Services Liberalization and Computable General Equilibrium Modeling: Beyond Tariff Equivalents

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Abstract

The services sector is the next frontier in trade liberalization, and progress in this area is likely to bring enormous economic gain to developed and developing economies. A major impediment to services trade liberalization, however, is the lack of rigorous analytical work on its potential impact. Our aim in this paper is to propel the policy relevant research forward. Restrictions on services trade are far more complex than those on goods. While goods trade liberalization is relatively straightforward to model and its implications are fairly well understood, the same is not true for services. Services trade policy is often opaque and does not fit easily into computational models. Our survey of the current literature reveals a set of stylized facts that we hope will be useful in this area of computable general equilibrium modeling research: (1) barriers to trade in services are complex and heterogeneous across sectors; (2) services have significant effects on downstream industries; (3) market structure assumptions are crucial; (4) foreign presence is often necessary for services trade; and (5) many barriers are entry or fixed cost barriers that restrict foreign and domestic new entrants.

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Introduction

Liberalizing trade in services is important for economic growth both in the United States and abroad. As an economy develops, services tend to increase as a share of gross domestic product (GDP) and as a share of trade. Like many advanced industrialized economies, the United States has a global competitive advantage in services and can benefit from services liberalization abroad by gaining access to markets and increasing foreign market share. But the largest gains may be realized by developing countries, in which trade liberalization in services can bring transformative change to the broader economy, increasing productivity at the firm, industry, and economy-wide level.

Despite the immense potential benefits from services liberalization, services remain highly protected in most countries. One impediment to liberalization has been the difficulty in assessing the effects of services liberalization, both qualitatively and quantitatively. Recent efforts to pursue liberalization have spawned a number of studies on the economic effects of such reforms. In this article, we explore recent empirical evidence of services liberalization efforts and economic effects. We aim to translate key findings into useful stylized facts for computable general equilibrium (CGE) modeling efforts in this area.

Services, which include sectors such as telecommunications, express delivery, transportation and storage, and financial and business services, generate 68 percent of world GDP but account for just under 20 percent of world trade. Not all services are easily traded, and perhaps we should not expect the share of services of trade to match its share of GDP. Still, technological advances in information communication technology have allowed an increasing number of services to be delivered internationally. Over the past decade, international trade in services has grown 8 percent, outpacing world GDP growth of 5 percent.[2]

Not only do services sectors represent the majority of GDP value-added in most economies today, they are crucial inputs throughout the economy. Information communication and telecommunications play a vital role in diffusing knowledge and digitizing products. Transport services drive the cost of shipping goods and facilitate the movement of workers. Business and professional services such as accounting, engineering, financial, and consulting and legal services can reduce transaction costs and foster business process innovations. Retail and wholesale distribution services link producers and consumers within and across countries.

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[2] Data from World Bank Development Indicators (1998–2008).

Despite—or perhaps because of—their importance, services face restrictions on trade at least as high as those on goods trade. Indeed, a number of careful studies using different methodologies, such as Dee (2005), Bradford (2005), and Dihel and Shepard (2007), have shown up to an order of magnitude of difference between barriers to services trade and barriers to goods trade, and consequently much larger payoffs from services trade liberalization than from goods trade liberalization.

Policies that restrict services trade and competition are not the same across all service sectors. For example, a recent survey by the World Bank (Gootiiz and Mattoo 2009) of the extent of discriminatory policies restricting entry by foreign firms in 30 developing countries found significant heterogeneity across individual service sectors. Still, the consensus among economists is that the tariff equivalents of prevailing restrictions on services trade are a multiple of those that restrict merchandise trade.

This paper aims to survey the literature on how economies respond to an increase in services trade and to reform in the services sector that leads to increased competition from domestic and international competitors. We consider theoretical predications and empirical findings. Then we consider how CGE modeling efforts have captured services liberalization. Finally, we conclude by proposing a set of stylized facts that indicate the way forward for future modeling efforts.

State of policy

Removing restrictions on services trade is expected to generate larger gains than removing those on goods trade. While actual estimates may vary across individual studies, relatively larger gains—often by an order of magnitude—from services trade liberalization is a finding that emerges fairly consistently from a survey of modeling results.[3]

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[3] CGE modeling results are sensitive to a number of factors, such as the initial level of protection, the assumed liberalization scenario, model structure, elasticities, and various other assumptions of the model. For instance, multilateral liberalization brings a larger payoff than preferential, and the higher the level of initial protection, the greater the benefit from liberalization. Assumptions on model structure include whether capital ownership is differentiated between domestic and foreign, whether capital accumulation can occur, and whether productivity can be affected by liberalization. Piermartini and Teh (2005) present a detailed survey of the literature on services trade liberalization.

The payoff to the United States from global services liberalization has been estimated to be between 1.68 and 4.3 percent of GDP, compared to an estimated gain of 0.03 to 0.1 percent of GDP from remaining goods liberalization.[4] Most developing countries also stand to gain more from services liberalization. For instance, in a careful analysis of India, Chadha, Brown, Deardorff, and Stern (2000) estimate the annual gains from services liberalization at 1.6 percent of GDP ($12 billion in national income each year), compared to 0.4 percent of GDP ($3.4 billion) from goods liberalization. Similar findings for other developing countries are reported in a series of CGE papers discussed in section 5. The larger gains from services liberalization reflect greater restrictions on trade in services than in goods, as well as the larger role played by services in most economies.

Trade barriers for goods have been largely dismantled, while trade restrictions in services remain high. According to the Organisation for Economic Co-operation and Development (OECD), the average ad valorem tariff for manufactured goods is 6.2 percent for OECD countries and 13.5 percent for developing countries. A broad survey of existing barriers for services reveals tariff equivalents of 25 to 50 percent for most service sectors and up to 100 to 200 percent for others, such as transportation, storage, and communications (Deardorff and Stern 2004).

Despite large potential gains from services liberalization, much of the Doha negotiations have focused on manufactured goods and agriculture. World Trade Organization (WTO) observers report that offers to date provide no greater market access in services, but rather a weak assurance that access will not get worse. Gootiiz and Mattoo (2009) articulate the current state of negotiations and describe some of the best offers as merely locking in levels of "liberalization" that do not provide more openness than the policies currently in place. While this does not suggest countries will be increasing trade restrictions, it does indicate a reluctance to make binding commitments to liberalize trade in services.

The discrepancy between progress in the negotiations and expected economic payoffs reflects a number of factors. Liberalization targets in services are less objective than in goods or agriculture. Negotiating tariff cuts or subsidy levels is straightforward, and the effects are fairly easy to measure. By contrast, the opaqueness of services policies means that it is unclear to negotiators how much more market access may be gained from offers in this area, resulting in a complex and slow request-offer negotiating process. Further, not all countries are convinced of the benefits of services liberalization, and

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[4] See Brown, Deardorff, and Stern (2003), Robinson, Wang, and Martin (2002), and Anderson, Martin, and van der Mensbrugghe (2006).

many policymakers fear the potential costs of adjustment, particularly for domestic labor markets.[5]

In the General Agreement on Trade in Services (GATS), the WTO distinguishes among four modes of supplying services: cross-border trade, consumption abroad, commercial presence, and presence of natural persons. Cross-border trade (mode 1 in WTO parlance) and commercial presence (mode 3) together account for over 80 percent of services trade.[6] We focus our attention on these two modes of services trade.

Theoretical considerations

The foundational body of theoretical research on trade and growth does not explicitly account for the characteristics distinctive of the services sectors, although many lessons of general trade theory apply to services. A more recent body of literature models some key features of services sectors, and examines channels through which liberalization of services can affect the domestic economy.

Broadly speaking, several types of channels are involved. Services are inputs into production and can both increase the productivity of capital and labor inputs (producing level-growth effects) and affect total factor productivity (producing long-run steady-state growth effects). We should expect increased access to low-cost and high-quality services to foster productivity increases in firms that consume those services, as well as in the broader economy as resources are reallocated toward more efficient sectors (or sectors that improve their efficiency as a result of trade liberalization in services).

Endogenous growth models developed by Romer (1986) and Lucas (1988) show that international trade can spur a "level effect" on economic growth that can create positive growth effects over a transitory period of time. These models encouraged a host of empirical studies on the impact of international trade on economic growth, documenting positive productivity effects of technology diffused

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[5] The adjustment costs associated with services liberalization may be lower than those associated with goods liberalization. Konan and Maskus (2006) link lower adjustment costs to the local provision of services. Because services will continue to be produced locally following reform and liberalization, they argue, these sectors will continue to generate demand for local labor, resulting in fewer sectoral labor shifts than we might expect with goods trade liberalization.

[6] Pindyuk and Woerz (2008) and Magdeleine and Maurer (2008) each estimate the sum of commercial presence and cross-border trade to be between 80 and 90 percent. A detailed discussion on the presence of natural persons can be found in Winters (2008), and a more general discussion of the modes of services supply can be found in Mattoo et al. (2008).

through international trade in goods. In the services context, Hoekman and Javorcik (2006) assert that technology diffused through factor flows, such as increased services trade and competition, should affect TFP growth as well.

Another channel through which a country's economy may benefit from increased liberalization of services is through altering its comparative advantage. Comparative advantage is at the basis of international trade theory, which has historically assumed a dominant role for goods, predicting that trade will flow from low-cost exporters to high-cost importers. A study by Fink, Mattoo, and Neagu (2002) suggests that services reform can affect the composition of trade. The authors found that differentiated products (as opposed to homogeneous products) are disproportionately affected by communications costs. Improvements in communications therefore can help countries move up the value chain in international trade toward more complex goods.

A third channel is via knowledge spillovers from foreign direct investment (FDI). One key difference between goods and services is that for services firms, FDI is an important way to deliver products to overseas consumers, particularly those products that require face-to-face interaction. Hence, we cannot expect to understand services reform without clarifying the role played by FDI in services. FDI is a powerful channel for knowledge spillovers, as it involves the transfer of not only of capital but also of technology and know-how to a foreign country. Since the mid-1990s, sales of services by foreign affiliates of U.S. firms (outward FDI) have grown more rapidly than cross-border trade. In their canonical work on technology transfer via trade, Grossman and Helpman (1994) discuss a variety of ways technical knowledge can be transferred across borders. Their work is general to trade rather than specific to services, but aspects of the channels they discuss have been examined in the services context by Javorcik (2004) for FDI and Mattoo, Rathindran, and Subramanian (2001) for the financial and telecommunications sectors.

Markusen, Rutherford, and Tarr (2000) consider the importance of restraints on foreign providers of producer services for welfare and growth in developing countries. They develop a theoretical model that allows the formation of foreign firms that provide intermediate services. In their model, foreign service providers import an input (a composite of foreign skilled labor and specialized technology) and economize on the use of domestic skilled labor, compared to domestic firms that provide the substitute service. They find relatively large gains (3 to 15 percent of GDP) to the host country from liberalization. The source of these large gains is that additional intermediate service firms provide more choice of specialized expertise; this increases the productivity of the final goods sector that uses these firms' services as intermediate

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inputs. Their model shows how domestic skilled labor and specialized foreign input workers can be complements.

Increased international competition is another channel that may promote gains within an economy. Competitive pressures can reduce prices and/or raise the quality of services, resulting in the so-called pro-competitive effects of trade. Particularly beneficial is the dismantling of monopolies. Although in theory a monopoly may be dismantled without opening borders (for example, by splitting it into several smaller companies), in many countries and for many sectors, the large economies of scale required imply that services liberalization must be part of the process. In a paper that illustrates this mechanism, Konan and van Assche (2007) examine the theoretical implications of dismantling the telecommunications monopoly in Tunisia, which required the entrance of foreign players to apply competitive pressure to the incumbent firm.

Other effects may provide opportunities for increased productivity. Deardorff (2001) examines "network effects"—i.e., the effects of improved efficiency on other sectors of the economy. In this case, he models transportation costs as a real resource cost that functions like a tariff but which involves transfers to factors of production rather than to the government. Shipping costs are paid to the transportation providers to cover the increased cost of resources that are required for the additional transportation services. Similar arguments have been made for telecommunications and other business-enabling services.

The prevalence of fixed-cost, or entry, barriers are one way in which services barriers differ dramatically from goods barriers. In his typology of barriers, Hoekman (2006) organizes regulatory policy according to those with fixed- versus variable-cost effects. Entry costs set up by regulatory policies, such as obtaining licenses or setting up legal entities to operate in the country, comprise a hurdle with implications different from a variable cost barrier. Fixed costs imply firms may need to reach a certain size before market entry becomes profitable, or that the market within a country needs to be large enough to cover the fixed costs. There is a substantial literature in the general trade literature using the concept of fixed costs in an increasing returns to scale framework dating back to Krugman (1979). More recently, Melitz (2003)—also in the general trade literature rather than that specifically related to services—has launched a branch of the literature that uses the concept of fixed costs including, as is frequently the case in services, a fixed cost of exporting to each country.

Empirical Evidence

While there is far less empirical evidence on the impact of liberalizing trade in services than in goods, a survey of the existing body of work reveals certain regularities in the data. Services products pervade an economy, particularly as inputs into the manufacturing process. There is compelling evidence that increased competition and trade liberalization in services can improve the performance of domestic firms, particularly downstream manufacturing sectors, and more broadly, lower trade costs and increase trade volumes.

In one study that highlights this effect, Arnold, Javorcik, and Mattoo (2006) find that services liberalization affected the performance of domestic manufacturing firms in the Czech Republic that relied on services inputs. Services liberalization and reform efforts involved privatization and the presence of foreign providers, both of which increased the level of competition. The authors' empirical strategy was to measure total factor productivity (TFP) at the firm level, and see whether and to what extent the share of foreign presence in service sectors used by each firm was related to TFP performance. Together, services liberalization and reform were key channels through which services liberalization helped to improve the performance of downstream manufacturing sectors.

Using similar methods, Fernandes (2007) uncovers a relationship between productivity and liberalization. In econometric work focusing on Eastern European and Central Asian economies, Fernandes obtains evidence of the positive effects of services liberalization both on the services sectors themselves and on downstream manufacturing. In a later paper, Fernandes and Paunov (2008) find a similar downstream effect on manufacturing in Chile. Their econometric work shows that increased FDI in the services sector had a positive effect on manufacturers that use those services.

In another firm-level paper, Arnold, Mattoo, and Narciso (2006) find that improvements in services industries—specifically, communications, electricity, and financial services—also improved performance in manufacturing firms. The authors use firm-level data for 1,000 firms in sub-Saharan African countries, including data on each firm's access to communications, electricity and financial services, and calculate the TFP for each firm. The authors find a positive and significant relationship between firm productivity and service performance in all three services sectors analyzed.

Transport, communications, and distribution are key services sectors and tightly linked to trade costs. A day of delay in shipping time has been equated with an 0.8 percent ad valorem tariff (Hummels 2001). Potential gains from "trade services" are likely to be large because transport-related costs are likely larger than those related to merchandise trade. Transport costs generate real resource costs, are far reaching, and can affect downstream pricing.

Infrastructure-related services can affect several sectors throughout the economy. Research by Djankov, Freund, and Cong (2006) suggests they are a key determinant in the competitiveness of exporters. The authors have data on the number of days it takes to move standard cargo from the factory gate to the ship in 126 countries. They find that on average, each additional day that a product is delayed before being shipped reduces trade by at least 1 percent. Delays have an even greater impact on developing country exports and exports of time-sensitive goods.

Eschenbach and Francois (2005) find that both domestic liberalization of the banking sector and foreign participation in the sector (via FDI) are significantly associated with growth. Using a set of 130 countries, including 26 transition economies, they replicate findings from prior studies linking financial development, banking sector competition (but not capital account openness), and growth.

Bayraktar and Wang (2008) investigate the channels by which foreign entrants to a country's financial sector affect the domestic economy. They examine direct channels (e.g., providing domestic firms with cheaper, more efficient sources of financing) and indirect channels (e.g., knowledge spillovers and competitive pressures on the domestic banking sector). Both effects are found to be statistically significant. For services, FDI is an important way to deliver products to consumers, particularly those products that require face-to-face interaction.

The communications sector, as demonstrated by Fink, Mattoo and Neagu (2002) is a source of significant trade costs, and can influence trade patterns. The authors use a gravity-type estimation framework. Using per-minute country-to-county calling prices charged in importing and exporting countries as a proxy for bilateral communication costs, the authors find that the impact of communication costs on trade in differentiated products is larger than on trade in homogeneous products (e.g., commodities such as cement, steel or tobacco)—by as much as one-third. Small increases in telecommunications costs, therefore, will have larger effects on the trade of other services, which tend to be heterogeneous. Jensen (2008) examines the attributes of services sectors, particularly with respect to employment. A key feature that he notes is the high share of "tradable occupations" in nontradable industries. This is clear, for

example, in the outsourcing of back office operations in industries that are otherwise domestically oriented. This suggests that the liberalization of services can result in the unbundling of tradable and nontradable elements in a particular production process; as tasks are taken up by countries possessing a comparative advantage in the area, additional income gains from liberalization can be realized.

Kox and Nordas (2007) assess the costs and benefits of regulations in the context of international trade in services. In general, aggregate regulatory indices are negatively correlated with service imports, but a number of other interesting findings emerge. They show that regulatory measures can affect either the fixed costs of entering a market or the variable costs of servicing that market or both. Home market regulation is strongly related to domestic firms' export performance in business and financial services. Taking care to discriminate among trade-enhancing and trade-restricting regulations, the authors show that excessive domestic regulation restricts foreign suppliers from entering the domestic market and to a greater extent can restrict domestic suppliers from entering foreign markets. In contrast, well-regulated domestic markets can enhance the competitiveness of local service suppliers; and, regulations aimed at correcting market failure, such as ensuring appropriate standards, can positively affect trade. The authors also show that trade liberalization and reform can affect the size of the average firm depending on how such changes affect fixed and variable costs. Higher barriers to entry and restrictive regulations tend to deter small and medium size enterprises (SMEs) firms from engaging in international trade in services, while regulations that promote harmonization, integration and mutual recognition among markets can promote SMEs involvement in trade. Further, improvements in communication technology stimulate trade in services.

Unlike with goods, there is a great deal of cross-country heterogeneity in services provided and in the restrictions on providing those services. A review of the *Report on Foreign Trade Barriers* by the Office of the U.S. Trade Representative (2009) reveals a host of trade barriers, varying by country, for U.S. lawyers wishing to provide legal services to potential customers in nearly all of our major trading partners. Such restrictions may encompass establishments, equity participation, nationality or citizenship, licensing or accreditation, quotas, advertising and fee setting, and multidisciplinary practices, among others. A particular service can also vary by country. For instance, a specific legal service performed in the United States is not the same as that service performed in, say, Australia or Japan.

Finally, in a recent study, Borchert and Mattoo (2009) find that trade in services has weathered the financial crisis relatively well, particularly when contrasted with the downturn in goods trade. While some services sectors, such as travel and transportation,

have seen decreases in trade, others such as professional business services have held steady or expanded. The authors posit that services' less cyclical nature and lower dependence on trade finance (relative to goods trade) are possible reasons.

The empirical evidence surveyed here suggests that services liberalization, like goods liberalization, can foster productivity gains, but also that services barriers differ in several substantial ways from goods barriers. The high degree of differentiation across services sectors and the complexity of the barriers in use indicate that tariff equivalents, as used in the CGE literature, may be misleading when modeling services barriers. This work further suggests that services liberalization should be modeled with more attention to inside-the-border phenomena. Lower production costs to downstream domestic firms,higher productivity of those firms, and salient effects like lower trade and transportation costs are modeling issues that deserve attention.

Reconciling empirical evidence with CGE modeling

CGE models are often employed to assess the economy-wide effects of trade liberalization, which can be useful in policy deliberations. A body of work has employed CGE models to illustrate some of the theoretical considerations described above. The rich general equilibrium framework enables us to trace the effects of liberalization on other sectors affected by reform and to estimate its effects on economic welfare and real income. A common analytical approach is to take estimates from econometric studies that can yield per-unit effects of services trade restrictions, and then convert these effects into tax equivalents. In terms of operational ease, tax- or tariff-equivalent price wedges can be fairly easily incorporated into a CGE framework. However, these estimates involve at best a great deal of subjectivity and are sometimes simply "best guesses," leaving the interpretation of the CGE results open to question.

For instance, Chadha, Brown, Deardorff, and Stern (2000) employ a CGE model to assess the impact of future liberalization on India's economy. For their analysis of services liberalization, the authors model barriers to services trade as tariff-equivalent price wedges, using ad valorem barriers that they describe as "ad hoc guestimates" from earlier work (Hoekman 1995). They acknowledge that barriers to services trade are likely more complex than tariff barriers, but describe their approach as a first approximation. They estimate that India's real income would rise by 1.6 percent following services reform (higher than the real income gain of 0.7 percent for goods liberalization).

In a broad survey piece, Whalley (2004) assessed the quantitative literature on the effects of potential services trade liberalization for developing countries. He highlighted the importance of firm and worker mobility, the heterogeneity of services, and the relatively large effect of capturing capital flows, typically in the form of FDI. Whalley called for more empirical evidence on the benefits of services liberalization for developing countries. A number of careful case studies have attempted to fill this gap, although much work remains to be done.

In their study on Tunisia, Konan and Maskus (2006) also employ a CGE approach to quantify the economy-wide effects of services trade liberalization, although with explicit treatment of foreign investment in service production. The barriers to services trade are modeled as price wedges, with 10 to 50 percent price wedges for most service sectors, and 200 percent for the communications service sector. The price wedges are based on interviews and educated guesses, with resulting values that are magnitudes greater than most tariffs on goods (consistent with much of the literature). By contrast with the standard 0.5 to 1 percent real income gain from goods trade liberalization, the authors obtain 6 to 8 percent real income gains from services liberalization. The economic effects of services liberalization are thought of as a reduction in the market power of cartels, or a "cost inefficiency effect." Their model is designed to capture several static effects of services trade liberalization, including efficiencies from production reallocation, pro-competitive gains from reducing cartel power, and efficiencies from adopting best-practice technologies. Their results highlight the removal of barriers against FDI as an essential component of potential welfare gains in services liberalization.

When Jensen, Rutherford, and Tarr (2007) model Russia's potential accession to the WTO, they also include explicit treatment of FDI. They estimate economic welfare gains equivalent to 11 percent of GDP and find FDI to be a key channel of economic gain. In related work, Rutherford, Tarr, and Shepotylo (2005) examine the reforms associated with Russia's WTO accession, including lifting barriers against FDI in business services, reduced exposure to antidumping duties on Russia's exports, and tariff cuts. They find real income effects from liberalization to be in the range of a 2 to 25 percent increase, with a decomposition of the results indicating that FDI liberalization is a principal component of the welfare gains.

In later work, Jensen, Rutherford, and Tarr (2008) illustrate the importance of coordinated domestic regulatory and trade reform in services. The authors employ a CGE model to assess the potential impact of liberalizing regulatory barriers against foreign and domestic service providers in Tanzania. In decomposing their results, the authors reveal that the largest gains to Tanzania derive from liberalizing

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nondiscriminatory barriers. In addition, their model illustrates that greater access to business services improves the productivity of labor and capital in all sectors of the economy, and that in the long run, the increased productivity of capital induces capital accumulation and an increase in the capital stock, which results in a general expansion of Tanzanian manufacturing.

Following the model structure of Jensen, Rutherford, and Tarr (2007), Balistreri, Rutherford, and Tarr (2008) evaluate the potential impact of liberalizing service barriers for the Kenyan economy. They allow FDI in business services as well as cross-border trade. The largest gains emanate from reducing regulatory barriers against potential service providers, both foreign and domestic, again illustrating the importance of coordinated domestic regulatory and trade reform in services.

In order to better calculate services trade barriers, there have been numerous recent attempts to transform the regulatory restrictions on services into credible price wedges. The principles behind the main methodology for estimating price wedges originated with Findlay and Warren (2000). The method uses indices representing policy variables quantified in some way as explanatory variables within an econometric specification to understand the impact of the barriers on trade. This approach is labor-intensive, however, often involving surveys of industry representatives and subjective analysis of the policy variables.[7]

The results thus far have been less than robust, revealing wide ranges across research efforts within particular sectors and often with either the "wrong sign" (e.g., restrictive policy variables explaining positive movements in trade volume) or with very large standard errors. For instance, Dihel and Shepard (2007) find price wedge point estimates for mobile telecommunications of 1 to 24 percent over a set of middle-income countries, while Doove, Gabbitas, Nguyen-Hong, and Owen (2001) find a range of 6 to 56 percent for the same sector with a similar set of countries. Herfindahl and Brown (2007) estimate price effects on nontariff impediments to trade in banking services. They find tariff-equivalent barriers that vary from 6 to 96 percent across countries in 1999.[8]

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[7] Dee (2005) provides a comprehensive overview of the literature to date. Dihel and Shepard (2007) perform an exhaustive analysis of several industries by mode of service delivery. The OECD (2009) is conducting a large-scale project on a services trade restrictiveness index that is still in its early stages.

[8] Herfindahl and Brown (2007) estimate that GATS rules changes that were proposed in 2005 would have brought barriers to between 11 and 92 percent. They estimate that the most liberalized country, Japan, would have had tighter barriers under the 2005 proposal due to a reduction in length of stay under mode 4 (presence of natural persons).

Most CGE literature on services liberalization examines solely border effects, modeled as barriers in the form of tariff-equivalent price wedges. This method is taken directly from the goods literature. Results suggest that the larger the tariff equivalents, the larger the effects. Applying this approach to services is more complicated than is the case for goods, due to at least two distinguishing features. First, the computation of these price wedges remains quite uncertain: although many methods have been applied, estimates of these wedges still vary widely. There is as yet no clear or rigorous measure of restrictions in services that can be converted so as to be usable in a CGE framework. This methodological uncertainty at least partly reflects the lack of production and trade data on services, as well as on the policies that govern the provision of services. Deardorff and Stern (2004) present a thorough survey of these issues.

Stylized Facts

Notwithstanding the methodological difficulties, several stylized facts emerge from the theoretical and empirical literature surrounding services trade that could be useful in future CGE estimates of trade policy effects.

First, **services barriers differ substantially from goods barriers**. The ways in which barriers to services trade manifest can vary by country, the high degree of differentiation across services sectors, and the complexity of the barriers in use all indicate that using the tariff equivalents found in the CGE literature may be misleading when trying to assess the economic effects of dismantling services barriers.

Second, **services sector reform may raise the productivity of downstream domestic manufacturing firms**. Lower production costs to downstream firms, higher productivity of those firms, and salient effects like lower trade and transportation costs are modeling issues that deserve attention.

Third, **the computation of the welfare effects of services trade liberalization can depend on the internal market structure of the liberalizing economy**. In many services sectors, the domestic market before liberalization is dominated by a single monopoly supplier. Breaking up such a monopoly and eliminating the monopoly rents reduces costs for downstream customers of the supplied services, which in many cases, such as telecommunications and transportation, means that it will affect nearly all producers. Reform may also address other market imperfections, such as cartels or pricing agreements among producers. Hence, in order to incorporate policy-relevant

services liberalization, modelers need to recognize that market access restrictions affect not only new foreign entrants but domestic new entrants as well.

Fourth, **services trade frequently consists of sales by affiliates of multinational companies**. FDI in services sectors can foster pro-competitive effects, reduce production costs for the industry, and encourage productivity improvements in linked industries and throughout the economy.

Fifth, **fixed costs appear to play a larger role in restricting new entrants—both foreign and domestic—in services sectors than in goods**. This results from the greater quality verification measures (e.g., certification and licensing) required for services, and the need to establish a local presence. Applying high fixed costs rather than their tariff equivalent may result in significantly different predictions about the effects of liberalization policies. For example, small firms may be disproportionately assisted by a reduction of fixed-cost barriers. Alternatively, sectors with large economies of scale may be less affected by further cuts in fixed-cost barriers.

To capture these stylized facts, a number of CGE model enhancements are necessary. For instance, the importance of FDI makes it important to identify on a sectoral basis the factors of production that move across borders—e.g., capital that crosses borders, who owns that capital, and how that capital is financed.[9]

Another point that emerges from the literature is the heterogeneity across services sectors. The world's major services sectors differ sharply from one another in a number of important characteristics, particularly in terms of regulations that affect trade and competition. Subsequently, sector-specific studies are often the only way to gain insight into the economic effects of a policy change in services. In a relatively new policy area like services, information from such studies can be helpful in informing trade policymakers and practitioners about the economic consequences of services trade barriers. Yet the heterogeneity of services presents a conundrum for CGE modeling as industry-specific findings do not lend themselves easily to economy-wide CGE assessments of general services liberalization. Restriction measures that are estimated across industries are more easily integrated into a CGE framework for economy-wide experiments, although estimation exercises of this scale present its own challenges.

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[9] Working from a theoretical standpoint, Dee (2003) carefully describes special features of services to be taken into account in modeling services trade. Many of these have been borne out by recent empirical evidence.

While CGE models are often used in trade policy analysis, they are not without limitations. Building and maintaining CGE models is time- and resource-intensive. Even the best computational models are constrained by the data and services data on production and trade are not nearly as complete as goods data. CGE models are less testable than other more traditional analytical approaches, such as econometric analysis. In econometric studies it is necessary to control for all other factors affecting performance and still deal with simultaneity issues. Econometric models have the advantage of simplicity, but are unable to deal with the richness and detail of the underlying structures involved. Consequently, econometric results could be misleading in the face of structural change, a common phenomenon which often coincides with services liberalization and reform.

Conclusion

Services are deeply integrated into the production process. When such services are poorly provided, the rest of the production chain suffers as well. Opening services trade to increased competition is projected to benefit both developed and developing countries. For developing countries in particular, access to improved services may be a critical step in the development path.

To enable services liberalization, policymakers need to understand the potential ramifications of reform. CGE modeling has provided a thorough and detailed analytical approach to understanding trade liberalization in goods. The same work must now be done in services.

In this paper we have identified several stylized facts that have been explored in the theoretical literature and consistently supported by empirical evidence. Until now, the main approach to services modeling has been the use of tariff equivalents. In fact, services and their barriers are sufficiently different from goods barriers that several other modeling approaches, in concert or separately, are called for. Entry, or fixed-cost, barriers are more prevalent in services and should be modeled to understand their effects on trade. Inside-the-border impediments, such as regulatory barriers that affect both domestic and foreign suppliers, are also more prevalent in services. Market structure, including monopolies, plays a significant role in many services industries. Linkages to other industries, particularly downstream manufacturing, must be taken into account. Finally and perhaps most importantly, the effects of FDI, including technology diffusion and knowledge spillover, are of particular relevance to the

services sector. These stylized facts, as robust characteristics of services sectors, should be considered in the implementation of future CGE modeling. The body of literature is still far from complete. Further empirical evidence that identifies specific channels of the economic effects of services trade liberalization, as well as corresponding directions in CGE modeling, will be vital for this area of international trade and trade policy. It is our hope that such work will provide the analytical support for key policy reform.

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