THE ECONOMIC EFFECTS OF SIGNIFICANT U.S. IMPORT RESTRAINTS, PHASE II: AGRICULTURAL PRODUCTS AND NATURAL RESOURCES

Report to the Committee on Finance of the United States Senate on Investigation No. 332-262 Under Section 332 of the Tariff Act of 1930

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PREFACE[1]

On October 11, 1988, the United States International Trade Commission instituted investigation 332-262, The Economic Effects of Significant U.S. Import Restraints, in response to a request from the Committee on Finance of the U.S. Senate. The investigation, conducted under section 332(g) of the Tariff Act of 1930, is being conducted in three one-year phases. This report, phase II of the investigation, examines restraints in the agricultural and natural resource sectors. Phase I of the investigation, completed in September 1989, examined imported manufactures. Phase III of the investigation, due in 1991, will examine the service sector and will provide a general equilibrium analysis of the import restraints considered in phases I and II.

The report includes an assessment of the effects of significant agricultural and natural resource import restraints on consumers, on the output and profits of U.S. firms, on the income and employment of U.S. workers in the protected industry, and on the net economic welfare of the United States. In addition, the effects of the restraints on the employment, profits, and output of significant downstream industries are examined. A summary of the Commission's findings begins on page vii.

The Commission received the request on September 12, 1988. (See appendix A.) Phase II of the investigation was initiated on July 28, 1989. Public notice of phase II was given by posting a copy of the notice in the Office of the Secretary, U.S. International Trade Commission, Washington, DC, and by publishing the notice in the *Federal Register* of October 4, 1989 (vol. 54, No. 191, p.40915). (See appendix B.)

A public hearing in connection with the investigation was held at Commission on March 7, 1990. (See appendix C.)

[1] Acting Chairman Brunsdale did not participate in the preparation or approval of those portions of this report that pertain to restraints on sugar.

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EXECUTIVE SUMMARY

This report is the second phase of a three part study that examines the economic effects of significant U.S. import restraints on consumers, on the output and profits of firms, on the income and employment of workers, on downstream customers of the protected industries, and on the net economic welfare of the United States. These effects are examined on an industry-by-industry basis.

This phase focuses on nontariff restraints in the agricultural and natural resource sectors.[1] The first phase of the investigation, completed in September 1989, was confined to manufactured imports.[2] The third phase, scheduled for release in 1991, will examine the service industries and provide a general equilibrium analysis of the import restraints considered in phases I and II.

Five agricultural industries are identified as having significant nontariff import restraints. Four of the industries—sugar, dairy, peanuts, and cotton —are protected by import quotas. The fifth industry, meat, is protected through voluntary export restraints (VERs). The value of production in each of the five industries exceeds $100 million.

Results

Interpreting the results

In each of the industries studied, the import restraint is used in conjunction with domestic programs to achieve policy goals with regard to the price, output, or trade of the commodity. To isolate the effects of the import restraint from other farm programs, we hold the income and production of domestic farmers constant. Specifically, we calculate the effects of removing the import restraint while replacing domestic price supports with a per-unit subsidy equal to the difference between the support price and the world price. In this way, farm income and farm production are held constant, but removing the import restraint lowers consumer prices.[3] In the case of meat, there are no domestic price supports, so we do not keep farm income constant in our calculations.

The direct costs of current domestic farm support programs are substantial for the cotton, peanut, and dairy sectors. The costs of Government subsidies that we report are increases to the costs of current programs.

The analysis in this study is conducted on an industry-by-industry basis and does not consider interactions beyond those between the protected industry and its immediate suppliers and customers. Consequently, it is inappropriate to merely sum the estimates of the effects from this study to get the economy-wide effects on consumers, producers, or welfare. In particular, the interactions ignored in the present analysis are more likely to be important when more than one import restraint is removed at the same time.[4] The third phase of this investigation will provide estimates which account for these interactions.

The estimates of employment effects need to be interpreted carefully. Specifically, the change in employment refers only to changes in the industry under investigation and are not economy-wide job gains or losses. In fact little, if any, net change in overall

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[1] The study excludes import restraints imposed as a result of antidumping and countervailing duty investigations conducted by the Department of Commerce and the ITC and sections 337 and 406 investigations conducted by the ITC.

[2] *The Economic Effects of Significant U.S. Import Restraints, Phase I: Manufacturing,* USITC Publication 2222, October, 1989.

[3] The reader should be aware that the scenario analyzed in this study differs in at least two significant respects from what was being discussed in the Uruguay Round at the time this study was being completed. First, the current U.S. proposal in those negotiations would require that countries phase-out a wide range of programs that distort trade in agriculture, not just quotas. Second, all parties to the GATT would implement changes simultaneously. The analysis in this report considers the case in which only the U.S. changes its policies and only removes quotas while maintaining U.S. farm production and income at their current levels.

[4] For a more detailed discussion, see appendix D.

employment would have been expected to result from the removal of these import restraints.

Finally, the effects estimated in this study are for a one year period. If the markets were allowed to adjust over a longer period, the change in the quantity of imports would be tend to be proportionally larger than the one year effects reported. Whether the change in prices, consumer benefits, and net national welfare would be greater or less than the one year effects is unclear. The estimated import increases would tend to be large, proportionately, for dairy, cotton and peanuts because imports of these goods are currently such a small share of the U.S. market and are subject to such high import restraints.

Estimates of the effects of significant import restraints

Tables A and B summarize the estimates for the effects of unilaterally eliminating significant import restraints in the agricultural and natural resources sectors during 1988 and 1989 while holding the income and production of domestic farmers constant. The tables highlight the effect on consumers, the Government, and net national welfare; the effect on prices and quantities of both the domestic and imported commodity; and the effect on employment in downstream industries that are significant users of the commodity.

Consumers gain from the removal of import restraints because the price of both the import and the competing domestic product decrease. These benefits are reported separately. The cost to the Government of maintaining farm income and production when the restraint is eliminated is reported as "producer subsidy cost."[5] The difference between the gain to the consumer and the cost to the Government (and, ultimately, to the taxpayer) is the net increase in national welfare.

Sugar—The consumer cost of the sugar quotas was well over a billion dollars in both 1988 and 1989. Even holding farm income and production constant through a per unit subsidy, net economic welfare in the United States would have improved by nearly $250 million in 1988 and $150 million in 1989 if the restraint had been eliminated. Further, the decline in consumer prices would have increased employment in significant downstream industries by over 2 percent in 1988 and 1.5 percent in 1989. Finally, sugar prices would have fallen significantly: the price of imported sugar would have dropped over 45 percent in 1988 and over 35 percent in 1989.

Meat—Meat VERs were not negotiated in 1989. In 1988, the last year the VERs were binding, consumers paid $167 million in higher costs while domestic producers received $73 million dollars in extra revenue. The net welfare loss to the economy was thus $94 million dollars. Imported meat prices were nearly 5 percent greater due to the import restraints.

Peanuts—The effects of removing restraints in the peanut industry would be quite small. Total consumer benefits would have been over $1 million in 1988 and 1989. The net gain to United States welfare would have been only $0.2 million dollars. Imports would increase significantly, but the import share would still be less than 0.1 percent of production.

Cotton—The effects of removing import restraints in the cotton industry during 1988 and 1989 would be very small. Consumer costs of the quotas are well under $1 million dollars.

Dairy—The major effect of removing the dairy restraints would occur in the cheese market. In both 1988 and 1989, having removed the restraints would have yielded consumer benefits over $250 million. Once the cost of supporting farm income is accounted for, net national welfare would have risen by $42 million in 1988 and by $38 million in 1989. Domestic cheese prices would have fallen by approximately 5 percent and imported cheese prices would have dropped by approximately 20 percent in1988 and approximately 15 percent in 1989.

[5] These are costs above the existing domestic subsidies.

Table A
Summary of the economic effects of unilaterally eliminating significant nontariff import restraints in the agricultural sector, 1989[1]

Type of effect	Sugar	Meat[2]	Peanuts	Cotton	Dairy			
					Fluid milk	Condensed and evaporated milk	Butter	Cheese
	Value (million dollars)							
Consumer benefit:								
On purchases of the domestic product	894	0.0	1.04	.07	9.56	2.61	2.14	221.42
On purchases of the imported product	211	0.0	.21	.01	1.10	.56	0.21	41.64
Total consumer benefit	1,105	0.0	1.34	.08	10.66	3.17	2.35	263.06
Producer subsidy cost[3]	-955	0.0	-1.04	-.07	-9.57	-2.62	-2.15	-224.75
Net welfare gain	150	0.0	.30	.01	1.10	.55	.20	38.31
	Percent							
Price change:								
Domestic product	-24.9	0.0	-0.1	0.0	-0.2	-0.1	-0.6	-4.6
Imported product	-35.6	0.0	-31.4	-1.1	-18.1	-18.1	-13.0	-16.4
Quantity change:								
Domestic product	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Imported product	40.9	0.0	97.0	4.4	92.9	93.1	71.7	66.2
Employment change in significant downstream industries[4]	[5]1.7	[6]0.0	[7]0.1	([8])	([9])	([10])	([11])	([11])

[1] The estimated effects of the unilateral removal of significant non-tariff import restraints in the agricultural sector assume that the income and production of domestic farmers are held constant.

[2] Meat Voluntary Export Restraints were not in effect in 1989.

[3] Does not include the cost of existing subsidies.

[4] Unweighted average of significant downstream users. "Significant downstream users" have at least 5 percent of total costs attributable to the protected upstream industry.

[5] Significant downstream users: chocolate and cocoa products; flavoring extracts and syrups, n.e.c.; and blended and prepared flour.

[6] Significant downstream users: sausages and prepared meats; frozen specialties; and eating and drinking places.

[7] Significant downstream users: peanut butter; roasted and salted peanuts; peanut candy; and peanut oil and meal.

[8] Significant downstream users: broadwoven fabric mills; yarn mills; thread mills; felt goods (n.e.c.); and cottonseed oil. Less than 0.05 percent.

[9] Significant downstream users: butter; cheese; condensed and evaporated milk; and ice cream and frozen deserts. Less than 0.05 percent.

[10] Significant downstream users: ice cream and frozen desserts; and chocolate and cocoa products. Less than 0.05 percent.

[11] Not applicable.

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

Table B
Summary of the economic effects of unilaterally eliminating significant nontariff import restraints in the agricultural sector, 1988[1]

Type of effect	Sugar	Meat	Peanuts	Cotton	Dairy			
					Fluid milk	Condensed and evaporated milk	Butter	Cheese
	Value (million dollars)							
Consumer benefit:								
On purchases of the domestic product	997	73.4	1.0	.29	10.85	2.97	3.85	233.86
On purchases of the imported product	283	94.0	0.2	.05	1.3	0.66	0.45	46.63
Total consumer benefit	1,280	167.4	1.2	.34	12.15	3.62	4.30	280.49
Producer subsidy cost[2]	-1,038	[3]-73.4	-1.0	-.29	-10.85	-2.97	-3.86	-238.05
Net welfare gain	242	94.0	0.2	.52	1.30	0.65	.44	42.44
	Percent							
Price change:								
Domestic product	-30.7	-1.9	-0.1	0.0	-0.2	-0.1	-1.0	-5.5
Imported product	-46.2	-4.3	-20.5	-3.8	-21.9	-21.9	-30.8	-18.9
Quantity change:								
Domestic product	0.0	-1.9	0.0	0.0	0.0	0.0	0.0	0.0
Imported product	56.0	11.7	65.6	14.5	105.4	105.6	129.1	71.9
Employment change in significant downstream industries[4]	[5]2.1	[6]0.5	[7]0.1	([8])	([9])	([10])	([11])	([11])

[1] The estimated effects of the unilateral removal of significant non-tariff import restraints in the agricultural sector assume that the income and production of domestic farmers are held constant.

[2] Does not include the cost of existing subsidies.

[3] Since meat does not have Government price supports, the cost of removing the Voluntary Export Restraints is born by the producers and not by the Government.

[4] Unweighted average of significant downstream users. "Significant downstream users" have at least 5 percent of total costs attributable to the protected upstream industry.

[5] Significant downstream users: chocolate and cocoa products; flavoring extracts and syrups, n.e.c.; and blended and prepared flour.

[6] Significant downstream users: sausages and prepared meats; frozen specialties; and eating and drinking places.

[7] Significant downstream users: peanut butter; roasted and salted peanuts; peanut candy; and peanut oil and meal.

[8] Significant downstream users: broadwoven fabric mills; yarn mills; thread mills; felt goods (n.e.c.); and cottonseed oil. Less than 0.05 percent.

[9] Significant downstream users: butter; cheese; condensed and evaporated milk; and ice cream and frozen deserts. Less than 0.05 percent.

[10] Significant downstream users: ice cream and frozen desserts; and chocolate and cocoa products. Less than 0.05 percent.

[11] Not applicable.

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

The effects of removing import restraints in the fluid milk market would be concentrated at the U.S. borders. Total consumer benefits from removing the restraints would have been over $12 million in 1988 and over $10 million in 1989. The producer subsidy cost would have been approximately $11 million in 1988 and $9 million in 1989. Consequently, the net gain to U.S. welfare would have been over $1 million in both years. The employment effect of removing the quotas would have been negligible.

The effects of removing restraints in the butter market and the condensed and evaporated milk market are similar in size. Total consumer benefits of removing the restraints on butter would have been over $4 million in 1988 and $4 million in 1989; the consumer benefits from removing restraints on condensed and evaporated milk would have been over $3 million in both years. The net welfare effects would have been less then $1 million for both products in both years.

The removal of the quota on sugar, which has a large market share under quota, results in relatively large domestic price and economic welfare effects. The removal of a quota on products such as peanuts, cotton and all dairy products, except for cheese, whose market shares under quota are less than one percent of domestic consumption, results in relatively minor domestic price and economic welfare effects. Even a doubling of these modest import market shares, due to the removal of quotas, results in small effects.

Chapter 1
Introduction

Introduction

This report is the second phase of a three part study that examines the economic effects of significant U.S. import restraints. This phase focuses on nontariff restraints in the agricultural and natural resource sectors.[1] The first phase of the investigation, completed in September 1989, was confined to manufactured imports.[2] The third phase, scheduled for release in 1991, will examine the service sector and will also provide, based on general equilibrium model, the estimated effects of the import restraints considered in the first two phases.

Five agricultural industries are identified as having significant non-tariff import restraints. Four of the industries—sugar, dairy, peanuts, and cotton—are protected by import quotas. The fifth industry, meat, was (until 1989) protected through voluntary export restraints (VERs). The value of production in each of the five industries exceeds $100 million.

In each of the industries studied, the import restraint is used in conjunction with domestic programs to achieve policy goals with regard to the price, output, or trade of the commodity. To isolate the effects of border measures in the presence of domestic programs, we hold the income and production of domestic farmers constant. In the cases where quotas are used to protect domestic producers from import competition, we calculate the effects of replacing domestic price supports with a per unit subsidy equal to the difference between the support price and the world price. In this way, farm income and farm production would remain constant, but the effect of the quota on consumer prices would be removed. In the case of meat, there are no domestic price supports, so we do not keep farm income constant in our calculations.

The study is organized as follows. Chapters 2 through 6 examine the effects of significant import restraints in the sugar, dairy, peanut, cotton, and meat industries. In each chapter, the estimates of economic effects are preceded by a brief history of the U.S. government programs that operate in the industry. Appendix D describes the methodology used to measure the effect of the import restraints. Appendix E lists the data and parameters used to apply the methodology in each industry.

[1] The study excludes import restraints imposed as a result of anti-dumping and countervailing duty investigations conducted by the Department of Commerce and the ITC and section 337 and section 406 investigations conducted by the ITC.

[2] *The Economic Effects of Significant U.S. Import Restraints, Phase I: Manufacturing,* USITC Publication 2222, October, 1989.

Summary of Methodology

The methodology was designed to measure the economic effects of removing the restraints on imports of certain agricultural products when the import-competing domestic producers are sheltered from loss by government support payments. Specifically, we measure the gain to U.S. consumers, the cost to the Government of supporting producers in the protected sector, the gain to U.S. producers in industries that are downstream from the protected sector, and the change in overall economic welfare of U.S. residents. Consumers gain because removing the import restraint lowers the price of both the import and the competing domestic good. The loss to the Government comes from supporting labor earnings and profits in the import competing sector once the restraints are removed. The change in economic welfare is the gain to consumers less the loss to the Government.

Removing an import restraint reduces the price of the import and induces consumers to substitute the relatively cheaper import for the competing domestic good. Consequently, consumption of the import rises, demand for the domestically produced good falls, and the domestic price and output of the domestic good fall as well. The gain to consumers from the decline in the import price is approximately the reduction in the price multiplied by the quantity consumed. The gains are twofold. First, removing the quota reduces the import price and transfers revenue (quota rents) from the exporting country to domestic consumers. Second, the decline in the import price allows consumers to increases consumption of the import at the lower price thereby eliminating the "deadweight loss" of the quota. In addition, consumers gain from the decline in price of the domestic good, a gain equal to the decline in price multiplied by the quantity consumed.

Ordinarily, domestic producers in the import competing-sector lose when the import restraint is removed because demand for their output falls. This output fall causes income losses to labor in the industry and a reduction in industry profits. In the present study, we assume that the Government will use subsidies to prevent the import-competing sector from incurring any loss as a result of removing the restraint. Thus, there is no producer loss. However, removing the restraint imposes a subsidy cost on the Government.

Removing the import restraints increases profits (economic rents to capital) and the income of labor (economic rents to labor) in downstream industries (consumers of the protected product). Because removing the import barriers lowers the price of the imported product and the domestically produced substitute, downstream users face a lower price for these products. As their costs decline, their output expands and they bid up the

price for capital and labor used in their industries. An important factor in determining the size of the gains for labor and capital in the downstream industry is the share of the protected product in the cost of producing the downstream product. The larger is this share, the greater will be the gains to downstream industries from removing the import restraint.

For the dairy, sugar, peanut, and cotton industries, we calculate the rise in per unit government subsidies that would maintain the domestic support price when the import restraint is removed. This increase in the subsidy is a cost to the Government. Thus, for those industries, the effect of the import restraint on overall economic welfare is the consumer gain from lower prices for the import and competing domestic good, less the rise in Government subsidy payments. The gains to producers in the downstream industries are included as part of the consumer gain from the lower price of the import and the domestic, import-competing good.

In the meat industry, there are no costs to the Government from eliminating the import restraint, because the Government does not support the domestic price of meat. However, because the price is not supported, producers suffer losses. Consequently, for this industry the effect of the import restraint on overall economic welfare is the gain to consumers less the loss to the domestic meat producers.

Limitations of the Study

The analysis in this study is conducted on an industry-by-industry basis and does not consider interactions beyond those between the protected industry and its immediate suppliers and customers. Consequently, it is inappropriate to merely sum the estimates of the effects from this study to get the economy-wide effects on consumers, producers, or welfare. In particular, the interactions ignored in the present analysis are more likely to be important when more than one import restraint is removed at the same time.[3] The third phase of this investigation will provide estimates that account for these interactions.

The estimates of employment effects need to be interpreted carefully. Specifically, the change in employment refers only to changes in the downstream industry under investigation and are not economy-wide job gains or losses. In fact, little, if any, net change in overall employment would be expected to result from the removal of these import restraints.

Finally, the effects estimated in this study are for a one year period. If the markets were allowed to adjust over a longer period, the change in the quantity of imports would be tend to be proportionally larger than the one year effects reported. Whether the change in prices, consumer benefits, and net national welfare would be greater or less than the one year effects is unclear.

[3] For a more detailed discussion, see appendix D.

Chapter 2
Sugar and Sugar-Containing Products

Introduction

Refined sugar is derived from sugar cane and sugar beets. In the United States, sugar cane is grown in Louisiana, Florida, Texas, and Hawaii whereas sugar beets are grown mainly in five regions, Minnesota-North Dakota, Michigan-Ohio, the Great Plains, the Northwest, and California. Sugar accounted for the dominant share of U.S. consumption of sweeteners until 1985, when it was surpassed by corn sweeteners.[1] Sugar also lost market share to low-calorie sweeteners during the 1980s. During the 1988/89 marketing year, the United States accounted for approximately 6 percent of both world production and imports of sugar and for 7 percent of world consumption.

Historically, sugar programs have been aimed at supporting the incomes of sugar-cane farmers, sugar-cane millers, sugar-beet farmers, and sugar-beet processors by raising the price of sugar. Producers of substitute sweeteners, in particular high fructose corn syrup (HFCS), also benefit from these programs.[2] Domestic refiners of cane sugar are adversely affected by domestic sugar policy, however, because it raises the cost of their raw sugar inputs and they cannot pass all of the cost increase on to their customers. Similarly, downstream industries that produce sugar-containing products also are adversely affected.

This section provides a brief description of U.S. programs for sugar and sugar-containing products since 1934. It also describes the approach used to assess the economic costs and benefits of the current sugar program.

The History of the U.S. Sugar Programs

The history of protection for the domestic sugar industry since 1934 can be divided into two periods: the "Sugar Acts" period, 1934–1974, and the "target price" period 1976–1989.[3] (See Table 2–1) During both periods, income support and border measures were used to protect domestic sugar-cane and sugar-beet growers. From 1934 to 1974, import quotas, subsidy payments, and acreage restrictions were used to support domestic growers. From 1976 to the present, import duties, fees, and quotas have been used to prevent imports from disrupting domestic price-support programs.

From 1934 through 1974, the Sugar Acts of 1934, 1937, and 1948 were passed,[4] but the salient features of the 1934 Act remained basically in force until 1974, when the 1948 Act expired.[5]

[1] See USDA, *Sugar and Sweetener: Situation and Outlook Report,* Economic Research Service, September 1989 and Stephen Neff, *Welfare Implications of Removing U.S. Import Quotas on Sugar and Dairy Products,* unpublished Ph.D. dissertation, Stanford University, October 1988.

[2] At the public hearing for this investigation, representatives of the Hawaiian Sugar Planters Association, on the behalf of the U.S. sugar industry and the U.S. corn refining industry, presented testimony that supported the quotas.

[3] See Gary Hufbauer, Diane Berliner, and Kimberly Elliott, *Trade Protection in the United States: 31 Case Studies* (Washington, DC: Institute for International Economics, 1986) and USDA, *Sugar: Background for 1985 Farm Legislation,* Economic Research Service, September 1984 for further discussion of the history of U.S. sugar programs.

[4] The Sugar Act of 1948 was further amended in 1951, 1956, 1962, and 1971. The Act, as amended in 1971 was allowed to expire in 1974 with no equivalent legislation to replace it.

[5] Ibid.

Table 2-1
History of U.S. price supports for sugar: income and border measures,[1] 1934-74 and September 1976 - October 1992

Period	*Income measures*	*Border measures[2]*	*Authority*
"Sugar Acts" period			
(1934-74)	Benefit payments to growers. Acreage restrictions	Quota allocations[3] Excise tax	Sugar Acts of 1934, 1937, and 1948.[4]
"Target price" period			
(September 76 - October 92)	Price-support payments and nonrecourse loans to growers.	Section 22 fees Headnote 2 tariffs and quotas.	Agriculture Act of 1949, Food & Agricultural Act of 1977, Agriculture & Food Act of 1981, Food and Security Act of 1985.

[1] During two brief periods, 1975-76 and 1980-81, sugarcane and sugar-beet farmers did not benefit from price-support programs and border measures except the col. 1 rate of duty.
[2] The border measures listed exclude the minimum col. 1 rate of duty.
[3] The quotas were suspended from 1942 through 1947.
[4] The Sugar Act of 1948 was amended in 1951, 1956, 1962, and 1971. The act, as amended in 1971, was allowed to expire in 1974 without any alternative legislation implemented.

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

These early acts used import quotas to protect domestic sugar producers from foreign competition. The U.S. sugar market was divided into shares for specific domestic producers and specific foreign countries based on historic market shares. Payments were also made to domestic farmers to encourage them to restrict acreage planted in sugar. These payments were funded by a tax imposed on all sugar (whether imported or produced domestically) that was processed or refined in the United States.[6]

During two brief periods, 1975–76 and 1980–81, sugar-cane and sugar-beet farmers did not benefit from price-support programs and border measures except from the col. 1 rate of duty. These program lapses were mainly the result of peaks in the world price of raw sugar, which occurred in 1974 and 1980.[7]

Since 1976, sugar-cane and sugar-beet growers, sugar-cane millers, and sugar-beet processors have benefitted from either price-support payments or (what amounts to the same thing) nonrecourse loans. To receive nonrecourse loans, millers and processors must pay sugar cane and sugar beet growers the support prices.[8] The sugar is used as collateral for the loans. If processors elect to forfeit the sugar to the Commodity Credit Corporation (CCC), they are not liable for repayment of the loan (hence "nonrecourse" loan). Border measures have been used to help maintain the target price of domestic refined sugar and thus reduce loan forfeitures to the CCC.

In the current sugar program (the Food Security Act of 1985), the target price for refined sugar is supported entirely through the use of quotas on imported sugar. The Act requires the President to use all legislative authorities available to enable the sugar program to operate at no cost to the Federal Government, or more specifically, to prevent the accumulation of sugar by the CCC. Since the 1984/1985 marketing year, no forfeitures of sugar have been made to the CCC.

The col. 1 rate of duty (the "MFN" rate) has also been adjusted to prevent imports from disrupting price supports.[9] Since January 1, 1968, the minimum col. 1 rate of duty applicable to raw sugar has been 0.625 cents per pound, raw value. But the 1962 Act establishes the col. 1 rate of duty for sugar at 1.875 cents per pound whenever sugar quota legislation is not in effect. In addition, the Act authorizes the President to vary the rate to a maximum of 2.8125 cent per pound to administer concessions of the Kennedy Round.[10] Since 1976, the President has made frequent use of the 1962 Act to increase the col. 1 rate of duty on sugar,[11] but the current rate is at the statutory minimum.

Section 22 of the Agricultural Adjustment Act of 1933 also gives the President the power to impose either fees (not to exceed 50 percent ad valorem) or quotas (not below 50 percent of the quantity imported during a representative period that is selected by the President). Either one of these border measures, but not both simultaneously[12], may be imposed by the President after it has been determined, on the basis of an ITC investigation, that imports materially interfere with USDA price-support programs.[13] There is currently a section 22 fee on imports of refined and liquid sugar set at 1 cent per pound.

Because the gap between the U.S. domestic price and the world price of raw sugar has been so large in recent years, the United States has relied on "headnote 2" quotas, rather than section 22 quotas, to protect domestic price-support programs. Headnote 2 of the U.S. Tariff Schedule authorizes the President to impose quotas on sugar imports whenever the Sugar Act of 1948 or equivalent legislation is not in effect. The United States has made use of headnote 2 quotas to maintain domestic price-support programs since May 1982. Those quotas are allocated among forty countries.[14] The total quota for January 1, 1989, to September 30, 1990, was 2.19 million short tons.

[6] Under the Sugar Act of 1934, a processing tax was imposed on all domestic and imported sugar and was used to fund the benefit payments to domestic growers. Under the Sugar Act of 1937, the processing tax, which was determined to be unconstitutional by the Supreme Court, was replaced by an excise tax on all sugar processed or refined in the United States with the proceeds going to the general fund of the Treasury. The 1937 Act imposed an import tax on all direct consumption sugar imported into the United States. Other provisions of the 1934 Act included minimum wage rates for field workers and child labor provisions. For further discussion, see USDA, *Sugar: Background.*

[7] In November 1974, world prices peaked at 57.2 cents per pound. In October 1980, world prices peaked at 41.1 cents per pound. For further discussion, see USDA, *Sugar: Background.*

[8] Sugar-cane millers and sugar-beet processors agree to pay farmers support prices that are based on the loan rates at which millers and processors obtain financing from the Commodity Credit Corporation (CCC). Price support levels and loan rates for sugar cane and sugar beets vary by region. For instance, in 1989, the price support level for sugar beets ranged from $28.07 per ton for Michigan and Ohio sugar beets to $33.82 per ton for Texas sugar beets. Similarly, the price support level for sugar cane ranged from $16.77 per ton from Puerto Rican sugar cane to $25.02 per ton for Florida sugar cane. The current weighted averages for loan rates are 18 cents per pound for refined cane sugar and 21.54 cents per pound for processed beet sugar. The quotas are set to maintain the market price of refined sugar above the market stabilization price (MSP). The MSP, which is higher than the loan rate, is the price at which USDA determines that millers would be induced to sell sugar on the market rather than forfeit it to the CCC.

[9] The tariff also applies to refined sugar after it has been converted to an equivalent raw value.

[10] Ibid.

[11] Ibid.

[12] However, section 22 fees may be imposed simultaneously with headnote 2 quotas.

[13] Ibid.

[14] Forty countries receive quota allocations. The largest quota-allocation recipients in descending order are the Dominican Republic, Brazil, the Philippines, Australia, Guatemala, Argentina, and Peru. These countries account for 67.1 percent of the current quota allocations.

The price of sugar is also supported by quotas on imports of sugar-containing products, which prevent imports of these products from disrupting the price-support programs for cane sugar and beet sugar. Quotas on sugar-containing products were in existence during 1948–1974 under the authority of the Sugar Act of 1948. The recent quotas are Section 22 quotas.

The current quotas, which have been in effect since January 1, 1989, are on a first-come, first-served basis. The quotas apply to five broad categories of sugar-containing products.[15]

The Economic Effects of Removing Import Quotas on Sugar and Sugar-Containing Products

This section presents estimates of the economic effects of removing the U.S. import quotas on sugar and sugar-containing products. The magnitude of these effects should be considered in perspective to the size of the industry. (See table 2–2.) U.S. production of sugar was valued at $3.38 billion in 1988 and $3.74 billion in 1989. The value of imports was $442 million in 1988 and increased to $567 million in 1989. Exports were valued at $85 million in 1988 and $149 million in 1989.

To examine the effects of removing quotas, we use a model in which imported raw sugar and domestic refined sugar[16] are imperfect substitutes, and where changes in U.S. imports can have an important effect on the world price.[17] The analysis examines the effects of simultaneously removing the quotas on the three sugar-containing products that are the largest downstream users of sugar: chocolate and cocoa products, other flavoring extracts and syrups, and blended and prepared flour.[18]

The analysis of the sugar quotas shares some common characteristics with the analyses of the peanut and dairy quotas, which are presented in subsequent sections. First (as noted in the methodology appendix D), the analysis estimates the effects of removing the quotas while maintaining farm income and production through per unit subsidies. If we were to consider the effects of eliminating the quota without maintaining the incomes of the domestic growers, we would confound the effects of the quotas with those of the domestic programs.

Second, agricultural quotas are represented by equivalent ad valorem tariffs.[19] (Table 2–3 presents the ad valorem tariff equivalents for sugar.) That is, removing the equivalent tariff causes the import price and quantity to change in the same manner as removing the quota. The only difference is that removing a tariff results in the loss of government revenue, whereas removing a quota merely shifts economic rents among market participants. Finally, it is assumed that the quota rents accrue to the foreign exporters.

[15] The five categories of sugar-containing products covered by current section 22 quotas and the quantity of the quotas are: 1) blended syrups containing sugar, not in retail containers (HTS 9904.50.20), none (i.e., this category is embargoed); 2) edible preparations containing over 65 percent sugar, not in retail containers (HTS 9904.50.40), none; 3) sweetened cocoa powder (HTS 9904.60.20), 2,721 metric tons; 4) flour mixes and doughs containing over 10 percent sugar, except doughs in retail containers (HTS 9904.60.40), 6,350 metric tons; and 5) edible preparations containing over 10 percent sugar (HTS 9904.60.60), 76,203 metric tons.

[16] Domestic raw sugar is converted to its equivalent refined value by dividing the quantity of raw sugar by 1.07.

[17] Our analysis includes the effects on HFCS. Removal of the sugar quotas would cause the price of domestic HFCS to decline. This decline in the price of HFCS would cause the demand of imported raw sugar to fall. In the methodology described in appendix C, this is analogous to an import-demand curve for sugar which is more inelastic than the import-demand curve depicted in figure C–2.

[18] By simultaneously removing the quotas in both the upstream and downstream sectors, we avoid the problem of welfare distortions that result from removing the quotas in only one of the sectors but not in the other. In the downstream sector, the removal of downstream import quotas would cause demand for the domestic downstream product to decline. Simultaneous removal of upstream import quotas would also cause the supply curve of the domestic downstream product to fall. In the methodology in appendix C, this is analogous to a domestic downstream demand-curve which is more inelastic than the domestic downstream demand-curve described.

[19] The tariff equivalents used in this analysis are taken from USITC, *Estimated Tariff Equivalents of U.S. Quotas on Agricultural Imports and Analysis of Competitive Conditions in U.S. and Foreign Markets for Sugar, Meat, Peanuts, Cotton, and Dairy Products*, USITC Publication 2276, April 1990.

Table 2–2
Value of production, imports, and exports for sugar, 1988–89[1]
(In millions of dollars)

Item	1988	1989
Production	3,376.6	3,744.0
Imports	442.0	567.1
Exports	84.5	149.4

[1] The value of U.S. production is based on the average annual U.S. price of wholesale refined beet sugar. The values of imports and exports are based on the average annual U.S. and world prices of raw sugar.

Source: U.S. Department of Agriculture, *Sugar and Sweetener: Situation and Outlook Report*, Economic Research Service, March 1990.

Table 2-3
Tariff equivalents for raw sugar, 1988-89[1]

Year	Average world price[2]	Average world price gross of freight & handling[3]	Average U.S. price[4]	Ad valorem tariff equivalent[5]
	Cents per pound			Percent
1988	10.18	11.78	22.12	102
1989	12.79	14.45	22.81	65

[1] HTSUS item 1701.11.

[2] The world price is the annual average contract-No. 11-price—i.e., f.o.b. stowed Caribbean port (including Brazil) bulk (spot price).

[3] Freight and handling are the average charge per pound of shipping raw sugar between Caribbean countries and the U.S. customs district of New York City. These estimates, provided by the U.S. Department of Agriculture (USDA), include freight, stevedoring, weighing, interest, insurance, and miscellaneous charges.

[4] The U.S. price is the annual average price for nearby No. 14 futures.

[5] The ad valorem tariff equivalent is the difference between the average U.S. price and average world price gross of freight and handling calculated as a percent of the world f.o.b. price.

Source: U.S. and world price data were obtained from U.S. Department of Agriculture, *Sugar and Sweetener: Situation and Outlook Report*, Economic Research Service, March 1990; freight and handling charges provided by the USDA, Economic Research Service, Commodity Economics Division; specific and ad valorem tariff equivalents computed by the staff of the U.S. International Trade Commission.

The tables on the next page report estimates of the following:

1. The consumer surplus gain;
2. The welfare cost of maintaining sugar grower support at the current levels;
3. The net welfare gain;
4. The price and quantity effects for the domestic and imported products; and
5. The price, quantity, and employment effects, and the economic rents accruing to capital and labor for the downstream sectors.

The estimates are for the years 1988 and 1989. The method used to obtain these results is described in appendix D.

The economic welfare effects of removing the import quotas on sugar and sugar-containing products are presented in table 2-4. Having eliminated this quota while simultaneously maintaining sugar grower support would have resulted in a net economic welfare gain of $242 million in 1988 and $150 million in 1989. The quota elimination, net of the grower support subsidy, would have resulted in an increase in total consumer benefits of $1.3 billion in 1988 and $1.1 billion in 1989. In the import market, the quota rents recovered from foreign exporters would have equaled $157 million in 1988 and $137 million in 1989 while the deadweight loss recovered would have totaled $126 million in 1988 and $74 million in 1989. The reduced consumer costs in the domestic market equaled $997 million in 1988 and $894 million in 1989, whereas the subsidy cost of maintaining farm income and production would have been $1,038 million and $955 million.

The price and quantity effects are presented in table 2-5. The price to U.S. consumers would have decreased by 30.7 percent in 1988 and by 25 percent in 1989. The world price of sugar would have increased by 8.6 percent in 1988 and by 6.3 percent in 1989, and the price of imported sugar in the U.S. would have fallen by 46.2 percent in 1988 and 35.6 percent in 1989. The quantity of imported sugar would have increased by 56 percent in 1988 and by 41 percent in 1989. Because we calculate the effects in which the price received by domestic producers is maintained by a per unit subsidy, the quantity of domestic output is not changed.

The economic effects of removing the import quota on sugar and sugar-containing products are presented in table 2-6. In the chocolate and cocoa products industry, the economic rents accruing to labor would have increased by $12 million in 1988 and by $10 million in 1989. The economic rents accruing to capital would have increased by $22 million in 1988 and by $20 million in 1989. The price of chocolate and cocoa products industry would have fallen by approximately 1 percent in both 1988 and 1989. The results of the model indicate an increase of approximately 1 percent in the quantity sold in both 1988 and 1989 and an increase in industry employment of 1.5 percent in 1988 and 1.2 percent in 1989.

In the flavoring extracts and syrups industry, the economic rents accruing to labor would have increased by $26 million in 1988 and by $24 million in 1989. The economic rents accruing to capital would have increased by $66 million in 1988 and by $59 million in 1989. The price of flavoring extracts and syrups would have fallen by approximately 2 percent in both 1988 and 1989. The results of the model indicate an increase of approximately 2 percent in the quantity sold and an increase in industry employment of 3 percent in both 1988 and 1989.

Table 2-4
The economic welfare effects of removing the quotas on sugar and sugar containing products, 1988-89
(In millions of dollars)

Item	1988	1989
Consumer benefit:		
On purchases of the domestic market	997	894
On purchases of the imported market:		
Quota rents recovered	157	137
Deadweight loss recovered	126	74
Total consumer benefit	1,280	1,105
Producer subsidy cost	-1,038	-955
Net welfare gain	242	150

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

Table 2-5
The price and quantity effects of removing the quotas on sugar and sugar-containing products, 1988-89
(In percent)

Item	1988	1989
Price effects:		
Domestic product	-30.7	-24.9
Imported product	-46.2	-35.6
Quantity effects:		
Domestic product	0.0	0.0
Imported product	56.0	40.9

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

Table 2-6
The downstream economic effects of removing the quotas on sugar and sugar-containing products, 1988-89

Item	1988	1989
Chocolate and cocoa products:		
Economic rents accruing to		
Labor (million dollars)	12	10
Capital (million dollars)	22	20
Price effect (percent)	-1.1	-0.9
Quantity effect (percent)	1.1	0.9
Employment effect (percent)	1.5	1.2
Flavoring extracts and syrups, n.e.c.:		
Economic rents accruing to		
Labor (million dollars)	26	24
Capital (million dollars)	66	59
Price effect (percent)	-2.3	-1.9
Quantity effect (percent)	2.3	1.9
Employment effect (percent)	3.2	2.6
Blended and prepared flour		
Economic rents accruing to:		
Labor (million dollars)	3	3
Capital (million dollars)	3	3
Price effect (percent)	-1.2	-1.0
Quantity effect (percent)	1.2	1.0
Employment effect (percent)	1.5	1.2

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

In the blended and prepared flour industry, the economic rents accruing to labor would have increased by $3 million in both 1988 and 1989. The economic rents accruing to capital would have increased by $3 million in 1988 and by $3 million in 1989. The price of blended and prepared flour would have fallen by approximately 1 percent in both 1988 and 1989. The results of the model indicate an increase of approximately 1 percent in the quantity sold in both 1988 and 1989 and an increase in industry employment of 1.5 percent in 1988 and 1.2 percent in 1989.

Chapter 3
Dairy

Introduction

Most major dairy-producing countries subsidize the production and export of dairy products and all of them restrict dairy imports. Consequently, only about 5 percent of world dairy production is internationally traded.

In the United States, imports are restricted by quotas and have averaged less than 2 percent of annual production in recent years. Exports, though encouraged, have consisted mainly of below market price sales or food aid to developing countries. These have totaled about 2 percent of annual U.S. production.

The History and Current Operation of the U.S. Dairy Programs[1]

Regulation of the dairy industry evolved from legislation enacted in the 1930s and 1940s. In particular, the Agricultural Marketing Agreement Act of 1937 provided for Federal milk marketing orders, and the Agricultural Act of 1949 established the dairy price support program.[2] These two programs play a major role in determining the prices and production of dairy products.

The Dairy Price Support Program

The Agricultural Act of 1949, as amended, established the dairy price support program. It gave three main guidelines for the operation of the program:

1. It set the minimum and maximum levels at which farm milk prices were to be supported;
2. It authorizes the Secretary of Agriculture to determine the actual price support level between the minimum and maximum; and
3. It specifies that the price of milk would be supported by U.S. Federal Government purchases of milk and milk products through the Commodity Credit Corporation (CCC).

The milk price specifically supported by this legislation is Grade B milk. Grade B milk can be used to make only manufactured dairy products such as butter and cheese. Since most milk prices are based on the prices paid for Grade B milk, the program provides a foundation for all dairy prices.

The dairy price support program remained basically the same from 1949 to 1981. Then, in the face of large product surpluses, the Agriculture and Food Act of 1981 was passed. In this Act, the support level was tied to the size of CCC purchases rather than to a set parity. The 1981–82 support price was set at its level in 1980–81, which was $13.10 per hundredweight (cwt) of milk.

The next important change to the price support program came with the Dairy and Tobacco Adjustment Act of 1983. This Act lowered the milk support level from $13.10 to $12.60 per cwt and allowed further reductions in the support level on April 1, 1985, if net government purchases were projected to exceed 6 billion pounds for the year and on July 1, 1985, if the purchases were projected to exceed 5 billion pounds for the year. The Act also established the Milk Diversion Program, which allowed dairy farmers to lower their production between 5 and 30 percent and receive $10 per cwt for these reductions. The Act also authorized a nonrefundable assessment of $0.15 per cwt to fund research and development.

The last important change to the price support program occurred when the Food Security Act of 1985 was enacted. This Act continued the support price in effect at that time of $11.60 per cwt through the calendar year 1986, lowered it to $11.35 for the period January 1 through September 30, 1987, and to $11.10 for the period October 1, 1987, through December 31, 1990. The Act gives the Secretary of Agriculture leeway to reduce the support price in any calendar year by $0.50 if the projected CCC net purchases exceed 5 billion pounds or raise the support price by $0.50 per cwt if net purchases are projected to be less than 2.5 billion pounds. Since net purchases by the CCC were estimated to be greater than 5 billion pounds in 1988, the support level was reduced to $10.60 per cwt on January 1, 1988. After fluctuations caused by drought-relief legislation that was passed in mid-1988, the support price was reduced again to $10.10 per cwt on January 1, 1990.

The 1985 Act also authorized the voluntary Dairy Termination Program (DTP), more commonly referred to as the whole-herd buyout. Under this program, a dairy farmer could submit a bid enabling the Federal Government to buy out his entire herd. If a dairy farmer elected to participate in this program, he was required to leave the dairy industry for at least five years. Finally, the 1985 Act gave the Secretary of Agriculture the option to continue the DTP through 1990 and established a program to encourage additional exports of dairy products.

Since milk is a perishable product and is expensive to transport in liquid form, the CCC supports the farm price of milk indirectly by buying butter, cheddar cheese, and nonfat dry milk from processors at specified prices. The CCC sets

[1] This section is based largely on Richard Fallert et al., *Dairy: Background for 1990 Farm Legislation*, Economic Research Service, U.S. Department of Agriculture, Staff Report AGES 9020.

[2] Federal milk marketing orders set minimum prices that processors must pay to dairy farmers for their fluid milk.

its prices using a formula that adds margins, or "manufacturing allowances," to the support price of milk to cover the costs of processors. For example, suppose each one hundred pounds of milk yields 4.48 pounds of butter and 8.13 pounds of nonfat dry milk, and the CCC pays $1.09 per pound for butter and $0.79 per pound nonfat dry milk. Then the products made from the farmer's milk are worth $11.31, and, if the processing costs are $1.21 per cwt, the farmer receives $10.10 per cwt of milk.

From the example, it is clear that the farm price depends on several factors in addition to the support level, including transportation and processing costs, the type of product manufactured, the quantity of milk delivered, and the butterfat content of the milk. The price farmers receive is, thus, free to move above or below the support price depending on local market conditions.

The Federal Milk Marketing Order Program

The price of Grade A milk (milk produced under sanitary conditions that qualify it for both fluid consumption and manufacture of dairy products) is regulated directly by the Milk Marketing Order Program. This program regulates only Grade A milk prices. Its enabling legislation is the Agricultural Marketing Agreement Act of 1937, as amended, and the Agricultural Adjustment Acts of 1933 and 1935. This legislation stemmed from the idea that milk producers needed assistance in achieving and maintaining some bargaining power over milk prices. The Act was designed to stabilize fluid milk prices, provide secure and dependable markets for farmers producing milk for the Grade A market, and maintain the balance of bargaining power between farmers and handlers. The Act also resulted in a reserve of Grade A milk for the fluid market in case seasonal swings in demand cause supplies to fall short.

There are 41 geographically defined Federal milk marketing orders operating in the United States. They regulate the handling and pricing of about 70 percent of all milk sold to processors and handlers, and about 80 percent of the Grade A milk sold in the United States. They set minimum prices that processors must pay to dairy farmers (or their cooperatives) who have opted to be regulated.

The minimum price for a marketing order is determined by a system of "marketwide pooling," under which dairy farmers receive a monthly weighted average (or blend) price for their milk. This average depends on the particular mix or blend of dairy products that processors in the marketing order choose to make that month. Each individual processor regulated by the order must pay at least the announced minimum blend price.

The minimum prices set by the marketing orders are based on the average price of Grade B milk in Minnesota and Wisconsin (the M-W price), which, in turn, is indirectly supported by the CCC. In general, prices for Grade A milk used for manufactured products are set at or near the M-W price, while prices for Grade A milk destined for the fluid market are set higher by fixed differentials unique to each Federal order. Thus, the marketing orders extend the support price for the price of Grade B milk to all milk prices.

The Economic Effects of Removing the Dairy Quotas

In this section estimates are presented for the economic effects of removing the U.S. dairy quotas. In order to gain perspective on the magnitude of these effects, table 3–1 presents the value of production, imports, and exports in the four dairy sectors for the years 1988 and 1989. Production of fluid milk increased from $17.2 billion in 1988 to $18.2 billion in 1989. Imports for both years were less than $0.01 billion. Exports rose from under $0.01 billion in 1988 to $0.02 billion in 1989. In the cheese market, production was $11.1 billion in 1988 and rose to $12.6 billion in 1989. Imports were $0.30 billion in 1988 and increased slightly to $0.31 billion in the following year. Exports fell from $0.05 to $0.02 billion. Production of condensed and evaporated milk increased from $4.40 billion in 1988 to $4.50 billion in 1989. Imports for both years were less than $0.01 billion. Exports, which were well below $0.01 billion in 1988, increased to $0.02 billion in 1989. Finally, in the butter market, production totaled $1.55 billion in 1988 and $1.52 billion in 1989. Imports were significantly less than $0.01 billion in both years. Exports of butter increased from $0.01 billion in 1988 to $0.04 billion in 1989.

The estimates for the economic effects of removing the import restraints in dairy are based upon a scenario in which the Federal dairy price support programs are eliminated when the quotas on dairy imports are removed.[3] Otherwise, the U.S. Government would have to purchase enough of the world supply to drive the domestic price up the support level. The Government, in effect, would have to support the world price. In place of these supports, in this scenario, dairy farmers would receive a per unit subsidy to maintain the price they receive for milk at the current level. Two versions of this scenario are considered. In the first version (version A), all domestic dairy production enters the market. In the second version (version B), the Federal Government removes some dairy production from the market and transfers it to welfare programs and school lunch programs.

[3] The milk marketing orders, however, are assumed to remain in effect.

Table 3-1
Value of production, imports, and exports for the dairy sector, 1988-89

(In millions of dollars)

Item	1988	1989
Production:		
Fluid milk	17,200	18,193
Condensed and evaporated milk	4,400	4,500
Butter	1,547	1,522
Cheese	11,100	12,600
Imports:[1]		
Fluid milk	8	8
Condensed and evaporated milk	4	4
Butter	2	2
Cheese	300	310
Exports:		
Fluid milk	8	20
Condensed and evaporated milk	4	19
Butter	10	43
Cheese	46	25

[1] Since fluid milk is not directly imported, the value of imports for fluid cream is used as a proxy for the value of imports for fluid milk.

Source: Compiled from official statistics of the U.S. Department of Commerce and from data provided by Dairy, Livestock, and Poultry Division, Foreign Agricultural Service, U.S. Department of Agriculture.

The analysis estimates the effects of import quotas by looking at the effects of an equivalent ad valorem tariff, i.e. a tariff that has the same effect on import price and quantity as the actual quota. The specific tariff equivalents used are presented in table 3-2. Consistent with the operation of a quota, we assume that the economic rents resulting are merely shifted among market participants rather than resulting in government revenues as would be the case with a tariff. We assume that the quota rents accrue to the foreign exporters.

Ideally, estimates would be made for sectors at the eight-digit HTS level to reflect the actual quota. However, the parameters needed for the calculations are not available at this level of detail. Consequently, more aggregated sectors are used.[4] Specifically, four protected dairy sectors and six downstream sectors are analyzed. These sectors are listed in table E-2.

The method used to evaluate the effects of removing the dairy quotas is presented in appendix D. The tables on the next page report estimates for the following:

1. The total consumer benefit;
2. The producer subsidy cost;
3. The overall welfare gain;
4. The effects on price and quantity for the imported and competing domestic products; and
5. The effects on price, quantity, employment and the economic rents accruing to capital and labor for the downstream sectors.

The estimates are based on data for the years 1988 and 1989.

[4] See appendix D for a detailed explanation of the sectors chosen.

Sector 1, Fluid Milk[5]

The economic welfare effects of removing the quota on fluid milk are presented in table 3-3. Having eliminated this quota would have resulted in overall welfare gains of $1.3 million in 1988 and $1.1 million in 1989. The total consumer benefit would have been $12.2 million in 1988 and $10.7 million in 1989. The cost of providing a subsidy to producers would have been $10.9 million in 1988 and $9.6 million in 1989.

The effects on price and quantity are presented in table 3-4. The price of domestic fluid milk would have declined by 0.2 percent under version A, but would have remained unchanged under version B. The price of imported fluid milk would have declined by 22 percent in 1988 and by 18 percent in 1989. The quantity of imported fluid milk would have increased by 106 percent in 1988 and by 93 percent in 1989. The results indicate no change in the quantity of domestic fluid milk in version B.

The economic effects on the downstream industries of removing the quota on fluid milk are presented in table 3-5. The gains in economic rents to both labor and capital are negligible relative to the total rents accruing to labor and capital. This is the case in each of the downstream industries. In the butter industry, the gains in economic rents accruing to labor range from $1,000 to $22,000 in 1988 and from $1,000 to $18,000 in 1989. The gain in economic rents accruing to capital range from near zero to $4,000 in 1988 and from near zero to $3,000 in 1989. The effect on price in the butter industry would have been negligible in both 1988 and 1989. The results indicate no change in quantity or employment in the industry.

[5] Since fluid milk is not directly traded, the quantity of imported cream is used as a proxy for the quantity of imported fluid milk in the estimates.

Table 3-2
Tariff equivalents for the dairy sector, 1988-89[1]

(In percent)

Item	1988	1989
Fluid milk	64.5	52.8
Condensed and evaporated milk	64.5	52.8
Butter	95.9	37.2
Cheese	47.3	41.1

[1] Since the data necessary for calculating the tariff equivalents for fluid milk and condensed and evaporated milk are not available, the tariff equivalent for whole milk powder is used as a proxy for the tariff equivalents of fluid milk and condensed and evaporated milk.

Source: U.S. International Trade Commission, *Estimated Equivalents of U.S. Quotas on Agricultural Imports and Analysis of Competitive Conditions in U.S. Foreign Markets for Sugar, Meat, Peanuts, Cotton, and Dairy Products*, Investigation No. 332-281, USITC Publication 2276, February 1990.

Table 3-3
The economic welfare effects of removing the dairy quotas: Sector 1, fluid milk, 1988-89

(In thousands of dollars)

Item	1988	1989
Consumer benefit:		
On purchases of the domestic product	10,847	9,561
On purchases of the import market:		
Quota rents recovered	851	750
Deadweight loss recovered	452	351
Total consumer benefit	12,150	10,662
Producer subsidy cost	-10,852	-9,565
Net welfare gain	1,298	1,097

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

Table 3-4
The effects on price and quantity of removing the dairy quotas: Sector 1, fluid milk: versions A and B, 1988-89

(In percent)

	Version A		Version B	
Item	1988	1989	1988	1989
Price effects:				
Domestic product	-0.2	-0.2	0.0	0.0
Imported product	-21.9	-18.1	-21.8	-18.1
Quantity effects:				
Domestic product	0.0	0.0	(1)	(1)
Imported product	105.4	92.9	105.9	93.3

[1] Less than 0.05 percent.

Note.—In version A, the Government provides a per-unit subsidy to dairy farmers that maintains the prices they currently receive and all dairy production reaches the market. In version B, the Government also provides a per-unit subsidy but transfers some dairy production to recipients of Federal Government programs.

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

Table 3-5
The downstream economic effects of removing the dairy quotas: Sector 1, fluid milk: versions A and B, 1988-89

Item	Version A		Version B	
	1988	1989	1988	1989
Butter:				
Economic rents accruing to—				
Labor (1,000 dollars)	22.0	18.0	1.0	1.0
Capital (1,000 dollars)	4.0	3.0	(1)	(1)
Price effect (percent)	-0.1	-0.1	(2)	(2)
Quantity effect (percent)	(2)	(2)	(2)	(2)
Employment effect (percentage change)	(3)	(3)	(3)	(3)
Cheese:				
Economic rents accruing to—				
Labor (1,000 dollars)	88.0	83.0	3.0	2.0
Capital (1,000 dollars)	21.0	20.0	1.0	1.0
Price effect (percent)	-0.1	-0.1	(2)	(2)
Quantity effect (percent)	(2)	(2)	(2)	(2)
Employment effect (percentage change)	(3)	(3)	(3)	(3)
Condensed and evaporated milk:				
Economic rents accruing to—				
Labor (1,000 dollars)	81.0	72.0	2.0	2.0
Capital (1,000 dollars)	71.0	62.0	2.0	2.0
Price effect (percent)	-0.1	-0.1	(2)	(2)
Quantity effect (percent)	(2)	(2)	(2)	(2)
Employment effect (percentage change)	(3)	(3)	(3)	(3)
Ice cream and frozen desserts:				
Economic rents accruing to—				
Labor (1,000 dollars)	84.0	72.0	2.0	2.0
Capital (1,000 dollars)	15.0	13.0	(1)	(1)
Price effect (percent)	-0.1	-0.1	(2)	(2)
Quantity effect (percent)	(2)	(2)	(2)	(2)
Employment effect (percentage change)	(3)	(3)	(3)	(3)

[1] Less than 1 thousand dollars.
[2] Less than 0.05 percent.
[3] Less than 0.05 percentage change.

Note.—See table 3-4.

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

In the cheese industry, the gains in economic rents accruing to labor range from $3,000 to $88,000 in 1988 and from $2,000 to $83,000 in 1989. The gains in economic rents accruing to capital range from $1,000 to $21,000 in 1988 and from $1,000 to $20,000 in 1989. The price effect in the cheese industry would have been negligible in both 1988 and 1989. The results indicate no change in quantity or employment in the industry.

In the condensed and evaporated milk industry, the gain in economic rents accruing to labor range from $2,000 to $81,000 in 1988 and from $2,000 to $72,000 in 1989. The gain in economic rents accruing to capital range from $2,000 to $71,000 in 1988 and from $2,000 to $62,000 in 1989. The price effect in the condensed and evaporated milk industry would have been negligible in both 1988 and 1989. The results indicate no change in quantity or employment in the industry.

In the ice cream and frozen desserts industry, the gain in economic rents accruing to labor range from $2,000 to $84,000 in 1988 and from $2,000 to $72,000 in 1989. The gain in economic rents accruing to capital range from near zero to $15,000 in 1988 and from near zero to $13,000 in 1989. The price effect in the ice cream and frozen desserts industry would have been negligible in both 1988 and 1989. The results indicate no change in quantity or employment in the industry.

Sector 2, Condensed and Evaporated Milk

The economic welfare effects of removing the quota on condensed and evaporated milk (CEM) are presented in table 3-6. Eliminating this quota would have resulted in overall welfare gains of $651,000 in 1988 and $550,000 in 1989. The total consumer benefit would have been $3.6 million in 1988 and $3.2 million in 1989. The cost of providing a subsidy to producers would have been $3 million in 1988 and $2.6 million in 1989.

The effects on price and quantity are presented in table 3-7. The effect on the price of domestic CEM would have been negligible under version A, and there would have been no effect under version B. The price of imported CEM would have declined by 22 percent in 1988 and by 18 percent in 1989. The quantity of imported

Table 3-6
The economic welfare effects of removing the dairy quotas: Sector 2, condensed and evaporated milk, 1988-89

(In thousands of dollars)

Item	1988	1989
Consumer benefit:		
On purchases in the domestic market	2,967	2,615
On purchases in the import market:		
Quota rents recovered	426	375
Deadweight loss recovered	226	176
Total consumer benefit	3,619	3,166
Producer subsidy cost	-2,968	-2,616
Net welfare gain	651	550

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

Table 3-7
The price and quantity effects of removing the dairy quotas: Sector 2, condensed and evaporated milk: versions A and B, 1988-89

(In percent)

	Version A		Version B	
Item	1988	1989	1988	1989
Price effects:				
Domestic product	-0.1	-0.1	0.0	0.0
Imported product	-21.9	-18.1	-21.8	-18.1
Quantity effects:				
Domestic product	0.0	0.0	-0.1	-0.1
Imported product	105.6	93.1	105.9	93.3

Note.—See table 3-4.

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

CEM would have increased by 106 percent in 1988 and by 93 percent in 1989. The quantity of domestic output would have declined by 0.1 percent under version B.

The downstream economic effects are presented in table 3-8. Once again, the gains in economic rents to both labor and capital are negligible relative to the total rents accruing to labor and capital in the downstream industries. In the ice cream and frozen desserts industry, the gain in economic rents accruing to labor range from $4,000 to $40,000 in 1988 and from $3,000 to $36,000 in 1989. The gain in economic rents accruing to capital range from $1,000 to $7,000 in 1988 and from $1,000 to $6,000 in 1989. The results indicate no change in price, quantity, or employment in the industry.

In the chocolate and cocoa products industry, the gain in economic rents accruing to labor range from $6,000 to $65,000 in 1988 and from $6,000 to $62,000 in 1989. The gain in economic rents accruing to capital range from $10,000 to $107,000 in 1988 and from $9,000 to $101,000 in 1989. The results indicate no change in price, quantity, or employment in the industry.

Sector 3, Butter

The economic welfare effects of removing the quota on butter are presented in table 3-9. Having eliminated this quota would have resulted in overall welfare gains of $436,000 in 1988 and $210,000 in 1989. The total consumer benefit would have been $4.3 million in 1988 and $2.3 million in 1989. The cost of providing a subsidy to producers would have been $3.9 million in 1988 and $2.5 million in 1989.

The effects on price and quantity are presented in table 3-10. The price of domestic butter would have declined by 1 percent in 1988 and by less than 1 percent in 1989 under version A, and there would have been no effect in either year under version B. The price of imported butter would have declined by 31 percent in 1988 and by 13 percent in 1989. The quantity of imported butter would have increased by 129 to 132 percent in 1988 and by 72 to 73 percent in 1989. The quantity of domestic butter would have declined by 0.2 percent in 1988 and 0.1 percent in 1989 under version B.

Table 3-8
The downstream economic effects of removing the dairy quotas: Sector 2, condensed and evaporated milk: versions A and B, 1988-89

Item	Version A		Version B	
	1988	1989	1988	1989
Ice cream and frozen desserts:				
Economic rents accruing to—				
Labor (1,000 dollars)	40.0	36.0	4.0	3.0
Capital (1,000 dollars)	7.0	6.0	1.0	1.0
Price effect (percent)	(1)	(1)	(1)	(1)
Quantity effect (percent)	(1)	(1)	(1)	(1)
Employment effect (percentage change)	(2)	(2)	(2)	(2)
Chocolate and cocoa products				
Economic rents accruing to:				
Labor (1,000 dollars)	65.0	62.0	6.0	6.0
Capital (1,000 dollars)	107.0	101.0	10.0	9.0
Price effect (percent)	(1)	(1)	(1)	(1)
Quantity effect (percent)	(1)	(1)	(1)	(1)
Employment effect (percentage change)	(2)	(2)	(2)	(2)

[1] Less than 0.05 percent.
[2] Less than 0.05 percentage change.

Note.—See table 3-4.

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

Table 3-9
The economic welfare effects of removing the dairy quotas: Sector 3, butter, 1988-89

(In thousands of dollars)

Item	1988	1989
Consumer benefit:		
On purchases of the domestic market	3,852	2,144
On purchases of the import market:		
Quota rents recovered	267	149
Deadweight loss recovered	178	55
Total consumer benefit	4,297	2,348
Producer subsidy cost	-3,861	-2,147
Net welfare gain	436	201

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

Table 3-10
The price and quantity effects of removing the dairy quotas: Sector 3, butter: versions A and B, 1988-89

(In percent)

Item	Version A		Version B	
	1988	1989	1988	1989
Price effects:				
Domestic product	-1.0	-0.6	0.0	0.0
Imported product	-30.8	-13.0	-30.4	-12.7
Quantity effects:				
Domestic product	0.0	0.0	-0.2	-0.1
Imported product	129.1	71.7	131.7	73.2

Note.—See table 3-4.

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

Sector 4, Cheese

The economic welfare effects of removing the quota on cheese are presented in table 3-11. Having eliminated this quota would have resulted in economic welfare gains of $42.4 million in 1988 and $38.3 million in 1989. The total consumer benefit would have been $280.5 million in 1988 and $263.1 million in 1989. The cost of providing a subsidy to producers would have been $238.1 million in 1988 and $224.8 million in 1989.

The effects on price and quantity are presented in table 3-12. The price of domestic cheese would have declined by 6 percent in 1988 and 5 percent in 1989 under version A, but would have remained constant in both years under version B. The price of imported cheese would have decreased by 16 to 19 percent in 1988 and by 14 to 17 percent in 1989. The quantity of imported cheese would have increased by 72 to 86 percent in 1988 and by 66 to 78 percent in 1989. The quantity of domestic cheese would have declined by 2 percent under version B.

Table 3-11
The economic welfare effects of removing the dairy quotas: Sector 4, cheese, 1988-89

(In thousands of dollars)

Item	*1988*	*1989*
Consumer benefit:		
On purchases of the domestic market	233,857	221,422
On purchases of the import market:		
Quota rents recovered	31,014	28,681
Deadweight loss recovered	15,623	12,960
Total consumer benefit	280,494	263,063
Producer subsidy cost	-238,052	-224,750
Net welfare gain	42,442	38,313

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

Table 3-12
The price and quantity effects of removing the dairy quotas: Sector 4 cheese: versions A and B, 1988-89

(In percent)

	Version A		*Version B*	
Item	*1988*	*1989*	*1988*	*1989*
Price effects:				
Domestic product	-5.5	-4.6	0.0	0.0
Imported product	-18.9	-16.4	-16.3	-14.2
Quantity effects:				
Domestic product	0.0	0.0	-2.3	-1.9
Imported product	71.9	66.2	86.1	78.1

Note.—See table 3-4.

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

Chapter 4
Peanuts

The History of the U.S. Peanut Program[1]

Most of the U.S. peanut crop is consumed as edible nuts and as part of such edible products as peanut butter, candy, and cookies. Most of the foreign peanut crop, however, is crushed for food oil and animal feed. The edible nuts market commands a higher price than the crush market domestically as well as abroad. Peanut oil and peanut meal face strong competition from products derived from soybeans, cottonseed, and sunflowerseed. Peanuts are the world's third most important oilseed behind soybeans and cottonseed.

Three major peanut-producing regions of the United States provide 98 percent of U.S. peanut production: They are the Georgia-Florida-Alabama (Southeast) region, the Texas-Oklahoma (Southwest) region, and the Virginia-North Carolina region. The Southeast region dominates, with about 65 percent of U.S. production. Three main types of peanuts are grown in the United States: Runners (which have a medium-sized kernel), Virginia (which have a large kernel), and Spanish (which have a small kernel). The Southeast region grows mostly Runners. The Southwest region grows two-thirds Spanish and one-third Runners. The Virginia-Carolina region grows mainly Virginia peanuts. (A fourth type, the Valencia, is grown in New Mexico.) In 1987/88, Runners accounted for about 78 percent of peanuts used in domestic edible products.

The United States has had programs designed to increase or stabilize domestic peanut prices for more than 55 years. In April 1934, peanuts were designated as a "basic" crop and came under the provisions of the Agricultural Adjustment Act of 1933. The Act limited peanut growers to planting at most 90 percent of the 1933 or 1934 acreage, but the 1935 crop was reduced by only 1 percent from the 1934 level. The Act also provided payments to encourage diverting peanuts into crushing for oil and meal. The Supreme Court voided acreage limits in 1936, but Congress quickly passed the Soil Conservation and Domestic Allotment Act, authorizing payments to farmers for voluntarily shifting acreage from soil-depleting surplus crops (including peanuts) into soil-conserving legumes and hays.

In 1937, four regional growers' associations were organized to participate in the peanut diversion programs. (In 1940, the number of associations was reduced to three, the current number.) They were authorized to buy a certain quantity of peanuts at prices established by the U.S. Department of Agriculture and were reimbursed by the Department (at taxpayers' expense) for storage costs and losses on surplus peanuts diverted to crushing. However, despite the offers to pay growers for withdrawing land from production, high prices could not be sustained because nonparticipating growers expanded their acreage.

Acreage quotas became part of the program in 1941, but because of increased demand for peanuts, penalties for noncompliance were not enforced during World War II . Thus U.S. peanut acreage almost doubled, from 1.9 million acres to 3.4 million acres, during the war. The Agricultural Act of 1949 established new support prices for peanuts to be paid only if peanut growers agreed to acreage allotments and marketing quotas. (The marketing quotas exceeded the production on allotted acreage.) The growers agreed and allotments and quotas remained in effect until 1982. In 1967, new legislation allowed the sale or lease of acreage allotments, but only to other growers in the same county.

Until 1977, all peanuts grown on allotted acres were guaranteed the support price. Production in excess of domestic consumption was purchased by the Commodity Credit Corporation (CCC) and sold in the domestic crush market (for oil, cake, and meal) or exported. Since 1953, imports have been limited to 1.7 million pounds (shelled basis), (about one-tenth of one percent of domestic edible consumption) to support high domestic prices.[2] Because domestic demand grew more slowly than per acre yields,[3] costs to the government of the program increased greatly. Also, the Secretary of Agriculture decided not to sell 1974 and 1975 crop-year peanuts bought by the CCC at less than the edible support price. Because the support price exceeded the world price, his decision meant that CCC stocks could not be sold. Consequently, net CCC losses reached a peak of $139 million in the 1975 crop year.

The Food and Agricultural Act of 1977 established poundage quotas and increased the number of marketing options faced by peanut growers. Under the Act, the support price for edible peanuts applied only to a grower's poundage quota, which could either be sold directly into the edible market or placed under loan with the CCC. "Additional" peanuts (those in excess of poundage quotas but within the acreage allot-

[1] This discussion is based largely on James D. Schaub and Bruce Wendland, Peanuts: Background for 1990 Farm Legislation, Economic Research Service, U.S. Department of Agriculture, Staff Report AGES 89-61, November 1989; and Randal R. Rucker and Walter N. Thurman, "The Economic Effects of Supply Controls: The Simple Analytics of the U.S. Peanut Program," unpublished working paper, North Carolina State University, May 1989.

[2] In addition to the quota, there are small duties on imports of peanuts and peanut products.

[3] The national average yield increased 2.5 times between 1957 and 1977.

ments) could be sold only in the export or domestic crush market, or placed under loan with the area growers' association at a support price well below the edible support price. The 1981 farm bill suspended acreage allotments, allowing anyone to grow peanuts, but only peanuts grown under poundage quotas could receive the edible support price.

Since the 1977 Act, there has been some leakage of "additional" peanuts into the domestic edible market. The Act allowed the growers' associations to sell additionals at the domestic edible support price after buying the peanuts at the much lower additional support price. The profits were distributed to individual growers in proportion to their additional placements into the association pools. While the link between these profits received by an individual grower and his own additional production was somewhat uncertain, there was nevertheless incentive for production beyond poundage quotas. This incentive was reduced by the Food Security Act of 1985, which requires that profits earned from additionals pools be used to offset losses incurred by taxpayers in supporting the price of edible peanuts. Only after such reimbursement can any remaining profits be distributed to growers who contributed to the additionals pool. Thus, an incentive for production beyond poundage quotas will arise only if the excess can be sold profitably in export markets.

The national poundage quota is set by the Secretary of Agriculture at an amount equal to the estimated domestic demand for peanuts for all uses. The quota was 1.355 million tons in 1986 and 1987, 1.402 million tons in 1988, and 1.44 million tons in 1989. Farm level quotas are set on the basis of allotted acreage and historical yields for each farm. The national average price support levels for quota peanuts was $607.47 per ton in both 1986 and 1987, $615.27 per ton in 1988, and $615.87 per ton in 1989. The price support level for nonquota additional peanuts was set at $149.75 per ton in all four years. The value of peanut allotments raised the value of the land assigned the historical allotments, giving the owners a windfall gain. Because poundage quotas are tied to the specific counties, efficiency-related shifts in production are limited.

The Economic Effects of Removing Import Quotas on Peanuts

This section provides estimates for the economic effects of removing the U.S. import quotas on peanuts. Eliminating the peanut quotas will have several effects in both the peanut growing industry itself as well as in its downstream industries. We estimate a scenario in which the Government maintains the income of domestic peanut growers by continuing to support the price of domestic peanuts grown under the domestic quota allotments, through a per unit subsidy. If we considered the effects of eliminating the quota without maintaining the incomes of the domestic peanut growers, we would confound the effects of the quotas with those of changes in the domestic programs; furthermore, the U.S. Government would be supporting the world price of peanuts through its programs. We represent the agricultural quotas by an equivalent ad valorem tariff.[4] That is, the tariff affects the import price and quantity in the same manner as the existing quota. The difference lies in the fact that a tariff provides government revenue, whereas a quota merely shifts economic rents among market participants. Finally, it is assumed that the quota rents accrue to the exporters.

In addition to the peanut-growing sector, the following four downstream sectors are analyzed: (1) peanut butter, (2) roasted and salted peanuts, (3) peanut candy, and (4) peanut oil and meal. The methodology for evaluating the effects of removing the peanut quotas is presented in appendix D. In the tables below several results are reported:

1. The consumer surplus gain;
2. The cost of maintaining peanut grower support at the current levels;
3. The net welfare gain to the U.S. economy as a whole;
4. The effects on price and quantity for the domestic and imported products; and
5. The effects on price, quantity, and employment and the economic rents accruing to capital and labor for the downstream sectors.

The estimations are for the effects of the quotas in calendar years 1988 and 1989 (and, only for raw peanuts, crop year 1988/89).

The magnitude of the effects of removing the import quotas should be considered in the context of U.S. peanut production. (See table 4–1.) U.S. production of peanuts was valued at $1.12 billion in both 1988 and 1989. The value of exports was $133.0 million in 1988 and increased to $160.8 million in 1989. The value of imports was only $0.8 million in 1988 and fell to $0.7 million in 1989.

The estimated tariff equivalents of the import quotas on peanuts are reported in Table 4–2. The effects on economic welfare of removing the import quota are presented in table 4–3. Having eliminated the quota would have caused a consumer benefit gain of $1.20 million in 1988, $1.34 million in 1989, and $1.37 million in crop year 1988/89. However, producer subsidy costs would have increased by $1.00 million in 1988,

[4] The tariff equivalents used in this analysis are taken from a recent ITC report, *Estimated Equivalents of U.S. Quotas on Agricultural Imports and Analysis of Competitive Conditions in U.S. Foreign Markets for Sugar, Meat, Peanuts, Cotton, and Dairy Products*, USITC Publication No. 2276, February 1990.

Table 4-1
Value of production, imports, and exports of peanuts, 1988-89

(In millions of dollars)

Item	1988	1989
Production	1,115.2	1,118.4
Imports	0.8	0.7
Exports	133.0	160.8

Source: U.S. Department of Agriculture and U.S. Department of Commerce.

Table 4-2
Tariff equivalents for peanuts, 1988-89 and crop year 1988/89

(In percent)

Year	Ad valorem tariff equivalent[1]
1988	34
1989	60
Crop year 88/89	60

[1] Weighted average of tariff equivalents for in-shell and shelled raw peanuts.

Source: U.S. International Trade Commission, *Estimated Equivalents of U.S. Quotas on Agricultural Imports and Analysis of Competitive Conditions in U.S. Foreign Markets for Sugar, Meat, Peanuts, Cotton, and Dairy Products*, Investigation No. 332-281, USITC Publication 2276, February 1990.

Table 4-3
The economic welfare effects of removing the peanut quotas, 1988-89 and crop year 1988/89

(In thousands of dollars)

Item	1988	1989	Crop year 1988/89
Consumer benefit:			
On the purchases of the domestic market	999	1,038	1,038
On the purchases of the import market:			
Quota rents recovered	151	202	222
Deadweight loss recovered	50	98	108
Total consumer benefit	1,200	1,338	1,368
Producer subsidy cost	-999	-1039	-1039
Net welfare gain	200	299	329

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

and $1.04 million in both 1989 and crop year 1988/89. The net economic welfare gain would have been $200 thousand in 1988, $299 thousand in 1989, and $329 thousand in crop year 1988/89.

The effects on price and quantity are presented in table 4-4. The price of domestic peanuts would have decreased by a negligible amount in all three periods. The price of imported peanuts would have decreased by 21 percent in 1988 and by 31 percent in both 1989 and crop year 88/89. The quantity of imported peanuts would have increased by 66 percent in 1988, by 97 percent in 1989, and by 97 percent in crop year 1988/1989. There would have been no effects on the quantity of domestic peanuts.

The downstream economic effects of removing the quota are presented in table 4-5. In the downstream peanut butter industry, the economic rents accruing to labor would have increased by $60,000 in 1988 and by $82,000 in 1989. The economic rents accruing to capital would have increased by $75,000 in 1988 and by $102,000 in 1989. Note that the increases in labor and capital rents are very small relative to the total rents received by capital and labor. The price in the peanut butter industry would have fallen by a negligible amount in both years and there would have been no significant effects on quantity or employment in the peanut butter industry.

In the downstream roasted and salted peanut industry, the economic rents accruing to labor would have increased by $116,000 in 1988 and by $156,000 in 1989. The economic rents accruing to capital would have increased by $91,000 in 1988 and by $123,000 in 1989. Once again, these increases are negligible as a percentage of total rents accruing to capital and labor. The effects on

Table 4-4
The price and quantity effects of removing the peanut quotas, 1988-89 and crop year 1988/89

(In percent)

Item	1988	1989	Crop year 1988/89
Price effects:			
Domestic product	-0.1	-0.1	-0.1
Imported product	-20.5	-31.4	-31.4
Quantity effects:			
Domestic product	0.0	0.0	0.0
Imported product	65.6	97.0	96.9

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

Table 4-5
The downstream economic effects of removing the peanut quotas, 1988-89

Item	1988	1989
Peanut butter:		
Economic rents accruing to—		
Labor (1,000 dollars)	60.0	82.0
Capital (1,000 dollars)	75.0	102.0
Price effect (percent)	-0.1	-0.1
Quantity effect (percent)	(1)	(1)
Employment effect (percent)	(1)	(1)
Roasted and salted peanuts:		
Economic rents accruing—		
Labor (1,000 dollars)	116.0	156.0
Capital (1,000 dollars)	91.0	123.0
Price effect (percent)	-0.1	-0.1
Quantity effect (percent)	0.1	0.1
Employment effect (percent)	0.1	0.1
Peanut candy:		
Economic rents accruing to—		
Labor (1,000 of dollars)	154.0	210.0
Capital (1,000 of dollars)	122.0	166.0
Price effect (percent)	(1)	-0.1
Quantity effect (percent)	(1)	(1)
Employment effect (percent)	(1)	(1)
Peanut oil and meal:		
Economic rents accruing to—		
Labor (1,000 of dollars)	6.0	8.0
Capital (1,000 of dollars)	2.0	2.0
Price effect (percent)	-0.1	-0.2
Quantity effect (percent)	0.1	0.2
Employment effect (percentage change)	0.1	0.2

[1] Less than 0.05 percent.

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

price, quantity, and employment in the processed peanut industry would have been negligible in both years.

In the downstream peanut candy industry, the economic rents accruing to labor would have increased by $154,000 in 1988 and by $210,000 in 1989. The economic rents accruing to capital would have increased by $122,000 in 1988 and by $166,000 in 1989—increases of minor significance given total rents in the industry. The effect on price in the peanut candy industry would have been negligible in 1988 and 1989, and there would have been no significant effects on quantity or employment in the industry.

In the downstream peanut oil and meal industry, the economic rents accruing to labor would have increased by $6,000 in 1988 and by $8,000 in 1989. The economic rents accruing to capital would have increased by $2,000 in both years. The effect on price, quantity, and employment in the peanut oil and meal industry would have been negligible in both years.

Chapter 5
Cotton

Introduction

The United States has been a major producer, consumer, and exporter of cotton for well over 100 years. Cotton is the fifth largest U.S. field crop in terms of value. During the 1980s, U.S. production of upland cotton, the predominant variety, has accounted for nearly 20 percent of world production and 25 percent of world exports. The United States also accounts for 10 percent of world consumption.

During the last fifty years, the Government has played an active role in the cotton market. Government programs have attempted to stabilize farm income by supporting cotton prices directly through deficiency payments and indirectly through acreage adjustments. Import quotas were used in conjunction with the domestic programs to allow domestic prices to rise above world prices.

This section provides a brief history of the U.S. cotton programs and describes their operation. It also describes the method for assessing the economic effects of significant U.S. import restraints on the cotton industry.

The History and Operation of the United States Cotton Programs[1]

The first U.S.legislation affecting the cotton market was the Agricultural Marketing Act of 1929. The Act created the Federal Farm Board, which was responsible for making loans to cooperatives for the purchase and storage of surplus crops. However, the lack of production controls and a secular decline in the demand for cotton made the program ineffective in supporting either farm income or cotton prices.

The Agricultural Adjustment Act of 1933 attempted to correct the failings of the earlier Act by establishing "parity" prices for each of the basic commodities and by controlling production through limiting acreage.[2] The basic tenets of the Act were implemented during the mid-1930s: one quarter of the cotton acreage was eliminated in 1933 and price supports were implemented in the form of nonrecourse loans.[3] In 1934, marketing quotas were added to limit the cotton program benefits to participants in the acreage reduction programs.

The unconstitutionality of the 1933 Act and its replacement by the 1936 Act caused an increase in acreage and a fall in farm incomes. To correct this, Congress quickly passed the Agricultural Adjustment Act of 1938, which instituted mandatory price supports and tied marketing quotas to acreage allotments. The program was effective in decreasing acreage, but production failed to decline because of increasing yields.

Between 1942 and 1949 cotton acreage allotments were suspended while price supports were increased to 95 percent of parity. Consequently, by 1949, total cotton acreage had increased to above the prewar levels. This brought a return of marketing quotas and acreage allotments in conjunction with a support price set at 90 percent of parity. Subsequent to their brief suspension during the Korean War, marketing quotas and allotment were reestablished in the Agricultural Act of 1954. The marketing quotas ran continuously through 1970.

The effect of the 1954 Act and the 1956 Act was to continue the decline in acreage. However, yields continued to increase. Although acreage declined from 28 million acres in 1949 to 15 million acres in the early 1960s, cotton stocks grew rapidly. Program administrators had reached the legislated floor for cotton allotments and further discretionary decreases were prohibited.

The 1964 Act attempted to reduce the large stocks by lowering cotton prices and continuing to decrease acreage. One provision allowed the Secretary of Agriculture to make payments to domestic textile mills to equalize the domestic and export price of cotton thus ending the two-tier price system. Other provisions tied the level of price support to the level of acreage reduction. The Food and Agricultural Act of 1965 continued to tie farm income and acreage reduction. By the end of 1970, the CCC inventory had been eliminated.

The 1970s saw the introduction of market prices as a determining factor in the level of price support. The 1973 Agriculture and Consumer Protection Act introduced the target price. Direct payments to farmers were made only if the market price fell below the target. Further, payments could not exceed the difference between target price and the loan rate. The target price provisions applied only to acreage allotments and additional plantings were ineligible.

The decline in cotton prices during the mid-1970s engendered a change in the target price program. After the 1977 Act, target prices were calculated on cost of production rather than on market prices whereas the loan rate was still based on past market prices. Further, target prices were calculated on actual acres planted

[1] See, Harold Stults et al., *Cotton: Background for 1990 Farm Legislation*, Economic Research Service, U.S. Department of Agriculture, 1990.

[2] Parity prices, which were used to establish minimum price support levels through the 1960s, were based upon historical levels of commodity purchasing power rather than upon market conditions.

[3] Nonrecourse loans allow the producer to repay the amount of the loan or deliver the cotton to the Commodity Credit Corporation (CCC). The loan rate thus acts as a price floor.

rather than on historical allocations. This encouraged a reallocation of resources toward more efficient growing regions in the western United States.

By the early 1980s, the provisions of the 1977 Act were clearly not supporting farm income at the desired level. Consequently, minimum target prices were raised in the Agriculture and Food Act of 1981. Also, the Secretary of Agriculture was given discretion to further raise target prices. However, this attempt to support farm income became very expensive when the recession of the early 1980s struck. Cotton exports fell as did domestic and world cotton prices. Deficiency payments to farmers totaled over $500 million.

The relatively high level of Treasury outlays resulted in the payment-in-kind (PIK) program of 1983. The program required beneficiaries to reduce acreage by 20 percent. The program was very successful in reducing acreage: only 60 percent of the estimated available acreage was planted. However, deficiency payments still totaled over $400 million since farm prices were well below the target price. Consequently, the Agricultural Program Adjustment Act of 1984 froze the target price, made no payment for the normal 20 percent acreage reduction, and required even further reductions. Even with the new provisions, the record yields of 1985 resulted in over $800 million of deficiency payments.

The current cotton program, the Food Security Act of 1985, established farm policy through 1990. The major objective of the new act was to make U.S. cotton competitive on world markets. While the fundamentals of the program still consist of nonrecourse loans, target prices, and acreage limitations, a major new provision was added—the marketing loan.

In cases where the world price is below the loan rate, the Secretary must institute a marketing loan plan. The Secretary has two options: 1) to lower the producer repayment rate (on the nonrecourse loan) by not more than 20 percent for the duration of loan rate period or 2) to periodically adjust the repayment rate to reflect the adjusted world price (as determined by the Secretary). In either case, farmers have to repay less to the Government. Consequently, the price of U.S. cotton in export markets will fall to the world price unless the marketing loan adjustment is too small.

The Economic Effects of Removing Import Quotas on Cotton

In this section, we analyze the effects of eliminating the quota on cotton imports while maintaining government support for the income of domestic cotton growers. This is accomplished by a per unit subsidy to cotton grown under domestic quota allotments, equal to the difference between the world price and the domestic price. With this subsidy, removal of the import restraint will not affect cotton production or the income received by farmers. If we considered the effects of eliminating the quota without maintaining the income of the domestic cotton farmers, we would confound the effects of the import quotas with those of the domestic programs.

The tables on the next page report the following results which are described in the methodology section in appendix D:

1. The consumer gain;
2. The cost of replacing the quotas with additional subsidies to maintain the current level of farm income;
3. The net welfare gain;
4. The price and quantity effects for the domestic and imported products; and
5. The price, quantity, and employment effects for the downstream sectors as well as the economic rents accruing to capital and labor in these sectors.

Estimates are presented for the calendar years 1988 and 1989 and the 1988/1989 crop year.

The effects of removing the import quotas are quite small relative to the size of the U.S. cotton industry. U.S. production of cotton was valued at $4.20 billion in 1988 and $4.17 billion in 1989. The value of exports was $1.77 billion in 1988 and increased to $2.11 billion in 1989. The quotas were effective in limiting imports: the value of imports was only $1 million in 1988 and fell to $0.9 in 1989. (See table 5-1.)

In assessing the effects of the import restraints, we represent the import quotas as an equivalent ad valorem tariff. The tariff equivalents are presented in table 5-2. Because of the effectiveness of the marketing loan program, U.S. and world cotton prices are nearly equal. Consequently, the tariff equivalents are very small.

The effects on economic welfare of removing the import quota on cotton are presented in table 5-3. Eliminating the quota would have yielded a consumer benefits of $0.34 million in 1988, $0.08 million in 1989, and $0.21 million in crop year 1988/89. However, producer subsidy costs would have increased by $0.29 million in 1988, by $0.07 million in 1989, and by 0.17 million in crop year 1988/89. The net economic welfare gain would have been $52 thousand in 1988, $14 thousand in 1989, and $32 thousand in crop year 1988/89.

The effects on price and quantity of cotton are presented in table 5-4. The price of domestic cotton would have decreased by a negligible amount in all three periods. The price of imported cotton would have decreased by 3.8 percent in 1988, by 1.1 percent in 1989, and by 1.7 percent in crop year 88/89. The quantity of imported cotton would have increased by 15 percent in 1988, by 4 percent in 1989, and by 7

Table 5-1
Value of production, imports, and exports for cotton, 1988-89 and crop year 1988/89[1]
(Millions of dollars)

Item	1988[2]	1989[3]	Crop year 1988/89
Production	4,199.8	4,174.2	4,186.9
Imports	1.0	0.9	1.4
Exports	1,772.0	2,108.9	1,670.3

[1] Valued at farm prices for a weighted average of all growths.
[2] Calendar year quantities are constructed using 1987 and 1988 crop years.
[3] Calendar year quantities are constructed using 1989 and 1990 crop years.

Source: U.S. Department of Agriculture and U.S. Department of Commerce.

Table 5-2
Tariff equivalents for cotton, 1988-89 and crop year 1988/89
(In percent)

Year	Ad valorem tariff equivalent[1]
1988	7
1989	2
Crop year 88/89	3

[1] Weighted average of tariff equivalents for Type A, Type B, and ELS cotton.

Source: U.S. International Trade Commission, *Estimated Equivalents of U.S. Quotas on Agricultural Imports and Analysis of Competitive Conditions in U.S. Foreign Markets for Sugar, Meat, Peanuts, Cotton, and Dairy Products*, Investigation No. 332-281, USITC Publication 2276, February 1990.

Table 5-3
The economic welfare effects of removing the cotton quotas, 1988-89 and crop year 1988/89
(In thousands of dollars)

Item	1988	1989	Crop year 1988/89
Consumer benefit:			
On the purchases of the domestic market	292	67	174
On the purchases of the import market:			
Quota rents recovered	48	14	31
Deadweight loss recovered	4	0	1
Total consumer benefit	344	81	206
Producer subsidy cost	-292	-67	-174
Net welfare gain	52	14	32

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

Table 5-4
The price and quantity effects of removing the cotton quotas, 1988-89 and crop year 1988/89
(In percent)

Item	1988	1989	Crop year 1988/89
Price effects:			
Domestic product	0.0	0.0	0.0
Imported product	-3.8	-1.1	-1.7
Quantity effects:			
Domestic product	0.0	0.0	0.0
Imported product	14.5	4.4	6.5

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

percent in crop year 1988/1989. There would be no effect on the quantity of domestic cotton produced.

The downstream economic effects of removing the quota are presented in table 5-5. Effects on price, quantity and employment would have been negligible in all of the significant downstream industries (the cotton broadwoven fabric mill sector, the cotton yarn mill sector, the cotton thread mill industry, the cotton felt industry, and the cottonseed oil industry) in both 1988 and 1989. Further, the increase in economic rents to both capital and labor can be measured in the thousands of dollars. These sums are negligible as a percentage of total labor and capital rents in the industry.

In summary, the import restraints on cotton had very little effect on the industry in 1988 and 1989. The marketing loan program as well as other domestic programs have borne the burden of supporting cotton farm income. So long as domestic programs keep the U.S. and world price of cotton equal, the cost of supporting farm income will be borne by the Government (and, ultimately, the taxpayer) and not by the consumer.

Table 5-5
The downstream economic effects of removing the cotton quotas, 1988-89

Item	*1988*	*1989*
Broadwoven fabric mills:		
Economic rents accruing to—		
Labor (1,000 of dollars)	3	1
Capital (1,000 of dollars)	2	0
Price effect (percent)	(1)	(1)
Quantity effect (percent)	(1)	(1)
Employment effect (percent)	(1)	(1)
Yarn mills:		
Economic rents accruing to—		
Labor (1,000 of dollars)	1	0
Capital (1,000 of dollars)	0	0
Price effect (percent)	(1)	(1)
Quantity effect (percent)	(1)	(1)
Employment effect (percent)	(1)	(1)
Thread mills:		
Economic rents accruing to—		
Labor (1,000 of dollars)	1	0
Capital (1,000 of dollars)	0	0
Price effect (percent)	(1)	(1)
Quantity effect (percent)	(1)	(1)
Employment effect (percent)	(1)	(1)
Felt goods (n.e.c.):		
Economic rents accruing to—		
Labor (1,000 of dollars)	0	0
Capital (1,000 of dollars)	0	0
Price effect (percent)	(1)	(1)
Quantity effect (percent)	(1)	(1)
Employment effect (percent)	(1)	(1)
Cottonseed oil:		
Economic rents accruing to—		
Labor (1,000 of dollars)	0	0
Capital (1,000 of dollars)	0	0
Price effect (percent)	(1)	(1)
Quantity effect (percent)	(1)	(1)
Employment effect (percent)	(1)	(1)

[1] Less than 0.05 percent.

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

Chapter 6
Meat

Introduction

This chapter describes how government programs and barriers to meat imports affect the U.S. meat industry. The chapter is divided into two parts. Part one provides a history of the government programs used to aid the livestock industry and protect it from import competition. Part two describes the method for assessing the economic effects of significant import restraints and reports the results.

The History of the U.S. Meat Programs

The U.S. Government uses both domestic programs and import restraints to support incomes of domestic meat producers and to reduce the variability of meat supply. Nevertheless, Government intervention has been minimal; price supports are nonexistent; and trade barriers have been used only sporadically.

Domestic Programs

Government support for incomes of meat producers began with the National Wool Act of 1954. This Act, which extends through December of 1990, supports domestic sheep and goat producers. Although it increases the supply of meat, the main purpose of the Act is to stimulate production of wool and mohair. The Government uses the revenue from tariffs on imported wool to finance this program.

The Dairy Termination program (DTP) (established on April 1, 1986 and ending on September 1987) was meant to reduce the cost of price supports for milk by reducing the size of dairy herds. Under the program, dairy farmers would receive a payment from USDA for slaughtering or exporting dairy cows. Disposal of dairy cattle under the program amounted to 10 percent of the U.S. inventory of dairy cattle and 4 percent of the total amount of cattle slaughtered in 1987. The DTP helped depress the price of beef, because the slaughtered dairy cattle increased the supply of beef. To offset that, the USDA agreed to purchase 200 million pounds of red meat for distribution through the National School Lunch Act and to purchase an addition 200 million pounds of meat for use in U.S. commissaries. The cost of the purchases was approximately $1.8 billion.

Border Programs

Section 204 of the Agricultural Act of 1956, and the Meat Import Acts of 1964 and 1979, provide for voluntary export restraints. Other restrictions include import tariffs, export assistance, and inspection and sanitary regulations. Section 204 gives the President authority to negotiate agreements with foreign governments to restrict imports of *any* agricultural product from certain countries. The Act also gives the President power to limit the withdrawal of imported products stored in the U.S. even if the imports are from countries not specifically under restraint.

The Meat Import Act of 1964 was passed to protect the domestic cattle industry. The Committee on Finance in the Senate asserted "that imported meat has played an important part in creating the distressed market conditions"[1] in the industry. The Act covered fresh, chilled, or frozen beef and veal,[2] meat of sheep (except lambs),[3] and goats.[4] Base quantities, adjusted yearly, were used to determine whether import restrictions would be imposed. The base quantity for each year was computed by multiplying the original base quantity (established by law to be 725.4 million pounds of meat) by a production factor, which was the ratio of a 3 year moving average of domestic production to a 4 year moving average of domestic production. This adjusted the minimum import level for changing trends in U.S. production. At the beginning of each year, the Secretary of Agriculture announced the new base quantity and the "trigger" level which was 10 percent over the new base quantity. At the beginning of each quarter, the Secretary also forecasted the amount of subject meat that would enter the country in the absence of restrictions. If the Secretary's estimates exceeded the trigger level, then the President was required by law to impose quotas. The Act allowed the President to suspend the quotas, but only if there were some grave reason, such as a threat to national security.

The Meat Import Act of 1979 altered the 1964 Act in a number of ways. Coverage of products was extended to include prepared or preserved beef and veal (TSUS item numbers 107.55, 107.61, and 107.62).[5] Most importantly, the 1979 Act was designed to make imports of subject meats countercyclical to U.S. production. That is, restrictions on imports are more stringent when domestic production is high and less stringent when the domestic production is low. The intent is to dampen the variability of both price and supply.

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[1] S.R. 1167, 88th Congress, 2d session, 2, reprinted in 1964 U.S. Code Cong. and Ad Nes 3070, 3071. Note 3, page 1 at 3074.

[2] This category represents TSUS item 106.10 and the corresponding HS numbers are 0201.10.00, 0201.20.60, 0201.30.60, 0202.10.00, 0202.20.60, and 0202.30.60.

[3] The TSUS item no. is 106.2020, and the corresponding HS numbers are 0204.21.00, 0204.22.40, 0204.23.40, 0204.41.00, 0204.42.40, and 0204.43.40.

[4] The TSUS item number is 106.25, formerly 106.2040, and the corresponding HS number is 0204.50.00.

[5] The corresponding HS numbers for these categories are: 0202.30.40, 0201.20.20, 0201.30.20, 0202.20.20, 0202.30.20, 0201.20.40, 0201.30.40, 0202.20.40, and 0202.30.40.

The 1979 Act operates much like the 1964 Act. At the beginning of each year, the Secretary of Agriculture announces a quantity equal to the original base quota (1,250 million pounds) multiplied by a growth factor and a countercyclical factor. The growth factor is the ratio of a 3 year moving average of domestic production to a 10 year moving average of domestic production. The countercyclical factor is a ratio of a 5 year moving average of domestic beef production to a 2 year moving average of domestic beef production.

As under the 1964 Act, the "trigger" level for imports exceeds the base quantity by 10 percent. If the Secretary's quarterly estimate of imports, absent any restraint, exceeds the trigger level, the President is required to impose quotas. The Secretary allocates shares of the quota to individual exporting countries on the basis of the shares each country had during a representative period when quotas were not in place. When the countercyclical factor is greater than 1 (indicating current production is low relative to past production), the President may suspend the quotas if such action is justified by "overriding economic or national security interests of the U.S." or if current supplies would be inadequate to satisfy demand at "reasonable" prices. Unlike the 1964 Act, the 1979 Act adds the provision that the President must publish a statement of intent to lift the import quota and permit a 30 day comment period before taking final action.

In years when circumstances clearly indicated that quotas would be imposed, voluntary export restraints have been negotiated with supplying countries under the authority of the Agricultural Act of 1956, section 204. As a result, quotas have been imposed only once during the fourth quarter of 1976.

Import tariffs

Tariffs on fresh, chilled, or frozen beef and veal (TSUS 106.10) are 2 cents per pound. For fancy cuts of beef and veal valued over 30 cents a pound, the tariff rate is 4 percent ad-valorem if the meat satisfies USDA requirements and 10 percent otherwise. Imports of sausages, beef and veal, and corned beef from General System of Preferences (GSP) and Caribbean Basin Initiative (CBI) countries enter the United States duty free.

Export assistance

The U.S. government promotes exports through the Food Security Act (1985) and the Export Cooperator Program, which promotes exports with advertising and promotion plans funded by both the U.S. Government and the Meat Export Federation (a private, nonprofit trade group). All of the funds supporting these programs are spent overseas. The Export Enhancement Program (EEP) also helps meat exports, but it provides no direct subsidy for meat.

The Economic Effects of Removing the VERs on Meat

The evidence suggests that the main barriers to trade in the meat industry are the voluntary export restraints on shipments from Australia and New Zealand which operated during parts of 1987 and 1988. Accordingly, we estimate what the price of meat would have been without these restraints, and then examine the effects of the lower price on domestic consumers and producers.

This report considers only U.S. imports of boneless cow beef, most of which is blended with prescribed amounts of fat to produce meat used mainly for hamburger by restaurants. Imports of boneless cow beef account for more than 90 percent of the total amount of meat imports from Australia and New Zealand covered by the Meat Import Act of 1979. U.S. imports of sheepmeat and goatmeat are quite small, and domestic demand for these types of meat is also quite small.

The Protected Sector

This section presents the results of removing the voluntary export restraints on beef on the domestic protected sector. The magnitude of these effects should be considered in perspective to the size of the industry. (See table 6-1.) U.S. production of boneless cow beef was valued at $4.06 billion in 1987 and $3.95 billion in 1988. The value of imports was $1.34 billion in 1987 and increased to $1.49 billion in 1988. There were no U.S. exports of boneless cow beef beef, the beef subject to the quota, in either year.

In assessing the effects of the import restraints, we represent the VER as an equivalent ad valorem tariff. The tariff equivalents are presented below in table 6-2. Removing the equivalent tariff results in a reduction in the price of imported beef, inducing purchasers to substitute the relatively cheaper import for the domestic good. As a consequence, consumption of imported meat rises, demand for domestically produced meat falls along with its price, and domestic production falls as well.[6] Domestic producers of meat would now require fewer inputs, resulting in income losses to both labor and capital used in the industry as demand for both of these inputs falls. The welfare effects of removing the VERs are twofold. First, when the VER is removed, quota rents previously paid to foreign exporters are now retained by U.S. consumers. Second, the country receives an additional welfare gain by eliminating the deadweight loss created by the VER. Therefore, the total welfare gain from the removal of the VERs is the sum of these effects.[7] Table 6-3, below, reports the wel-

[6] Note that the price received by ranchers falls. In the analysis of sugar, dairy, peanuts, and cotton, the decline in price was offset by a per unit subsidy to producers because farm programs support the price of these commodities. This is not the case in meat.

[7] See appendix D for a detailed explanation of the causes and measurements of these effects.

Table 6-1
Value of production, imports, and exports[1] of boneless cow beef, 1987-88
(In millions of dollars)

Item	1987	1988
Production	4,055.0	3,947.0
Imports	1,337.0	1,494.0
Exports	0.0	0.0

[1] Exports of the type of beef subject to the quota.

Source: U.S. Department of Agriculture and U.S. Department of Commerce.

Table 6-2
Tariff equivalents for boneless cow beef, 1987-88[1]

Year	Average Price to Canadian buyers[2]	Average Price to U.S buyers[3]	Ad valorem tariff equivalent[4]
	Cents per pound		Percent
1987	83.6	84.9	1.6
1988	90.6	96.1	6.1

[1] These are comparable prices for boneless cow beef, 90 percent visual lean or 85 percent chemical lean. Prices reported here are arithmetic averages over the relevant period. Prices were quoted in New Zealand cents per kilogram and converted to U.S. dollars per pound using exchange rates published in *International Financial Statistics*, by the International Monetary Fund, May 1989. This table compares f.o.b. New Zealand prices rather than c.i.f. prices. Since 1987, transport costs from New Zealand to the United States were identical to transport costs to Canada, either to the west coast or east coast, so they are irrelevant to the calculation.

[2] The Canadian price for 1987 is an average over 5 months; the Canadian price for 1988 is an average over 7 months, and both are f.o.b., New Zealand.

[3] The U.S. price for 1987 is an average price over 5 months; the U.S. price for 1988 is an average over 7 months, and both are f.o.b., New Zealand.

[4] As a percent of the average world price.

Source: New Zealand Meat Producers Board; specific and ad valorem tariff equivalents computed by the staff of the U.S. International Trade Commission.

Table 6-3
The economic welfare effects of removing the VERs on meat, 1987-88
(In millions of dollars)

Item	1987	1988
Consumer benefit:		
On purchases of the domestic market	19.1	73.4
On purchases of the import market:		
Quota rents recovered	21.0	86.0
Deadweight loss recovered	1.0	8.0
Total consumer benefit	41.1	167.4
Producer loss in the domestic market	19.1	73.4
Net welfare gain	22.0	94.0
Loss in Labor Rents	14.0	54.0
Loss in Capital Rents	3.0	13.0

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

fare effects from removing the VERs and the changes in income of labor and capital in the industry. Table 6-4 presents the effects of removing the VERs on the price of imported meat, and the effects on the price and output of domestically produced meat. Estimates of the effects are given for the years 1987 and 1988, the two most recent years when the VERs were binding.

Removing the VERs on meat would result in a net welfare gain of $22 million in 1987 and $94 million in 1988. Consumer benefits totaled $41 million in 1987 and $167 million in 1988. Approximately half of the consumer benefits are due to lower prices for domestically produced beef while the other half is due to quota rents recovered in the import market. Producer losses in the domestic market are $19 in 1987 and $73 million in 1988.

Table 6-4
The price and quantity effects of removing the VERs on meat, 1987-88
(In percent)

Item	1987	1988
Price effects:		
Domestic product	-0.47	-1.86
Imported product	-1.21	-4.30
Quantity effects:		
Domestic product	-0.49	-1.91
Imported product	3.40	11.70
Inputs in domestic production:		
Change in labor employment	-0.59	-2.28
Change in capital employment	-0.23	-1.06
Change in use of material inputs	-0.49	-1.89

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

Removing the VERs would reduce the income of labor employed in the domestic industry by $14 million dollars in 1987 and by $54 million dollars in 1988, while the income of capital falls by $3 million in 1987 and $13 million in 1988. Reductions in output and employment in the domestic industry would have amounted to less than 1 percent of total industry production and employment in 1987. In 1988, the effects are larger—domestic output and employment both fall by 2 percent.

Downstream Results

This section presents the results of removing the voluntary export restraints on beef on the downstream customers of the protected industry. Specifically, this section reports the changes in the income of labor and capital and the changes in prices, output, and employment in the downstream industries. Three industries have been identified as significant downstream purchasers of the protected product: sausages and prepared meats, frozen specialties, and eating and drinking establishments. Removing the VERs on meat will lower the price of imported meat and reduce the demand for domestically produced meat as consumers substitute imported meat for domestic meat. As a result, downstream users face a lower price for the protected product, which causes their output to expand and increases their demand for labor and capital. Thus, the returns to both labor and capital employed in the downstream industry will rise if the VERs are eliminated. The downstream welfare effects are analyzed in much the same way as the upstream effects. Removing VERs will result in a welfare gain as quota rents are captured and deadweight loss is eliminated. There are no net welfare effects in the domestic market from elimination of the VERs since there is no target price established for the domestic meat industry: the consumer gains in this market are exactly offset by the producer loss.[8] Therefore, the scenario for the meat industry differs from those conducted for the other industries considered in this report. The estimates of the changes in the income of labor and capital from removing the import restraint as well as the other effects on the downstream industry are presented in table 6-5.

Sausages and Prepared Meats

The first downstream industry considered is the sausage and prepared meat industry. Appendix E identifies the "protected" sector as the industry labeled "meat packing plants." However, there is an aggregation problem: the "meat packing plants" industry produces a variety of products, not all of which are subject to quotas. Therefore, it would be inappropriate to treat the entire industry as the protected sector. This is important when calculating the effects of removing the VERs on downstream industries, since the returns to labor and capital in those industries hinge on the share of the protected product in their production costs. Appendix E provides an estimate of the share of the costs of producing sausages and prepared meats accounted for by meat packing plants. The original coefficient of .48 has been revised downward to .24 because roughly half of the output of meat packing plants purchased by the downstream industry of sausages of prepared meats consists of pork, which is not subject to a quota.[9]

In the downstream industry of sausages and prepared meats, removal of the VERs on meat would have increased the returns to labor by $10 million in 1987 and $40 million in 1987, whereas returns to capital would have increased by $8 million in 1987 and by $30 million in 1988. However, these sums are negligible as a percentage of total labor and capital rents in the industry. In 1987, having removed the VERs would have caused only insignificant changes in price, output, and employment in the sausages and prepared meats industry. In 1988, the effects would have been more pronounced. The price of sausages

[8] See appendix D for details of the welfare cost calculation when domestic price support policies are in place.

[9] This information was obtained from the Census of Manufactures report for Meat Products, July 1989.

Table 6-5
The downstream economic effects of removing the VERs on meat, 1987-88

Item	1987	1988
Sausages and prepared meats:		
Economic rents accruing to—		
Labor (million dollars)	10.0	40.0
Capital (million dollars)	8.0	30.0
Price effect (percent)	-0.2	-0.8
Quantity effect (percent)	0.2	0.8
Employment effect (percentage change)	0.3	1.0
Frozen specialties:		
Economic rents accruing to—		
Labor (million dollars)	1.0	4.0
Capital (million dollars)	1.0	3.0
Price effect (percent)	0.0	-0.2
Quantity effect (percent)	0.0	0.2
Employment effect (percentage change)	0.1	0.2
Eating and drinking places:		
Economic rents accruing to—		
Labor (million dollars)	13.0	53.0
Capital (million dollars)	18.0	72.0
Price effect (percent)	0.0	-0.2
Quantity effect (percent)	0.0	0.2
Employment effect (percentage change)	0.1	0.2

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

and prepared meats would have fallen by 1 percent, whereas output would have risen by 1 percent and employment would have been 1 percent higher.

Frozen Specialties

Since meat subject to the quota restriction represents 6 percent of the cost of producing frozen specialties, the effects on the returns to labor and capital in the frozen food industry are minuscule. Without the VERs in place, both labor and capital income would have been $1 million higher in 1987 while in 1988, labor income would have been $4 million higher and capital income would have been $3 million higher. These effects are very small relative to the size of total labor and capital rents in the industry. For 1987, the effects of removing the VERs on the domestic frozen food industry would have been negligible since inputs from the protected sector account for a small share of the cost of producing frozen foods, and the tariff equivalent is quite small. There would have been only insignificant changes in domestic prices, output and employment in 1987 or 1988.

Eating and Drinking Establishments

The results of removing the VERs on meat on eating and drinking establishments are likewise very small since meat represents only 5 percent of production costs. In 1987, having eliminated the VERs would have increased the income of labor by $13 million and that of capital by $18 million. For 1988, labor income would have increased by $53 million while capital income would have been $72 million higher. These estimates may seem large, but they are small relative to the size of the industry: sales would have been $147 billion in 1987 and $157 billion in 1988, and industry price, output or employment would have changed insignificantly in either 1987 or 1988.

APPENDIX A
REQUEST LETTER

United States Senate

COMMITTEE ON FINANCE
WASHINGTON, DC 20510-6200

September 9, 1988

The Honorable
Anne Brunsdale
Vice Chairman
United States International
Trade Commission
500 "E" Street, S.W.
Washington, D.C. 20436

Dear Madam Vice Chairman:

On behalf of the Committee on Finance, I request that the Commission conduct a study pursuant to section 332 of the Tariff Act of 1930 on the economic effects of existing significant U.S. import restraints. The study should include an assessment of the effects on U.S. consumers, on the output and profits of U.S. firms, on the income and employment of U.S. workers, and on the net economic welfare of the United States. The study should assess the direct effect on U.S. industries that are protected by the import restraints and the indirect effects on "downstream" industries that are customers of the protected industries.

The study should consider the effects of significant restraints on U.S. imports, such as voluntary restraints on steel and autos, and the Multifiber Arrangement, whether they result from an Act of Congress, an action taken under the fair trade laws of the United States, such as section 201 investigations, or an international agreement. The study should not include those import restraints resulting from final antidumping or countervailing duty investigations by the ITC and the Department of Commerce or section 337 and 406 investigations by the ITC.

The results of the study should be reported in three phases. The first phase should address the effects of restraints on imports of manufactured products. The second phase should address the effects of restraints on imports of agricultural products and natural resources, and the third phase should address the effects of restraints on services industries. The Committee would appreciate receiving the report for the first phase within one year after receipt of this request, the report for the second phase within two years, and the report for the third phase within three years.

Sincerely,

Lloyd Bentsen

APPENDIX B
FEDERAL REGISTER NOTICE

submit comments to the Medford District Manager at the above address.

Objections will be reviewed by the State Director who may sustain, vacate, or modify this realty action.

Date signed: September 26, 1989.

David A. Jones,

District Manager.

[FR Doc. 89-23412 Filed 10-3-89; 8:45 am]

BILLING CODE 4310-33-M

[CA-910-09-4214-10; CACA 24047]

Partial Termination of Proposed Withdrawal and Reservation of Land; California

AGENCY: Bureau of Land Management, Interior.

ACTION: Notice.

SUMMARY: Notice of the U.S. Department of the Navy application CACA 24047 for the withdrawal and reservation of public lands from settlement, sale, location, or entry under the general land laws, including the mining laws, was published in the Federal Register on February 2, 1989 (54 FR 5284). The U.S. Department of the Navy has cancelled its application as to the lands described below:

Mount Diablo Meridian

T. 28 S., R. 43 E.,

Sec. 19, S½N½N½, S½N½, and S½.

The area described contains 560 acres in San Bernardino County.

DATE: At 10 a.m. on November 6, 1989, the land will be relieved of its segregative effect in accordance with the regulations in 43 CFR 2310.2-1(c).

FOR FURTHER INFORMATION CONTACT: Viola Andrade, BLM California State Office, E-2845 Federal Office Building, 2800 Cottage Way, Sacramento, California 95825, (916) 978-4820.

Dated: September 28, 1989.

Nancy J. Alex,

Chief, Lands Section Branch of Adjudication and Records.

[FR Doc. 89-23407 Filed 10-3-89; 8:45 am]

BILLING CODE 4310-40-M

INTERNATIONAL TRADE COMMISSION

[Investigation No. 332-262]

The Economic Effects of Significant U.S. Import Restraints Phase II: Agricultural Products and Natural Resources

AGENCY: United States International Trade Commission.

ACTION: Scheduling of hearing and request for comments in connection with phase II of the investigation.

EFFECTIVE DATE: July 28, 1989.

FOR FURTHER INFORMATION CONTACT: Seth Kaplan (202) 252-1231, or Donald Rousslang (202) 252-1223, Research Division, Office of Economics, U.S. International Trade Commission, Washington, DC 20436.

Background

The Commission instituted investigation No. 332-262 following receipt of a letter dated September 9, 1988, from the Senate Committee on Finance. The Committee requested that the investigation be conducted in three consecutive annual phases addressing the effects of significant U.S. import restrains on (1) imports of manufactured products, (2) imports of agricultural products and natural resources, and (3) service industries. The Commission has submitted its report on phase I on September 11, 1989. Notice of the institution of the investigation and of the hearing and other matters related to phase I was published in the Federal Register of October 19, 1988 (53 FR 40971).

As requested by the Committee, the phase II report (like the reports on the other two phases) will include an assessment of the effects on U.S. consumers, on the output and profits of U.S. firms, on the income and employment of U.S. workers, and on the net economic welfare of the United States. It will assess the direct effect on U.S. industries that are protected by the import restraints and the indirect effects on "downstream" industries that are customers of the protected industries.

This phase will focus on U.S. restraints to imports of agricultural products and natural resources, whether the restraints result from an Act of Congress, an action taken under the fair trade laws of the United States, such as 201 of the Trade Act of 1974, or an international agreement. However, the report will not cover those import restraints resulting from final antidumping or countervailing duty investigations by the ITC and the Department of Commerce, investigations by the ITC under section 337 of the Tariff Act of 1930, or section 406 of the Trade Act of 1974, or investigations by the U.S. Trade Representative under section 301 of the Trade Act of 1974.

The Commission expects to report the results of this phase of the investigation to the Committee on Finance on or about September 11, 1990.

Public Hearing

A public hearing in connection with the second phase of this investigation will be held in the Commission Hearing Room, 500 E Street, SW, Washington, D.C. 20436, beginning at 9:30 a.m. on March 7, 1990. All persons have the right to appear by counsel or in person, to present information, and to be heard. Requests to appear at the public hearing should be filed with the Secretary, United States International Trade Commission, 500 E Street, SW, Washington, DC 20436, no later than noon, February 21, 1990. The deadline for filing prehearing briefs (original and 14 copies) is February 21, 1990. A date for public hearings in connection with the third phase will be announced later.

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. 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 for inspection by interested persons in the Office of the Secretary to the Commission. To be assured of consideration by the Commission, written statements relating to the Commission's report and post-hearing briefs should be submitted at the earliest practical date and should be received no later than March 21, 1990. All submissions should be addressed to the Secretary to the Commission at the Commission's office in Washington, DC

Hearing impaired persons are advised that information on this matter can be obtained by contracting the Commission's TDD terminal on (202) 252-1810.

By order of the Commission.

Kenneth R. Mason,

Secretary.

Issued: September 27, 1989.

[FR Doc. 89-23394 Filed 10-3-89; 8:45 am]

BILLING CODE 7020-02-M

APPENDIX C
CALENDAR OF PUBLIC HEARING

CALENDAR OF PUBLIC HEARING

Those listed below appeared as witnesses at the United International Trade Commission's hearing:

Subject: **THE ECONOMIC EFFECTS OF SIGNIFICANT U.S. IMPORT RESTRAINTS PHASE II: AGRICULTURE PRODUCTS AND NATURAL RESOURCES**

Inv. No.: 332-262

Date and Time: March 7, 1990 - 9:30 a.m.

Sessions were held in connection with the investigation in the Main Hearing Room 101 of the United States International Trade Commission, 500 E Street, S.W., in Washington, D.C.

WITNESS AND ORGANIZATION:

Hawaiian Sugar Planters Association
Washington, D.C.

Eiler C. Ravnholt, Vice President

Jack Roney

National Cotton Council of America
Washington, D.C.

Jess Barr, Agricultural Economist

Clifford & Warnke
Washington, D.C.
On Behalf of:

The Australian Meat and Livestock Corporation (AMLC)

J. B. Penn, Senior Vice President, Sparks Commodities, Inc.

Bryan Jay Yolles)--OF COUNSEL

- end -

APPENDIX D
METHODOLOGY

Introduction

This appendix describes the methodology used to measure the effects that removing agricultural quotas would have on the U.S. economy. It begins by looking at the protected sector itself, focussing on the effects in the markets for the restrained imports and the competing domestic output. It then examines the effects in important downstream industries, including the effects on income received by labor and capital in these industries.

Equilibrium in the Import and U.S. Product Markets

In general, terminating an import quota results in increased imports as consumers substitute the now cheaper imports for competing domestic goods. Consequently, both price and output of the domestic goods decline. The model used in this study does not assume that U.S. consumers regard the imported and domestic product as perfect substitutes for each other. Instead, consumers are allowed to distinguish among products of different national origin for a variety of reasons, including differences in physical qualities or durability, warranty terms, speed and reliability of delivery, and liability of manufacturers.

Effect on Labor and Capital Income in the Protected Industry

For all the agricultural products protected by quotas, except for beef, U.S. producers receive a support price. If the quotas were ended for these products, demand for the competing U.S. product would decline, and the Government would have to increase the subsidy to the domestic industry if it wanted to maintain the support price. Thus, if the price support program is maintained, it insulates labor and capital employed in the U.S. industry from the effects of terminating the quota, but it imposes additional support costs on the Government.

The U.S. beef industry, however, does not benefit from a domestic price support program. Therefore, removing the quotas would cause the price received by domestic beef producers to decline, and would cause the income of both labor and capital employed in that industry to also decline.

National Welfare Effects

A quota restricts imports and raises the price to U.S. consumers. Furthermore, if the quota rights are assigned as export licenses to foreign interests, as they are in the case of all agricultural products, except dairy, the premium U.S. consumers pay above world price for the imports accrues to foreign exporters rather than to domestic importers or other U.S. residents. Had the quotas not been in place, these payments to foreigners would have been retained by U.S. consumers and could have been used to purchase other products.

A quota reduces U.S. demand for the import which tends to drive the world price down. Such a reduction in the world price would ameliorate (but never offset) the rise in price to consumers caused by the quota.

Eliminating a quota increases demand for the imports, putting upward pressure on the world price but lowering the price to U.S. consumers. Eliminating the quota also reduces demand for the U.S. competing good which means the Government must increase the rate of subsidy in order to maintain the support price. This subsidy increase causes an additional welfare cost, but net national welfare generally increases. The model estimates the size of the welfare cost attributable to the subsidy increase, the gain to consumers, the loss to domestic producers, and the net welfare gain to the nation that are caused by eliminating the quota.

Effect on Income of Labor and Capital Employed by Downstream Industries

When the quota is eliminated, the price of both the imported and competing U.S. product declines, as just described. As a result, production costs for industries that use these products as intermediate inputs will fall. As their costs and prices fall, consumers buy more of the downstream products. The resultant greater production in these industries means that they will employ more labor and capital and, consequently, bid up the price of these inputs, at least in the short-run. The model estimates the resultant short run increase in income received by labor and capital employed in each downstream industry.

Effects Not Included in the Current Model

Several economic effects that could result from eliminating agricultural import quotas are not accounted for in the methodology. These effects are discussed in this section.

Terms of trade effects of exchange-rate depreciation

The phrase "terms of trade" refers to the prices a country receives for its exports compared to the prices it pays for its imports. Specifically, the terms of trade are measured as the weighted average of export prices divided by the weighted average of import prices. A reduction in the terms of trade is also called a worsening of the terms of trade, because it implies that the home country must give up a greater amount of its output to pay for a given amount of imports.

Eliminating an import restraint increases U.S. imports and tends to move the U.S. trade balance towards deficit. The move toward deficit, in turn, causes the U.S. dollar to depreciate against other currencies, raising the dollar prices of U.S. imports and exports for a given dollar price for non-traded goods. Nontraded goods include, generally, many types of services (such as the productive services of labor) and certain products characterized by high transportation costs. Since the United States is large enough in world markets to affect the price it pays for imports and the price it receives for exports, the depreciation will ordinarily worsen the terms of trade.[1]

The net welfare loss of the worsened terms of trade is the loss to consumers (who must pay higher prices for imports), less the gain to producers (who receive higher prices for their exports), less the gain to those who receive income from foreign investments (whose foreign exchange earnings translate into a greater dollar amount owing to the dollar depreciation). During periods of current account deficit, the losses to national residents are likely to exceed the gains.

The adjustment for the response of exchange rates is not needed if foreign trading partners reciprocate for the tariff removal. When foreign tariff concessions accompany the U.S. tariff concessions, an increase in foreign demand for U.S. exports accompanies the increase in U.S. demand for imports, so the U.S. trade balance does not tend toward deficit and there is no need for an exchange rate adjustment.[2]

Domestic taxes

Domestic income and excise taxes lower real after-tax wages, thereby distorting the work-leisure choice and discouraging work effort. Eliminating an import restraint can reduce the work disincentive effect of domestic taxes by increasing real wages. The increase in real wages comes from the reduction in consumer prices caused by eliminating the import restraint. Thus, by ignoring the role of domestic taxes, the methodology tends to understate the actual efficiency gain of removing an import restraint.[3]

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[1] See G. Basevi, "The Restrictive Effect of the U.S. Tariff and Its Welfare Value," *American Economic Review*, 58:4 (September 1968), pp. 840-852.

[2] For a further discussion of terms-of-trade effects, see D.J. Rousslang and J.W. Suomela, *Calculating the Consumer and Net Welfare Costs of Import Relief*, Staff Research Study #15, U.S. International Trade Commission, 1985.

[3] For a further discussion of the role of domestic taxes in commercial policy, see D.J Rousslang, "The Welfare Cost of Import Restraints in the Presence of Domestic Taxes," Mimeo, USITC, April 1990.

Macroeconomic effects and employment

Policy makers often are interested in the effects that eliminating import restraints would have on the overall level of employment. Unfortunately, the overall level of employment is the result of many economic forces both at home and abroad, including monetary and fiscal policies, technological innovation, and even political events. A full macroeconomic model is needed to assess these factors, but such a model is not useful for assessing the welfare consequences of disaggregate commercial policy actions. In contrast, the model employed here is useful for assessing disaggregate U.S. commercial policy actions, but it sheds light only on the sectoral employment effects of such actions. Aggregate employment effects depend on such factors as the response of monetary and fiscal policies and labor market congestion. In particular, aggregate employment effects are likely to vary substantially depending on the stage of the business cycle when the commercial policy action occurs.

The Protected Sector

This section provides the equations for measuring the loss to labor and capital in the protected industry when the quota is eliminated. It is assumed that the loss of protection does not cause any involuntary unemployment of labor. Imports and the competing domestic output in the industry are treated as imperfect substitutes in demand.

The effect of a tariff on labor's income is illustrated in figure D-1. There, the tariff causes output in the protected industry to rise, which increases the industry's demand for labor from L_D to L_D'. Given the labor supply curve Ls, the increase in demand causes the wage to rise from w_0 to w_1 and causes employment (number of hours worked) to rise from L_0 to L_1. The increase in the wage ($w_1 - w_0$) multiplied by the initial (pretariff) level of employment (L_0) is an approximate measure of the increase in labor's income in the protected sector. This approximation is shown as the shaded rectangle in figure D-1. (The exact increase in labor's income would include the triangle to the right of this shaded area.)

Let t be the equivalent *ad valorem tariff*, i.e. the tariff that would restrain imports to exactly the quota amount. Then, the loss in labor's income in the protected sector caused by removing this tariff (ΔV_L) is approximated by

$$\Delta V_L \approx (\hat{w}/\hat{T}) V_L \hat{T}, \qquad \text{(D1)}$$

where w is the wage rate of labor employed in the protected industry, T = 1 + t, and V_L is the total labor-wage bill in the protected industry (= wL where L is the volume of employment). A hat (^) over a variable denotes percentage change. For example, $\hat{w} = \Delta w/w$. The increase in income to capital caused by a tariff is estimated in an entirely analogous manner.

When a tariff is imposed, T = 1 initially and $\hat{T} = t$. When a tariff is removed, T = 1 + t initially, so $\hat{T} = -t/(1 + t)$. The ratio $\hat{w}/\hat{T}$ is the elasticity of the wage rate with respect to a change in T. This ratio is obtained as follows.

First, it is assumed that production of the domestic product is described by the equation

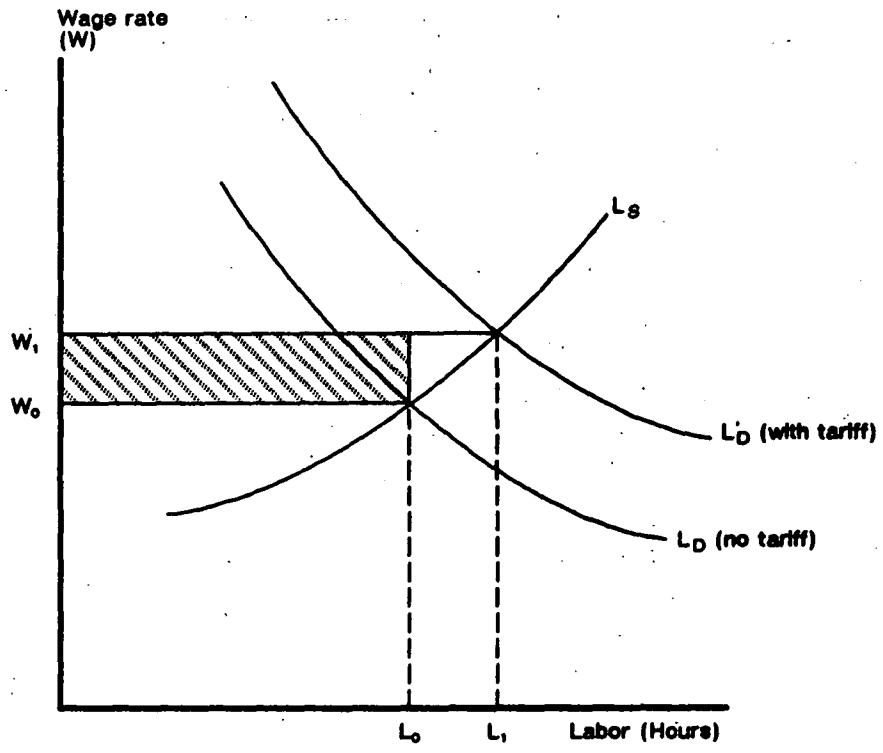
$$D = f(\, VA(\, K, L), I) = \min \{\, VA^{1/\psi_{VA}}, I^{1/\psi_I} \,\}, \qquad \text{(D2)}$$

where D is the quantity of domestic output, VA is value added, and ψ_{VA} and ψ_I are output elasticities. VA is both linearly homogeneous and constant elasticity of substitution (CES) in capital and labor.[4] The function f assumes that VA and material inputs, I, are used in fixed proportions, with constant output elasticities, ψ_{VA} and ψ_I.[5] It is also assumed that the price of I is fixed to the industry.

[4] For a description of CES production functions, see Section 9-4 of P.R.G. Layard and A.A. Walters, *Microeconomic Theory*, McGraw Hill, New York, 1978.

[5] An output elasticity is the percentage change in the use of a production factor brought about by a one-percent increase in production, holding all factor prices fixed. If all output elasticities equal one, the production function is linear homogeneous (constant returns to scale). Output elasticities greater than one correspond to decreasing returns to scale; output elasticities less than one correspond to increasing returns to scale; negative output elasticities correspond to inferior factors.

Figure 1
Factor market in the protected sector



Labor market in the protected sector

= Approx. of increase in labor income in protected sector consequent to a tariff.

If the domestic industry is in competitive equilibrium before the tariff is removed (firms are earning zero economic profits), the average output elasticity must equal one initially,

$$1 = \alpha_{VA}\psi_{VA} + \alpha_I\psi_I \qquad \text{(D3)}$$

where α_{VA} is the share of value added in total cost and α_I is the share of material input costs. That is, in competitive equilibrium, production must be characterized by local constant returns to scale when marginal cost equals average cost for the marginal firm.

Next, write the factor market equilibrium conditions as

$$L_d(\, w,\, r,\, D_d(\, P_d,\, P_mT)) = L_s(\, w) \qquad \text{(D4)}$$

$$K_d(\, w,\, r,\, D_d(\, P_d,\, P_mT)) = K_s(\, r), \qquad \text{(D5)}$$

where L_d and K_d denote the quantities of labor and capital demanded by the industry, r is the rental rate on capital and D_d is the consumer demand for the industry's output, which in turn is a function of the price of domestic output (P_d) and the tariff-ridden price of the competing imports (P_mT); L_s and K_s are the quantities of labor and capital supplied to the industry.

In the market for imports, we have

$$M_d(\, P_d,\, P_mT) = M_s(\, P_m), \qquad \text{(D6)}$$

where M_d is the quantity of imports demanded and M_s is the quantity supplied.

In a short-run period, the industry supply curve is the horizontal sum of existing firms' marginal cost curves. (Over a sufficiently longer period, however, entry by new firms will tend to dissipate any profits, and the supply curve will be horizontal at the minimum average cost.) Thus, price equals marginal cost, which is obtained by differentiating the cost function with respect to quantity, or

$$P_d = w\partial L_d/\partial D + r\partial K_d/\partial D + \partial I_d/\partial D, \tag{D7}$$

where units of I are defined such that the price $P_I = 1$.

Logarithmically differentiating equilibrium conditions (D4), (D5), and (D6) totally with respect to T yields a system of three equations in four variables, $\hat{w}/\hat{T}$, $\hat{r}/\hat{T}$, $\hat{P}_m/\hat{T}$, and $\hat{P}_m/\hat{T}$ and $\hat{P}_d/\hat{T}$.[6] Logarithmically differentiating condition (D7) with respect to T yields the required fourth equation. Since this calculation is somewhat tricky, the procedure is sketched here.

First, note that condition (D7) may be rewritten as

$$P_d D = V_L\psi_{VA} + V_K\psi_{VA} + V_I\psi_I \tag{D7'}$$

Logarithmically differentiating condition (D7') with respect to T yields

$$\hat{P}_d/\hat{T} + \hat{D}/\hat{T} = (\hat{w}/\hat{T} + \hat{L}/\hat{T})\,\phi_L + (\hat{r}/\hat{T} + \hat{K}/\hat{T})\,\phi_K + \hat{I}/\hat{T}\phi_I, \tag{D8}$$

where,

$$\phi_i = (V_i\psi_i)/[(V_L + V_K)\psi_{VA} + V_i\psi_i] \quad i = L,K,I \tag{D9}$$

Note that $\hat{L}/\hat{T}$, $\hat{K}/\hat{T}$, and $\hat{I}/\hat{T}$ may be expanded in terms of $\hat{w}/\hat{T}$, $\hat{r}/\hat{T}$, and $\hat{Q}/\hat{T}$,

$$\hat{L}/\hat{T} = \eta_L\hat{w}/\hat{T} + \eta_{LK}\hat{r}/\hat{T} + \psi_{VA}\hat{D}/\hat{T} \tag{D10}$$

$$\hat{K}/\hat{T} = \eta_{KL}\hat{w}/\hat{T} + \eta_K\hat{r}/\hat{T} + \psi_{VA}\hat{D}/\hat{T} \tag{D11}$$

$$\hat{I}/\hat{T} = \psi_I\hat{D}/\hat{T}, \tag{D12}$$

where the η's are own- or cross-price demand elasticities. (Throughout this appendix, all own-price demand elasticities are negative numbers.)

Finally,

$$\hat{D}/\hat{T} = \eta_d\hat{P}_d/\hat{T} + \eta_{dm}(\hat{P}_m/\hat{T} + 1), \tag{D13}$$

By substituting equation (D13) into equations (D8), (D10), (D11), and (D12), and then equations (D10), (D11), and (D12) into equation (D8), $\hat{P}_d/\hat{T}$ may be expressed in terms of $\hat{w}/\hat{T}$, $\hat{r}/\hat{T}$, and $\hat{P}_m/\hat{T}$, forming the fourth independent equation.

[6] The model is solved using the conventional method of comparative statics that calculates analytically the desired elasticities at the initial equilibrium. The elasticities are then used as log-linear approximations of the rate of change as the policy variable is perturbed. Thus, in equation (D1) the elasticity (log linear slope) $\hat{w}/\hat{T}$ is multiplied by the percentage change in the policy variable, the tariff, t, and scaled by the labor bill. This method generates estimates that differ from true values by an approximation error because the true elasticity deviates from the elasticity at the initial equilibrium as the policy change causes the equilibrium to change. In other words, a point elasticity is used to approximate an arc elasticity. Because some of the policy changes contemplated in this study are proportionally large, we also solved the model by a different method that does not suffer from approximation error. The alternate solution technique requires that all of the structural equations be perfectly satisfied in both the initial and the post-policy change equilibrium. Although more difficult to use, the alternate solution technique was relied on in cases where the relative magnitude of the policy change was judged to be so large as to result in unacceptably large approximation errors. Similarly, in such cases, the downstream factor income analysis presented in the next section was also performed using the same alternate solution technique.

In matrix notation, the four equations may be written,

$$A\,v' = B' \tag{D14}$$

where

$$A = \begin{bmatrix} \eta_L - \epsilon_L & \eta_{LK} & \psi_{VA}\eta_d & \psi_{VA}\eta_{dm} \\ \eta_{KL} & \eta_K - \epsilon_K & \psi_{VA}\eta_d & \psi_{VA}\eta_{dm} \\ \phi_L/\theta(1+\eta_L+\phi_K/\phi_L\eta_{KL}) & \phi_K/\theta(1+\eta_K+\phi_L/\phi_K\eta_{LK}) & -1 & \eta_{dm}/\theta[(\phi_L+\phi_K)\psi_{VA}+\phi_I\psi_I-1] \\ 0 & 0 & \eta_{md} & \eta_m - \epsilon_m \end{bmatrix}$$

$$v = (\hat{w}/\hat{T},\ \hat{r}/\hat{T},\ \hat{P}_d/\hat{T},\ \hat{P}_m/\hat{T})$$

$$B = (-\psi_{VA}\eta_{dm},\ -\psi_{VA}\eta_{dm},\ -\eta_{dm}/\theta[(\phi_L+\phi_K)\psi_{VA}+\phi_I\psi_I-1],\ -\eta_m)$$

$$\theta = 1 - \eta_d\,[(\phi_L+\phi_K)\psi_{VA}+\phi_I\psi_I-1],$$

and where the ϵ's are supply elasticities. The solutions to (D14) yield the values of $\hat{w}/\hat{T}$, $\hat{r}/\hat{T}$, $\hat{P}_d/\hat{T}$, and $\hat{P}_m/\hat{T}$.[7]

Now, using the solution for the wage-tariff elasticity, $\hat{w}/\hat{T}$, the change in labor's income may be evaluated in (D1).

The compensated demand elasticities for K and L required in (D14) may be expressed in terms of cost shares and elasticities of technical substitution,

$$\eta_K = \alpha_L\sigma_{KL} \tag{D16a}$$

$$\eta_{KL} = \alpha_K\sigma_{KL} \tag{D16b}$$

$$\eta_{KL} = \alpha_L\sigma_{KL} \tag{D16c}$$

$$\eta_{LK} = \alpha_K\sigma_{KL} \tag{D16d}$$

where the α's are cost-shares of total value added accounted for by either capital or labor and σ_{KL} is the elasticity of substitution between labor and capital in value added.

Similarly, the uncompensated own-price and cross-price demand elasticities for the domestic and imported product used in (D14) may be expressed in terms of market shares (δ), Armington elasticity of substitution between the domestic and imported product (σ_{dm}), and the elasticity of demand for the composite good comprised of the two products (η)[8],

[7] Alternatively, the elasticities of the domestic and imported product prices may be calculated in terms of the expenditure shares, demand elasticities and the domestic product's supply elasticity. This last parameter is not specified in the problem solved in (D14) because the domestic product supply elasticity is implicit in the fully specified production structure and factor supply functions that underlie the exercise. The implicit supply elasticity, ϵ_d, that is consistent with this underlying structure may be calculated by dividing $\hat{D}/\hat{T}$ evaluated with the solution price-tariff elasticities in (D13) by $\hat{P}_d/\hat{T}$ which is solved in (D14). The solutions for the price tariff elastici ties in terms of ϵ_d are given by,

$$\hat{P}_m/\hat{T} = [\eta_{dm}\eta_{md} - \eta_m(\eta_d - \epsilon_d)]/[(\eta_m - \epsilon_m)(\eta_d - \epsilon_d) - \eta_{dm}\eta_{md}] \tag{D15a}$$

$$\hat{P}_d/\hat{T} = (\eta_{dm}\epsilon_m)/[(\eta_m - \epsilon_m)(\eta_d - \epsilon_d) - \eta_{dm}\eta_{md}] \tag{D15b}$$

[8] The Armington elasticity describes the degree of substitutability between these two good in domestic demand. For an introduction to this concept, see Section 7.2 of K. Dervis, J. de Melo, and S. Robinson, General Equilibrium Models for Development Policy, Cambridge University Press, Cambridge, 1982.

$$\eta_d = \delta_d \eta - \delta_m \sigma_{dm} \quad \text{(D17a)}$$

$$\eta_m = \delta_m \eta - \delta_d \sigma_{dm} \quad \text{(D17b)}$$

$$\eta_{dm} = \delta_m (\sigma_{dm} + \eta) \quad \text{(D17c)}$$

$$\eta_{md} = \delta_d (\sigma_{dm} + \eta) \quad \text{(D17d)}$$

The analysis has been presented in terms of removing a tariff. To apply the analysis to estimate the effects of removing a quota, replace T with one plus the tariff-equivalent of the quota.

In summary, the parameters required to estimate the effect of a quota on the income of capital and labor are cost and expenditure shares, the composite demand elasticity, the elasticities of substitution between the imported and domestic products and between capital and labor, the imported product and factor supply elasticities, the total wage (or capital rental payments) bill, and the equivalent tariff rate for the quota.

Welfare Analysis

Relaxing import restraints has several effects on U.S. national welfare. In this section, those effects are identified and analyzed. The analysis is for a quota when the quota rents accrue to exporters. It is assumed that in the absence of the quota, the U.S. Government would increase subsidies to producers of the import-competing product so as to maintain the initial price.

Figure D-2, panel A depicts the import market. With the quota in place at quantity M^*, U.S. consumers pay the price TP^0_m, the world price is P^0_m, and foreign exporters receive the difference between the U.S. and world price in the form of rents equal to areas B and C. When the quota is removed, U.S. residents pay a lower price for the import (P^1_m), and thus reduce expenditure on the initial quantity of imports by area B. In addition, U.S. residents increase purchases of imports and receive additional consumers' surplus of area A. Thus, in the import market, national welfare increases by the sum of areas A and B.

Panel B illustrates the domestic product market. In that market, the subsidy must rise to maintain the support price (P^s_d) when the quota is eliminated. Eliminating the quota causes consumption of the domestic product to fall from D_0 to D_1. Welfare increases by the amount of reduction in subsidy paid to producers (trapezoid E plus triangle F). The additional subsidy needed to maintain the support price results in a welfare loss that is the sum of areas E, F, and G. Thus, the net cost incurred in the domestic product market consequent to removing the quota while maintaining the price with a subsidy is area G.[9]

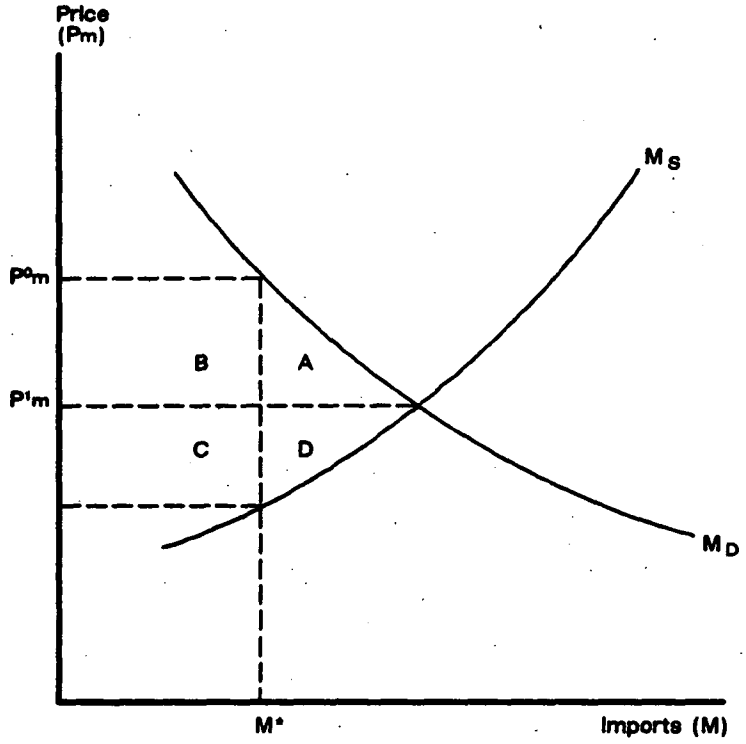
The full national welfare effect of eliminating the quota is thus the sum of areas A and B in panel A less area G in panel B.

The geometry of figure D-2 may be translated into algebraic expressions. Area A, for instance, is approximated by a triangle with a base of $(\hat{P}_m/\hat{T}+1)\hat{T}\eta_m Q_m$, and a height of $-(\hat{P}_m/\hat{T}+1)\hat{T}\hat{P}_m$ where $\hat{T}$ is negative because a quota with tariff equivalent t is being removed. Therefore, area A is approximated as,

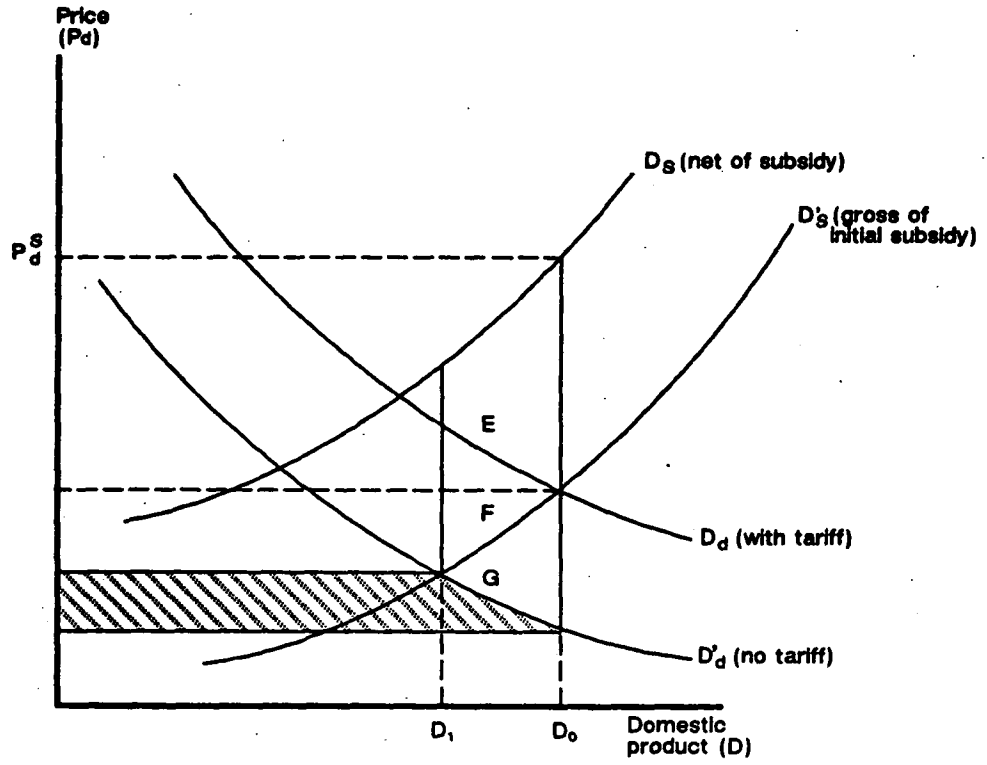
$$\text{Area A} = -[(\hat{P}_m/\hat{T}+1)^2\hat{T}^2\eta_m V_m]/2, \quad \text{(D18)}$$

[9] The cost of the increased subsidy in the import-competing product market, area G, understates the true social cost to the extent that the tax used to generate the revenue needed to pay the additional subsidy results in less efficient allocations of resources and goods. The efficiency of U.S. Federal taxes varies substantially among the various tax instruments. Even if it is assumed that the revenue would come at the expense of other government spending rather than from new tax revenue, a similar cost arises provided each additional dollar of government expenditure generates social benefits that exceed a dollar. The benefits of additional government expenditure would have to exceed the actual expenditure in order to justify the efficiency costs of the required taxes. For a discussion of this issue, see E. K. Browning, "On the Marginal Welfare Cost of Taxation," *American Economic Review*, March 1987, pp. 11-23.

Figure 2
Welfare analysis



Panel A: Import market



Panel B: Import—Competing domestic product market

where V_m is the initial expenditure on the imported product, and $\hat{P}_m/\hat{T}$ is obtained from the solution to equation (D14) or (D15a).

Similarly, area B is a rectangle with height $-(\hat{P}_m/\hat{T}+1)\hat{T}P_m$ and base Q_m. Thus,

$$\text{Area B} = -(\hat{P}_m/\hat{T}+1)\hat{T}V_m \qquad \text{(D19)}$$

Finally, area G may be approximated by a triangle with height $[\hat{P}_d/\hat{T}]_0\hat{T}P_d$, and base $[\hat{P}_d/\hat{T}]_1\hat{T}\epsilon_d Q_d$, where $[\hat{P}_d/\hat{T}]_0$ is the solution to equation (D15b) under the assumption that the domestic product's supply elasticity, ϵ_d, is zero, because the target price is maintained; and $[\hat{P}_d/\hat{T}]_0$ is the solution to the same equation under the assumption that the target price is not maintained and the full domestic supply response occurs.[10] Accordingly, area G may be estimated by calculating,

$$\text{Area G} = \{[\hat{P}_d/\hat{T}]_0[\hat{P}_d/\hat{T}]_1\hat{T}^2\epsilon_d V_d\}/2 \qquad \text{(D20)}$$

The total effect on national welfare of eliminating a quota is given by

$$\Delta \text{ Welfare} \approx \text{Area A} + \text{Area B} - \text{Area G}. \qquad \text{(D21)}$$

Note that the total gain to domestic consumers of removing a quota equals the sum of areas A and B in Panel A plus the shaded area in Panel B. The consumer gains depicted in Panel B, however, come at the expense of U.S. taxpayers who must finance increased Government subsidies, and thus do not represent a change in net national welfare. Total consumer gains are calculated and reported for each product, and are comparable conceptually to consumer gains reported in previous studies that have generally treated the competing domestic product as homogeneous with the imported product.

The Downstream Markets

This section presents an analytical framework for assessing the effect that removing a quota has on the income of capital and labor employed in industries that are downstream from the protected market.

Removing the quota causes prices of the import and competing domestic good to decline, so downstream industries will face a lower price for these intermediate inputs. The price reductions should lead to increases in production and sales of downstream products, and in the demand for labor and capital in these industries (L_n and K_n). If L_n and K_n are not perfectly mobile among industries, or if the downstream industry is large enough to affect prices in the markets for these factors, their price will be bid up[11] and they will receive higher income.

In Figure D-3, removing the quota causes demand for labor in a downstream industry to shift from L_D to L_D'. Employment in the industry increases along the labor supply curve (L_{sn}) from L_{n0} to L_{n1} and the wage rises from w_{n0} to w_{n1}. The shaded rectangle approximates the income gain to workers in the industry. The equation for the rectangle is

$$\Delta V_{LN} \approx (\hat{w}_n/\hat{T})V_{LN}\hat{T}, \qquad \text{(D22)}$$

where w_n is the wage rate of labor in the downstream industry, V_{LN} is the total labor-wage bill in the downstream industry ($= w_nL_n$), and $\hat{T}$ equals $-t/(1+t)$.[12] Production in the downstream industry uses both primary factors and intermediate inputs, I. Intermediate inputs include both a composite product, I_u, comprised of the restrained upstream import (I_{um}) and its U.S. import-competing substitute (I_{ud}) and a composite product (I_a) comprised of all other intermediate inputs.

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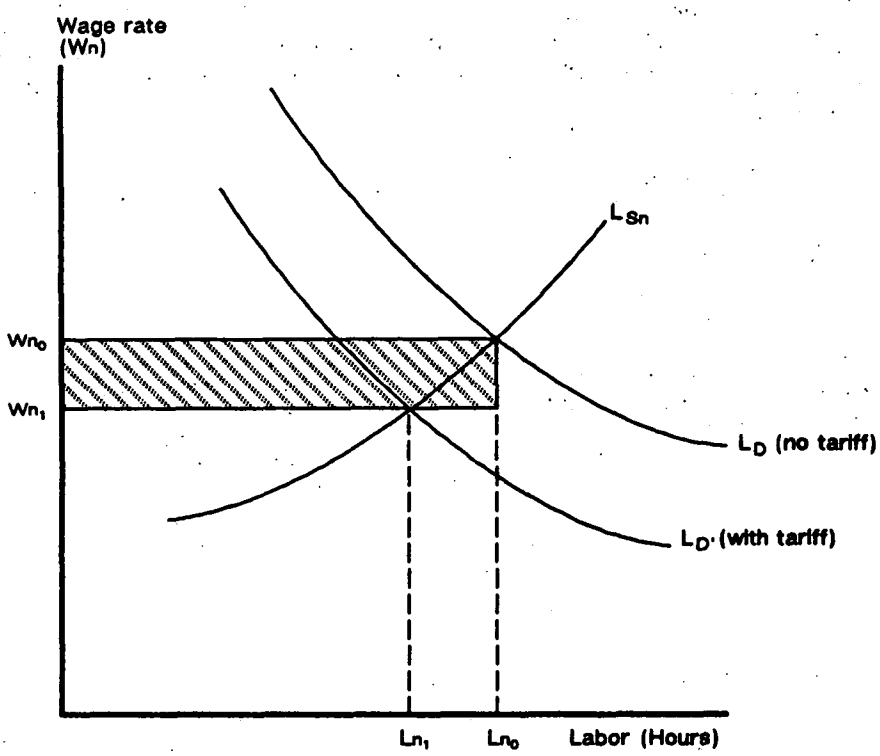
[10] For a discussion of , ϵ_d, see note 6, above.

[11] Generally, industry-specificity of production factors is greater the shorter the adjustment period.

[12] The analysis of the effects of an upstream tariff on income to capital employed by a downstream industry is entirely analogous.

Figure 3
Downstream factor market



Labor market in the downstream industry

= Approx. of decrease in labor income in the downstream industry consequent to a tariff.

The production function for the downstream product is given by

$$Q_n = f(\, VA(\, K_n,\, L_n),\, I(\, I_u(\, I_{ud},\, I_{um}),\, I_a)) = \min \{\, VA^{1/\mu_{VA}},\, I^{1/\mu_I} \}, \qquad \text{(D23)}$$

which assumes that value added (VA) and intermediate inputs (I) are used in fixed proportions. Output Q_n, however, is not necessarily linear homogeneous in VA and I; scale returns depend on the output elasticities, μ_{VA} and μ_I, and the cost shares.

Value added is assumed to be both linear homogeneous and CES in K_n and L_n with an elasticity of substitution of σ_{KnLn}. The upstream intermediate input, I_u, is both linear homogeneous and CES in I_{ud} and I_{um}. The composite intermediate input, I, however, is composed of I_u and I_a in fixed proportions,

$$I = g(\, I_u,\, I_a) = \min \{\, I_u^{1/\mu_{Iu}},\, I_a^{1/\mu_{Ia}} \}. \qquad \text{(D24)}$$

The total output elasticities for I_u and I_a in Q_n are given by

$$\mu_u = \mu_I \mu_{Iu}\,, \text{ and} \qquad \text{(D25a)}$$

$$\mu_a = \mu_I \mu_{Ia}\,. \qquad \text{(D25b)}$$

Assuming the downstream industry begins in competitive equilibrium, the cost-share weighted average of output elasticities must equal one, or

$$1 = (\alpha_{Ln} + \alpha_{Kn})\mu_{VAn} + (\alpha_{dn} + \alpha_{mn})\mu_u + \alpha_{an}\,\mu_a. \qquad \text{(D26)}$$

Furthermore, as in the case of the upstream market, downstream firms charge marginal cost. Finally, the period considered is one that is too short for entry or exit to dissipate economic profits resulting from the upstream shock. Thus, the industry as a whole may be out of competitive equilibrium during this period. The markets to be examined include the capital and labor markets in the downstream industry, the downstream product markets, and the markets for both the upstream import and competing domestic products.

Equilibria in the downstream factor markets require equality of demand and supply for each factor, or

$$D_{Ln}(w_n, r_n, Q_n) = S_{Ln}(W_n), \text{ and} \tag{D27a}$$

$$D_{Kn}(w_n, r_n, Q_n) = S_{Kn}(r_n). \tag{D27b}$$

Demands for labor and capital in the downstream industry (D_{Ln} and D_{Kn}) depend on the wage rate (w_n), the user cost of capital (r_n) (assumed equal to the return to capital), and the quantity of the downstream product produced in equilibrium (Q_n). Intermediate input prices do not affect these demands because those inputs are used in fixed proportions. Supplies of each factor (S_{Ln} and S_{Kn}) depend only on own prices.

Logarithmic differentiation of conditions (D27a) and (D27b) yields,

$$\eta_L \hat{w}_n/\hat{T} + \hat{\eta}_{LK} \hat{r}_n/\hat{T} + \mu_{VA} \hat{Q}/\hat{T} = \epsilon_L \hat{w}_n/\hat{T}, \text{ and} \tag{D28a}$$

$$\eta_{KL} \hat{w}_n/\hat{T} + \eta_K \hat{r}_n/\hat{T} + \mu_{VA} \hat{Q}/\hat{T} = \epsilon_K \hat{r}_n/\hat{T}. \tag{D28b}$$

Note that the factor demand elasticities are income compensated, so

$$\eta_L = -\alpha_{Kn}/(\alpha_{Ln} + \alpha_{Kn})\sigma_{KnLn}, \tag{D29a}$$

$$\eta_{Kn} = -\alpha_{Ln}/(\alpha_{Ln} + \alpha_{Kn})\sigma_{KnLn}, \tag{D29b}$$

$$\eta_{LKn} = \alpha_{Kn}/(\alpha_{Ln} + \alpha_{Kn})\sigma_{KnLn}, \text{ and} \tag{D29c}$$

$$\eta_{KLn} = \alpha_{Ln}/(\alpha_{Ln} + \alpha_{Kn})\sigma_{KnLn}, \tag{D29d}$$

where the α's are cost shares.

To solve simultaneously equations (D28a) and (D28b), we need an expression for $\hat{Q}/\hat{T}$. This expression is obtained by differentiating the pricing condition that characterizes the output market equilibrium, which yields

$$MC(w_n, r_n, P_m T, P_d, Q_n) = P_n(Q_n), \tag{D30}$$

where MC is the marginal cost function and $P_n(Q_n)$ is the downstream product's inverse demand function. Recalling that the downstream industry is in competitive equilibrium initially so that price equals average cost, total differentiation of (D30) yields

$$\hat{Q}_n/\hat{T} = \beta \{\mu_{VAn}(\alpha_{Ln} \hat{w}_n/\hat{T} + \alpha_{Kn} \hat{r}_n/\hat{T}) + \mu_u [\alpha_{dn} \hat{P}_d/\hat{T} + \alpha_{mn} (\hat{P}_m/\hat{T} + 1)]\}, \tag{D31}$$

where

$$\beta = (\eta_n \epsilon_n)/(\epsilon_n - \eta_n). \tag{D32}$$

In definition (D32), ϵ_n is the elasticity of output (Q_n) with respect to marginal cost holding factor prices fixed and η_n is the own-price elasticity of demand for the

downstream U.S. product. The output–marginal cost elasticity ϵ_n) is implicit in the production structure specified by equation (D23) and may be found by twice logarithmically differentiating the cost function, recalling that the various output elasticities are assumed to be invariant with respect to scale. Doing so yields,

$$\epsilon_n = A/B, \tag{D33}$$

where

$$A = (\alpha_{Ln} + \alpha_{Kn})\ \mu_{VAn} + (\alpha_{dn} + \alpha_{mn})\ \mu_u + \alpha_{an}\ \mu_a, \text{ and} \tag{D34a}$$

$$B = (\alpha_{Ln} + \alpha_{Kn})\ \mu_{VAn}\ (\mu_{VAn} - 1)$$

$$+ (\alpha_{dn} + \alpha_{mn})\ \mu_u(\mu_u - 1) + \alpha_{an}\ \mu_a\ (\mu_a - 1) \tag{D34b}$$

Note from equation (D26) that A equals one.

Now, inserting equation (D31) into equations (D28a) and (D28b) yields the desired system of simultaneous equations

$$\begin{bmatrix} \eta_{Ln} - \epsilon_L + \mu^2_{VA}\beta\alpha_{Ln} & \eta_{LKn} + \mu^2_{VA}\beta\alpha_{Kn} \\ \eta_{LKn} + \mu^2_{VA}\beta\alpha_{Ln} & \eta_{Kn} - \epsilon_K + \mu^2_{VA}\beta\alpha_{Kn} \end{bmatrix} \begin{bmatrix} \hat{w}_n/\hat{T} \\ \hat{r}_n/\hat{T} \end{bmatrix}$$

$$= -\ \beta\mu_{VAn}\,\mu_u\ [\alpha_{dn}\hat{P}_d/\hat{T} + \alpha_{mn}(\hat{P}_m/\hat{T} + 1)] \begin{bmatrix} 1 \\ 1 \end{bmatrix} \tag{D35}$$

where $\hat{P}_m/\hat{T}$ and $\hat{P}_d/\hat{T}$ are solved in equation (D14), or in equations (D15a) and (D15b).

The solutions to equation (D35) may then be used in equation (D22) to estimate the effect of changes in upstream protection on incomes of capital and labor in downstream industries.

APPENDIX E
DATA AND PARAMETERS

This appendix describes the data and parameters needed for the analysis outlined in appendix D

Input-Output Data

The analysis of agricultural import restraints outlined in appendix D requires a number of values calculated from input-output tables.[1] These values are taken from the 1982 IMPLAN Input-Output Tables of the U.S. Forestry Service. This section describes these tables and values derived from them.

The first step is to concord the product categories being examined to the Bureau of Economic Analysis (BEA) input-output sectors. In most cases, the categories being examined are Harmonized Tariff System (HTS) lines. These HTS lines are mapped into Standard Industrial Classification (SIC) sectors and from there to the BEA input-output sectors. In other cases (certain sugar products), the products are SIC sectors, and only a single mapping from SIC to BEA sectors is necessary. The results of these mappings are presented in table E-1.

Table E-1

Concordance to input-output sectors

HTS Line	*SIC sector*	*BEA Input-output sector*
0201, Fresh, chilled beef and veal	2011, Meat packing plants	140101, Meat packing plants
0202, Frozen beef and veal	2011, Meat packing plants	140101, Meat packing plants
0204, Mutton	2011, Meat packing plants	140101, Meat packing plants
0401, Milk and cream, not conc	2026, Fluid milk	140600, Fluid milk
0402, Milk and cream, conc	2023, Dry, cond. and evap. milk	140400, Cond. and evap. milk
040310, Yogurt	2026, Fluid milk	140600, Fluid milk
04039010, Sour cream	2026, Fluid milk	140600, Fluid milk
804039015, Sour cream	2026, Fluid milk	140600, Fluid milk
04039020, Buttermilk	2026, Fluid milk	140600, Fluid milk
04039040, Dried sour cream	2023, Dry, cond. and evap. milk	140400, Cond. and evap. milk
04039050, Dried sour cream	2023, Dry, cond. and evap. milk	140400, Cond. and evap. milk
04039060, Dried sour cream	2023, Dry, cond. and evap. milk	140400, Cond. and evap. milk
04039070, Sour cream	2026, Fluid milk	140600, Fluid milk
04041020, Fluid whey	2022, Cheese	140300, Cheese
04041040, Dried whey	2023, Dry, cond. and evap. milk	140400, Cond. and evap. milk
040490, Other milk constituents	2023, Dry, cond. and evap. milk	140400, Cond. and evap. milk
0405, Butter, other fats and oils	2021, Creamery butter	140200, Creamery butter
0406, Cheese and curd	2022, Cheese	140300, Cheese
1202, Peanuts, not roasted	0139, Field crops, n.e.c	020600, Oil bearing crops
17011100, Cane sugar	2061, Cane sugar, except refining	141900, Sugar
17011100, Cane sugar	2062, Cane sugar refining	141900, Sugar
17011200, Beat sugar	2063, Beet sugar	141900, Sugar
12129100, Beat sugar	0133, Sugarcane and sugar beets	020502, Sugar crops
12129200, Cane sugar	0133, Sugarcane and sugar beets	020502, Sugar crops
17026020, Fructose syrup	2046, Wet corn milling	141700, Wet corn milling
20081100, Peanut butter	2099, Food preparations, n.e.c	143200, Food preparations, n.e.c.
5201, Cotton, not carded or combed	0131, Cotton	020100, Cotton
5202, Cotton card strips	2299, Textile goods, n.e.c	171002, Textile goods, n.e.c.
5203, Cotton, carded and combed	2299, Textile goods, n.e.c	171002, Textile goods, n.e.c.

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

[1] The reader unfamiliar with input-output economics can consult C.S. Yan, *Introduction to Input Output Economics*, Holt, Rinehart and Winston, New York, 1969.

To calculate downstream effects, it is necessary to identify the important downstream users. This is done employing a "use matrix," which gives the inputs of commodities into industrial production.[2] First, the domestic use matrix is transformed from value terms into input-output coefficients. These coefficients give the value of inputs of a given commodity into a dollar's worth of output of a given industry. Second, the coefficients are adjusted to account for differences in industry inflation rates between 1982 and 1987 using IMPLAN price indices.

Important downstream users are sectors with a significant amount of their total costs attributable to protected upstream industries. A "significant" downstream connection is defined as one where the protected industry accounts for at least 5 percent of the total cost to the downstream user. The significant downstream users are presented in table E-2. A problem arises with the case of Bottled and Canned Soft Drinks. The input-output data show this downstream user having a coefficient of 0.06 for sugar inputs and 0.02 for wet corn milling inputs (corn syrup). In fact, the production process of the soft drinks industry has changed so that it exclusively uses corn syrup. For this reason, we set the coefficient for corn syrup inputs into soft drink production to 0.02 + 0.06 = 0.08 and the coefficient for sugar inputs into soft drink production to 0.00.

Table E-2
Important downstream users of protected sectors' output

BEA Supplier	*BEA downstream user*	*Input Coefficient*[1]
140101, Meat packing plants	140102, Sausages and other prepared meats	0.48
	141302, Frozen specialties	0.06
	740000, Eating and drinking places	0.05
140600, Fluid milk	140200, Creamery butter	0.57
	140500, Ice cream and frozen desserts	0.14
	140400, Cond. and evap. milk	0.07
	140300, Cheese, natural and proc	0.06
140400, Cond. and evap. milk	140500, Ice cream and frozen desserts	0.11
	142002, Chocolate and cocoa products	0.05
140300, Cheese	(2)	(2)
140200, Creamery butter	(2)	(2)
020600, Oil bearing crops	142600, Vegetable oil mills, n.e.c	0.82
	142001, Confectionery products	0.20
	143200, Food preparations, n.e.c	0.09
141900, Sugar	142002, Chocolate and cocoa products	0.06
	142300, Flavoring extracts and syrups, n.e.c	0.15
	141403, Blended and prepared flour	0.06
020502, Sugar crops	141900, Sugar	0.29
141700, Wet corn milling	142200, Bottled and canned soft drinks	[3]0.08
	142300, Flavoring extracts and syrups, n.e.c	0.07
143200, Food preparations, n.e.c	(2)	(2)
020100, Cotton	160100, Broadwoven fabric mills and finishing	0.07
	160300, Yarn mills and finishing of textiles, n.e.c	0.08
	142400, Cottonseed oil mills	0.37
	160400, Thread mills	0.05
171002, Textile goods, n.e.c	170200, Felt goods, n.e.c	0.05

[1] This coefficient represents the dollar value of the input per dollar output of the downstream user.
[2] Not applicable.
[3] See text for discussion of this coefficient.

Source: Calculated by the staff of the U.S. International Trade Commission from U.S. Forestry Service data.

The methodology given in appendix D also requires information on the cost shares of labor, capital, and intermediate goods in the protected meat processing sector and in all downstream sectors. These shares are calculated from the IMPLAN commodity output and value added data for the BEA input-output sectors given in table E-1. The resulting shares are presented in table E-3.

[2] The use matrix is the sum of the IMPLAN domestic use matrix and import use matrix.

Table E-3
Shares of labor, capital, and intermediate goods in production

BEA No.	Description	Shares		
		Labor	Capital	Interm. Goods
140101	Meat packing plants	0.090	0.015	0.896
140102	Sausages and other prepared meats	0.130	0.068	0.802
140200	Creamery butter	0.037	0.010	0.953
140300	Cheese	0.062	0.037	0.900
140400	Condensed and evaporated milk	0.082	0.112	0.805
140500	Ice cream and frozen desserts	0.184	0.079	0.737
141302	Frozen specialties	0.159	0.096	0.745
141403	Blended and prepared flour	0.143	0.110	0.747
141900	Sugar	0.094	0.057	0.849
142001	Confectionery products	0.197	0.133	0.670
142002	Chocolate and cocoa products	0.122	0.187	0.692
142200	Bottled and canned soft drinks	0.189	0.076	0.735
142300	Flavoring extracts and syrups, n.e.c	0.147	0.295	0.558
142400	Cottonseed oil mills	0.119	0.136	0.744
142600	Vegetable oil mills, n.e.c	0.079	0.018	0.903
143200	Food preparations, n.e.c	0.188	0.199	0.612
160100	Broadwoven fabric mills and finishing	0.206	0.054	0.740
160300	Yarn mills, finish. of text., n.e.c	0.215	0.064	0.721
160400	Thread mills	0.211	0.049	0.740
170200	Felt goods, n.e.c	0.414	0.121	0.465
74000	Eating and drinking places	0.290	0.157	0.553

Source: Calculated by the staff of the U.S. International Trade Commission using IMPLAN Input-Output Tables from the U.S. Forestry Service.

Tariff Equivalents

The analysis of appendix D requires the tariff equivalent of the subject agricultural import restraint. These equivalent are taken from a recent, ITC report on tariffication of agricultural import restraints that was prepared for the U.S. Trade Representative.[3]

Elasticities of Substitution

Two types of elasticities of substitution are required. The first of these is the Armington elasticity of substitution between imports and the domestic competing good.[4] These were taken from the literature and are presented in table E-4.

Table E-4
Armington elasticities

Item	Elasticity	Source
Meat	0.5	Hertel et al. (1989)
	1.7	Hanson et al. (1989)
Sugar	large	Hertel et al. (1989)[1]
	5.0	Hanson et al. (1989)
Dairy	large	Hertel et al. (1989)[1]
	1.7	Hanson et al. (1989)
Cotton	4.0	Hertel et al. (1989)
	4.0	Hanson et al. (1989)
Peanuts	4.0	Hertel et al. (1989)
	3.0	Hanson et al. (1989)

[1] These authors calibrated Armington elasticities for sugar and dairy in a computable general equilibrium model so that the model generated a "plausible" influx of imports when the quotas were removed. "Plausible" was defined as that obtained using USDA's SWOPSIM model.

Sources: K. Hanson, S. Robinson, and S. Tokarick, "United States Adjustment in the 1990s: A CGE Analysis of Alternative Trade Strategies," Working Paper No. 510, Department of Agricultural and Resource Economics, University of California, August 1989; T.W. Hertel, R.L. Thompson, and M.E. Tsigas, "Economywide Effects of Unilateral Trade and Policy Liberalization in U.S. Agriculture," in A.B. Stoeckel, D. Vincent, and S. Cuthbertson (eds.), *Macroeconomic Consequences of Farm Support Policies*, Duke University Press, Durham, 1989.

[3] *Estimated Equivalents of U.S. Quotas on Agricultural Imports and Analysis of Competitive Conditions in U.S. Foreign Markets for Sugar, Meat, Peanuts, Cotton, and Dairy Products*, USITC Publication No. 2276, February 1990.

[4] The Armington elasticity describes the degree of substitutability between these two good in domestic demand. For an introduction to this concept, see Section 7.2 of K. Dervis, J. de Melo, and S. Robinson, *General Equilibrium Models for Development Policy* (Cambridge: Cambridge University Press, 1982).

The second type of elasticity of substitution is the elasticity of substitution between labor and capital in the value added production function. These are taken from a survey by Caddy.[5] These estimates are given in table E-5.

Table E-5

Central tendency for estimates of elasticity of substitution between labor and capital, by sector

Sector	*Estimate*
Agriculture, forestry, fisheries	0.676
Food and tobacco	0.712
Textiles, apparel, and leather	0.903
Paper and printing	0.903
Petroleum refining	0.783
Chemicals, rubber, and plastics	0.960
Lumber, furniture, stone, clay, and glass	0.912
Metals, machinery, instruments, and miscellaneous manufacturing	0.737
Transport equipment and ordnance	0.816

Source: V. Caddy, "Empirical Estimation of the Elasticity of Substitution: A Review," Working Papers OP-09, IMPACT Project, Industrial Assistance Commission, Melbourne Australia, 1976.

Supply Elasticities

Three kinds of supply elasticities are required. The first of these is the elasticity of import supply. Estimates were taken from the literature and are presented in table E-6.

Table E-6

Import supply elasticities

Item	*Elasticity*	*Time period*	*Source*
All imports	10.0	Long run	Haynes and Stone (1983)
Meat	10.0	1 year	Tyers and Anderson (1989)
	15.0	> 1 year	Tyers and Anderson (1989)
Beef	5.0		Martin (1982)
Sugar	6.5	1 year	Tyers and Anderson (1989)
	9.0-12.0	> 1 year	Tyers and Anderson (1989)
	2.4		Hammig et al. (1982)
Dairy	3.7	Long run	Lattimore et al. (1987)

Sources: M. Hammig et al., "The Effects of Shifts in Supply on the World Sugar Market," *Agricultural Economic Research*, vol. 34, 1982, pp. 12-18; S.E. Haynes and J.A. Stone, "Specification of Supply Behavior in International Trade," *Review of Economics and Statistics*, vol. 65, November 1983, pp. 626-632; R. Lattimore, J. Robertson, and G. Griffiths," Domestic Dairy Policies and International Market Adjustment," unpublished USDA Cooperative Agreement 58-3J22-5-00202 Project Report, September 1987; W.J. Martin, "U.S. Agricultural Policy and the Demand for Imported Beef," unpublished Ph.D. Dissertation, Iowa State University, 1982; R. Tyers and K. Anderson, "Price Elasticities in International Food Trade: Synthetic Estimates From a Global Model," *Journal of Policy Modelling*, vol. 11, Fall 1989, pp. 315-344.

The second type of supply elasticity required is for U.S. supply. Estimates were taken from the literature and are presented in table E-7.

[5] V. Caddy, "Empirical Estimation of the Elasticity of Substitution: A Review," Working Papers OP-09, IMPACT Project, (Melbourne Australia: Industrial Assistance Commission, 1976).

Table E-7
Domestic supply elasticities

Item	*Elasticity*	*Time period*	*Source*
Meat:			
Beef, Veal	0.65	3-5 years	Gardiner et al. (1989)
Pork	1.00	3-5 years	Gardiner et al. (1989)
Mutton, Lamb	0.80	3-5 years	Gardiner et al. (1989)
Sugar	0.50	3-5 years	Gardiner et al. (1989)
	2.00		Leu et al. (1987)
Dairy:			
Milk	0.50	3-5 years	Gardiner et al. (1989)
Butter	0.50	3-5 years	Gardiner et al. (1989)
Cheese	0.64	3-5 years	Gardiner et al. (1989)
Other	0.48	3-5 years	Gardiner et al. (1989)
Cotton	0.74	3-5 years	Gardiner et al. (1989)
Peanuts	0.55	3-5 years	Gardiner et al. (1989)

Sources: W.H. Gardiner, V.O. Roningen, and K. Liu, *Elasticities in the Trade Liberalization Database*, U.S. Department of Agriculture, Economic Research Service, May 1989; G.J. M. Leu, A. Schmitz, and R.D. Knutson, "Gains and Losses of Sugar Program Policy Options," *American Journal of Agricultural Economics*, vol. 69, August 1987, pp. 591-602.

Demand Elasticities

The analysis requires estimates of the own-price elasticity of demand for the composite good made up of the import and the domestic substitute. Such estimates and their sources are presented in table E-8.

Table E-8
Demand elasticities

Item	Elasticity	Time period	Source
Food	-0.56		Maki (1988)
	-0.32		Blanc. and Green (1983)
	-0.58	Long run	Theil and Clements (1978)
Meat	-0.65		Green and Alston (1989)
	-0.51	Cross section	Helen and Wessells (1988)
Beef, Veal	-0.70	3-5 years	Gardiner et al. (1989)
	-0.62	1 year	Huang (1985)
	-0.58	1 year	Hahn (1988)
Pork	-0.86	3-5 years	Gardiner et al. (1989)
	-0.78	1 year	Hahn (1988)
Mutton, Lamb	-0.70	3-5 years	Gardiner et al. (1989)
Sugar	-0.23	3-5 years	Gardiner et al. (1989)
	-0.05	1 year	Huang (1985)
	-0.10	1 year	Lopez (1989)
Dairy:			
Milk	-0.20 to -0.30	3-5 years	Gardiner et al. (1989)
	-0.63	Cross section	Hein and Wessells (1988)
Fluid	-0.26	1 year	Huang (1985)
Evap	-0.83	1 year	Huang (1985)
Butter	-0.56 to -0.70	3-5 years	Gardiner et al. (1989)
	-0.17	1 year	Huang (1985)
	-0.73	Cross section	Helen and Wessells (1988)
Cheese	-0.50 to -0.60	3-5 years	Gardiner et al. (1989)
	-0.33	1 year	Huang (1985)
	-0.52	Cross section	Helen and Wessells (1988)
Other	-0.75	3-5 years	Gardiner et al. (1989)
Frozen	-0.12	1 year	Huang (1985)
Cotton	-0.56	3-5 years	Gardiner et al. (1989)
Peanuts	-0.74	3-5 years	Gardiner et al. (1989)
	[1]-0.12	1 year	Huang (1985)
	-0.20	1 year	Schaub (1987)
	-0.14	1 year	Rucker and Thurman (1989)

[1] Dried beans, peas, and nuts.

Sources: L. Blanciforti and R. Green, "An Almost Ideal Demand System Incorporating Habits," *Review of Economic Studies*, vol. 65, August 1983, pp. 511-515; W.H. Gardiner, V.O. Roningen, and K. Liu, *Elasticities in the Trade Liberalization Database*, U.S. Department of Agriculture, Economic Research Service, May 1989; R. Green and J. Alston, "Elasticities in AIDs Models," unpublished paper, University of California, Davis, January 1989; W.F. Hahn, "Effects of Income Distribution on Meat Demand," *Journal of Agricultural Economic Research*, vol. 40, Spring 1988, pp. 19-24; Helen, D.M. and C.R. Wessels, "The Demand for Dairy Products: Structure, Prediction, and Decomposition," *American Journal of Agricultural Economics*, vol. 70, May 1988, pp. 219-220; K.S. Huang, *U.S. Demand for Food: A Complete System of Price and Income Effects*, USDA ERS, Technical Bulletin No. 1714, 1985; R. Lopez, "Political Economy of U.S. Sugar Policy," *American Journal of Agricultural Economics*, 71, 1989, 20-31; A. Maki, "The Estimation of a Complete Demand System Using the Marginal Rates of Substitution," *The Economic Studies Quarterly*, vol. 39, March 1988, pp. 64-76; R.R. Rucker and W.N. Thurman, "The Economic Effects of Supply Controls: The Simple Analytics of the U.S. Peanut Program," North Carolina State University, May 1989; J.D. Schaub, "Peanut Demand Estimates and Consumers' Cost of the Peanut Program," paper presented at the annual meeting of the American Peanut Research and Education Society, Orlando, Florida, July 14-17, 1987; H. Theil and K.W. Clements, "A Differential Approach to U.S. Import Demand," *Economics Letters*, vol. 1, 1978, pp. 249-254.