1.84	1.68	6.66	[3]	[3]
Italy (731-TA-342):							
Date published	June 1987	Mar. 1989	[4]	Sept. 1991	Aug. 1992	[4]	[4]
RIV-SKF Officine di Villar Perosa S.p.A (RIV-SKF) *(percent)*	124.75	[5]	[4]	[4]	[4]	[4]	[4]
All other *(percent)*	124.75	[5]	[4]	[6]49.06	[6]36.85	[4]	[4]
Japan (731-TA-343):							
Date published	Oct. 1987	Aug. 1991	Feb. 1992	Feb. 1992	Dec. 1993	Dec. 1993	[7]
Koyo Seiko K.K. *(percent)*	70.44, [8]36.21	35.20	24.88	23.44	14.65	19.79	[7]
NTN Toyo Bearing Co. Ltd., other than exports to Caterpillar *(percent)*	47.05,	36.53	36.53	36.53 [8]36.53	14.34	13.86	[7]
NTN (Caterpillar) *(percent)*	[9]	10.17	38.89	45.95, [10]21.49	[4]	[4]	[7]
All other *(percent)*	47.57, [8]36.52	35.20	40.37	45.95, [10]21.49	36.52	36.52	[7]
China (731-TA-344):							
Date published	May 1987	Jan. 1991	Jan. 1991	Dec. 1991	[7]	[7]	[7]
Premier Bearing and Equipment, Ltd. *(percent)*	.97, [11].97	.97	.97	.60	[7]	[7]	[7]
China National Machinery and Equipment Import and Export Corporation (CMEC) *(percent)*	[12], [11]4.69	[13]	[13]	0	[7]	[7]	[7]
All other *(percent)*	.97, [11]2.96	.97	.97	8.83	[7]	[7]	[7]

See footnotes at end of table.

Table 14-2
Final AD order and final administrative review cash deposit rates for tapered roller bearings, by sources, May 1987-January 1994

Country/Commission investigation, date rates published,[1] and original respondent	Duty order margins	Administrative reviews					
		No. 1	No. 2	No. 3	No. 4	No. 5	No. 6
Romania (731-TA-345):							
Date published	May 1987	Jan. 1991	Aug. 1991	(4)	(4)	(4)	(4)
Technoimportexport (*percent*) ..	8.70	13.89	0	(4)	(4)	(4)	(4)
Yugoslavia (731-TA-346):							
Date published	June 1987	(4)	(4)	(4)	(4)	(4)	(4)
Unis Ro Proment (*percent*)	33.61	(4)	(4)	(4)	(4)	(4)	(4)
All other (*percent*)	33.61	(4)	(4)	(4)	(4)	(4)	(4)

[1] Date margins were published by Commerce in the *Federal Register.*
[2] No all other category established, since MGM accounted for virtually all exports to the United States.
[3] Review terminated at the request of Timken and MGM, in order to conserve the resources of both parties. 59 F.R. 2594.
[4] Commerce did not conduct a review, since none was requested. The all other rate from the original order or last administrative review remained in effect.
[5] Review terminated at RIV-SKF's request. The all other rate from the original order or last administrative review remained in effect.
[6] Margin for Gnutti Carlo S.p.A., a new exporter; this margin was applicable to all other manufacturers/exporters except RIV-SKF.
[7] Review in progress.
[8] Amended because of clerical errors. 52 F.R. 47955.
[9] In the first administrative review, sales by NTN Toyo Bearing were broken into two categories: those to Caterpillar Inc. and those to other customers.
[10] Amended because of clerical errors. 57 F.R. 9104.
[11] Amendment to AD order in accordance with remand order from CIT. 55 F.R. 6669.
[12] Commerce excluded CMEC since no margins were found on its exports to the United States. 52 F.R. 19748-19751.
[13] Since the amended AD order for CMEC was not published until Feb. 26, 1990, Commerce did not include CMEC in this administrative review. 55 F.R. 41735.

Source: Compiled by the staff of the U.S. International Trade Commission from the *Federal Register.*

(investigation No. 701-TA-307 (preliminary)). On April 1, 1991, the Commission made negative preliminary determinations in all these investigations.

Scope of Investigation

Subject and Substitute Products

The subject TRBs and most AFBs are types of rolling-element bearings used to reduce friction while supporting heavy loads in virtually all machinery and transportation vehicles. Because bearings are incorporated into so many products, Commerce has issued numerous scope determinations on subject TRBs and AFBs. These determinations have broadened the scope of subject merchandise since the duty orders were set in place.[22]

There are no substitutes for ball and roller bearings, except to design the bearings out of the product. Bearings might be replaced or their numbers reduced by eliminating moving parts. The interchangeability of different types of bearings is slight, and occurs in the early design stage of a product. Design choices, however, have allowed BBs to replace TRBs. For example, as U.S. automobile producers shifted automobile designs to front-wheel drive from rear-wheel drive in the mid-1980s, they

[22] For example, Commerce determined ceramic bearings to be subject merchandise. Scope determinations are published in the *Federal Register.*

Table 14-3
Final AD and CVD order and final administrative review cash deposit rates for antifriction bearings (other than tapered roller bearings), by investigation type, product, source, original respondents, and by review

(Percent)

Investigation type, product, source, and original respondent	Duty order margins issued in May 1989	Administrative review final margins, issued in— July 1991, for Nov. 1988 through April 1990	June 1992, for May 1990 through April 1991	July 1993, for May 1991 through April 1992
	Antidumping			
Ball bearings and parts:				
Germany (731-TA-391):				
FAG Kugelfischer Georg Schaefer KGaA	70.41	11.93	18.41, [1]17.24	11.81
Georg Meuller Numberg AG	35.43	2.84	.29	.07
INA Walzlager Schaeffler	31.29	10.56	12.11	22.74
SKF Gmbh (including all relevant affiliates)	132.25	5.25	12.40, [1]11.44	14.81
All other	68.89	51.56	24.02,	68.89
France (731-TA-392):				
INA Roulements S.A.	66.18	66.42	66.42	[2]
SKF	66.42	7.79	9.03, [1]8.37	2.08
SNR Roulements S.A.	56.50	2.03	11.27, [1]15.96	4.47, [3]1.08
All other	65.13	7.79	14.13, [1]15.96	65.13
Italy (731-TA-393):				
FAG	68.29	4.40	6.14 [1]4.94	5.95, [4]5.19
SKF	155.99, [5]69.99	4.06	10.00, [1]9.31	4.46
All other	155.57	11.67	10.00	155.57
Japan (731-TA-394):				
Koyo Seiko Co. Ltd	73.55	9.82	8.89, [1]6.85	7.55
Minebea Co. Ltd	106.61	106.61	106.61	[2]
Nachi-Fujikoshi Corp	48.69	10.72	7.85, [1]7.86	5.02
NSK	42.99	6.33	7.22, [1]4.62	[6]23.95
NTN	21.36	14.23	2.24, [1]2.26	2.60
All other	45.83	23.88	16.71	45.83
Romania (731-TA-395):				
Technoimport export	39.61	1.85	0	[7]
All other	39.61	1.85	0	39.61
Singapore (731-TA-396):				
NMB/Pelmec	25.08	[8]1.88	4.49	8.14
All other	25.08	[8]1.88	4.49	25.08
Sweden (731-TA-397):				
SKF	180.00, [5]105.92	6.43	8.27, [1]7.81	7.79
All other	180.00	6.43	8.27, [1]7.81	180.00
Thailand (731-TA-398):				
NMB/Pelmec	[9]0	[10]0	.50	.18
All other	[9]0	[10]0	.50	0
United Kingdom (731-TA-399):				
RHP	44.02	15.96	16.21	[6]49.14
SKF	61.14	4.92	14.24, [1]8.41	[11]
All other	54.27	20.89	46.53, [1]41.99	54.27
Cylindrical roller bearings and parts thereof:				
Germany (731-TA-391):				
FAG Kugelfischer Georg Schaefer KGaA	52.43	3.90	7.63	17.62
INA Walzlager Schaeffler	52.43	14.56	17.38	13.47
SKF Gmbh (including all relevant affiliates)	76.27	6.42	10.92	7.17
All other	55.65	14.56	24.82, [1]23.52	55.65
France (731-TA-392):				
INA	11.03	18.37	18.37	[2]
SNR	18.37	1.08	18.37	12.29, [3]0.67
All other	17.31	10.63	6.52	17.31

See footnotes at end of table.

Table 14-3—*Continued*
Final AD and CVD order and final administrative review cash deposit rates for antifriction bearings (other than tapered roller bearings), by investigation type, product, source, original respondents, and by review

(Percent)

Investigation type, product, source, and original respondent	Duty order margins issued in May 1989	Administrative review final margins, issued in— July 1991, for Nov. 1988 through April 1990	June 1992, for May 1990 through April 1991	July 1993, for May 1991 through April 1992
		Antidumping—*Continued*		
Cylindrical roller bearings and parts thereof—Continued:				
Italy (731-TA-393):				
SKF	212.45	1.87	0	25.88
All other	212.45	17.36	13.52	212.45
Japan (731-TA-394):				
Koyo Seiko Co. Ltd	51.21	1.45	1.40	2.26
Nachi-Fujikoshi Corp	4.00	10.50	22.73	2.30
Nippon Seiko K.K. (NSK)	12.28	51.82	14.34, [1]12.69	[6]31.40
NTN	9.30	15.82	2.63	1.05
All other	25.80	51.82	22.73	25.80
Sweden (731-TA-397):				
SKF	13.69	4.12	6.20	5.35
All other	13.69	4.12	6.20	13.69
United Kingdom (731-TA-399):				
RHP	43.44	31.07	48.29	[6]45.35
All other	43.44	31.07	48.29	43.36
Spherical plain bearings and parts thereof:				
Germany (731-TA-391):				
FAG Kugelfischer Georg Schaefer KGaA	74.88	10.80	1.90	2.56
SKF Gmbh (including all relevant affiliates)	118.98	3.69	1.92	8.37
All other	114.52	10.80	1.92	114.52
France (731-TA-392):				
SKF	39.00	26.31	0	0
All other	39.00	26.31	42.79	39.00
Japan (731-TA-394):				
Minebea Co. Ltd	84.26	92.00	92.00	([2])
NTN Toyo Bearing Co. Ltd	92.00	.66	.50	6.80
All other	84.33	3.08	.57	84.33
		Countervailing		
Antifriction bearings (other than tapered roller bearings):				
Singapore (303-TA-19):				
NMB/Pelmec	2.34	[12]0, [12]2.97	[13]0	[14]0
All other	2.34	[12]0, [12]2.97	[13]0	[14]2.01
Ball bearings and parts thereof:				
Thailand (303-TA-20):				
NMB/Pelmec	21.54	([15])	[16]8.51	[17]7.07
All other	21.54	([15])	[16]8.51	[17]7.07

[1] Amended because of clerical errors, 57 F.R. 59081.

[2] No review of this company was requested.

[3] Amended because of clerical errors, 58 F.R. 51055.

[4] Amended because of clerical errors, 58 F.R. 53914.

[5] Amended as a result of remand order from the U.S. Court of International Trade, 58 F.R. 12932.

[6] Cash deposit rate published Aug. 9, 1993 (58 F.R. 42289), after U.S. Court of International Trade lifted its restraint prohibiting Commerce from publishing this rate.

[7] No U.S. sales during period of review.

[8] The AD margins for NMB/Pelmec and all other were 4.85 percent and were adjusted by CVD margins, 2.97 percent for NMB/Pelmec and all other, resulting in cash deposit rates of 1.88 for all exporters. 56 F.R. 31761.

Table 14-3—Footnotes—*Continued*

[9] The AD margin was 18.77 percent and was adjusted by subtracting the CVD rate resulting in a cash deposit rate of zero. 54 F.R. 20909.

[10] The AD margin was 0.54 percent for NMB/Pelmec and all other and was adjusted by subtracting the CVD margin in effect, 21.54 percent, resulting in a cash deposit rate of zero. 56 F.R. 31767-31768.

[11] Review terminated because SKF withdrew its request for review.

[12] Commerce determined the bounty or grant was zero percent ad valorem during Sept. 6, 1988-Dec. 31, 1988, and 2.97 during Jan. 1, 1989-Dec. 31, 1989. 56 F.R. 26384.

[13] Reviews cover the period Jan. 1, 1990-Dec. 31, 1990. 57 F.R. 13333.

[14] Reviews cover the period Jan. 1, 1991-Dec. 31, 1991. 58 F.R. 47122.

[15] No reviews were conducted for the period Sept. 1988-Dec. 1989.

[16] Reviews cover the period Jan. 1, 1990-Dec. 31, 1990. 57 F.R. 26647.

[17] Reviews cover the period Jan. 1, 1991-Dec. 31, 1991. 58 F.R. 36394.

Source: Compiled by the staff of the U.S. International Trade Commission from the *Federal Register.*

were able to move from using two TRBs per wheel to one BB per wheel.[23]

Description of the Upstream Industry

The bearing-quality steel industry is the upstream industry supplying the U.S. bearings industry.[24] Bearing-quality steel has either a high carbon or alloy content and is made to high levels of purity. Production of bearing-quality steel is concentrated among a few U.S. and foreign producers. The industry also produces significant amounts of specialty steel for other markets. In 1993, U.S. bearing-quality steel production was approximately $800 million.[25]

During 1982-92, the U.S. bearing-quality steel industry benefited from the VRAs on steel,[26] as some U.S.- and foreign-owned BB producers were forced to purchase domestic rather than imported steel.[27] In addition, the AD/CVD orders on bearings had a small, positive impact on the bearing-quality steel industry. After the issuance of duty orders on TRBs in 1987 and AFBs in 1989, Timken, a major producer of bearing-quality steel and the petitioner in the TRB investigations, noted that U.S. subsidiaries of foreign bearings producers, particularly of Japanese producers, began to purchase U.S. bearing-quality steel and other inputs.[28] The increase in shipments of bearing-quality steel, due in part to the duty orders on bearings, helped retain capacity in the bearing-quality steel industry in the United States.[29] Specific estimates as to the effect of the orders on employment, wages, income, production, and investments in the U.S. bearing-quality steel industry were unavailable.[30]

Description of Downstream Industry

Virtually anything that rolls, moves, or has moving parts needs bearings, resulting in extensive downstream linkages into the general economy. Bearings are used in finished products such as automobiles and power tools; and in intermediate products, such as transmissions, electric motors, and clutches. The major markets for TRBs are the motor-vehicle and related equipment industries and the construction and farm, rolling mill, well-drilling, and railroad machinery industries. The markets for BBs encompass a greater number of downstream industries, with the major markets being the motor vehicles and related equipment, industrial machinery,

[23] USITC, *Tapered Roller Bearings and Parts Thereof, and Certain Housings Incorporating Tapered Rollers From Italy and Yugoslavia*, USITC publication 1999, p. A-20.

[24] Bearing producers also purchase flat-rolled steel for producing retainers and cages, seals, lubricants, and castings from outside companies.

[25] Estimated by the staff of the U.S. International Trade Commission based on interviews with industry officials and company annual reports. The estimate includes captive production by Timken.

[26] VRAs on steel products were negotiated in 1982 with the EU, and were expanded to include 19 other countries in 1984; the VRAs expired in March 1992.

[27] Responses to the Commission's producers' questionnaires.

[28] The Timken Co., official submission to the USITC, Sept. 13, 1994, pp. 53-54.

[29] Official of CSC Industries, Inc., telephone interview by USITC staff, Dec. 19, 1994.

[30] According to bearing-quality steel producers, data to estimate such effects are not readily available, and if such data were available, the effects of the duty orders would be masked by the increase in demand and the VRAs.

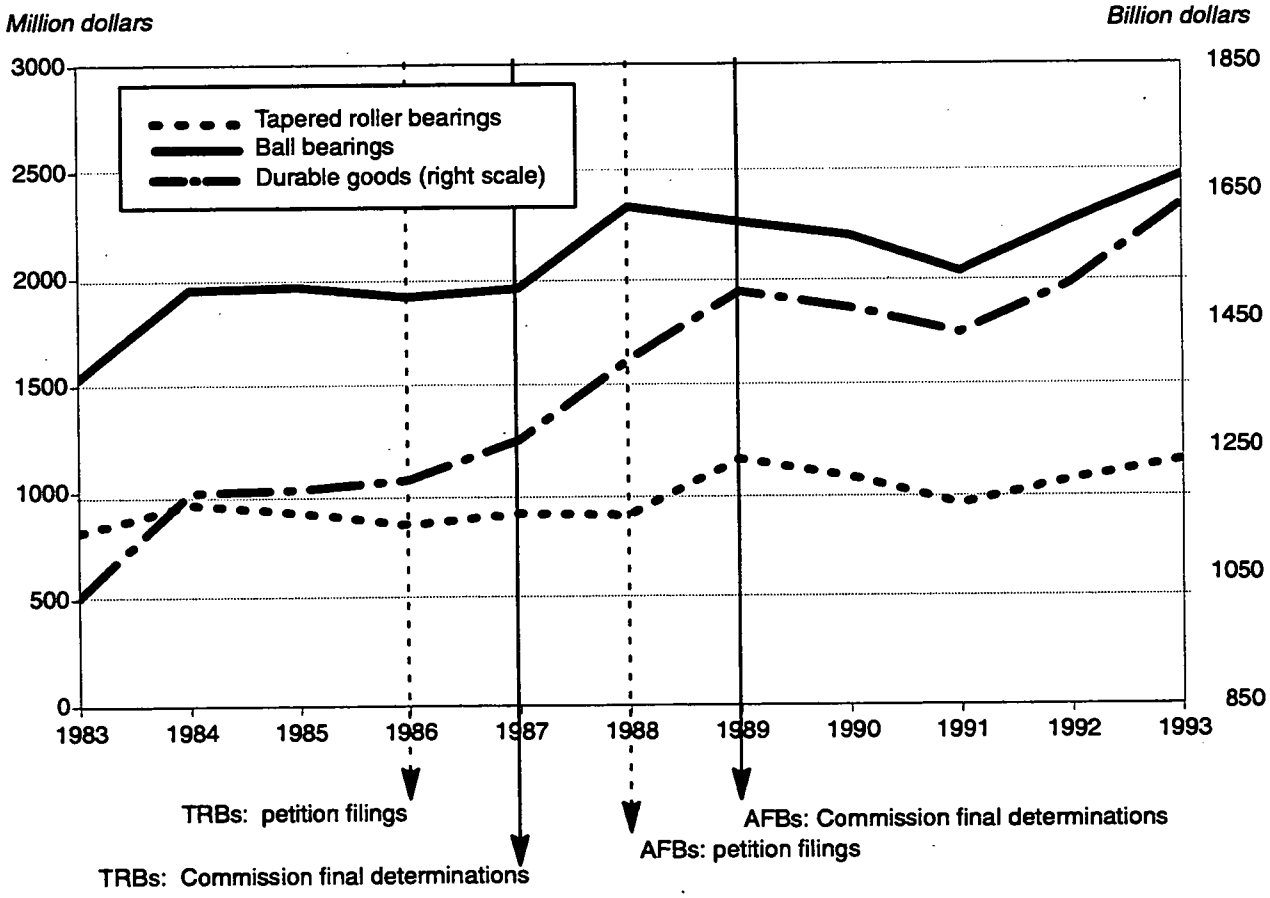
and aerospace industries. The motor vehicles and motor-vehicle-related markets together account for 40 to 50 percent of the U.S. market for bearings.[31]

U.S. consumption of TRBs and BBs follow the trend of the general economy and, in particular, the trend of U.S. manufacturers' shipments of durable goods (figure 14-1). This is particularly so for BBs, since they are used in a wide range of machinery and transportation applications. However, consumption of TRBs follows the demand trends of fewer industries. After the recessions in 1980 and 1981-82, the economy began a long expansion through mid-1990. The U.S. economy then entered a recession during July 1990 through March 1991, after which the current expansion began.

U.S. consumption of TRBs, by value, remained flat in 1988 because of depressed pricing; however, consumption of TRBs by quantity peaked in 1988; consumption of TRBs by value peaked in 1989. U.S. consumption of BBs peaked in 1988, which was 1 year before the peak in U.S. producers' shipments of durable goods.

[31] General Motors is the only U.S. automobile producer to have integrated bearing production through its Delphi Chassis Systems (formerly Delco Chassis, and during the AFB investigations, known as New Departure Hyatt) subsidiary that produces wheel hubs. Federal-Mogul, an automobile parts producer, also produces BBs for internal consumption as well as for the aftermarket.

Figure 14-1
Apparent U.S. consumption of tapered roller bearings and ball bearings, and U.S. producers' shipments of durable goods, 1983-93



Source: Compiled from official statistics of the U.S. Department of Commerce.

During the AFB investigations, as demand for bearings rose, prices of BBs also began to rise. Delivery delays[32] and long lead times for AFBs from bearings suppliers resulted in some "panic" buying by original-equipment manufacturers (OEMs) in order to secure bearings for OEM production lines or aftermarket sales.[33] This panic buying mainly affected OEMs, other than the large automobile producers.[34] Hence, many OEMS began to purchase imported bearings in order to secure shorter delivery times and, if possible, to lower prices, without compromising product quality. On the basis of data from the Commission's producers' questionnaires, U.S. producers of bearings believe that bearings consumers will purchase either domestic and imported bearings when there is a 10-percent price differential.[35]

U.S. producers of AFBs also raised prices after Commerce published preliminary LTFV margins in November 1988 and again after the AD/CVD duty orders in May 1989. U.S. importers also raised prices to match some of the price increases of domestic producers and also to pass on some of the cost of the AD/CVD duties.

Bearings account for about 1 percent or less of the cost of products such as automobiles, trucks, construction and agricultural machinery, and aircraft engines. Bearings account for 3 to 5 percent of many subassemblies, such as clutches, drive axles, transmissions, generators, and water pumps. For some products, such as electric motors and power handtools, bearings account for 10 to 15 percent of the product's cost. The other areas most affected by price increases and the pass-through of AD/CVD duties were the distributor market and the OEM aftermarket. In these markets, sales volumes are low, and the lack of an alternative source for a particular bearing allows suppliers to readily increase prices to distributors and OEM aftermarket resellers.

U.S. bearings purchasers adjusted to the price increases and the AD/CVD duties in several ways, including the following: (1) leveraging buying power, (2) obtaining individual company margins for imports, (3) using the "Roller Chain" rule[36] regarding imports, (4) raising productivity to absorb bearings costs, and (5) passing the cost through to customers. Responses from the Commission's purchasers'/importers' questionnaires from U.S. automobile producers indicate that AFB prices rose by about 10 to 15 percent after the AD and CVD orders were issued. However, most of these responses indicated that the companies did not know whether to attribute the price increases to the duty orders or to other factors, such as demand and supply conditions or inflation. Automobile producers in particular have pressured their suppliers to limit price increases[37] and have been able to do this by using long-term (typically 3-year) contracts with bearings producers.

Several importers[38] that were also bearings consumers and/or resellers obtained their own duty margins through administrative reviews. During the TRBs reviews, Caterpillar was the only importer to obtain its own margins.[39] During the reviews of BBs, CRBs, and SPBs, most of the companies that obtained individual company margins were aerospace products producers, such as Pratt & Whitney and SNECMA. For many of the named aerospace companies, the margins were substantially lower than the all other rate. For some firms, however, the margins were higher than the all other rate. Among the automobile producers, only Honda obtained margins, which ranged between zero and 2.2 percent.

In many instances, OEM purchasers of bearings had to absorb price increases and the AD/CVD duties passed-through by bearings producers.[40] Some OEM producers offset bearing price increases by raising

[32] For example, see Caterpillar Inc., postconference brief, Apr. 25, 1988, pp. 9-12.

[33] Susan Avery, "Bearings Buyers Take A Bashing," *Purchasing*, Aug. 17, 1989, pp. 120-123. Statement of Raymond B. Langton, SKF USA Inc., TR, p. 148, and statement of David Gridley, Vice President, Torrington Co., TR, pp. 163-167. For an example of shortages, see prehearing brief of Deere & Co., Mar. 23, 1989, pp. 7-8, and prehearing brief of the Ad Hoc Bearing Group, Mar. 23, 1989, pp. 10-14.

[34] There were no statements for the record by automobile or truck producers either individually or as part of a group during the TRB or AFB investigations.

[35] Some producers indicated lower thresholds, such as 3 to 5 percent.

[36] This rule allows subject merchandise to be exempt from AD and CVD duties if the subject merchandise is incorporated into a product by a related party and represents less than 1 percent of the cost of the downstream product.

[37] Koyo Seiko Inc., posthearing statement, Nov. 4, 1994, pp. 13-14.

[38] In general, Commerce has conducted reviews of exporters of subject merchandise. However, an importer may request "that the Secretary of Commerce conduct an administrative review of only a producer or reseller of the merchandise imported by that importer." 19 CFR 353.22(a)(3).

[39] In reviews of the 1976 AD order on TRBs under 4 inches, Toyota Motors Inc., Nissan Motors, and Isuzu Motors all obtained their own margins.

[40] For example, see Navistar International Corp., posthearing statement, Nov. 3, 1994.

productivity. Other OEMs passed on some or all of the price increases to customers. For example, the electric motor industry raised its prices in the late 1980s, in part because of increases in bearings prices.[41]

Approach of Investigation

Methodology

The analytical framework used to assess the economic effects of dumping and countervailing duty orders on the U.S. bearings market is described in chapter 5. The time series analysis, the comparative statics analysis, and the welfare effects analysis—using a CPE model—were applied to the TRB and BB markets. In addition, a CGE model was used to obtain upstream and downstream effects on output and employment. The analyses covered the period from 3.5 years before the initiation of the investigations (1983 for TRBs and 1985 for BBs) through 1993. Aside from this case study, no empirical estimates of the effects of AD and CVD order on bearings have been made.[42] In 1993, the Commission used a CGE model to examine the economic impact of eliminating all tariffs on the ball and roller bearings, which is the basis of the CGE analysis used in this case study.[43]

Data Sources

This analysis relied primarily on data compiled by the U.S. Bureau of the Census, the U.S. Bureau of Labor Statistics, and responses to questionnaires sent by the Commission to U.S. producers of BBs, CRBs, and TRBs, as well as to those importers believed to account for the majority of imports of the subject bearings. The Commission sent questionnaires to 33 U.S. producers, of whom 25 responded with usable data. Questionnaires were also sent to 53 purchasers/importers, of whom 22 responded with usable data, which included six automobile producers.

[41] Susan Avery, "Sub and FHP Motors: The Acceleration Continues," *Purchasing*, Mar. 9, 1989, p. 83.

[42] Carbaugh and Wassink (1992) provide a partial equilibrium framework using hypothetical data to examine the welfare effects of dumping of intermediate products and used the AFB investigations as an example. See Robert Carbaugh and Darwin Wassink, "International Dumping: Final and Intermediate Products," *Journal of Asian Economics*, vol. 3, No. 2 (Fall 1992), pp. 239-251.

[43] U.S. International Trade Commission, *The Economic Effects of Significant U.S. Import Restraints* (investigation No. 332-325), USITC publication 2699, 1993, pp. 49-51.

Industry Profile and Structure

Industry Size and Structure

The U.S. industry[44] has been highly concentrated. During 1987-93, there were 9 to 12 producers of TRBs and 50 to 55 producers of BBs.[45] Timken is the dominant U.S. producer of TRBs and has accounted for over-half of U.S. industry sales.[46] In the BB industry, 23 firms accounted for 80 percent of BB production in 1987.[47] In 1990, 25 firms accounted for 74 percent of U.S. shipments of complete BBs, by quantity, and about 64 of U.S. shipments of BBs, including parts.[48] The major producers of BBs are Torrington, GM's Delphi Chassis Systems, and SKF USA Inc.

Timken produced only TRBs until it acquired MPB Corp., a producer of miniature precision BBs, in 1990. Brenco Inc. produces TRBs only for railroad equipment. Torrington and the major foreign-owned producers supply a broad range of bearings, both in terms of size and type, but otherwise the U.S. industry is fragmented[49] by product niche. For example, Torrington is the largest U.S. producer of NRBs and

[44] Most of the industry is in the Southeast, the Midwest, New York, Pennsylvania, and New England.

[45] U.S. Bureau of the Census, *Current Industrial Reports: Antifriction Bearings*, MA35Q, issues for 1987-93.

[46] USITC, *Tapered Roller Bearings and Parts Thereof, and Certain Housings Incorporating Tapered Rollers from Italy and Yugoslavia*, USITC publication 1999, p. A-14, and based on responses to the Commission's producers' questionnaires in this investigation.

[47] USITC, *Antifriction Bearings (Other Than Tapered Roller Bearings)*, USITC publication 2185, p. A-24

[48] U.S. International Trade Commission, *Ball Bearings, Mounted or Unmounted, and Parts Thereof, From Argentina, Austria, Brazil, Canada, Hong Kong, Hungary, Mexico, The People's Republic of China, Poland, The Republic of Korea, Spain, Taiwan, Turkey and Yugoslavia* (investigations Nos. 701-TA-307 (preliminary) and 731-TA-498 through 511 (preliminary)), USITC publication 2374, 1991, p. A-24.

[49] Statement by Raymond B. Langton, president, SKF USA Inc., TR, p. 195, and statement by Thomas E. Bennett, president, Torrington Co., corrected transcript of conference in investigations Nos. 303-TA-19 and 20 (final) and 731-TA-391 through 399 (final), p. 32.

BBs,[50] and has smaller market shares in CRBs and TRBs (produced principally for metal-rolling mills). GM's Delphi Chassis Systems produces only wheel hub units (a mounted bearing unit for motor-vehicles). The major producers of TRBs and BBs, both before and after the AD and CVD orders, are shown in table 14-4.

In the TRB industry, Timken noted the increase in foreign investment and also the export of bearing-producing machinery to China by General Bearing (a small U.S. producer) to be used for the production of TRBs for export to the United States.[51] The most significant changes in the structure of the BB industry in the United States have been the increased presence of foreign producers in terms of U.S. production[52] and the consolidation of firms after the duty orders as firms redefined their business lines. Between 1987 and 1991, foreign-owned firms increased their share of domestic shipments from 22 to 31 percent for BBs.[53]

Foreign investment in the U.S. bearings industry was driven by the need to be close to the customer. U.S. customers, especially those in the motor-vehicle industry, desired bearings suppliers with local production[54] that could meet their needs for "just-in-time" delivery and CAFE (Corporate Average Fuel Economy) regulations, and in 1994, for the Auto Labeling Act and North American Free Trade Agreement.[55] Foreign investment in the United States also limited foreign currency risks, thereby reducing the cost of exports to the United States. In addition, the DFARS required U.S.- or Canadian-produced bearings in defense items, and it also accounted for some foreign investment.[56]

The duty orders on TRBs and BBs accelerated U.S. investment by some foreign producers. For example, the AD orders on TRBs hastened foreign investment by Koyo Seiko Co. Ltd. (Koyo) and NTN Corp. (NTN),[57] and SKF sped up its transfer of production lines from Sweden and Italy to the United States as a result of the orders.[58] Foreign investment in the United States enabled foreign producers to avoid duty orders and maintain U.S. market share. For example, Minebea moved production lines to its U.S. subsidiary, New Hampshire Ball Bearing, thereby bypassing a margin of 106 percent. Japanese producers of bearings parts also followed Japanese bearings producers to the United States in order to maintain past customer relationships and to avoid being shut out of the U.S. market because parts were subject to the duty orders. European and Japanese foreign investment also increased in U.S. producers of specialized parts for the production of bearings.[59]

During the period following the AD/CVD orders, U.S.-owned producers increased their level of investment. In March 1989, Timken announced a $1 billion investment program to be completed in 1995.[60] Under this program, Timken opened new a hub TRB plant in Altavista, VA, in 1991, and a TRB plant in Asheboro, NC, in 1994. In 1990, Timken purchased MPB Corp., a leading producer of superprecision bearings, giving Timken a leading position in aerospace, computer, medical equipment, and other high-technology markets.[61] In 1993, Timken's MPB subsidiary purchased Torrington's jet engine bearings assets. In January 1995, Timken purchased Rail Bearing Service Inc., which services railroad bearings. Beginning in the late 1980s, Timken moved toward products incorporating value-added features such as electronic sensors.

[50] Torrington obtained much of its BB production when it acquired the Fafnir Bearing Division of Textron Inc. in 1985.

[51] The Timken Co., official submission, Nov. 4, 1994, pp. 41-42.

[52] U.S. Department of Commerce, *National Security Assessment of the Antifriction Bearings Industry*, 1993, pp. 7-16.

[53] USITC, *Antifriction Bearings (Other Than Tapered Roller Bearings)*, USITC publication 2185, p. A-24 and responses to the Commission's producers' questionnaires.

[54] Since the AD orders in 1989, the number of wheel hub unit producers has risen from 1 producer (GM's New Departure Hyatt, now a part of GM's Delphi Chassis Systems) to 6 producers (SKF (Sweden), FAG (Germany), NSK (Japan), NTN (Japan), Koyo (Japan), and Timken.

[55] Statement of Raymond B. Langton, President, SKF USA Inc., TR, p. 150, and responses to the Commission's producers' questionnaires.

[56] In response, FAG of Germany moved some aerospace bearing production to Canada and also acquired the Barden Corp., a U.S. producer of aerospace bearings.

[56]—*Continued*
SKF also upgraded its U.S. aerospace bearing production. See U.S. Department of Commerce, *National Security Assessment of the Antifriction Bearings Industry*, p. 10.

[57] Press reports cited in appendix 4, The Timken Co., official submission to the USITC, Sept. 13, 1994.

[58] Statement of Raymond B. Langton, president, SKF USA Inc., TR, p. 150.

[59] In 1990, Tsubakimoto of Japan purchased the ball and roller division of the Hoover Group Inc., forming Hoover Precision Products Inc. In 1988, SKF AB purchased Ajax Forge, forming Ovako-Ajax, a ring forger.

[60] This program was "designed to capitalize on the favorable reputation of our products and our design capabilities." The Timken Co., *1989 Annual Report*, p. 2. The program included building plants in North Carolina, Virginia, the Netherlands, and India, and modernizing plants in Brazil and Ohio (bearings and steel). The Timken Co., *1990 Annual Report*, pp. 2 and 8.

[61] The Timken Co., *1990 Annual Report*, p. 2.

Table 14-4
Tapered roller bearings and ball bearings industries, by major producers, before and after duty orders

Tapered roller bearings	
1986[1]	**1991**
• American NTN Bearing MFG. Co. Brenco Inc. Bower Division of Federal-Mogul Hyatt-Clark Kaydon Corp.	• American NTN Bearing Mfg. Co. Brenco Inc. • Bower Division bought by NTN-Bower[2] Hyatt-Clark exited industry (Chapter 11) Kaydon Corp.
• American Koyo Corp. L&S Bearing	• American Koyo Corp. L&S Bearing
• NTN Bearing Corp. of America	• assets of NTN Bearing Corp. of America bought by NTN-Bower[2]
• SKF USA Inc. Timken Co. Torrington Co.	• SKF USA Inc. Timken Co. Torrington Co.
Ball bearings	
1988[1]	**1991**
• American Koyo Corp.	• American Koyo Corp.
• American NTN Bearing Mfg. Co. Barden Corp. Delphi Chassis Sys., General Motors Corp. Emerson Power Transmission Co.	• American NTN Bearing Mfg. Co. • Barden bought by FAG Bearings Delphi Chassis Sys., General Motors Corp. Emerson Power Transmission Co.
• FAG Bearings Federal-Mogul Inc.	• FAG Bearings Federal-Mogul Inc.
• INA Bearing Kaydon Corp. McGill Manufacturing MPB Corp.	• INA Bearing Kaydon Corp. McGill bought by Emerson Electric Co. MPB bought by Timken Co.
• New Hampshire Ball Bearing	• New Hampshire Ball Bearing
• NSK Corp. PT Link-Belt/PT Components Inc. Reliance Electric Rollway Bearings Schatz Manufacturing	• NSK Corp. PT Link-Belt bought by Rexnord/Banner Industries Reliance Electric Rollway Bearings Schatz Manufacturing
• SKF USA Inc. Torrington Co.	• SKF USA Inc. Torrington Co.

[1] Year of petition filings.

[2] In December 1985, Federal-Mogul sold its roller bearings operations to NTN-Bower Corp., a joint venture 40 percent owned by Federal-Mogul and 60 percent owned by NTN Corp. (fomerly NTN Toyo Bearing Co., Ltd.) of Japan. In December 1987, Federal-Mogul sold its share of the venture to NTN Corp.

Note.—• signifies foreign ownership.

Source: Compiled by the staff of the U.S. International Trade Commission.

Internationally, Timken expanded its sales network overseas and opened plants to produce BBs in the Netherlands and TRBs in India. Timken also consolidated two TRB plants into one in the United Kingdom.

In 1989, the year of the duty orders, Torrington formed a joint venture with GMN George Mueller Nuernberg AG (GMN) to produce high-volume, commercial BBs in Rockford, IL. Torrington purchased the GMN share in the venture in 1993. Also in 1989, Torrington increased its capital expenditures on BBs and rationalized its bearings businesses.[62] Internationally, in 1992 Torrington purchased a bearings producer in Spain, Industrias del Rodamiento, S.A., and in 1993 purchased the NRB and CRB businesses of FAG of Germany.

Competitiveness Factors

This section discusses employment, wages, and materials costs in the TRB and BB industries.

[62] Torrington closed its New Britain (1989), and Newington (1993), CT, plants. In 1993, Torrington sold its jet engine bearing assets to Timken's subsidiary, MPB Corp.

Expenditures for capital investments and research and development (R&D) are also examined, as are indicators of profitability. Relevant unfair foreign trade practices affecting exports are also discussed.

Employment and Wages

Since 1980, employment in the TRB and BB industries has declined, following the industry-wide trend.[63] Employment in the TRB industry followed the trend in TRB shipments, by quantity, rising in 1988 (the year after the AD orders) and declining as the economy went into recession in 1990 (table 14-5). During 1988-89, the number of production workers rose because of strong demand for TRBs and the shift of Japanese TRB production to the United States, which was prompted in part by AD orders. Wages and total compensation of production workers in the TRB industry followed the trend of TRB shipments; however in 1987, events at a single firm were responsible for both the decline in wages and rise in total compensation.

In the BB industry, employment of production workers declined from 12,937 to 11,331 persons during 1985-91 (table 14-6). Prior to the duty orders, the number of production workers declined principally because firms were rationalizing production.[64] After the duty orders, the small decline in employment in the BB industry probably reflected the positive effects of the orders in raising prices and shipments, and also the increased hiring by foreign producers. In 1990, employment fell as the economy went into recession and demand for bearings weakened. Wages and total compensation of production workers also followed the trends in employment and demand for BBs.

[63] Employment in SIC 3562, Ball and Roller Bearings, fell from 57,900 persons in 1980 to 37,200 persons in 1993. Employment of production and related workers fell from 45,200 persons in 1980 to 29,500 persons in 1993.

[64] During 1985-87, Torrington, Federal-Mogul, SKF, and NMB (Minebea) restructured their operations by closing plants and reducing employment, while other U.S. firms reduced employment. This was somewhat offset by some foreign producers adding production workers in their U.S. operations.

Table 14-5
Average number of total employees and production and related workers in U.S. establishments wherein tapered roller bearings are produced, hours worked, wages and total compensation paid to such employees, and hourly wages, by products, 1983-91[1]

Item	1983	1984	1985	1986	1987[2]	1988	1989	1990	1991
Employees (*number*)	([3])	([3])	([3])	([3])	10,494	12,104	12,884	12,454	12,025
Production and related workers (PRWs) (*number*)	7,506	9,149	7,694	6,792	5,986	6,825	7,348	6,908	6,528
Hours worked by PRWs (*thousands*)	14,509	18,678	15,163	12,973	12,837	14,807	15,369	14,467	14,089
Wages paid to PRWs (*million dollars*)	186.9	227.7	193.9	161.5	153.0	225.1	222.7	217.6	206.5
Total compensation paid to PRWs (*million dollars*)	239.1	287.3	253.1	194.3	239.7	294.4	291.1	285.7	271.8
Hourly wages paid to PRWs	$12.88	12.19	12.79	12.45	11.92	15.21	14.49	15.04	14.66
Hourly compensation paid to PRWs	$16.48	15.38	16.69	14.98	18.67	19.88	18.94	19.75	19.29

[1] Firms providing employment data accounted for approximately 80 to 85 percent of reported total U.S. shipments (based on value) during 1983-91.

[2] Data for 1987-91 were from a different sample of firms than data for 1983-86.

[3] Data were not collected in the final investigation on TRBs. See U.S. International Trade Commission, *Tapered Roller Bearings and Parts Thereof, and Certain Housings Incorporating Tapered Rollers From Italy and Yugoslavia* (investigations Nos. 731-TA-342 and 346 (final)), USITC publication 1987, Aug. 1987, p. A-33.

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission and data collected in the final investigation on AFBs. See U.S. International Trade Commission, *Tapered Roller Bearings and Parts Thereof, and Certain Housings Incorporating Tapered Rollers From Italy and Yugoslavia* (investigations Nos. 731-TA-342 and 346 (final)), USITC publication 1987, Aug. 1987, p. A-33.

Table 14-6
Average number of total employees and production and related workers in U.S. establishments wherein ball bearings and cylindrical roller bearings are produced, hours worked, wages and total compensation paid to such employees, and hourly wages, by products, 1985-91[1]

Item	1985	1986	1987[2]	1988	1989	1990	1991
			Number of employees				
Ball bearings:							
U.S.-owned firms	(3)	(3)	10,251	10,533	10,519	10,395	9,923
Foreign-owned firms	(3)	(3)	3,226	3,278	3,773	3,873	3,808
Total	(3)	(3)	13,477	13,811	14,292	14,268	13,731
Cylindrical roller bearings	(3)	(3)	1,959	2,096	2,057	2,056	2,006
			Number of production and related workers (PRWs)				
Ball bearings:							
U.S.-owned firms	10,300	9,977	8,087	8,345	8,819	8,442	8,332
Foreign-owned firms	2,637	2,052	2,546	2,560	2,985	3,080	2,999
Total	12,937	12,029	10,633	10,905	11,804	11,522	11,331
Cylindrical roller bearings	1,803	1,850	867	984	1,092	941	899
			Hours worked by PRWs (*1,000 hours*)				
Ball bearings:							
U.S.-owned firms	22,888	21,804	18,993	19,722	20,174	19,341	18,632
Foreign-owned firms	4,773	4,246	5,795	5,818	6,826	7,117	6,985
Total	27,661	26,050	24,788	25,540	27,000	26,458	25,617
Cylindrical roller bearings	3,600	3,277	2,705	3,092	3,073	2,956	2,546
			Wages paid to PRWs (*1,000 dollars*)				
Ball bearings:							
U.S.-owned firms	275,240	273,290	229,532	241,122	247,662	245,949	239,095
Foreign-owned firms	50,493	50,309	56,851	61,184	74,077	80,280	78,007
Total	325,733	323,599	286,383	302,306	321,739	326,229	317,102
Cylindrical roller bearings	40,593	45,024	24,391	32,012	32,939	34,914	31,911
			Total compensation paid to PRWs (*1,000 dollars*)				
Ball bearings:							
U.S.-owned firms	(3)	(3)	302,991	309,638	323,439	323,040	316,070
Foreign-owned firms	(3)	(3)	75,401	82,082	98,522	105,784	104,718
Total	(3)	(3)	378,392	391,120	421,961	428,824	420,788
Cylindrical roller bearings	(3)	(3)	34,407	41,246	42,625	44,213	41,134
			Hourly wages paid to PRWs				
Ball bearings:							
U.S.-owned firms	$12.03	$12.53	$12.09	$12.33	$12.28	$12.72	$12.83
Foreign-owned firms	10.58	11.85	9.81	10.52	10.85	11.28	11.17
Average	11.78	12.42	11.55	11.84	11.92	12.33	12.38
Cylindrical roller bearings	11.25	12.11	9.02	10.35	10.72	11.81	12.53

See footnotes at end of table.

Table 14-6—*Continued*
Average number of total employees and production and related workers in U.S. establishments wherein ball bearings and cylindrical roller bearings are produced, hours worked, wages and total compensation paid to such employees, and hourly wages, by products, 1985-91[1]

Item	1985	1986	1987[2]	1988	1989	1990	1991
			Hourly compensation paid to PRWs—*Continued*				
Ball bearings:							
U.S.-owned firms	(3)	(3)	$15.27	$15.34	$15.63	$16.21	$16.43
Foreign-owned firms	(3)	(3)	13.01	$14.11	14.43	14.86	14.99
Average	(3)	(3)	15.27	15.34	15.63	16.21	16.43
Cylindrical roller bearings	(3)	(3)	12.72	13.34	13.87	14.96	16.16

[1] Firms providing employment data accounted for approximately 60 to 65 percent of reported total U.S. shipments (based on value) of BB production and 50 percent of CRB shipments during 1987-91.

[2] Data for 1987-91 collected from a different sample of firms than data for 1985-86.

[3] Data were not collected in the final investigation on AFBs. See U.S. International Trade Commission, *Antifriction Bearings (Other Than Tapered Roller Bearings) and Parts Thereof From the Federal Republic of Germany, France, Italy, Japan, Romania, Singapore, Sweden, Thailand, and the United Kingdom* (investigation Nos. 303-TA-19 and 20 (final) and 731-TA-391 through 399 (final)), USITC publication 2185, May 1989, pp. A-48—A-51.

Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission and data collected in the final investigation on AFBs. See U.S. International Trade Commission, *Antifriction Bearings (Other Than Tapered Roller Bearings) and Parts Thereof From the Federal Republic of Germany, France, Italy, Japan, Romania, Singapore, Sweden, Thailand, and the United Kingdom* (investigation Nos. 303-TA-19 and 20 (final) and 731-TA-391 through 399 (final)), USITC publication 2185, May 1989, pp. A-48—A-51.

Materials

Responses to the Commission's producers' questionnaires indicate that materials costs (steel and purchased parts) have not been a major factor in driving bearings pricing trends, but that bearings prices have been set by competition. In the period prior to the AD/CVD investigations and duty orders, the average price of U.S. bearing-quality steel was higher than that of imported bearing-quality steel. In 1985, the Commission reported that the price differential between U.S. and imported bearing-quality steel was 14 to 17 percent.[65] During the past few years, these prices have converged.[66]

During 1987-91, the VRAs on steel products did not significantly limit the availability of bearing-quality steel.[67] Under the steel VRAs short-supply provisions, bearings producers were able to import certain types of bearing-quality steel.[68] However, in response to the Commission's producers' questionnaires, two firms indicated that they switched to U.S. bearing-quality steel because of the VRAs. They characterized U.S. bearing-quality steel as being more costly and lower in quality than imported steel.

Investment and R&D

Investment in the TRB industry increased substantially after the AD orders on TRBs. Data on such investment, however, are confidential, because one producer dominated such expenditures. As an indication of the investment trend, capital expenditures by Timken are shown in figure 14-2. In 1988, with improved cash flow, Timken began a program of incremental capital investment to upgrade facilities and machinery.[69] In 1989, Timken announced a 5-year $1 billion investment program, which is discussed in the industry size and structure section of this case study. Capital expenditures by the rest of the industry have been more modest.

Since 1983, the increase in capital expenditures by the U.S. BB industry since 1983 has been made principally by foreign-owned companies. Capital expenditures in the BB industry rose from just under $114 million in 1987 (the year before the AD/CVD orders) to a peak of $184 million in 1990, before declining to $134 million in 1991 (figure 14-3). Capital expenditures for the BB industry and the Ball and Roller Bearing Industry (SIC 3562) followed a similar trend, accelerating in 1988 to a peak in 1990.

[65] USITC, *Competitive Assessment of the U.S. Ball and Roller Bearing Industry*, USITC publication 1797, pp. 95-96.

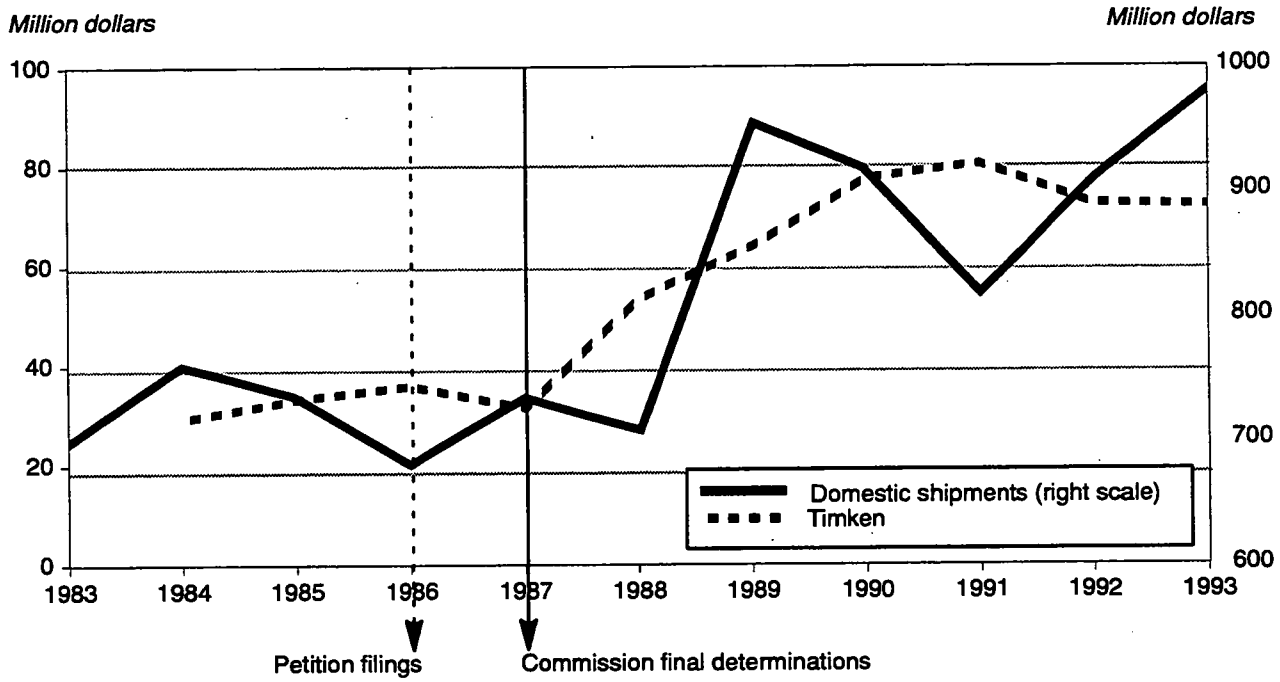
[66] U.S. bearing and U.S. bearing steel producer officials, interviews with USITC staff, Oct.-Dec. 1994.

[67] Responses from the Commission's producers' questionnaires.

[68] Data on short supply requests and approvals during the VRAs were obtained from Commerce.

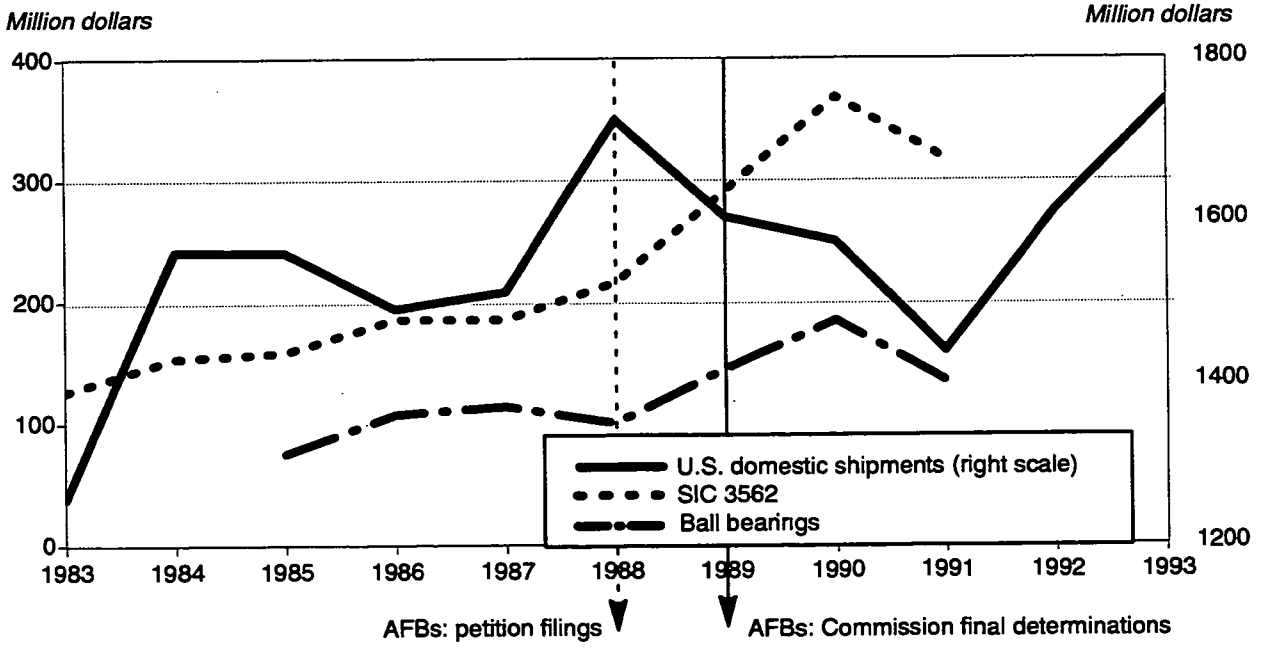
[69] The Timken Co., *1988 Annual Report*, pp. 7 and 25.

Figure 14-2
Capital expenditures for bearings by the Timken Co. and U.S. domestic shipments of tapered roller bearings, 1983-93



Source: Compiled by the staff of the U.S. International Trade Commission from annual reports of the Timken Co.

Figure 14-3
Capital expenditures by U.S. producers of ball bearings and by the Ball and Roller Bearings Industry (SIC 3562), and U.S. domestic shipments of ball bearings, 1983-93



Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission and data from the U.S. Bureau of the Census.

In contrast, U.S. domestic shipments of BBs peaked in 1988. Expenditures by U.S.-owned BB producers ranged between $40 million and $46 million. During 1987-91, capital expenditures by foreign-owned producers rose from $21 million in 1987 to $137 million in 1990, before falling to $89 million in 1991, thus accounting for much of the rise of capital expenditures in the BB industry.

Foreign-owned BB producers increased their capital investments in the United States in order to be close to U.S. customers, limit foreign currency risk,[70] reduce trade friction, and meet DFARS requirements. Capital expenditures by U.S.-owned BB producers have been lower than those of foreign-owned producers in recent years, because they have been on a gradual basis and focused on automated machinery to improve productivity.[71]

R&D expenditures in the TRB industry rose as a result of the AD orders; however, such data are confidential. According to its annual reports, Timken substantially increased R&D expenditures. Data from its annual reports includes R&D expenditures for its steel products. R&D expenditures by other TRB producers rose slightly.[72]

During 1985-90, R&D expenditures for BBs rose from $18 million to $28 million before falling to $20 million in 1991. The decline in R&D expenditures was due to one firm. Some foreign-owned BB producers do not conduct R&D in the United States, while others have only recently opened U.S. R&D centers.

Profitability

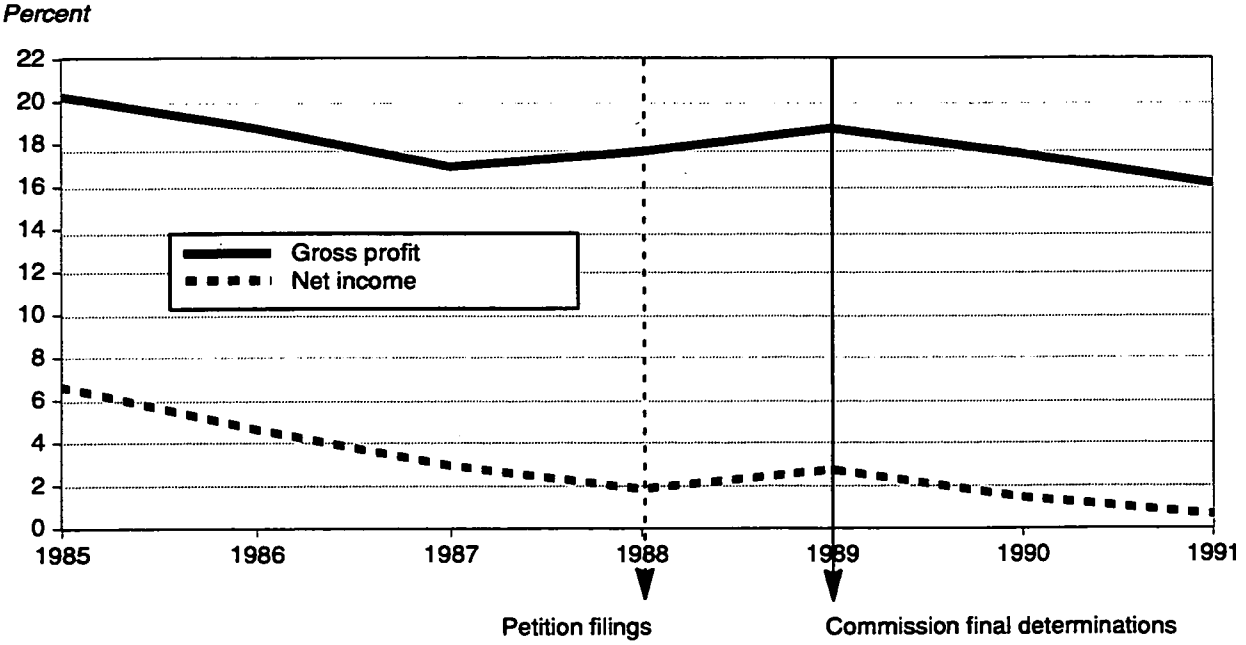
Prior to the AD/CVD orders on TRBs and BBs, industry profitability was declining due to weak demand, unfair trade practices, and nonsubject import competition. Data on the profitability of the TRB industry are confidential; however, Timken has regained its profitability in bearings. During 1988-90, the profitability of the BB industry was mixed (figure 14-4). Both gross profit and net income rose in 1989, the year after the AD/CVD orders were imposed and the economy peaked. Low net profit was principally due to growing expenses for corporate restructuring charges. Profitability suffered during 1990-91 because of the recession.

[70] Commerce's summary of its sec. 232 investigation cites low production costs for material and labor as reasons for foreign investment. 54 F.R. 1974-1979.

[71] Ibid.

[72] Responses to the Commission's producers' questionnaires.

Figure 14-4
Financial performance of the U.S. ball bearings industry: Ratios of gross profit to net sales and net profit to net sales, 1985-91



Source: Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

Export barriers

The principal markets for U.S. TRB and BB producers have been and continue to be Canada and Mexico. Many of the foreign-owned U.S. producers export to Canada, Mexico, and Central and South America and do not face significant export barriers. According to responses to the Commission's producers' questionnaires, U.S.-owned BB and TRB producers reported that purchasers in Japan and Europe tend to be loyal to national bearings producers.[73] Local European suppliers reportedly resist inroads made by U.S.-owned suppliers through aggressive pricing.[74] The dominance of foreign producers in their relatively closed home markets combined with high-home market prices, is credited with, in part, causing the dumping of AFBs in the United States.[75]

Market Performance—Trend Analysis

Domestic Shipments and Prices

Demand for ball and roller bearings is driven by the consumption of products that incorporate bearings. U.S. shipments of ball and roller bearings have followed the trend of the overall economy. Shipments of TRBs and BBs are shown with U.S. producers' shipments of durable goods, a proxy for the general economy, during 1983-93 (figure 14-5). Shipments of BBs began to rise in 1987, lagging by a year the increase in U.S. producers' shipments of durable goods that began in 1986. BB shipments peaked in 1988, a year before the peak in shipments of durable goods. Throughout the 1980s, the lag in shipments of BBs relative to durable goods reflected long leadtimes for bearings from U.S. producers. Beginning in 1990, shipments of BBs began to closely follow those of durable goods as more OEMs adopted "just-in-time" delivery schedules and U.S. bearings producers responded by adding capacity and thereby reducing leadtimes.

During 1984-88, weak demand for TRBs by the automotive and industrial sectors[76] put downward pressure on prices that resulted in the low value of shipments. In 1989 and 1990, TRB shipments peaked with the economy, fell during the recession 1990-91, and then continued to expand.

According to responses to the Commission's producers' questionnaires, U.S. producers increased prices after the duty orders by about 5 to 10 percent. Producers indicated that price increases were limited because of the competitive environment, including broadening domestic competition and imports from new sources. Some producers indicated that prices rose in 1988, principally because of panic buying by OEMs in order to secure sources of supply. Many foreign-owned producers in the United States reported that prices on imported products were raised to offset the AD/CVD duties.

Unit values (proxies for prices) for U.S. producers' shipments of TRBs and BBs revealed different trends than those shown by shipments data (figure 14-6). TRB unit values declined during 1985-88, due in part because of import competition and weak demand. In 1989, TRB unit values rose with demand, but fell during 1990-93 because of the 1990-91 recession, increased domestic competition resulting from foreign investment, and import competition from China and nonsubject sources.[77] BB unit values remained relatively flat and reflected the shift of foreign production to the United States and increased domestic competition, especially after 1989.[78]

The U.S. producer price index (PPI) compiled by the U.S. Bureau of Labor Statistics for ball and roller bearings, TRBs, and BBs, excluding parts, are shown on a quarterly basis for 1986-90 in figure 14-7. The PPI for TRBs followed the upward movement of the PPIs for BBs in the second quarter of 1988, as opposed to immediately rising after the AD orders on TRBs in 1987, in part because of the depressed market for TRBs that continued in 1988. Prior to 1987, the PPI for BBs in part reflected price

[73] According to responses to the Commission's producers' questionnaires, U.S.-owned BB and CRB producers reported that access to the European aerospace market was difficult because of nationalism. In general, foreign-owned producers did not report such problems, however, their exports were generally limited to Canada and Central and South America.

[74] Responses to the Commission's producers' questionnaires.

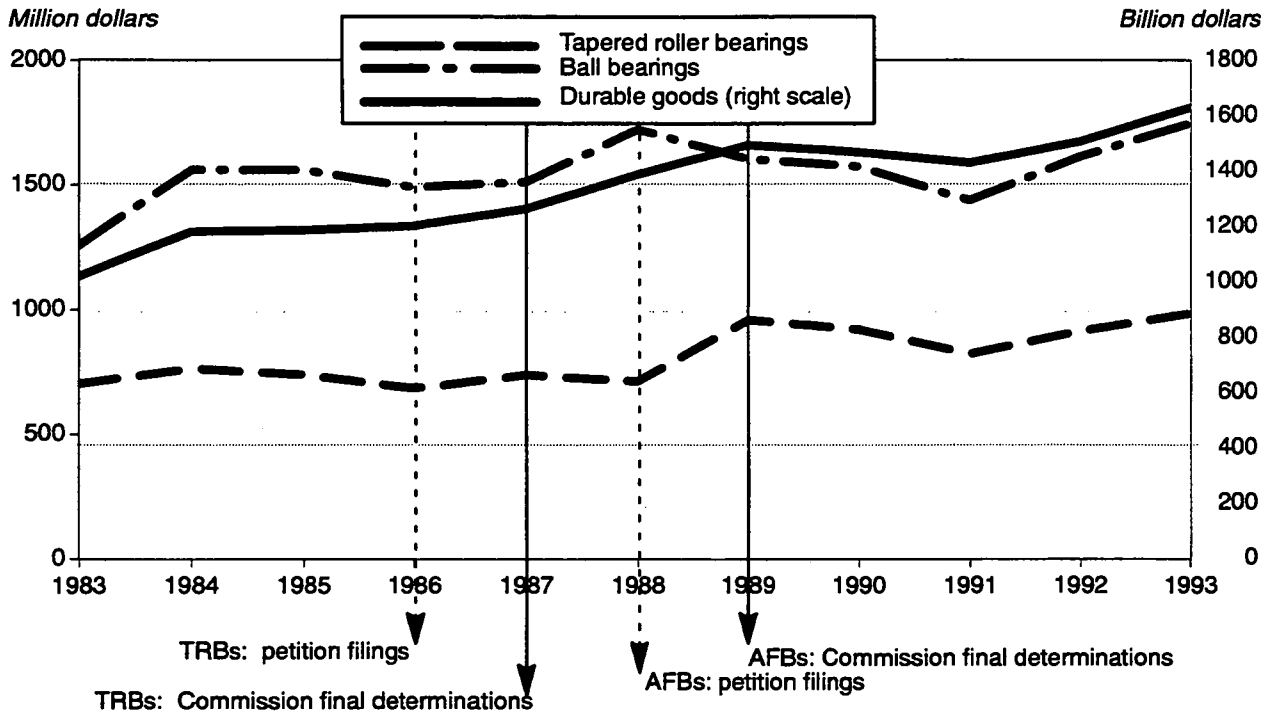
[75] Jeffery E. Garten, undersecretary of Commerce for International Trade, "New Challenges in the World Economy: The Antidumping Law and U.S. Trade Policy," remarks before the U.S. Chamber of Commerce, Washington, DC, Apr. 7, 1994, p. 13.

[76] USITC, *Tapered Roller Bearings and Parts Thereof, and Certain Housings Incorporating Tapered Rollers from Italy and Yugoslavia*, USITC publication 1999, p. A-72.

[77] The Timken Co., official submission to the USITC, Sept. 13, 1994, pp. 48 and 52.

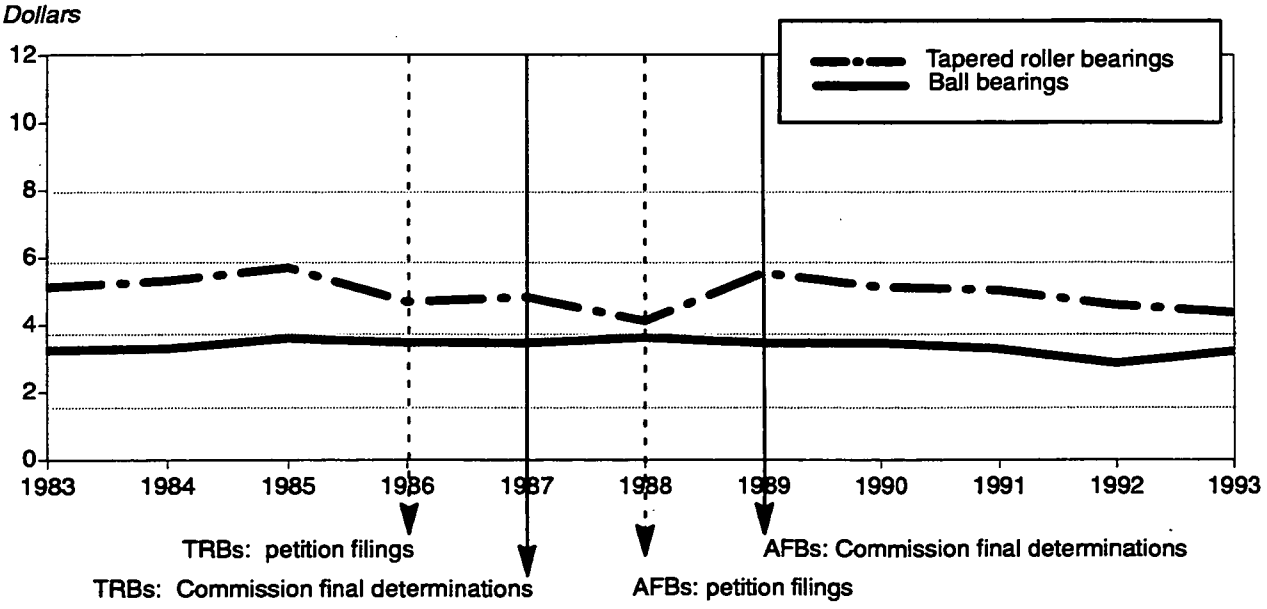
[78] Torrington Co., official submission to the USITC, Sept. 13, 1994, p. 4.

Figure 14-5
Tapered roller bearings and ball bearings: U.S. domestic shipments and U.S. producers' shipments of durable goods, 1983-93



Source: Compiled from official statistics of the U.S. Department of Commerce.

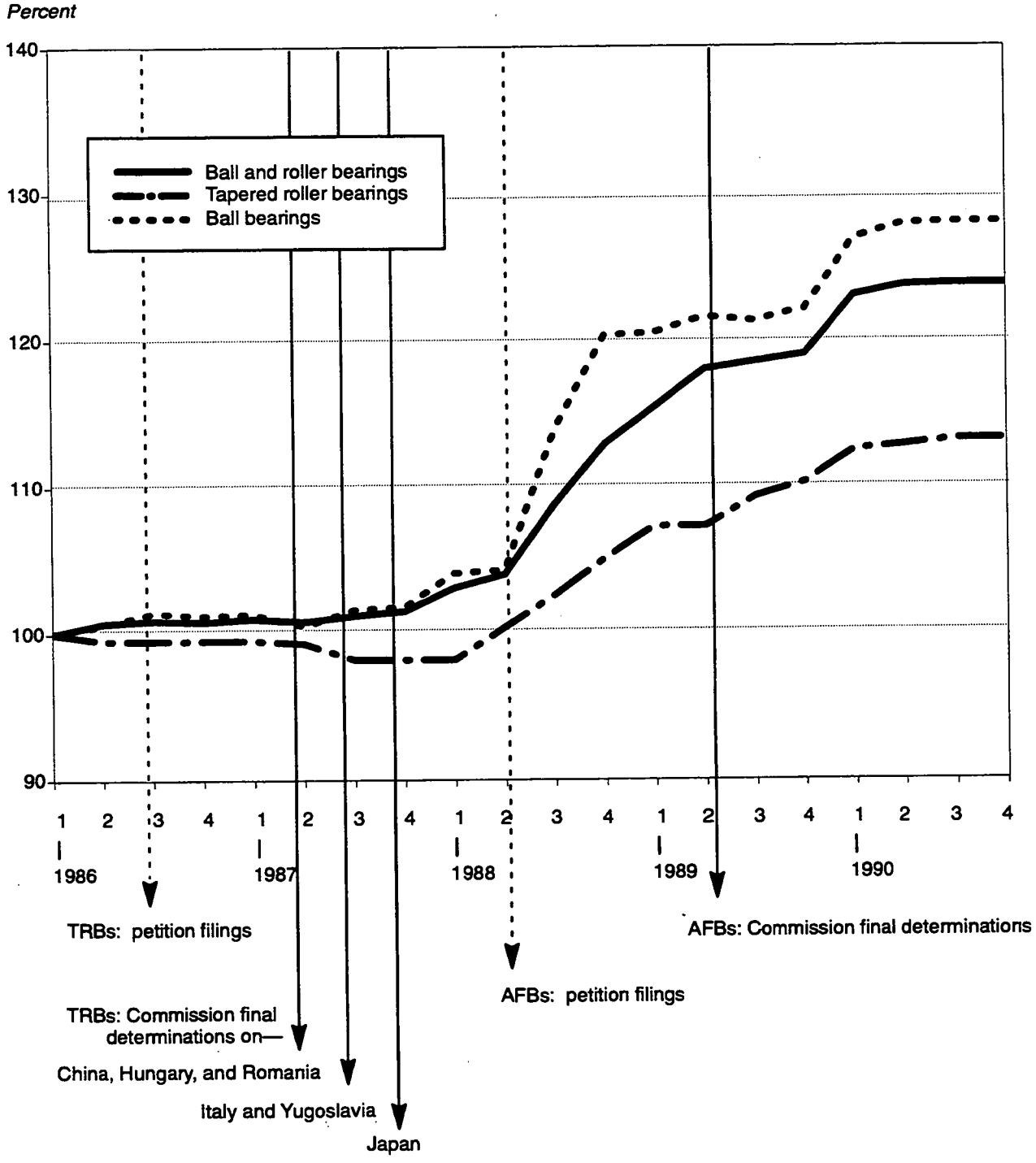
Figure 14-6
Tapered roller bearings[1] and ball bearings:[2] U.S. unit values,[3] 1983-93



[1] Includes exports, since export data are not available for 1983-88.
[2] Based on domestic shipments.
[3] Unit values are based on complete bearings.

Source: Estimated by the staff of the U.S. International Trade Commission from official statistics of the U.S. Department of Commerce.

Figure 14-7
U.S. producer price indexes for SIC 3562, Ball and Roller Bearings, tapered roller bearings, and ball bearings, quarterly, 1986-90



Source: Compiled from official statistics of the U.S. Bureau of Labor Statistics.

suppression caused by import competition.[79] The PPI for BBs began to rise in the third quarter of 1987 and rose sharply between the second and fourth quarters of 1988. This increase reflected the firming of prices as demand increased and, in part, "panic" buying, and fears that the anticipated AD orders would further limit supplies.[80]

Subject Imports: Quantity, Prices, and Market Share

This section of the case study discusses overall import trends and then examines shifts among U.S. import suppliers as a result of the duty orders. Trends in import quantities, unit values (prices), and import market share are subsequently discussed for TRBs and BBs.

TRBs

U.S. imports of TRBs followed the trend in U.S. producers' shipments of durable goods in 1984 and then again during 1989-93 (figure 14-8). U.S. imports and U.S. shipments of TRBs declined during the 1990-91 recession. During 1987-89, Japanese TRB producers[81] slowly shifted production to the United States. The sharp decline in subject imports in 1989 reflected the effects of the AD orders on all subject sources except China, and also the issuance of new margins on Japanese TRBs under 4 inches (covered by the 1976 AD order) in 1990.[82] U.S. imports and shipments of finished TRBs[83] followed the same trends (figure 14-9), except that while the value of U.S. shipments of TRBs fell in 1988, shipments of finished TRBs, by quantity, were rising.

Prices (unit values) of U.S.-produced TRBs declined during 1985-88 because of weak demand and price suppression caused by unfair trade practices (figure 14-10). In 1988, the year after the duty orders, prices remained weak because of continued price competition around the world.[84] In 1989, U.S. producers of TRBs were able to raise prices because of rising demand. This increase in prices coincided with the investigations and duty orders on AFBs during 1988-89. During 1990-93, prices U.S.-produced TRBs fell because of the 1990-91 recession, increased competition due to foreign investment, and increased imports from nonsubject sources.

During 1985-87, average prices of subject TRB imports (unit values) declined as apparent U.S. consumption of TRBs slowed. After the AD orders and contrary to the trend in consumption of TRBs, average prices of subject TRB imports rose slightly in 1990 and then flattened out. During 1989-93, imports from Japan declined, but unit values of Japanese TRBs rose by 44 percent. However, this trend was offset by a decrease in the unit value of Chinese TRBs as imports from China rose significantly.

The market share held by subject imports of TRBs fell from 14 percent of apparent U.S. consumption in 1985, the year before the filing of the petition, to 12 percent in 1988, the year after AD orders were issued (figure 14-11).

By 1991, market share held by subject imports had dropped to 5 to 6 percent, principally because Japanese TRB producers shifted production to the United States beginning in 1988. However, rising subject imports from China[85] with low AD duty rates partially offset the decline in subject imports from Japan (table 14-7).

Imports from China have replaced imports from Hungary, Romania, and former Yugoslavia that had higher AD margins. The average AD margins on TRB imports from subject countries on a calendar year basis during 1991-93 are shown in table 14-8. Subject imports of TRBs from Romania declined abruptly from mid-1988 through late 1993, because Romania lost MFN status during that period.[86] The increase in duty rates effectively priced Romanian

[79] USITC, *Antifriction Bearings (Other Than Tapered Roller Bearings)*, USITC publication 2185, pp. 69-75. For price effects in distributor markets, see also Prehearing Brief of King Bearing, Inc., Mar. 23, 1989.

[80] Susan Avery, "Bearings Buyers Take A Bashing," *Purchasing*, Aug. 17, 1989, pp. 120-123.

[81] NTN, NSK, and Koyo, together, were believed to have accounted for over 90 percent of TRB exports to the United States. USITC, *Tapered Roller Bearings and Parts Thereof, and Certain Housings Incorporating Tapered Rollers from Japan*, USITC publication 2020, p. A-3.

[82] According to official trade statistics, during 1989-93, about one-half to two-thirds of U.S. imports of TRBs from Japan were with an outside diameter of 4 inches or less and were covered by the 1976 AD order.

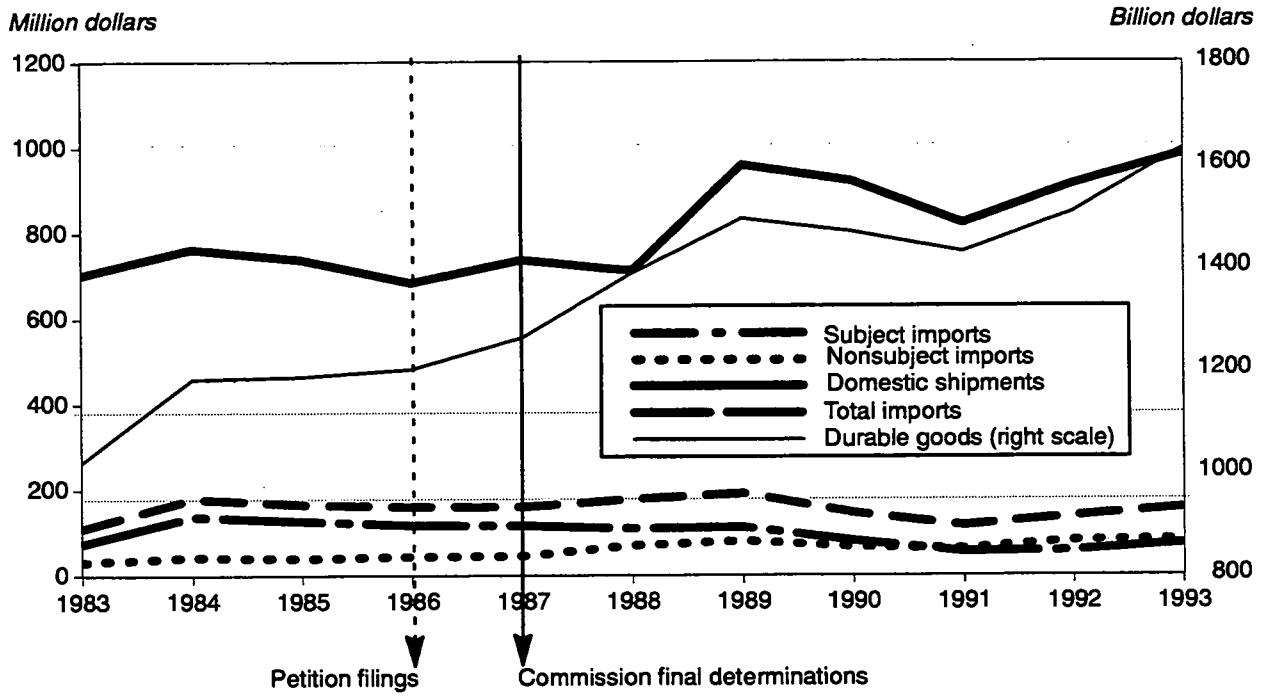
[83] Finished TRBs include TRB sets (cone assemblies and cups), cone assemblies, and cups sold separately.

[84] Timken noted that although its sales were higher in 1988, selling prices of TRBs remained depressed. The Timken Co., *1988 Annual Report*, p. 24.

[85] Imports from Hong Kong were from resellers of Chinese TRB producers.

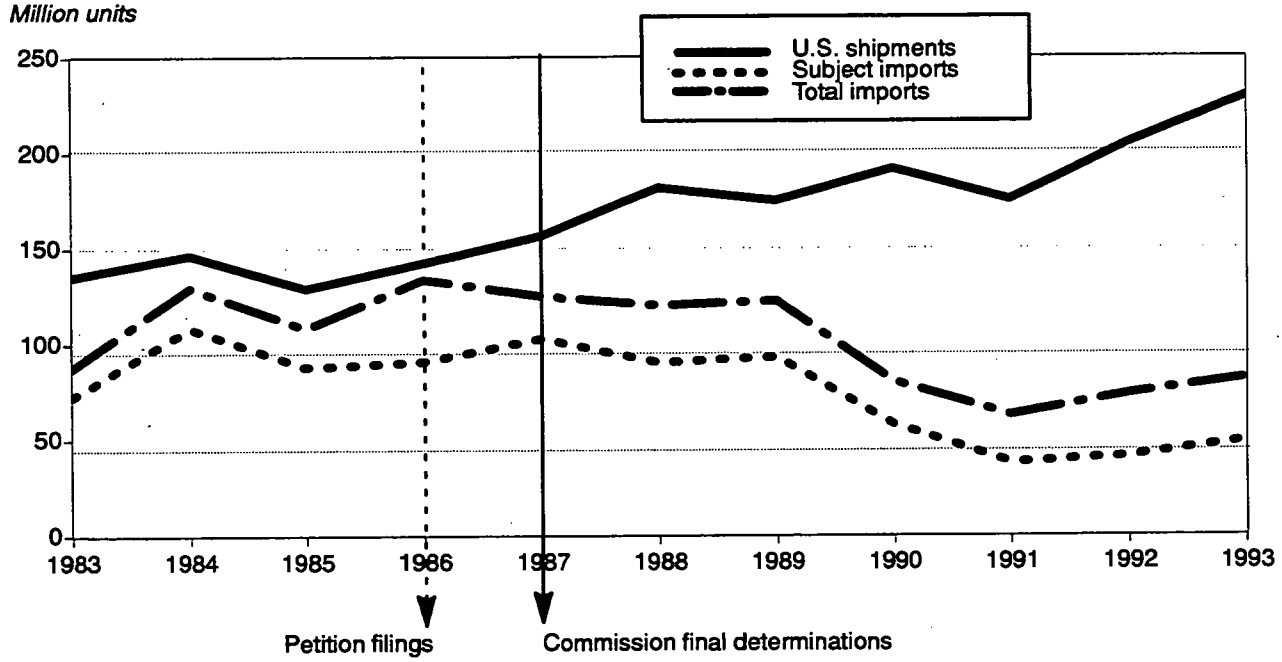
[86] Imports from Romania became subject to the column 2 rate of duty of 67 percent ad valorem, in addition to the AD margin of 8.70 percent ad valorem. See President, Proclamation 5836, June 28, 1988, 53 F.R. 24921-24922, July 1, 1988 and President, Proclamation 6577, July 2, 1993, 58 F.R. 36301-36302; and 58 F.R. 60226. The effective date for restoring MFN was Nov. 8, 1993.

Figure 14-8
Tapered roller bearings: Total imports, subject imports, nonsubject imports, U.S. domestic shipments, and U.S. producers' shipments of durable goods, 1983-93



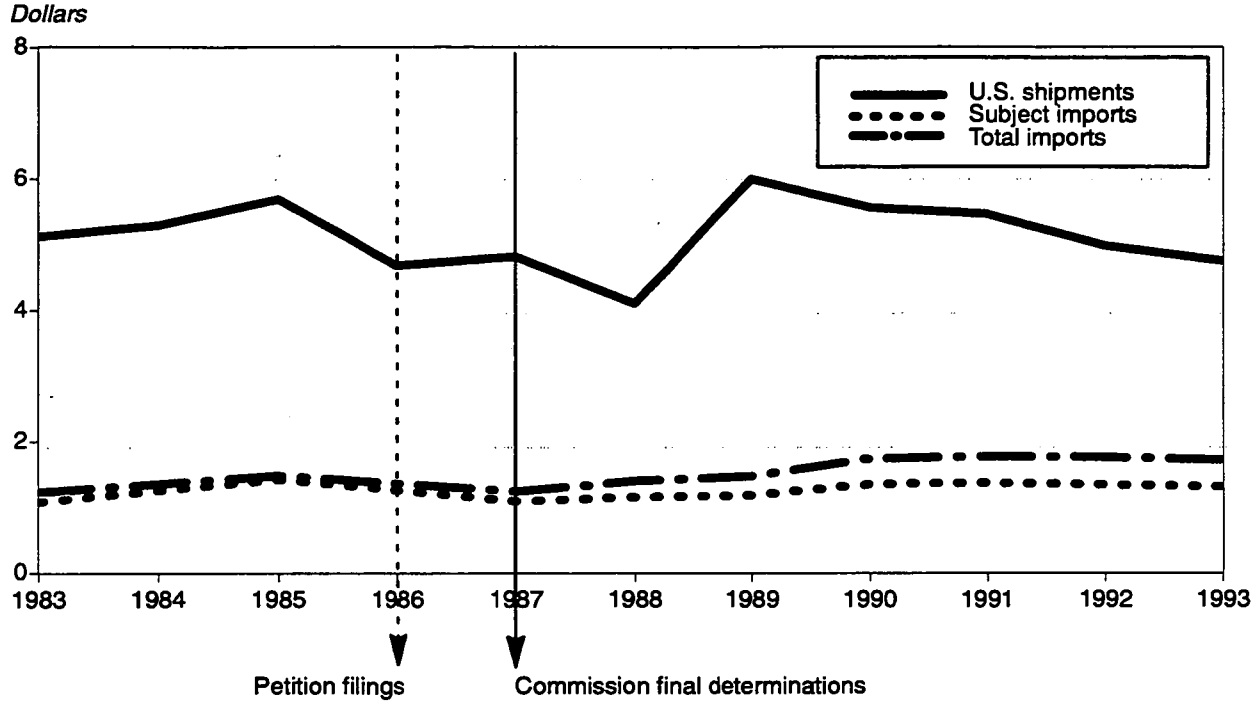
Source: Compiled from official statistics of the U.S. Department of Commerce.

Figure 14-9
Tapered roller bearings: U.S. shipments,[1] total imports, and subject imports, by quantity, 1983-93



[1] Data include exports, since tapered roller bearing quantities are not available for 1983-88.
Source: Compiled from official statistics of the U.S. Department of Commerce.

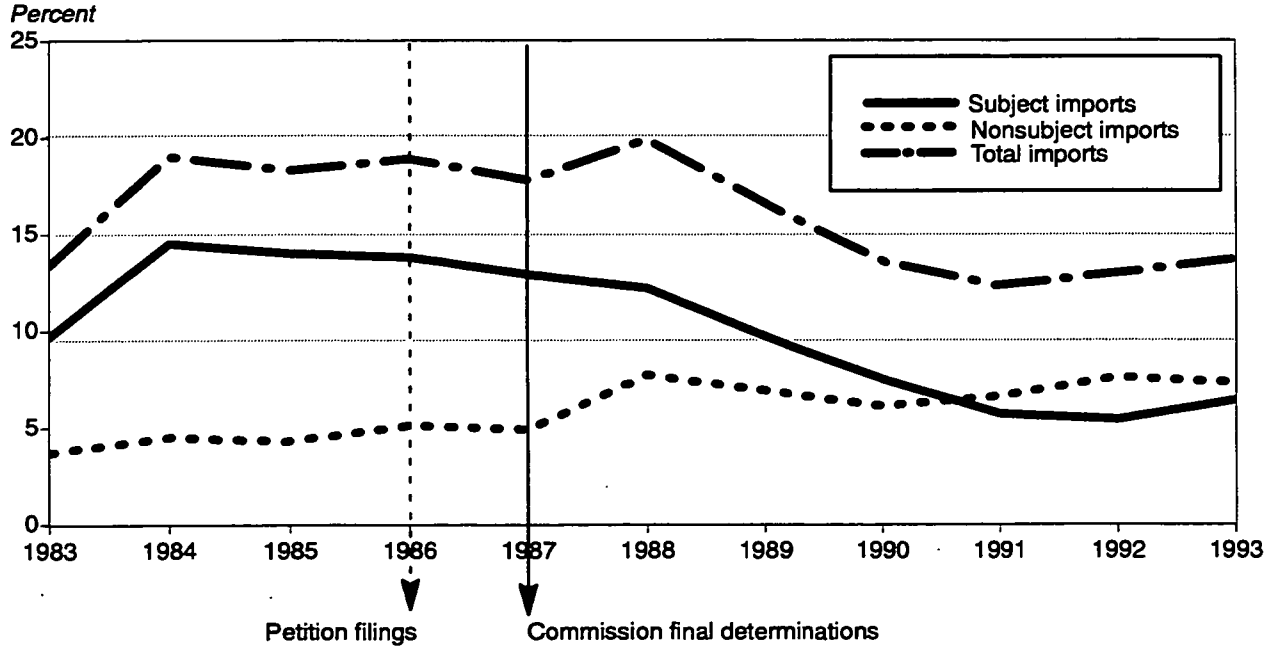
Figure 14-10
Tapered roller bearings: Unit values[1] of U.S. shipments,[2] total imports, and subject imports, 1983-93



[1] Unit values are based on complete bearings.
[2] Includes exports, since export date are not available for 1983-88.

Source: Compiled from official statistics of the U.S. Department of Commerce.

Figure 14-11
Tapered roller bearings: Total imports, subject imports, and nonsubject imports as a share of apparent U.S. consumption, 1983-93



Source: Compiled from official statistics of the U.S. Department of Commerce.

Table 14-7
Tapered roller bearings: U.S. imports for consumption, by subject and nonsubject sources, 1983-93

(1,000 dollars[1])

Source	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Subject sources:											
Hungary	1,803	1,856	1,925	2,909	2,677	3,576	4,186	4,143	3,305	1,938	383
Italy	371	946	1,116	2,144	444	231	537	1,944	443	81	173
Japan	69,724	126,344	112,853	104,659	102,791	92,533	90,058	56,885	38,198	38,358	50,779
China	989	1,751	955	830	2,159	5,577	14,991	14,412	11,385	16,791	21,933
Hong Kong[2]	14	337	580	1,307	866	484	342	756	81	27	168
Romania	4,702	3,153	7,598	3,741	5,802	5,684	2	1,332	213	-	4
Yugoslavia	781	2,419	1,341	947	603	148	836	42	24	-	-
Subtotal	78,383	136,807	126,366	116,538	115,341	108,232	110,953	79,514	53,649	57,195	73,440
Nonsubject sources:											
Canada	17,816	23,126	20,823	20,565	17,584	28,428	27,513	21,417	21,045	26,593	27,809
Germany	4,879	7,636	7,164	10,098	11,058	13,107	17,796	18,874	15,446	18,753	19,913
France	1,283	1,946	4,214	4,916	5,305	6,422	9,235	6,430	6,589	7,487	7,223
United Kingdom	4,586	3,467	2,254	2,695	3,157	5,233	7,835	6,769	7,176	12,774	11,008
Mexico	159	612	14	483	1,635	3,530	5,534	2,825	2,373	2,353	5,546
Brazil	1,496	2,371	2,485	2,380	3,537	8,087	4,265	3,630	3,394	3,685	3,138
Poland	6	-	-	-	-	60	329	197	184	2,776	3,320
Australia	2	8	662	930	484	694	1,253	2,124	3,642	3,728	3,286
All other	382	2,583	1,165	1,165	1,255	2,849	5,569	3,041	1,376	1,590	1,728
Subtotal	30,608	41,748	38,780	43,233	44,016	68,409	79,328	65,306	61,225	79,738	82,972
Total	108,991	178,555	165,146	159,771	159,357	176,640	190,281	144,820	114,875	136,933	156,412

[1] C.i.f. value, plus calculated duties paid.
[2] Although imports from Hong Kong were not subject to AD orders, most TRBs from Hong Kong were probably of Chinese origin.

Note.—Because of rounding, figures may not add to the totals shown.

Source: Compiled from official statistics of the U.S. Department of Commerce.

Table 14-8
Tapered roller bearings: Average AD duty rates on imports from subject sources, 1991–93

(Percent ad valorem)

Order/source	1991	1992	1993
1987 AD orders:			
China	2.18	0.67	2.62
Hungary	1.76	1.68	1.68
Italy	99.96	70.92	37.35
Japan	36.39	31.98	29.59
Romania	13.96	.01	0
Former Yugoslavia	33.61	30.00	0
1976 AD order:			
Japan	26.86	9.31	8.84

Source: Compiled by the staff of U.S. International Trade Commission from U.S. Customs Service ENB database.

TRBs out of the U.S. market. Since Romania regained MFN status in late 1993, imports rose to almost $6 million in 1994.

According to data from the Commission's importers'/purchasers' questionnaires, several importers of Eastern European products shifted to nonsubject sources of supply, such as Poland and, in 1994, Russia. Nonsubject imports of TRBs rose from 4 percent of apparent U.S. consumption in 1983 to almost 8 percent in 1988, the year after the AD orders. During 1989-93, nonsubject imports accounted for 6 to 8 percent of consumption. In 1993, U.S. imports from nonsubject sources supplied 53 percent of total imports compared with 28 percent in 1983. In 1993, almost 80 percent of the nonsubject imports were from Canada, Germany, France, and the United Kingdom. The major producers in these countries are Timken, NSK, NTN, Koyo, and SKF.

BBs

Trends in shipments, subjects imports, and unit values of BBs, as well as U.S. industry market share are discussed in this section.[87] In general, U.S. imports and U.S. domestic shipments, by value and quantity, followed the trend of U.S. producers' shipments of durable goods (figure 14-12). Imports and U.S. domestic shipments of BBs peaked 1988, reflecting the demand for BBs required in components and parts of other machinery (figure 14-13).

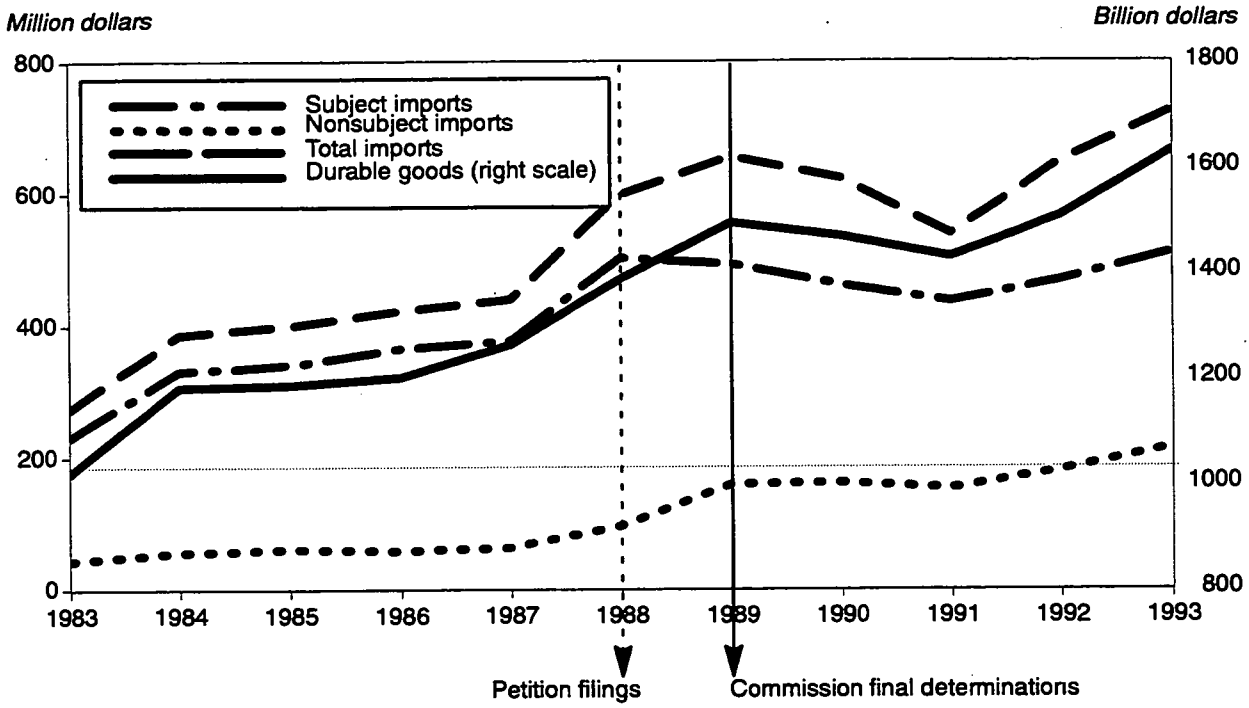
The large rise in subject import quantities in 1988 was due to imports of BBs in the 9mm to 30mm sizes, principally from Thailand. U.S. production of BBs in this size range declined as U.S. producers closed high-volume production lines during 1982-87, in part because of unfair trade practices.[88] This gap in production capacity was filled, first by subject imports and then by nonsubject imports. During the 1990-91 recession, imports and U.S. domestic shipments fell. Foreign investment in the U.S. BB industry accounted for some of the rise in U.S. domestic shipments during 1991-93. The value of total imports rose in 1989, as nonsubject imports replaced subject imports and filled areas of the market that were not served by U.S. producers (figure 14-14). Subject imports declined by 2 percent during 1988-89, coinciding with the AD/CVD orders issued in May 1989 and nonsubject imports rose by 70 percent.

Despite the orders, the value of all subject imports, except those from Japan, Singapore, and the United Kingdom, fell in 1989 (table 14-9). During 1988-93, Japan was the leading source of subject imports, and Singapore became the second leading source in 1990, displacing Germany. During 1990-91, subject imports declined from all sources, except Singapore. Nonsubject imports sources replaced and augmented subject imports during 1988-90. This shift in U.S. import sources coincided with the AD/CVD duty orders. In 1989, Canada was the leading nonsubject source of imports, followed by Taiwan, Spain, and China (table 14-9). During 1988-89, foreign producers temporarily shifted their source of bearings from Italy and Germany to Spain and Austria as production lines were transferred to the United

[87] U.S. CRB producers indicated that the economic effects of AD orders on imports of CRBs were similar to those on ball bearings, but of a lesser magnitude because about a third of U.S. CRB production is of precision CRBs used in the aerospace and defense industries and that is subject to Defense procurement regulations. In addition, demand for CRBs from the aerospace and defense markets has declined significantly since 1990.

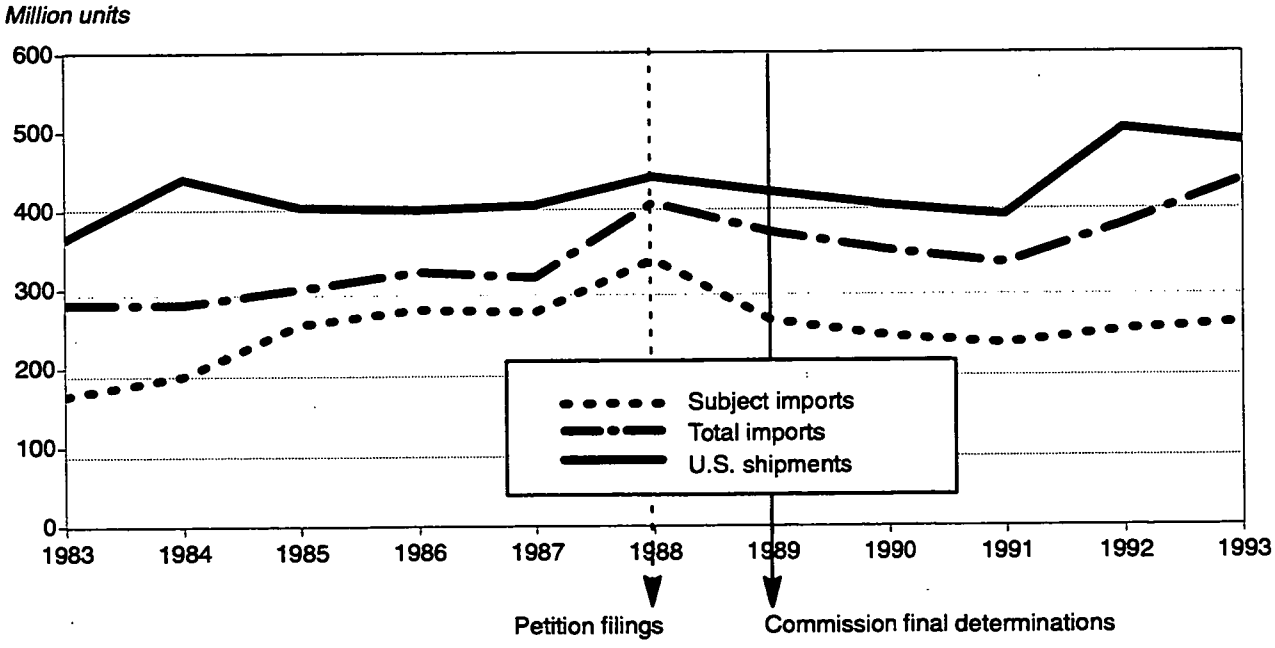
[88] The Torrington Co., official submission to the USITC, Sept. 13, 1994, p. 12.

Figure 14-12
Ball bearings: U.S. producers' shipments of durable goods, total imports, subject imports, and nonsubject imports, 1983-93



Source: Compiled from official statistics of the U.S. Department of Commerce.

Figure 14-13
Ball bearings: U.S. domestic shipments, total imports, and subject imports, by quantities,[1] 1983-93

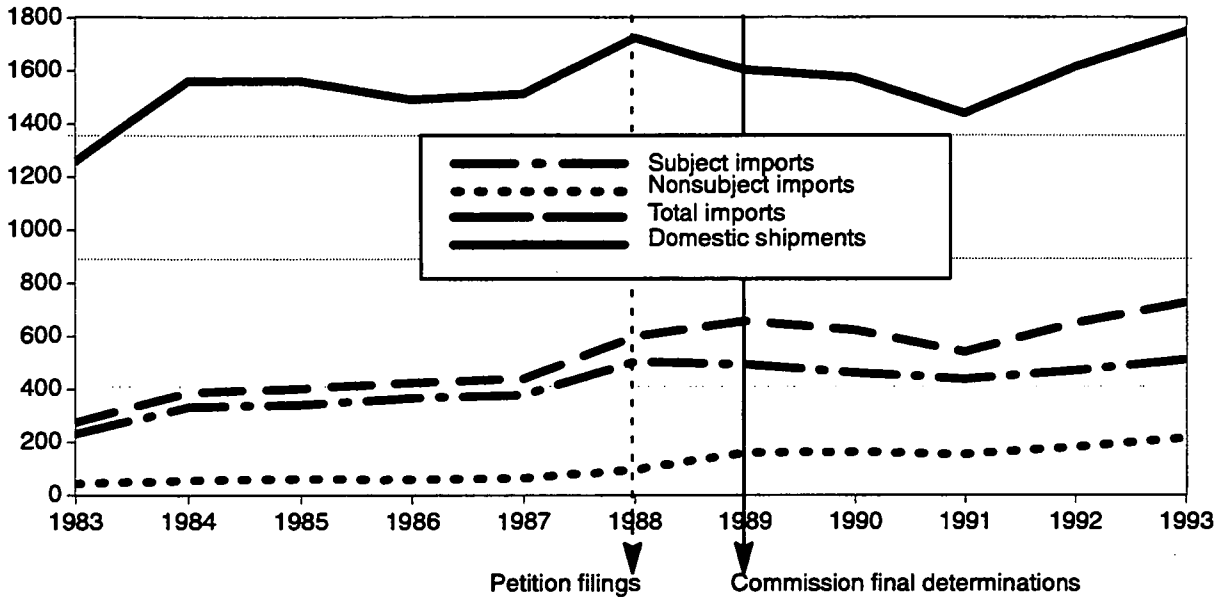


[1] Complete (finished) bearings, excluding parts.

Source: Compiled from official statistics of the U.S. Department of Commerce.

Figure 14-14
Ball bearings: U.S. domestic shipments, total imports, subject imports, and nonsubject imports, 1983-93

Million dollars



Source: Compiled from official statistics of the U.S. Department of Commerce.

States and Canada.[89] The growth in imports of BBs from Canada, Korea, and Taiwan was due to more permanent shifts in sourcing by Japanese and European producers. Imports from Hungary and Yugoslavia temporarily replaced imports from Romania,[90] which also competed with imports from China,[91] including Chinese exports from Hong Kong,[92] and from Poland.

The decline in subject imports coincided with the recession of 1990-91 and the high AD/CVD margins in effect until the first administrative review in July 1991. During 1991-93, the rise in subject imports coincided with relatively low AD/CVD margins, as shown by the average AD/CVD margins on a calendar year basis[93] of BB imports from subject sources during 1991-93 (table 14-10).

During 1988-90, the rise in prices (unit values) of U.S. domestic shipments and subject and nonsubject imports was due to the strong U.S. demand for BBs and coincided with the AD/CVD orders (figure 14-15). During 1988-90, prices of subject imports rose to offset the effects of AD/CVD duties and because importers of subject products shifted to higher value-added products. During the same period, prices of nonsubject imports rose because of strong demand.[94] The disparity between unit values of U.S. domestic shipments and subject and nonsubject imports was because imports have tended to be of more standardized, higher volume products that have lower unit prices. Subject imports also had a high weighting of small-sized ball bearings. The product mix within U.S. BB production has a higher weighting of higher priced precision bearings that accounted for about 5 percent of bearings quantities but 17 percent of value. During 1990-93, unit values of U.S. domestic shipments fell because of weak demand from the aerospace and defense markets and increased foreign investment in high-volume BB production.

[89] SKF temporarily shifted production to Spain while it transferred production lines from Sweden and Italy to the United States. FAG shifted production from Germany to Austria, before transferring production to Canada.

[90] Romania lost MFN status from July 1988 through November 1994.

[91] Peer Bearing Co., postconference brief, Mar. 9, 1991, p. 26.

[92] Imports from Hong Kong are generally from Chinese producers, as there are no producers of BBs in Hong Kong.

[93] Commission staff compared AD/CVD duties collected with subject imports by source from data collected by the U.S. Customs Service ENB database.

[94] For a discussion of prices of nonsubject imports, see USITC, *Ball Bearings, Mounted or Unmounted*, USITC publication 2374, pp. A-59—A56 and Appendix K.

Table 14-9
Ball bearings: U.S. imports for consumption, by subject and nonsubject sources, 1983-93

(1,000 dollars[1])

Source	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
Subject sources:											
Germany[2]	40,269	50,969	47,763	57,869	68,652	86,539	68,913	69,654	60,947	61,312	63,798
France	5,776	10,017	10,662	14,471	16,335	21,590	20,558	14,893	18,703	21,995	18,901
Italy	16,905	27,870	22,430	33,457	22,048	29,172	21,514	12,261	12,260	7,788	12,392
Japan	123,797	186,349	200,116	192,085	195,542	273,858	290,279	274,195	248,458	280,563	319,434
Romania	9,494	8,617	9,711	8,816	10,700	11,032	1,262	351	639	191	257
Singapore	22,563	24,206	21,579	20,810	22,037	26,156	50,708	70,699	72,853	75,912	67,619
Sweden	4,982	7,323	7,167	8,909	11,181	10,101	7,924	2,235	9,181	5,963	4,897
Thailand	139	3,143	8,209	14,310	16,336	22,487	5,578	4,067	3,504	3,839	10,151
United Kingdom	6,279	12,058	12,151	14,039	13,679	21,339	26,060	12,906	9,912	10,717	13,272
Subtotal	230,204	330,554	339,787	364,765	376,509	502,274	492,797	461,262	436,456	468,281	510,720
Nonsubject sources:											
Subject sources in the 1991 investigations:[3]											
Argentina	5	2	4	-	-	719	3,472	1,557	1,016	3	390
Austria	1,420	2,488	2,946	3,081	2,909	3,278	7,674	6,279	3,362	1,768	1,474
Brazil	640	761	699	426	154	535	2,260	1,882	2,595	1,300	3,180
Canada	27,223	32,357	32,496	32,662	35,600	47,097	50,390	48,324	54,678	57,371	67,288
China	639	514	936	773	960	6,269	13,115	16,721	21,690	34,510	48,776
Hong Kong	71	340	390	274	838	855	2,612	880	1,013	741	1,512
Hungary	1,057	99	669	441	207	2,172	3,419	4,080	1,833	911	1,418
Mexico	63	742	361	194	603	1,496	6,852	10,501	7,239	12,604	17,468
Poland	1,312	1,174	656	126	374	669	2,639	2,978	3,339	5,543	8,505
Korea	1,380	2,541	4,022	4,489	3,859	4,160	8,340	8,805	10,193	14,435	14,709
Yugoslavia[4]	1,006	1,601	1,012	790	1,202	1,886	4,610	3,378	2,283	1,150	109
Spain	248	356	601	844	1,004	2,454	15,391	8,879	7,205	3,347	3,212
Taiwan	1,631	3,252	4,627	5,697	6,496	12,241	21,931	24,990	21,011	25,375	24,879
Turkey	-	-	-	-	-	739	4,910	3,210	949	98	670
Subtotal	36,692	46,226	49,421	49,797	54,205	84,571	147,613	142,463	138,406	159,156	193,590
All other	6,370	8,950	10,831	7,829	8,742	11,038	15,294	18,618	14,145	20,839	21,253
Subtotal	43,062	55,176	60,252	57,626	62,947	95,609	162,907	161,081	152,551	179,995	214,843
Total	273,267	385,730	400,038	422,392	439,456	597,883	655,704	622,343	589,007	648,276	725,563

[1] C.i.f. value, plus calculated duties paid.
[2] Data for 1983-88 are for the former West Germany and data for 1989-90 include imports for the former East Germany—such data are negligible.
[3] This category includes 14 countries subject to AD investigations in U.S. International Trade Commission investigations Nos. 731-TA-498-511 and CVD investigation No. 701-TA-307 with respect to ball bearings and parts thereof during April-May 1991.
[4] Includes the former Yugoslavia and the new countries of Slovenia, Croatia, and Serbia and Montenegro.

Note.—Because of rounding, figures may not add to the totals shown.

Source: Compiled from official statistics of the U.S. Department of Commerce.

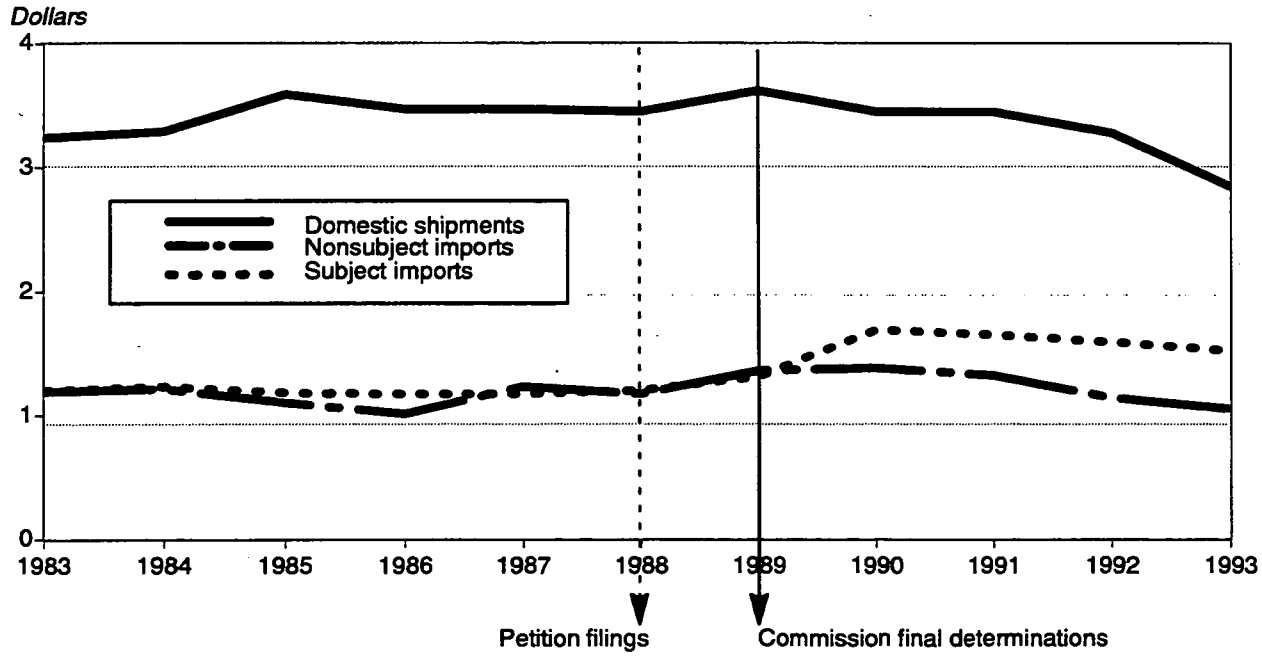
Table 14–10
Ball bearings and antifriction bearings (other than tapered roller bearings), and cylindrical roller bearings: Average AD/CVD duty rates on imports from subject sources, 1991–93

(Percent ad valorem)

Product/order type/source	1991	1992	1993
Ball bearings:			
Antidumping:			
Germany	32.35	13.31	13.79
France	38.29	10.09	11.68
Italy	86.69	8.28	10.40
Japan	22.30	9.27	9.20
Romania	34.18	12.37	19.71
Singapore	12.71	3.30	6.43
Sweden	94.35	6.66	16.08
Thailand	.23	.38	.16
United Kingdom	35.03	17.35	21.17
Countervailing duty:			
Thailand	21.45	13.34	7.66
Antifriction bearings (other than tapered roller bearings):			
Countervailing duty:			
Singapore	25.08	25.07	25.08
Cylindrical roller bearings:			
Antidumping:			
Germany	23.25	6.89	11.70
France	108.11	5.72	14.26
Italy	19.39	8.88	6.91
Japan	9.04	4.87	5.68
Sweden	35.00	5.33	10.82
United Kingdom	13.37	7.14	8.91

Source: Compiled by the staff of U.S. International Trade Commission from U.S. Customs Service ENB database.

Figure 14-15
Ball bearings: Unit values[1] of domestic shipments, subject imports, and nonsubject imports, 1983-93



[1] Unit values are based on complete bearings.

Source: Compiled from official statistics of the U.S. Department of Commerce.

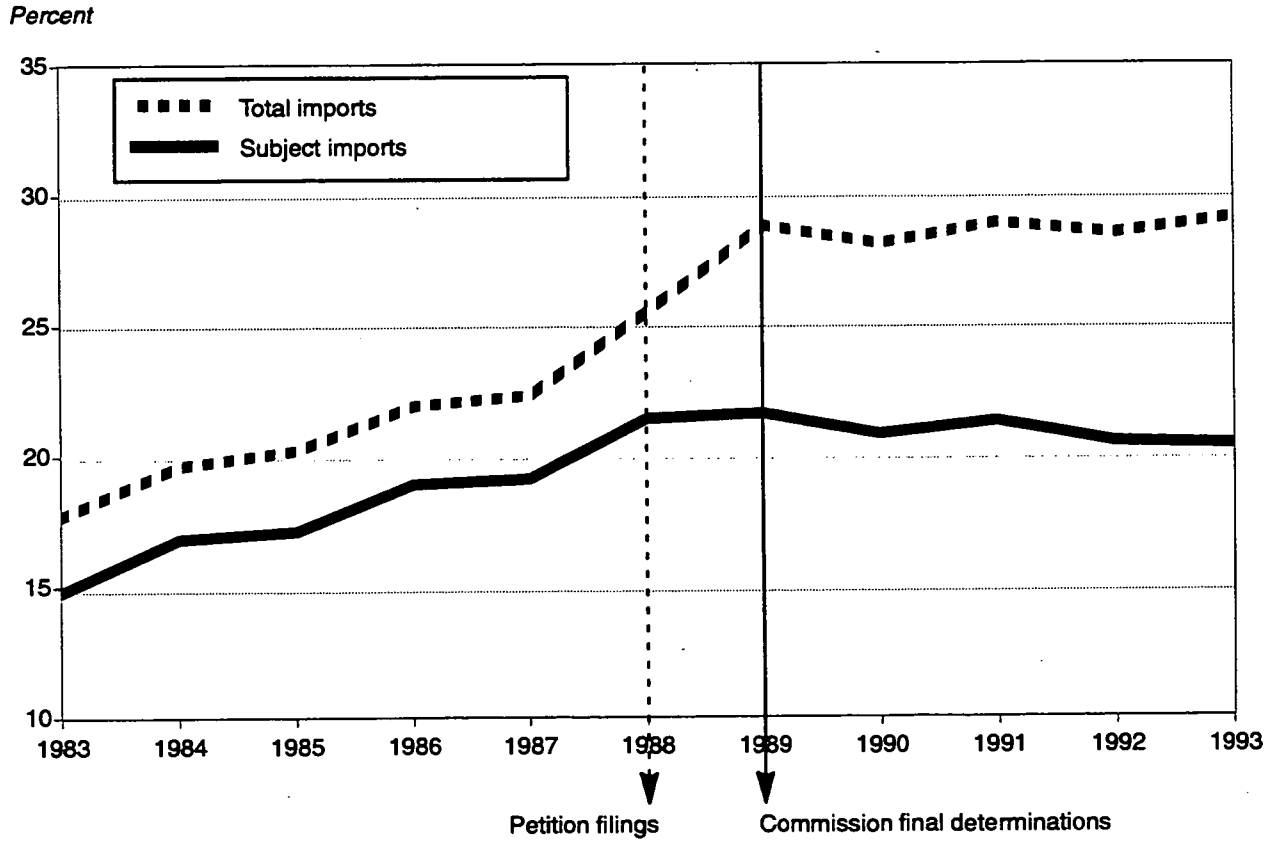
During 1983-89, U.S. industry market share of apparent U.S. consumption of BBs, by value,[95] fell from 82 to 71 percent, where it remained during 1989-93. Market share held by subject imports of BBs rose from 19 percent in 1987, the year before the petitions, to 22 percent in 1989, when the duty orders were issued (figure 14-16). During 1990-93, subject imports accounted for 21 percent of apparent U.S. consumption. This plateau in subject import market share was due in part to increased foreign investment in the United States and an increase in imports from nonsubject sources. The market share held by nonsubject imports rose from 3 percent in 1987 to 9 percent in 1993.

During 1988-92, the AD/CVD investigations and orders caused producers of ball bearings in Japan, Singapore, and Thailand to change their trade patterns between Japan, Singapore, Thailand, and the United States. Subject imports of BBs in the 9mm to 30mm sizes from Thailand and Japan were replaced by subject imports of BBs of those sizes from Singapore.[96] This shift in sources coincided with a considerable rise in Japanese exports of finished BBs to Singapore and Thailand. Japanese imports of finished BBs from Thailand also rose dramatically, but Japanese imports from Singapore declined. Minebea Ltd. of Japan, the major producer of BBs in Thailand and Singapore, most likely changed its sourcing patterns because the AD/CVD orders disrupted its U.S. market.

[95] Market share is based on value because the duty orders cover both bearings and parts.

[96] Imports of BBs in the 9mm to 30mm size accounted for the vast majority of all the BBs imported from Thailand and Singapore.

Figure 14-16
Ball bearings: U.S. total imports and subject imports as a share of apparent U.S. consumption, 1983-93



Source: Compiled from official statistics of the U.S. Department of Commerce.

Estimates of Economic Effects[97]

Time Series Analysis

Hypotheses Tested

The two time series analyses, one for TRBs and one for BBs, test whether the filing of the petitions and the final determinations had a significant impact on the volume of domestic shipments, subject imports, and nonsubject imports of TRBs and BBs. The analyses test the hypotheses that the quantity of domestic product and nonsubject imports increased while the quantity of subject imports decreased because of the case filings and final determinations.[98] The hypotheses are tested by using binary variables that partition the data into these three time periods: pre-petition, investigation, and postfinal determination periods. As was mentioned in chapter 5, the economic effects of unfair trade practices (dumping/subsidy) have not been estimated for TRBs and BBs, since it was not possible to identify the starting date for dumping/subsidization for these products.

Each of the econometric models was based on the system of simultaneous demand and supply equations outlined in the methodology section in chapter 5. To correctly reflect characteristics of the bearings market, however, a number of modifications were made to the generic 6-equation model described in chapter 5. Specifically, supply curves for the three sources—i.e., domestic producers, and subject and nonsubject countries—could not be estimated. As in the other case studies in this investigation, import supply curves from both subject and nonsubject countries were assumed to be perfectly elastic.[99] Attempts to estimate the domestic reaction functions for TRBs and BBs were inconclusive. Consequently, econometric estimates of the effects of the case filings and the determinations focused on the demand side of the bearings market.

Data Sources

The analysis uses five separate econometric models that reflect the markets for five individual types of TRBs and BBs.[100] For TRBs, the product types are (1) cup and cone assemblies entered as a set, (2) cone assemblies entered separately, and (3) cup assemblies entered separately. For BBs, the product types are (1) radial BBs from 30 mm to 51 mm in outside diameter, and (2) radial BBs from 52 mm to 100 mm in outside diameter.

Each of the econometric models for the five product categories consisted of demand equations for domestic production, subject imports, and nonsubject imports. In addition, where data availability permitted, individual demand curves for imports from each of the subject countries were estimated. Quarterly data from 1983 through 1991 were used to estimate the demand equations that are described below in equations (1)-(3).[101]

(1) Quantity of domestic product = f(filing variable, remedy variable, price of domestic product, price of subject imports, price of nonsubject imports, price of other types of substitute bearings, motor vehicle production)

[97] The economic analyses on both TRBs and AFBs used three separate frameworks: time series, computable partial equilibrium, and computable general equilibrium. Most of the variables—for example, production, employment, etc.—that USTR requested be analyzed were examined. Because of data limitations, the effects on wages, investment, and competitiveness in the petitioning, upstream, and downstream industries were not analyzed in this section. Similarly, effects to prices in upstream and downstream industries were not examined in this section. Furthermore, because of the wide variety and complexity of bearing products which fall within the AFB category, the estimates of the economic effects focused on a selected portion of AFBs, namely BBs. BBs were selected for analysis because they accounted for the major share of AFB production and also had the most complete data.

[98] According to the study done by Staiger and Wolack reviewed in chapter 5, however, subject imports could increase rather than decrease after the petition is filed and before the final determination, if importers import more in order to avoid paying the AD duties. Robert W. Staiger and Frank A. Wolack, "Measuring Industry-Specific Protection: Antidumping in the United States," *Brookings Papers on Economic Activity: Microeconomics 1994*, (1994), pp. 51-103.

[99] In addition, data on costs and the capacity utilization of foreign producers were not available to permit modeling of the supply for those sources.

[100] Each of the product types corresponds to an individual 7-digit TSUS/10-digit HTS statistical line.

[101] Technical note: Each of the regression equations in the five sets of models was independently estimated using ordinary least squares. With the exception of the binary variables, all of the data used in the estimations of the demand curves were in logarithms. Therefore, each of the regression coefficients is estimated in elasticity form. In addition, where appropriate, estimates were corrected for serial correlation by applying generalized least squared methods that used the ordinary least squared residuals to estimate the covariance across observations.

(2) Quantity of subject imports = f(filing variable, remedy variable, price of subject imports, price of domestic product, price of nonsubject imports, price of other types of substitute bearings, motor vehicle production)

(3) Quantity of nonsubject imports = f(filing variable, remedy variable, price of nonsubject imports, price of domestic product, price of subject imports, price of other types of substitute bearings, motor vehicle production)

Quantity for each of the demand equations was defined as (1) a function of its own price; (2) the price of the other directly competing products (i.e., either domestic, subject, or nonsubject); (3) the price of other types of substitute bearings; (4) production for the largest downstream consumer of bearings, motor vehicles, and (5) the filing and remedy variables.[102] The binary remedy variables for TRBs[103] took on different values depending when the duty orders went into effect. The binary remedy variables for BBs took and the same values for all subject countries.[104]

Results

The estimated coefficients for the filing and remedy variables and their related t-statistics are reported in tables 14-11 and 14-12.[105] To facilitate the presentation of the large number of coefficients that were estimated, the remainder of these estimates were summarized in tables D-11 through D-15 in the Appendix D. However, the discussion below focuses on the estimates of all of the variables in the demand functions. Coefficients with t-statistics significant at a 95-percent confidence level are highlighted in the discussion below.[106]

TRBS

In general, the TRB estimates provided modest support for the hypotheses that overall subject and nonsubject imports were affected by the filings and the determinations. In addition, the results from the analyses of the effects on domestic TRBs were inconclusive. The strongest evidence of the effects of the filings and determinations on TRB products was for the category of TRB cone assemblies. The coefficients for the filing and remedy variables for nonsubject imports of TRB cone assemblies were both positive as hypothesized and statistically significant. In addition, the remedy variable for subject imports was negative and statistically significant. The estimate of the filing variable for TRB cone assemblies suggests that nonsubject imports increased by 43 percent. Furthermore, the estimates of the remedy variables for TRB cone assemblies suggest that the volume of subject imports declined by approximately 30 percent while nonsubject imports more than doubled.

Of the individual country demand curves from subject countries that were estimated, those that occurred with filing or remedy coefficients that were statistically significant and with the correct, hypothesized sign were TRB cup and cone assemblies from Italy and Japan. The coefficient for the remedy variable for TRB cup and cone assemblies from China was positive and statistically significant. This estimate as well as the remedy estimates for TRB cup

[102] Technical note: The bearing industry is characterized by multinational producers who are capable of sourcing bearings from several countries. The provision of relief through AD/CVD duties occurred at different times for different countries in the TRB and AFB investigations. The difference in the timing of the relief would have affected sourcing decisions for multinational firms; however, these effects were not captured by the model that was used in this analysis. The estimation of such effects would have required a more complex model and more detailed data that were not available.

[103] For the TRB categories, the filing variable for imports from Italy and Japan took the value of 1 for 1986/3d quarter to 1987/3d quarter, and 0 for all other quarters from 1983 through 1991. The remedy variable imports from Italy and Japan took the value of 1 for 1987/4th quarter to 1991/4th quarter, and 0 for all other quarters from 1983 through 1987. The sequence of binary variables for imports from China, Hungary, and Romania are similar but reflect the issuance of AD orders on TRBs from these sources in the 2d quarter of 1987.

[104] For the BB categories, the filing variable took the value of 1 for 1988/2d quarter to 1989/2d quarter, and 0 for all other quarters from 1983 through 1991. The remedy variable took the value 1 for 1989/3d quarter to 1991/4th quarter, and 0 for all other quarters from 1983 through 1989.

[105] Technical Note—Coefficients of binary variables in logarithmic equations may be transformed into estimated percentage changes by raising e, the base of the natural logarithm, to the power of the coefficient, subtracting one, and multiplying by 100. See Halvorsen and Palmquist, "The interpretation of Dummy Variables in Semilogarithmic Equations," *American Economic Review*, Vol. 70, pp. 474-475.

[106] The discussion above focuses on estimates of coefficients that are significant at a 95-percent confidence level (one-tail test). The terms "significant" and "significance" here mean statistically significant and imply that there is relatively large probability, for example, 95 or more in 100, that the estimated effects of the variables labeled as significant would not have occurred by chance.

Table 14-11
Tapered roller bearings: Coefficients of filing and remedy variables[1]

Independent variable	Subject imports[2]	Non-subject imports[3]	Domestic product	Subject import-demand by individual country				
				Imports from China	Imports from Hungary	Imports from Italy	Imports from Japan	Imports from Romania
TRBs/cup and cone assemblies entered as a set:								
Case filing binary variable	0.01	0.85*	-0.03	0.43	0.65	-0.12	-0.45*	-
	(.03)	(2.97)	(-.26)	(1.17)	(.71)	(-.15)	(-3.06)	-
Remedy binary variable	-.24	.35	-.03	1.57*	1.75	-2.15*	-.51*	-
	(-.83)	(.84)	(-.25)	(3.11)	(1.49)	(-1.81)	(-2.00)	-
TRBs/cone assemblies entered separately:								
Case filing binary variable	-.18	.36*	-.01	.78	-0.06	-.99	-.11	.26
	(-1.12)	(1.79)	(-.13)	(.73)	(-0.09)	(-.85)	(-.69)	(.25)
Remedy binary variable	-.37*	.79*	.15	-.19	-0.76	1.27	-.16	.11
	(-1.89)	(3.07)	(1.38)	(-.17)	(-1.06)	(1.04)	(-.78)	(.09)
TRBs/cup assemblies entered separately:								
Case filing binary variable	-.01	-.25	.02	.31	-0.01	-.46	.04	.35
	(-.07)	(-1.18)	(-0.18)	(.27)	(-0.02)	(-.22)	(.25)	(.85)
Remedy binary variable	-.25	-.08	([4])	1.07	-0.30	-.15	-.11	1.45*
	(-1.55)	(.27)	(.01)	(.96)	(-0.36)	(-.07)	(-.58)	(2.06)

[1] T-statistics noted in parentheses. "*" indicates statistical significance at the 95 percent confidence level (one-tail test). R^2 and Durbin-Watson statistics are reported in tables D-11 through D-15.

[2] Average prices and quantities of subject imports of cup and cone assemblies entered as a set included imports from China and Japan. Average prices and quantities of subject imports of cup and cone assemblies entered separately included imports from Hungary and Japan.

[3] Average prices and quantities of nonsubject imports included imports from Canada, France, Germany and the United Kingdom.

[4] Less than .005.

Source: Estimated by the staff of the U. S. International Trade Commission.

Table 14-12
Radial ball bearings: Coefficients of filing and remedy variables[1]

Independent variable	Subject imports[2]	Non-subject imports[3]	Domestic product	Subject import-demand by individual country: Imports from France	Imports from Germany	Imports from Italy	Imports from Japan	Imports from Romania	Imports from Sweden	Imports from United Kingdom
Radial BBs greater or equaled to 30 mm, but less than 52 mm:										
Case filing binary variable ..	0.30*	-0.08	-0.02	0.36	0.37*	0.51	0.30*	0.40	-0.08	-0.28
	(2.16)	(-.33)	(-.31)	(.87)	(2.21)	(.92)	(1.75)	(.63)	(-.18)	(-.64)
Remedy binary variable	.25	.36	-.11	-.48	.60*	.34	.25	1.35	-1.55*	.06
	(1.19)	(.95)	(-.93)	(-.69)	(2.12)	(.37)	(1.11)	(1.21)	(-1.96)	(.08)
Radial BBs greater or equaled to 52 mm, but less than 100 mm:										
Case filing binary variable ..	.06	.50*	.02	-.08	.37*	.22	.05	-1.37	-.26	.03
	(.47)	(2.12)	(.39)	(-.50)	(2.07)	(.76)	(.37)	(-1.62)	(-.73)	(.12)
Remedy binary variable	.13	.43	(4)	-.24	.82*	-.14	.18	-.30	-1.45*	-.45
	(.59)	(.99)	(4)	(-.79)	(2.70)	(-.30)	(.76)	(-.19)	(-2.51)	(-1.14)

[1] T-statistics noted in parentheses. "*" indicates statistical significance at the 95 percent confidence level (one-tail test). R^2 and Durbin-Watson statistics are reported in tables D-11 through D-15.
[2] Average prices and quantities of subject imports included imports from France, Germany, and Japan.
[3] Average prices and quantities of nonsubject imports included imports from Canada and Korea.
[4] Less than .005.

Source: Estimated by the staff of the U.S. International Trade Commission.

and cone assemblies from Italy and Japan were consistent with the information obtained in the trends analysis. Imports from China were subject to smaller AD duties than imports from other subject countries. As a result, after the remedies were imposed, imports from China rose as consumers substituted away from the imports from other subject countries with the higher AD duties, especially those from Hungary.

In general, estimates of the own-price elasticities for most of the import demand functions[107] as well as the demand functions for the domestic products had the expected sign, negative, and they were statistically significant at the 95-percent confidence level. The own-price elasticities for TRBs that were statistically significant, and the correct sign ranged from -0.63 to -8.08.

Coefficients for the prices of directly competing bearings from other sources, or other types of substitute bearings, were the cross-price elasticities. If two products are substitutes, then the signs for the estimates of the cross-price elasticities will be positive. With respect to having the correct sign and being statistically significant, the estimates of the cross-price elasticities varied considerably for TRBs. In general, even estimates that had the correct, positive sign were usually not statistically significant.

The sign for the coefficients of the downstream-demand variable, motor vehicle production, were expected to be positive. In general, most of the estimates for TRBs were the correct sign; however, in most cases, these estimates were not statistically significant.

BBs

The results obtained from the analyses of BB products from all sources provided weak support for the hypotheses that the case filings and the remedies affected these products. The case filing variables for subject imports of radial BBs (30 mm to 51 mm) and nonsubject imports of radial BBs (52 mm to 100 mm) were both positive and statistically significant. In the case of the former, the positive sign of the coefficient would lend support to the alternative hypothesis that importers of the subject product increased imports during the investigation period in anticipation of an unfavorable determination.[108] Estimates of the filing variables for subject BBs (30 mm to 51 mm) suggest that the volume of these imports increased by approximately 35 percent while such imports of nonsubject BBs (52 mm to 100 mm) increased by approximately 65 percent. The only individual country demand curves from subject countries that occurred with filing or remedy coefficients and were statistically significant and with the correct, hypothesized sign were both categories of radial BBs from Sweden.

Overall, the estimates of the own-price elasticities for most of the demand functions for imports and domestic products had the expected sign, negative, and they were statistically significant at the 95-percent confidence level. The own-price elasticities for BBs that were statistically significant at the 95-percent confidence level with the correct sign ranged from -0.77 to -1.95.

The estimates of the cross-price elasticities (e.g., coefficients for the prices of directly competing bearings from other sources or other types of bearings) having the correct sign and being statistically significant varied considerably for BBs. In general, even estimates that had the correct, positive sign were usually not statistically significant. The sign for the coefficients of the downstream-demand variable, motor vehicle production, generally had the correct sign, positive. But in most instances, these estimates were not statistically significant.

Computable Partial Equilibrium Analysis

The estimated effects of dumping and unfair subsidies, as well as the estimated effects of the remedies, on the TRB and BB sectors were obtained using the CPE model discussed in chapter 5.[109] The CPE analyses for both TRBs and for BBs measure aggregate country-level effects for subject and nonsubject imports and domestic production. The results discussed below focus on the short-run effects of the unfair practice (dumping and/or subsidies) and the corresponding remedy on the price, output, and revenue of imports and domestic sales as well as the short-run effects on U.S. domestic employment.

[107] Technical Note—Due to the specification of the variables in logarithmic form, coefficients for non-binary variables in tables D-11 through D-15 can be interpreted as elasticity estimates. An elasticity is the percentage change in the dependent variable (quantity) that results from a one-percent change in an explanatory variable.

[108] See chapter 5 for further discussion on the strategic responses to filings by foreign firms.

[109] The effects of the unfair trade practices and the remedies on upstream and downstream sectors were analyzed in the subsequent section using a CGE model.

The inputs that were used in both CPE analyses are presented in tables 14-13 and 14-14.[110] In both the unfair-practice and remedy analyses for TRBs and BBs, the base-year values of domestic shipments, subject imports, and nonsubject imports in the U.S. market were obtained from publicly available data compiled by Commerce while U.S. market elasticities were obtained from previous Commission staff estimates that were used in the final AD and CVD cases.[111]

The elasticities used in the final investigations pertained to AFBs, which included BBs. In this analysis, it was assumed that the market factors that determined the magnitude of the elasticities for BBs also determined those for TRBs. Factors used in the AFB investigations to evaluate the domestic supply elasticity included capacity utilization (low to moderate),[112] the ability to convert to other product lines (low), and the leadtimes required to fill an order (low). For the import supply elasticity, the factors considered included foreign capacity utilization (low to moderate) and the ability to shift exports to alternate markets (low to moderate). Factors used to evaluate the substitution elasticity included quality (moderate) and the conditions of sale, such as the leadtimes between orders and delivery dates (moderate). Finally, because the demand for bearings is a derived demand, the factors considered to evaluate the aggregate demand elasticity included the percentage cost of bearings in final products (low) and the ability of downstream consumers to substitute to other types of bearings (low).

[110] The import demand elasticities and the domestic demand elasticities estimated in the time series analysis were consistent with the aggregate demand elasticity reported in tables 14-11 and 14-12.

[111] For further discussion of the elasticity estimates, see the public version of USITC, *Economic Memorandum, Investigations Nos. 303-TA-19 and 20 (Final), and 731-TA-391-399 (Final)*, USITC Memorandum No. EC-M-151, 1989.

[112] The terms in parentheses (i.e., low, moderate, high) indicate the range of the elasticity implied by the relevant market factor.

Table 14-13
Computable partial equilibrium analysis for tapered roller bearings: Assumed values of input variables, 1985

Input variable	Minimum	Maximum
Dumping margin[1] (*percent*)	3.0	124.8
Average U.S. tariff rate (*percent*)	8.1	(2)
Transportation ratio (*percent*)	3.7	(2)
Values for U.S. market (*1,000 dollars*):		
Domestic value	738,815	(2)
Subject value	125,786	(2)
Nonsubject value	39,360	(2)
U.S. market elasticities (*absolute value*):[3]		
Substitution:		
Domestic/subject	3	4
Domestic/nonsubject	3	4
Subject/nonsubjec	3	4
Aggregate demand	0	0.5
Supply:		
Domestic	1	3
Subject	1	3
Nonsubject	1	3

[1] The range of the dumping margins for subject countries is based on all other margins calculated by Commerce in its final investigations. See table 14-2 for individual country margins.

[2] Not applicable.

[3] Elasticities are based in part on estimates in USITC, *Economic Memorandum, Investigations Nos. 303-TA-19 and 20 (Final), and 731-TA-391-399 (Final)*, USITC Memorandum No. EC-M-151, 1989.

Source: Compiled by the staff of the U.S. International Trade Commission.

Table 14-14
Computable partial equilibrium analysis for ball bearings: Assumed values of input variables, 1987

Input variable	Minimum	Maximum
Dumping margin[1] (*percent*)	18.8	180.0
Subsidy margin[2] (*percent*)	.9	(3)
Average U.S. tariff rate (*percent*)	11.0	(3)
Transportation ratio (*percent*)	3.2	(3)
Values for U.S. market (*1,000 dollars*):		
Domestic value	1,511,799	(3)
Subject value	376,509	(3)
Nonsubject value	62,947	(3)
U.S. market elasticities (*absolute value*):[4]		
Substitution:		
Domestic/subject	2	4
Domestic/nonsubject	2	4
Subject/nonsubject	2	4
Aggregate demand	0	0.5
Supply:		
Domestic	1	3
Subject	1	3
Nonsubject	1	3

[1] The range of the dumping margins for subject countries is based on all other margins calculated by Commerce in its final investigations. See table 14-3 for individual country margins.
[2] Trade-weighted average subsidy margin for subject countries. See table 14-3 for individual subsidy margins.
[3] Not applicable.
[4] Elasticities are based in part on estimates in USITC, *Economic Memorandum, Investigations Nos. 303-TA-19 and 20 (Final), and 731-TA-391-399 (Final)*, USITC Memorandum No. EC-M-151, 1989.

Source: Compiled by the staff of the U.S. International Trade Commission.

As discussed in chapter 5, the base year used in the analysis of TRBs corresponds to the year before the AD petitions were filed against imports. The base year used in the analysis of BBs is 1987, the year before AD and CVD petitions were filed against imports from the subject countries. Similar to the method described above for TRBs, the dumping margins used in the CPE analysis were based on the final all other margins that Commerce found for individual subject countries (table 14-3).[113] In addition, the trade-weighted average subsidy margin was calculated from individual subsidy margins (table 14-3). The results of the unfair practices and the remedies for TRBs and BBs are summarized in tables 14-15 and 14-16.

[113] Technical note: Because of the wide range in dumping margins for BBs, CPE estimates based on a single "average" dumping margin would tend to overstate the effects of dumping. This bias was corrected by separating subject imports into two groups: those facing "high" dumping margins and those facing "low" dumping margins. Two separate CPE analyses were done for each of these groups. The results reported in table 14-16 are the sum of these two separate analyses. The "low" and "high" average dumping margins applied in the two analyses were based on the all other margins found by Commerce.

Effects of unfair trade practices

The estimated effects of the dumping on TRBs and BBs are reported in tables 14-15 and 14-16. The CPE results are based on midpoint values of parameter ranges from tables 14-13 and 14-14. The effects on prices, output, and revenue are reported as a share of the "fair" values that would have existed had the dumping of TRBs and BBs not occurred. These effects are reported under the "Unfair trade practice" column in the above-mentioned tables.

The analysis for TRBs (table 14-15) indicates that domestic prices were 5 percent lower than their "fair value" as a result of the dumping. Consequently, the estimated loss to domestic revenue was 13 percent of fair-value revenue. Subject import prices were estimated to have declined by 24 percent, which consequently caused the quantity of subject imports to increase by 105 percent. The decline in the price of nonsubject imports was 5 percent, while quantities of nonsubject imports declined by 8 percent. As a result of dumping, domestic employment fell by 7 percent.

The CPE analysis for BBs simultaneously examines the effects of dumping and unfair subsidies. Because the AD/CVD margins and the market share

Table 14-15
Tapered roller bearings: Results of computable partial equilibrium analysis (estimated effect on U.S. market of unfair trade practices and remedies), base year 1985[1]

Item	Unfair trade practice	Unfair trade practice and remedy	Remedy
	— *(Change from fair value)*[2] —		*(Change from actual value)*[3]
Impact on industry *(percent)*:			
Domestic price	-4.8	-3.0	1.9
Domestic output	-8.4	-4.8	3.9
Domestic revenue	-12.8	-7.6	6.0
Domestic employment	-6.7	-3.7	3.2
Impact on imports *(percent)*:			
Subject import price	-23.6	-14.1	12.4
Subject import quantity	104.5	47.6	-27.8
Subject import revenue	56.1	26.1	-19.2
Nonsubject import price	-4.8	-2.8	2.1
Nonsubject import quantity	-8.4	-4.6	4.2
Nonsubject import revenue	-12.8	-7.3	6.3
Welfare effects (*1,000 dollars*):			
Gain to consumers	65,692	37,112	-28,532
Benefit to producers	-34,826	-21,244	14,862
Net welfare effects	30,866	15,869	-13,670

[1] The estimated effects reported are the results of the Commission's CPE model using the midpoint values of parameter ranges from table 14-13.
[2] The "fair values" are the values estimated by the model to have been in place without the effect of the unfair trade practice.
[3] The "actual values" are the market values during the base year.

Source: Estimated by the staff of the U.S. International Trade Commission.

Table 14-16
Ball bearings: Results of computable partial equilibrium analysis (estimated effect on U.S. market of unfair trade practices and remedies), base year 1987[1]

Item	Unfair trade practice	Unfair trade practice and remedy	Remedy
	— *(Change from fair value)*[2] —		*(Change from actual value)*[3]
Impact on industry *(percent)*:			
Domestic price	-6.8	-2.5	4.6
Domestic output	-12.7	-4.7	9.2
Domestic revenue	-19.1	-7.8	14.0
Domestic employment	-11.7	-4.3	8.4
Impact on imports *(percent)*:			
Subject import price	-27.3	-15.7	15.9
Subject import quantity	221.9	47.1	-54.3
Subject import revenue	134.9	24.7	-46.9
Nonsubject import price	-9.4	-2.7	7.4
Nonsubject import quantity	-18.0	-5.5	15.2
Nonsubject import revenue	-26.4	-9.3	23.2
Welfare effects (*1,000 dollars*):			
Gain to consumers	211,916	74,318	-135,783
Benefit to producers	-105,569	-37,498	70,428
Net welfare effects	106,347	36,820	-65,355

[1] The estimated effects reported are the results of the Commission's CPE model using the midpoint values of parameter ranges from table 14-14.
[2] The "fair values" are the values estimated by the model to have been in place without the effect of the unfair trade practice.
[3] The "actual values" are the market values during the base year.

Source: Estimated by the staff of the U.S. International Trade Commission.

for subject BBs were larger than those for subject TRBs, the estimated effects of the unfair trade practices in the BB market were larger than the estimated effects of the unfair trade practices in the TRB market. The analysis for BBs (table 14-16) indicates that the estimated loss to domestic revenue was 19 percent of fair-value revenue; the decline in domestic prices was 7 percent. Subject import prices were estimated to be 27 percent lower than their fair value, which consequently caused the quantity of subject imports to increase by 222 percent. The quantity of nonsubject imports declined by 18 percent. As a result of the dumping and unfair subsidies, domestic employment fell by 12 percent.

Effects of remedies

The estimated effects of the remedy on TRBs and BBs are reported in tables 14-15 and 14-16. The CPE results are based on the midpoint values of parameter ranges in tables 14-13 and 14-14. The effects of the AD duties on prices, output, and revenue are reported as a share of both the fair-value and the actual market value. When measured as a share of fair-value, the estimates are, by definition, the combined effects of the unfair trade practice and the remedy. These results show the extent to which the remedy does not offset the unfair trade practice. The effects relative to fair value are reported under the column "Unfair trade practice and remedy" in the above-mentioned tables.

The remedy effects relative to fair value suggest that the AD/CVD duties for TRBs and BBs would have suppressed home-market prices in subject countries as these products were diverted out of the U.S. market. For this reason, subject product exporters could have eliminated dumping without raising average U.S. prices by the full Commerce margin. As explained in chapter 5, this incomplete pass-through of the AD duties for TRBs and BBs is a terms-of-trade effect.[114]

In the case of TRBs, domestic price and nonsubject prices remained 3 percent below their fair values, indicating that the remedy did not completely offset the effect of the dumping. Similarly, the subject price remained 14 percent below fair value. After the imposition of the AD duties, domestic employment remained 4 percent below its fair value.

The effect of the remedy relative to the actual market value in 1985 shows that domestic TRB prices increased by 2 percent while domestic output increased by 4 percent. The price of subject imports increased by 12 percent and import quantity declined by 28 percent. The price and quantity of nonsubject imports increased by 2 and 4 percent, respectively. Finally, as a result of the remedy, domestic employment increased by 3 percent relative to the actual value.

The CPE analysis for BBs simultaneously examines the effects of imposing AD/CVD duties (table 14-16). In terms of the fair value, domestic price and nonsubject prices remained 3 percent below their fair values. The subject price remained 16 percent below fair value. After the imposition of the AD/CVD duties, domestic employment remained 4 percent below its fair value.

The remedy effect shows that domestic output increased by 9 percent relative to the actual market value in 1987. Domestic prices increased by 5 percent; subject import price increased by 16 percent, and import quantity declined by 54 percent. The price and quantity of nonsubject imports increased by 7 and 15 percent, respectively. Domestic employment increased by 8 percent relative to actual value as a result of the imposition of the AD/CVD duties.

The remedy estimates relative to actual market values for both TRBs and BBs can be compared for consistency to the remedy-variable estimates obtained in the econometric analysis. In general, only a few of the results obtained from the CPE analysis were consistent with the results obtained in the econometric analysis. For instance, in the econometric analysis, the remedy variable estimate suggested that the quantity of subject imports of TRB cone assemblies declined by 31 percent after the AD remedy was imposed. This estimate is of a similar magnitude to the 28-percent decline in quantity estimated for subject TRBs in the CPE analysis. In addition, the remedy variable for both types of ball bearings from Sweden suggested that these subject imports declined by approximately 80 percent. The estimated quantity decline for subject BBs in the CPE analysis was 54 percent.

Net Welfare Effects

The net welfare effects are also reported in tables 14-15 and 14-16. The net welfare effects resulting from the unfair practices as well as the remedies are based on the midpoint values of parameter ranges from tables 14-13 and 14-14. The results that are reported focus on the gains to consumers, the benefits to producers, and the overall net change to national income. In general, the benefits to producers will

[114] See chapter 5 for further discussion of the pass through issue.

include increases in the incomes of producers in the bearings sector and increases in the income of producers in sectors that are upstream to bearings, such as the steel sector. Similarly, the gains to consumers reflects gains to final consumers in the economy as well as gains to producers in downstream sectors such as the automotive and industrial machinery sectors who use bearings as a components in their products.

As a result of the lower prices resulting from dumping, consumers of TRBs received a $66 million gain in consumer surplus. However, producers experienced a loss of $34 million. The overall net welfare gain to the economy as a result of the dumping was $31 million.

The net welfare results for the BB market are presented in table 14-16. As a result of the lower prices resulting from dumping and unfair subsidies, consumers of BBs received a gain in consumer surplus of $212 million. However, BB producers experienced a loss of $106 million. The overall net welfare gain to the economy as a result of the dumping and unfair subsidies was $106 million.

As discussed in the remedy section above, with the suppression of home market prices in subject countries, the AD duties alone for TRBs and BBs would not have returned TRB and BB prices to their fair values in the U.S. market. Because of the incomplete pass-through of the remedy, the economy would continue to experience a net gain. (These results are reported in tables 14-15 and 14-16 in the third column entitled "Unfair trade practice and remedy".)

The CPE results suggest that TRB producers continued to lose $21 million after the imposition of AD duties. However, after the imposition of the TRB remedy, the economy continued to benefit by a net gain of $16 million. Similarly, the CPE results suggest that BB producers continued to lose $37 million after the imposition of AD duties. However, after the imposition of the BB remedy, the economy continued to experience a net gain of $37 million.

Upstream and Downstream Effects

Similar to the comparative-static analysis conducted above using the CPE framework, an analysis of the effects of the dumping and the remedies on upstream and downstream industries was conducted using a CGE framework. The main advantage of the CGE framework is that it specifically models the upstream and downstream sectors most heavily linked to the bearings sector. To give an indication of the relative magnitude of the upstream and downstream effects, the effects to the aggregate ball and roller bearings sector were included for comparison in tables 14-17 and 14-18. The CGE results discussed below bear on the short-run effects of the unfair practice and the corresponding remedy on U.S. domestic employment and output.

In the ITC model, the ball and roller bearings sector is defined by the 4-digit SIC industry 3562. Therefore, to conduct the comparative-static CGE analysis, the AD/CVD margins that were applied in the CPE analysis were weighted by the subject-import share of total imports for SIC industry 3562.[115] Using these trade-weighted margins, two separate CGE analyses were conducted to examine the effects of dumping: one for the effects of the TRB dumping and one for the effects of the BB dumping.[116] Similarly, two separate CGE analyses were conducted to examine the effects of the remedies.

Unfair trade practices

The estimated effects of the dumping of TRBs are reported in table 14-17. The effects on domestic employment and output are reported as a share of the "fair" value of these variables that would have existed had the dumping of TRBs not occurred. A similar interpretation applies to the results reported for BBs in table 14-18.

The analysis for the TRB dumping indicates that the effects were concentrated primarily in the ball and roller bearings and parts sector. As a result of the dumping, domestic output and employment in this primary focus sector were both 2.9 percent lower than their fair value. This figure corresponds to an employment loss of 1,223 jobs and a corresponding decline in domestic output of $33 million. In general, potential changes in output and employment to upstream and downstream sectors resulting from the dumping were negligible, with all changes to these sectors amounting to less than 0.05 percent. Changes to employment and output to other sectors in the rest of the U.S. economy were also negligible.

[115] In 1985, the year prior to the filing of the AD petition on TRBs, subject imports of TRBs accounted for approximately 17 percent of total imports for SIC industry 3562. In 1987, the year prior to the filing of the AD/CVD petitions on AFBs, subject ball bearings and parts accounted for approximately 54 percent of total imports of SIC industry 3562.

[116] Because of the small magnitude of the trade-weighted subsidy margin, 0.6 percent, the analysis for ball bearings focused on the effects of the dumping.

Table 14-17
Computable general equilibrium analysis for tapered roller bearings: Estimated effects of the dumping and the AD remedy on U.S. domestic employment and output

Sector	Effects of dumping				Effects of dumping and AD remedy			
	Employment		Output		Employment		Output	
	Number[1]	Percent	Value[2]	Percent	Number[1]	Percent	Value[2]	Percent
			Million dollars				*Million dollars*	
Primary focus sector:								
Ball and roller bearings, and parts	-1,223	-2.9	-33	-2.9	-136	-0.3	-4	-0.3
Upstream sectors:								
Steel	-3	(4)	-1	(4)	-8	(4)	-2	(4)
Downstream sectors:								
Farm and garden machinery	-1	(4)	(3)	(4)	-2	(4)	(3)	(4)
Machine tools	-3	(4)	(3)	(4)	-6	(4)	-1	(4)
Industrial machinery	-7	(4)	-1	(4)	-13	(4)	-2	(4)
Special industrial machinery	-4	(4)	(3)	(4)	-6	(4)	-1	(4)
Automotive industry	19	(4)	6	(4)	-5	(4)	-1	(4)
Aircraft and missile equipment	-42	(4)	-9	(4)	-57	(4)	-12	(4)
Rest of the U.S. economy:								
Agriculture, forestry, and fisheries	-25	(4)	-5	(4)	-50	(4)	-9	(4)
Mining	-3	(4)	-1	(4)	-10	(4)	-2	(4)
Construction	13	(4)	2	(4)	-5	(4)	(3)	(4)
Nondurable manufacturing	3	(4)	(3)	(4)	-40	(4)	-8	(4)
Durable manufacturing	31	(4)	-5	(4)	-119	(4)	-19	(4)
Transportation, communications, and utilities	43	(4)	8	(4)	-30	(4)	-5	(4)
Wholesale and retail trade	365	(4)	23	(4)	138	(4)	9	(4)
Finance, insurance, and real estate	160	(4)	37	(4)	63	(4)	17	(4)
Other services	566	(4)	47	(4)	117	(4)	12	(4)

[1] Full-time equivalents.
[2] In base year prices.
[3] Change less than 1 million dollars.
[4] Change less than 0.05 percent.

Source: Estimated by the staff of the U.S. International Trade Commission.

Table 14-18
Computable general equilibrium analysis for ball bearings: Estimated effects of the dumping and the AD remedy on U.S. domestic employment and output

Sector	Effects of dumping				Effects of dumping and AD remedy			
	Employment		Output		Employment		Output	
	Number[1]	Percent	Value[2]	Percent	Number[1]	Percent	Value[2]	Percent
			Million dollars				*Million dollars*	
Primary focus sector:								
Ball and roller bearings, and parts	-4,222	-10.0	-114	-10.0	-461	-1.1	-12	-1.1
Upstream sectors:								
Steel	-11	(4)	-2	(4)	-26	(4)	-5	(4)
Downstream sectors:								
Farm and garden machinery	-4	(4)	-1	(4)	-6	(4)	-1	(4)
Machine tools	-10	(4)	-1	(4)	-18	(4)	-2	(4)
Industrial machinery	-22	(4)	-3	(4)	-43	(4)	-6	(4)
Special industrial machinery	-12	(4)	-1	(4)	-18	(4)	-2	(4)
Automotive industry	67	(4)	22	(4)	-16	(4)	-5	(4)
Aircraft and missile equipment	-138	(4)	-29	(4)	-189	(4)	-39	(4)
Rest of the U.S. economy:								
Agriculture, forestry, and fisheries	-82	(4)	-16	(4)	-163	(4)	-29	(4)
Mining	-8	(4)	-2	(4)	-31	(4)	-8	(4)
Construction	45	(4)	7	(4)	-16	(4)	(3)	(4)
Nondurable manufacturing	10	(4)	2	(4)	-131	(4)	-25	(4)
Durable manufacturing	-97	(4)	-15	(4)	-390	(4)	-61	(4)
Transportation, communications, and utilities	150	(4)	27	(4)	-99	(4)	-16	(4)
Wholesale and retail trade	1,246	(4)	77	(4)	457	(4)	31	(4)
Finance, insurance, and real estate	547	(4)	127	(4)	207	(4)	56	(4)
Other services	1,941	(4)	160	(4)	391	(4)	39	(4)

[1] Full-time equivalents.
[2] In base year prices.
[3] Change less than 1 million dollars.
[4] Change less than 0.05 percent.

Source: Estimated by the staff of the U.S. International Trade Commission.

Similar to the analysis for TRB dumping, the analysis for ball bearings dumping indicates that the effects were concentrated primarily in the ball and roller bearings and parts sector (table 14-18). Domestic output and employment in this sector were both 10 percent lower than their fair value. This figure corresponds to an employment loss of 4,222 jobs and a corresponding decline in domestic output of $114 million. In general, potential changes in output and employment to upstream and downstream sectors resulting from the dumping were negligible, with all changes to these sectors amounting to less than 0.05 percent. Similar employment and output effects were observed for other sectors in the U.S. economy.

Remedies

The estimated effects of the remedy for the TRB dumping were reported in table 14-17. The estimated effects of the remedy on domestic output and employment indicated that both of these variables were 0.3 percent lower than the fair value. The interpretation of these remedy results is somewhat more complex than the dumping effects. The results indicated that after the remedy was imposed, domestic output and employment for the entire ball and roller bearings sector continued to remain below the fair value level by a very small amount. Similar to the dumping effects, remedy effects for upstream and downstream sectors were negligible, with all changes to these sectors amounting to less than 0.05 percent.

The CGE analysis for the BB remedy is presented in table 14-18. The results indicate that after the remedy was imposed, domestic output and employment for the entire ball and roller bearings sector continued to remain below the fair-value level by 1.1 percent. This amounts to shortfalls in output and employment of $12 million and 461 jobs. Remedy effects for all upstream and downstream sectors remained negligible. It should be noted that, unlike the CPE model used earlier, the ITC CGE model does not distinguish between subject and nonsubject imports. Furthermore, although the CPE analysis was focused on narrowly defined markets, specifically examining the effects of dumping and the remedy to the TRB and BB markets, the CGE model was held to examining only these effects on the more aggregated ball and roller bearings sector. Consequently, the percentage changes to employment and output were smaller in the CGE analysis, because they applied to the entire ball and roller bearings sector.

In addition, the ITC CGE model does not have the flexibility to examine the effects of the dumping and remedies for the base years that were used in the CPE analyses. The CPE base years were 1985 and 1987, the years prior to when the cases were filed for TRBs and AFBs, respectively. The base year for which the CGE model is constructed is 1991. Because of this difference in base years, the comparative static results of the CGE analyses do not correspond directly to the results obtained in the CPE analyses. Nonetheless, the CGE analyses give a general indication of the potential magnitude of the dumping and remedy effects on upstream and downstream industries.

COMMISSIONER COMMENTS

Comments of Chairman Peter S. Watson and Commissioner Carol T. Crawford

We commend the staff of the U.S. International Trade Commission (USITC) for the outstanding work completed in response to the request from the United States Trade Representative (USTR) to estimate the economic effects of antidumping and countervailing duty orders (AD/CVD) and suspension agreements. This study represents one of the most difficult and comprehensive technical analyses ever performed by the Commission staff. We believe it will prove to be an invaluable tool assisting a wide audience of trade policy makers, industry members, researchers, and others in understanding the economic effects of "unfair" trade practices and remedies. At a time when trade barriers are increasingly a focal point of policy concern, the Commission has extended the scope and depth of knowledge in this critically important area in a significant way.

The results of this study confirm that U.S. AD/CVD laws have many different economic effects on the U.S. economy. While the study reveals that AD/CVD remedies typically benefit successful petitioning industries by raising prices and improving output and employment, the study also demonstrates that the costs to the rest of the economy are far greater. The study conservatively estimates that the U.S. economy would have experienced a net welfare gain of $1.59 billion *in the year 1991 alone*, had outstanding U.S. AD/CVD orders not been in effect.[1] In other words, the study shows that in 1991, outstanding AD/CVD orders imposed costs on consumers, downstream industries, and the economy as a whole of at least $1.59 billion greater than the benefits enjoyed by successful petitioning industries and their employees.

The study produced a conservative estimate of the costs to the economy, as it does not capture the *cumulative* effects of outstanding AD/CVD orders, orders that were revoked, suspended, withdrawn, or terminated, or the effects of orders that were put in place after 1991.[2] Had these additional economic effects been included in the estimation, the net costs likely would have been far greater.

These estimates are consistent with other estimates of the economic effects of import restraints generally. As the study shows, AD/CVD orders rank third behind the Multifiber Arrangement restrictions and the Jones Act maritime restrictions in their net costs to the economy,[3] thereby acting as a tax on consumers and other groups, such as downstream industries, that do not directly benefit from the laws. It was in this spirit that President Clinton referred to the GATT and its associated tariff reductions as "the biggest world tax cut in history."[4]

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[1] The study also cites an alternative set of cost estimates showing that, without the outstanding AD/CVD orders, workers and firm owners would have lost up to $1.09 billion, while the rest of the economy would have gained up to $2.94 billion. Under this approach, the net welfare gain to the U.S. economy without the AD/CVD orders would have been $1.85 billion.

[2] There have been over 110 new orders issued since 1991.

[3] USITC, *The Economic Effects of Significant U.S. Import Restraints*, USITC publication No. 2699, Nov. 1993.

[4] "Vote on Trade Pact Postponed Until After Elections", *St. Louis Post Dispatch*, October 6, 1994, page 3A.

The Commission also conducted a series of exhaustive case studies, representing the typical caseload of agricultural, high–technology, and commodity industries, final and intermediate products, and new and mature industries. In addition to providing comprehensive time series and comparative static analyses, the case studies focus greater attention on effects of these laws that are not easily quantifiable. These studies demonstrate that AD/CVD orders have extensive price and output effects, and highlight the role of fair value imports in offsetting the benefits gained by successful petitioning industries.

It is important to note, however, that the study does not address whether the level of protection provided by the U.S. government to domestic industries is "appropriate", since this is a policy, not an empirical, question. This study merely provides an empirical estimation of certain costs of protection, and identifies the winners and losers of AD/CVD laws, using actual industry data and proven and accepted methodologies. In this respect, this study provides an objective basis for trade analysts and policy makers to make informed decisions about these important matters.

Throughout the conduct of this study, the Commission strove to achieve the highest degree of precision that is professionally possible given the complex task at hand. The request received from the USTR over two years ago specifically asked the Commission to employ comprehensive empirical analyses and formal quantitative economic methodologies in estimating the economic effects of "unfair" trade practices and remedies, both economy–wide and in a sample of industries. The USTR did not, however, merely ask the Commission to perform an academic modeling exercise, and it would be an injustice to characterize this comprehensive analysis as such. Rather, this study represents the collective efforts of a team of industry, investigative, economic, and legal Commission experts. Over the past two years, these Commission experts worked intensively to answer the USTR's request in a complete, balanced, and thoroughly rigorous analytical manner.

For example, in performing analyses of the economic effects of "unfair" trade practices and remedies in the eight case study industries, the Commission employed a team research effort similar to that used in every antidumping and countervailing duty investigation actually voted on by the Commission. Specifically, each case study team was composed of Commission industry, investigative, and economic experts. The investigative expert on each case study team worked on the original antidumping or countervailing duty investigations in each respective industry, as did most of the industry experts. Thus, the report benefits from the extensive knowledge and experience of all those who contributed to the report.

In completing this study, Commission staff also conducted extensive research to gather actual, historical data to use as an objective basis for analysis. The case study analyses requested by the USTR necessitated large and complex data requirements. To approximate conditions in the markets studied, Commission staff collected industry data from petitioners and downstream purchasers via questionnaires and association and industry interviews. The Commission held two days of public hearings to gather the views of industry members, scholars, government agencies, and other interested parties.

Staff also performed extensive reviews of existing literature with respect to the methodologies employed, as well as each industry studied, and contacted industry experts, academics, and researchers for their views and expertise. The empirical methodologies employed by the Commission staff in this study were made available to the public for comment. Thus, the basis for the empirical analysis in this study is well grounded in reality and is not simply a theoretical construct.

The highest standards of procedure and review were followed by staff throughout the completion of this study. The study identifies very carefully how each data base underlying each empirical analysis was constructed, the assumptions underlying the analysis, and the basis for such assumptions. The methods used and assumptions employed in each analysis, therefore, are

transparent to the reader. To the extent there are limitations on the analysis, they have been made clear in the study.

The modeling techniques used by the Commission staff to respond to the USTR's request are well accepted in the economic and scientific community and represent state–of–the–art analytical methods. The Commission's United States Computable General Equilibrium (CGE) model and its predecessors have been described and documented in scientific publications. Such peer review and acceptance is the mechanism for determining the usefulness and quality of economic models, and the Commission's CGE model has been well–received in this community. The Commission is unique in having the modeling capability to undertake a study of this magnitude. The CGE model has been applied by the Commission staff extensively to estimate the welfare effects of changes in trade laws and policies (including those associated with NAFTA and the Uruguay Round and in previously–published Commission studies).[5]

In sum, we have substantial confidence in the findings and conclusions of this study. It represents a broad–based, comprehensive assessment of a very complex topic. Its completion represents a significant accomplishment for the staff of the Commission, and evidence of the ability of the Commission to perform a balanced, objective, and rigorous assessment of the economic effects of "unfair" trade practices and remedies.

[5] See, for example, USITC, *The Economic Effects of Significant U.S. Import Restraints.*

Views of Vice Chairman Janet Nuzum and Commissioner David Rohr

We have approved this report to enable the Commission as an institution to comply with the June 30, 1995 deadline set by the U.S. Trade Representative in his request letter.[1] We do so with certain reservations, however, about the adequacy of this report in presenting a balanced and comprehensive discussion of relevant issues.

This study provides a number of insights into the economic effects on the U.S. economy of dumping and subsidies and the orders and agreements that can be put in place to offset them. In attempting to answer the specific questions posed by the U.S. Trade Representative, however, it became clear to us that we have not been able to provide the full picture of the impact of unfair trade practices on the domestic economy. While the Commission's methodologies and research provide some partial answers, they suggest a variety of other issues that need to be explored in order to make a sound evaluation of the unfair trade phenomenon and the regime used to counteract this phenomenon. In providing these additional views, we are attempting to identify at least some of the major issues on which further work would need to be done to achieve a more accurate assessment.

Limitations of the CGE modeling exercise

One must first recognize that any modeling effort is inherently limited by its structure and assumptions. Modeling results, therefore, must be interpreted with an understanding of such structure and assumptions. For example, the Commission's CGE analysis merely provides a snapshot of the economy as affected by AD/CVD orders in 1991. Being, by definition, concerned with only a single year, the impact of unfair trade practices on a cumulative basis has not been considered. While the losses to an industry due to dumping may not, in themselves, be substantial in a particular year, cumulative losses may, over time, lead to large scale plant closures or unemployment.

The short-term focus of the Commission's CGE modeling exercise also overlooks the long-term competitiveness implications of injury from unfair trade practices. In many industries, particularly high technology industries, maintenance of U.S. competitiveness requires a continuous progression of technological innovation, product development and capital investment. Unfair trade practices have a short-term effect on production and income, which is captured by our modeling effort. However, they also can have more damaging long-term effects by causing the U.S. industry to fall behind its foreign competitors. In certain cases, the U.S. industry simply never catches up. This downward spiral in the condition of the industry may not be quantifiable through a model, but is nevertheless a real world effect of dumping practices, particularly in today's fast-paced global economy.

Second, the CGE model assumes that the size of the dumping or subsidy margin is a full and accurate measurement of the effect of unfair trade practices. Dumping and subsidy practices have other effects, however, which are not necessarily dependent on the margin. The mere presence of dumping or subsidies, for example, can discourage investment or the most efficient allocation of resources.

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[1] *See Public Service v. Federal Power Commission*, 543 F.2d 757, 777 (D.C. Cir. 1974) ("Commissioners, no less than judges, may cast their votes solely to void an impasse, or otherwise to draw the administrative phase to a close.").

Third, it is important to understand that a number of simplifying techniques are employed in the modeling exercise, and that these assumptions drive certain effects. For example, different dumping or subsidy margins assessed on individual companies are simply averaged. There is assumed to be full pass-through of the unfair trade margin on price. And, large aggregations of industries were used in the CGE modeling rather than the specific industries to which dumping findings apply. In each case, the assumption or technique may be perfectly appropriate, or even necessary in a modeling exercise, but each represents a further removal from the "real" world.

Foreign market barriers

Furthermore, one area not explored in this study is foreign market access barriers in those countries found to be dumping. This area of inquiry is important in at least two respects. First, the ability of foreign producers to engage in dumping, and to sustain those practices, is usually a reflection of some degree of home market protection. This underlying cause of dumping has long been recognized by economists and policymakers alike. Thus, the range of effects of dumping practices includes not only the reduced U.S. prices of the dumped imports and resultant injury to U.S. producers, but also the higher prices and reduced competition in the foreign market. Second, to the extent that U.S. producers in particular are impeded from competing in the dumping producers' home markets, U.S. producers suffer from lost sales opportunities and the attendant volume, employment, and revenue effects of those lost opportunities. These economic effects have not been captured by the analysis in this report.

Distributional effects within the United States

By focusing on the aggregate economy-wide effects, this study also does not recognize or take into account certain distributional effects within the United States of unfair trade practices. The real world effects of unfair trade practices affect not hypothetical households, but real firms and real workers, with particular skill levels, who work in particular geographic areas of the country. The opportunities for those firms and workers to engage in other productive pursuits in the absence of trade remedies are a function of the state of the economy in their region, their mobility, and the transferability of their skills. Put another way, the social costs of unfair trade are more severe when jobs are tight due to recessions or when a company put out of business by the unfair trade is the principal employer in town.

This study, however, does not analyze the disproportionate distributional effects that unfairly traded imports or their remedies may have had, for example, on certain parts of the United States, or certain types of workers (such as by income level, educational level, or skill level). It also does not examine the real costs of reallocating resources (i.e., adjustment) over time based on the particular circumstances facing those firms and workers affected by the unfair trade.

Fundamental policy objective of the trade laws

Finally, when viewing the conclusions of this report, it must be remembered that the purpose of the antidumping and countervailing duty laws is not to protect consumers, but rather to protect producers. Inevitably, some cost is associated with this purpose. However, unlike the antitrust laws, which are designed to protect consumer interests, the function of the AD/CVD laws is, indeed, to protect firms and workers engaged in production activities in the United States. So it should not come as a surprise that the economic benefits of the remedies accrue to producers, and the economic costs accrue to consumers. The United States Government, through legislation, has made a conscious policy choice to provide these trade remedies in recognition of

the reality that free and open trade does not yet exist worldwide. We concur with Commissioner Bragg's observation that the alternative to these trade remedies is most likely to be politically-driven decisions, which may have even more profound costs to our economic interests.

Concluding observations

This report represents an attempt to look back at what happens after certain government actions were taken, and to enable our policymakers to assess the effectiveness of those actions. This is a very worthy purpose, and we are proud of the fact that the Commission has been entrusted with this task. Much of the information in this report, particularly in the case studies, makes an important contribution to a more informed understanding of the effects of unfair trade practices and of trade remedy actions. Additional issues, however, remain to be explored, and we regret that circumstances did not allow this report to be as comprehensive as we would have liked.

Views of Commissioner Don Newquist

Commissioner Newquist disapproved transmittal to the U.S. Trade Representative and release to the public of this study. In his view, in its present form, the information gathered and presented, although intended to be responsive to the request by the U.S. Trade Representative, is essentially an academic exercise in modelling and counterfactual economic theory. Moreover, Commissioner Newquist has serious doubts about whether the study sufficiently addresses a fundamental question put forth by the U.S. Trade Representative: namely, the costs to U.S. industries of subsidization and dumping by foreign governments and producers and benefits from relief under the AD/CVD laws.

The economic estimates included in this study are derived from the manipulation of variables and data by the Commission staff in the course of their macroeconomic modelling exercise. Because models rely on an array of assumptions and subjective interpretation of available data, estimates can and will differ according to the information sought, the quality of data used, and the judgment and prejudices of those performing the exercise.

Therefore, Commissioner Newquist emphasizes that in his view, the estimates provided here are not "facts" or "findings" in the usual sense of Commission 332 studies; instead, they are the theoretical, untested results of certain modelling exercises undertaken by Commission economists and should be viewed with that understanding and limitation. In its current form, the report is a relevant illustration of a recent *Business Week* editorial which noted that in discussions about trade, "some economists and trade mavens frequently turn to elaborate economic explanations that confuse rather than clarify...."

Commissioner Newquist also notes that the report acknowledges that economic modelling does not adequately capture, without additional extrapolations and manipulations, the costs to U.S. industries of dumping and subsidization. Thus, reliance on derived "proxies" and "value-added measures" suggests that the quantification of the costs to U.S. industries is even more theoretical than estimates of the net welfare effect.

The dominant focus of this study on the theoretical macroeconomic impact of dumping and countervailing duty orders should not be allowed to detract from other important issues regarding the implementation and operation of U.S. antidumping and countervailing duty laws. While the academic explanations and estimates provided here may be helpful, they are not the only measure of the effect of these laws, nor can they substitute for a balanced, comprehensive assessment which includes "real-world" experience and fact-based considerations.

Views of Commissioner Bragg

After much deliberation, and with some regret, I have concluded that I must disapprove the study in Investigation No. 332-344, *The Economic Effects of Antidumping and Countervailing Duty Orders and Suspension Agreements*. I believe that it provides useful analysis, given its constraints, and I know that it reflects considerable effort on the part of ITC staff. I also recognize that the acknowledged limitations of the model and the data available may not permit a more balanced assessment of the effects of unfair trade practices and remedies. In my view, as a result of these limitations, the report has the potential to be misconstrued.

My concerns are twofold. First, I believe the study does not provide a complete picture of the costs and benefits of unfair trade practices and remedies. Although economic modeling is a useful tool, it cannot substitute for "real world" experience. In my own experience, for example in analyzing injury issues in antidumping (AD) and countervailing duty (CVD) cases, I consider the results of economic modeling, but only as one of many factors that bear on a determination of whether an industry is injured by unfairly traded imports. The output of any economic model is limited by the assumptions that go into it, and in my opinion cannot be considered in isolation.

As the authors of this study recognize, economic models do not take into account the qualitative aspects of the costs and benefits they attempt to measure. In general, the costs of unfair trade practices are not spread evenly across the economy, but are borne disproportionately by specific industries and workers, while the "benefits" of such practices are spread widely across the economy. Similarly, economic models do not impose value judgments on the practices they analyze. As a nation, however, we have made a judgment that unfairly traded imports are to be discouraged, regardless of their "benefits," if they cause harm to competing domestic industries and workers.

I further am concerned that the modeling techniques employed in this study do not provide reliable separate estimates of the economy-wide costs associated with unfair trade practices, or the benefits of unfair trade remedies to domestic industries injured by unfair imports. The computable general equilibrium (CGE) model used by the staff to measure economy-wide effects produces only a net estimate of the impact of the removal of such remedies at a particular point in time. It is self-evident that unfair trade remedies will have some overall effect on the economy, just as unfair trade practices will. Without knowing more precisely how those gains and losses are distributed, such a net welfare estimate is incomplete and can be misleading. Although the staff has attempted to devise a proxy for the welfare losses associated with removal of AD and CVD orders, the resulting estimates are admittedly very rough, full of uncertainty, and so broad in variation as to be of very little value. In addition, as Vice Chairman Nuzum and Commissioner Rohr have noted, the model does not measure long-term effects such as the cumulative damage done by unfair trade practices to U.S. industries, exports, investment and infrastructure over time.

I believe that the study does provide some useful information. Unlike the economy-wide analysis, the case studies attempt to measure the extent of harm caused to domestic industries by unfairly-priced imports, and the benefits to those industries of the remedies, as well as the effects of these measures on consumers. Had such a direct and reliable analysis been possible at the economy-wide level, perhaps the study would have been more balanced. As it is, however, the study emphasizes effects of unfair trade remedies on consumers, without providing a balanced and reliable picture showing the effects of unfair trade practices not only on competing U.S. industries and workers, but also on the U.S. technology base and infrastructure.

In deciding how to deal with issues of import competition, our society has struck a balance in favor of open markets, while providing a limited safety valve, in the form of the unfair trade laws, to allow domestic industries injured by unfair import practices to seek relief. This study

assumes that the alternative to unfair trade laws is unfettered free trade. In reality, however, the alternative to these laws is not unrestricted competition from unfairly traded imports, but rather a return to politically-driven solutions to trade disputes. Such solutions are rarely optimal, from a net economic welfare perspective or otherwise. It is important to recognize that the alternatives to AD and CVD laws may impose far greater net welfare costs on our economy than the remedies these laws afford. I believe that the purpose of these laws must be considered as part of the broader context in any assessment of their economic effects.

APPENDIX A
REQUEST LETTERS

THE UNITED STATES TRADE REPRESENTATIVE
Executive Office of the President
Washington, D.C. 20506

JAN 15 1993

The Honorable Don E. Newquist
Chairman
U.S. International Trade Commission
500 E Street S.W.
Washington, D.C. 20436

Dear Mr. Chairman:

As you know, the economic effects of U.S. import restraints resulting from final antidumping and countervailing duty investigations conducted under Title VII of the Tariff Act of 1930 (19 U.S.C. 1671 et seq.) have been the subject of considerable public debate in recent years. Yet our understanding of these effects is very limited.

In order to increase government and public understanding of the economic effects of antidumping and countervailing duty orders and suspension agreements, I am requesting, under authority delegated by the President and pursuant to section 332(g) of the Tariff Act of 1930, as amended, that the Commission conduct a study of the economic effects of existing antidumping and countervailing duty orders and suspension agreements. Specifically, I request that the Commission examine the effects on:

- the petitioning industries and their activities;
- the income and employment of U.S. workers, both in the petitioning and other affected industries;
- U.S. consumers of the affected products, both final consumers and intermediate consumers that use the affected product as an input to other production;
- U.S. producers of parts and components of products; and
- the net economic welfare of the United States, both short and longer term.

This study should provide appropriate time series data on developments in the affected industries since the imposition of the order or suspension agreement. The study should also furnish partial equilibrium analysis to isolate, if possible, the effects of the antidumping or countervailing duty order or suspension agreement on the petitioning industry's welfare over the relevant time period. The study should also seek to determine how the presence of an order or suspension agreement on a product from specific countries affects (a) the use of dumping by firms from those countries as a strategy to gain access to or improve market position in the U.S. market, and (b) import levels from other countries not subject to the Title VII order or agreement. In examining the impact on the petitioning industry, the Commission should collect data similar to that collected in a normal Title VII investigation.

I understand that the Commission may be unable to conduct the type of in depth analysis that would be most useful if it attempts to focus on all outstanding orders. However, the Commission should evaluate the largest possible representative sample of orders and suspension agreements.

The Commission should consider holding a public hearing as part of these studies. A report on the study should be submitted by January 31, 1995. In view of the outstanding instruction to the Commission on the security classification of reports prepared by the Commission at the request of the U.S. Trade Representative, the report on this investigation should be made available to the public at the same time it is submitted to this Office.

The Commission's assistance in this matter is greatly appreciated.

Sincerely,

Carla A. Hills

6/9/93 TO: Dockets

THE UNITED STATES TRADE REPRESENTATIVE
Executive Office of the President
Washington, D.C. 20506

June 9, 1993

The Honorable Don E. Newquist
Chairman
U.S. International Trade Commission
500 E Street S.W.
Washington, D.C. 20436

Dear Mr. Chairman:

The new Administration is committed to enhancing U.S. employment, growth and competitiveness. Trade policy is one of a number of important tools by means of which the Administration intends to reach its objectives. I intend, therefore, to use the authority pursuant to section 332(g) of the Tariff Act of 1930, as amended, delegated to the USTR by the President, to request investigations by the Commission which have the greatest bearing on these objectives.

In accordance with your letter of March 2, 1993, I have reviewed our near term priorities for Commission investigations under section 332(g). This review has included the January 15, 1993 request by Ambassador Hills on the economic effects of U.S. import restraints resulting from final affirmative determinations in anti-dumping and countervailing duty investigations.

I have identified two priority areas for new Commission investigations. These concern the results achieved under past market opening agreements with Japan and analytical tools which will be needed to evaluate the results of the Uruguay Round. I will shortly forward to the Commission requests for investigations in these two areas.

With respect to the January 15, 1993 request by Ambassador Hills, I believe that the scope of the investigation needs to be expanded. An expanded investigation will assure greater balance in the analysis. It should enhance our understanding of the economic consequences of foreign subsidies and dumping as transmitted through unfair imports to the United States, and the effectiveness and economic impact of the remedies provided. It should also prove useful in developing possible future efforts to improve the effectiveness of remedies provided by our antidumping and countervailing duty laws. However, the specifics of this current request for economic analysis should not be interpreted as reflecting any particular Administration position on how U.S. laws concerning foreign subsidy or dumping practices are currently interpreted or implemented.

I am, therefore, restating and expanding the original request to the Commission, as provided below.

I request that the Commission investigate the economic effects of existing antidumping and countervailing duty orders and/or suspension agreements, and the economic effects of the dumping and subsidy practices, as transmitted through unfair imports to the United States, which the orders and agreements address.

The investigation should include a comprehensive empirical analysis of conditions in the US domestic industries impacted by unfairly traded imports both for a proximate period prior to the provision of relief and for a period sufficiently later than the date relief was accorded for the condition of the industry to fully reflect the effects of the relief. These reviews should include relevant industry information on employment, wages, production, prices, investment, trade and other factors internal and external to the industry, including but not limited to the relevant unfair foreign trade practices, affecting its general economic health and competitiveness. This empirical analysis should include an assessment of the degree to which offsetting duties (in CVD cases) were collected or price changes (in AD cases) occurred.

In addition to the comprehensive empirical analysis described above, I further request that the Commission provide formal quantitative economic estimates of the effects of the unfair trade practices and remedies (as defined above), employing a standard comparative static framework. This part of the investigation should be structured to answer the following questions with regard to relevant factors and parties (listed in items 3, 4 and 5 further on):

1. a) What would the U.S. position (with respect of factors listed in items 3,4 and 5 below) have been in a proximate period prior to the provision of relief (same time period as covered by the comprehensive industry review requested above), if the unfair foreign subsidy or dumping practices had not been in effect? b) What was the U.S. position in fact in this period? c) Measured as the difference between a) and b) above, what was the effect of the unfair practice?

2. a) What was the effect of the remedy provided? b) How closely did the remedy move the U.S. position to what it would have been had the foreign unfair practices not occurred in the first place? (please consider same time periods as covered by the comprehensive industry review requested above) c) If the remedy did not fully restore the U.S. position to what it would have been, why did a gap remain (e.g. because of the nature of the remedy, because of effects in third country markets

beyond the reach of the remedy, because of irreparable initial effects of the unfair practice, because of foreign circumvention)?

The investigation should answer these and any related questions to cover the parties and factors listed below:

3. Petitioning Industries

Employment, wage, income, production, price, trade and competitiveness effects (including trade effects in country markets other than the United States and country of origin of the product subject to the order or suspension agreement).

4. Upstream Industries

Employment, wage, income, production, price, trade and competitiveness effects for U.S. industries supplying components and other inputs into the petitioning industries' production or production of the subsidized or dumped product (including any trade effects in country markets other than the United States and country of origin of the product subject to the order or suspension agreement).

5. Downstream Consumers/Industries

Employment, wage, income, production, price, trade and competitiveness effects for consumers of the petitioning industries output, including industries consuming intermediate products as well as consumers of final products (including any trade effects for downstream consuming industries of components or other intermediate products in country markets other than the United States and country of origin of the product subject to the order or suspension agreement).

The quantitative economic analysis called for above often assumes as a theoretical construct the instantaneous and complete adjustment of all markets and actors to both unfair practices and remedies. In fact, there are real costs to firms, to individual workers and to taxpayers. Thus, the Commission should complement its comparative static economic assessment of dumping and subsidy practices (as defined above) and remedies with quantitative and other estimates of the labor and other domestic adjustment costs involved.

Finally, for each of the cases examined, I request that the Commission provide an assessment of the economy-wide net economic welfare effects of a) the original unfair practice and b) the remedy provided.

This investigation should provide appropriate time series data for the affected industries for a period beginning some time before the imposition of the order or suspension agreement. To the extent possible, the Commission should collect data similar to that collected in a normal Title VII investigation. However, given the expanded scope of the investigation called for in this request, I encourage the Commission, where appropriate, to make full use of existing analytical work from all available sources, even when available from sources outside the Commission.

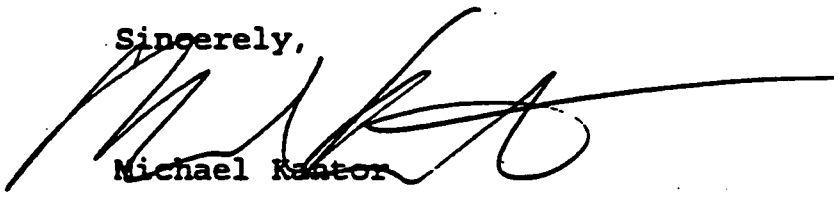
I understand that because of resource and other constraints the Commission cannot conduct the type of in-depth analysis called for in this request on all outstanding orders and/or agreements. However, the Commission should evaluate a representative sample of orders and agreements, taking into account the potential conflicts that would arise from an investigation of any order or remedy that is currently before an appellate body or may result from currently pending proceedings, and the limitations imposed by statutory restrictions on the use in any other proceedings of business proprietary information obtained in Title VII investigations.

The Commission should also consider holding a public hearing as part of these studies. A report on the investigation should be submitted by June 30, 1995. In view of the outstanding instruction to the Commission on the security classification of reports prepared by the Commission at the request of the U.S. Trade Representative, the report on this investigation should be made available to the public at the same time it is submitted to this Office.

In addition, I request that the Commission provide USTR a briefing on the status of the study in early 1994 to which interested representatives of the Congressional committees of jurisdiction would be invited.

The Commission's assistance in this matter is greatly appreciated.

Sincerely,



Michael Kantor

APPENDIX B
INSTITUTION OF INVESTIGATION

prudent to give further consideration to this alternative.

2. IBWC Replacement of Existing Bridge—A new Bridge of the Americas (BOTA) would be constructed in approximately the same place, size, and configuration as the existing bridge. Improvements to vehicle lane widths, commercial lanes and ingress and egress would be undertaken. The bridge would not involve large scale modifications to inspection facilities and associated roadways. Replacement would be in application at the 1963 Chamizal Convention, such that the bridge would continue to be toll-free. The United States and Mexican Governments would equally share in the cost of the part of the bridge that spans the Rio Grande levee to levee, approximately 40 percent of the bridge's length, and the U.S. Government would pay for the cost of replacing the elevated section (the remaining 60 percent of the bridge) that facilitates access to the existing facilities. The U.S. Section has budget authority to seek appropriations for a replacement bridge and request annual operation and maintenance funding, but Mexican Government financing arrangements for a toll-free bridge remain uncertain. This was not considered as the preferred alternative.

3. IBWC Replacement of Existing Bridge with Commercial Structures—This is essentially Alternative 2 with the parallel construction of commercial traffic structures. The commercial sector would cover the costs of construction, operation, and maintaining the commercial structure. This alternative is acceptable to the U.S. Congress for appropriation purposes, and to Mexico and would permit as fast as possible replacement of the bridge, an important factor due to its condition. This alternative is considered as the preferred alternative.

4. Non-IBWC Replacement of Existing Bridge—The IBWC would make arrangements for agencies or entities in each country, other than the IBWC, to assume the responsibility for replacing the existing bridge in the configuration, location, and size that such agencies or entities may determine. Tolls, which are contrary to the provisions of the Chamizal Convention, would be necessary to recover the cost of financing a replacement bridge.

Tolls would work an economic hardship upon individuals that for years traveled freely back and forth to work and shop in either country. Authorization to construct a replacement bridge in this manner would take considerable time as it would involve a need to arrange financing in both countries and additional lengthy and uncertain bilateral understandings. The structural deficiency of the bridge requires as rapid replacement as possible, and thus this alternative was not preferred.

5. No Action Alternative—This would be a status quo arrangement which is not acceptable. The safety of millions of people who use this bridge would be in continued peril. Without remedial action, the distressed condition of the 24-year old BOTA will continue to deteriorate due to questionable construction materials and the constant and heavy traffic. These factors, among others, precluded giving this alternative further consideration.

Finding of the Final Environmental Assessment

The Final Environmental Assessment finds that the preferred alternative does not constitute a major federal action which would cause a significant local, regional, or national impact on the environment since it:

(a) Removes the danger to life and property on or under this bridge which a structurally deficient bridge subject to further deterioration represents.

(b) Provides a structurally sound bridge that would serve the commercial and non-commercial needs of an international community.

(c) Effects common to construction alternatives would be short-term. Fugitive dust and equipment emissions would be minimized through implementation of standardized construction practices.

(d) There would not be a significant impact to air quality and all local, state, and federal air quality regulations would be followed.

(e) There would not be any impacts to surface water, nor would the construction alternatives impact upon the capabilities of the international Rio Grande Rectification Project to carry flood flows should the need arise during construction.

(f) Construction related impacts on traffic would be short lived.

(g) A replacement bridge would permit continued use of existing and additional inspection facilities now under construction, which include commercial inspection docks capable of handling more than four times the present loaded trucks presently inspected in the El Paso area.

(h) The United States and Mexico would be complying with pertinent provisions of the 1963 Chamizal Convention, including that the bridge would continue to be toll-free and that the cost of the part of the bridge that spans the Rio Grande levee to levee be equally shared by the two countries. Both governments would also apply their "user pays" principles to the commercial structures.

(i) A replacement bridge would be constructed in as timely as possible manner.

(j) Would not affect fish and wildlife, including endangered and threatened species in the immediate area of the proposed project.

(k) Would not affect cultural resources listed on or determined to be eligible for listing on the National Register of Historic Places.

Availability

Single copies of the Final Environmental Assessment and Final Finding of No Significant Impact may be obtained by request at the above address.

Dated: June 29, 1993.

Suzette Zaberecki,

Staff Counsel.

[FR Doc. 93-16601 Filed 7-13-93; 8:45 am]

BILLING CODE 4710-09-M

INTERNATIONAL TRADE COMMISSION

[Investigation No. 332-344]

The Economic Effects of Antidumping and Countervailing Duty Orders and Suspension Agreements

AGENCY: United States International Trade Commission.

ACTION: Institution of investigation.

SUMMARY: Following receipt of a letter dated June 9, 1993, from the United States Trade Representative (USTR), the Commission instituted investigation No. 332-344, The Economic Effects of Antidumping and Countervailing Duty Orders and Suspension Agreements, under section 332(g) of the Tariff Act of 1930 (19 U.S.C. 1332(g)). The Commission was requested to submit its report by June 30, 1995.

EFFECTIVE DATE: July 1, 1993.

FOR FURTHER INFORMATION CONTACT: Joseph Flynn on (202) 205-3251, Office of Operations, U.S. International Trade Commission.

SUPPLEMENTARY INFORMATION: As requested by the USTR, the Commission will investigate the economic effects of such orders and suspension agreements, and the economic effects of the dumping and subsidy practices that such orders and agreements address.

The investigation will include a comprehensive empirical analysis of the economic condition of U.S. domestic industries impacted by unfairly traded

imports both before and after relief was granted. This analysis will include relevant industry information on employment, wages, production, prices, investment, trade and other factors internal and external to the industry, including but not limited to the relevant unfair foreign trade practices affecting the general health and competitiveness of such industries.

As requested by the USTR, the Commission will seek to structure its empirical analysis to answer the following questions:

1. What would the U.S. position (with respect to such factors as employment, production, and prices) have been in a proximate period prior to the provision of relief, if the unfair foreign subsidy or dumping practices had not been in effect? What was the U.S. position, in fact, this period? What was the effect of the unfair practice?

2. What was the effect of the remedy provided? How closely did the remedy move the U.S. position to what it would have been had the foreign unfair practices not occurred in the first place? If the remedy did not fully restore the U.S. position to what it would have been, why did a gap remain?

Also as requested by the USTR, the Commission will seek to answer these and any related questions to cover the parties and factors listed below:

1. Petitioning Industries

Employment, wage, income, production, price, trade and competitiveness effects (including trade effects in country markets other than the United States and country of origin of the product subject to the order or suspension agreement).

2. Upstream Industries

Employment, wage, income, production, price, trade and competitiveness effects for U.S. industries supplying components and other inputs into the petitioning industries' production or production of the subsidized or dumped product (including any trade effects in country markets other than the United States and country of origin of the product subject to the order or suspension agreement).

3. Downstream Industries and Consumers

Employment, wage, income, production, price, trade and competitiveness effects for consumers of the petitioning industries output, encompassing industries consuming intermediate products as well as consumers of final products (including any trade effects for downstream consuming industries of components or other intermediate products in country markets other than the United States and country of origin of the product subject to the order or suspension agreement).

The USTR noted that the process of relief from unfair trade practices entails real costs to firms, to individual workers, and to taxpayers. As requested by the USTR, the Commission will seek to provide with the empirical analysis outlined above, quantitative and other estimates of the labor and other domestic adjustment costs involved.

Also as requested by the USTR, the Commission will seek to provide an assessment of the economy-wide net economic welfare effects of unfair trade practices and the remedies provided.

In addition, as requested, the Commission will seek to provide in its report appropriate time series data for the affected industries for a period some time before the imposition of the order or suspension agreement. The Commission, to the extent possible, will seek to collect data similar to that collected in a normal title VII investigation. The Commission will evaluate a representative sample of orders and agreements. In constructing a sample, the Commission will take into account potential conflicts that might arise from any remedy that is currently before an appellate body or may result from currently pending proceedings, and the limitations imposed by statutory restrictions on the use in any other proceedings of business proprietary information obtained in Title VII investigations.

WRITTEN SUBMISSIONS: Interested persons are invited to submit written statements concerning the matters to be addressed in the report. Commercial or financial information that a party desires the Commission to treat as confidential must be submitted on separate sheets of paper, each clearly marked "Confidential Business Information" at the top. (Generally, submission of separate confidential and public versions of the submission would be appropriate.) All submissions requesting confidential treatment must conform with the requirements of § 201.6 of the Commission's Rules of Practice and Procedure (19 CFR 201.6). All written submissions, except for confidential business information, will be made available in the Office of the Secretary to the Commission for inspection by interested persons. A deadline for written submissions will be announced at a later date.

PUBLIC HEARING: A public hearing will be scheduled at a time and place to be announced.

Hearing impaired persons are advised that information on this investigation can be obtained by contacting the Commission's TDD terminal on (202) 205–2648.

Issued: July 8, 1993.

By order of the Commission.

Donna R. Koehnke,

Secretary.

[FR Doc. 93–16693 Filed 7–13–93; 8:45 am]

BILLING CODE 7020–02–P

[Investigation No. 731–TA–571 (Final)]

Professional Electric Cutting and Sanding/Grinding Tools From Japan

Determinations

On the basis of the record [1] developed in the subject investigation, the Commission determines, pursuant to section 735(b) of the Tariff Act of 1930 (19 U.S.C. 1673d(b)) (the Act), that an industry in the United States is materially injured by reason of imports from Japan of professional electric cutting tools, provided for in subheadings 8508.20.00, 8508.80.00, 8461.50.00, and 8465.91.00 of the Harmonized Tariff Schedule of the United States (HTS), that have been found by the Department of Commerce to be sold in the United States at less than fair value (LTFV).

On the basis of the record developed in the subject investigation, the Commission also determines, pursuant to section 735(b) of the Act, that an industry in the United States is not materially injured or threatened with material injury, and the establishment of an industry in the United States is not materially retarded, by reason of imports from Japan of professional electric sanding/grinding tools, provided for in subheadings 8508.20.00 and 8508.80.00 of the HTS, that have been found by the Department of Commerce to be sold in the United States at LTFV.

Background

The Commission instituted this investigation effective January 4, 1993, following a preliminary determination by the Department of Commerce that imports of professional electric cutting and sanding/grinding tools from Japan were being sold at LTFV within the meaning of section 733(b) of the Act (19 U.S.C. 1673b(b)). Notice of the

[1] The record is defined in § 207.2(f) of the Commission's Rules of Practice and Procedure (19 CFR 207.2(f)).

APPENDIX C
LIST OF SUBMISSIONS AND HEARING PARTICIPANTS

LIST OF SUBMISSIONS AND HEARING PARTICIPANTS

U.S. CONGRESS

The Honorable Bill Archer, United States Congressman, State of Texas
The Honorable Philip Crane, United States Congressman, State of Illinois
The Honorable Jim Kolbe, United States Congressman, State of Arizona
Sean Mulvaney, Staff Assistant, Congressman Kolbe's Office
The Honorable Ralph Regula, United States Congressman, State of Ohio

OTHER U.S. GOVERNMENT

Federal Trade Commission
Dr. Morris Morkre, Staff Economist
Dr. Kenneth Kelly, Staff Economist
Michael O. Wise, Associate Director, Bureau of Economics

GENERAL

Cargill Incorporated
W. Brendan Harrington, Assistant Vice President

Citizens for a Sound Economy Foundation
Bryan Riley, Economist

Consumers Union
Mark Silbergeld, Director, Washington Office

Dewey Ballantine
Thomas R. Howell, Counsel
Brent L. Bartlett, Economist, Dewey Ballantine

The Heritage Foundation
Joe Cobb, Senior Fellow in political economics

Institute for International Economics, Washington, D.C.
Gary C. Hufbauer, Senior Fellow

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Edward Black, Chairman of Pro–Trade Group and Vice President General Counsel of Computer and Communications Industry Association
Bruce Aitken of Aitken Irvin and Lewin

Trade Resources Company, Washington, D.C.
Richard D. Boltuck, Economist

Wiley, Rein, and Fielding
Charles Verrill, Jr., Counsel

Robert Willig, Professor of Economics and Public Affairs, Princeton University

AGRICULTURE AND FOREST PRODUCTS

FLOWERS

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Timothy Haley, President
Terence Stewart of Stewart and Stewart

LAMB MEAT

American Sheep Industry Association
Pierce Miller, President

Australian Meat and Livestock Corporation
Katherine D. McManus of Howrey and Simon
Ashley G. Gable of Howrey and Simon

New Zealand Meat Producers Board
Laurie I. Bryant, North American Director
Edward J. Farrell of Wigman, Cohen, Leitner, and Myers, P.C.

LUMBER

Coalition for Fair Lumber Imports
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Government of Quebec
Elliot J. Feldman of Pepper, Hamilton and Scheetz

National Association of Home Builders
Gopal Ahluwalia, Assistant Staff Vice President–Research
Stanley Duobinis, Assistant Vice President–Forecasting

ORANGE JUICE

Brazilian Association of Citrus Exporters
Ademerval Garcia, President
Michael House of Kaye, Scholer, Fierman, Hays and Handler
Timothy Feighery of Kaye, Scholer, Fierman, Hays and Handler

Florida Citrus Mutual
Bobby F. McKown, Executive Vice President and CEO
James H. Lundquist of Barnes, Richardson and Colburn
Matthew T. McGrath of Barnes, Richardson and Colburn

ELECTRONICS AND EQUIPMENT

SEMICONDUCTORS/EPROMS

International Business Machine Corporation
Phyllis Shearer Jones, Program Director, Public Affairs

Japan Machinery Exporters' Association
Isao Imura, Executive Managing Director
William Clinton of White and Case

ELECTRONICS AND EQUIPMENT—Continued

SEMICONDUCTORS/EPROMS—Continued

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Gilbert B. Kaplan of Hale and Dorr
Paul W. Jameson of Hale and Dorr
Cris R. Revaz of Hale and Dorr

Motorola
Timothy A. Harr, Senior Counsel

Semiconductor Industry Association
Michael C. Maibach, Director of Government Affairs, Intel Corporation
William A. Noellert, Chief Economist, Dewey, Ballantine

PICTURE TUBES

Committee to Preserve American Color Television ("COMPACT")
Timothy J. Regan, Director of Public Policy for Corning, Incorporated
David A. Hartquist of Collier, Shannon, Rill and Scott
Paul D. Cullen of Collier, Shannon, Rill and Scott
Jeffrey S. Beckington of Collier, Shannon, Rill and Scott

MACHINERY

BEARINGS

Japan Machinery Exporters' Association
Isao Imura, Executive Managing Director
William Clinton of White and Case

Koyo Seiko Co., Ltd. and Koyo Corporation, U.S.A.
Peter O. Suchman of Powell, Goldstein, Frazer and Murphy
Neil R. Ellis of Powell, Goldstein, Frazer and Murphy
Elizabeth C. Hafner of Powell, Goldstein, Frazer and Murphy

Navistar International Corporation
Thomas Trueblood, Manager, Public Affairs International

SKF USA, Incorporated
Raymond B. Langton, President
Herbert C. Shelley of Howrey and Simon

The Timken Company
Donald L. Hart, Vice President–Bearings,
North and South America
Terence P. Stewart of Stewart and Stewart

Torrington Company
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Copper and Brass Fabricators Council, Incorporated
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Revere Copper Products,
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Edgar J. Martson III, Esq., Executive Vice President and General Counsel, Southdown, Inc.
Donald Unmacht, President, National Cement Company of California, Inc.
Edward Allsopp, Director of Marketing, Florida Crushed Stone Company
Joseph W. Dorn of King and Spalding

Cemontos Mexicanos, SA
Seth Kaplan of Trade Resouces Company

FLAT GLASS

PPG Industries
Terence P. Stewart of Stewart and Stewart

STANDARD PIPE AND TUBE

Allied Tube and Conduit
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Korean Iron and Steel Association
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Sawhill Tubular, Division of Armco, Inc.
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Standard Pipe Subcommittee of the Committee on Pipe and Tube Imports
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Wheatland Tube Company
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METALS AND MINERALS—Continued

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American Institute for International Steel, Inc.
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Laird Patterson, Counsel
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General Motors Corporation

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Neil R. Ellis of Powell, Goldstein, Frazer and Murphy
Elizabeth C. Hafner of Powell, Goldstein, Frazer and Murphy

Sammi Atlas Inc.
William Silverman of Rogers and Wells

Specialty Steel Industry of North America (SSINA)
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Jeffrey S. Beckington of Collier, Shannon, Rill and Scott

Specialty Tubing Group ("STG")
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Jeffrey S. Beckington of Collier, Shannon, Rill and Scott

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Enron Operations Corporation
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INDUSTRIAL BELTS

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URANIUM

Concord
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UREA

Ad Hoc Committee of Domestic Nitrogen Producers
Valerie A. Slater of Akin, Gump, Strauss, Hauer and Feld
Margaret L. H. Png of Akin, Gump, Strauss, Hauer and Feld

APPENDIX D
CASE STUDY TECHNICAL AND STATISTICAL DATA

APPENDIX D
Case Study Technical and Statistical Data

Tables

Technical Appendix for the Lamb Case

The econometric model estimated over the January 1981-May 1994 period is specified as follows:

$$(1)\quad USPRICE(t) = a_0*CONSTANT + a_1*USLAMB(t) + a_2*WAGE(t) + a_3*PELEC(t) + a_4*REMEDY + a_5*TREND + R1(t)$$

$$(2)\quad USLAMB(t) = b_0*CONSTANT + b_1*USPRICE(t) + b_2*PERSINC(t) + b_3*PCHICKEN(t) + b_4*PBEEF(t) + b_5*PPORK(t) + b_6*PNZ(t) + b_7*PAUS(t) + b_8*REMEDY + b_9*TREND + R2(t)$$

$$(3)\quad NZLAMB(t) = c_0*CONSTANT + c_1*USPRICE(t) + c_2*PERSINC(t) + c_3*PCHICKEN(t) + c_4*PBEEF(t) + c_5*PPORK(t) + c_6*PNZ(t) + c_7*PAUS(t) + c_8*REMEDY + R3(t)$$

$$(4)\quad AUSLAMB(t) = d_0*CONSTANT + d_1*USPRICE(t) + d_2*PERSINC(t) + d_3*PCHICKEN(t) + d_4*PBEEF(t) + d_5*PPORK(t) + d_6*PNZ(t) + d_7*PAUS(t) + d_8*REMEDY + R4(t)$$

Above, lower case letters a, b, c, and d denote regression coefficient estimates for equations 1-4, respectively. The parenthetical t's refer to the variable's current (t-th period) value; the nought-subscripted coefficients reflect intercepts; and the R1(t), R2(t), R3(t), and R4(t) reflect the white-noise residuals on equations 1, 2, 3, and 4, respectively.

Equation 1 (USPRICE), the price-dependent U.S. supply of domestic lamb, is a function of a constant (CONSTANT); the quantity of domestic lamb produced and consumed (USLAMB); the deflated wage for meat-packing-house workers (WAGE); the deflated price of electric power (PELEC); a time trend (TREND); and a binary variable (REMEDY) coinciding to the "CVD period" of 1985:6-1990:3. This period is when the Department of Commerce determined that certain quantities of New Zealand lamb imports benefited from bounties and grants and imposed a countervailing duty on these imports. Equation 2 (USLAMB), the demand for domestically-produced lamb, is a function of CONSTANT; the deflated U.S. lamb price (USPRICE); deflated U.S. personal income (PERSINC); the deflated prices of chicken, beef, and pork (PCHICKEN, PBEEF, and PPORK, respectively); the deflated prices of imported New Zealand and Australian lamb (PNZ, PAUS, respectively); REMEDY; and the time trend (TREND).

Equations 3 and 4, the U.S. demands for imported New Zealand and Australian lamb, are denoted by NZLAMB and AUSLAMB, respectively. These equations are each a function of CONSTANT; the deflated personal income (PERSINC); the deflated alternative meat prices of PCHICKEN, PBEEF, and PPORK; the deflated lamb import prices (PNZ, PAUS); deflated U.S. price (USPRICE); and REMEDY.

Correlations among the Residuals

Harvey[1], as well as Granger and Newbold[2], note that a key assumption of the classical regression model is that the errors or residuals of the estimated equations (R1, R2, R3, R4

[1] A. Harvey, *The Econometric Analysis of Time Series* (Cambridge, MA: MIT Press, 1990), p. 191. Harvey notes that with economic data, it is reasonable to assume that the serial correlation is of the first order. That is, an equation's residuals are correlated with that of the previous period.

[2] C.W.J. Granger and P. Newbold, *Forecasting of Economic Time Series* (New York: Academic Press, 1986), pp. 188-189.

above) are uncorrelated. Two kinds of residual correlations are common to economic time series: contemporaneously correlated current errors, where disturbances of different equations are correlated at a point in time; and serially correlated errors, where a single equation's residuals are correlated across two points in time. More intuitively, contemporaneously correlated residuals are those of different equations correlated during the same or "contemporaneous" period.[3] Serially correlated errors are those of the same equation related across different time periods. Failure to utilize information inherent in contemporaneous and serial correlations of residuals may result in nonminimal variances, such that inference on coefficient estimates (e.g., with student t-values) may not be valid.[4] That is, reliable t-statistics, and hence inference, on econometric coefficient estimates require that the estimator utilize and account for information inherent in contemporaneously and serially correlated residuals.

Contemporaneous correlation. Contemporaneously correlated residuals are often accounted for by using a systems estimation method called Zellner's seemingly unrelated regression (hereafter, SUR).[5]

Serial correlation. Durbin-Watson (D-W) tests are used to discern whether evidence is sufficient or insufficient to suggest that an equation's residuals are serially correlated. The D-W test statistics are 1.06 for the U.S. domestic lamb supply equation, 1.86 for the U.S. demand equation for domestically produced lamb; 1.49 for the U.S. demand equation for New Zealand lamb; and 1.86 for the U.S. demand equation for Australian lamb. Given that each equation has at least 17 regressors and the sample has 161 observations, evidence at the 5 percent significance level is either sufficient or inconclusive to reject the hypotheses that each equation's residuals are not serially correlated. Staff concluded that each equation's residuals may be serially correlated.

In order to correct the data for first-order serial correlation, the widely applied Cochrane-Orcutt and Prais-Winsten methods described in Hamilton[6] and Kennedy[7] were used. Such methods suggest that each equation's estimated correlation coefficient (hereafter rho-estimate) is estimated by the simple OLS regression of the equation's residuals against its one-period lag (without an intercept).

However, a systems wide correlation coefficient or rho-estimate was deemed more desireable for two reasons. First, the four-equation model was estimated as a system for reasons explained below. And secondly, the first two equations of the model's four (the U.S. domestic lamb supply and demand for domestically produced lamb) constitute a simultaneous model subset requiring a single rho-estimate.

Following Kennedy[8] and Harvey[9], each equation's rho-estimate was estimated by regressing the equation's residuals against its one-period lag (without an intercept). In order to obtain a systems wide rho-estimate, these four residual regressions were stacked into an SUR system, and the restriction that the lagged dependent variable coefficients (i.e., rho-estimates) are equal across the system's four equations was imposed. The logged data in the four equations were then adjusted by the system's rho-estimate according to established Cochrane-Orcutt and Prais-Winsten methods.

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[3] See Harvey, *Econometric Analysis*, p. 66.

[4] Ibid., pp. 65-69, provides a discussion on the problems with inference on coefficient estimates when residuals are contemporaneously correlated. J. Hamilton, 1994, pp. 224-226, provides a discussion on the problems with inference on coefficient estimates when residuals are serially correlated.

[5] See A. Harvey, pp. 64-69, for a detailed discussion on SUR methods.

[6] J. Hamilton, *Time Series Analysis* (Princeton, NJ: Princeton University Press, 1994), ch. 9.

[7] P. Kennedy, *A Guide to Econometrics*, Cambridge, MA: MIT University Press, 1985, p. 107.

[8] P. Kennedy, *Guide*, pp. 146-156.

[9] A. Harvey, *Econometric Analysis*, ch. 6.

Method of Econometric Estimation

Because supply equals demand in equilibrium, staff modeled the price-dependent U.S. domestic lamb supply (USPRICE) as containing U.S. demand for domestically produced lamb (USLAMB) as a regressor, and modeled the USLAMB equation as containing USPRICE.[10] That is, because the USPRICE and USLAMB equations share each other's dependent variable as a regressor, the equations are simultaneous. By themselves, one would estimate these first two equations with the econometric method of two-stage least squares (2SLS) to avoid regression estimate distortion or bias from the simultaneous influences across equations.[11] Further, all four equations (USPRICE, USLAMB, NZLAMB, AUSLAMB) have residuals (terms R1 through R4 above) that are contemporaneously correlated by common influences beyond the direct scope of the model. Such correlated equations are said to be "seemingly unrelated," because aside from the simultaneity of the USPRICE and USLAMB equations, the four equations share the characteristic, common to economic relationships, of being interrelated by events or influences not directly accounted for by the model.[12] Zellner's seemingly unrelated regression (SUR) method is needed to utilize the information inherent in the four equations' contemporaneously correlated current errors among the four equations, so that the coefficient estimates have minimum variances.[13] Combining 2SLS with SUR renders a four-equation system estimation where the simultaneous USPRICE and USLAMB equations are estimated with three-stage least squares and where the two import demand equations (NZLAMB, AUSLAMB) are estimated with SUR.

Tests for Change of Structure

The classical regression model requires that parameters be valid over the period of estimation, that is that the parameters being estimated be *constant* over the sample period, here January 1981-May 1994. For this investigation, USITC staff found it useful to apply tests to see whether the "CVD period events"[14] introduced enough change into the system modeled by equations 1-4 to render nonconstant or time-varying coefficients over the sample period (hereafter "structural change"). When evidence suggests structural change, the sample is often "split," at the points where the change occurred, into subperiods, and then subperiod models are estimated.[15] In fact, there should not be structural change, so that the coefficients on REMEDY are constant, and so that inference on REMEDY's coefficient estimates is valid. Therefore, staff applied econometric structural change tests (described below) to determine whether or not the CVD period events fundamentally changed the basic market relationships among USPRICE, USLAMB, NZLAMB, and AUSLAMB (as specified above as equations 1-4) over the sample period. More specifically, staff tested for structural change from conditions before or after the CVD subperiod.

Given that the four equations were estimated using a systems estimator, Chow tests for structural change based on equation-specific F-tests were not used. Rather, staff chose to treat the four equations as a system, and generated system-wide likelihood ratio test statistics used to test the null hypothesis that the entire system did not experience structural change. The 1981:1-1994:5 sample period was divided into three subperiods: the "pre-CVD" subperiod of January 1981-June 1985, the June 1985-March 1990 CVD period, and the "post-CVD" subperiod of April 1990-May 1994. Thus, two tests of structural change are required. The first

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[10] See J. Hamilton, *Time Series*, ch. 9.

[11] J. Hamilton, *Time Series*, ch. 9.

[12] A. Harvey, *Econometric Analysis*, pp. 65-72.

[13] Ibid.

[14] As explained in the case discussion, the CVD period is June 1985-March 1990, when the Department of Commerce determined that certain quantities of U.S. imports of New Zealand lamb benefited from bounties or grants, and imposed a countervailing duty (CVD) on these imports.

[15] See B. Larue, and R.A. Babula, "Evolving Dynamic Relationships Between the Money Supply and Food-Based Prices in Canada and the United States"; *Canadian Journal of Agricultural Economics*, vol. 42, No. 2, (July 1994), pp. 159-176.

tests whether structural change has occurred between the pre-CVD and the CVD periods. The second test, in effect, tests whether the CVD period is structurally different from the post-CVD period. For the first test, a likelihood ratio test statistic of 20.8 was generated, which is less than the critical chi-square value of 95.1. Hence, evidence at the 5-percent significance level is not sufficient to reject the null hypothesis of no structural change between the pre-CVD and CVD periods.

For the second test of structural change, a likelihood ratio test value of 23.6 was generated, which is less than the critical chi-square value of 95.1. Evidence at the 5-percent significance level is therefore insufficient to reject the null hypothesis of no structural change between the CVD and post-CVD periods.

Evidence was insufficient to suggest that events of the CVD period resulted in structural change when compared to regimes which occurred before the CVD period (first structural change test above) or after the CVD period (second structural change test above). Therefore, the model was estimated over the entire January 1981-May 1994 period. Coefficient estimates, and inference on such estimates, particularly with the REMEDY coefficient estimates, are not subject to problems caused by varying parameters over time.

Diagnostics on Model Adequacy

Equation-specific coefficients of determination (r-square values) are not well defined with models estimated with systems estimators. Stationarity of each equation provides an accepted indication that an equation has been adequately specified.[16] Stationary equations should generate stationary residuals that behave approximately as white noise at the chosen significance level.[17] More specifically, a stationary series of equation residuals should not be characterized by a unit root. Tests for a unit root developed by Fuller[18] and by Dickey and Fuller,[19] and augmented by Engle and Granger,[20] were applied to the four equations' residuals (hereafter ADF or augmented Dickey-Fuller tests). Evidence at the 5-percent significance level was sufficient in each equation's case to reject the null hypothesis of nonstationarity using both the τ_μ and τ_τ ADF tests.[21] The pseudo-t values on the lagged, non-differenced residual regressors (i.e., the test values) were negative and had absolute values above those of the critical values of -2.89 (τ_μ test) and -3.45 (τ_τ test).[22] These results reflect evidence at the 5-percent significance level that each of the model's four equations has been adequately specified according to reasonable diagnostic standards established in the literature.

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[16] R.A. Babula and D.A. Bessler, "The Corn-Egg Price Transmission Mechanism," *Southern Journal of Agricultural Economics*, vol. 22, No. 2 (1990), pp. 79-86.

[17] C.W.J. Granger and P. Newbold, *Forecasting*, pp. 188-189.

[18] W. Fuller. *Introduction to Statistical Time Series* (New York: John Wiley, 1976).

[19] D. Dickey and W. Fuller, "Distribution of the Estimates for Autoregressive Time Series with a Unit Root," *Journal of the American Statistical Association*, vol. 74 (1979), pp. 427-31.

[20] R.F. Engle and C.W.J. Granger, "Cointegration and Error Correction: Representation, Estimation, and Testing," *Econometrica*, vol. 55 (1987), pp. 251-276.

[21] Details and procedures of these two ADF tests are in Engle and Granger, "Cointegration," and in Hamilton, *Time Series*.

[22] Critical values are published in W. Fuller, *Introduction*; and Hamilton, *Time Series*.

Table D-1
FCOJ: U.S. production, imports, exports, beginning stocks, and consumption, crop years 1978/79-1993/94

(Million gallons SSE)

Crop year	U.S. production	Imports	Beginning stocks (cold storage)	Total[1] supply	Exports	Consumption[2]
1978/79	936.4	158.6	219.1	1,314.1	67.2	1,004.1
1979/80	1,199.3	118.9	242.8	1,561.0	123.9	1,127.4
1980/81	958.5	227.6	309.8	1,495.9	89.8	1,084.5
1981/82	694.2	412.6	322.1	1,428.9	75.0	996.8
1982/83	968.0	376.0	355.2	1,699.2	83.2	1,353.8
1983/84	641.7	577.7	262.2	1,481.6	71.6	1,140.3
1984/85	622.9	590.7	269.7	1,483.3	57.5	1,145.8
1985/86	684.4	546.0	249.0	1,479.0	71.0	1,204.0
1986/87[3]	780.8	557.0	204.0	1,541.8	73.0	1,267.0
1987/88	907.3	416.0	201.0	1,524.3	90.0	1,223.0
1988/89	970.2	382.6	211.6	1,564.4	73.5	1,258.5
1989/90	652.3	492.1	232.4	1,376.8	90.0	1,061.8
1990/91	876.2	327.2	225.0	1,428.4	96.4	1,174.3
1991/92	930.0	286.0	157.7	1,373.7	107.6	1,096.8
1992/93	1,211.7	326.1	169.3	1,707.1	114.1	1,346.2
1993/94	1,116.1	400.1	246.8	1,763.0	105.9	1,386.2

[1] Equals production plus imports and beginning stocks.

[2] Equals production plus imports plus or minus the change in stocks.

[3] Data for beginning stocks do not equal the ending stocks of the previous year. This is because of discrepancies in the FAS data. However, the discrepancies are small and do not affect any conclusions made with this data.

Source: U.S. Department of Agriculture, FAS. *World Horticultural Trade and U.S. Export Opportunities*, various issues.

Table D-2
Urea: East Germany, Romania, U.S.S.R., U.S., and world production, 1981-91

Year	East Germany	Romania	U.S.S.R.	United States	World	U.S. share of world production
	1,000 short tons					*(Percent)*
1981	1,071	1,737	7,980	8,062	48,515	16.6
1982	1,017	1,881	9,497	6,470	47,962	13.5
1983	1,086	2,289	9,715	6,013	55,453	10.8
1984	1,064	2,169	10,065	7,752	61,705	12.6
1985	1,110	2,205	10,807	6,975	63,766	10.9
1986	1,222	2,037	12,221	6,264	69,776	9.0
1987	1,078	2,219	12,701	7,433	76,879	9.7
1988	1,215	2,289	11,742	7,914	77,861	10.2
1989	1,145	2,037	11,517	8,004	78,124	10.2
1990	(1)	959	10,316	8,120	83,452	9.7
1991	(1)	947	10,703	8,133	82,302	9.9

[1] Separate data for East Germany are not available. The formal political unification of East and West Germany occurred on Oct. 3, 1990.

Source: Compiled from official statistics of the International Fertilizer Industry Association and the U.S. Department of Commerce.

Table D-3
Urea: U.S. shipments, exports, imports, trade balance, and apparent consumption, 1981-91

Item	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Shipments (*1,000 short tons*)	4,346	3,783	3,768	4,396	3,632	3,185	4,173	4,165	4,301	4,513	4,498
Exports (*1,000 short tons*)	1,578	1,651	1,099	1,270	1,154	549	1,125	1,066	1,257	941	1,180
Imports (*1,000 short tons*):											
East Germany	0	12	0	69	59	210	0	0	11	0	0
Romania	16	0	136	393	330	321	0	0	0	0	0
U.S.S.R.	0	97	387	418	455	843	35	0	0	(1)	0
Subject import subtotal	16	109	523	880	844	1,374	35	0	11	(1)	0
All other imports	837	998	1,396	1,320	1,321	2,104	2,466	2,224	2,163	2,050	1,785
Total imports	853	1,107	1,919	2,200	2,165	3,478	2,501	2,224	2,174	2,050	1,785
Trade balance[2] (*1,000 short tons*)	725	544	(820)	(930)	(1,011)	(2,929)	(1,376)	(1,158)	(917)	(1,109)	(605)
Apparent consumption[3] (*1,000 short tons*)	3,621	3,239	4,588	5,326	4,643	6,114	5,549	5,323	5,218	5,622	5,103
Ratio of imports to apparent consumption (*percent*):											
East Germany	0	0.4	0	1.3	1.3	3.4	0	0	0.2	0	0
Romania	.4	0	3.0	7.4	7.1	5.3	0	0	0	0	0
U.S.S.R	0	3.0	8.4	7.8	9.8	13.8	.6	0	0	(4)	0
Subject import subtotal	.4	3.4	11.4	16.5	18.2	22.5	.6	0	.2	(4)	0
Total imports	23.6	34.2	41.8	41.3	46.6	56.9	45.1	41.8	41.7	36.5	35.0
Ratio of subject imports to total imports (*percent*)	1.9	9.8	27.3	40.0	39.0	39.5	1.4	-	0.5	(4)	-

[1] Less than 500 short tons.
[2] Calculated as exports minus imports.
[3] Calculated as shipments minus exports plus imports.
[4] Less than 0.05 percent

Source: Compiled from official statistics of the U.S. Department of Commerce.

Table D-4
U.S. prices of solid urea, ammonia, and natural gas and East Europe price of solid urea, by quarters, Jan. 1981-Dec. 1991

Period	Solid urea (granular)	Solid urea (prilled)	Ammonia	Natural gas	Solid urea (East Europe)
	Per short ton			Per 1,000 cubic feet	Per metric ton
1981:					
Jan.-Mar.	$180.83	(1)	$163.33	$1.81	(1)
Apr.-June	185.50	(1)	171.83	1.94	$202.75
July-Sept.	167.17	(1)	166.67	2.04	183.34
Oct.-Dec.	145.00	(1)	142.33	2.14	150.00
1982:					
Jan.-Mar.	147.34	(1)	148.67	2.29	130.83
Apr.-June	143.50	(1)	130.50	2.43	128.34
July-Sept.	129.36	(1)	117.67	2.52	127.50
Oct.-Dec.	122.00	(1)	116.00	2.68	131.34
1983:					
Jan.-Mar.	132.56	(1)	134.83	2.63	116.84
Apr.-June	130.33	(1)	132.33	2.55	114.17
July-Sept.	125.00	(1)	123.17	2.59	108.17
Oct.-Dec.	132.84	(1)	162.33	2.60	112.84
1984:					
Jan.-Mar.	157.42	(1)	191.83	2.68	121.50
Apr.-June	156.63	$142.85	154.17	2.67	142.50
July-Sept.	155.03	149.83	160.17	2.66	165.00
Oct.-Dec.	159.70	152.85	150.83	2.60	168.34
1985:					
Jan.-Mar.	145.29	136.04	147.59	2.66	150.00
Apr.-June	136.04	120.13	145.46	2.58	116.00
July-Sept.	121.17	104.36	134.94	2.47	90.50
Oct.-Dec.	107.63	92.05	116.70	2.34	86.00
1986:					
Jan.-Mar.	99.97	86.75	101.94	2.23	77.50
Apr.-June	111.68	95.85	89.72	1.97	70.00
July-Sept.	96.91	73.18	74.45	1.78	67.00
Oct.-Dec.	83.60	67.05	68.98	1.75	66.50
1987:					
Jan.-Mar.	102.04	92.89	95.97	1.73	70.00
Apr.-June	95.50	82.24	108.13	1.66	89.50
July-Sept.	94.46	88.69	91.93	1.62	90.00
Oct.-Dec.	104.48	98.63	85.54	1.64	92.00
1988:					
Jan.-Mar.	130.27	124.53	103.23	1.83	105.00
Apr.-June	119.22	111.29	90.34	1.55	120.00
July-Sept.	128.48	122.63	89.00	1.57	127.00
Oct.-Dec.	150.11	139.83	112.79	1.78	123.00
1989:					
Jan.-Mar.	149.84	139.29	129.34	1.84	120.00
Apr.-June	124.15	113.98	96.52	1.61	103.50
July-Sept.	92.76	80.97	71.60	1.62	76.50
Oct.-Dec.	107.10	97.47	82.68	1.75	87.00
1990:					
Jan.-Mar.	122.64	115.08	93.75	1.88	103.50
Apr.-June	118.19	113.09	77.45	1.48	105.00
July-Sept.	136.04	128.84	94.02	1.52	140.00
Oct.-Dec.	157.23	146.68	116.63	1.91	151.50
1991:					
Jan.-Mar.	152.42	142.96	111.39	1.69	147.50
Apr.-June	141.16	97.33	83.72	1.47	138.50
July-Sept.	132.78	125.90	111.38	1.45	134.50
Oct.-Dec.	133.45	126.13	117.29	1.90	121.50

[1] Not available.

Source: Compiled from data of the U.S. Department of Energy, Energy Information Administration, *Natural Gas Monthly*, from *Green Markets*, McGraw-Hill Co., and Fertecon, Inc.

Table D-5
Solid urea: U.S. domestic shipments, public sources[1] and questionnaire responses[2], by quarters and annually, 1981-91

(1,000 short tons material)

	Jan.-Mar.		Apr.-June		July-Sept.		Oct.-Dec		Annual totals		
Year	Public	Question-naire	Public	Question-naire	Public	Question-naire	Public	Question-naire	Public[3]	Question-naire (Q)[4]	Question-naire (A)[5]
1981	598	133	691	137	713	95	630	116	2,632	481	944
1982	511	131	382	145	422	103	684	128	1,999	507	934
1983	704	162	531	92	554	103	847	108	2,636	465	1,230
1984	822	155	735	180	569	150	752	114	2,878	599	1,236
1985	609	156	821	179	412	126	878	122	2,720	583	1,148
1986	535	183	548	196	743	95	822	130	2,648	604	1,329
1987	797	174	957	141	526	138	733	166	3,013	619	1,494
1988	810	130	847	168	432	117	1,156	149	3,245	564	1,541
1989	994	182	932	183	467	119	772	177	3,165	661	1,667
1990	894	139	914	175	756	170	1,206	120	3,770	604	1,670
1991	924	153	890	205	805	187	891	112	3,510	657	1,634

[1] Quarterly (or monthly) shipment data are not collected. The data presented here were calculated from Department of Commerce published monthly data on production, exports, and inventories. These data were first aggregated into quarterly data, then shipments were calculated as production - change in inventories - exports.

[2] Compiled from data submitted in response to questionnaires of the U.S. International Trade Commission.

[3] Annual shipment data thus calculated varies between approximately 92 and 110 percent compared with published annual shipment data.

[4] Annual shipment data thus calculated reflect reported quarterly prilled and granular shipments of 5 producers together accounting for approximately 25 percent of domestic urea capacity as of Dec. 31, 1991.

[5] Annual shipment data thus calculated varies significantly from reported quarterly questionnaire data added up to annual totals because of differences in producer number and identity. These data are based on responses that reflect reported annual prilled and granular shipments of 7 producers together accounting for approximately 45 percent of domestic urea capacity as of Dec. 31, 1991.

Source: Compiled from U.S. Department of Commerce, *Current Industrial Reports: Monthly Reports on Inorganic Fertilizer Materials and Related Products*, M28B (1981-91), except as noted.

Table D-6
Urea: U.S. Imports, by principal sources, 1981-91

Source	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
					Quantity (*1,000 short tons*)[1]						
East Germany	0	12	0	69	59	210	0	0	11	0	0
Romania	16	0	136	393	330	321	0	0	0	0	0
U.S.S.R	0	97	387	418	455	843	35	0	0	(2)	0
Subject subtotal	16	109	523	880	844	1,374	35	0	11	(2)	0
Canada	653	622	766	880	771	1,189	1,263	1,240	1,129	1,325	1,264
Mexico	0	(2)	75	35	2	26	70	33	85	138	127
Trinidad and Tobago	17	30	9	22	40	97	219	189	115	122	124
Netherlands	115	273	232	127	192	168	248	114	155	79	57
Venezuela	7	13	145	78	0	61	79	136	89	103	23
All other	45	61	171	177	314	561	585	511	589	283	189
Total	853	1,107	1,919	2,200	2,165	3,478	2,501	2,224	2,174	2,050	1,785
					Value (*1,000 dollars*)[3]						
East Germany	-	1,760	-	7,920	4,885	14,574	-	-	546	-	-
Romania	2,893	-	10,885	40,473	25,711	21,941	-	-	-	-	-
U.S.S.R	-	10,434	38,913	44,694	57,130	58,209	2,106	-	-	5	-
Subject subtotal	2,893	12,194	49,798	93,087	87,726	97,724	2,106	-	546	5	-
Canada	88,988	89,599	112,115	115,268	97,564	126,264	108,955	109,709	117,548	153,106	126,413
Mexico	0	11	7,296	3,955	302	2,199	5,254	3,196	7,857	12,951	14,423
Trinidad and Tobago	2,548	3,768	897	2,435	5,311	7,766	17,452	22,779	12,780	13,743	15,457
Netherlands	28,507	57,143	30,799	23,119	36,880	28,312	23,273	12,713	18,848	8,457	7,386
Venezuela	1,240	2,326	14,671	9,204	0	4,365	6,199	14,815	9,991	10,432	2,759
All other	7,062	8,218	20,370	22,538	34,697	42,564	42,022	51,843	71,196	25,412	22,130
Total	131,238	173,259	235,946	269,606	262,480	306,194	205,260	215,055	238,766	224,106	188,570
					Unit value (per *short ton*)						
East Germany	-	$145.13	-	$114.96	$83.31	$69.54	-	-	$49.64	-	-
Romania	$181.44	-	$79.98	103.06	77.81	68.20	-	-	-	-	-
U.S.S.R	-	107.61	100.56	107.04	125.57	69.02	$59.35	-	-	$206.19	-
Subject subtotal	181.44	126.37	90.27	108.35	95.56	68.92	59.35	-	49.64	206.19	-
Canada	136.34	144.06	146.45	130.95	126.53	106.17	86.29	$88.46	104.12	115.55	$100.01
Mexico	-	53.20	97.93	113.30	123.51	84.37	74.10	96.58	92.44	93.85	113.57
Trinidad and Tobago	146.06	127.51	105.10	108.56	131.93	79.89	79.77	120.25	111.13	112.65	124.65
Netherlands	148.01	209.40	132.91	181.70	191.59	168.05	93.78	111.73	121.60	107.05	129.58
Venezuela	185.65	183.50	101.35	117.44	-	71.00	78.17	108.90	112.26	101.28	119.96
All other	154.98	122.62	118.43	141.22	109.88	77.36	70.51	100.85	120.88	89.95	117.09
Average	153.81	156.51	122.93	122.57	121.26	88.03	82.07	96.71	110.41	103.39	117.47

[1] On a dry, 100-percent-urea basis.
[2] Less than 500 short tons.
[3] On a customs-value basis.

Source: Compiled from official statistics of the U.S. Department of Commerce.

Table D-7
Solid urea: U.S. industry market share, 1981-91

Year	Domestic shipments	Total imports	Apparent consumption	U.S. market share
		1,000 short tons		*Percent*
1981	2,768	853	3,621	76.4
1982	2,132	1,107	3,239	65.8
1983	2,669	1,919	4,588	58.2
1984	3,126	2,200	5,326	58.7
1985	2,478	2,165	4,643	53.4
1986	2,636	3,478	6,114	43.1
1987	3,048	2,501	5,549	54.9
1988	3,099	2,224	5,323	58.2
1989	3,044	2,174	5,218	58.3
1990	3,572	2,050	5,622	63.5
1991	3,318	1,785	5,103	65.0

Source: Compiled from official statistics of the U.S. Department of Commerce.

Table D-8
Major nitrogenous fertilizers: U.S. farm prices, semiannually, March 1981-October 1991

(Per pound)

Period	Anhydrous ammonia[1]	Nitrogen solutions[2]	Solid urea[3]	Ammonium nitrate[4]
1981:				
March	$0.148	$0.235	$0.258	$0.272
October	.152	.253	.268	.282
1982:				
March	.155	.252	.261	.267
October	.144	.249	.248	.281
1983:				
March	.145	.237	.233	.272
October	.138	.227	.226	.271
1984:				
March	.168	.242	.241	.291
October	.158	.238	.248	.288
1985:				
March	.155	.238	.240	.282
October	.145	.233	.222	.271
1986:				
March	.137	.203	.189	.251
October	.106	.187	.173	.241
1987:				
March	.114	.182	.175	.231
October	.110	.187	.173	.226
1988:				
March	.127	.228	.199	.244
October	.116	.227	.204	.250
1989:				
March	.137	.237	.230	.278
October	.110	.217	.187	.265
1990:				
March	.121	.220	.200	.265
October	.116	.225	.216	.266
1991:				
March	.128	.230	.230	.271
October	.115	.232	.221	.271

[1] 82.2 percent nitrogen.
[2] Average of 30 percent nitrogen.
[3] 46.6 percent nitrogen.
[4] 35 percent nitrogen.

Source: Compiled from data of the U.S. Department of Agriculture, NASS, *Agricultural Prices*.

Table D-9
Major nitrogenous fertilizers: U.S. consumption, 1981-91

(1,000 nutrient tons)

Year	Anhydrous ammonia[1]	Ammonium nitrate[2]	Nitrogen solutions[3]	Urea[4]
1981	4,673	1,057	2,181	1,034
1982	4,206	900	2,174	1,025
1983	3,153	753	1,832	1,012
1984	3,875	765	2,420	1,273
1985	4,429	768	2,477	1,249
1986	3,578	607	2,109	1,601
1987	3,722	575	2,047	1,550
1988	3,781	619	2,182	1,552
1989	3,801	665	2,117	1,576
1990	3,810	622	2,323	1,742
1991	4,165	645	2,310	1,582

[1] 82.2 percent nitrogen.
[2] 35 percent nitrogen.
[3] UAN solutions. The nitrogen content ranges from 28-32 percent and averages 30 percent.
[4] 46.6 percent nitrogen.

Source: Compiled from data of the U.S. Department of Agriculture, *Commercial Fertilizers.*

Table D-10
U.S. farm prices of corn, wheat, cotton, and rice, 1981-91

Year	Corn	Wheat	Cotton	Rice
	Per bushel		*Per CWT*	
1981	$2.50	$3.65	$54.00	$9.05
1982	2.68	3.55	59.10	8.11
1983	3.20	3.53	66.40	8.76
1984	2.73	3.38	58.70	8.06
1985	2.23	3.08	56.50	6.62
1986	1.50	2.42	52.40	3.93
1987	1.94	2.57	64.30	7.27
1988	2.57	3.72	56.60	6.83
1989	2.36	3.72	66.20	7.35
1990	2.28	2.61	67.10	6.70
1991	2.37	3.00	58.10	7.58

Source: Compiled from data of the U.S. Department of Agriculture, NASS, *Agricultural Prices.*

Table D-11
Coefficients of demand and related T-statistics[1] for tapered roller bearings: Cup and cone assemblies entered as a set

Independent variable	Subject imports[2]	Non-subject imports[3]	Domestic product	Subject import-demand by individual country: Imports from China	Imports from Hungary	Imports from Italy	Imports from Japan
Case filing binary variable	0.01	0.85*	-0.03	0.43	0.65	-0.12	-0.45*
	(.03)	(2.97)	(-.26)	(1.17)	(.71)	(-.15)	(-3.06)
Remedy binary variable	-.24	.35	-.03	1.57*	1.75	-2.15*	-.51
	(-.83)	(.84)	(-.25)	(3.11)	(1.49)	(-1.81)	(-2.00)
Constant	-9.31	-2.18	13.79*	-37.69*	-18.36	13.29	28.43*
	(-.98)	(-.17)	(2.81)	(-2.14)	(-0.39)	(.35)	(3.30)
Own-price	-.85*	-.93*	-4.29*	-1.38*	-1.35*	-.64*	-.97*
	(-3.42)	(-3.00)	(-2.34)	(-3.92)	(-5.32)	(-3.31)	(-3.90)
Cross price:							
Subject import price	-	-.16	.02	-	-	-	-
	-	(-.41)	(.23)	-	-	-	-
Nonsubject import price	-.21	-	.17*	-.37	-.40	-.25	-.26
	(-1.02)	-	(1.96)	(-.85)	(-.44)	(-.30)	(-1.38)
Domestic product price	-.49	2.50	-	9.92	-2.21	-1.06	-10.72*
	(-.13)	(.45)	-	(1.40)	(-.12)	(-.07)	(-2.88)
Substitute bearings price[4]	4.38*	.88	1.71	-0.35	3.59	.06	7.32*
	(1.84)	(.23)	(1.49)	(-.07)	(.29)	(.01)	(3.05)
Motor vehicle production	1.02*	.37	.18	1.33	2.67	.53	.59
	(2.03)	(.47)	(.75)	(1.33)	(1.01)	(.24)	(1.31)
Test statistics:							
R-square	.63	.58	.72	.88	.84	.85	.74
Durbin-Watson	1.51	2.03	2.03	2.11	2.39	2.19	1.66
Number of observations	42	41	41	42	31	41	42

[1] T-statistics noted in parentheses. "*" indicates statistical significance at the 95-percent confidence level (one-tail test).
[2] Average prices and quantities of subject imports included imports from China and Japan.
[3] Average prices and quantities of nonsubject imports included imports from Canada, France, and Germany.
[4] Price of ball bearings and parts.

Source: Estimated by the staff of the United States International Trade Commission.

Table D-12
Coefficients of demand and related T-statistics[1] for tapered roller bearings: Cone assemblies entered separately

Independent variable	Subject imports[2]	Non-subject imports[3]	Domestic product	Subject import-demand by individual country: Imports from China	Imports from Hungary	Imports from Italy	Imports from Japan	Imports from Romania
Case filing binary variable	-0.18	0.36*	-0.01	0.78	-0.06	-0.99	-0.11	0.26
	(-1.12)	(1.79)	(-.13)	(.73)	(-.09)	(-.85)	(-.69)	(.25)
Remedy binary variable	-.37*	.79*	.15	-.19	-.76	1.27	-.16	.11
	(-1.89)	(3.07)	(1.38)	(-.17)	(-1.06)	(1.04)	(-.78)	(.09)
Constant	66.49*	-9.53	23.67*	3.98	39.94	93.40*	48.23*	99.08
	(5.29)	(-.58)	(3.53)	(.16)	(.73)	(2.33)	(5.87)	(1.06)
Own-price	-1.28*	-1.35*	-5.44*	-.11	-.63*	-1.50*	-1.44*	-1.99*
	(-5.56)	(-5.96)	(-2.80)	(-.33)	(-3.41)	(-7.25)	(-6.52)	(-4.65)
Cross-price:								
Subject import price	-	.26	.13	-	-	-	-	-
	-	(.87)	(1.06)	-	-	-	-	-
Nonsubject import price	-.26	-	.15	-2.01*	.23	.03	-.16	-.37
	(-1.49)	-	(1.57)	(-2.79)	(.31)	(.03)	(-1.08)	(-.29)
Domestic product price.	-14.44*	-2.90	-	-3.96	-3.57	-24.71*	-6.23*	-13.71
	(-3.96)	(-.61)	-	(-.47)	(-.23)	(-1.91)	(-2.03)	(-.45)
Substitute bearings price[4]	4.53*	4.75*	1.48	6.39	.69	12.78	-.08	2.46
	(2.17)	(1.75)	(1.33)	(1.09)	(.08)	(1.44)	(-.04)	(.14)
Motor vehicle production	.25	1.90*	-.25	.61	-1.32	-2.69	.49	-2.45
	(.45)	(2.62)	(-.83)	(.59)	(-.57)	(-1.47)	(1.20)	(-.51)
Test statistics:								
R-square	.90	.95	.73	.85	.56	.80	.95	.86
Durbin-Watson	1.23	1.67	1.36	2.23	2.04	1.42	2.07	1.62
Number of observations	32	32	32	28	32	31	41	23

[1] T-statistics noted in parentheses. "*" indicates statistical significance at the 95-percent confidence level (one-tail test).
[2] Average prices and quantities of subject imports included imports from Hungary and Japan.
[3] Average prices and quantities of nonsubject imports included imports from Canada, France, Germany, and the United Kingdom.
[4] Price of ball bearings and parts.

Source: Estimated by the staff of the United States International Trade Commission.

Table D-13
Coefficients of demand and related T-statistics[1] for tapered roller bearings: Cup assemblies entered separately

Independent variable	Subject imports[2]	Non-subject imports[3]	Domestic product	Subject import-demand by individual country: Imports from China	Imports from Hungary	Imports from Italy	Imports from Japan	Imports from Romania
Case filing binary variable	-0.01	-0.25	-0.02	0.31	-0.01	-0.46	0.04	0.35
	(-.07)	(-1.18)	(-.18)	(.27)	(-.02)	(-.22)	(.25)	(.85)
Remedy binary variable	-.25	-.08	([4])	1.07	-.30	-.15	-.11	1.45*
	(-1.55)	(.27)	(.01)	(.96)	(-.36)	(-.07)	(-.58)	(2.06)
Constant	54.07*	-25.21	32.90*	-56.44*	36.37	58.59	57.28*	6.71
	(5.88)	(-1.57)	(3.98)	(-2.04)	(.70)	(.63)	(5.17)	(.14)
Own-price	-.81*	-.85*	-8.08*	.72	-.81*	-1.02*	-.98*	-1.27*
	(-2.91)	(-4.83)	(-3.22)	(1.17)	(-2.83)	(-2.82)	(3.07)	(-4.83)
Cross-price:								
Subject import price	-	-.56	-.27	-	-	-	-	-
	-	(-1.15)	(-1.49)	-	-	-	-	-
Nonsubject import price	-.02	-	.09	.19	-.43	.16	-.10	-.61
	(-.18)	-	(1.36)	(.25)	(-.84)	(.10)	(-.96)	(-1.69)
Domestic product price	-12.40*	.38	-	-4.88	-17.53	-20.61	-11.67*	7.97
	(-4.88)	(.09)	-	(-.43)	(-1.20)	(-.67)	(-3.44)	(.51)
Substitute bearings price[5]	4.66*	6.45*	2.58*	10.89	2.27	9.86	3.15	-11.29
	(2.95)	(2.33)	(1.84)	(1.55)	(.24)	(.55)	(1.60)	(-1.19)
Motor vehicle production	.12	1.36	-.26	3.66*	5.43	.13	.29	3.42
	(.21)	(1.39)	(-.63)	(2.96)	(1.69)	(.04)	(.59)	(1.22)
Test statistics:								
R-square	.85	.92	.75	.82	.78	.52	.89	.93
Durbin-Watson	1.71	2.12	1.79	1.90	2.31	2.33	1.99	1.54
Number of observations	28	26	27	27	28	23	31	21

[1] T-statistics noted in parentheses. "*" indicates statistical significance at the 95-percent confidence level (one-tail test).
[2] Average prices and quantities of subject imports included imports from Hungary and Japan.
[3] Average prices and quantities of nonsubject imports included imports from Canada, France, Germany and the United Kingdom.
[4] Less than .005.
[5] Price of ball bearings and parts.

Source: Estimated by the staff of the United States International Trade Commission.

Table D-14
Coefficients of demand and related T-statistics[1] for radial ball bearings greater than 30mm, but less than 52mm

Independent variable	Subject imports[2]	Non-subject imports[3]	Domestic product	Subject import-demand by individual country: Imports from France	Imports from Germany	Imports from Italy	Imports from Japan	Imports from Romania	Imports from Sweden	Imports from United Kingdom
Case filing binary variable	0.30*	-0.08	-0.02	0.36	0.37*	0.51	0.30*	0.40	-0.08	-0.28
	(2.16)	(-.33)	(-.31)	(.87)	(2.21)	(.92)	(1.75)	(.63)	(-.18)	(-.64)
Remedy binary variable	.25	.36	-.11	-.48	.60*	.34	.25	1.35	-1.55*	.06
	(1.19)	(.95)	(-.93)	(-.69)	(2.12)	(.37)	(1.11)	(1.21)	(-1.96)	(.08)
Constant	25.92*	-6.89	-5.44*	17.81	62.69*	50.10*	19.54*	195.30*	-17.54	72.14*
	(5.15)	(-.76)	(-1.89)	(.90)	(8.01)	(1.92)	(3.57)	(5.94)	(-.74)	(3.27)
Own-price	-1.26*	-1.14*	-.32	-1.86*	-1.27*	-1.95*	-1.21*	-1.44*	-1.25*	-.97*
	(-3.71)	(-2.18)	(-.70)	(-3.44)	(-7.42)	(-4.74)	(-2.93)	(-12.85)	(-2.70)	(-5.47)
Cross-price:										
Subject import price	-	.26	.05	-	-	-	-	-	-	-
	-	(.43)	(.28)	-	-	-	-	-	-	-
Nonsubject import price	-.04	-	.04	.68	-.01	.68	-.14	-2.11	-1.25	.22
	(-.12)	-	(.22)	(.66)	(-.03)	(.48)	(-.40)	(-1.30)	(1.10)	(.22)
Domestic product price	3.69*	2.16	-	4.57	5.68*	4.61	3.20*	3.96	-2.47	12.21*
	(4.54)	(1.47)	-	(1.42)	(4.49)	(1.09)	(3.62)	(.81)	(-.69)	(4.16)
Substitute bearings price[4]	-6.07*	.99	2.08*	-2.70	-14.17*	-16.14*	-4.63*	-33.2*	7.12	-28.53*
	(-3.90)	(.35)	(2.35)	(-.45)	(-5.89)	(-2.01)	(-2.76)	(-3.3)	(1.04)	(-5.05)
Motor vehicle production	.72*	1.15*	.17	-.91	-.39	2.52	.94*	-3.24	.96	1.78
	(2.40)	(2.12)	(1.00)	(-.70)	(-.84)	(1.59)	(2.88)	(-1.69)	(.76)	(1.43)
Test statistics:										
R-square	.83	.74	.53	.59	.85	.88	.78	.95	.87	.88
Durbin-Watson	1.66	1.40	.70	1.50	1.71	1.44	1.67	2.01	1.24	1.91
Number of observations	42	42	42	42	42	42	42	37	42	42

[1] T-statistics noted in parentheses. "*" indicates statistical significance at the 95-percent confidence level (one-tail test).
[2] Average prices and quantities of subject imports included imports from France, Germany, and Japan.
[3] Average prices and quantities of nonsubject imports included imports from Canada and Korea.
[4] Price of tapered roller bearings.

Source: Estimated by the staff of the United States International Trade Commission.

Table D-15
Coefficients of demand and related T-statistics[1] for radial ball bearings greater than 52mm, but less than 100mmm

Independent variable	Subject imports[2]	Non-subject imports[3]	Domestic product	Subject import-demand by individual country: Imports from France	Imports from Germany	Imports from Italy	Imports from Japan	Imports from Romania	Imports from Sweden	Imports from United Kingdom
Case filing binary variable	0.06	0.50*	0.02	-0.08	0.37*	0.22	0.05	-1.37	-0.26	0.03
	(.47)	(2.12)	(.39)	(-.50)	(2.07)	(.76)	(.37)	(-1.62)	(-.73)	(.12)
Remedy binary variable	.13	.43	([4])	-.24	.82*	-.14	.18	-.30	-1.45*	-.45
	(.59)	(.99)	([4])	(-.79)	(2.70)	(-.30)	(.76)	(-.19)	(-2.51)	(-1.14)
Constant	27.74*	6.53	-4.93*	18.65*	62.63*	9.07	24.21*	20.34	3.84	66.74*
	(5.25)	(.63)	(-1.86)	(2.38)	(7.02)	(.63)	(3.94)	(.36)	(.24)	(5.53)
Own-price	-.49	-1.10*	-.12	-1.05*	-.77*	-1.02*	-.94*	-1.02*	-.78*	-.94*
	(-1.38)	(-4.94)	(-.26)	(-9.35)	(-6.67)	(-5.92)	(-2.07)	(-6.64)	(-2.19)	(-5.40)
Cross-price:										
Subject import price	-	.17	-.28	-	-	-	-	-	-	-
	-	(.24)	(-1.58)	-	-	-	-	-	-	-
Nonsubject import price	.19	-	-.02	-.19	-.04	-.12	.27	.79	-.70	-.15
	(1.68)	-	(-.44)	(-1.20)	(-.25)	(-.44)	(2.02)	(.84)	(-2.10)	(-.68)
Domestic product price	3.96*	.53	-	7.99*	3.24*	2.05	4.64*	-10.09	3.37	9.86*
	(4.19)	(.29)	-	(5.79)	(2.35)	(.91)	(4.27)	(-1.39)	(1.24)	(5.50)
Substitute bearings price[5]	-8.53*	.59	2.20*	-9.44*	-14.89*	-3.37	-8.30*	3.80	-1.09	-2.12*
	(-5.00)	(.17)	(2.56)	(3.63)	(-5.31)	(-.78)	(-4.16)	(.22)	(-.21)	(-5.63)
Motor vehicle production	1.07*	.50	.15	.51	.89*	1.57*	1.16*	2.51	.45	.12
	(3.36)	(.87)	(.99)	(1.19)	(2.00)	(2.20)	(3.40)	(.78)	(.52)	(.20)
Test statistics:										
R-square	.76	.53	.56	.82	.95	.85	.62	.85	.83	.94
Durbin-Watson	1.23	2.30	.73	2.29	1.52	2.16	1.15	2.19	1.86	2.03
Number of observations	42	42	42	42	42	42	42	32	42	42

[1] T-statistics noted in parentheses. "*" indicates statistical significance at the 95-percent confidence level (one-tail test).
[2] Average prices and quantities of subject imports included imports from France, Germany, and Japan.
[3] Average prices and quantities of nonsubject imports included imports from Canada and Korea.
[4] Less than .005.
[5] Price of tapered roller bearings.

Source: Estimated by the staff of the United States International Trade Commission.