PRODUCTIVITY COMMISSION

Global Gains from Liberalising Trade in Telecommunications and Financial Services

Staff Research Paper

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The Productivity Commission

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Preface

Service industries account for a growing share of many developed economies. At the same time, international trade in services is growing. Service industries are also subject to a range of regulations, which can constrain their performance and impose costs on communities. Estimating the potential gains from liberalising service industries requires that such regulations be identified and their effects on service industries assessed.

In recent years, the Productivity Commission has played a leading international research role in quantifying and analysing the effects of regulations on service industries. Recent developments in this area of economic research have involved important innovations in modelling and have identified the types and quality of data required to strengthen the analysis of regulations.

In a collaborative project, researchers from the Commission and the Australian National University quantified regulations affecting trade in banking (Kalirajan et al. 2000) and telecommunications (Warren 2000a, 2000b), among other sectors, for selected economies. Recently, Doove et al (2001) applied innovative methods to estimate impacts of regulation on air transport, telecommunications and electricity industries.

This paper builds on part of the above research by analysing the impacts on national and global economies of removing trade barriers on two types of services: telecommunications and financial services.

The results, while suggestive of the gains from liberalisation, are the product of analytical methods that are still being refined and developed. They are being published to facilitate further improvements, including by other researchers. Feedback on this paper is welcomed.

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Abbreviations

ABS	Australian Bureau of Statistics
APEC	Asia-Pacific Economic Cooperation
CES	constant elasticity of substitution
CET	constant elasticity of transformation
CGE	computable general equilibrium
EU	European Union
FDI	foreign direct investment
FTAP	Foreign direct investment and Trade Analysis Project model
FTAP2	Foreign direct investment and Trade Analysis Project model version 2
GATS	General Agreement on Trade in Services
GATT	General Agreement on Tariffs and Trade
GDP	gross domestic product
GNP	gross national product
GTAP	Global Trade Analysis Project model
UR	Uruguay Round of multilateral trade negotiations
USA	United States of America
WTO	World Trade Organization

Key findings

- Barriers to trade in telecommunications and financial services are higher in developing economies than developed economies.
- Removing all barriers to trade in telecommunications and financial services is estimated to increase world real GNP by some $US 48 billion. In both cases there are significant differences in effects on GNP in different regions.
- Regions with high barriers, offering significant scope to liberalise, gain most from complete liberalisation. Regions with low barriers gain less. This indicates that developing regions should have the strongest incentives to extend their GATS commitments to liberalise in these sectors.
- Removing barriers to trade in these sectors creates a number of effects, for the world as a whole and for individual regions. The model classifies these effects into changes in the allocation of resources , returns to the world capital stock, the terms of trade, product variety and foreign direct investment (FDI) income.
- For the world as a whole, the gain from the reallocation of resources is found to dominate the gains from an increase in returns to the world capital stock and product variety when removing barriers to trade in telecommunications. When removing barriers to trade in financial services, the gain from an increase in returns to the world capital stock dominates the gains from the reallocation of resources and product variety.
- For regions with high barriers, the gains from removing barriers to trade in telecommunications and financial services result from an improved allocation of resources, increased capital via FDI inflows and increased product variety. For regions with few barriers, the gains from removing barriers to trade in telecommunications and financial services result from improvements in their terms of trade and increased FDI income from investment in other regions.
- Unlike the typical effects of removing barriers to goods trade, regions with the highest barriers to trade experience the biggest expansion in telecommunications and financial services output.
- Commercial presence of foreign firms via FDI plays an important role in delivering telecommunications and financial services. Thus it is vital to model FDI explicitly when estimating the gains from liberalising trade in these sectors.

Overview

At the present time various multilateral and plurilateral trade liberalisation agreements are being negotiated around the world under the auspices of numerous organisations, including the World Trade Organization (WTO) and Asia-Pacific Economic Cooperation (APEC). There are also an increasing number of bilateral agreements being negotiated by members of these organisations. Almost all of these negotiations include trade in various services. As such, understanding the likely economic effects of liberalisation of services trade is important for bringing transparency to the domestic and international trade policy debate.

This paper quantifies the economic impact of complete liberalisation of trade in two important services sectors, telecommunications and financial services. WTO members have undertaken scheduled commitments to liberalise these sectors at least partially (The Secretariat of the Council for Trade in Services 1998a, 1998b). By quantifying the economic effects of complete liberalisation in telecommunications and financial services, it is hoped that this study will illuminate for WTO members the gains that might be achieved by extending their commitments to liberalise these sectors.

The General Agreement on Trade in Services (GATS) identifies two types of barriers to trade in services: barriers to market access which restrict the establishment and ongoing operations of all firms in a sector, and restrictions on national treatment which impede the establishment and ongoing operations of foreign firms in a sector. Market access barriers are generally non-discriminatory barriers, whereas restrictions on national treatment are discriminatory. Market access barriers are significant in telecommunications, whereas restrictions on national treatment are significant in financial services. Barriers to trade in telecommunications and financial services are higher in developing regions than in developed regions.

This paper uses recent estimates of the magnitude of these barriers for telecommunications and financial services. These are barriers to trade remaining after full implementation of the Uruguay Round of multilateral trade agreements. FTAP2, a 'computable general equilibrium (CGE) model' of world trade and investment, is adopted for analysis of the effects. Using this model, completely liberalising trade in telecommunications and financial services is estimated to increase world real gross national product (GNP) by 0.2 per cent. The model used to

estimate these effects only captures the static gains from trade liberalisation. As such, the dynamic effects of trade liberalisation are not captured in the results. Thus, the estimated gains from the liberalisation can be interpreted as the lower bounds of all potential gains to regional and world economies.

Box 1 **Key features of FTAP2**

FTAP2 is a multi-country model which embodies interactions between 19 regions and eight sectors. It models the activities of three economic 'agents' in each region: firms, government and a representative household (that is, private citizens). The representative household is assumed to own all primary factors of production: land, natural resources, capital and labour. The supplies of land, natural resources and labour are given in each region. Land and natural resources are used only by the primary industries sector and in fixed quantities. Labour is assumed to be mobile among sectors within each region, but not between regions. Capital is mobile among sectors within each region and between regions.

All regions have their own firms operating in all sectors. The model assumes that all local firms in a given sector are identical in size but produce slightly differentiated products. It is further assumed that, in each sector of a given region, the firms are multinational enterprises with their headquarters located domestically and wholly owned affiliates operating simultaneously in the same sectors of other foreign regions.

The model assumes that the objective of a multinational firm is to maximise the return for its home region's investor (capital owner). As the firm has special knowledge about the sector in which it operates, it will relocate its sector-specific operations between home and foreign regions and across all foreign regions until the post-tax rate of return on capital is maximised. This involves direct investment overseas, which facilitates the firm's commercial presence in foreign markets. The multinational firm of a given sector combines its home-sourced capital with land, labour and other intermediate inputs, obtained from the regions where its operation is located, to produce goods and services for local consumers and exports. In equilibrium, the expected rates of return to capital are equalised for all firms originating from the same region, but not for firms located in the same regions.

The global gains from removing barriers to trade in these sectors come from three sources: improvements in the allocation of resources, increased returns to the world stock of capital, and increased product variety. Individual regions also experience these effects, as well as other effects from changes in their terms of trade and income from foreign direct investment (FDI). For individual regions, these five effects can cause either gains or losses in real GNP. High barrier regions gain from improvements in the allocation of resources, increased capital via inward FDI, increased product variety, and lose from changes in their terms of trade and increased payments on inward FDI. Low barrier regions gain from changes in their

terms of trade and increased FDI income, and lose from the capital allocative effect on output and product variety, and decreased capital via outward FDI.

Liberalising trade in telecommunications is estimated to increase world GNP by 0.1 per cent (roughly $US 24 billion), with almost all of the gains coming from removing non-discriminatory barriers. Liberalising trade in financial services is also estimated to increase world GNP by 0.1 per cent. The nature of the barriers to trade in financial services means that almost all of the gains come from removing trade barriers that discriminate against foreign firms. However, the gains for most regions are highest when *all* restrictions are removed, despite significant variation in regional GNP gains.

The global gains from liberalising telecommunications are overwhelmingly derived from improvements in the allocation of resources. The scale of non-discriminatory barriers to trade in telecommunications causes a significant increase in domestic capital and labour and foreign capital in this sector, at the expense of other sectors, when these trade barriers are removed. This is captured as an improvement in the allocation of resources. The global gains from liberalising financial services are mainly due to an increase in the returns to the world capital stock. The importance of discriminatory barriers to trade in financial services means that their reduction causes a significant increase in foreign-owned capital in this sector, at the expense of domestically owned capital. This is captured as an increase in the returns to the world capital stock.

The benefits from liberalising trade in these two sectors are distributed to almost all regions, according to the model used in this study. The largest gains accrue to high-barrier developing regions while smaller gains accrue to low-barrier developed regions. The modelling indicates that developing regions have strong incentives to extend their GATS commitments to liberalise in these sectors. The modelling also indicates that commercial presence of foreign firms via FDI is an important mode of delivering telecommunications and financial services. So it is vital to model changes in FDI when estimating gains from liberalising trade in these sectors.

1 Introduction

Trade in services is a rapidly growing area of international trade. Since the General Agreement on Trade in Services (GATS) was implemented in 1995, multilateral trade in a few key services sectors has been liberalised further. In most countries, however, barriers to trade in services are still significant, which implies that potentially large gains could be expected from further liberalisation.

In 1999, a report by the WTO Council for Trade in Services noted that there had been no comprehensive empirical study of the effects of multilateral liberalisation of services trade.[1] Despite some research on this issue,[2] the impact of multilateral liberalisation of trade in services, especially individual service sectors, on economies and the world as a whole, has yet to be rigorously assessed.

This study provides a quantitative analysis of the effects of trade liberalisation on two large service sectors: telecommunications and financial services. WTO members have already undertaken scheduled commitments to liberalise these two sectors. These commitments, however, are only the beginning of a long process of negotiation towards full liberalisation. Recent studies indicate that despite the agreements reached, most WTO members' commitments to liberalising trade are only partial in these two services sectors (The Secretariat of the Council for Trade in Services 1998a, 1998b). Extensive negotiations are still needed for WTO members to commit to more open trade policies, not only in telecommunications and financial services but also in other service sectors (WTO Secretariat 1999).

By quantifying the effects of complete liberalisation in telecommunications and financial services, this study is aimed at illuminating for WTO members the gains that might be achieved by further trade liberalisation in these two sectors.[3]

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1 '…[T]o the knowledge of the Secretariat, there is not a single empirical study analysing on a comprehensive basis – across countries, sectors and modes – the effects on services trade attributable to scheduled commitments.' (The Secretariat of the Council for Trade in Services 1999).

2 See for example Hertel (1999), Markusen, Rutherford and Tarr (1999), McKibbin (1999) and Dee and Hanslow (2000).

3 The analysis in this study includes some regions that are not currently WTO members such as China and Taiwan, although both of these economies are expected to become WTO members in the near future. As such, the analysis encompasses a greater coverage of regions of the world than just those regions represented by the WTO.

Previous studies have attempted to quantify the effects of liberalising services trade using a CGE approach.[4] A recent Productivity Commission study (Dee and Hanslow 2000) addressed some of their shortcomings. Dee and Hanslow (2000) uses a three-sector multi-region CGE model (FTAP), with international trade and investment flows, to quantify the effects of removing barriers to trade in aggregate services. It finds that complete liberalisation of trade in services leads to a gain of around $US136 billion or 0.46 per cent of world real gross national product (GNP). The gains vary among regions: the largest gains are projected to go to the regions with the highest barriers to trade in services, while regions with low barriers are projected to experience smaller gains or, in some cases, losses.

The inclusion of a single services sector in Dee and Hanslow (2000) confines the analysis largely to the regional effects of trade liberalisation. The GATS provides for sectoral negotiations because it requires 'positive listing'.[5] A disaggregated approach should provide a better breakdown of the sectoral effects of trade liberalisation. This study extends Dee and Hanslow (2000) to focus on two individual sectors: telecommunications and financial services. The FTAP model is modified to suit the special characteristics of these two sectors, and like Dee and Hanslow (2000), it incorporates recent studies by Warren (1999) and Kalirajan et al. (1999) to provide barrier estimates for these two sectors, but in a more targeted way. The database used here allows for the full implementation of the Uruguay Round of multilateral trade negotiations (UR) to measure the effects of removing barriers to trade in telecommunications and financial services.[6] The model database did not originally contain distinct telecommunications and financial services sectors. These were disaggregated using output shares based on stylised facts as the information on regional services sectors is limited. As such, the results presented in this study partly depend on the reliability of these stylised facts. In future work, these shares should be drawn from regional input-output tables with the necessary sectoral detail for more services, including those examined here.

4 For example, see Brown et al. (1995), Petri (1997), Hertel (1999) Markusen, Rutherford and Tarr (1999) and McKibbin (1999). Most of these are somewhat limited in their approach to modelling trade in services. Brown et al. (1995) and McKibbin (1999) model foreign portfolio, rather than direct, investment in services, one of the key vehicles by which services are traded internationally. Petri (1997) liberalises trade in goods and FDI in services, but uses barrier data that is outdated. Hertel (1999) does not liberalise FDI in services only cross-border trade. Markusen, Rutherford and Tarr (1999) only model FDI in services that are used as intermediate inputs into production, not for final demand.

5 Under the positive list approach, the requirement is to list those sectors or measures in respect of which obligations are to be assumed. Under the negative list approach, governments must specify the sectors or measures to which obligations do not apply (WTO Secretariat 1996).

6 The UR is expected to lead to little or no liberalisation in services (Hoekman 1995) and none was assumed in this implementation of the agreements.

The paper is organised as follows. The remainder of this chapter highlights some unique features of services trade and how they influence liberalisation of trade in telecommunications and financial services. Chapter 2 outlines the analytical framework, FTAP2, a multi-region, multi-sector global general equilibrium model incorporating FDI flows. Chapter 3 discusses the nature of trade liberalisation policies under the GATS and the main economic effects of these policy changes. The estimated effects of trade liberalisation in telecommunications and financial services are presented separately and discussed in chapters 4 and 5. Chapter 6 summarises the policy implications of this study and suggests avenues for further research.

1.1 The GATS and unique features of services trade

The GATS framework

The GATS negotiated during the UR is perhaps the most significant addition to the "rules" of the multilateral trading system since the General Agreement on Tariffs and Trade (GATT) in 1948. The GATS extends internationally agreed rules and commitments into a rapidly growing area of international trade. The GATS represents a major step beyond the GATT. It extends the GATT's principles not only to border measures, but also to regulations relating to access to domestic markets for domestic and foreign service suppliers. Unlike the GATT, however, many of the important rules of the GATS apply only when commitments are made for particular sectors (WTO Secretariat 1999). This gives a much greater sectoral focus to trade liberalisation in services than for goods under the GATT.

At the end of the UR negotiations in 1993, negotiations in many key service sectors were incomplete. Sectoral negotiations continued and agreements were reached on basic telecommunications and financial services in February and December 1997, respectively (see box 1.1). The new commitments by WTO members took effect from January 1998 for telecommunications and from January 1999 for financial services (WTO Secretariat 1999). Even so, most WTO members have made only partial commitments to opening trade in these sectors (The Secretariat of the Council for Trade in Services 1998a, 1998b). Therefore, estimating the effects of complete liberalisation may show WTO members the consequences of increasing their scheduled commitments in future trade negotiations.

Box 1.1 **The GATS after the Uruguay Round**

Attached to the GATS are additional agreements called 'protocols', which deal with the results of subsequent negotiations.

- Second protocol: financial services (adopted 21 July 1995, entered into force 1 September 1996)
- Third protocol: movement of natural persons (adopted 21 July 1995, entered into force 30 January 1996)
- Fourth protocol: basic telecommunications (adopted 30 April 1997, entered into force 5 February 1998)
- Fifth protocol: financial services (adopted 14 November 1997, entered into force 1 March 1999

The GATS contains a 'built-in agenda' requiring a new round of negotiations to begin in January 2000.

Source: WTO (2001).

The nature of trade in services

Understanding the issues raised by liberalisation of services trade requires understanding of the unique features of trade in services. Services are different in nature from goods. Goods can be transported and consumed or used away from their production location. The consumers of many services, however, cannot be easily separated, geographically, from the producer of the services.

The GATS sets out a comprehensive and broad definition of trade in services in terms of four different modes of delivery:

- cross-border supply;
- consumption abroad;
- commercial presence in the consuming country; and
- the presence of natural persons (WTO Secretariat 1999).

This definition is important for understanding the special features of trade in services and the policy issues involved in liberalising this trade.

Cross-border supply resembles most closely merchandise goods: it is the service itself that crosses national borders, such as international telephone calls and international financial transactions.

Consumption abroad refers to the supply of a service in one country to the consumers of another country. This may involve, for example, consumers travelling to the supplying country for tourist or educational purposes. Cross-border supply and consumption abroad are similar modes of delivery in that they do not require suppliers to be admitted to the consuming country.

Commercial presence of a foreign supplier, via FDI or joint ventures, in the territory of another country is another mode of delivery.

The movement of natural persons can be seen as an extension of commercial presence. For example, the establishment of a local affiliate by a foreign service supplier may require some foreign managers or specialists to be employed. It can also be seen as an important mode in its own right, as is the case with personal services such as immigrant house maids.

For many economies, cross-border supply and commercial presence are important modes of supplying foreign telecommunications and financial services, with consumption abroad and the presence of natural persons being less important modes. Currently, cross-border supply is still the dominant mode of trade in these services. In the mid-1990s the share of cross-border supply in world output of telecommunications and financial services was 5.9 and 3.4 per cent respectively, compared with 1.0 and 1.7 per cent for commercial presence respectively.[7] The apparent low share of commercial presence in consuming regions is most likely a result of restrictions currently in place in these two sectors. Therefore there is great potential for expanding trade in telecommunications and financial services through increased commercial presence of foreign service suppliers, if trade barriers in these two sectors were to be removed.

1.2 Gains from liberalising trade in telecommunications and financial services

The gains from merchandise trade depend on changes in production and consumption induced by expanded opportunities of exchange. Liberalising trade in services is also expected to confer gains to liberalising countries. However, the nature of services trade means the gains from trade may not be the same as from trade in goods. To trace the source of gains in services trade an understanding of the effect of barriers to trade in services is required.

[7] By way of comparison, cross-border supply as a proportion of world output of goods is 21 per cent. These estimates are taken from the FTAP2 database, the construction of which is summarised in chapter 2.

The existence of diverse modes of supply makes the identification of barriers to trade in services a complicated task. Any restriction imposed on the supply of a service by any of the four modes of delivery should be regarded as a barrier to trade. Barriers can range from conventional border regulations restricting the cross-border supply of services, such as tariff and non-tariff barriers, to domestic regulations restricting the establishment of a foreign company.

Of all the barriers to trade in services, restrictions on cross-border supply are probably the least effective. First, the nature of some services (for example, those transmitted electronically) makes it difficult for governments to monitor and quantify the level of trading activities, let alone to impose any enforceable restrictions on these activities. Second and perhaps more important, some cross-border services may be quite different from domestic services, so there may be no pressure to restrict their cross-border trade. Contrast this with cross-border trade in goods, where many imported goods are directly substitutable for their domestic counterparts. Many imported telecommunication services are quite different from domestic telecommunication services, in that they are not substitutable for each other in intermediate input use or final demand. For example, imported telecommunication services are combined with domestic telecommunication services to deliver international telephone calls. Imported financial services have similar characteristics in this regard to imported telecommunications.[8]

Restricting imported telecommunications and financial services harm domestic as well as foreign producers of these services. For example, restrictions on imported telecommunication services make international telephone calls more expensive. Reduced consumption of international telephone calls implies lower demand for imported and domestic telecommunication services used as inputs to international telephone calls. This effect is quite different from that of restricting cross-border trade in most goods and services, where domestic producers of the similar good or service usually benefit from the import protection.

Gains from trade in services also come from reallocation of primary factors of production across borders. This reallocation of factors is associated with removing barriers to commercial presence of foreign service suppliers. Compared with cross-border supply, telecommunications and financial services delivered through commercial presence of foreign firms potentially represent a much larger portion of total trade in these services.

Restricting the entry to, or the operation of a firm in, a sector is a restriction on the mobility of the primary factors of production used by that firm. Imposing a barrier to foreign commercial presence distorts primary factor markets, generating a ‘rent’

8 This is discussed further in chapter 2.

(a mark up of price over opportunity cost) to incumbents and a 'tax' on local capital users. It generates losses in allocative efficiency for the domestic economy and for the world as a whole.[9] Removing a barrier to commercial presence returns the rent from incumbents to capital users and other capital suppliers. With a liberalised market, foreign firms are able to exploit new profit opportunities by increasing investment in the local economy, which in turn increases economic activity in the receiving economy.

A more efficient use of global resources lowers the cost of producing telecommunications and financial services which benefits consumers, and producers who use them as intermediate inputs.[10] The world economy as a whole benefits from an improved allocation of resources and cheaper services. For individual regions, however, the size of the benefits varies depending on trade barriers and trade linkages.

The foregoing discussion suggests that the telecommunications and financial services sectors have some characteristics that are distinct from trade in most goods and services. It implies that analysing the effects of liberalising trade in these sectors requires a clear sectoral perspective, in order to accommodate the differences. To quantify the impact of liberalising trade in these services on regional economies, in a consistent manner, requires a general equilibrium framework. This framework should incorporate not only cross-border trade flows but also bilateral foreign capital allocation at the sectoral level, so that services trade captures cross-border supply and foreign commercial presence.

9 Appendix A contains a diagrammatic illustration of the comparative static gains from removing barriers to commercial presence.

10 In addition, a region may benefit from positive externalities associated with the inflow of foreign capital which embodies new technologies and managerial skills.

2 Analytical framework

The model used in this study is FTAP2, which is a modified version of the FTAP model applied in Dee and Hanslow (2000).[1] The FTAP model was developed at the Productivity Commission from the GTAP model, a multiregion CGE trade model (Hertel 1997). The main features distinguishing FTAP2 from a standard CGE trade model, such as GTAP, are:

- its description of bilateral capital flows between regions at the sectoral level, primarily to account for the supply of services abroad through commercial presence;
- the treatment of the cross-border supply of some services is different from that for most goods and other services; and
- the treatment of barriers to the delivery of telecommunications and financial services.

FTAP2 is implemented using the GEMPACK software suite (Harrison and Pearson 1996).

The main features of FTAP2 are described here, with special emphasis on three key areas: the commercial presence of foreign firms, cross-border supply of services and barriers to services trade. A more detailed description of the theoretical features is contained in appendix B.

2.1 Commercial presence of foreign affiliates

Model structure

The activities of three economic agents are modelled in each region: firms, a representative household and government. The household owns all primary factors of production: land, natural resources, capital and labour. The supplies of land, natural resources and labour are given in each region. Land and natural resources

[1] FTAP is an acronym for '**F**oreign direct investment and **T**rade **A**nalysis **P**roject'. For details of the FTAP model see Hanslow, Phamduc and Verikios (1999). FTAP2 is detailed in Verikios and Zhang (2001).

are used only by the primary industries sector and in fixed quantities. Labour is assumed to be mobile among sectors within each region, but not between regions. Capital is mobile among sectors within each region and between regions.

All regions have their own firms operating in all sectors. It is assumed that all local firms in a given sector are identical in size but produce slightly differentiated products. It is further assumed that, in each sector of a given region, the firms are multinational enterprises with their headquarters located domestically and wholly owned affiliates operating simultaneously in the same sectors of other foreign regions.

In each region the household, as the owner of capital, also represents a collective investor. The objective of the capital owner is to maximise the total return on the region's capital by investing in locally-owned firms, and their foreign affiliates, of every sector.

The objective of these multinational firms is to maximise the return for its home region's investor (capital owner). As the firm has special knowledge about the sector in which it operates, it will relocate its sector-specific operations between home and foreign regions and across all foreign regions until the post-tax rate of return on capital is maximised. This involves direct investment overseas, which facilitates the firm's commercial presence in foreign markets. The multinational firm of a given sector combines its home-sourced capital with land, labour and other intermediate inputs, obtained from the regions where its operation is located, to produce goods and services for local consumers and exports.

Two levels of direct capital investment are observed. The multinational firm in a given sector makes the decision to invest in its own operations within a given sector across regions, while the regional investor makes the decision to invest in the region's own firms across sectors. The regional investor can only invest its capital overseas through its investment in the region's multinational firms.

Both levels of direct investment are driven by the same return maximisation behaviour. At the firm level, for each multinational firm, the return can only be maximised if its home parent firm and all its overseas affiliates generate an equal rate of return on every unit of capital they use.[2] At the regional level, on the other hand, for the regional capital owner, the return to total regional capital can only be maximised if locally originated multinational firms across all sectors generate an equal rate of return on every unit of capital they use. This capital reallocation process ensures that, in the absence of barriers to capital mobility, the expected rates

[2] It is assumed that the operations of the parent firm and its overseas affiliates in different locations are separable and independent from each other.

of return to capital used by all firms originating from the same region will converge over the course of a simulation.

The expected rate of return is risk-adjusted. Capital investment involves uncertainty and risk. A high market rate of return may not be achievable because of the potential high risk involved. Therefore, when investors make investment decisions they normally adjust the market rate of return by the probability of not receiving it. The rate of return that the capital owner responds to in the model is defined as the risk-adjusted or the expected rate of return, rather than the observed market rate of return.[3]

In equilibrium, the expected rates of return to capital are equalised for all firms originating from the same region, but not for firms located in the same regions. It is assumed that capital assets owned by different regions may not have the same quality or composition. For instance, foreign affiliates in a host region may have superior technologies or new products, which can generate higher rates of return to their capital than those generated by their local counterparts. The concept of 'knowledge capital' may account, in part, for the apparently high rates of return enjoyed by multinational corporations.[4] Based on this consideration, capital is assumed to be region-specific and mobile only between a region's own firms. There is no convergence of rates of return across the capital owned by different regions over the long run.

In the model, capital stock owned by a region may not be equal to the capital its firms use in their production, depending on its foreign debt or credit position. In the current model no repayment of debt principal is considered. It is therefore assumed that the shares of net foreign debt in government and household incomes for each region are fixed and stable over time. Net foreign debts are serviced only by paying interest at an internationally fixed rate.[5] As no automatic borrowing is allowed, the net foreign debt position moves only with changes in a region's income.

On the demand side, from a host region's perspective, each host region has two types of firms in each sector: domestic firms (the parent firm of the local multinational) and various foreign affiliates. Firms are identifiable by location (sector of the host region) and by ownership (home region). Foreign affiliates

3 This is different from the FTAP model, which uses market rates of return to capital taken directly from Disclosure (1999) and assumes no equalisation of rates of return is assumed. Instead, capital is assumed to be firm-specific and allocated between sectors and regions in a set of nested CET functions, adapted from Petri (1997). By assuming arbitrage of expected rates of return, FTAP2 implies a greater degree of capital mobility than FTAP.

4 See Markusen (1995) for a theory of FDI and multinational firms consistent with this treatment.

5 This is different from FTAP in which foreign debt can be changed through bond trading.

combine their home region's capital with the host region's labour, land and natural resources to produce goods and services for the host region's consumers and exports. Within each sector, domestic firms and foreign affiliates produce differentiated products.

Consumers in the host region are assumed to allocate a fixed nominal share of their income among goods and services. Consumers' utility is assumed to increase with the number of varieties available for a product as well as with the quantities of different products.[6] Foreign produced goods and services can be delivered via cross-border supply or by foreign affiliates in the host region. Most imported goods and services are assumed to be imperfect substitutes with their domestically produced equivalents. However, imported telecommunication and financial services delivered via cross-border supply are assumed to be non-substitutable with domestically produced services for the reasons to be discussed below (see section 2.2).

Given these characteristics, an increase in the quantity demanded of services provided by foreign affiliates in a host region increases the commercial presence of these affiliates. An increase in the quantity demanded can be triggered by a fall in their output prices and production costs (that is, an increase in supply).

These changes may be brought about by changes in trade barriers.[7] For instance, barriers to services provided by foreign affiliates increase the price of these services and reduce the quantity demanded. Barriers to FDI increase the cost of foreign capital and reduce the quantity demanded by foreign affiliates. Both types of barriers serve to discourage the commercial presence of foreign affiliates. When these barriers are removed, more foreign affiliates are encouraged to enter the liberalising region or sector. This reduces or eliminates the rents earned by existing foreign affiliates and thus reduces the cost of capital and the price of the services provided by foreign affiliates, both of which lead to an increase in the quantity demanded of foreign capital and services provided by foreign affiliates.

Model database

The database specifies the commercial presence of foreign affiliates by origin (home region) and destination (sector of a host region), with a complete input-

6 The model assumes large-group monopolistic competition as applied by Francois, McDonald and Nordstrom (1995), such that increased choice for a product is measured by the quantity of output in a sector. A small proportion of gains arising from increased output is attributed to this increased choice between varieties of a product.

7 For a detailed discussion on trade barriers see section 2.3.

output structure defined for each foreign affiliate.[8] The database provides the same regional detail as in Dee and Hanslow (2000) but with greater sectoral detail. It divides the world into 19 regions (see table 2.1) and each regional economy into eight sectors, six of which are services sectors. They are:

- construction;
- (wholesale and retail) trade and transport;
- communications;[9]
- finance, insurance and business services;[10]
- other services; and
- dwellings.

Non-services sectors are aggregated into primary and secondary industries.

Table 2.1 reports the share of FDI in the capital stocks of the telecommunications and financial services sectors of each host region. The information is based on statistics for the mid-1990s. The share of FDI for the world as a whole is relatively small, accounting for less than 1.5 per cent of the capital stock in each sector. Developed regions usually have a larger foreign commercial presence than developing regions. The low foreign presence in many developing countries and regions, for example China, are likely to be the result of high barriers.

8 The construction of the FDI stocks database is briefly described in appendix C and documented in Verikios and Zhang (2001).

9 Despite this sector including non-telecommunication services (as defined by the GATS) such as postal services, liberalising barriers to trade in telecommunications is generalised to the whole sector. Thus from this point forward, this sector will be referred to as telecommunications only.

10 Despite this sector including non-financial services (as defined by the GATS) such as business services, liberalising barriers to trade in financial services is generalised to the whole sector. Thus from this point forward, this sector will be referred to as financial services only.

Table 2.1 **Shares of FDI in sectoral capital stocks by host region, mid-1990s (per cent)**

Region	*Telecommunications*	*Financial services*
Australia	1.33	0.38
New Zealand	1.43	9.65
Japan	0.07	1.39
Korea	0.22	0.55
Indonesia	0.19	0.25
Malaysia	0.12	0.18
Philippines	0.14	1.91
Singapore	0.22	1.26
Thailand	0.03	2.26
China	0.01	0.05
Hong Kong	1.42	12.90
Taiwan	0.20	0.42
Canada	0.27	4.62
United States of America	1.11	0.85
Mexico	0.19	4.14
Chile	0.57	0.35
Rest of the Cairns Group[a]	0.40	0.98
European Union	1.94	1.65
Rest of the World[b]	0.02	0.37
World	**0.92**	**1.35**

[a] This region is composed of Argentina, Brazil, Colombia and Uruguay. [b] This region is almost entirely composed of non-APEC developing countries and economies in transition from socialism.

Source: FTAP2 database.

2.2 Cross-border supply of services

FTAP2 recognises a fundamental attribute of cross-border supply of telecommunications and financial services that differentiates them from most other goods and services. Normally, imported goods and services delivered via cross-border supply are substitutable for their domestically produced counterparts. However, there are exceptions for some services. Cross-border telecommunication services, for instance, cannot be directly consumed by domestic users. Instead, along with domestic telecommunication services they represent an input into international telephone calls, which is the service that final users actually purchase. This feature is captured in the balance of payments accounts (see the first paragraph of box 2.1).

Cross-border financial services are similar in nature to cross-border telecommunication services. Cross-border financial services, along with domestic financial services, are inputs into international financial transactions, such as

drawing a cheque in foreign currency. Consumers purchase international financial transactions, but do not directly purchase cross-border financial services. Therefore, cross-border financial services are not readily substitutable with any domestically provided financial services. This feature is also captured in the balance of payments accounts (see the second paragraph of box 2.1).

Box 2.1 **Imports and exports of telecommunications and financial services: what do these data represent?**

For telecommunications, an import recorded in Australia's balance of payments data reflects a portion of a larger service such as of an international telephone call. Take, for example, a telephone call made by an Australian resident in Canberra to a friend in Washington DC. This call is composed of two parts. The charge by the domestic carrier which comprises the cost of connecting from Canberra to Sydney (the border), and the charge by a United States carrier of connecting from Los Angeles to Washington DC. The first component of this call counts as part of domestic production, while the second component is counted in the balance of payments as an import of telecommunications from the United States to Australia. Between Sydney and Los Angeles the call passes through the telephone cable lying at the bottom of the Pacific Ocean (McLennan, K., ABS, Canberra, pers. comm., 15 July 2000).

In the case of financial services, an import of financial services recorded in Australia's balance of payments reflects a portion of a larger service in the form of an international financial transaction, examples of which include the purchase of foreign currencies, drawing a cheque in a foreign currency and transferring funds overseas. The data on imports of financial services comprises two components. Direct explicit fees reflect the service provided such as brokerage fees or account fees, and an indirect service charge captures the margin on lending and borrowing rates. All such international financial transactions are provided via a resident financial institution. The total charge to an Australian resident for such a transaction service comprises two separate charges. One charge is levied by a domestic financial institution for its services as an intermediary, and another charge is levied by the foreign financial institution concerned. The first charge is counted as part of domestic production, whereas the second charge is counted in the balance of payments as an import by Australia of financial services from the country where the foreign financial institution resides (O'Day, D., ABS, Canberra, pers. comm., 30 August 2000).

FTAP2 uses regional input-output tables from the GTAP 4 database (McDougall, Elbehri and Truong 1998). This database does not distinguish between international telephone calls (or financial transactions) and domestic telephone calls (or financial transactions), neither in terms of intermediate input usage or final demand. The only distinction made is between imported telecommunication services (or financial services) provided via cross-border supply and domestic telecommunication services (or financial services), which include the domestic component of international telephone calls (or financial transactions). Consequently the elasticity

of substitution between domestic and cross-border telecommunications and financial services are assumed to be close to zero for intermediate input usage and final demand. For the same reason, telecommunications and financial services delivered via cross-border supply from different regions are also assumed to be non-substitutable with each other, so these elasticities are also set to zero.[11]

The nonsubstitutability of domestic and imported telecommunications and financial services implies that domestic suppliers of these services do not directly compete with foreign service suppliers in cross-border trade. However, they do compete with each other in the host region's domestic market.

Finally, the elasticities of substitution for all other imported and domestically produced varieties of goods and services remain the same as those used in Dee and Hanslow (2000).

2.3 Barriers to trade in telecommunications and financial services

Commercial presence and cross-border supply are two important modes of international trade in telecommunications and financial services, and barriers to trade in these two sectors are usually imposed via these two modes of delivery.[12] Estimating the effects of these barriers is important for modelling the effects of trade liberalisation in these two services. Thus, of the four modes of delivery set out in the GATS, only commercial presence and cross-border supply are explicitly modelled here. It is assumed that the effects of the other two modes, consumption abroad and the presence of natural persons, are implicitly captured by the first two modes of delivery.

Modelling trade barriers

A common effect of any barrier to trade in a service is to reduce supply of the service which increases the price for users. In a general equilibrium framework,

[11] Allowing substitution between imported telecommunication services (or financial services) delivered via cross-border supply and domestic telecommunications (or financial services) causes this type of imported telecommunication services to rise at the expense of domestic telecommunication services if the relative price of cross-border telecommunication services falls. This result seems unrealistic.

[12] To the extent that the movement of natural persons is associated with the location of production abroad and this movement is greater than one year (that is, permanent), barriers to this movement are accounted for in FTAP2 by barriers to FDI flows. Transactions associated with the temporary (less than one year) movement of persons are generally captured in cross-border trade statistics.

there are two possible interpretations with regard to the effects of barriers on economic activity. The first views these barriers purely as cost-increasing for users and producers of the service, with no corresponding increase in prices received by factors owners and/or intermediate-input producers. The removal of such a barrier is modelled via a productivity improvement in the services sector concerned. The productivity improvement reduces the price of the service for users and producers, leading to an increase in consumption and production of the service. In a general equilibrium framework, this approach is seen as equivalent to a 'free lunch'. The resulting increase in real GNP is 'paid for' by a technological improvement that has been imposed on the model from the outside. This is the approach adopted in Hertel et al. (1999) and Hertel (1999).[13] In these studies, the barriers are represented as cost-increasing for firms using imported intermediate inputs in which trade is restricted.[14] Removal of trade barriers is assumed to create 'import-augmenting technical change' for firms in a host region, which is equal to the measured tariff equivalent.[15]

An alternative way to represent barriers to trade in a service is by linking the expected reduction in the price of the service for users to the elimination of rents earned by either the producers of the service, factors owners or both. This is similar to the loss in tax revenue when import tariffs are removed. In this case, the barriers are both cost-increasing for users, and rent-creating for producers and/or factor owners. The barriers create rents to producers and/or factors used in the sector in which trade is restricted. These producers and factors earn supranormal rates of return compared with their counterparts in other unrestricted sectors. More importantly, the barriers also create losses in efficiency for the economy as a whole.[16]

Modelling the removal of these barriers then involves removal of these rents. The loss in rents for producers and factor owners in the restricted sector 'pays' for the increase in the real income of factor owners or consumers elsewhere. For the economy as a whole, however, net gains accrue from the gains in efficiency. This is a conventional approach to modelling services trade liberalisation within a general equilibrium framework, adopted in Petri (1997) and Dee and Hanslow (2000). This

[13] Where imports of goods are restricted by imposing tariffs, trade liberalisation generates lower prices for users and increased GNP for exporting and (usually) importing regions, at the expense of domestic producers and tariff revenue.

[14] Both of these studies use the standard GTAP model for their analysis. The GTAP model does not distinguish foreign affiliates from domestic firms in a host region. Thus the effect of trade liberalisation can only be captured in the form of changes in the cross-border supply of services.

[15] These tariff equivalents are drawn from Hoekman (1995) and Francois (1999).

[16] The losses in efficiency are usually referred to as 'Harberger triangles'. See appendix A for a diagrammatic representation of these losses.

approach is more in line with trade theory and the effects of limiting market entry (Lipsey 1971). This is also the approach adopted in this study for telecommunications and financial services liberalisation.

Estimated tax equivalents of barriers to trade

As services are traded via various modes there are also various ways that trade in services can be restricted. These restrictions can be classified into two broad types: restrictions imposed on the delivery of the service itself or restrictions imposed on the use of primary factors used in producing the service. These barriers create distortions in either product markets or factor markets, or both.

If a barrier is imposed on the entry of a factor to a particular sector and it is binding, the observed rate of return to that factor (that is, to the quantity of the factor that *is* employed in the sector) will be higher than would otherwise be the case. In the case of a quantitative (non-tax) restriction, the owner of the restricted factor used in that sector receives a 'quota' rent above the normal rate of return, which also pushes up the price of the service to users. If a barrier is imposed on trade in the service itself, the price of the service will also be higher than otherwise would be the case. In this case, a 'quota' rent goes to the producer.

Both types of barriers contribute to a shortage in the host region for the service and, therefore, a higher price level than would otherwise be the case. The aim of barrier measurement is to estimate the price distortion due to the barriers at the current level of consumption.

Similar to Dee and Hanslow (2000), trade barriers in FTAP2 are represented as one of two types of *ad valorem* tax equivalents: the price of firms' output and the rental price of capital used by firms. The former measures barriers to ongoing operations of a firm while the latter measures the barriers to the establishment of a firm. Domestic firms and foreign affiliates in a host region may face different barriers to ongoing operations and establishment. Thus there are, altogether, four different tax equivalent estimates for trade barriers in the model database. These tax equivalents for all 19 regions are listed in table 2.2. Appendix D contains a description of the sources of these estimates and the methods used in their construction. These estimates are representative of barriers which were in place in 1997.

Table 2.2 **Estimated tax equivalents of post-UR barriers to trade in telecommunications and financial services (per cent)**

Region	*Telecommunications*				*Financial services*			
	Output		*Capital*		*Output*		*Capital*	
	Domestic	*Foreign*	*Domestic*	*Foreign*	*Domestic*	*Foreign*	*Domestic*	*Foreign*
Australia	-	-	1.4	1.4	-	1.4	-	43.3
NZ	-	-	1.3	1.3	-	1.9	-	8.5
Japan	-	-	1.8	1.8	5.8	7.7	-	3.0
Korea	2.5	4.9	4.8	9.2	14.9	18.6	-	80.7
Indonesia	41.0	82.0	85.9	163.3	5.3	16.3	-	81.0
Malaysia	5.5	11.0	3.6	15.0	6.7	24.6	41.7	97.4
Philippines	21.4	53.5	-	50.0	3.5	13.4	24.0	109.9
Singapore	0.8	0.8	5.5	8.1	8.0	20.4	-	62.7
Thailand	14.0	28.0	32.7	55.8	-	7.3	-	58.4
China	50.0	100.0	339.4	678.8	14.9	24.7	60.6	140.7
Hong Kong	0.6	0.6	3.2	3.2	2.6	4.9	-	6.4
Taiwan	1.3	2.1	5.8	9.3	8.6	14.7	-	48.8
Canada	0.8	2.3	1.8	6.6	-	2.3	-	13.4
USA	0.2	0.2	-	-	-	2.4	-	8.1
Mexico	5.4	10.8	1.8	7.8	-	2.2	-	21.8
Chile	1.3	1.3	1.0	1.0	7.7	11.3	39.0	57.4
R. Cairns[a]	2.7	6.5	11.8	15.9	0.2	9.0	8.1	33.2
EU	0.3	0.7	3.6	4.6	-	2.3	-	12.3
R. World[b]	16.4	32.8	114.0	215.0	-	8.2	6.4	51.5
World	**3.2**	**0.9**	**13.2**	**3.9**	**1.5**	**3.8**	**1.1**	**11.5**

a The rest of the Cairns group (Argentina, Brazil, Colombia and Uruguay). **b** The rest of the world. This region is almost entirely composed of non-APEC developing countries. - Nil.

Source: FTAP2 database.

In Dee and Hanslow (2000), additional barriers are imposed on cross-border trade in services. They appear as an export tax, the export tax rates being derived from the importing region's barriers on the output of foreign affiliates. This is done to reflect the assumption that exporting regions receive the rents created by the barriers imposed by importing regions on the output of foreign affiliates.

As FTAP2 focuses on trade in telecommunications and financial services, the treatment of border restrictions is modified to suit the unique features of these services. The studies from which the estimated tax equivalents on the output of domestic firms and foreign affiliates are drawn, capture the effects of *all* barriers to trade in these services, that is both domestic barriers and cross-border trade barriers. As a result, no additional border restrictions are necessary in modelling the effects on cross-border trade of restrictions on ongoing operations. This includes export and import taxes.

Furthermore, imposing an export tax, as in FTAP, to capture the effects on cross-border trade of restrictions to ongoing operations, assumes that exporting regions can benefit from an importing region's barriers. The ability of exporting regions to extract rents from importing region's barriers is constrained by their own domestic market conditions. If exporting regions have a competitive domestic market, it is difficult for individual exporters to retain these rents. This is another reason why no additional border taxes on telecommunications and financial services are imposed in FTAP2.

3 Policy options

This chapter outlines the policy options for services trade liberalisation, modelled in this study, in the context of the GATS framework and the types of trade barriers removed in each option. A simplified model is subsequently introduced to highlight the main effects of the unilateral removal of different trade barriers, in order to aid in understanding the effects of multilateral trade liberalisation.

3.1 Trade liberalisation under the GATS

The GATS encompasses a number of basic principles (see box 3.1), one of which is that member countries undertake scheduled commitments specifying conditions for foreign service suppliers to gain access to their domestic markets. Article XVI of the GATS covers market access requirements that apply only to sectors covered in the schedule. This article requires that each member gives no less favourable treatment to service suppliers of other members than is provided in its schedule of commitments. These commitments outline the minimum access that may be available to foreign service suppliers. Thus market access can be free or conditional, depending on a country's commitments specified in the specific schedules. Article XVI also sets out six forms of measures affecting free market access that may not be applied to foreign service suppliers for the sectors for which commitments are made unless their use is clearly provided for in the schedule. These six elements cover all aspects of limitation of market access that can be specified in national schedules (WTO Secretariat 1999). The provisions of the market access article actually extend beyond those of national treatment to cover some non-discriminatory measures, that restrict access but do not discriminate against foreigners as such (Hoekman 1995; Snape and Bosworth 1996). Further, the articles relating to monopolies and exclusive service suppliers require a member to ensure that monopoly suppliers are not allowed to act in a manner inconsistent with the member's obligations under the agreement.

Article XVII of the GATS covers national treatment, by stating that in the sectors covered by the schedule and subject to any conditions and qualifications set out in the schedule, each member shall give treatment to foreign services and service suppliers no less favourable than it gives to its own domestic services and service suppliers. This basic obligation is similar to the national treatment rule in Article III

of the GATT, but is limited to service sectors for which commitments have been given in the schedule of the country concerned. Each member country can set up conditions or qualifications for the access of foreign services or service suppliers to its domestic market in the commitment schedule. Like the GATT-bound tariff, these conditions outline the worst treatment that may be given to foreign service suppliers (WTO Secretariat 1999).

Box 3.1 **Basic principles of the GATS**

- All services are covered by the GATS. However, the annex on air transport excludes major aspects of this sector from coverage of the GATS.
- Most-favoured-nation treatment applies to all services except for the provision for the one-off temporary exemptions.
- National treatment applies in the areas where commitments are made.
- Transparency in regulations and inquiry points is required.
- Regulations have to be objective and reasonable.
- International payments are normally unrestricted.
- Individual countries' commitments are negotiated and bound.
- Progressive liberalisation through further negotiations was mandated in the UR.

Source: WTO (2001) and WTO Secretariat (1999).

This differs from the GATT, in which the right to national treatment is universal for all goods. National treatment in the GATS is specific only to those sectors in which commitments have been undertaken, that is, positive listing is required. This is partly due to the nature of trade in services. Particularly in the case of commercial presence and the presence of natural persons, granting national treatment virtually means a complete removal of all regulatory advantages enjoyed by domestic service suppliers, and thus gives foreign service suppliers free access to a country's internal market (WTO Secretariat 1999).

This study models the estimated barriers to entry for domestic service firms, along with the barriers for foreign service suppliers, in the telecommunications and financial services sectors. This is because in these sectors entry is also regulated for domestic firms. For instance, one or a few state-owned enterprises may dominate an entire nation's supply of telecommunications and entry may be restricted for domestic firms as well as foreign affiliates.

Domestic regulations can also restrict competition in the domestic market and act as entry barriers to all firms. The existence of such barriers implies that gains can be reaped if liberalisation is also extended to domestic markets. Such liberalisation has

significant ramifications for trade liberalisation as well, as these barriers are equally applicable to foreign service suppliers. Under the GATS's national treatment rule, if barriers for domestic suppliers are lowered in scheduled sectors, similar treatment should also be extended to foreign suppliers to ensure equal market access unless otherwise provided in a member's schedules of commitments.

3.2 Liberalisation scenarios modelled

Three trade liberalisation scenarios are analysed for each of the two service sectors examined in this study: removing restrictions on national treatment, removing barriers to market access, and a combination of the two. The first two are partial liberalisation scenarios while the third is a complete liberalisation scenario.

Restrictions on national treatment are discriminatory in nature as they are biased against foreign service suppliers. Granting foreign service suppliers national treatment requires the host region to lower the barriers for affiliates to the same level as for domestic firms. This implies that all discriminatory barriers on foreign affiliates' output and capital are removed. This is modelled in the national treatment scenarios. It should also be noted that non-discriminatory barriers, where they exist, still apply in the national treatment scenarios.

Market access barriers are non-discriminatory in nature, imposed on both domestic and foreign service suppliers. In this scenario, barriers are reduced equally for domestic firms and foreign affiliates in a host region. This leaves any discriminatory barriers, where they exist, in place.

In all three scenarios a long-run equilibrium situation is simulated in which trade barriers are removed and the prices of all goods, services and factors of production respond to clear their respective markets in all regions. In the long run, each region's capital owner is allowed to respond to the policy changes by reallocating its capital across sectors and regions to maximise their returns. As the analysis is comparative static, the results only show the differences between two equilibrium outcomes, that is, the changes or percentage changes in the model's endogenous variables from the current equilibrium with all barriers in place to a new equilibrium in which some or all barriers have been removed.[1]

[1] This is different from FTAP, which is a comparative static model with wealth accumulation as developed by McDougall (1993). FTAP allows for the accumulation of wealth over a 10 year period, so that model results show the changes or percentage changes in endogenous variables from the equilibrium which would exist 10 years hence with all barriers in place, and a new equilibrium in which some or all barriers have been removed.

4 Liberalising trade in telecommunications

This chapter examines three multilateral liberalisation scenarios for the telecommunications sector: two partial (national treatment and market access) and one complete.[1] Table 4.1 presents the tax equivalents of post-UR barriers to trade in telecommunications listed in table 2.2 broken down in terms of the restrictions on market access and national treatment. In market access liberalisation, non-discriminatory barriers to establishment and ongoing operations that apply for both domestic firms and foreign affiliates are completely removed, leaving only discriminatory barriers on foreign affiliates in place. In national treatment liberalisation, only barriers that discriminate against foreign affiliates are removed. In other words, the barriers for foreign affiliates are lowered to the same level as for domestic firms, leaving only non-discriminatory market access barriers in place.

Table 2.2 indicates that the developing regions have much higher barriers than developed regions. Indonesia, China and the rest of the world have the highest barriers of all developing regions, while Korea, Malaysia, Taiwan, Chile and Mexico have the lowest. The barriers in all developed regions are consistently low. The most discriminatory barriers are among developing regions, with Indonesia, the Philippines, Thailand, China, and the rest of the world heading the list.

[1] It should be noted that the results presented in this chapter for the complete liberalisation scenario assume that the restrictions to trade in financial services remain intact. This scenario was also run with the assumption that the restrictions to trade in financial services had been removed. The results were almost identical in the two cases. For this reason, only the results for the former scenario are presented.

Table 4.1 **Estimated tax equivalents of post-UR barriers to trade in telecommunications (per cent)**

Region	*Market access - domestic and foreign*		*National treatment - foreign*	
	Output	*Capital*	*Output*	*Capital*
Australia	-	1.4	-	-
New Zealand	-	1.3	-	-
Japan	-	1.8	-	-
Korea	2.5	4.8	2.4	4.4
Indonesia	41.0	85.9	41.1	77.4
Malaysia	5.5	3.6	5.5	11.4
Philippines	21.4	-	32.6	50.0
Singapore	0.8	5.5	-	2.6
Thailand	14.0	32.7	14.0	23.1
China	50.0	339.4	50.0	339.4
Hong Kong	0.6	3.2	-	-
Taiwan	1.3	5.8	0.8	3.5
Canada	0.8	1.8	1.5	4.8
United States	0.2	-	-	-
Mexico	5.4	1.8	5.6	6.0
Chile	1.3	1	-	-
Rest of Cairns[a]	2.7	11.8	3.8	4.1
European Union	0.3	3.6	0.4	1.0
Rest of World	16.4	114.0	16.6	101.0

[a] This group is made up of Argentina, Brazil, Colombia and Uruguay. - Nil.

Source: Adapted from Warren (2000b).

4.1 Global and regional effects

Table 4.2 shows the percentage changes in real GNP, by region and for the world as a whole, of the three liberalisation scenarios. The world as a whole benefits in all three liberalisation scenarios. In the complete liberalisation scenario the world is projected to gain 0.1 per cent in world real GNP, or about US$24 billion. This is equal to the combined global gains from the two partial liberalisation scenarios. The projected global GNP gains from national treatment and market access liberalisation are 0.01 and 0.09 per cent or US$1.5 and US$22.8 billion, respectively.

The global gains from complete liberalisation mainly come from the removal of non-discriminatory market access barriers. This result seems influenced by the incidence of the barriers and the share of FDI in this sector. Firstly, not all regions have discriminatory barriers in telecommunications. Secondly, and not unexpectedly, the most significant discriminatory barriers exist only in regions in which foreign firms have a low penetration in the domestic telecommunications sector (see table 2.1). Therefore, the removal of these barriers is not expected to

lead to large gains for the world as a whole. In contrast, all regions have non-discriminatory market access barriers. Therefore removal of these barriers is expected to lead to larger gains for the world as a whole, compared with the removal of discriminatory barriers.

Table 4.2 **Projected effects on real GNP of three multilateral trade liberalisation scenarios for telecommunications**

Region	*National treatment*	*Market access*	*Complete liberalisation*
	%	%	%
Australia	0.00	0.06	0.06
NZ	0.00	0.09	0.09
Japan	0.04	0.04	0.04
Korea	0.00	0.01	0.01
Indonesia	-0.77	0.36	0.70
Malaysia	0.00	-0.03	-0.03
Philippines	0.22	-0.01	0.72
Singapore	0.04	0.00	0.02
Thailand	-0.01	-0.35	-0.35
China	-0.39	0.79	0.81
Hong Kong	0.64	0.25	0.16
Taiwan	-0.01	0.02	0.02
Canada	0.00	0.01	0.01
USA	0.02	0.01	0.01
Mexico	0.00	-0.07	-0.06
Chile	0.00	0.01	0.01
R. Cairns[a]	0.00	0.01	0.02
EU	0.02	0.05	0.05
R. World[b]	-0.01	0.38	0.39
World	**0.01**	**0.09**	**0.10**

a The rest of the Cairns group (Argentina, Brazil, Colombia and Uruguay). **b** The rest of the world. This region is almost entirely composed of non-APEC developing countries.

Source: FTAP2 model projections.

Regional distribution of global gains

The distribution of the global gains among regions is different in different policy scenarios. National treatment liberalisation gives all investing regions better access to other regions' domestic markets. Regions with high discriminatory barriers and large inflows of FDI may lose. This is because as foreign affiliates expand their market share at the expense of domestic firms, they benefit from the existing market access barriers and repatriate the rents that arise as a consequence.[2]

2 This possibility has been canvassed by Francois and Wooton (1999).

Table 4.2 shows that major investing regions, such as Japan, the United States of America, (USA) and the European Union (EU), all benefit from national treatment liberalisation, while high barrier regions such as Indonesia, China and the rest of the world all lose. Hong Kong benefits the most because of its close trade and investment ties with China and China's remaining high market access barriers.

Almost all regions gain from the removal of market access barriers in telecommunications. This is because all regions have market access barriers in telecommunications and, therefore, benefit directly from removing these barriers. For investing regions, further gains come from freer access to other regions' domestic markets. For recipient regions, as the barriers are removed increased competition reduces the price of telecommunications to users. This stimulates the demand for these services and for capital used by the telecommunications sector. As a result, real GNP increases with the biggest winners being China, the rest of the world and Indonesia.

Four regions, Malaysia, the Philippines, Thailand and Mexico, are worse off under market access liberalisation. All these economies have market access barriers. However, both market access barriers and barriers to national treatment are high in the Philippines and Thailand and low in Malaysia and Mexico. When the market access barriers are removed, all these economies suffer terms of trade losses commensurate with the size of the barriers. However, the gains from liberalisation do not offset the terms of trade losses, leading to overall losses in these economies. In the case of the Philippines and Thailand, the remaining high barriers to national treatment prevent foreign affiliates from significantly expanding their market share in the domestic telecommunications sector. As a result, there are no significant gains from increased inward FDI in these economies. In the case of Malaysia and Mexico, however, their low initial market access barriers means that the direct benefits from liberalisation are low relative to other regions. Moreover, since all four of these regions are not significant international investors in telecommunications themselves, they cannot take advantage of other regions' liberalisation.

It is worth noting that for regions with high barriers (usually developing regions), the gains from complete liberalisation tend to be greater than the sum of the gains from the two partial liberalisation scenarios. For regions with low barriers (usually developed regions), the gains from complete liberalisation tend to be smaller than the sum of the gains from the two partial liberalisation scenarios. This is because, compared to complete liberalisation, partial liberalisation leaves some barriers, and therefore rents, in place, thus reducing the gains for high barrier regions and increasing the gains for low barrier regions. With complete liberalisation these

effects are absent, thus there are extra gains for high barrier regions and extra losses for low barrier regions.

Complete liberalisation of trade in telecommunications leads to a gain for all regions, except Malaysia, Thailand and Mexico. Table 4.2 shows that the distribution of the gains across regions is close to the distribution in market access liberalisation. This suggests that market access liberalisation dominates the regional effects of complete liberalisation in this sector.

Sources of global and regional gains

The percentage change in real GNP for each region can be decomposed into various contributing factors.[3] For analytical convenience, these factors are grouped into five effects:

- allocative effects;
- terms of trade effects;
- net capital endowment effects;
- product variety effects; and
- net FDI income effects.

Allocative effects measure changes in resource allocation as a result of policy changes. For instance, the expansion of a subsidised sector (in net terms), due to a policy change, is measured as a loss because the sector, which is already 'too big' compared with an undistorted equilibrium, has grown even larger. Similarly, a sector which is taxed (in net terms), is already 'too small' relative to an undistorted equilibrium. Thus if trade liberalisation causes it to expand, it moves closer to this undistorted equilibrium and represents a gain. The same logic applies to internationally mobile factors, such as capital. Increases in capital endowments will bestow a gain on a region in which capital is taxed, while decreases in capital endowments in that region will cause a loss.

Terms of trade effects measure the changes in the relative price of exports and imports for a region. Where export prices rise more quickly than import prices, or export prices fall less quickly than import prices, there is a terms of trade gain for that region.

[3] The percentage changes in real GNP are analysed using the GTAP welfare decomposition (Huff and Hertel 1996) which is modified to account for cross-border capital flows (Hanslow et al. 1999).

The net capital endowment effect measures the changes in the rental value of the net (of depreciation) capital stock *located* within a region, due to changes in the rates of return on capital located within a region. The capital stock located within a region is made up of the domestically owned and foreign-owned capital stock. An increase in the net capital endowment in a region, due to liberalisation, results in a rise in real GNP for the region concerned through its contribution to the region's production.[4]

Product variety effects refer to the benefits that the increased variety of a particular good or service may provide for consumers. In the model, an increase in the output of a given sector means more firms and more varieties for consumers to choose from. This bestows a benefit to consumers in that region.

Net FDI income effects embrace three different forms of income for a region: the normal rentals received by the owners of foreign capital from host regions, less normal rentals paid to the owners of foreign capital in home regions; the barrier rents received by the owners of foreign capital and affiliates from host regions less the barrier rents paid to the owners of foreign capital and affiliates in home regions; and the income received or paid on foreign credit or debt by a region.[5]

For the world as a whole, only allocative effects, net capital endowments and product variety contribute to the changes in real GNP.[6] These three effects can be referred to as 'income generating' factors. The other effects do not change world total GNP, and can therefore be referred to as 'income redistributing' factors. That is, what constitutes a gain for one region is a loss for other regions.

For the world as a whole, whether a policy change is beneficial or not depends on income generating factors rather than income redistribution factors. At the regional level, however, both types of contributing factors are important. The contributions of the five effects to the change in regional and world GNP are presented in table 4.3. The results are taken from the complete liberalisation scenario. The row sums of the five contributors, listed in the last column, equal the change in real GNP.

4 This effect captures the so-called 'capital diversion' effect for economies with already low barriers.

5 This last effect is typically quite small in FTAP2 projections, so it is not discussed in latter parts of the text when examining the projected effects of liberalisation.

6 By assumption, the asset value of the world capital stock does not change in the model. The change here is to the rental value of the world capital stock, due to changes in the rates of return to capital assets caused by trade liberalisation. Trade liberalisation changes the rental value of capital assets used by each region, leading to changes in real GNP. Appendix A shows how in a two country, partial equilibrium setting, movements of capital between regions can increase the rental value of existing capital and, thus, real GNP.

Table 4.3 **Sources of changes in real GNP of complete trade liberalisation in telecommunications (US$ million)**

Region	*Allocative effects*	*Terms of trade*[c]	*Net capital endowment*	*Product variety*	*Net FDI income*	*Change in real GNP*[d]
Australia	-26	269	-57	-26	43	204
NZ	-6	54	-3	-	3	48
Japan	-177	1 751	-826	-359	1 168	1 559
Korea	36	-5	-13	1	16	35
Indonesia	1 152	-434	1 303	401	-1 151	1 258
Malaysia	17	-30	-	-5	-3	-22
Philippines	440	-189	523	163	-475	458
Singapore	3	6	-16	4	15	13
Thailand	37	-562	60	17	-55	-502
China	5 575	-1 301	354	1 037	-343	5 321
Hong Kong	-45	378	-441	-123	390	160
Taiwan	34	13	-22	-2	20	43
Canada	-68	124	-38	-9	33	42
USA	-339	1 386	-1 203	-298	1 114	662
Mexico	-4	-166	65	19	-56	-143
Chile	-10	32	-25	-6	16	7
R. Cairns[a]	-42	200	-10	-15	18	151
EU	-347	4 077	-717	-347	850	3 518
R. World[b]	14 370	-5 638	1 898	2 485	-1 604	11 502
World	**20 600**	**-34**	**833**	**2 938**	**-**	**24 313**

[a] The rest of the Cairns group (Argentina, Brazil, Colombia and Uruguay). [b] The rest of the world. [c] The sum of the terms of trade effects on GNP do not sum exactly to zero due to numerical inaccuracy in solving the model. [d] This is equal to the row sum. - Nil.

Source: FTAP2 model projections.

For the world as a whole, the single most important contributor is the gain from allocative effects. This is primarily the result of the reallocation of capital between regions and the reallocation of capital and labour between sectors within regions. This alone generates around 85 per cent of the estimated total increase in world real GNP. The world also gains from increases in both net capital endowments and product variety. The former is related to a global revaluation of capital assets used in each region. The latter is related to output expansion because product variety increases as output expands.

For individual regions both the income generating and income redistribution factors determine the changes in real GNP. The extent to which regional GNP is affected depends on the characteristics of each region. As shown in table 4.3, the net change for a given region is the result of the interaction of all these effects.

Despite its positive effect for the world as a whole, the contribution of allocative effects to individual regions' GNP may not always be positive. As table 4.3 shows,

the distribution of these gains across regions tends to be in favour of high barrier regions and, sometimes, at the expense of regions that have a more open telecommunications sector.

For a given region these effects consist of two sub-effects which are largely driven by the movement of capital between regions. The first is the combined effect derived from changes in the size of production of all goods and services sectors within a region. These changes in output are driven by the movement of capital and labour between sectors within a region, and the movement of capital between regions. For highly protected regions this effect tends to be positive overall, as these regions experience the largest increases in capital and hence total output. For other regions these effects tend to be either small negatives or small positives, depending on the size of the change in their capital stock.

The second sub-effect is the effect derived from the change in the overall size of the capital stock in each region, and the change in the capital stock in each sector within a region. As capital is taxed in all regions, when capital moves from low barrier investing regions to high barrier regions the former tend to lose and the latter tend to gain, relative to an undistorted equilibrium.

Table 4.4 reports the relative importance of these two sub-effects for all regions. Each sub-effect is presented as a percentage of the change in allocative effects for each region. These percentages sum to either –100 or 100 depending on whether allocative effects make a negative or positive contribution to real GNP.

Decreases in capital explain a significant proportion of the overall loss from allocative effects for most liberal regions, including Australia, Japan, Hong Kong, the USA and the EU. On the other hand, changes in output explain a significant proportion of the overall allocative effects for highly protected regions, including Korea, Indonesia, Malaysia, the Philippines, Singapore, Taiwan, Mexico, Chile and the rest of the Cairns group. In general, regions using more capital tend to experience a gain from allocative effects, while regions using less capital tend to experience a loss from allocative effects.

In contrast to the effect on real GNP of allocative effects, the terms of trade effects tend to transfer real GNP from high barrier regions to low barrier regions. High barrier regions are expected to experience a worsening terms of trade, while other regions experience an improving terms of trade. This is because the barriers in the highly protected regions raise the price of their exports relative to the price of their imports. When the barriers are removed, the relative price of exports to imports

7 Net taxes refers to all taxes (export, import, output and intermediate input taxes) net of all subsidies (export, import, output and intermediate input subsidies).

tends to fall in high barrier regions and rise in other regions. This represents a correction of the distortions in the relative prices of exports and imports in all regions.

Table 4.4 **Decomposition of three effects on real GNP of complete trade liberalisation in telecommunications**

Sub-effects as a percentage of each main effect

Region	*Allocative effects*		*Net capital endowment*		*Net FDI income*	
	Output	*Capital*	*Domestically owned capital*	*Inward FDI*	*Net FDI income*	*Net FDI rents*
Australia	-27	-73	-63	-37	89	11
NZ	-83	-17	-54	-46	74	26
Japan	36	-136	-96	-4	103	-3
Korea	86	14	-172	72	46	54
Indonesia	40	60	26	74	-98	-2
Malaysia	100	-	-296	196	-257	157
Philippines	80	20	20	80	-101	1
Singapore	167	-67	-81	-19	127	-27
Thailand	-157	257	12	88	-106	6
China	53	47	25	75	-108	8
Hong Kong	-	-100	-108	8	104	-4
Taiwan	91	9	-81	-19	146	-46
Canada	-94	-6	-60	-40	107	-7
USA	-41	-59	-74	-26	110	-10
Mexico	-350	250	15	85	-115	15
Chile	-70	-30	-31	-69	84	16
R. Cairns[a]	-240	140	-210	110	164	-264
EU	-40	-60	-87	-13	88	12
R. World[b]	30	70	63	37	-99	-1
World	**37**	**63**	**-450**	**550**	-	-

a The rest of the Cairns group (Argentina, Brazil, Colombia and Uruguay). **b** The rest of the world. - Nil.

Source: FTAP2 model projections.

The net capital endowment effect measures the change in the capital stock, net of depreciation, used in each region. This effect can be decomposed into two sub-effects, the changes in domestically owned capital and inward FDI. When policy changes cause a reallocation of capital from low to high barrier regions, both domestically owned capital and inward FDI tend to increase in the latter and decrease in the former. An expansion in domestically owned capital can be financed by reducing outward FDI. Increased inward FDI in highly protected regions can be financed by low barrier regions reducing their FDI in other low barrier regions or their domestically owned capital stock. Generally, the GNP effect of this reallocation of capital is negative for low barrier regions and positive for high barrier regions.

Table 4.4 reports the relative importance of these two sub-effects in determining the overall net capital endowment effect for all regions. Of all the regions experiencing an overall gain in net capital endowments, the rest of the world is the only one in which the gain is dominated by increased FDI. It is likely that this is due to intra-regional FDI being counted as domestically owned capital in this region. For low barrier regions the loss in net capital endowments is generally dominated by the loss in domestically owned capital.

With capital being the only factor mobile among regions, the change in regional gross domestic product (GDP)[8] is reflected largely in the change in regional capital endowments. Given the general trend of capital reallocation from low to high barrier regions, GDP normally falls in the former and rises in the latter. This has a direct impact on product variety in those regions, as an increase in the output of a given sector means more firms and more varieties for consumers to choose from. As a result, the product variety effect tends to reinforce the gains or losses that a region experiences in its real GDP due to capital reallocation.

The contribution of the net FDI income effect to regional real GNP largely depends on whether the region concerned is a net FDI supplier or recipient initially. This effect can be further decomposed into two sub-effects, the effect of net FDI income and the effect of net FDI rents. The relative importance of these two sub-effects is reported in table 4.3. Of these two sub-effects, net FDI income is more important than net FDI rents for all regions except the rest of the Cairns group. A net FDI supplier benefits from increased FDI income due to increased outward FDI. In financing outward FDI, the investing region decreases its domestically owned capital stock. The overall benefit for an investing is the return from FDI.

The opposite is true for regions that are net FDI recipients. As trade liberalisation tends to reallocate capital assets from net FDI investing regions to net FDI receiving regions, the net FDI income effect moves in the opposite direction to the capital flows. Table 4.4 confirms this by showing that net FDI income flows from net FDI receiving to other regions, with negative net FDI income effects for former and positive net FDI income effects for the latter. As FDI suppliers lose rents previously earned in FDI recipient regions, net FDI rents flow from FDI investing regions to FDI recipient regions. As shown in table 4.3, however, net FDI rents are usually not as significant a source of gains or losses for most regions as the net FDI income effect.

In summary, most highly protected regions benefit from allocative effects, net capital endowments and product variety, while most liberal regions gain from improvements in their terms of trade and increases in net FDI and bond income.

8 Unlike GNP, GDP does not include income from abroad.

Although the change in real GNP for a particular region depends on which of these effects dominates, the overall majority of regions gain from complete trade liberalisation of telecommunications.

4.2 Sectoral effects

The projected effects on sectoral output of completely removing barriers to trade in telecommunications are reported in table 4.5. Given the nature of barriers to services trade, the regions with the highest barriers to trade in telecommunications experience the biggest expansion in telecommunications output. These regions include, among others, China, Indonesia and the rest of the world. The rapid expansion of telecommunications output is due to the large increase in domestic and foreign commercial presence in these regions. Telecommunications output for the world is projected to increase by 1.73 per cent.

Table 4.5 **Projected effects on sectoral output of complete trade liberalisation in telecommunications (per cent)**

Region	*Pri*[a]	*Sec*[b]	*Con*[c]	*Tt_*[d]	*Cmn*[e]	*Fib*[f]	*Osr*[g]	*Dwe*[h]
Australia	0.56	-0.55	-0.46	-0.11	0.08	-0.03	0.03	-0.05
NZ	0.89	-0.60	-0.43	-0.21	0.03	-0.04	0.03	0.00
Japan	0.12	-0.10	-0.36	0.03	0.17	-0.03	-0.01	0.03
Korea	0.07	0.08	-0.49	-0.06	1.19	-0.07	-0.04	-0.16
Indonesia	0.21	2.50	3.31	1.39	13.59	0.85	-0.29	1.08
Malaysia	0.22	-0.10	-0.41	-0.37	1.33	-0.06	0.00	-0.16
Philippines	0.74	4.50	1.10	2.19	5.37	0.71	0.69	0.58
Singapore	1.72	0.15	-0.40	-0.67	0.33	-0.08	0.19	-0.37
Thailand	0.69	-0.56	-0.53	0.02	6.95	0.07	-0.33	-0.53
China	-0.43	1.02	3.12	0.34	13.78	0.58	-0.11	0.41
Hong Kong	-0.31	-1.31	-1.99	-0.24	-0.20	-0.47	-0.40	-0.44
Taiwan	0.15	0.03	-0.54	-0.17	0.84	-0.01	0.00	-0.14
Canada	0.46	-0.08	-0.50	-0.06	0.48	-0.04	-0.01	-0.12
USA	0.35	-0.11	-0.44	-0.03	0.11	-0.03	0.03	-0.04
Mexico	0.18	0.30	-2.27	-0.26	1.54	-0.13	-0.22	0.01
Chile	0.46	-0.41	-1.03	-0.09	0.23	-0.04	-0.04	-0.06
R. Cairns[i]	0.32	-0.12	-1.03	0.02	2.12	-0.05	-0.08	-0.13
EU	0.35	-0.17	-0.32	-0.01	0.60	-0.04	0.00	-0.07
R. World[j]	-0.40	0.78	2.44	0.19	11.36	0.39	-0.27	-0.67
World	**0.09**	**0.05**	**0.03**	**0.02**	**1.73**	**0.00**	**-0.03**	**-0.12**

[a] Primary industries. [b] Secondary industries. [c] Construction. [d] Trade and transport. [e] Telecommunications. [f] Financial services. [g] Other services. [h] Dwellings. [i] The rest of the Cairns group (Argentina, Brazil, Colombia and Uruguay). [j] The rest of the world.

Source: FTAP2 model projections.

The expansion of output occurs through increased output of domestic firms and foreign affiliates in almost all regions. On the demand side, the fall in the price of telecommunications relative to other goods and services encourages consumers to switch from other goods and services to telecommunications. Furthermore, as total GNP rises in highly protected regions, the demand for all goods and services rises, as evidenced by the significant rise in consumption expenditure in real terms in those regions.

The effects on the output of other sectors can be explained by the changes in resource allocation. That is, as liberalisation causes telecommunications output to rise, this is generally accompanied by a reduction in the output of other sectors, as resources shift from the latter to the former. If the barriers removed are substantial, a region can attract more foreign capital to enlarge its total capital endowment, and the output of other sectors may not fall at all. This is the case with the Philippines. More often than not, however, the expansion of telecommunications output is accompanied by reductions in the output of at least some other sectors.

The impact of removing barriers to trade in telecommunications on other sectors of a regional economy also depends on the changes in the relative rates of return to factors which are mobile or immobile between regions. When capital moves from open regions to highly protected regions, the expected rate of return to capital rises in the former relative to that in the latter. Thus the rate of return on capital, relative to immobile factors of production, rises in open regions and falls in highly protected regions. In response to these changes in relative factor returns, firms in open regions tend to use more labour and other immobile factors and less capital in order to minimise their production costs, while firms in highly protected regions tend to use more capital and less labour and other immobile factors. As a result, the sectors intensive in the use of immobile factors of production are encouraged to expand more rapidly in liberal regions, while the sectors intensive in the use of capital expand more rapidly in highly protected regions. For example, primary industries in Australia, Japan, the USA and the EU all experience strong growth relative to other sectors. In contrast, secondary industries in Indonesia, the Philippines and China all experience strong growth relative to other sectors.

For the world as a whole, the primary sector has the second highest rate of expansion in output, following the telecommunications sector. In fact, there are only three regions not experiencing an expansion in their primary sectors under the liberalisation of telecommunications: China, Hong Kong and the rest of the world. In general, the expansion in the primary sector tends to be larger in low barrier regions than in high barrier regions. Furthermore, in some low barrier regions the primary sector has the highest output growth rate of all sectors (Australia, New Zealand, Singapore, the USA and the EU). Whereas in high barrier regions the

primary sector generally has one of the lowest growth rates among all sectors, if not the lowest.

The differences in primary output expansion among regions can be explained by the special features of the primary sector, as well as the changes in the rates of return to other factors. The primary sector is the only sector that uses the sector-specific factors of production land and natural resources. As the supply of land and natural resources is fixed at the sectoral level within regions, when capital endowments fall in open regions and rise in highly protected regions, the return to (and rental cost of) land and natural resources relative to capital, tends to fall in the former and rise in the latter. The immobility of land and natural resources means that primary producers must fully pass on the changes in primary factor costs to users, regardless of any change in the rental costs of other factors, such as capital and labour. As a result, the price of primary goods falls more in open regions than in highly protected regions. The demand for the primary exports of liberal regions increases, as the demand in highly protected regions for primary goods shifts from domestically produced goods to imports. On the other hand, in liberal regions, the demand shifts from imports to domestically produced primary goods. An interesting general equilibrium result seems to be that liberalising trade in a service sector tends to cause an expansionary effect on the production of primary goods in low barrier regions, and boosts their exports of primary goods to high barrier regions.

5 Liberalising trade in financial services

This chapter examines three multilateral liberalisation scenarios for the financial services sector: two partial (national treatment and market access) and one complete.[1] Table 5.1 lists the estimated tax equivalents of post-UR restrictions on market access and national treatment to trade in financial services. All regions have discriminatory restrictions on national treatment in financial services, whereas market access barriers are not present in all regions. Most developed regions have low or no market access barriers. In contrast, developing regions maintain more significant market access barriers than developed regions, and their discriminatory barriers are generally much higher again.

5.1 Global and regional effects

Table 5.2 details the aggregate changes in regional and world real GNP brought about by each of the three multilateral liberalisation scenarios for financial services. Complete liberalisation of financial services is expected to generate a gain in the world real GNP of US$23 billion, or a 0.1 per cent increase. This is equal to the combined gains from the two partial liberalisation scenarios. The projected global gains from national treatment and market access liberalisation are about US$22.4 and US$0.4 billion, respectively.

[1] It should be noted that the results presented in this chapter for the complete liberalisation scenario assume that the restrictions to trade in telecommunications remain intact. This scenario was also run with the assumption that the restrictions to trade in telecommunications had been removed. The results were almost identical in the two cases. For this reason, only the results for the former scenario are presented.

Table 5.1 **Estimated tax equivalents of post-UR barriers to trade in financial services (per cent)**

	Market access – domestic and foreign		*National treatment - foreign*	
Region	*Output*	*Capital*	*Output*	*Capital*
Australia	-	-	1.4	43.3
New Zealand	-	-	1.9	8.5
Japan	5.8	-	1.9	3.0
Korea	14.9	-	3.7	80.7
Indonesia	5.3	-	11.0	81.0
Malaysia	6.7	41.7	17.9	55.7
Philippines	3.5	24.0	9.9	85.9
Singapore	8.0	-	12.4	62.7
Thailand	-	-	7.3	58.4
China	14.9	60.6	9.8	80.1
Hong Kong	2.6	-	2.3	6.4
Taiwan	8.6	-	6.1	48.8
Canada	-	-	2.3	13.4
United States	-	-	2.4	8.1
Mexico	-	-	2.2	21.8
Chile	7.7	39.0	3.6	18.4
Rest of Cairns[a]	0.2	8.1	8.8	25.1
EU	-	-	2.3	12.3
Rest of World	-	6.4	8.2	45.1

[a] This group is made up of Argentina, Brazil, Colombia and Uruguay. - Nil.

Source: Adapted from Kalijaran et al. (1999).

The global gains from complete liberalisation mainly come from the removal of discriminatory barriers. This result seems influenced by the incidence of the barriers and the share of FDI in this sector. Firstly, not all regions have non-discriminatory barriers in financial services. Secondly, the most significant non-discriminatory barriers exist only in regions in which foreign firms have a low penetration in the domestic financial services sector (see table 2.1). Therefore, the removal of these barriers is not expected to lead to large gains for the world as a whole. In contrast, all regions have discriminatory barriers to national treatment, with a number of developed economies having very high discriminatory barriers to establishment. Therefore removal of these barriers is expected to lead to larger gains for the world as a whole, compared with the removal of non-discriminatory barriers.

Regional distribution of global gains

In the national treatment liberalisation scenario, all regions are expected to gain except China, which experiences an insignificant loss. In terms of changes in real GNP, the biggest winners are Thailand, Mexico, the Philippines and Indonesia. All

these regions have high discriminatory barriers, particularly to establishment. FDI investing regions also benefit from better market access to these high barrier regions. Table 5.2 shows that the three major FDI investing regions, Japan, the USA and the EU, all benefit.

Table 5.2 **Projected effects on real GNP of three multilateral trade liberalisation scenarios for financial services**

Region	*National treatment*	*Market access*	*Complete Liberalisation*
Australia	0.04	0.01	0.05
NZ	0.42	-0.01	0.40
Japan	0.01	0.01	0.01
Korea	0.08	-0.01	0.36
Indonesia	0.59	-0.09	0.70
Malaysia	0.17	-0.03	0.27
Philippines	0.70	-0.51	0.93
Singapore	0.29	0.00	0.73
Thailand	1.00	-0.01	0.96
China	0.00	0.04	0.06
Hong Kong	0.12	0.26	0.27
Taiwan	0.02	-0.04	0.03
Canada	0.07	-0.04	-0.01
USA	0.01	-0.01	-0.02
Mexico	0.74	-0.04	0.69
Chile	0.04	0.14	0.24
R. Cairns[a]	0.54	0.01	0.70
EU	0.07	-0.01	0.05
R. World[b]	0.16	0.00	0.17
World	**0.09**	**0.00**	**0.09**

a The rest of the Cairns group (Argentina, Brazil, Colombia and Uruguay). **b** The rest of the world.

Source: FTAP2 model projections.

The removal of market access barriers for financial services has a negligible effect on real GNP for most regions. This is because most regions have no or low market access barriers.

Table 5.2 shows that complete liberalisation tends to benefit high barrier regions more than low barrier regions. In the two partial liberalisation scenarios, however, the distribution of the global gains is not always in favour of high barrier regions. Take China as an example. The removal of barriers to national treatment leads to a minor fall in real GNP for China and a rise in real GNP for Hong Kong which is a major investor in China. Removal of barriers to national treatment leaves market access barriers in place, which transfers rents from China to other economies that have invested in China. This mitigates some of the gains that China receives from

national treatment liberalisation. It is only when complete liberalisation is undertaken that the negative effects (that is, the rents) of existing barriers can be avoided for the high barrier regions. This suggests that, with complete liberalisation, economies with high barriers will benefit more from complete liberalisation than from the combination of the two partial liberalisation scenarios. This result was also observed when liberalising trade in telecommunications.

Overall, most economies are expected to gain from complete liberalisation of trade in financial services. The biggest winners are South-East Asian and Latin American economies. The USA and Canada are the only two countries projected to be slightly worse off. Examining the decomposition of the changes in real GNP helps trace the sources of these gains or losses for each region.

Sources of global and regional gains

Table 5.3 presents the contributions of five effects to the changes in world and regional real GNP for all regions. The complete liberalisation of financial services trade is expected to increase world real GNP by around US$24 billion. Unlike telecommunications liberalisation, however, the most important contributor to this gain is the increase in net capital endowments, which accounts for about 63 per cent of the projected change in world real GNP. Compared with telecommunications, there is a much larger flow of FDI across regions when financial services are liberalised. Two differences between telecommunications and financial services influence this result. Firstly, all regions have barriers to national treatment in financial services, especially barriers to establishment or capital. Secondly, foreign affiliates have a higher penetration of domestic financial services markets prior to liberalisation. As a result, financial services liberalisation causes a much greater proportion of the world capital stock to be reallocated across regions. Therefore, the gains from this capital reallocation, measured as the contribution of net capital endowments, dominate the gains in world real GNP.

Gains from allocative effects (US$6 billion) and product variety (US$2 billion) contribute to 29 and 9 per cent, respectively, of the change in world real GNP. The distribution of gains from allocative effects across regions tends to favour highly protected regions at the expense of the major FDI investing regions, such as Japan, the USA and the EU.

Table 5.3 **Sources of changes in real GNP of complete trade liberalisation in financial services (US$ million)**

Region	*Allocative effects*	*Terms of trade*[c]	*Net capital endowment*	*Product variety*	*Net FDI income*	*Change in real GNP*[d]
Australia	2	126	14	1	11	154
NZ	117	-15	210	66	-158	218
Japan	-2 672	1 348	-4 618	-2 350	8 592	354
Korea	796	-578	1 826	663	-1 229	1 468
Indonesia	753	-340	2 245	549	-1 943	1 250
Malaysia	262	-112	150	70	-144	226
Philippines	796	-820	1 146	331	-853	591
Singapore	326	-259	460	205	-290	440
Thailand	703	-266	2 311	453	-1 797	1 396
China	1 221	-1 157	104	322	-106	384
Hong Kong	-1	340	-260	-87	281	275
Taiwan	88	-188	240	82	-151	71
Canada	22	-108	31	-10	27	-38
USA	-1 511	1 794	-5 720	-1 555	5 887	-1 091
Mexico	1 004	-540	3 249	719	-2 718	1 701
Chile	178	-96	142	37	-124	136
R. Cairns[a]	3 092	-749	11 839	2 839	-10 296	6 625
EU	-1 529	1 775	-3 880	-1 749	8 739	3 375
R. World[b]	2 817	-172	4 676	1 527	-3 728	5 108
World	**6 463**	**-16**	**14 164**	**2 112**	**0**	**22 640**

[a] The rest of the Cairns group (Argentina, Brazil, Colombia and Uruguay). [b] The rest of the world. [c] The sum of the terms of trade effects on GNP do not sum exactly to zero as expected due to numerical inaccuracy in solving the model. [d] This is equal to the row sum.

Source: FTAP2 model projections.

Table 5.4 reports the relative importance of two sub-effects on the overall allocative effects for all regions: the effect of changes in output and the effect of changes in capital usage. Each sub-effect is presented as a percentage of the overall allocative effects in each region. These percentages sum to either –100 or 100 depending on whether there is a loss or gain from allocative effects.

The table shows that the large low barrier regions (Japan, the USA and the EU) experience a loss from allocative effects as the capital stock declines, with Japan and the USA experiencing a loss in output as well. The EU experiences a gain from allocative effects on output, but this gain is not great enough to offset the loss from a smaller capital stock. In contrast, all high barrier regions experience a gain from the allocative effects of a larger capital stock, largely because of FDI inflows. Combined with a gain from increased output, this gives an overall gain from allocative effects.

Table 5.4 **Decomposition of three effects on real GNP of complete trade liberalisation in financial services**

Sub-effects as a percentage of each main effect

Region	*Allocative effects*		*Net capital endowment*		*Net FDI income*	
	Output	*Capital*	*Domestically owned capital*	*Inward FDI*	*Net FDI income*	*Net FDI rents*
Australia	-	100	-898	998	-202	302
NZ	42	58	19	81	-136	36
Japan	-48	-52	-137	37	105	-5
Korea	75	25	35	65	-120	20
Indonesia	30	70	25	75	-101	1
Malaysia	66	34	20	80	-107	7
Philippines	72	28	28	72	-110	10
Singapore	71	29	25	75	-117	17
Thailand	64	36	29	71	-106	6
China	48	52	-28	128	-190	90
Hong Kong	2990	-3090	-320	220	67	33
Taiwan	71	29	-18	118	-114	14
Canada	127	-27	-1714	1614	33	67
USA	-32	-68	-131	31	117	-17
Mexico	60	40	19	81	-109	9
Chile	32	68	-2	102	-117	17
R. Cairns[a]	52	48	23	77	-106	6
EU	10	-110	-169	69	107	-7
R. World[b]	61	39	31	69	-108	8
World	**83**	**17**	**-303**	**403**	**-**	**-**

a The rest of the Cairns group (Argentina, Brazil, Colombia and Uruguay). **b** The rest of the world.

Source: FTAP2 model projections.

The terms of trade effects of liberalising financial services transfer real income from highly protected to more open regions. Highly protected regions experience a worsening of their terms of trade, while liberal regions experience an improvement in their terms of trade (see table 5.3). This is because the barriers in highly protected regions restrict the supply of financial services and raise the price of exports relative to the price of imports. When the barriers are removed, the relative price of exports to imports falls in highly protected regions and rises in liberal regions.

The net capital endowment effect measures the change in the capital stock located in each region. In contrast to liberalising telecommunications trade, financial services liberalisation increases FDI for all regions (see tables 5.4). This is because all regions have some discriminatory barriers to the establishment and ongoing operations of foreign affiliates, and these are typically higher than in telecommunications. The removal of these barriers provides an incentive for inward

FDI in all regions. However, whether a region experiences an overall gain in net capital endowments is determined by what happens to domestically owned capital.

The increase in total FDI worldwide is driven, in the main, by the large FDI investing regions (Japan, the USA and the EU). Their outward FDI is financed from their domestically owned capital stocks. In the case of these three countries, the reduction in their domestically owned capital is significant enough to outweigh the positive effect of increased inward FDI, thus causing an overall fall in their net capital endowments with a negative effect on their real GNP. On the other hand, high barrier regions experience no such negative effect. Instead, their domestically owned capital stocks increase, along with inward FDI, because removing their relatively high market access barriers increases the demand for domestically owned and foreign-owned capital.

The change in net capital endowments also, indirectly, determines the change in product variety. Increased net capital endowments means increased GDP. As capital is the only interregionally mobile factor of production, given capital reallocation from the low barrier to high barrier regions, GDP normally falls in the former and rises in the latter. Gains or losses in real GNP associated with changes in product variety are correlated with any changes in GDP and, therefore, with changes in net capital endowments. Table 5.3 shows that the product variety effect and the net capital endowment effect move in the same direction.

The contribution of the net FDI income effect to regional real GNP largely depends on whether the region concerned is a net FDI investor or recipient. As with telecommunications liberalisation, net FDI income is a more important factor in determining the overall net FDI effect for almost all regions than FDI rents, as demonstrated in table 5.4.

In summary, most highly protected regions benefit from allocative effects, net capital endowments and product variety, while most low barrier regions gain from improvements in the terms of trade and increases in net FDI income. Although the change in real GNP for a particular region depends on which of these effects dominates, the overall majority of regions gain from complete liberalisation of trade in financial services.

The USA and Canada are the only regions that are not projected to benefit from liberalisation of financial services. The USA has significant commercial presence in many regions in which there are substantial barriers to financial services. The USA already benefits from other regions' trade barriers and receives rents earned by its foreign affiliates. When other regions liberalise their financial services, the USA benefits from increased FDI income from liberalising regions, but loses rents and also experiences a decline in net capital endowments, as it relocates capital abroad,

and therefore output. As the world's largest investor, the losses exceed the gains marginally, resulting in a small fall in real GNP.

5.2 Sectoral effects

The projected effects of complete liberalisation of trade in financial services on sectoral output in all regions are presented in table 5.5. World output of financial services is projected to increase by 0.61 per cent, which is the largest increase experienced by any sector.

Table 5.5 **Projected effects on sectoral output of complete trade liberalisation in financial services (per cent)**

Region	*Pri*[a]	*Sec*[b]	*Con*[c]	*Tt_*[d]	*Cmn*[e]	*Fib*[f]	*Osr*[g]	*Dwe*[h]
Australia	0.15	-0.09	-0.16	-0.05	0.00	0.04	0.04	0.01
NZ	0.88	1.15	0.68	0.70	0.50	0.76	0.36	0.65
Japan	-0.61	-0.90	-0.43	-0.74	-0.61	2.06	-0.93	-0.72
Korea	-0.37	1.38	0.89	0.30	0.32	4.85	-0.34	-0.33
Indonesia	0.61	4.82	1.84	2.12	1.50	3.81	1.55	1.17
Malaysia	-0.27	0.57	0.97	0.91	0.44	2.97	0.63	0.18
Philippines	0.98	7.32	3.77	5.45	1.82	5.12	4.34	0.65
Singapore	0.90	0.93	1.62	2.28	0.52	3.12	2.23	-0.32
Thailand	0.30	3.84	1.45	3.25	1.24	2.94	1.41	1.33
China	-0.37	0.46	0.82	-0.16	0.16	3.31	-0.12	0.27
Hong Kong	-0.34	-1.17	-1.53	-0.13	-0.17	0.63	-0.30	-0.50
Taiwan	0.11	0.37	-0.02	-0.02	0.08	1.28	-0.20	-0.02
Canada	0.18	-0.07	-0.29	0.02	-0.01	0.16	0.02	-0.13
USA	-0.05	-0.36	-0.45	-0.14	-0.10	-0.05	-0.02	-0.19
Mexico	0.96	3.83	0.88	1.76	1.21	1.79	0.99	1.64
Chile	0.00	-0.20	1.66	0.25	0.16	4.61	0.03	-1.77
R. Cairns[i]	1.59	3.04	2.03	1.72	1.09	2.38	0.86	0.72
EU	-0.04	-0.31	-0.42	-0.16	-0.06	-0.02	-0.01	-0.08
R. World[j]	0.09	0.61	0.32	0.31	0.23	0.77	0.24	0.05
World	**0.04**	**0.02**	**-0.12**	**-0.06**	**-0.06**	**0.61**	**-0.07**	**-0.06**

[a] Primary industries. [b] Secondary industries. [c] Construction. [d] Trade and transport. [e] Telecommunications. [f] Financial services. [g] Other services. [h] Dwellings. [i] The rest of the Cairns group (Brazil, Argentina, Uruguay and Colombia). [j] The rest of the world.

Source: FTAP2 model projections.

Given the nature of barriers to services trade, the regions with the highest barriers to trade in financial services experience the biggest expansion in their financial sectors. These include the Philippines, Korea, Chile and Indonesia. Only the USA and the EU experience a slight fall in the output of their financial services sectors. In fact, these two regions experience a fall in the output of all sectors. This is a

direct result of reallocating their capital from domestic sectors to other regions, in response to general liberalisation.

On the other hand, high barrier regions generally record positive growth in almost all other sectors. This is in contrast to telecommunications liberalisation where some sectors expand and others contract. This difference results from the importance of financial services as an intermediate input into the production of other goods and services, relative to telecommunications.

Financial services are a relatively more important intermediate input into production, compared with telecommunications. The share-weighted average of financial services in total production costs for the world as a whole is 8.8 per cent, compared with 1.5 per cent for telecommunications. Thus, removing a given barrier in financial services will lead to a larger fall in the production costs and output prices of all sectors using them as their intermediate inputs and in their output prices. Sectoral outputs are expected to respond to the changes in their prices.

The largest reductions in the price of financial services occur in the regions with the highest barriers. As the price of both financial services *and* non-financial services sectors in high barrier regions fall, the demand for their exports increases. This helps drive the strong output expansion of both financial services *and* non-financial services sectors in high barrier regions, which requires increased capital in these sectors. Moreover, the rise in the real GNP in high barrier regions also pushes up their consumption of all goods and services, which provides another impetus for domestic output expansion.

At the global level the primary and secondary sectors experience the largest and second largest expansions, respectively, after the liberalising sector. This result was also observed with the liberalisation of telecommunications. At the regional level the changes in the output of these two sectors diverges between low and high barrier regions. In low barrier regions the primary sector usually experiences the largest expansion or smallest contraction, after the financial services sector. In high barrier regions the secondary sector usually experiences the largest expansion, after the financial services sector. As with telecommunications liberalisation, these divergent effects are driven by changes in the relative rates of return to factors which are mobile or immobile between regions. These changes tend to cause firms in open regions to use more labour and other immobile factors and less capital in order to minimise their production costs, while firms in highly protected regions tend to use more capital and less labour and other immobile factors. As a result, the sectors intensive in the use of immobile factors of production are encouraged to expand more rapidly or contract less quickly in liberal regions, that is, primary industries. While the sectors intensive in the use of capital expand more rapidly in highly protected regions, that is, secondary industries.

6 Conclusion

This paper presents a quantitative analysis of the possible effects on the regional and world economies of liberalising trade in two key service sectors: telecommunications and financial services. These are sectors for which WTO members have undertaken commitments for trade liberalisation. However, these commitments are for partial rather than complete liberalisation. By modelling the effects of complete liberalisation of these two sectors, this study is intended to add impetus for further commitments for trade liberalisation in these sectors by WTO members. The analysis is based on a multi-region and multi-sector CGE model, FTAP2.

6.1 General results

The results of trade liberalisation depend, to a large extent, on the incidence and nature of the trade barriers in the regions and economies of the world. Barriers to trade in telecommunications and financial services are generally much higher in developing regions than in developed regions. Consequently, regions with relatively high barriers and, therefore, significant scope to liberalise gain most from liberalisation. Non-discriminatory market access barriers are more significant in telecommunications trade. Discriminatory national treatment barriers are more significant in financial services trade. Given the nature of the barriers, most of the gains from telecommunications liberalisation come from the removal of non-discriminatory barriers, whereas most of the gains from financial services liberalisation come from the removal of discriminatory barriers. Removing barriers to trade in telecommunications and financial services is projected to increase world real GNP by about 0.2 per cent.

Removing all barriers to trade in telecommunications is projected to increase world real GNP by 0.1 per cent. For the world as a whole, the single most important contributor is the gain from allocative effects. This is primarily the result of the reallocation of capital between regions and the reallocation of capital and labour between sectors within regions. Despite its positive effect for the world as a whole, the contribution of allocative effects to individual regions' GDP may not always be positive. The distribution of gains from allocative effects across regions tends to be in favour of highly protected regions and, sometimes, at the expense of regions that

have more open telecommunications sectors. Decreases in capital explain a significant proportion of the overall losses from allocative effects for most developed and FDI investing regions. In contrast to the effect on real GDP of allocative effects, the terms of trade effects tend to transfer real GNP from highly protected regions to less protected regions. Highly protected regions are expected to experience a worsening terms of trade, while other regions experience an improving terms of trade.

The world also gains from both increases in net capital endowments and product variety. The former is related to a global revaluation of capital assets (and therefore capital productivity) used in each region. The latter is related to output expansion because product variety increases as output expands. High barrier regions tend to gain from increases in net capital endowments and product variety, whereas liberal regions tend to lose output from decreases in net capital endowments and product variety. In contrast to the real GNP effects from changes in net capital endowments and product variety, high barrier regions lose from decreased net (of payments) FDI income, and low barriers regions gain from increased net (of payments) FDI income.

Regions with the highest barriers to trade in telecommunications experience the biggest expansion in telecommunications output. The effects on the output of other sectors can be explained by the changes in resource allocation. That is, as liberalisation causes telecommunications output to rise, this is generally accompanied by a reduction in the output of other sectors, as resources shift from the latter to the former.

Removing all barriers to trade in financial services increases world real GNP by 0.09 per cent. Given the nature of the barriers to trade in financial services, liberalisation causes a much greater proportion of the world capital stock to be reallocated across regions via FDI. Therefore, the gains from this capital reallocation, measured as the contribution of net capital endowments, dominate the gains in world real GNP. Low barrier regions which increase their outward FDI usually experience losses in net capital endowments, whereas high barrier regions which experience increases in inward FDI experience gains in net capital endowments. The second most important contributor to the gains in world real GNP is the gain in allocative efficiency. Similar to telecommunications liberalisation, the distribution of allocative efficiency gains across regions tends to be in favour of highly protected regions and, sometimes, at the expense of regions that have more open telecommunications sectors. Decreases in capital explain a significant proportion of the overall allocative efficiency losses for most developed and FDI investing regions.

The losses from changes in net capital endowments and allocative effects experienced by low barrier regions are more than offset by increased net (of payments) FDI income. The gains from changes in net capital endowments and allocative effects experienced by high barrier regions are partially offset by decreased net (of payments) FDI income. Highly protected regions also experience losses from terms of trade effects and gains from product variety effects, while liberal regions experience gains from terms of trade effects and losses from product variety effects. The regions with the highest barriers to trade in financial services experience the biggest expansion in their financial sectors.

The impact of removing barriers to trade in telecommunications and financial services on other sectors of a regional economy, depend not only on the reallocation of resources, but also on the changes in the relative rates of return to factors which are mobile or immobile between regions. When capital moves from open regions to highly protected regions, the expected rate of return to capital rises in the former relative to that in the latter. Thus the rate of return on capital, relative to immobile factors of production, rises in open regions and falls in highly protected regions. In response to these changes in relative factor returns, firms in open regions tend to use more labour and other immobile factors and less capital in order to minimise their production costs, while firms in highly protected regions tend to use more capital and less labour and other immobile factors. As a result, the sectors intensive in the use of immobile factors of production are encouraged to expand more rapidly in liberal regions, while the sectors intensive in the use of capital expand more rapidly in highly protected regions. For example, primary industries in liberal regions tend to experience strong growth relative to other sectors. In contrast, secondary industries in highly protected regions tend to experience strong growth relative to other sectors.

6.2 Policy implications

One of the general results of liberalising either of the two services sectors examined in this study is that gains accrue to almost all regions. Thus, on the basis of the modelling almost all regions would have an incentive to participate in multilateral liberalisation of trade in these two sectors. Greater gains accrue to high barrier regions than to other regions.

The estimated gains from liberalising telecommunications and financial services are not large. This is due, in part, to the non-substitutability of cross-border supply with domestic services. Not all services have this characteristic. Therefore, it would inappropriate to generalise the size of the gains estimated here to liberalisation in other service sectors. Furthermore, the model used to simulate trade liberalisation is

comparative static, and like most comparative static models dynamic gains are not captured in the results.

The two sectoral liberalisation scenarios that have been examined in this paper have assumed that any existing distortions in other sectors remain in place. That is, liberalising trade in telecommunications is simulated under the assumption that the trade barriers in financial services are still intact. The results indicate that existing distortions in other sectors do not interact in a significant way to undermine the benefits of trade liberalisation in the liberalising sector.

The results also show that the order in which complete liberalisation of each of these services sectors is conducted has no bearing on the results. The two sectoral liberalisation scenarios that have been examined in this paper have assumed that any existing distortions in other sectors remain in place. The same scenarios were also conducted on the basis that any existing distortions in other sectors had already been removed. That is, liberalising trade in telecommunications was simulated under the assumption that the trade barriers in financial services had been removed. The results, at the global as well as at the regional level, remained very close to those observed under the assumption that the existing distortions in other sectors remained in place. Therefore, the sequence in which these services sectors are liberalised should not be of concern.

The results do seem to suggest that the type of liberalisation that is undertaken for a given services sector may be important. Chapters 4 and 5 have demonstrated that almost all the gains from telecommunications liberalisation come from removing market access barriers, while almost all the gains from financial services liberalisation come from removing barriers to national treatment. This prompts the view that partial liberalisation in these sectors may be sufficient to realise most of the gains. While this is true for the world as a whole, it is not true for individual regions. The results show that partial liberalisation of removing only market access barriers in telecommunications or barriers to national treatment in financial services, leads to a lower gains for many high barrier regions compared with the gains from complete liberalisation. Therefore, upon closer inspection complete liberalisation is still the preferred strategy as it is expected to bring more benefits for most regions, especially those with relatively high barriers.

6.3 Agenda for future work

Further work on services trade liberalisation can be undertaken in a number of areas. Two are highlighted here.

The current model only captures the static gains from trade liberalisation (for example, allocative efficiency). In reality, there are dynamic gains from trade liberalisation as well. In a dynamic setting, a rise in real GNP also increases savings, which can be used to finance future investment and the accumulation of capital. An increase in the capital stock leads to further growth in GNP. The model used to simulate the policy changes is comparative static, and like most comparative static models dynamic impacts are not captured in the results. Thus, the estimated gains from the liberalisation scenarios could be interpreted as the lower bounds of all the potential gains to regional and world economies. Identifying these static gains sheds some light on the pattern of interregional distribution of gains from the proposed trade liberalisation scenarios. These static gains are important as they can trigger a growth effect on regional economies in a dynamic setting that, to a large extent, reinforces the initial static gains. Further work is needed to extend the model to incorporate some key dynamic features, such as investment behaviour and capital accumulation.

Furthermore, with greater sectoral detail it will be possible to extend the current analytical framework to estimate trade liberalisation in other services sectors, such as wholesale and retail trade, business services, health, education, maritime transport and electricity.

A A diagrammatic illustration of the comparative static gains from removing barriers to commercial presence

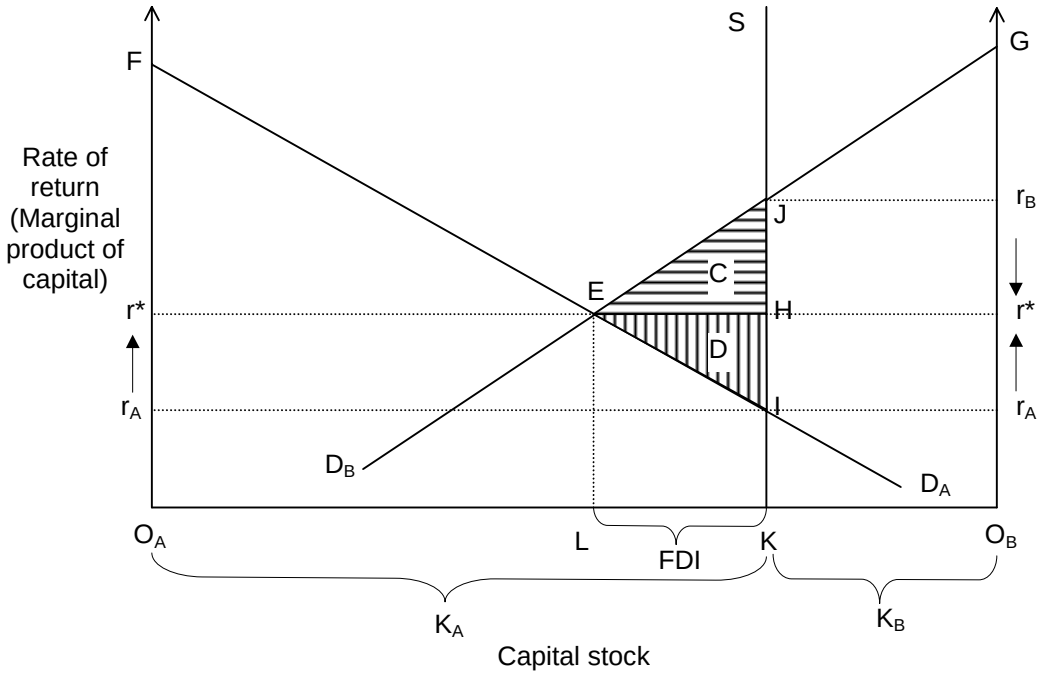
This appendix demonstrates the comparative static effects of removing barriers to the commercial presence of foreign affiliates using a simple diagram. Barriers to commercial presence of foreign affiliates are essentially barriers to capital mobility between countries. Thus, the impact of removing barriers to commercial presence is similar to the impact of removing barriers to capital mobility between countries.

Figure A.1 illustrates the impact of a barrier to foreign capital on the investing country and the host country, and the gains from removing this barrier. The figure combines the capital markets of two countries, A and B. The horizontal axis measures the total capital stock for this two-country world. The total capital stock is divided between two countries as indicated by the vertical supply curve S: K_A is owned by country A while K_B is owned by country B. The vertical axis measures the rate of return to capital (or the value of the marginal product of capital). The two downward-sloping curves D_A and D_B represent the marginal product of capital and hence the demand for capital in country A and B, respectively. Labour is assumed to be fixed and immobile between the two countries. The terms of trade are also assumed to be constant and there is no change in cross-country trade barriers.

The figure indicates that country A is more capital-abundant than country B. At the equilibrium point E, country A's supply of capital exceeds its demand, whereas country B's supply of capital is less than its demand. With no barriers to capital flow between the two countries, country A will invest in country B equal to the distance EH in the form of FDI. Now suppose that country B imposes a ban on FDI. Country B experiences a shortage of capital and the rate of return on capital equals r_B. Country A is affected by country B's policy change and the capital measured by the distance EH is forced to stay at home. This depresses the rate of return to capital to r_A. The difference between r_B and r_A reflects the rent per unit of capital generated by the barrier for country B's capital owner. After the ban,- world total income and output are equal to the areas O_AFIJGO_B, of which O_AFIJK accrues to country A and $KJGO_B$ accrues to country B.

When the barrier to foreign capital is removed and capital is allowed to move between country A and country B, country A will invest in country B until the rate of return equals r*. Country A's investment in country B is in the form of FDI and is measured by the distance EH. In this new equilibrium, world total income and output is equal to the area O_AFEGO_B, of which O_AFEHK represents country A's income and $KHEGO_B$ represents country B's income. Compared to when the ban was in place, world income and output is greater by the area EIJ, of which area D represents the gain in income for country A and area C represents the gain in income for country B. These gains arise from a more efficient use of capital within a static setting. In terms of output, country's A output has contracted by the area EIKL, whereas country B's output has increased by the area EJKL.

Figure A.1 **The comparative static gains from removing barriers to FDI**



B Modelling commercial presence in the FTAP2 model

As in FTAP, foreign commercial presence in FTAP2 is represented by foreign affiliates of multinational firms, and these firms and their affiliates are identifiable by location, ownership and sector. The region in which the firm's operations are located is referred to as the host region, while the region from which the firm originates is referred to as the home region.

In each sector of a host region, goods or services may be produced by domestic and foreign affiliates simultaneously. Like domestic firms, foreign affiliates have their own cost structure for intermediate inputs and primary factors. They also have their own domestic sales and exports. Foreign affiliates compete with domestic firms and with each other, not only in the host region's domestic markets but also in foreign markets for their exports.

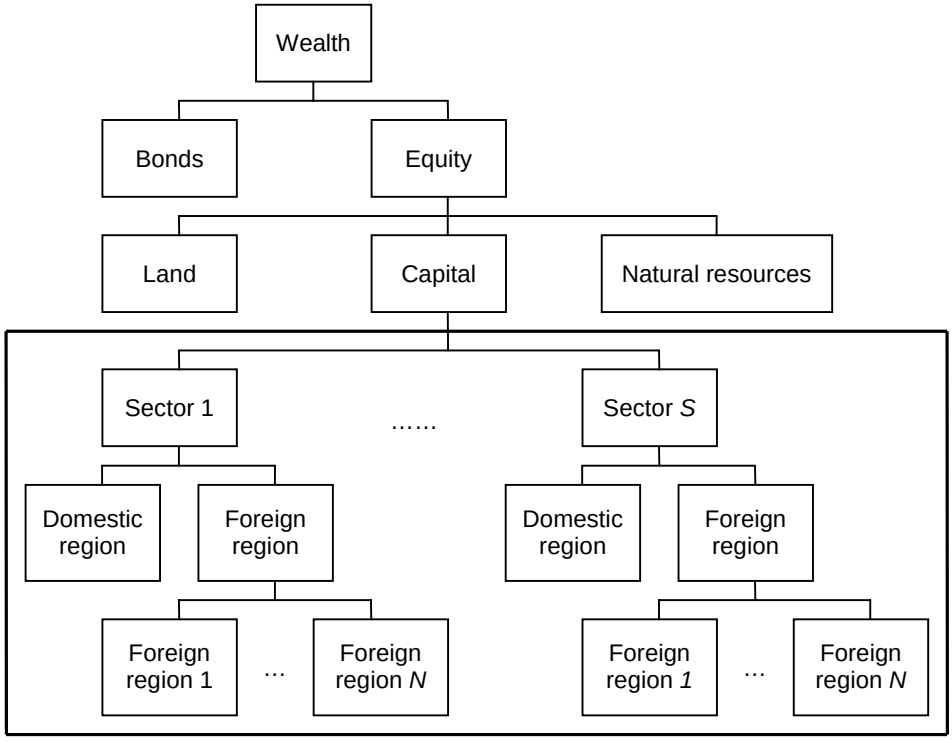
Foreign affiliates of multinational firms are assumed to source capital from their home regions and other factors of production from host regions. Given input prices and output demands, firms are assumed to select a combination of inputs to minimise production costs.

Specialising in a given sector, firms can potentially locate their affiliates in the same sector of any region. The exact location or commercial presence of a firm, however, is determined by the supply of capital by the home region's capital owner and the demand for output by the host region's consumers.

B.1 Supply of capital

Commercial presence of foreign affiliates in host regions is driven by the firm's desire to maximise the return for the capital owner. Figure B.1 shows how capital is allocated by the capital owner to the region's multinational firms across sectors and allocated by the firm in each sector across regions.

Figure B.1 **Allocation of capital by a home region**



Source: Modified from figure 2.3 of Hanslow, Phamduc and Verikios (1999).

Figure B.1 indicates that each region has a given endowment of wealth.[1] The wealth owner, the representative household, is assumed to maximise returns by allocating wealth across all sectors of the region. Wealth is composed of equity in productive assets and net bond holdings (net foreign debt). Equity is made up of land, natural resources and physical capital. Of these three, only capital is mobile. As such, the allocation of wealth essentially involves deciding on the allocation between capital and net foreign debt. As the proportion of foreign debt in regional income is fixed by assumption, the wealth owner's decision is in fact reduced to one about how capital should be allocated between a region's firms across all sectors.

In the model, capital is allocated at two levels. At the regional level, capital is allocated by its owner across all sectors. Within each sector, there is a collective regional multinational firm. Sectoral capital can be allocated by this multinational firm between the home region and foreign regions, and across all foreign regions.

[1] As opposed to FTAP, regional wealth is assumed to be fixed in FTAP2. In preliminary simulations the wealth accumulation mechanism generated unexpected results. This is because FTAP links wealth accumulation to net bond holdings, which become so dominant in some regions that it distorts the effect of reallocation of physical capital. By fixing regional wealth and removing wealth accumulation, the effect of bonds can be minimised. This treatment is also consistent with the comparative static nature of the current study.

The outward allocation of capital represents the region's outward FDI, which is invested in the firm's foreign affiliates.

The capital owner in each region intends to maximise returns by moving capital from low rate of return sectors to high rate of return sectors. The multinational firm in each sector maximises the return for its capital owner by investing in its parent firm at home and affiliates overseas. The returns to capital for each region are maximised when the expected rates of return to all capital owned by that region, and used by all firms located at home or abroad, are equalised. The enclosed area in figure B.1 indicates the location of these firms.

It should be noted that while FTAP2 incorporates investment flows, the dynamics of investment and savings behaviour is not included. This is important for interpreting simulation results using FTAP2 as the welfare gains will be understated.

B.2 Demand for firm-specific products

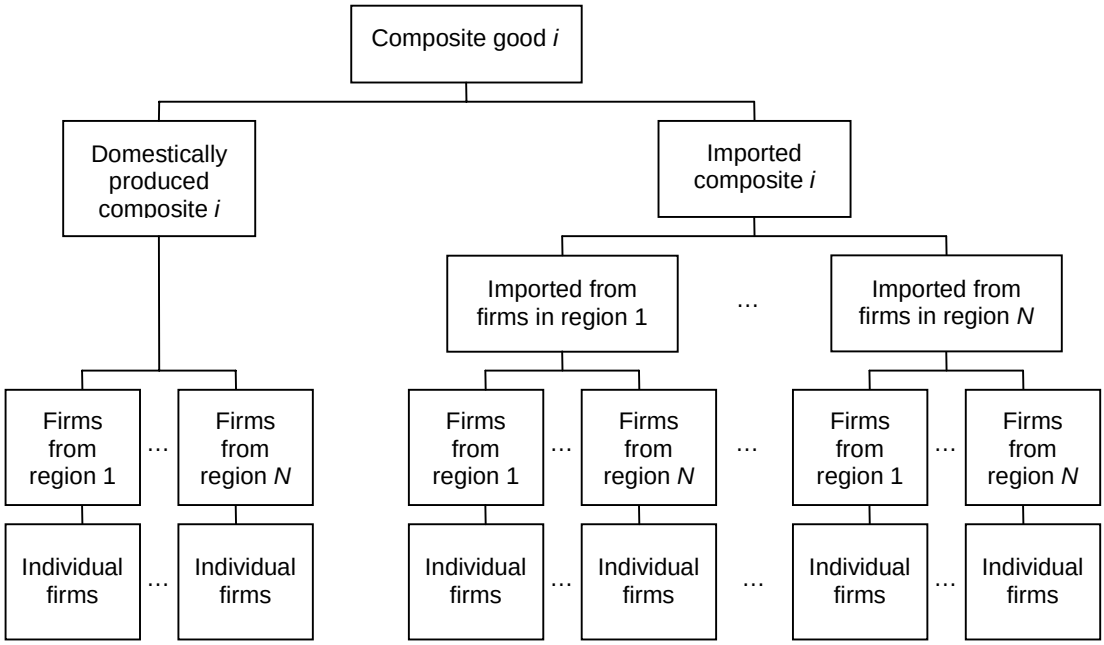
The location of a firm's operations is also influenced by the demand for its products by consumers in the host region where the firm's operation is located.

The products of domestic firms and foreign affiliates located in the same region are assumed to be imperfect substitutes. Consumers are assumed to maximise utility by selecting a particular bundle of differentiated goods and services to suit their needs. As foreign affiliates compete with domestic firms in the same region, the demand for a given good or service determines the location or commercial presence of foreign affiliates. The demand structure of the model is similar to FTAP, and is represented in figure B.2.

At the top node of the nesting in figure B.2, the consumer can choose between composite goods from domestic or foreign locations. At the second node, the consumer can also choose composite imports from a particular source region. At the third node of the nesting, the consumer can choose a domestically produced good produced by a foreign affiliate or by a domestic firm. The consumer can also choose an imported good produced by a firm located in any other region.[2]

[2] This treatment assumes that from an Australian perspective, for example, a good produced by a US multinational located in Australia is a closer substitute for a good produced by an Australian firm than it is for a good produced by a US firm located in the United States.

Figure B.2 **Structure of the demand for a firm-specific product by a host region**



Source: Adapted from figure 2.2 of Hanslow, Phamduc and Verikios (1999).

The bottom node of the nesting in figure B.2 shows that the good produced by each firm in either the domestic region or foreign regions, is a composite of all the varieties of individual firms within that group. This implies firm-level product differentiation associated with large-group monopolistic competition (Francois, McDonald and Nordstrom 1995). With such firm-level product differentiation, the consumers of each region can benefit from having more varieties to choose from, as it is more likely for them to find a product or service which best suits their particular needs. This increased choice is modelled as a gain for consumers in each region.[3]

Consumer choices are modelled in a nest of constant elasticity of substitution (CES) utility functions. The values for the elasticities used for the first and second nodes of the demand nesting (levels one and two in figure B.2) vary by commodity. For telecommunications and financial services these elasticities are set to zero. For all other commodities they are the same as those used in Dee and Hanslow (2000). The

[3] The model structure assumes that each firm's output is fixed, so that the output of a sector can only expand or contract via an expansion or contraction in the number of firms in that sector. Coupled with the assumption of firm-level product differentiation, a contraction or expansion in industry output in a sector corresponds with a contraction or expansion in product varieties in that sector.

values used for the elasticity of substitution between goods produced by firms from different home regions but located in the same host region (level three in figure B.2) is 7.5, smaller than the value of 10 used in the initial implementation of FTAP.[4] The values used for the elasticity of substitution between different firm types (level four in figure B.2) is set at 15, which is the same as in FTAP.

[4] A smaller value is chosen because FTAP2 assumes a higher degree of capital mobility than FTAP. The original value used in FTAP assumes a degree of substitution that is inconsistent with the higher degree of capital mobility in FTAP2.

C Database construction

To support the theoretical structure of the FTAP2 model and to simulate the removal of all barriers to trade in services, the database must contain information on:

- bilateral FDI stocks[1] by region and sector;
- rental returns to FDI by region and sector; and
- barriers to the establishment and operation of domestic firms and foreign affiliates.

Bilateral FDI stocks at the sectoral level are estimated from APEC (1995), United Nations (1999) and a wide range of publications by various international organisations as well as individual countries (see Verikios and Zhang 2001). These sources provide information on total inward and outward FDI stocks by region and broad sectors. With this information, a RAS procedure is used to generate a consistent database of bilateral FDI stocks by region and sector. The resulting inward and outward FDI stocks by region and sector are largely consistent with the three-sector database used in Dee and Hanslow (2000), and are summarised in tables C.1 and C.2.

As shown in tables C.1 and C.2, the database retains the same regional detail as in Dee and Hanslow (2000), but provides greater sectoral detail. The tables show the sources and destinations of FDI stocks in seven of the eight sectors in the database. The EU, the USA and Japan are the main sources of FDI, accounting for 36, 23 and 17 per cent of total outward FDI stocks, respectively. Both the EU and the USA are also the main destinations of FDI, receiving about the same amount of FDI as they invest abroad. Unlike the EU and the USA, however, Japan's outward FDI far exceeds its inward FDI. Japan is the source of 83 per cent of total net outward FDI,[2] making it the single most important net FDI exporter in the world. Among developing countries, Indonesia is the largest recipient, receiving 29 per cent of the total net inward FDI stocks.[3] The next most important net FDI importers are Mexico (10 per cent), China (9 per cent) and Malaysia (5 per cent).

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1 'FDI stocks' refers to the stocks of capital that are owned by foreign affiliates.

2 Total net outward FDI stocks are the sum of regional net outward FDI stocks.

3 Total net inward FDI stocks are the sum of regional net inward FDI stocks.

Table C.1 **Outward FDI stocks by home region and sector, 1995 (US$ million)**

Region	*Pri*[a]	*Sec*[b]	*Con*[c]	*Tt_*[d]	*Cmn*[e]	*Fib*[f]	*Osr*[g]	*Total*
Australia	9,807	6,622	550	1,293	498	358	2,326	21,453
N Zealand	695	1,459	82	568	48	110	330	3,293
Japan	49,987	87,043	2,058	53,845	8,585	46,818	27,973	276,309
Korea	4,508	1,340	26	178	12	124	104	6,292
Indonesia	217	775	41	261	23	116	89	1,523
Malaysia	247	781	30	369	0	5	89	1,520
Philippines	0	144	12	77	5	41	362	642
Singapore	1,797	3,933	174	1,191	73	869	694	8,731
Thailand	0	120	25	170	14	124	102	554
China	548	129	49	115	3	29	37	910
H Kong	6,625	14,614	289	1,829	170	6,066	3,808	33,400
Taiwan	100	5,282	0	324	0	267	316	6,290
Canada	12,721	33,478	0	5,804	114	11,714	7,548	71,380
USA	84,235	161,579	370	50,749	5,494	58,855	5,222	366,505
Mexico	177	433	21	261	14	138	73	1,117
Chile	0	177	7	51	2	31	30	299
R Cairns[h]	657	1,519	72	487	30	293	284	3,341
EU	140,863	235,818	4,160	76,714	9,001	86,049	29,642	582,246
R. World[i]	54,548	98,904	4,755	32,395	23	3,245	19,050	212,920
Total	367,733	654,149	12,723	226,680	24,110	215,253	98,078	1,598,726

[a] Primary industries. [b] Secondary industries. [c] Construction. [d] Trade and transport. [e] Telecommunications. [f] Finance, insurance and business services. [g] Other services. [h] The rest of the Cairns group (Brazil, Argentina, Uruguay and Colombia). [i] The rest of the world.

Source: FTAP2 database.

The tertiary sector makes up 36 per cent of all FDI stocks, compared with 23 per cent for the primary sector and 41 per cent for the secondary sector. Within the tertiary sector, the trade and transport sector (*tt_*) has the largest share, 14 per cent, followed by financial services (*fib*), 14 per cent and other services 6 per cent. The telecommunications sector has less than 2 per cent of the total FDI stocks.

FDI accounts for around 2 per cent of the world capital stock. Services sectors receive proportionally less foreign capital than non-services sectors. The world average FDI share is only 0.9 per cent for telecommunications and 1.4 per cent for financial services.

The expected rates of return to capital are obtained from an updated version of the GTAPICM[4] database, which fully implements the UR. Rental returns to FDI are derived by multiplying FDI stocks by the corresponding rates of return. The FDI capital rental shares are then used in splitting the total output of each sector in the

4 GTAPICM is a version of the GTAP model (Hertel 1997) incorporating international capital mobility (Verikios and Hanslow 1999).

updated GTAPICM database into production by domestic firms and foreign affiliates.

Table C.2 **Inward FDI stocks by host region and sector, 1995 (US$ million)**

Region	*Pri*[a]	*Sec*[b]	*Con*[c]	*Tt_*[d]	*Cmn*[e]	*Fib*[f]	*Osr*[g]	*Total*
Australia	14,207	13,137	524	12,274	627	388	5,030	46,188
N Zealand	1,700	3,134	79	207	138	3,576	478	9,312
Japan	0	16,230	101	5,332	289	61,720	4,315	87,987
Korea	0	4,216	63	218	169	868	1,858	7,392
Indonesia	77,550	5,305	218	537	33	181	434	84,258
Malaysia	6,946	7,272	608	1,545	21	27	292	16,711
Philippines	3,178	862	20	156	22	397	210	4,845
Singapore	0	11,682	329	2,981	42	268	59	15,361
Thailand	1,550	4,002	1,227	2,024	11	1,213	673	10,701
China	3,902	15,557	289	905	2	47	5,418	26,120
H Kong	4,315	5,691	336	3,572	916	9,127	546	24,503
Taiwan	0	11,823	12	554	61	268	1,218	13,937
Canada	5,610	47,006	4,104	7,503	155	9,866	2,741	76,987
USA	28,899	131,977	2,215	93,630	7,153	35,393	52,637	351,905
Mexico	5,680	10,714	86	6,217	225	7,918	494	31,335
Chile	9,757	995	52	934	106	107	400	12,351
R. Cairns[h]	8,182	32,968	297	5,332	523	8,342	2,286	57,931
EU	148,818	222,269	0	59,536	13,586	72,066	4,583	520,858
R. World[i]	47,438	109,308	2,163	23,222	29	3,479	14,405	200,044
Total	367,733	654,149	12,723	226,680	24,110	215,253	98,078	1,598,726

[a] Primary industries. [b] Secondary industries. [c] Construction. [d] Trade and transport. [e] Telecommunications. [f] Finance, insurance and business services. [g] Other services. [h] The rest of the Cairns group (Brazil, Argentina, Uruguay and Colombia). [i] The rest of the world.

Source: FTAP2 database.

The updated GTAPICM database does not contain barriers to trade and foreign investment in services. These have to be injected into the database separately. Estimates of the tax equivalents of these barriers for banking and telecommunications are taken Warren (1999b) and Kalirajan et al. (1999). The barriers to telecommunications are imposed on the corresponding sector (*cmn*), and the barriers to financial services are applied to the entire finance, insurance and business services sector (*fib*). This is done using the technique of Malcolm (1998), described in section 4.2 of Hanslow et al. (2000).

D Estimating tax equivalents of barriers to trade in telecommunications and financial services

The estimates of barriers to trade in telecommunications by region are drawn from Warren (2000b). This study develops a method for examining the impact of entry barriers, on the consumption of fixed and mobile telecommunications services within a country. It estimates the impact on average output in the sample countries if these barriers are removed, and the tariff equivalent of these barriers.

Warren (2000a) assumes that liberalisation increases telephone network penetration and estimates a number of regression models for mobile network penetration and fixed network penetration. The dependent variables of those models are proxies for network penetration. The independent variables include a series of impediment frequency indexes, which measure discriminatory and non-discriminatory restrictions to cross-border supply and FDI, as well as proxies for income, connection waiting lists, quality, household density and population density. All models had a high degree of explanatory power.

The quantity impacts of the impediment policy variables are separated from other impacts and converted to price impacts using a price elasticity of demand of -1.2 Warren (2000b). The price impacts are then converted to tariff equivalents. These estimates are injected into the FTAP2 database to represent the barriers to the establishment (rents to capital) or ongoing operation (rents to output) of domestic firms and foreign affiliates in the telecommunications sector.

Kalirajan et al. (1999) develop a model and apply it to 694 banks in 27 economies to assess the price impact of non-prudential or trade restrictions on the interest margins of banks. It assumes that high bank profitability reflects a lack of competition arising from various restrictions and such restrictions impose costs on banks, which may be passed onto their customers in the form of high prices. As such, the interest margin of banks can be used to measure the price of banking services.[1]

[1] In fact, the estimated interest margin is a direct measure of the profit, or price-cost margin, of banks.

Kalijaran et al. (1999) apply a two-stage regression model to estimate the impact that non-prudential restrictions on trade in banking services may have on banks' net interest margins. This estimate is then used to derive the price impact of non-prudential restrictions on trade in banking services in different economies. They adopt a measure of non-prudential restrictions introduced by McGuire and Schuele (2000), in which both domestic and foreign restrictiveness indexes are calculated. The price impact of non-prudential restrictions is calculated by combining the estimated coefficient for the trade restrictiveness index with the trade restrictiveness index for each economy. This is done for both domestic and foreign trade restrictiveness indexes. The estimated tariff equivalents are used in the FTAP2 database to represent the barriers to the establishment (rents to capital) or ongoing operation (rents to output) of domestic firms and foreign affiliates in the financial services sector.

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