RESEARCH SEMINAR IN INTERNATIONAL ECONOMICS

School of Public Policy
The University of Michigan
Ann Arbor, Michigan 48109-1220

Discussion Paper No. 453

Measurement and Modeling of the Economic Effects of Trade and Investment Barriers in Services

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Abstract

In this paper, we adapt the latest version of the Michigan Model of World Production and Trade to incorporate cross-border services trade and foreign direct investment (FDI). Firms are taken to be monopolistically competitive. Each firm produces products differentiated by the original R&D that defines the basic product and by location of production. Each firm faces a fixed cost in the country where production occurs, and sets an optimal mark-up for sales from each location. Firms locate production for export or for local consumption depending on the type of barriers faced. Barriers to trade in services take the form of an additional cost of employing variable capital and labor. We report the impact on welfare, trade, factor prices, sectoral output, economies of scale, and activities of multinationals following the introduction of national treatment of multinational firms in all countries.

November 24, 2000

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I. Introduction

In this paper, we adapt the latest version of the Michigan Model of World Production and Trade to incorporate relationships and data for cross-border services trade and foreign direct investment (FDI) in the major developed and developing countries subsumed in the model's structure and database. Our objective is to conduct some model simulations to assess the economic effects of the reduction/removal of existing services trade and FDI barriers. It is hoped that our computational analysis will be useful as a first cut to provide guidance and rationale for the liberalization of services barriers that will be addressed in the ongoing WTO multilateral services negotiations.

The paper is structured as follows. In Section II, we discuss a number of salient issues that arise in the measurement of barriers to services trade and FDI. Alternative approaches to the modeling and analysis of these barriers and their reduction/removal are discussed in Section III. With this as background, we present in Section IV details of the adaptation of our Michigan Model of World Production and Trade that is to be used for computational and analytical purposes. The data, parameters, and solution procedure of the model are discussed in Section V. In Section VI, we outline the modeling scenarios for liberalization of existing services trade and FDI barriers and present and discuss our computational results. Our conclusions and policy implications are indicated in Section VII.

II. Measurement of Barriers to Trade in Services and FDI[1]

Given the fact that international trade in services has been increasing significantly in recent decades and now is equal to about 20 percent of global merchandise trade, it is obviously important to consider the barriers that affect services trade and issues of measurement of these barriers. There has been similarly an increasing amount of foreign direct investment (FDI) in both goods and services sectors in

[*] We wish to thank Philippa Dee, Bernard Hoekman, and Susan Stone for helpful comments and providing data, Alan Deardorff for modeling suggestions, Soraphol Tulayasathien for research assistance, and Judith Jackson for typing and editorial assistance.

and between advanced and developing countries. FDI is subject to a variety of barriers as well and thus merits attention in its own right.

Characteristics and Modes of International Transactions in Services

The most distinguishing characteristic of services transactions is that their production and consumption occur simultaneously, thus often requiring direct contact between producers and consumers. While some services are traded internationally across borders (e.g., "separated" services such as telecommunications) in a manner similar to cross-border trade in goods, other services may require the consumer to move to the location of the producer, as in the case of tourism. Further, because of the necessary proximity of consumers and producers, factors of production may have to move across national boundaries to the place of consumption. Thus FDI may be necessary in order to establish a foreign commercial presence, and there may also be temporary cross-border movement of labor that is required to serve foreign consumers. An indication of the magnitudes of the four modes of services transactions is provided in Table 1.

Types of Barriers to Trade and FDI in Services

As noted by Hoekman and Primo Braga (1997, p. 288), because of the simultaneity of the production and consumption of services, border measures such as tariffs will generally be difficult to apply because customs agents cannot readily observe the service as it crosses the border. Typically therefore the restrictive policies followed will be designed to limit the access of foreign services and the suppliers of services to domestic markets. Hoekman and Primo Braga distinguish the following types of barriers: (1) quotas, local content, and prohibitions; (2) price-based instruments; (3) standards, licensing, and procurement; and (4) discriminatory access to distribution networks. To explain further:

> (1) Quantitative-restriction (QR) type policies are commonly applied to service providers. Two prominent examples are the bilateral agreements regulating international air transportation services, which are usually reciprocal and company specific, and

[1] Adapted in part from Deardorff and Stern (1998, Appendix 4).

ocean-cargo-sharing arrangements, which also often rely on reciprocity in providing shipping services in mutual trade. In many countries, there are outright prohibitions directed against foreign providers of such services as domestic transportation, basic telecommunications, and legal, insurance, education, surveying, and investment advising services. Restrictions on transborder data flows are also prevalent and may impede market access by foreign providers.

(2) Price-based instruments may take the form of visa fees and entry or exit taxes, discriminatory airline landing fees, and port taxes. Tariffs can be significant barriers to trade in goods that embody services (e.g., films, television programs, computer software) or goods that are used in producing services (e.g., computers, telecommunications equipment, advertising material). Further, many service sectors are subject to government-sanctioned or monitored price controls, examples including air transportation, financial services, and telecommunications. Government subsidies are commonly used in such service sectors as construction, communications, and road and rail transport.

(3) Licensing or certification requirements may be imposed on foreign providers of professional and business services. Environmental standards may also impact on service providers, particularly in transportation and tourism. Government procurement policies are often designed to favor domestic over foreign providers of services as well as goods by means of preference margins and outright prohibitions.

(4) Discriminatory access to distribution and communications systems exists in many countries in such sectors as telecommunications, air transport, advertising, insurance, and dealer networks.

Hardin and Holmes (1997) have focused specifically on barriers to FDI. They define (p. 24) an FDI barrier as "…any government policy measure which distorts decisions about where to invest and in what form. …policy measures such as limits on the level of foreign investment, or the need to go through costly and time-consuming screening processes to convince authorities that FDI in a project will be in the national interest, are considered barriers."

In considering ways of classifying FDI barriers, Hardin and Holmes note (pp. 33-34):

"The appropriate classification system may vary, depending on the purpose of the exercise. For example, if the purpose is to check and monitor compliance with some policy commitment, then the categories should reflect the key element of the commitment…. If the primary interest is instead the resource allocation implications of the barriers, some additional or different information may be useful.

Barriers to FDI may distort international patterns and modes of…trade. They may also distort allocation of capital between different economies, between foreign and domestic investment, between different sectors, and between portfolio and direct investment. …the classification system…should highlight the key characteristics of the barriers that will determine their size and impact. Market access and national treatment are…relevant categories from a resource allocation perspective. …national treatment is generally taken

> to refer to measures affecting firms after establishment. A…way to classify barriers is therefore…according to what aspect of the investment they most affect: establishment, ownership and control; or operations. In addition…, some further information may be useful…on distinctions…between direct versus indirect restrictions on foreign controlled firms; and rules versus case-by-case decisions."[2]

The main types of FDI barriers that have been identified by UNCTAD (1996) are noted in Table 2. Further information on the barriers most commonly used to restrict FDI especially in the APEC economies is provided in Hardin and Holmes (1997, esp. pp. 37-40 and 45-55). As they note (p. 40), some common characteristics appear to be:[3]

> "application of some form of screening or registration process involving various degrees of burden for the foreign investor; restrictions on the level or share of foreign ownership, particularly in some service sectors, and often in the context of privatisations; widespread use of case-by-case judgments, often based on national interest criteria; widespread use of restrictions on ownership and control (e.g., restrictions on board membership), particularly in sectors such as telecommunications, broadcasting, banking; and relatively limited use of performance requirements on input controls in services sectors."

Measurement of Barriers to Trade and FDI in Services

The measurement of services barriers parallels to an extent the measurement of nontariff barriers (NTBs) that limit trade in goods. However, services barriers involve greater complexities when account is taken of the different modes of supply of services that include not only cross-border trade but also the movement of consumers to the location of providers as well as FDI and temporary international movement of labor.

Frequency Measures

Frequency measures of services barriers have been constructed by PECC (1995) and Hoekman (1996). These are based on the information contained in the country schedules of the General Agreement on Trade in Services (GATS) and refer to all four modes of the supply of services. Frequency ratios are constructed based on the number of commitments scheduled in the GATS by individual countries that

[2] Direct restrictions include limitations on the total size or share of investment in a sector and requirements on inputs used (e.g., local content). Indirect restrictions include net benefit or national interest criteria and limitations on membership of company boards. The distinction between rules and case-by-case decisions relates to issues of clarity in specification and transparency as compared to the exercise of administrative discretion.

[3] Hardin and Holmes (pp. 40-43) also provide information on investment incentives, which are widely used and for the most part are not subject to multilateral disciplines.

designate sectors or sub-sectors unrestricted or partially restricted in relation to the maximum possible number of unrestricted commitments. As noted in Hoekman (1996, p. 101), there are 155 sectors and sub-sectors and four modes of supply, which yields 620×2=1,440 total commitments on market access and national treatment for each of 97 countries.[4]

Hoekman (1995) has used frequency ratios to approximate the relative degree of restrictiveness of market-access barriers to services trade across countries and sectors. He established a judgmental set of benchmark tariff equivalents for individual sectors to reflect the degree to which market access to these sectors was restricted. The benchmark tariff equivalents chosen ranged from a high of 200 percent for sectors (e.g., maritime cabotage, air transport, postal services, voice telecommunications, and life insurance) in which market access was essentially prohibited in most countries to 20-50 percent for sectors in which market access was less constrained. He then assigned a value to each country and sector using the benchmarks multiplied by the calculated frequency ratio. Thus, for example, assuming a benchmark tariff equivalent of 200, say, for postal services and a frequency ratio of 50 percent to reflect the scheduled market access commitments, the tariff equivalent for that sector is set at 100 percent. Using the value of output by sector for a representative industrialized country, it is then possible to construct weighted average measures by sector and country. The weighted average tariff equivalents for 1-digit ISIC sectors for selected countries are indicated in Table 3.

It should be emphasized that Hoekman's measures are designed to indicate the *relative* degree of restriction and are not to be taken literally as indicators of absolute ad valorem tariff equivalents. But even granting this, there are some important limitations worth mentioning. Thus, as Hardin and Holmes (1997, p. 72) note, Hoekman's method may be misleading or biased because it assumes that the absence of positive country commitments in the GATS schedules can be interpreted as indicating the presence of restrictions, which may in fact not be the case. Also, the different types of restrictions are given equal

[4] As noted in Hardin and Holmes (1997, p. 70) the GATS commitments are based on a "positive list" approach and therefore do not take into account sectors and restrictions which are unscheduled. In PECC (1995), it is assumed that all unscheduled sectors and commitments are unrestricted, which will then significantly lower the

weight and are not distinguished according to their economic impact. Finally, market access restrictions are the only ones taken into account.

Hardin and Holmes (1997) have attempted to build on and improve Hoekman's methodology for constructing guesstimates of tariff equivalents for services. In particular, they use information on actual FDI restrictions and incorporate information on the types of barriers and their economic impact. Their objective is to construct an index of FDI restrictions that can be translated into a tariff equivalent or tax equivalent. They set the weights to reflect the relative degree of restriction of different barriers. Foreign equity limits are given greater weights than the other barriers noted. Hardin and Holmes confine their calculations of the indexes of FDI restrictions to the services sectors in the APEC countries.[5] Communications and financial services are most subject to FDI restrictions, while business, distribution, environmental, and recreational services are the least restricted.

Warren and Findlay (2000) have reviewed a number of studies of services sectors based on the use of frequency-type indices of services impediments:[6]

1. Mattoo (1998) analyzed market access commitments in financial services, covering direct insurance and banking. His results indicate that Latin America is the most restricted in direct insurance and Asia the most restricted in banking services.
2. McGuire (1998) showed that Australia's impediments in financial services, including banking, securities, and insurance, were much lower as compared to other economies in Asia.
3. McGuire and Schuele (1999) constructed indices of impediments to trade in banking services for 23 countries plus the European Union that distinguished impediments on commercial presence and operations and impediments affecting foreign banks and all banks. Weighting the various indices by the degree of restrictiveness, they showed that there was a negative relation between GNP per capita and financial market restrictions.
4. The OECD (1997) developed a pilot study of barriers affecting accounting services for Australia, France, the United Kingdom, and the United States. The United Kingdom was found to be the most liberal, the United States the least liberal.

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calculated frequency ratios. It would be useful accordingly to determine how accurate the PECC assumption may be.

[5] Details on the construction of the indexes and their sensitivity to variations in the restrictive weights are discussed in Hardin and Holmes (1997, esp. 103-11).

[6] More recent information on studies completed and in progress in association with the Australian Government Productivity Commission can be accessed at: http://www.pc.gov.au/research/staffres/index/html.

5. Marko (1998) found that 58% of the basic telecommunications services market for the 69 signatories of the February 1997 Agreement on Basic Telecommunications was covered by partial or full GATS commitments.
6. Warren (1999b) constructed a set of indices to measure the restrictiveness of telecommunications policies for 136 countries. There was a high degree of variation in the indices, indicating that many countries are resistant to liberalizing their telecommunications markets.
7. McGuire, Schuele, and Smith (1999) developed indices for restrictions on foreign maritime services suppliers and all maritime service suppliers covering 35 economies. The degree of restrictiveness varied considerably. Chile, the Philippines, Thailand, Turkey, and the United States treated foreign maritime service suppliers less favorably than domestic suppliers.

The various frequency-type measures that have been constructed are especially useful in identifying the types of barriers and the relative degree of protection afforded to particular sectors across countries. But, as is well known, frequency-type measures have only limited economic content with regard to assessing the size of service barriers and the consequences of maintaining or eliminating these barriers. The question then is whether it is possible to construct price-based or quantity-based measures of services barriers that can be used in quantitative assessment of the costs and benefits from the reduction or removal of the barriers. We turn next then to discuss a number of such recent measurement efforts.

Price-Based Measures of Services Barriers

Warren and Findlay (2000) have discussed ongoing efforts to construct price-based measures of services impediments, using estimates of price-cost margins. As they note, Kalirajan et al. (1999) have used a two-stage econometric technique to calculate the "net interest margins" for 694 national and state commercial banks in selected economies. Their results distinguish barriers to establishment and to ongoing operations for foreign and domestic firms. The price impacts of restrictions on foreign banks are the highest for Indonesia, the Philippines, Malaysia, Chile, Singapore, South Korea, and Thailand. Argentina, Australia, Canada, the EU, Hong Kong, Switzerland, and the United States appear to have relatively low non-prudential restrictions in foreign banks. A second set of domestic measures noted apply equally to domestic and foreign banks and range from 0 to 24 percent.

Warren and Findlay also discuss (p. 73) work in progress on price-based measures of policy variables for maritime services:

> "This work is using an estimate of shipping expenses (derived from comparisons of values at the point of export and the variables at the point of import) in bilateral trades in each direction as the proxy for price variables. Statistical methods are used to test for the significance of the policy measures for variations in prices, after allowing for the impact of other variables that will affect those charges, including the distance between them, the scale of the trade, indicators of the composition of the bilateral trade, the extent of imbalances in the trade flows, and the degree to which the routes are isolated from substitutes. The data set includes 506 observations. Under the method used, policy must be included in both partner economies. The results will help researchers determine whether a high degree of restrictiveness is necessary in both economies in order to drive up shipping charges or whether a high degree in one partner alone is sufficient."

Quantity-Based Measures of Services Barriers

Warren (1999a) has assessed the quantitative impact of barriers in telecommunications services, chiefly mobile telephony and fixed network services, for 136 countries. Combining the quantitative estimates of the effects of removing existing barriers with an estimate of the price elasticity of demand for the telecommunications services involved, tariff equivalents in the form of price wedges can be calculated. The estimates for the advanced industrialized countries are relatively low in comparison to the much higher estimates for the newly industrializing countries. There are cases of developing countries that in some cases have very large price wedges, including some with several hundred percent, e.g. China (804 and 1,000 percent), Colombia (11 percent and 24 percent), India (861 and 1,000 percent), Indonesia (71 and 128 percent), South Africa (14 and 21 percent), and Venezuela (10 and 15 percent).

Francois (1999) has fit a gravity model to bilateral services trade for the United States and its major trading partners, taking Hong Kong and Singapore to be free trade benchmarks. The independent variables include per capita income, gross domestic product (GDP), and a Western Hemisphere dummy variable. The differences between actual and predicted imports are taken to be indicative of NTBs and then normalized relative to the free trade benchmarks for Hong Kong and Singapore. Combining this with an assumed elasticity demand of –4, tariff equivalents can be estimated. The results for business/financial services and for construction are indicated in Table 4. As noted in Deardorff and Stern

(1998, p. 24), measures of this kind are useful mainly in identifying *relative* levels of protection across sectors and countries. But they have some important drawbacks.[7]

Financial-Based Measures of Services Barriers

Hoekman (2000) has suggested that financial data on gross operating margins calculated by sector and country may provide indirect information about the effects of government policies on firm entry and conditions of competition. High margins may be attributable of course to a variety of economic and institutional factors.[8] But since these margins may be indicative of relative profitability across sectors and between countries, they may yield insight about the relative size of existing barriers in individual countries/regions. The country-region results averaged over firms and sectors for 1994-96 are indicated for manufacturing and services in Table 5. Sectoral results for services only are given in Table 6.

III. Modeling the Economic Effects of Services Barriers

While the various measures of services barriers noted are of interest, they need to be incorporated into an explicit economic modeling framework in order to determine how the existence or removal of the barriers will affect conditions of competition and costs of production, economic welfare, and the intersectoral movement of capital and labor.

Most research to date on the measurement and modeling of barriers has been focused on international trade in goods rather than trade in services and FDI. The reasons for this stem in large part from the lack of comprehensive data on cross-border services trade and FDI and the associated barriers together with the difficult conceptual problems of modeling that are encountered. Some indication of pertinent modeling work done to date is provided in Table 7. Following Hardin and Holmes (1997, p.

[7] That is, by attributing to NTBs all departures of trade from what the included variables can explain, there is a great burden on the model being used. Thus, the worse the model, the more likely it is that NTB estimates will have an upward bias. Moreover, since trade cannot be predicted accurately for particular industries and countries, it is not clear how the deviations should be interpreted and the extent to which existing trading patterns depart from free trade.

[8] Hoekman notes (2000, p. 36) that: "In general, a large number of factors will determine the ability of firms to generate high margins, including market size (number of firms), the business cycle, the state of competition policy enforcement, the substitutability of products, fixed costs, etc."

85), the approaches to modeling can be divided as follows: (1) analysis of services trade liberalization in response to reductions in services barriers – Brown et al. (1996a,b), Robinson et al. (1999), Francois et al. (1996), Tamms (1999), and Hertel (2000); (2) FDI assumed to respond to trade liberalization or other exogenous changes that generate international capital flows in response to changes in rates of return – Martin and Yagashima (1993); Donovan and Mai (1996); McKibbin and Wilcoxen (1996); Bora and Guisinger (1997); Adams (1998), and Dee et al. (1996, 1998);[9] and (3) modeling of links between parents and affiliates and distinctions between foreign and domestic firms in a given country/region – Markusen et al. (1993, 1999); Benjamin and Diao (1997); Petri (1997); and Dee and Hanslow (2000).

Two of the studies that model links between parents and affiliates set a standard for other work that has followed. Petri (1997) introduces a model of foreign direct investment into a standard applied general equilibrium model using a nested utility function. Goods in the Petri model are produced by multinational firms. The multinational firms headquartered in each country produce a good that is differentiated from goods produced by firms headquartered in other countries. Multinationals locate plants around the world. Each of the plants themselves produces a variety that is differentiated from the variety produced in a plant in another host country.

Production in each host country requires inputs of capital, labor, intermediate inputs produced locally and an intermediate input imported from headquarters. Capital is allocated internationally depending on relative profitability of production in various locations. However, investors hold a diversified portfolio, so rates of return will vary across national locations.

Markets in the Petri model are perfectly competitive. Goods are aggregated into three sectors: primary, manufacturing and services. Barriers to multinational activities are modeled as region-specific taxes on capital income derived from foreign investments. Not surprisingly, barriers in the service sectors are considerably higher than in the primary and manufacturing sectors. The model has been used to analyze the economic effects of APEC's "Bogor Declaration."

[9] For more recent CGE modeling studies that focus on issues of international capital mobility, see Ianchovichina et al. (1999), Verikos and Hanley (1999), and Walmsley (1999), as well as selected papers presented at the Third

Dee and Hanslow (2000) have produced a variant on the Petri model. Like Petri, Dee and Hanslow assume that consumers follow a three-stage budgeting procedure. However, in the first stage, consumers allocate expenditure between goods produced domestically and varieties imported. That is, in the first stage, consumers are not concerned with the nationality of each firm's headquarters, but rather the nationality of the plant location. In the second stage, consumers allocate imports across goods produced by each trade partner. In the third stage, imports from each national source and domestically produced goods are allocated across the various multinational firms. Dee and Hanslow also incorporate imperfect competition. Firms are assumed to set an optimal mark-up over marginal cost. Entry and exit may not occur. Therefore, firm profits may not be zero.

A second approach has been developed by Markusen, Rutherford and Tarr (1999). They have constructed a small-country, two-good model of trade in services. Though not used for policy analysis, the Markusen et al. model suggests an attractive approach for modeling services trade. They capture the essence of imported services through two channels: (1) the special knowledge needed to produce the foreign variety of services combined with (2) the importation of specialized intermediate inputs.

Services are treated as inputs in the production of one good in the Markusen et al. model. Service inputs are differentiated by firm and are supplied by both domestic and foreign firms. Producers purchase some of all service varieties available. A foreign firm that seeks to enter the market for services must first make a fixed investment. The foreign firm then faces a constant marginal cost composed of skilled and unskilled labor and an intermediate input imported from headquarters. The market structure for services is monopolistically competitive. Services providers set an optimal mark-up of price over marginal cost, and entry guarantees that profits are zero. The model is used conceptually to compare an equilibrium in which no trade in services is permitted with one in which free trade in services is permitted.

Unlike Petri and Markusen et al., our previous work, as noted, has not focused on the behavior of multinational firms. What we propose now is to address the issues of modeling services trade and FDI

Annual Confernce on Global Economic Analysis, Sydney, Australia, June 2000.

and the associated barriers along the lines of the third group of studies noted in Table 7. Let us turn then to our adaptation of the Michigan model.

IV. Adaptation of the Michigan CGE Model

Our model employed in this study draws from the structure developed by Petri and Markusen et al. The equations of the model and a list of variables are available from the authors on request. Each multinational firm (MNC) produces a differentiated product and allocates production to its various host-country locations. Each location has different characteristics of production. Therefore, the outputs supplied by a MNC from the various locations are imperfect substitutes.

Consumers use a three-stage budgeting procedure. Following the demand structure used by Dee and Hanslow, consumers first allocate expenditure between an aggregate of the output produced domestically and an aggregate of the output of goods imported from other countries. At the second stage, expenditure on the import aggregate is allocated across individual trade partners. At the third stage, expenditure on goods from each national source is then allocated across multinationals with a plant in the supplying country.

The virtue of this treatment of the demand structure stems from the fact that domestically produced goods typically dominate domestic sales. Therefore, it is generally, though not exclusively, the case that MNCs primarily supply the local market from the local plant. Thus, what drives FDI in the model is that services have mainly to be provided locally in close proximity to consumers. However, MNCs also operate foreign plants for export to third country markets.

In order to undertake production, each MNC must employ capital and labor to engage in product development at their headquarters location. This expenditure generates a fixed cost of labor and capital at home. The MNC then faces a fixed set-up cost of capital and labor in the host country location. Production, itself, requires capital, labor, and intermediate inputs. Intermediate inputs are both produced locally and imported. They are then used in fixed proportion with the primary inputs.

Firms set a price for the output of each plant with an optimal mark-up of price over marginal cost. The elasticity of demand is derived assuming that each stage of the consumer's utility function is CES with an elasticity of substitution equal to 3.[10] However, the elasticity of substitution among various MNC products is taken to be 4.[11]

We also assume that there is free entry, in which case each MNC's profits averaged over all plants sum to zero. This assumption does not imply that profits are zero in each market. A firm may find that a substantial profit margin generated by one plant is offset by a smaller margin in another. Firms, of course, will continue to produce in any plant that can cover its variable cost.

Labor is taken to be freely mobile between sectors but not across borders. Therefore, there is an equilibrium wage for each country.

Capital, however, is mobile internationally. The capital installed in each host country is derived from the MNC's determination of the profit-maximizing output from each plant, as discussed above. New firms that enter a market and firms seeking to expand plant production purchase capital on international markets for installation in the host country. Similarly, contracting firms sell their capital on the world market.

The degree of international capital mobility can be set exogenously. The rate of return paid for capital depends on the international interest rate plus a risk premium. The risk premium paid by capital importers in a country depends on the overall change in its capital stock. In the results presented below, we first assume that capital is perfectly mobile between countries. Then we will assume that a one percent increase in a country's capital stock due to capital imports will generate a 0.1 percentage point increase in the interest rate.

Barriers to foreign direct investment are modeled in one of three ways. First, the barrier to foreign firms may take the form of an increased fixed cost of locating in a host country. Second, the barrier may take the form of a tax on installed capital. Third, the barrier may take the form of a tax on

[10] An elasticity of substitution equal to 3 gives results that comport well with other pieces of information like the elasticity of demand, the impact that we usually observe, and numbers used by other researchers.

variable capital and labor. In the version of the model presented below, we focus on barriers that increase variable costs.

Market equilibrium requires that consumers be willing to purchase the output sold by firms. In addition, each country is governed by a balance of trade constraint. Each country raises foreign exchange by selling products, exporting capital, receiving remittances of operating surpluses from foreign subsidiaries and receiving subsidies from foreign headquarters for local subsidiaries that run an operating loss. A country that exports physical capital is paid interest each year. The rate of return is taken to be 10 percent. In addition, each MNC's subsidiaries are required to rebate any operating profits back to headquarters. However, subsidiaries that lose money receive a subsidy from headquarters to cover operating expenses. Foreign exchange is spent on goods imports, interest paid on physical capital imports, and remittance of operating profits to headquarters.

V. Data, Parameters, and Solution Procedure

The model comprises 18 countries/regions, as indicated in Table 8. All other countries of the world are aggregated into a single rest-of-world (ROW). In order to keep the dimensions of the model manageable and to avoid lengthy solution time and associated computer-capacity constraints, each country/region is assumed to produce and trade only three aggregates of agricultural products, mining/manufactures, and services. The basic data are version 4 of the GTAP database. FDI data have been provided by the Productivity Commission of the Australian Government, courtesy of Philippa Dee.

Data on the barriers to FDI were provided by Bernard Hoekman, as indicated in our Tables 5 and 6. Hoekman estimates the margin between price and marginal cost. Some of this gap is attributable to fixed cost. However, the estimates vary across countries. Therefore, in most cases, some of the price-cost gap can also be attributed to barriers to FDI. The price-cost gap is smallest (in most sectors) for Hong Kong, a country considered to be freely open to foreign firms. Hence, we assume that the price-cost gap in Hong Kong is attributable to fixed cost. The excess in any other country in the model above

[11] This value was set to be larger than the elasticity of substitution of 3, but it is not a lot larger.

the Hong Kong figures is taken to be due to barriers to operations of foreign firms. Thus, the barrier is modeled as an increase in variable cost borne by MNCs attempting to operate an enterprise locally. In the simulations conducted below, the cost of employing variable capital and labor is reduced by the margin estimated by Hoekman.

VI. Liberalization Scenarios and Computational Results

We have run the following computational scenarios:

Scenario A Removal of services barriers, with perfect international capital mobility and fixed world capital stock

Scenario B Removal of services barriers, with risk-premium elasticity = 0.1, and fixed world capital stock

Scenario C Removal of services barriers, with risk-premium elasticity = 0.1, and world capital stock increased by 3%.

The assumptions made in running the scenarios are:

1. The risk-premium elasticity is set exogenously at 0.1 in Scenarios B and C in order to allow for less than perfect international capital mobility.
2. The world interest rate is set at 10% to represent the long-term internal rate of return to capital.
3. Barriers to trade and FDI in services are modeled as an additional cost to variable capital and labor in host-country locations to serve consumers locally.
4. The demand structure follows Dee and Hanslow (2000). In the utility function, expenditure is first allocated to place of production and then allocated across MNCs.
5. The number of firms is varied to hold MNC profits at zero.
6. In order to get the model to solve, the mark-up of price over marginal cost is held fixed.[12]

In Table 8, the countries/regions are listed in column (1), absolute changes in imports and exports in columns (2) and (3), the percentage change in the terms of trade in column (4), welfare effects, as

[12] Since the demand elasticity in the model does not move too much, fixing the price-cost margin and the demand elasticity does not have much of an impact on the model's results.

measured by the equivalent variation, as a percentage of GNP and in millions of dollars in columns (5) and (6), and the percentage change in the real wage in column (7).[13]

It can be seen in columns (5) and (6) of Table 8 that the welfare effects of removing the services barriers are both sizable and vary markedly across countries. Among the industrialized countries, the largest increases are for Canada, $84.0 billion (14.8% of GNP), the European Union (EU), $42.4 billion (0.5% of GNP), and the United States, $35.0 billion (0.5% of GNP). Among the developing countries, the largest increases are for Indonesia, $30.8 billion (15.6% of GNP), China, $26.9 billion (3.8% of GNP), and Taiwan, $20.7 billion, $7.6% of GNP). It is also evident that there are declines in welfare for a number of countries, in particular Japan, Korea, Mexico, and Rest of Cairns Group.

What is reflected here is that welfare effects are strongly associated with whether or not a country attracts or loses capital as a result of the services liberalization. Countries that lose capital become "smaller" in the economic sense of the word. As the economy contracts, surviving firms produce less than before. The fall in firm output generally occurs in order to avoid a large loss in variety of domestically produced goods. The subsequent economy-wide reduction in scale economies is usually the source of the welfare loss.

Changes in economies of scale also emerge when the relationship between total and variable cost is altered. We have assumed that there will be no change in the elasticity of demand, thus, in turn, fixing the price-cost margin. Output per firm may still rise if marginal cost falls relative to total cost. As a consequence, countries that cut barriers most deeply will experience a fall in marginal cost relative to total cost. In order to restore the optimizing price-cost margin, firm output must rise.

The percent change in wages is reported in column (7). Wage changes generally reflect the gain or loss in national welfare. Thus, wages rise in Canada by 14.1% and fall in Japan by 0.8% and in Mexico by 2.0%. Wage changes also mirror capital flows. It is generally the case that countries that acquire capital will see an increase in capital per worker. The consequent rise in the marginal value

[13] See Dee and Hanslow (2000) for computational results based on a related modeling framework and with estimated services barriers taken from Kalirajan et. al (1999) and Warren (2000).

product of workers raises the wage by more than the overall welfare increase. That is, in most cases in which national welfare rises, wages rise also and by a greater percentage. By contrast, labor is made worse off in countries where an outflow of capital occurs.

The results in Scenario A are sensitive to the assumption of perfect capital mobility. As discussed above, countries that import capital must pay a risk premium that is a function of capital imports. The elasticity of the risk premium with respect to the volume of capital imports can be set exogenously in the model. Thus, in Scenario B, we assume that capital imports that result in a 1% increase in the capital stock generate an interest-rate risk premium of 0.1%. That is, the risk-premium elasticity is 0.1%. It is immediately apparent from the results for Scenario B that the introduction of a risk premium that reflects a decrease in international capital mobility has the effect of reducing the welfare effects of services liberalization as compared to Scenario A in which there was perfect capital mobility.

In both Scenarios A and B, there is a rise in the real return to capital. Therefore, it is likely that, over time, there will be an increase in the world's capital stock. To take this into account, in Scenario C, with the risk premium remaining at 0.1%, we increase the world's capital stock by 3%. This is the amount necessary to hold the real return to capital equal to the level in the base period. As can be seen in Table 8, the welfare effects of services liberalization are now positive for all of the countries shown.[14] For the world as a whole, welfare rises by $703.7 billion. Canada's welfare increases by $85.0 billion (14.9% of GNP), the EU by $202.4 billion (2.5% of GNP), and the United States, $222.5 billion (3.1%). There are also sizable absolute and percentage increases for the developing countries, in particular China, Indonesia, Taiwan, and Hong Kong.

It is evident accordingly that these welfare effects associated with an increase in the world's capital stock in response to an increase in the rate of return to capital are considerably larger than what we

[14] It should be noted in column (4) of Table 8 that the terms of trade are negative for all countries, except for the Rest of Cairns. The reason is that most of the countries in the model get some new capital that generates an increase in supply. The increase in supply has to be absorbed somewhere and will occur only if price falls relative to some

are used to seeing in computable general equilibrium (CGE) models, including our Michigan Model in which capital is assumed to be internationally immobile. This may not be surprising because it has been apparent from previous CGE analyses of trade liberalization that have made allowance for international capital flows that the largest welfare gains stem from these flows rather than from the removal of tariffs and other trade barriers that distort consumer choice in goods trade.[15]

Given the large potential welfare effects associated with FDI liberalization one might expect that negotiating liberalization ought to be straightforward. However, in light of the potentially large negative effects for some countries, achieving an agreement on services may actually make negotiations quite difficult.

Sectoral Results

The results for the three aggregated sectors—agriculture, manufactures, and services—are shown for the Scenario C liberalization in Table 9. For each of the three sectors, we report the percentage changes in exports, imports, sectoral output, number of firms, and the output of foreign-owned affiliates. Output increases economy-wide in just about every sector in all countries. Comparing columns (5) and (6) for the percentage changes in output and number of firms suggests a wide prevalence of the realization of economies of scale. It is also evident that there are generally significant increases in activity by foreign-owned affiliates, especially in those countries that record large increases in output.

VII. Conclusions and Policy Implications

We have presented an applied general equilibrium model of the behavior of multinational enterprises. The model was used to evaluate the likely trade, production and welfare effects of liberalization of services barriers. We find that the welfare effects of services liberalization can be quite large, especially when allowance is made for increases in the world capital stock in response to an increase in the real return to capital due to liberalization. Our results are perhaps surprising in light of

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other price of goods that are not expanding in supply. Since the ROW is not expanding in supply, the price of most goods in the world falls relative to the price of ROW goods.

previous analysis of liberalization experiments concerning trade in goods, with internationally immobile capital. But we know from previous research that capital formation can play a far more important and substantive role than consumer distortions in determining the welfare effects of goods trade. In the analysis of the behavior of multinational firms, the international allocation of physical capital must play a central role. As a consequence, the welfare effects are far more pronounced than in most previous applied general equilibrium analyses of trade liberalization.

Generally, it is the case that welfare gains emerge for those countries that succeed in attracting physical capital. The capital inflow is correlated with an expansion in output by most or all sectors of the economy. Furthermore, firms in expanding sectors also increase output, thus realizing economies of scale. The improvement in the scale of production contributes to the welfare gain for capital importing countries. By contrast, welfare effects for countries that experience a capital outflow were generally negative.

In the initial liberalization scenarios, the real return to capital increased. So we then considered the possibility that new capital formation might occur. The expanding world capital stock permitted most countries of the model to increase output economy-wide. Realization of economies of scale for most countries in the model emerged as well. As a consequence, nearly all countries gained from services trade liberalization.

Countries that may lose initially from global services liberalization may be tempted to forgo multilateral negotiations. However, in the competition for international capital, the countries that liberalize services will gain at the expense of those countries that attempt to preserve barriers. Therefore, countries are more likely to gain or minimize their losses if they engage in liberalization as well.

We noted in the Introduction that our effort should be taken as a first cut at incorporating FDI into a global CGE model in order to provide estimates of the magnitude of the size, sectoral, and country impacts of services liberalization in the major countries in the global trading system. Clearly, there is more to be done. In particular, we need better and more direct measures of services barriers. In

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[15] See for example Brown, Deardorff, and Stern (1992).

particular, the measure used in this study does not account for differences in services product quality. Also, the conceptual formulation of how MNCs make their decisions on the choices among exporting, licensing, and location of their foreign affiliates requires careful attention together with how to represent and implement these more complex behavioral characteristics of MNCs into the CGE modeling structure.

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Table 1. Trade in Services by Modes of Supply, 1997

Mode of Supply[a]	Category	Value ($bn)	Cumulative share (%)
Mode 1	Commercial services (excl. travel)	890	41.0
Mode 2	Travel	430	19.8
Mode 3	Gross output of foreign affiliates	820	37.8
Mode 4	Compensation of Employees	30	1.4
Total		2,170	100.0

[a]Modes 1, 2, and 4 are derived from balance-of-payments data.

Source: Karsenty (2000).

Table 2. Barriers to FDI

Restrictions on market entry	Bans on foreign investment in certain sectors Quantitative restrictions (e.g., limit of 25 per cent foreign ownership in a sector) Screening and approval (sometimes involving national interest or net economic benefits tests) Restrictions on the legal form of the foreign entity Minimum capital requirements Conditions on subsequent investment Conditions on location Admission taxes
Ownership and control restrictions	Compulsory joint ventures with domestic investors Limits on the number of foreign board members Government appointed board members Government approval required for certain decisions Restrictions on foreign shareholders' rights Mandatory transfer of some ownership to locals within a specified time (e.g., 15 years)
Operational restrictions	Performance requirements (e.g., export requirements) Local content restrictions Restrictions on imports of labor, capital and raw materials Operational permits or licenses Ceilings on royalties Restrictions on repatriation of capital and profits

Source: UNCTAD (1996).

Table 3. Constructed Ad Valorem Tariff Equivalent "Guesstimates" by 1-Digit ISIC Services Sectors for Selected Countries (Percentage)

Country	ISIC 5 Con-struction	ISIC 6 Wholesale & Retail Distr.	ISIC 7 Transp., Storage & Communic.	ISIC 8 Business & Fin. Services	ISIC 9 Social & Personal Services
Australia	12.0	7.4	183.4	24.8	25.4
Austria	5.0	4.6	98.7	20.1	13.9
Canada	6.0	9.0	117.7	25.9	40.2
Chile	40.0	34.4	182.2	45.2	42.9
European Union	10.0	10.0	182.0	27.2	23.6
Finland	19.0	14.6	181.0	23.8	31.7
Hong Kong	32.0	31.5	149.8	39.0	42.9
Japan	5.0	4.6	142.0	28.9	32.3
Korea	16.0	21.4	164.9	36.3	40.7
Mexico	24.0	21.3	152.3	40.9	29.8
New Zealand	5.0	13.4	181.5	30.5	36.1
Norway	5.0	13.4	122.2	25.7	24.0
Singapore	12.0	34.4	138.8	35.9	33.7
Sweden	12.0	13.4	184.2	22.5	26.9
Switzerland	5.0	8.0	178.1	27.7	32.3
Turkey	5.0	34.4	31.6	35.4	35.9
United States	5.0	4.6	111.4	21.7	31.7

Source: Hoekman (1995, pp. 355-56).

Table 4. Estimated Tariff Equivalents in Traded Services: Gravity-Model Based Regression Method

Countries/regions	Business/financial Services	Construction
	%	%
North America[+]	8.2	9.8
Western Europe	8.5	18.3
Australia and New Zealand	6.9	24.4
Japan	19.7	29.7
China	18.8	40.9
Taiwan	2.6	5.3
Other Newly Industrialized Countries	2.1	10.3
Indonesia1	6.8	9.6
Other South East Asia	5.0	17.7
India	13.1	61.6
Other South Asia[*]	20.4	46.3
Brazil	35.7	57.2
Other Latin America	4.7	26.0
Turkey*	20.4	46.3
Other Middle East and North Africa	4.0	9.5
CEECs & Russia	18.4	51.9
South Africa	15.7	42.1
Other Sub-Saharan Africa	0.3	11.1
Rest of World (ROW)	20.4	46.3

[*]Turkey and Other South Asia are not available, separately, in the U.S. data, and have been assigned estimated ROW values.

[+]North America values involve assigning Canada/Mexico numbers to the United States.

Source: Francois (1999).

Table 5. Average Gross Operating Margins of Firms Listed on National Stock Exchanges, 1994-96 by Country/Region

Country/Region	Agriculture	Manufacturing	Services
	%	%	%
Australia	8.4	15.5	16.6
Canada	32.1	22.6	32.9
Chile	39.1	40.8	44.0
China	30.6	28.1	49.5
European Union	22.9	23.8	31.6
Hong Kong	25.9	12.8	18.1
Indonesia	41.8	34.3	41.3
Japan	38.4	26.4	28.7
Republic of Korea	11.2	25.7	25.8
Malaysia	22.6	6.0	21.6
Mexico	38.4	39.3	37.2
New Zealand	33.3	16.6	26.8
Philippines	18.1	28.6	42.3
Singapore	0.0	11.1	22.0
Taiwan	19.6	25.1	41.3
Thailand	38.2	27.3	52.6
United States	36.6	21.2	42.3
Rest of Cairns Group[a]	36.3	31.1	39.0

[a]Includes Argentina, Brazil, and Colombia.

Source: Hoekman (2000). Based on calculations using Worldscope (1998) data.

Table 6. Average Gross Operating Margins of Services Firms Listed on National Stock Exchanges, 1994-96, by Country/Region and by Sector

Country/ Region	Recrea- Tion	Business services	Construc- tion	Consult- ing	Finance	Health	Hotels	Retail Trade	Wholesale	Transport/ utilities
	%	%	%	%	%	%	%	%	%	%
Australia	17.9	13.8	15.3	7.0	41.0	b	27.3	7.9	9.1	-69.3[c]
Canada	60.1	51.7	14.4	19.2	44.5	2.3	67.8	12.0	16.0	36.5
Chile	B	b	68.7	b	55.2	b	b	21.3	27.9	46.8
China	B	b	45.9	67.1	34.0	b	77.5	24.4	25.5	46.9
European Union	42.5	32.1	19.3	22.1	51.6	22.3	23.7	23.6	19.9	32.6
Hong Kong	B	6.5	12.9	11.5	25.4	b	31.3	10.1	6.9	31.0
Indonesia	B	81.1	22.9	25.3	53.6	b	68.2	26.4	24.8	45.3
Japan	28.1	31.6	14.2	28.6	40.5	40.1	27.2	32.9	15.6	20.6
Republic of Korea	B	41.2	15.3	b	b	b	b	26.7	14.9	31.2
Malaysia	13.3	-39.9[c]	18.3	14.7	28.3	24.3	38.7	11.2	10.8	30.7
Mexico	19.6	b	25.7	37.3	33.3	b	49.6	28.4	25.0	51.0
New Zealand	B	b	13.8	b	57.6	b	26.9	6.6	19.7	35.6
Philippines	19.9	b	40.2	b	53.9	b	55.8	43.9	40.3	42.3
Singapore	46.7	8.6	10.6	7.7	46.3	29.2	28.2	5.4	7.9	28.0
Taiwan	79.9	36.3	21.6	11.1	64.8	b	74.5	21.5	23.2	38.9
Thailand	85.4	35.8	38.1	-8.8	60.3	40.6	55.5	44.2	25.6	56.7
United States	46.8	56.2	20.2	-136.0	56.3	37.0	48.5	34.6	27.0	43.4
Other Cairns[a]	B	b	28.9	26.2	69.8	29.3	64.6	24.2	22.9	52.4

[a]Includes Argentina, Brazil, and Colombia.
[b]Data not available.
[c]Reflects negative gross operating margin.
Source: Hoekman (2000). Based on calculations using Worldscope (1998) data.

Table 7. Alternative Approaches to Modeling the Impact of Barriers to Trade and Investment

1. Reduction in services barriers.
Brown et al. (1996a, b) Based on 8-region, 29-sector, 1990-reference year version of Michigan CGE model, with all goods and services tradable. Uses Hoekman's (1995) "guesstimates" of tariff equivalents covering all modes of providing services, including FDI. Factors involved in FDI assumed to be part of factor markets in country of origin.
Australian Department of Foreign Affairs and Trade (1999) Based on GTAP model, version 4 (1995) database covering 45 regions and 50 sectors in each region, and on the Asia Pacific G-cubed model with 18 regions and 6 sectors, with inclusion of a financial sector and full (dynamic) macroeconomic closure. Uses modifications of Hoekman's (1995) "guesstimates" of services tariff equivalents.
Francois et al. (1996) CGE analysis using 1989 reference year and calculation of the effects of price wedges that can be attributed to the Jones Act that restricts U.S. trade in domestic water transportation (cabotage) services.
Robinson et al. (1999) Based on 10-region, 11-sector, 1995-reference year CGE model, with all goods and services tradable. Uses Hoekman's (1995) "guesstimates" of services tariff equivalents, with allowance for growth in total factor productivity (TFP) stimulated from imports of services by developing countries.
Tamms (1999) Constructs cost functions using data for 50 airlines from 27 countries for 1982-95 and estimates a frontier function to determine the extent to which an airline lies off its frontier.
Hertel (2000) Based on a 19-region, 22-sector CGE model, with GTAP 1995 reference-year data projected to year 2005. Post-Uruguay Round tariff rates are used for agriculture and manufactures. Barriers for business services and construction are based on gravity-model estimates in Francois (1999).
2. Flows of FDI respond to changes in rates of return.
Martin and Yagashima (1993) Analysis of trade liberalization in Asia-Pacific region coupled with assumed changes in inward FDI.
Donovan and Mai (1996) Use MEGABARE model to estimate effects of trade liberalization with varying degrees of international capital mobility responding to differential rates of return on investment.
McKibbin and Wilcoxen (1996) Use G-Cubed model with international capital mobility responding to changes in differential sectoral rates of return to capital.
Bora and Guisinger (1997) Analysis of investment liberalization in APEC, with allowance for international capital mobility.

Adams (1998) Based on GTAP model, with 14 regions and 37 perfectly competitive sectors, and post-NAFTA database. Each region contributes a fixed proportion of its income to a global savings pool. Investment allocation depends upon relative rates of return. Focus is on effects of trade liberalization in APEC. FDI is not modeled explicitly.
Dee et al. (1996) Based on 13-region, 4-sector, 1992-reference year CGE model, with all goods and services tradable, monopolistic competition in the resources, food processing, and manufacturing sectors, and allowance of capital accumulation and international factor mobility. Uses Hoekman's (1995) "guesstimates" of services tariff equivalents.
Dee et al. (1998) Based on same model and data as Dee et al. (1996), with analysis of APEC sectors selected for "early voluntary sectoral liberalization."
3. Links between parents and foreign affiliates and distinctions between foreign and domestic firms.
Markusen et al. (1995) Analysis of trade liberalization in the automobile industry in the NAFTA countries, using a model with multinational firms or national firms responding to changes in their market shares.
Markusen et al. (1999) Conceptual static and dynamic CGE model used to analyze how inward FDI in producer services may complement domestic skilled labor, affect the pattern of trade in goods, and determine the characteristics of the dynamic adjustment path.
Benjamin and Diao (1997) Based on 10-region, 11-sector CGE model, using data for the early 1990s, with the focus on liberalization of cross-border trade of other private services in APEC. Service providers in the single services sector are imperfectly competitive and have fixed costs, and are able to price discriminate across countries. Liberalization is modeled as both reducing fixed costs and removing the market segmentation that permits price discrimination. FDI is not modeled explicitly, but it could be.
Petri (1997) Based on 6-region, 3-sector CGE model, using 1992 GTAP dataset, with FDI distinguished between activities of domestic and foreign-owned firms. Products differentiated by both country of ownership and place of production. Capital allocation between sectors and between domestic and foreign investments responds to changes in rates of return and to investor preferences. Barriers to FDI modeled as a tax on FDI profits.
Dee and Hanslow (2000) Based on 19-region, 3-sector, 1995-reference year CGE model, with modifications of Petri's (1995) framework and updating of data on FDI stocks, output, and rates of return. Used averages of services barriers for banking and telecommunications services contained in Kalirajan et al. (1999) and Warren (2000).

TABLE 8

SUMMARY RESULTS FROM FREE MARKET ACCESS BY FOREIGN FIRMS PERCENT CHANGE IN IMPORTS, EXPORTS, TERMS OF TRADE, WELFARE AND WAGES

Country	Imports Billions	Exports Billions	Terms of Trade Percent Change	Equivalent Variation		Wage Percent Change
				Percent	Billions	
(1)	(2)	(3)	(4)	(5)	(6)	(7)
A. Perfect International Capital Mobility, Fixed World Capital Stock						
Industrialized Countries						
Australia	1.1	1.6	-0.1	1.8	6.0	3.3
Canada	17.8	33.6	-4.1	14.8	84.0	14.1
European Union	16.8	8.2	0.4	0.5	42.4	1.7
Japan	12.1	-7.6	1.6	-2.0	-103.7	-0.8
New Zealand	0.8	1.8	-2.0	9.1	5.2	11.9
United States	30.4	33.3	0.1	0.5	35.0	2.9
Developing Countries						
Asia						
China	6.2	7.4	-0.4	3.8	26.9	4.4
Hong Kong	4.3	6.3	-0.4	6.6	6.6	13.0
Indonesia	2.9	9.7	-5.8	15.6	30.8	19.9
Korea	2.0	-1.6	1.1	-2.8	-12.3	-1.6
Malaysia	1.8	1.7	0.2	2.3	2.1	3.7
Philippines	0.8	1.1	-0.6	2.3	1.6	4.5
Singapore	5.0	6.6	-1.0	1.7	1.0	6.6
Taiwan	6.1	9.8	-2.3	7.6	20.7	5.8
Thailand	0.6	-0.9	0.7	-2.2	-3.6	-0.9
Other						
Chile	0.1	-0.3	0.9	-2.0	-1.3	-0.7
Mexico	1.2	-1.4	1.1	-4.3	-11.7	-2.0
Rest of Cairns Group	3.3	-3.3	2.0	-3.7	-39.6	-2.8
Total	113.0	105.9			90.3	

TABLE 8 (continued)

SUMMARY RESULTS FROM FREE MARKET ACCESS BY FOREIGN FIRMS
PERCENT CHANGE IN IMPORTS, EXPORTS, TERMS OF TRADE, WELFARE AND WAGES

Country	Imports	Exports	Terms of Trade	Equivalent Variation		Wage
	Billions	Billions	Percent Change	Percent	Billions	Percent Change
(1)	(2)	(3)	(4)	(5)	(6)	(7)
B. Risk Premium Elasticity = 0.1, Fixed World Capital Stock						
Industrialized Countries						
Australia	1.1	1.4	-0.1	1.5	5.0	3.1
Canada	17.1	31.1	-3.8	12.9	73.7	13.0
European Union	16.3	7.9	0.4	0.5	38.0	1.7
Japan	11.0	-6.1	1.5	-1.7	-88.4	-0.6
New Zealand	0.8	1.6	-1.7	7.5	4.3	10.8
United States	29.7	31.7	0.1	0.3	23.2	2.9
Developing Countries						
Asia						
China	5.9	6.8	-0.4	3.2	22.9	4.0
Hong Kong	3.8	5.3	0.0	5.4	5.5	12.3
Indonesia	2.8	8.7	-5.3	13.1	25.8	18.0
Korea	2.0	-1.0	0.9	-2.3	-10.1	-1.2
Malaysia	1.7	1.5	0.2	1.9	1.8	3.5
Philippines	0.8	1.1	-0.6	1.9	1.3	4.3
Singapore	4.7	6.2	-0.9	1.3	0.7	6.4
Taiwan	5.8	9.3	-2.2	6.8	18.5	5.4
Thailand	0.7	-0.6	0.5	-1.8	-2.9	-0.4
Other						
Chile	0.1	-0.2	0.8	-1.6	-1.0	-0.3
Mexico	1.3	-0.7	0.9	-3.2	-8.8	-1.1
Rest of Cairns Group	2.9	-2.7	1.8	-3.2	-34.1	-2.3
Total	108.5	101.3			75.6	

TABLE 8 (continued)

SUMMARY RESULTS FROM FREE MARKET ACCESS BY FOREIGN FIRMS
PERCENT CHANGE IN IMPORTS, EXPORTS, TERMS OF TRADE, WELFARE AND WAGES

Country	Imports	Exports	Terms of Trade	Equivalent Variation		Wage
	Billions	Billions	Percent Change	Percent	Billions	Percent Change
(1)	(2)	(3)	(4)	(5)	(6)	(7)
C. Risk Premium Elasticity = 0.1, World Capital Stock Increased by 3%						
Industrialized Countries						
Australia	1.3	2.3	-0.6	4.9	16.8	4.6
Canada	16.7	35.4	-4.4	14.9	85.0	14.0
European Union	-39.0	-3.4	-2.2	2.5	202.4	2.3
Japan	-4.0	3.9	-0.3	0.5	25.7	0.6
New Zealand	0.7	2.0	-2.5	10.5	6.0	12.5
United States	25.0	36.4	-0.6	3.1	222.5	4.0
Developing Countries						
Asia						
China	3.5	13.7	-1.6	6.0	42.8	6.5
Hong Kong	6.4	6.2	-0.7	13.4	13.5	15.1
Indonesia	2.2	9.9	-6.3	16.9	33.3	20.2
Korea	0.3	-0.1	-0.2	1.4	6.4	0.6
Malaysia	1.8	3.4	-0.5	4.7	4.4	5.3
Philippines	1.1	1.1	-1.1	8.3	5.7	7.2
Singapore	4.6	6.3	-1.3	4.3	2.5	5.9
Taiwan	5.2	12.3	-2.9	7.7	21.2	6.2
Thailand	1.2	0.7	-0.4	4.4	7.1	3.2
Other						
Chile	0.0	0.2	-0.3	2.7	1.7	2.4
Mexico	1.1	2.7	-0.1	0.2	0.5	1.5
Rest of Cairns Group	0.2	-1.0	0.1	0.6	6.2	-0.1
Total	28.4	132.0			703.7	

TABLE 9

PERCENT CHANGE IN EXPORTS, IMPORTS, OUTPUT, NUMBER OF FIRMS AND OUTPUT OF FOREIGN OWNED FIRMS BY SECTOR

FREE TRADE IN SERVICES - RISK PREMIUM ELASTICITY 0.1
WORLD CAPITAL STOCK AUGMENTED BY THREE PERCENT
Percent Change

Country	Sector	Exports	Imports	Output	No. Firms	Output of Foreign-Owned Firms
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Industrialized Countries						
Australia	Agr.	1.0	-1.0	3.5	11.0	-5.1
	Mfr.	7.9	1.8	7.6	-7.0	36.8
	Ser.	-0.2	2.8	2.1	3.3	0.7
	AVERAGE	3.7	1.9	3.5	-0.9	18.3
Canada	Agr.	2.4	14.5	14.3	9.5	95.6
	Mfr.	23.9	7.3	26.1	10.3	54.1
	Ser.	-9.5	20.5	8.4	2.2	70.4
	AVERAGE	17.8	9.7	15.3	6.1	56.9
European Union	Agr.	1.9	-21.5	9.9	-13.0	59.1
	Mfr.	-0.9	-0.9	2.1	0.1	64.4
	Ser.	0.8	-3.4	1.6	0.4	62.9
	AVERAGE	-0.4	-4.6	2.0	0.1	62.0
Japan	Agr.	2.7	-7.1	0.6	3.6	114.6
	Mfr.	0.4	3.1	-0.4	0.3	74.5
	Ser.	3.5	-4.8	-0.4	0.5	53.3
	AVERAGE	0.8	-1.0	-0.4	0.4	68.7
New Zealand	Agr.	28.0	-20.4	18.1	20.2	68.3
	Mfr.	11.4	4.9	12.4	7.5	42.7
	Ser.	-0.2	8.5	7.8	1.0	47.1
	AVERAGE	11.6	4.4	10.2	4.6	52.6
United States	Agr.	4.5	-6.5	5.6	7.0	105.8
	Mfr.	6.1	4.4	5.4	-1.5	58.4
	Ser.	2.3	1.5	3.1	-0.6	97.6
	AVERAGE	5.1	2.9	3.9	-1.0	71.2

TABLE 9 (continued)

PERCENT CHANGE IN EXPORTS, IMPORTS, OUTPUT, NUMBER OF FIRMS AND OUTPUT OF FOREIGN OWNED FIRMS BY SECTOR

FREE TRADE IN SERVICES - RISK PREMIUM ELASTICITY 0.1
WORLD CAPITAL STOCK AUGMENTED BY THREE PERCENT

Percent Change

Country	Sector	Exports	Imports	Output	No. Firms	Output of Foreign-Owned Firms
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Developing Countries-Asia						
China	Agr.	1.7	1.0	5.4	0.5	103.6
	Mfr.	6.6	2.8	6.9	0.6	73.6
	Ser.	8.6	-1.9	6.6	-1.6	113.8
	AVERAGE	6.5	2.2	6.5	0.1	93.5
Hong Kong	Agr.	41.0	-2.7	42.2	83.6	42.0
	Mfr.	14.0	7.6	15.5	21.6	25.4
	Ser.	4.1	1.9	7.4	5.3	11.5
	AVERAGE	8.3	5.9	10.0	11.6	25.0
Indonesia	Agr.	34.9	-20.6	23.8	10.7	81.8
	Mfr.	13.4	6.1	18.5	-1.8	97.5
	Ser.	-2.2	11.4	10.9	3.6	96.8
	AVERAGE	18.7	4.6	16.1	0.5	86.1
Korea	Agr.	0.8	-7.1	1.5	4.0	18.8
	Mfr.	-0.5	2.6	-0.2	-1.2	60.9
	Ser.	2.1	-2.0	0.5	0.2	42.0
	AVERAGE	-0.1	0.2	0.2	-0.8	55.5
Malaysia	Agr.	7.4	-2.1	6.0	-5.5	62.9
	Mfr.	3.6	3.5	3.6	2.1	2.6
	Ser.	4.6	-3.7	4.1	2.4	23.8
	AVERAGE	4.1	2.4	4.1	1.9	17.9
Philippines	Agr.	-1.2	-2.3	6.2	4.7	51.3
	Mfr.	5.9	4.4	7.3	-0.3	71.7
	Ser.	1.7	1.9	4.1	2.8	96.2
	AVERAGE	4.2	3.2	5.7	1.6	70.9
Singapore	Agr.	21.9	2.0	17.0	48.1	-0.3
	Mfr.	4.3	4.6	4.7	0.4	18.2
	Ser.	7.7	-1.7	6.9	1.1	24.6
	AVERAGE	5.3	3.6	5.8	1.5	21.3
Taiwan	Agr.	3.4	8.9	8.3	4.7	57.4
	Mfr.	10.3	4.3	11.6	-2.0	69.8
	Ser.	-0.8	6.5	4.9	2.9	96.9
	AVERAGE	9.5	4.9	8.4	-1.0	71.0
Thailand	Agr.	2.3	-7.7	3.6	2.0	146.7
	Mfr.	0.4	3.3	1.6	-0.7	79.0
	Ser.	3.4	-1.8	3.3	0.4	123.8
	AVERAGE	1.1	1.5	2.5	-0.2	105.2

TABLE 9 (continued)

PERCENT CHANGE IN EXPORTS, IMPORTS, OUTPUT, NUMBER OF FIRMS AND OUTPUT OF FOREIGN OWNED FIRMS BY SECTOR

FREE TRADE IN SERVICES - RISK PREMIUM ELASTICITY 0.1
WORLD CAPITAL STOCK AUGMENTED BY THREE PERCENT
Percent Change

Country	Sector	Exports	Imports	Output	No. Firms	Output of Foreign-Owned Firms
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Developing Countries						
Non-Asia						
Chile	Agr.	0.9	-6.8	2.1	-1.7	111.3
	Mfr.	1.1	1.7	0.9	1.0	106.8
	Ser.	2.0	-2.6	0.8	2.2	102.1
	AVERAGE	1.2	0.1	1.0	1.4	107.5
Mexico	Agr.	6.9	-2.1	2.9	-1.2	111.6
	Mfr.	2.6	2.4	1.7	-1.6	108.7
	Ser.	3.1	-2.5	0.5	0.0	83.2
	AVERAGE	3.2	1.6	1.4	-1.0	105.6
Rest of Cairns Group	Agr.	-1.7	-10.6	0.1	-0.1	109.8
	Mfr.	-1.6	2.6	-0.3	-0.5	88.3
	Ser.	1.8	-3.5	0.1	0.0	88.9
	AVERAGE	-1.2	0.3	0.0	-0.3	90.7