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Multilateral Liberalisation of Services Trade

Staff Research Paper

Philippa Dee
Kevin Hanslow

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Inquiries:
Media and Publications
Productivity Commission
Locked Bag 2
Collins Street East Post Office
Melbourne Vic 8003

Tel: (03) 9653 2244
Fax: (03) 9653 2303
Email: maps@pc.gov.au

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Preface

Earlier versions of this paper were presented at the 28th Annual Conference of Economists at La Trobe University in September 1999, and at the World Services Congress in Atlanta and Australian National University in Canberra in November 1999. The authors are grateful for comments from participants at those venues. This paper is the culmination of a large team effort and the authors thank their colleagues, Patrick Jomini, Tien Phamduc, Susan Stone, Alexandra Strzelecki, George Verikios and Andrew Welsh. The authors also thank Professor Richard Snape of the Productivity Commission for reviewing the paper.

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Summary

This paper compares estimates of the gains from eliminating barriers to trade in services with those from eliminating post-Uruguay barriers remaining in the traditional areas of agriculture and manufacturing. To do so, it uses a model that incorporates a bilateral treatment of foreign direct investment (FDI), one of the key vehicles by which services are traded internationally. This allows the paper to examine the comprehensive removal of restrictions on all modes of service delivery, including restrictions on services delivered via FDI (though not on FDI more generally).

Accordingly, the modelling framework distinguishes barriers to commercial presence (primarily through FDI) from those affecting other modes of service delivery (cross border supply, consumption abroad, and the presence of natural persons). It also distinguishes non-discriminatory barriers to market access from discriminatory restrictions on national treatment. It makes use of estimates of the barriers to trade in banking and telecommunications services, the first of a comprehensive new set of estimates of barriers to services trade, to be documented in Findlay and Warren (2000).

The paper finds that the world as a whole is projected to be better off by more than US$260 billion annually as a result of eliminating all post-Uruguay trade barriers. About US$50 billion of this would come from agricultural liberalisation, and a further US$80 billion from liberalisation of manufactures. This shows that there are still considerable gains to be had from liberalisation in traditional areas, even if no progress is made in services. But an additional US$130 billion would come from liberalising services trade. And about US$100 billion of the gains from services liberalisation would accrue in China alone.

Australia is projected to gain as much from global liberalisation of services trade as it would from global liberalisation of trade in agriculture and manufacturing. Each would make Australia's real income about US$2 billion higher than otherwise, for an overall gain of about US$4 billion a year. This is the projected gain in annual income, about ten years after the liberalisation has occurred and the associated resource adjustments have taken place.

The results highlight that services trade liberalisation could lead to a significant loss of rents generated by existing services trade restrictions. This is especially the case

for the United States and the European Union, economies that are important sources of current outward FDI. Their loss of rents would be partially offset by increased flows of FDI into other liberalising economies, with associated gains in repatriated income.

The paper also notes that because the structure of trade barriers in the services area is relatively complex, there is a real question as to the best way to approach partial (as opposed to full) liberalisation in that sector. It is important to determine paths of partial liberalisation of services trade that avoid worsening disparities in protection, moving resources further away from their pattern in a world free of distortions, and worsening real income.

The detailed results show that it is difficult of find a Pareto improvement (an outcome where at least some economies gain and none lose) from partial liberalisation, when it involves removing only one type of barrier (to market access, national treatment, commercial presence or other modes of service delivery). This suggests that a better strategy may be to negotiate gradual reductions in *all* types of barriers simultaneously.

Multilateral liberalisation of services trade

As the world faces a possible new round of multilateral trade negotiations, it is timely to examine what is at stake. This paper provides preliminary estimates of the benefits to individual economies, and to the world as a whole, from eliminating the barriers to trade that will remain after full implementation of the Uruguay Round.

The analysis compares estimates of the gains from eliminating remaining barriers in the traditional areas of agriculture and manufacturing, with those from eliminating barriers to trade in services. To do so, it uses a model that incorporates a treatment of foreign direct investment (FDI), one of the key vehicles by which services are traded internationally. This allows the paper to examine the comprehensive removal of restrictions on all modes of service delivery, including restrictions on services delivered via FDI (though not on FDI more generally).

The structure of the paper is as follows. It first describes the model used — a multi-sector, multi-regional computable general equilibrium model of world trade and investment. The theoretical structure of the model covers both FDI and portfolio investment. The model's database contains estimates of FDI stocks and the activities of FDI firms, each on a bilateral basis. These estimates allow a comparison of the extent to which both goods and services are delivered via FDI or via conventional trade. The paper then looks at the size of the trade barriers that will remain after full implementation of the Uruguay Round. These estimates include comprehensive new measures of existing barriers to services trade. Next, the paper looks at the implications of eliminating those trade barriers entirely. Since any new trade round is likely to lead to partial rather than full liberalisation, the paper then evaluates some options for partial liberalisation of services trade. Finally, it outlines directions for further research.

1 The FTAP model

The model is a version of GTAP (Hertel 1997) with foreign direct investment, known as FTAP. The treatment of FDI follows closely the pioneering work of Petri (1997). FTAP also incorporates increasing returns to scale and large-group monopolistic competition in all sectors. This follows Francois, McDonald and Nordstrom (1995), among others, who adopted this treatment for manufacturing and resource sectors, and Brown et al. (1995) and Markusen, Rutherford and Tarr (1999), who used similar treatments for services. Finally, FTAP makes provision for capital accumulation and international borrowing and lending. This uses a treatment of international (portfolio) capital mobility developed by McDougall (1993), and recently incorporated into GTAP by Verikios and Hanslow (1999). FTAP is implemented using the GEMPACK software suite (Harrison and Pearson 1996). Its structure is documented fully in Hanslow, Phamduc and Verikios (1999). The model and its documentation are available at the Productivity Commission web site at http://www.pc.gov.au.

Theoretical structure

FTAP takes the standard GTAP framework as a description of the *location* of economic activity, and then disaggregates this by *ownership*. For example, each industry located in Australia comprises Australian owned firms, along with US, European and Japanese multinationals. Each of these firm ownership *types* is modelled as making its own independent choice of inputs to production, according to standard GTAP theory. And each firm type has its own sales structure.

On the purchasing side, agents in each economy make choices among the products or services of each firm type, distinguished by both ownership and location, and then among the individual (and symmetric) firms of a given type. Thus, the model recognises the firm-level product differentiation associated with monopolistic competition. Firms choose among intermediate inputs and investment goods, while households and governments choose among final goods and services.

Agents are assumed to choose first among products or services from domestic or foreign locations, with a CES elasticity of substitution of 5. They then choose among particular foreign locations, and among ownership categories in a particular location, both with a CES elasticity of substitution of 10. Finally, they choose among the individual firms of a particular ownership and location, with a CES elasticity of substitution of 15. With firm-level product differentiation, agents benefit from having more firms to choose among, because it is more likely that they

can find a product or service suited to their particular needs. Capitalising on this, Francois, McDonald and Nordstrom (1995) show that the choice among individual firms can be modelled in a conventional model of firm types (not firms) by allowing a productivity improvement whenever the output of a particular firm type (and hence the number of individual firms in it) expands. But because the substitutability among individual firms is assumed here to be very high, the incremental gain from greater variety is not very great and this productivity enhancing effect is not particularly strong (the elasticity of productivity with respect to output[1] is 1/15 = 0.0667).

The first two choices, among domestic and foreign locations, are identical to the choices in the original GTAP model. They have been parameterised using values, 5 and 10, that are roughly twice the standard GTAP Armington elasticities. Two reasons can be given for doubling the standard elasticities. One is that only with such elasticities can GTAP successfully reproduce historical changes in trade patterns (Gehlhar 1997). The other is that higher elasticities accord better with notions of firm level product differentiation.

The order of the first three choices, among locations and then among ownership categories, is the opposite of the order adopted by Petri (1997). The current treatment assumes that from an Australian perspective, for example, a US multinational located in Australia is a closer substitute for an Australian owned firm than it is for a US firm located in the United States. Petri's treatment assumes that US owned firms are closer substitutes for each other than for Australian firms, irrespective of location.

There are two reasons for preferring the current treatment.

The first is that Petri's treatment produces a model in which multilateral liberalisation of tariffs on manufactured goods produces large economic welfare losses, for most individual economies and for the world as a whole — an uncomfortable result at odds with conventional trade theory. The reason for the result can be seen by considering the choices that Australians would make at the top of Petri's decision tree in the face of a tariff cut. They would choose between an aggregate of the output of Australian firms (irrespective of location) and an aggregate of the output of US firms (irrespective of location). The first aggregate would be overwhelmingly dominated by the output of domestically located

[1] The equivalent elasticity of productivity with respect to *inputs* is 0.0667/(1 – 0.0667) = 0.0714, where this latter concept is used by Francois, McDonald and Nordstrom (1995). The elasticities of productivity with respect to output and inputs are not equal because of the assumption of increasing returns to scale.

Australian firms, since 'boomerang' imports from Australian firms located offshore would be minimal. Thus the first aggregate would have a very small proportion of goods attracting a tariff. The second aggregate would include both goods produced by US multinationals located in Australia, and imports from US firms located in the United States. Only the latter would initially attract a tariff. Depending on relative shares, there is no guarantee that the price of the US aggregate would be dominated by the removal of the tariff on imports, rather than by endogenous changes in the cost structure of US multinationals in Australia. Simulations with a model of this structure showed that the price of the US aggregate *rose* relative to the price of the Australian aggregate in the face of a tariff cut, encouraging resources in Australia to move *into* the domestic protected sector as its protection was removed. This led to a deterioration in allocative efficiency and an overall economic welfare loss. The story was repeated in many other regions.

The second reason for preferring the current treatment is that, in many instances, it accords better with reality. Some Australian examples help to illustrate. Many Australian consumers prefer roomy cars with large capacity, 6 cylinder engines. Holden, originally locally owned, was bought out by General Motors, and has since produced such cars. Ford Australia has invested in significant local design capacity in order to produce a close rival. Even Mitsubishi and Toyota in Australia now produce 6 cylinder versions for the local market. Similarly, Hungry Jacks, the local version of Burger King, has had some success with a hamburger reminiscent of those popular in Australia before the arrival of international franchises — one with no pickle, but with a rasher of bacon, a fried egg, and above all, a slice of beetroot. Recently McDonalds in Australia announced that it had delayed introducing a burger with beetroot because it had been unable to secure adequate supplies.

Thus US firms are often not the same, irrespective of location, even when their foreign direct investment is 'horizontal' rather than 'vertical'. Indeed, one of the distinguishing characteristics of services is that they are tailored each time to meet the needs of the individual consumer. Another characteristic is that they are often delivered face to face, sometimes making commercial presence (through FDI) the only viable means of trade. These taken together mean that service firms in a given location, irrespective of ownership, will tailor their services to meet local tastes and requirements, and thus appear to be close substitutes, as in the current treatment.

While the demand for the output of firms distinguished by ownership and location is determined as above, the supply of FDI is determined by the same imperfect transformation among types of wealth as in Petri (1997). Investors in each economy first divide their wealth between 'bonds' (which can be thought of as any instrument of portfolio investment), real physical capital, and land and natural resources in

their country of residence. This choice is governed by a CET semi-elasticity of 1, meaning that a one percentage point increase in the rate of return on real physical capital, for example, would increase the ratio of real physical capital to bond holdings by one per cent. A bond is a bond, irrespective of who issues it, implying perfect international arbitrage of rates of return on bonds. However, capital in different locations is seen as different things. Investors next choose the industry sector in which they invest (with a CET semi-elasticity of 1.2). They next choose whether to invest at home or overseas in their chosen sector (with a CET semi-elasticity of 1.3). Finally, they choose a particular overseas region in which to invest (with a CET semi-elasticity of 1.4).

The less than perfect transformation among different forms of wealth can be justified as reflecting some combination of risk aversion and less than perfect information. It is important to note, however, that while the measure of economic welfare in FTAP currently recognises the positive income contribution that FDI can make, it does not discount that for any costs associated with risk taking, given risk aversion. This is an important qualification to the current results, and will be the subject of further research.

While the chosen CET parameters at each 'node' of the nesting structure may appear low, the number of nests means that choices at the final level (across destinations of FDI) are actually very flexible. For example, it can be shown that, holding total wealth fixed but allowing all other adjustments across asset types and locations to take place, the implied semi-elasticity of transformation between foreign destinations can easily reach 20, and be as high as 60. The variation across regions in these implied elasticities comes about because of the different initial shares of assets in various regional portfolios.

The choice of CET parameters at each 'node' was determined partly by this consideration of what they implied for the final elasticities, holding only total wealth constant. They were also chosen so that this version of FTAP gave results that were broadly comparable to an earlier version of GTAP with imperfect international (portfolio) capital mobility, for experiments involving the complete liberalisation of agricultural and manufacturing protection. That earlier version of GTAP was developed by Verikios and Hanslow (1999). Imperfect capital mobility was also a feature of the GTAP-based examination of APEC liberalisation by Dee, Geisler and Watts (1996) and Dee, Hardin and Schuele (1998). These parameters thus provide a familiar starting point, from which variations could be made in the future.

In one respect, however, the current version of FTAP does differ from previous versions of GTAP with imperfect capital mobility. The GTAP variants assumed that capital was perfectly mobile across sectors, whereas FTAP has less than perfect sectoral mobility. Furthermore, the choice of sector is relatively early in the nesting structure, so that the implied elasticities guiding choice of sector, holding only total wealth constant, are relatively low (eg 1.2 in the United States). As a result, FTAP tends to exhibit behaviour where resources move less readily between sectors in a given region, but more readily across regions in a given sector, although the differences are not dramatic. The current treatment is consistent with the idea that the knowledge capital often required to succeed in foreign direct investment, despite the difficulties of language and distance, is likely to be sector-specific.

Petri's model assumed that total wealth in each region was fixed. In FTAP, while regional endowments of land and natural resources are fixed (and held solely by each region's residents), regional capital stocks can accumulate over time, and net bond holdings of each region can adjust to help finance the accumulation of domestic and foreign capital by each region's investors. The treatment of capital accumulation follows the original treatment of McDougall (1993), and was also used by Verikios and Hanslow (1999), Dee, Geisler and Watts (1996) and Dee, Hardin and Schuele (1998).

With this treatment of capital accumulation, FTAP provides a long-run snapshot view of the impact of trade liberalisation, ten years after it has occurred. To the extent that liberalisation leads to changes in regional incomes and savings, this will be reflected in changes to the capital stocks that investors in each region will have been able to accumulate. As noted, investors in each region are not restricted to their own savings pool in order to finance capital investment. They may also issue bonds to help with that investment, but only according to their own preferences about capital versus bond holding, and only according to the willingness of others to accept the additional bonds.

Model database

The starting point for FTAP's database was not the standard GTAP database, since this includes measures of trade and investment barriers that are still to be eliminated under the Uruguay Round agreement. Instead, the starting point was an updated version of the GTAP database, following a simulation in which the barriers yet to be eliminated under the Uruguay Round had been removed. Such a database was provided by the work of Verikios and Hanslow (1999), under their assumption of less than perfect capital mobility.

The Petri treatment of FDI requires the addition of data on bilateral FDI stocks, and on the activity levels and cost and sales structures of FDI firms. The methods used to estimate such data were similar to those of Petri. APEC (1995) and United Nations (1994) provided limited data on FDI stocks by source, destination and sector. These data were fleshed out to provide a full bilateral matrix of FDI stocks by source, destination and sector, using RAS methods (Stone, Strzelecki and Welsh 2000). The results are summarised in table 1. Unlike Petri, the FDI stocks have not been 'grossed up' to account for the contributions of local joint venture partners, for reasons to be explained shortly. Thus the estimates given here are lower than his, but the pattern is similar. Europe and the United States are the main sources of and destinations for FDI. Japan is much more important as a source than as a destination. The OECD provides 87 per cent of outward FDI and receives 73 per cent of inward FDI. The detailed data show that 80 per cent of FDI from Asia (excluding Japan) remains in Asia, and that there are strong bilateral, bi-directional ties between neighbouring countries (Australia-New Zealand, United States-Canada). Finally, about 20 per cent of FDI is in the primary sector, with about 40 per cent each in the secondary and tertiary sectors.

Table 1 **FDI stock estimates (US$ billion)**

	Inward fdi stocks				*Outward fdi stocks*			
	Pri	*Sec*	*Ter*	*Total*	*Pri*	*Sec*	*Ter*	*Total*
Australia	17.7	14.8	42.1	74.6	4.8	7.3	16.3	28.4
NZ	1.6	4.0	4.2	9.8	0.9	2.0	1.3	4.2
Japan	0.5	16.3	9.5	26.3	29.3	91.0	251.1	371.5
Korea	0.4	5.1	3.3	8.8	2.5	1.7	1.2	5.4
Indonesia	54.3	9.2	1.9	65.4	0.5	1.1	0.7	2.3
Malaysia	7.4	8.9	7.1	23.4	0.4	1.0	0.6	2.0
Philippines	1.6	1.6	1.0	4.2	0.0	0.2	0.7	0.8
Singapore	0.6	14.7	20.5	35.7	2.2	4.9	3.2	10.4
Thailand	1.7	5.1	6.2	12.9	0.0	0.1	0.6	0.7
China	7.3	15.6	16.7	39.6	0.4	0.2	0.4	1.0
Hong Kong	0.0	7.0	22.5	29.6	8.8	19.4	12.7	40.9
Taiwan	0.3	14.8	2.0	17.1	0.3	3.3	1.8	5.4
Canada	15.9	60.4	37.1	113.4	8.8	39.5	32.6	80.9
USA	36.7	185.4	219.5	441.6	57.3	196.0	228.3	481.6
Mexico	3.9	14.4	20.6	38.9	0.3	0.6	0.4	1.3
Chile	7.4	1.3	3.8	12.4	0.1	0.2	0.2	0.5
R. Cairns	10.1	47.1	20.5	77.8	1.0	2.2	1.5	4.7
EU	121.9	310.0	319.4	751.2	166.6	366.3	238.5	771.5
R. World	34.3	87.4	90.0	211.7	39.0	85.8	55.9	180.7
World	323.5	823.0	847.9	1994.3	323.5	822.9	847.9	1994.3

Source: Based on APEC (1995) and United Nations (1994).

As shown in table 1, the data were collected (and the model implemented) for 19 regions (where R. Cairns stands for the rest of the Cairns group — Brazil, Argentina, Colombia and Uruguay) and three broad sectors. The three sectors — primary (agriculture, resources and processed food), secondary (other manufacturing), and tertiary (services) — correspond broadly to the three areas of potential trade negotiation in a new trade round. The intention is to use similar methods to produce a model with greater sectoral detail in the future.

The FDI stock data were used in turn to generate estimates of the output levels of FDI firms. Capital income flows were estimated by multiplying the FDI stocks by rates of return. The GTAP database does not contain rate of return estimates by sector, so these were calculated (using averages over 5 years where available) from the accounting information in the Worldscope Global Equity Database (Disclosure 1999).

Using the idea that there could be a premium earned on the firm-specific assets embodied in FDI, the rate of return taken to be relevant for a given FDI stock was the greater of the average rate in the home and host region. Thus the model allows rates of return to differ between locally owned and foreign firms. For this reason, it was considered unwise to allow for some fixed proportion of local equity in joint ventures, as in Petri (1997), since welfare results would then be tainted by the relatively arbitrary reallocation of locally owned capital between domestically owned firms and joint ventures. Furthermore, many of the barriers to trade in services directly affect that proportion!

Capital rentals were then grossed up to get an output estimate for FDI firms, using capital rental to output ratios from the GTAP database. Thus FDI firms were assumed to have the same capital rental to output ratios as domestically owned firms, although those rentals may imply a higher rate of return on the underlying capital stock. These output estimates for FDI firms were then compared with GTAP's output estimates, and adjusted downwards (along with the underlying FDI stock) in instances where they implied negative values for the residual output of locally owned firms. The resulting output estimates are summarised in tables 2 and 3, which compare the output of outward FDI firms with conventional exports (post-Uruguay), and the output of inward FDI firms with conventional imports (post-Uruguay). The tables confirm the impression that, in many regions, goods and services delivered via FDI are as important as conventional trade.

Table 2 **FTAP's exports and outward FDI output (US$ billion)**

	Conventional exports			*Outward fdi output*		
	Pri	*Sec*	*Ter*	*Pri*	*Sec*	*Ter*
Australia	42.5	16.1	11.1	19.1	14.4	8.8
NZ	9.4	5.3	3.4	0.8	3.0	1.7
Japan	4.4	417.4	56.7	57.1	159.3	134.3
Korea	3.8	113.9	22.2	3.4	2.4	0.5
Indonesia	20.2	28.5	4.7	0.2	1.6	1.2
Malaysia	15.0	64.2	6.1	0.2	1.2	0.8
Philippines	3.7	15.2	8.1	0.0	0.4	0.6
Singapore	6.5	90.8	24.3	1.2	5.5	3.6
Thailand	16.5	38.2	12.2	0.0	0.2	0.6
China	18.5	189.3	16.4	0.9	0.2	0.3
Hong Kong	1.1	33.4	41.2	5.2	18.1	25.6
Taiwan	4.8	117.6	8.8	0.1	6.5	2.3
Canada	33.1	145.3	19.4	22.2	64.5	17.5
USA	84.9	472.8	179.5	167.2	417.5	126.9
Mexico	13.6	60.2	9.2	0.3	0.8	0.4
Chile	7.2	8.2	2.6	0.0	0.2	0.2
R. Cairns	43.4	40.9	11.2	1.1	2.8	1.7
EU	224.3	1577.6	422.7	299.1	538.2	196.3
R. World	296.9	379.6	152.3	108.9	213.9	75.8
World	849.7	3814.7	1012.2	686.8	1450.8	599.3

Table 3 **FTAP's imports and inward FDI output (US$ billion)**

	Conventional imports			*Inward FDI output*		
	Pri	*Sec*	*Ter*	*Pri*	*Sec*	*Ter*
Australia	7.0	54.8	18.1	19.9	25.9	28.2
NZ	1.7	11.3	4.4	3.2	5.2	3.2
Japan	122.0	201.7	108.5	0.0	27.6	6.6
Korea	30.9	98.2	24.7	0.0	6.9	1.5
Indonesia	7.0	34.8	8.1	85.7	4.9	2.1
Malaysia	6.1	64.6	9.0	7.7	9.3	5.1
Philippines	6.8	24.7	6.4	4.8	1.9	1.0
Singapore	15.0	101.1	15.7	0.0	20.2	18.7
Thailand	9.2	60.0	14.9	2.0	1.8	2.8
China	19.8	141.0	16.3	7.3	19.7	32.5
Hong Kong	12.8	82.1	18.9	11.3	9.8	9.6
Taiwan	11.3	81.6	17.0	0.0	28.1	1.5
Canada	16.3	136.7	26.0	9.0	115.4	21.4
USA	117.9	657.2	128.3	45.0	247.0	167.6
Mexico	6.5	55.8	7.8	5.5	12.5	5.5
Chile	2.7	12.7	3.1	15.0	1.1	2.0
R. Cairns	16.6	74.9	20.2	9.7	44.7	11.5
EU	348.6	1512.6	409.8	377.0	678.5	187.2
R. World	151.2	582.7	154.8	83.8	190.3	91.3
World	909.4	3988.3	1012.2	686.8	1450.8	599.3

The detailed cost and sales structures of FDI firms were assumed to be the same as for locally owned firms, and were obtained by pro-rating the GTAP database. A subject for future research will be to make use of available information on the true cost and sales structures of FDI firms.

In a final step, estimates of existing barriers to services trade were injected into the model's database, using the techniques of Malcolm (1998). The process will be documented in Hanslow, Phamduc, Verikios and Welsh (2000). The GTAP model already contains estimates of the barriers to trade in agricultural and manufactured goods, and the updated version of this database obtained from Verikios and Hanslow (1999) has these at their post-Uruguay levels. However, GTAP does not contain estimates of barriers to services trade. Instead, estimates of barriers to trade in banking services were taken from Kaleeswaran et al. (2000), and estimates of barriers to trade in telecommunications services were taken from Warren (2000). These are the first of a comprehensive new set of estimates of barriers to services trade, to be documented in Findlay and Warren (2000). The rates can be taken as indicative of post-Uruguay rates, since while the Uruguay Round established the architecture for services trade negotiations, it did not achieve much in the way of services trade liberalisation (Hoekman 1995).

A simple average of the estimates for banking and telecommunications was taken as being typical of most services — all of the GTAP service categories of trade and transport and finance, business and recreational services, and half of public administration and defence, education and health. The remainder of public administration and defence, education and health, along with electricity, water and gas, construction, and ownership of dwellings were assumed to be strictly non-traded (note that engineering services are part of business services, not construction). The resulting average estimates of barriers to trade in the tertiary sector would have been about 50 to 100 per cent bigger, had the banking and telecommunications estimates been taken as indicative of the whole of the services sector. A topic of future research is to use the next version of the GTAP database, which will have more services sector detail, to model barriers to each service separately, thus overcoming the arbitrariness of these assumptions.

The resulting structure of post-Uruguay barriers to trade in services is summarised in table 4. Barriers to trade in agricultural and food products are represented via a combination of taxes on imports, and subsidies (shown in table 4 as negative taxes) on exports and output. Unfortunately, at FTAP's three sector level of aggregation, the actual taxes on primary exports and output are a combination of subsidies used for protective purposes, and taxes (eg excises on alcohol and tobacco) used for revenue raising. (While the average taxes on primary output are not shown in table

4, they are all relatively small and mostly positive.) In modelling the liberalisation of post-Uruguay trade barriers, the greater sectoral detail of Verikios and Hanslow's database was used to calculate what would happen to the average tax rates on primary exports and output, were the subsidies (where they occur) to be removed but the taxes (where they occur) to remain. In this way, the problem of averaging could be partially overcome when modelling liberalisation. A remaining problem is that GTAP's database aggregation facility implicitly uses import weights to aggregate import taxes, and the work of Anderson and Neary (eg 1994, 1996) shows that these give insufficient weight to very high (and therefore very distortionary) import taxes, leading to incorrect welfare results from trade liberalisation. In future, this 'aggregation bias' will be reduced by using a database with greater sectoral detail.

Table 4 **Tax equivalents of post-Uruguay barriers to trade and investment (per cent)**

	Imports		*Exports*		*Domestic output*	*Foreign affiliates' output*	*Domestic capital*	*Foreign affiliates' capital*
	Pri	*Sec*	*Pri*	*Ter*	*Ter*	*Ter*	*Ter*	*Ter*
Australia	1.69	7.30	0.65	4.81	0.00	0.69	0.62	14.79
NZ	1.16	4.51	-3.25	3.78	0.00	0.67	0.41	4.18
Japan	16.19	1.81	-8.12	4.41	3.59	4.75	0.33	3.01
Korea	12.95	6.61	-1.22	4.57	5.11	6.78	1.91	22.01
Indonesia	4.40	6.71	0.00	4.68	13.23	28.11	22.69	68.06
Malaysia	21.18	5.97	6.68	4.50	3.58	10.20	15.35	37.58
Philippines	16.16	18.51	-0.10	4.80	8.38	22.65	7.40	54.28
Singapore	3.22	0.56	0.01	4.70	3.40	8.32	2.42	24.50
Thailand	12.12	14.81	-16.98	4.14	4.69	13.36	12.16	36.49
China	8.92	28.45	5.13	4.08	18.75	36.40	123.46	250.66
Hong Kong	0.00	0.00	0.00	9.91	1.39	2.36	1.35	5.41
Taiwan	27.31	5.63	-1.82	4.35	2.88	4.90	1.90	19.19
Canada	3.57	1.40	-0.43	3.54	0.25	1.67	0.53	6.11
USA	1.29	2.24	-0.02	4.26	0.07	1.08	0.00	3.83
Mexico	-1.50	2.99	1.89	5.23	2.17	5.59	0.68	12.99
Chile	6.76	10.26	0.02	4.36	2.97	4.11	14.15	20.36
R. Cairns	3.82	13.39	6.30	4.49	0.98	5.55	7.19	19.45
EU	3.17	1.13	-2.33	4.72	0.10	1.31	1.33	6.49
R. World	15.94	13.67	0.59	4.95	4.89	13.92	39.07	86.97

Source: FTAP model database.

The detailed cost and sales structures of FDI firms were assumed to be the same as for locally owned firms, and were obtained by pro-rating the GTAP database. A subject for future research will be to make use of available information on the true cost and sales structures of FDI firms.

In a final step, estimates of existing barriers to services trade were injected into the model's database, using the techniques of Malcolm (1998). The process will be documented in Hanslow, Phamduc, Verikios and Welsh (2000). The GTAP model already contains estimates of the barriers to trade in agricultural and manufactured goods, and the updated version of this database obtained from Verikios and Hanslow (1999) has these at their post-Uruguay levels. However, GTAP does not contain estimates of barriers to services trade. Instead, estimates of barriers to trade in banking services were taken from Kaleeswaran et al. (2000), and estimates of barriers to trade in telecommunications services were taken from Warren (2000). These are the first of a comprehensive new set of estimates of barriers to services trade, to be documented in Findlay and Warren (2000). The rates can be taken as indicative of post-Uruguay rates, since while the Uruguay Round established the architecture for services trade negotiations, it did not achieve much in the way of services trade liberalisation (Hoekman 1995).

The structure of barriers to services trade in the last five columns of table 4 requires some explanation. The General Agreement on Trade in Services (GATS) framework distinguishes four modes of service delivery — via commercial presence, cross border supply, consumption abroad, and the presence of natural persons. Accordingly, the FTAP model distinguishes barriers to establishment from barriers to ongoing operation. This is similar to the distinction between commercial presence and other modes of delivery, since barriers to establishment are a component of the barriers to commercial presence.

In table 4, barriers to establishment have been modelled as taxes on capital. Barriers to ongoing operation may affect either FDI firms or those supplying via the other modes, and have been modelled as taxes on the output of locally-based firms (either domestic or foreign owned), and taxes of the same size on the exports of firms supplying via the other modes, respectively. The estimates of export taxes on services in the fourth column of table 4 are trade weighted averages of the taxes on exports to particular destinations, where these are equal in turn to the taxes on foreign affiliates' output in the destination region, shown in the sixth column. The reason for modelling these as taxes in the exporting region, rather than as tariffs in the importing region, is that it allows the rents created by the barriers to be retained in the exporting region. The issue of rents is addressed in more detail shortly.

The GATS framework also distinguishes restrictions on market access from restrictions on national treatment. The former are restrictions on entry, be it by locally owned or foreign owned firms. In this sense, they are non-discriminatory. Restrictions on national treatment mean that foreign owned firms are treated less favourably than domestic firms. These restrictions are discriminatory. Thus the taxes on domestic capital and domestic output in table 4 represent the effects of restrictions on market access (affecting establishment and ongoing operation, respectively). The taxes on the capital and output of foreign affiliates are higher than the corresponding taxes on domestic firms, because they represent the effects of restrictions on both market access and national treatment. The estimation of barriers to trade in banking and telecommunications services by Kaleeswaran et al. (2000) and Warren (2000) allowed the price effects to be split up according to this two-by-two classification.

The estimates in table 4 indicate that barriers to trade in services are generally at least as large as those on agricultural and manufactured products. In addition, the ad valorem equivalent of barriers to establishment are generally much higher than those on ongoing operation. This is significant, since taxes on capital can distort input decisions in ways that taxes on output do not.

Most economies have at least some significant barriers to trade in services. The only regions where barriers are low across the board are New Zealand, Japan, Hong Kong, Canada, the United States and the European Union. But this statement should be heavily qualified, because it is based only on estimates of barriers to banking and telecommunications.

Barriers to trade in services have been modelled as tax equivalents that generate rents — a mark-up of price over cost — rather than as things that raise costs above what they might otherwise have been (eg Hertel 1999). This decision was based on the way in which the price impacts of barriers to trade in banking and telecommunications services were measured. Kaleeswaran et al. (2000) measured the effects of trade restrictions on the net interest margins of banks, a direct measure of banks' mark-up of price over cost. Warren (2000) measured the effects of trade restrictions on the quantities of telecommunications services delivered, and these were converted to price impacts using an estimate of the elasticity of demand for telecommunications services. Thus, Warren's estimates did not provide direct evidence of a mark-up of price over cost, but the relative profitability of telecommunications companies in many countries suggests that some element of rent may exist. By contrast, there is evidence that trade restrictions in sectors such as aviation raise costs (Johnson et al. 2000, Tamms 2000). As estimates of the

effects of trade barriers in these sectors are incorporated into the model, it will be appropriate to treat some restrictions as cost-raising rather than as rent-creating.

One important implication of the current treatment is that welfare gains from liberalising trade in services are likely to be understated, perhaps significantly. If trade restrictions create rents, then the allocative efficiency gains from trade liberalisation are the 'triangle' gains associated with putting a given quantum of resources to more efficient use. By contrast, if trade restrictions raise costs, then the gains from trade liberalisation include 'rectangle' gains (qualified by general equilibrium effects) from lower costs, equivalent to a larger effective quantum of resources for productive use.

Because barriers to services trade appear to be significant, and because they have been modelled as taxes, the rents they generate will be significant. A key issue is whether those rents should be modelled as being retained by incumbent firms, appropriated by governments via taxation, or passed from one country to another by transfer pricing or other mechanisms. In FTAP, the rents on output have been modelled as accruing to the selling region, and those on capital have been modelled as accruing to the region of ownership, once the government in the region of location has taxed them at its general property income tax rate. Despite this, the asset choices of investors are modelled as being driven by pre-tax rates of return. This is because many economies, in the developed world at least, have primarily destination-based tax systems. For example, if tax credits are granted for taxes paid overseas, investors are ultimately taxed on *all* income at the owning region's tax rate. Although such tax credits have not been modelled explicitly, their effect has been captured by having investors respond to relative pre-tax rates of return. Nevertheless, investor choices are also assumed to be determined by rates of return excluding any abnormal rent component. Investors would like to supply an amount of capital consistent with rates of return including abnormal rents, but are prevented from doing so by barriers to investment. The amount of capital actually supplied is, therefore, that amount that investors would like to supply at rates of return excluding abnormal rents.

Thus a portion of the rent associated with barriers to services trade is assumed to remain in the region of location in the form of property income tax revenue, while the remainder accrues to the region of ownership. Thus liberalisation of services trade could have significant income effects in both home and host regions as these rents are gradually eliminated. The next section shows how significant these effects are, relative to the allocative efficiency effects and other effects normally associated with trade liberalisation.

A final point to note is that the model's database does not contain estimates of barriers to investment in agriculture and manufacturing, even though they are likely to be significant. It is unlikely that a new trade round would include negotiations on them. Nevertheless, their omission will affect the model's estimates of the effects of liberalisation elsewhere, and the results need to be qualified accordingly.

2 The effects of eliminating post-Uruguay barriers to trade

The FTAP model has been used to examine the effects of eliminating the post-Uruguay barriers to trade summarised in table 4. The results are comparative static, showing only the impact of trade liberalisation. During the ten year adjustment period, many other changes will affect each economy, but they are not taken into account in the current analysis. For this reason, the results should not be interpreted as indicating the likely changes that would occur over time in each economy — such results would require *all* changes, not just changes in trade barriers, to be taken into account. The model results should instead be seen as providing an indication, at some point in time ten years after liberalisation, of how different each economy would be, compared with the alternative situation at the same point in time, had the liberalisation not taken place.

The distinction is important to keep in mind. Sometimes, to aid fluency, the results are couched as if key indicators 'rise' or 'fall'. This should not be interpreted to mean that the indicators would be higher or lower than they are now. It means that they would, at some future time, be higher or lower than they otherwise would have been had the liberalisation not occurred. In both cases, in a growing economy, these indicators could be higher than they are now.

Table 5 shows first the projected effect on resource allocation, by showing the percentage changes in sectoral outputs.

As expected, liberalisation of trade in agricultural and manufactured products is projected to encourage resources to shift out of the relatively highly protected agricultural sectors in Japan, Korea, Malaysia, Philippines, Thailand, China, Taiwan, the European Union and the rest of the world region. According to table 4, the agricultural sector in the European Union does not look to be particularly highly protected post-Uruguay. However, this is an artefact of the averaging of subsidy assistance and revenue-raising taxes, mentioned earlier. As noted, liberalisation has been modelled by eliminating the subsidies but keeping the revenue-raising taxes.

Table 5 **Projected effects on sectoral output of eliminating post-Uruguay trade barriers**

	Primary and secondary liberalisation			*Tertiary liberalisation*		
	Primary	*Secondary*	*Tertiary*	*Primary*	*Secondary*	*Tertiary*
	%	%	%	%	%	%
Australia	3.6	-8.1	0.6	1.2	1.0	-0.3
NZ	27.4	-22.1	-1.2	1.8	1.0	-0.7
Japan	-9.3	2.0	0.1	-0.4	-0.3	0.1
Korea	-4.2	5.6	-0.8	-0.8	-1.6	1.1
Indonesia	1.0	2.0	-0.2	0.3	2.6	9.2
Malaysia	-0.4	3.6	-0.6	0.1	0.1	1.5
Philippines	-4.4	36.8	-2.4	-1.9	-3.6	2.5
Singapore	54.2	-0.1	-6.5	-3.9	-6.6	1.0
Thailand	-3.9	2.7	1.4	-0.1	-0.8	1.3
China	-0.8	3.1	1.1	-0.2	2.4	32.5
Hong Kong	26.5	27.2	-6.9	0.2	-2.2	0.6
Taiwan	-1.0	6.2	-1.5	0.1	1.0	-0.2
Canada	1.3	-3.6	0.8	0.7	1.0	-0.6
USA	6.0	-2.4	0.3	0.6	0.6	-0.4
Mexico	0.5	-2.2	0.7	-0.1	0.1	0.1
Chile	2.1	-2.7	0.6	0.1	-1.0	0.9
R. Cairns	3.7	-4.1	0.9	0.3	0.4	-0.1
EU	-5.5	-0.5	0.7	1.0	1.3	-0.6
R. World	-0.6	-0.7	0.8	-0.2	-0.4	1.5

Source: FTAP model projections.

It is harder to generalise about the effects on manufacturing sectors of liberalising trade in agricultural and manufactured products. Some of the Asian economies, such as the Philippines, Thailand and China, have the highest levels of manufacturing assistance post-Uruguay. But eliminating this protection also means they have much to gain by way of improvements in allocative efficiency. Thus, the manufacturing sectors in these economies are projected to expand, despite facing the biggest reductions in protection. On the other hand, the manufacturing sectors in the United States and Canada are projected to be smaller than otherwise, despite experiencing the loss of relatively modest protection. This is partly because resources are reallocated into the primary and tertiary sectors in those regions.

The sectoral effects of liberalising barriers to trade in services are relatively straightforward. The services sectors in most Asian economies are projected to expand as their relatively large barriers to entry are removed. The services sector in China is projected to be fully 33 per cent bigger than otherwise, because its barriers to entry had been particularly high. Services sectors in economies with low barriers

to entry, such as Australia, New Zealand, Canada, the United States, and the European Union are expected to be slightly smaller than otherwise. In part, this is because of increased competition via cross-border trade from the newly expanded Asian service sectors. But if the size of barriers to services trade in these economies has been underestimated, then the reductions in their service sector output will be overstated.

Table 6 shows the effects of these sectoral resource shifts on regional activity levels (as measured by changes in real GDP) and on economic wellbeing (as measured by the equivalent variation, a measure of the change in net national product, or real income accruing to the residents in each economy). It shows that all economies except Singapore are projected to be bigger than otherwise as a result of full trade liberalisation. But the Singaporean economy being smaller than otherwise does not make Singaporeans poorer than otherwise. They may simply have substituted FDI for investment at home, and be earning significantly higher incomes from these foreign investments. This is examined in more detail shortly.

In terms of real income, the world as a whole is projected to be better off by more than US$260 billion as a result of eliminating all post-Uruguay trade barriers. About US$50 billion of this would come from agricultural liberalisation, and a further US$80 billion from liberalisation of manufactures. This shows that there are still considerable gains to be had in traditional areas, even if no progress is made in services.[2] But an additional US$130 billion would come from liberalising services trade. And about US$100 billion of the gains from services liberalisation would accrue in China alone.[3]

[2] It might seem a possible source of second-best welfare problems to reduce trade barriers in agriculture and manufacturing, while leaving even higher restrictions in services untouched. But because services are a general equilibrium complement (rather than substitute) to agriculture and manufacturing, reducing trade restrictions in the traditional areas would mitigate the restrictions in services.

[3] In a recent similar exercise, Hertel's (1999) world welfare gains from eliminating barriers to services trade were smaller than those projected here. Although his income base was 2005 rather than 1995, and although he treated services trade barriers as being cost-raising rather than rent-creating, his exercise was limited to barriers in construction and business services (using estimated price impacts from Francois (1999)), and did not include liberalisation of FDI. Hertel's estimated gains from full liberalisation of agriculture and manufacturing were larger than those presented here. But correcting for the difference in income base by applying FTAP's results to Hertel's income base (we are grateful to Tom Hertel for making this available), FTAP's gain from liberalising manufactures is $120 billion, very close to Hertel's estimate of $129 billion. FTAP's gains from liberalising agriculture are still about half of Hertel's estimate of $160 billion. This is largely because Hertel assumed no effective Uruguay liberalisation post-1995, leaving much more to be done in a post-Uruguay environment. Reconciling FTAP's results with DFAT (1999) is more difficult because of a lack of detail in the DFAT study.

Table 6 **Projected effects on real GDP and welfare of eliminating post-Uruguay trade barriers**

	Real GDP			*Equivalent variation (EV)*		
	Primary and secondary	*Tertiary*	*Total*	*Primary and secondary*	*Tertiary*	*Total*
	%	%	%	$USm	$USm	$USm
Australia	0.2	0.0	0.2	1 994	2 098	4 092
NZ	1.2	-0.1	1.1	4 400	257	4 657
Japan	0.3	0.0	0.3	20 964	4 130	25 094
Korea	1.5	0.1	1.6	8 784	1 886	10 670
Indonesia	0.7	5.1	5.9	1 451	2 470	3 921
Malaysia	3.7	0.7	4.5	3 532	1 015	4 547
Philippines	5.1	0.4	5.5	1 601	1 236	2 837
Singapore	-0.3	-1.3	-1.5	7 421	-247	7 174
Thailand	2.6	0.2	2.8	4 063	1 698	5 762
China	3.4	14.6	18.0	14 088	90 869	104 957
Hong Kong	-0.2	1.0	0.9	916	5 896	6 812
Taiwan	2.7	0.2	3.0	11 659	-142	11 517
Canada	0.1	-0.1	0.0	-539	-499	-1 038
USA	0.2	-0.1	0.1	22 734	-1 809	20 925
Mexico	0.3	0.1	0.4	-83	357	274
Chile	0.7	0.4	1.1	45	330	375
R. Cairns	1.2	0.1	1.3	12 766	6 970	19 736
EU	0.1	0.0	0.1	6 394	-6 169	225
R. World	1.1	0.8	1.9	11 324	23 039	34 363
World				133 515	133 386	266 901

Source: FTAP model projections.

Australia is projected to gain as much from global liberalisation of services trade as it would from global liberalisation of trade in agriculture and manufacturing. Each would make Australia's real income about US$2 billion higher than otherwise, for an overall gain of about US$4 billion a year. This is the projected gain in annual income, about ten years after the liberalisation has occurred and the associated resource adjustments have taken place.

Most other economies are also projected to gain individually from these reforms. Only Canada is projected to be slightly poorer than otherwise as a result of complete trade liberalisation.

For some economies — the European Union, the United States, Canada, Singapore and Taiwan — the contribution of multilateral services trade liberalisation is projected to be negative. For the European Union, the projected loss of $6 billion would almost completely outweigh its gains from multilateral liberalisation of

agriculture and manufacturing. The United States is projected to lose almost $2 billion from services trade liberalisation, though it would still gain significantly overall. The following discussion tries to uncover the reasons for these projected income losses.

The measure of real income used here is similar to that in the GTAP model — a measure of national income, deflated by an index of the prices of household consumption, government consumption, and national saving. But for FTAP, as noted, the relevant measure of national income is net national product — the income accruing to the residents of a region — rather than net domestic product — the income generated within the borders of a region. Thus, net domestic product must be adjusted for the income earned on outward FDI, net of the income repatriated overseas from inward FDI, plus the income from net bond holdings.

As in the GTAP model, the measure of welfare can be decomposed into a number of influences. For agricultural and manufacturing liberalisation, the welfare results are dominated by two things — the contribution of improvements in allocative efficiency, and the contribution of changes in the terms of trade (which can be positive or negative). As shown above, the model's regions are projected to experience positive income gains, or in a few cases small losses, as a result of these effects.

For services liberalisation, however, changes in foreign direct investment patterns contribute two additional effects. Firstly, FDI can lead to an expansion or contraction in the capital stock located within a region, leading to a positive or negative contribution to income from this change in national endowments. Secondly, the changes in rents earned on foreign direct investments can also affect national incomes.

The first column of table 7 shows the contribution to real income from changes in real capital endowments. Generally, if capital endowments improve, real GDP is higher than otherwise. However, sometimes real GDP can rise, even if endowments fall, because those endowments are used more efficiently. The benefit of having additional varieties as output expands is another source of productivity improvement.

Some of the change in endowments comes from foreign direct investment, and some comes from investment by domestic residents. The second column of table 7 shows the contribution to real income from changes in real FDI stocks. The third column shows the contribution to real income from changes in real bond holdings. Both help to indicate the way in which changes in capital endowments are financed.

Table 7 **Contributions to real income changes from liberalising services trade**

	Contribution of endowment change to EV	*Contribution of change in real fdi stocks to EV*	*Contribution of change in real bond holding to EV*	*Contribution of change in rents on fdi capital*	*Contribution of change in rents on fdi output*
	$USm	$USm	$USm	$USm	$USm
Australia	58	0	4	534	-39
NZ	-43	5	52	-10	6
Japan	-1 030	3 120	-2 978	-3 629	-5 101
Korea	438	-5	39	51	72
Indonesia	7 158	-541	-4 519	162	368
Malaysia	367	-103	-168	253	332
Philippines	164	-91	47	70	144
Singapore	-1 071	-198	-108	401	1 049
Thailand	305	-24	-393	227	259
China	52 164	-12 649	-5 776	4 163	8 686
Hong Kong	102	7 829	-621	-2 638	-5 573
Taiwan	312	378	-583	-137	-286
Canada	-747	34	1 086	27	-52
USA	-5 713	2 665	1 708	-3 057	-3 659
Mexico	131	-67	332	247	266
Chile	202	-39	-54	101	56
R. Cairns	401	-137	1 800	450	486
EU	-3 672	1 441	6 327	-2 265	-3 110
R. World	15 002	-2 337	3 285	5 427	6 581

Source: FTAP model projections.

For example, Japan's capital stock shrinks, partly because it has a big increase in outward FDI. In fact, it also borrows (a negative change on bond holding) in order to finance its outward FDI. By contrast, China's increase in capital endowments comes partly from a large increase in inward FDI, and partly from additional foreign borrowing. The United States is projected to have a smaller capital endowment than otherwise, offset by an increase in outward FDI and increased lending to other regions. The pattern for the European Union is the same as for the United States.

The last two columns of table 7 show the income contributions to recipient countries of changes in the rents from barriers to services trade, as these barriers are eliminated. What is striking is the loss of rents to the main providers of outward FDI — Japan, Hong Kong, the United States and the European Union. In fact, the loss of rents to the United States is more than sufficient to explain its projected real income loss from services trade liberalisation in table 6, and the loss of rents in the European Union would explain most of its projected loss from services trade

liberalisation. Given the uncertainty about the allocation of existing rents, it is not at all clear that the true impact on the United States and European Union would be as great as shown in table 7. And if barriers to services trade in these economies have been understated, then so too will their gains in allocative efficiency. Thus, their projected net income losses from services trade liberalisation in table 6 should be heavily qualified. Similarly, Canada's overall income loss, which comes primarily from adverse terms of trade effects, should also be qualified, given uncertainty about many key features of the model.

3 The effects of partial liberalisation of services trade

While the preceding section examined the effects of complete liberalisation, a new trade round is likely to deliver only partial liberalisation. Because the structure of trade barriers in the services area is relatively complex, there is a real question as to the best way to approach partial liberalisation in that sector. It is well known that some approaches to partial liberalisation can worsen disparities in protection, moving resources further away from their pattern in a world free of distortions, and worsening real income. Thus, it is important to determine paths of partial liberalisation of services trade that avoid such outcomes.

It is hard to identify such paths a priori. In liberalisation of goods trade, 'tops down' and 'across-the-board' strategies to lowering tariffs are known to generally avoid second-best economic welfare losses. A 'tops down' approach to services trade liberalisation might suggest that restrictions on national treatment be tackled first, since these cause barriers to be higher for foreign than for domestic service providers. It might also suggest that barriers to commercial presence be tackled ahead of barriers to other modes of service delivery, since their ad valorem equivalents tend to be higher (see table 4). Putting these two propositions together, does this mean that the best strategy is to remove restrictions on national treatment for firms seeking to deliver via commercial presence? The problem is that, given the pervasiveness of restrictions elsewhere, there is a real danger that resources will move in the 'wrong' direction, a result demonstrated in a partial equilibrium framework in Dee, Hardin and Holmes (2000).

Table 8 gives a breakdown of the effects on world real income of various partial approaches to services liberalisation, comparing the removal of restrictions on market access and national treatment, as well as the removal of barriers on establishment versus ongoing operation. The first thing to note is that, because of interaction effects, the effects of various types of partial liberalisation are not strictly additive. Instead, the effects of combining two types of liberalisation

generally exceed the sum of the effects of doing each separately. One reason is that the more widespread the liberalisation, the less the chance of a second-best deterioration in allocative efficiency.

Table 8 shows that the best *single* type of liberalisation for world economic welfare is the removal of those barriers to establishment that affect domestic and foreign firms equally (ie affect market access). Removing *all* barriers to establishment would be better than removing *all* barriers to ongoing operation. This reflects the particularly distortionary effects of taxes on capital. Removing *all* restrictions on market access would be much better than removing *all* restrictions on national treatment. This is more like an 'across-the-board' than a 'tops down' approach, and it avoids the second-best welfare losses identified in Dee, Hardin and Holmes (2000).

Of course, the pattern shown in table 8 need not hold for individual economies. The results show, however, that the global removal of those barriers to establishment affecting domestic and foreign firms equally (ie affecting market access) remains a winning outcome for 14 of the 19 regions in the model (including Australia), leading to significant real income gains in those economies. The exceptions include Japan, Hong Kong and Canada, all significant sources of outward FDI. However, the United States and the European Union are not exceptions. Thus, the exceptions do not seem to arise because of a loss of rents — this tends to occur no matter what the type of liberalisation. Instead, it seems to reflect differences in the pattern of allocative efficiency and terms of trade effects.

The detailed results therefore show that it is difficult of find a Pareto improvement (an outcome where at least some economies gain and none lose) from partial liberalisation when it involves a particular *type* of barrier. This suggests that a better strategy may be to negotiate gradual reductions in *all* types of barriers simultaneously.

Table 8 **Effects of partial services liberalisation on world real income (US$billion)**

	Remove restrictions on market access	*Remove restrictions on national treatment*	*Both*
Remove barriers to establishment	56.8	3.7	64.2
Remove barriers to ongoing operation	25.6	12.9	39.3
Both	98.8	19.3	133.4

Source: FTAP model projections.

4 Agenda for further research

Much of the development agenda has been outlined already. It involves continuing to obtain estimates of the price impacts of barriers to services trade, along the lines outlined in Findlay and Warren (2000). Such methods could also be used to estimate the price impact of barriers to foreign direct investment in agriculture and manufacturing. More sectoral detail needs to be incorporated into FTAP, so as to be able to model the barriers to each service separately. More research is required to obtain more realistic cost and sales structures for FDI firms and, if possible, a realistic initial allocation of rents. And the welfare measure in FTAP needs to be amended to take account of the costs of risk taking, given risk aversion.

References

Anderson, J.E. and Neary, P.J. 1994, 'Measuring the restrictiveness of trade policy', *World Bank Economic Review*, 8(2), pp. 151–69.

Anderson, J.E. and Neary, P.J. 1996, 'A new approach to evaluating trade policy', *Review of Economic Studies*, 3(2), pp. 107–25.

APEC (Asia-Pacific Economic Cooperation) 1995, *Foreign Direct Investment and APEC Economic Integration*, APEC Economic Committee, Singapore.

Brown, D.K., Deardorff, A.V., Fox, A.K. and Stern, R.M. 1995, 'Computational analysis of goods and services liberalisation in the Uruguay Round', in Martin, W. and Winters, L.A. (eds), *The Uruguay Round and the Developing Economies*, Discussion Paper No. 307, World Bank, Washington DC, pp. 365–80.

Dee, P., Geisler, C. and Watts, G. 1996, *The Impact of APEC's Free Trade Commitment*, Industry Commission Staff Information Paper, AGPS, Canberra.

Dee, P., Hardin, A. and Holmes, L. 2000, 'Issues in the application of CGE models to services trade liberalisation', in Findlay, C. and Warren, T. (eds) 2000, *Impediments to Trade in Services: Measurement and Policy Implications*, Routledge, London and New York (forthcoming).

Dee, P., Hardin, A. and Schuele, M. 1998, *APEC Early Voluntary Sectoral Liberalisation*, Productivity Commission Staff Research Paper, Ausinfo, Canberra.

Department of Foreign Affairs and Trade (DFAT) 1999, *Global Trade Reform: Maintaining Momentum*, Ausinfo, Canberra.

Disclosure 1999, *Global Researcher — Worldscope database*, Disclosure, United States, January.

Findlay, C. and Warren, T. (eds) 2000, *Impediments to Trade in Services: Measurement and Policy Implications*, Routledge, London and New York (forthcoming).

Francois, J.F. 1999, 'A gravity approach to measuring services protection', unpublished manuscript, Erasmus University, Rotterdam.

Francois, J.F., McDonald, B. and Nordstrom, H. 1995, 'Assessing the Uruguay Round', in Martin, W. and Winters, L.A. (eds), *The Uruguay Round and the Developing Economies*, Discussion Paper No. 307, World Bank, Washington DC, pp. 117–214.

Gehlhar, M. 1997, 'Historical analysis of growth and trade patterns in the Pacific Rim: An evaluation of the GTAP framework', in Hertel, T. (ed), *Global Trade Analysis: Modelling and Applications*, Cambridge University Press, Cambridge, pp. 349–63.

Hanslow, K., Phamduc, T., Verikios, G. and Welsh, A. 2000, 'Incorporating barriers to FDI into the FTAP database', Research Memorandum, Productivity Commission, Canberra (forthcoming).

Hanslow, K., Phamduc, T. and Verikios, G. 1999, 'The structure of the FTAP model', Research Memorandum, Productivity Commission, Canberra, December.

Harrison, J.W. and Pearson, K.R. 1996, 'Computing solutions for large general equilibrium models using GEMPACK', *Computational Economics*, 9(2), pp. 83–127.

Hertel, T. 1997, *Global Trade Analysis: Modelling and Applications*, Cambridge University Press, Cambridge.

Hertel, T. 1999, 'Potential gains from reducing trade barriers in manufacturing, services and agriculture', paper presented at the 24th Annual Economic Policy Conference, Federal Reserve Bank of St. Louis, 21–22 October.

Hoekman, B. 1995, 'Assessing the General Agreement on Trade in Services', in Martin, W. and Winters, L.A. (eds), *The Uruguay Round and the Developing Economies*, Discussion Paper No. 307, World Bank, Washington DC, pp. 327–64.

Johnson, M., Gregan, T., Belin, P. and Gentle, G. 2000, 'Modelling the impact of regulatory reform', in Findlay, C. and Warren, T. (eds) 2000, *Impediments to Trade in Services: Measurement and Policy Implications*, Routledge, London and New York (forthcoming).

Kaleeswaran, K., McGuire, G., Nguyen-Hong, D. and Schuele, M. 2000, 'The price impact of restrictions on banking services', in Findlay, C. and Warren, T. (eds) 2000, *Impediments to Trade in Services: Measurement and Policy Implications*, Routledge, London and New York (forthcoming).

Malcolm, G. 1998, 'Adjusting tax rates in the GTAP data base', GTAP Technical Paper No. 12, Center for Global Trade Analysis, Purdue University.

Markusen, J., Rutherford, T.F. and Tarr, D. 1999, 'Foreign direct investment in services and the domestic market for expertise', paper presented at Second Annual Conference on Global Economic Analysis, Denmark, 20-22 June.

McDougall, R. 1993, 'Incorporating international capital mobility into SALTER', SALTER Working Paper No. 21, Industry Commission, Canberra,

Petri, P.A. 1997, 'Foreign direct investment in a computable general equilibrium framework', paper prepared for the conference, Making APEC work: Economic Challenges and Policy Alternatives, 13-14 March, Keio University, Tokyo.

Stone, S., Strzelecki, A. and Welsh, A. 2000, 'Estimating foreign returns to capital for the FTAP model', Research Memorandum, Productivity Commission, Melbourne (forthcoming).

Tamms, V. 2000, 'Frontier cost estimates of the impact of restrictions on trade in air transport services', in Findlay, C. and Warren, T. (eds) 2000, *Impediments to Trade in Services: Measurement and Policy Implications*, Routledge, London and New York (forthcoming).

United Nations 1994, *World Investment Directory Latin America and the Caribbean*, New York.

Verikios, G. and Hanslow, K. 1999, 'Modelling the effects of implementing the Uruguay Round: A comparison using the GTAP model under alternative treatments of international capital mobility', paper presented at Second Annual Conference on Global Economic Analysis, Denmark, 20-22 June.

Warren, T. 2000, 'The impact on output of impediments to trade and investment in telecommunications services', in Findlay, C. and Warren, T. (eds) 2000, *Impediments to Trade in Services: Measurement and Policy Implications*, Routledge, London and New York (forthcoming).