of a better alternative, we use past MFN applied rates for China and Taiwan as stand-in values for the past bound rates of these countries. The weighted average bound tariff faced by the United States in the past (that is, the Tokyo Round) was 17.9 per cent; the present rate (that is, the Uruguay Round) is 13.5 per cent.

Columns VII and VIII of Table 17.1 show our estimates of NTB rates in the past and the present. The present rates are taken from Kee et al. (2005). For the past rates we adopt a patchwork approach, extrapolating NTB liberalisation over a 15-year period from Kee et al. and several country-specific sources. We estimate a large fall in the *ad valorem* equivalent rate of NTB protection faced by the United States, with a past rate of 20.5 per cent and a present rate of 10.3 per cent.[8] Many scholars have commented on the increasing importance of NTBs in the overall profile of trade protection. Despite our estimate of a substantial fall in the level of NTB protection facing the United States, our figures are consistent with the view that NTB protection currently plays a more prominent role in the overall profile of protection, since the present average NTB rate faced by the United States (10.3 per cent) is more than twice the average tariff rate faced by the United States (3.9 per cent).

In Table 17.2, we display the average *ad valorem* cost of transport for US imports from the 17 partners in 1980, 1990 and 2003. Due to data limitations we use the estimate of transport costs on US imports as an estimate of transport costs for US exports in the same time periods. The data for these rates come from Hummels (2007); *ad valorem* rates of transport costs are calculated from this dataset as the total of insurance and freight charges divided by import values. According to our data, average transport costs faced by US partners exporting to the United States (and, by proxy, US firms exporting to those same partners) have been low since 1980, with a 4.3 per cent rate in 1980, a 3.7 per cent rate in 1990 and a 3.2 per cent rate in 2003. In other words, the decline in transport costs has not been a big factor in trade growth.

In Table 17.3 we present the actual tariff rate applied on US imports purchased from the 17 major partners. The table follows the same method as columns III and IV of Table 17.1 ('actual tariffs faced for US exports'), but uses 1990 and 2004 US imports to calculate weighted averages. Other US rates (that is, MFN applied, bound and NTB) are displayed in Table 17.4, which includes all the average tariff rates we use for the partial equilibrium analysis. US tariff or NTB rates (that is, rates on US imports) in the past and present are lower than average tariff or NTB rates applied against US exports. For example, US MFN applied tariffs went from 5.7 per cent in 1990 to 3.8 per cent in the present, while the weighted average of US partner MFN applied tariffs dropped from 10.3 per cent in 1990 to 7.4 per cent in the present.

Our method for carrying out the partial equilibrium analysis of changed protection from past to present loosely follows from Hufbauer and Elliot (1994). In the present analysis we are only concerned with US trade in the aggregate, so we jump directly to price elasticities of demand for US exports and imports. Table 17.5 shows various estimates of price elasticities for US exports and imports. Mann and Pluck (2005) and Crane et al. (2007) provide useful surveys of the literature. We use weighted average estimates from Kee et al. (2004), who take the novel approach of calculating price elasticities at the tariff line level. We use a US import price elasticity (–1.30) that is somewhat larger (in absolute terms) than our US export price elasticity (–1.17). These estimates are what we consider 'responsibly high' for the literature. We are comfortable with high estimates

Table 17.2 Estimates of tariff equivalents of transport costs on US imports from 17 major countries

Country	1980 rate (%)	1990 rate (%)	2003 rate (%)	Percentage point decline 1980 to 2003
Australia	10.4	7.7	5.0	5.4
Brazil	8.1	7.5	6.4	1.7
Canada	0.8	2.3	1.5	–0.7
China	10.0	7.2	7.0	3.0
Germany	4.4	3.1	2.3	2.1
Hong Kong	6.5	5.0	5.0	1.5
India	10.3	7.2	5.4	4.9
Indonesia	7.0	9.8	7.9	–0.9
Japan	6.3	3.4	2.7	3.6
Korea	6.8	4.3	3.6	3.2
Malaysia	4.2	4.1	3.0	1.2
Mexico	1.4	1.9	1.1	0.3
Philippines	9.6	7.3	4.4	5.2
Singapore	3.8	2.5	1.8	2.0
Taiwan	7.8	5.2	4.4	3.3
Thailand	6.8	5.6	6.2	0.6
United Kingdom	4.2	3.2	2.4	1.9
Venezuela	4.8	6.0	4.9	–0.1
Simple average	6.3	5.2	4.2	2.1
Weighted average by imports	4.3	3.7	3.2	1.0
Ad valorem equivalent of total charges and imports	4.3	3.7	3.2	1.1
Simple average of weighted average of GTAP sector estimates	6.5		4.4	2.1

Note: The simple average of rates from 1979, 1980 and 1981 are used for the 1980 rate; the simple average of rates from 1989, 1990 and 1991are used for the 1990 rate; and the simple average of rates from 2002, 2003 and 2004 are used for the 2003 rate. Weighted averages are weighted by 1980, 1990 or 2003 imports. The simple average of transport costs with the United Kingdom and Germany are used in the final calculations for EU-15 transport costs.

Sources: Hummels (2007); UNComtrade via WITS (2008); authors' calculations.

because the partial equilibrium approach we use probably does not account for the full impact of closer economic integration realised through policy liberalisation or transport cost declines.[9]

In Table 17.6 we conduct the calculations for the six scenarios discussed above. We calculate the percentage point change in *ad valorem* rates for each scenario and apply it to the relevant price elasticity to construct an 'impact on trade' figure for each part (exports or imports) of the six scenarios. We then multiply the relevant trade flow by one minus the 'impact on trade' figure to determine the hypothetical level of US trade with

Table 17.3 Actual US tariffs applied against imports from 17 major partners

Country	'Past' tariffs (%)	'Present' tariffs (%)	1990 US imports ($ bn)	2004 US imports ($ bn)	'Past' import share (%)	'Present' import share (%)	'Past' tariff weight (%)	'Present' tariff weight (%)
Australia	5.7	1.3	5	8	1	1	0.1	0.0
Brazil	5.7	3.8	9	23	2	2	0.1	0.1
Canada	3.8	0.2	94	260	21	20	0.8	0.0
China	5.7	3.8	16	211	4	16	0.2	0.6
EU15	5.7	3.8	99	281	22	22	1.3	0.8
Hong Kong	5.7	3.8	10	10	2	1	0.1	0.0
India	5.7	3.8	3	16	1	1	0.0	0.0
Indonesia	5.7	3.8	4	12	1	1	0.0	0.0
Japan	5.7	3.8	94	133	21	10	1.2	0.4
Korea	5.7	3.8	19	48	4	4	0.3	0.1
Malaysia	5.7	3.8	5	29	1	2	0.1	0.1
Mexico	5.7	0.1	31	158	7	12	0.4	0.0
Philippines	5.7	3.8	4	10	1	1	0.0	0.0
Singapore	5.7	0.6	10	16	2	1	0.1	0.0
Taiwan	5.7	3.8	24	36	5	3	0.3	0.1
Thailand	5.7	3.8	6	19	1	1	0.1	0.1
Venezuela	5.7	3.8	10	26	2	2	0.1	0.1
		Totals	441	1294	Weighted average tariff		5.3	2.5

Note: Country rates are the simple average of MFN applied or when applicable preferential tariffs at the tariff line level, including *ad valorem* equivalents of specific tariffs.

Sources: TRAINS via WITS (2008); UNComtrade via WITS (2008); authors' calculations.

the policy reversion or transport cost increase. We subtract the hypothetical trade figure to determine the impact on annual US trade in each scenario. The largest total impact is in scenario 5; this is not surprising considering that we estimate a very large change in NTB levels of protection from past to present. We estimate that NTB liberalisation increased US exports to the 17 partners by $84 billion in 2004 and US imports from these same partners by $132 billion. The impact of scenario 3, reverting to 1980 transport costs, is the smallest, with only a $9 billion impact on US exports and a $19 billion impact on imports. For scenario 2, a calculation that analyses the impact of traditional policy liberalisation (that is, tariff cuts), the impact is large, $115 billion for US exports and $59 billion for US imports. The impact of the four preferential trade agreements we consider (that is, scenario 4) is estimated to increase US two-way trade with the 17 partners by about $50 billion a year.

To compare the impacts calculated under scenarios 1–6 we also determine the amount of US trade growth from 1980 to 2004 attributable to GDP growth and exchange rate changes. To do these calculations we need income elasticities of US trade, GDP growth estimates, and estimates of real effective exchange rate changes for the United States. Table 17.5 also shows various estimates of income elasticities of US trade. For our

Table 17.4 Changes in US and US partner applied tariffs, bound tariffs, preferential tariffs, NTBs and transport costs

Subject	Rate in 1980 (%)	Rate in 1990 (%)	Rate in 2004 (%)	% point change
US MFN applied tariffs	ND	5.7	3.8	–2.0
US partner MFN applied tariffs	ND	10.3	7.4	–2.9
AVE of US import transport costs	4.3	3.7	3.2	–1.1
AVE of US export transport costs	4.3	3.7	3.2	–1.1
US bound rates (Tokyo to Uruguay)	6.0	6.0	4.1	–2.0
US partner bound rates (Tokyo to Uruguay)	17.9	17.9	13.5	–4.4
AVE of US NTBs	ND	15.4	7.5	–7.9
AVE of Partner NTBs	ND	20.5	10.3	–10.2
US actual tariffs (Including preferential)	ND	5.3	2.5	–2.8
US partner actual tariffs (Including preferential)	ND	9.4	3.9	–5.4

Note: ND: No data available. To derive 'past' US NTB rates a 51.1 per cent increase from 'present' rates is used.

Sources: Kee et al. (2005); Hummels (2007); TRAINS via WITS (2008); UNComtrade via WITS (2008); authors' calculations.

calculations we use long-run relative price estimates from Hooper et al. (2000) – specifically, a 0.80 income elasticity for US exports and a 1.80 income elasticity for US imports.[10] We calculate a weighted average of nominal GDP growth from 1980 to 2004 for the 18 countries we consider.[11] We do not differentiate between US growth and partner growth. The weighted average GDP growth rate, in nominal terms, is 312 per cent for these countries. We also calculate the US real effective exchange rate from 1980 to the present. Over the period from 1980 to 2004, the US dollar appreciated by roughly 13 per cent.

In Table 17.7 we estimate the role of GDP growth and exchange rate changes in US trade growth. To calculate the impact of GDP growth we extrapolate from 1980 levels of US trade using the GDP growth of 312 per cent and the relevant income elasticity of US trade (0.80 for exports and 1.80 for imports). Our estimates suggest that nominal GDP growth from 1980 to 2004 boosted US exports with the 17 partners by $413 billion (in nominal value) and imports from the 17 partners by $970 billion (again in nominal value). To calculate the impact of exchange rate changes, we carry out the following calculation: divide the change in index values for the US real effect exchange rate from 1980 to 2004 (10.88) by the average of 1980 and 2004 index values (86.88); then multiply by the relevant price elasticity (–1.17 for exports and –1.30 for imports) and the relevant one-way US 1992 trade flow (exports or imports) with the 17 partners (1992 was chosen as a mid-point value). We estimate that exchange rate changes led to a $53 billion decline in US exports to the 17 partners and a $77 billion increase in US imports from the 17 partners.

Our estimates of the impact of policy liberalisation, when considering the impact of

Table 17.5 Various estimates of price and income elasticities for US trade (imports and exports)

Type of estimate	N1	N2	N3	Period	Price elas.	Income elas.	Authors
US export	Goods, sevc.	SR	Relative price	1956–1996	–0.50	1.80	Hooper et al. (2000)
US export	Goods, sevc.	LR	Relative price	1956–1996	–1.50	0.80	Hooper et al. (2000)
US export	Goods, sevc.	LR	Real effective exchange rate	2004	–1.00	1.50	Cline (2005)
US export	Goods	LR	Real effective exchange rate	1981–2006	–0.63	2.51	Crane et al. (2007)
US export	Goods	LR	Relative price of exports	1981–2006	0.20	3.04	Crane et al. (2007)
US export	Goods	LR	Real effective exchange rate	1988–2006	–8.56	1.91	Crane et al. (2007)
US export	Goods	LR	Relative price of exports	1988–2006	2.21	4.90	Crane et al. (2007)
US export	Goods	LR	Real effective exchange rate	1973–2006	–0.27	1.82	Cardarelli et al. (2007)
US export	Goods	LR	Relative price	1973–2006	–0.23	1.85	Cardarelli et al. (2007)
US export	Goods	LR	Real effective exchange rate	1986–2006	ND	1.97	Cardarelli et al. (2007)
US export	Goods	LR	Relative price	1986–2006	ND	0.76	Cardarelli et al. (2007)
US export	Goods	SR	Relative price	1980–1995	–0.95	1.12	Wren-Lewis and Driver (1998)
US export	Goods	LR	Relative price	1980–1995	–0.65	1.21	Wren-Lewis and Driver (1998)
US export	Goods	SR	GDP as income	1980–2003	–0.07	2.79	Mann and Pluck (2005)
US export	Goods	LR	GDP as income	1980–2003	–0.20	1.44	Mann and Pluck (2005)
US export	Goods	LR	Matched expenditure and prices	1980–2003	–0.09	1.19	Mann and Pluck (2005)
US partners import (i.e. US export)	Goods	LR	Simple average of HS6 estimates	1988–2002	–2.40	ND	Kee et al. (2004)
US partners import (i.e. US export)	Goods	LR	Median of HS6 estimates	1988–2002	–1.12	ND	Kee et al. (2004)
US partners import (i.e. US export)	Goods	LR	Weighted average of HS6 estimates	1988–2002	–1.17	ND	Kee et al. (2004)
US import	Goods, sevc.	SR	Relative price	1956–1996	–0.60	2.30	Hooper et al. (2000)
US import	Goods, sevc.	LR	Relative price	1956–1996	–0.30	1.80	Hooper et al. (2000)

US partners export (i.e. US import)	Goods, sevc.	LR	Real effective exchange rate	2004	–0.82	1.50	Cline (2005)
US import	Goods	LR		1967–1987	–0.22	2.10	Crane et al. (2007)
US import	Goods	LR		1967–2006	–0.42	1.98	Crane et al. (2007)
US import	Goods	LR		1988–2006	–0.69	2.18	Crane et al. (2007)
US import	Goods	LR	Real effective exchange rate	1973–2006	–0.55	2.46	Cardarelli et al. (2007)
US import	Goods	LR	Relative price	1973–2006	–0.41	2.03	Cardarelli et al. (2007)
US import	Goods	LR	Real effective exchange rate	1986–2006	ND	1.86	Cardarelli et al. (2007)
US import	Goods	LR	Relative price	1986–2006	ND	2.46	Cardarelli et al. (2007)
US import	Goods	SR	Relative price	1980–1995	–0.38	2.43	Wren-Lewis, Driver (1998)
US import	Goods	LR	Relative price	1980–1995	–0.18	2.36	Wren-Lewis, Driver (1998)
US import	Goods	SR	GDP as Income	1980–2003	–0.17	4.11	Mann and Pluck (2005)
US import	Goods	LR	GDP as Income	1980–2003	–0.28	2.22	Mann and Pluck (2005)
US import	Goods	SR	Matched expenditure and prices	1980–2003	–0.09	1.00	Mann and Pluck (2005)
US import	Goods	LR	Matched expenditure and prices	1980–2003	0.10	1.63	Mann and Pluck (2005)
US import	Goods	LR	Simple average of HS6 estimates	1988–2002	–3.39	ND	Kee et al. (2004)
US import	Goods	LR	Median of HS6 estimates	1988–2002	–1.16	ND	Kee et al. (2004)
US import	Goods	LR	Weighted average of HS6 estimates	1988–2002	–1.30	ND	Kee et al. (2004)

Notes
The US import price elasticity calculated from Cline (2005) is the weighted average (by US 2004 imports) of export price elasticity estimates for the 17 US partner countries. The US export price elasticities calculated from Kee et al. (2004) are the weighted average (by US 2004 exports) of import price elasticity estimates for the 17 US partner countries (excluding Taiwan).
Goods, sevc.: Goods and services are considered; LR: Long-run analysis; SR: Short-run analysis; ND: No estimate made.

Table 17.6 Partial equilibrium analysis scenarios 1 through 6

Description	1 Back to Uruguay		2 Back to Tokyo		3 1980 transport		4 No preferential		5 NTB reversion		6 Back to 1990 MFN	
	A reversion from current tariffs (including preferential where applicable) to Uruguay Round era bound rates		A reversion from current tariffs (including preferential where applicable) to Tokyo Round era bound rates		A reversion to 1980 transportation cost		A reversion from current tariffs (including preferential where applicable) to MFN only tariffs		A reversion from Kee et al. (2005) estimates of NTB barriers to past estimates of US partner NTB barriers		A reversion from current tariffs (including preferential where applicable) to circa 1990 MFN applied tariffs	
Impact	Impact on US exports	Impact on US imports	Impact on US exports	Impact on US imports	Impact on US exports	Impact on US imports	Impact on US exports	Impact on US imports	Impact on US exports	Impact on US imports	Impact on US exports	Impact on US imports
Initial/present tariff/AVE (%)	3.9	2.5	3.9	2.5	3.2	3.2	3.9	2.5	10.3	7.5	3.9	2.5
Final/past tariff/ AVE (%)	13.5	4.1	17.9	6.0	4.3	4.3	7.4	3.8	20.5	15.4	10.3	5.7
Tariff percentage point change	–9.5	–1.5	–14.0	–3.5	–1.1	–1.1	–3.5	–1.2	–10.2	–7.9	–6.4	–3.2
2004 US exports to partners (USD bn)	707	707	707	707	707	707	707	707	707	707	707	707
2004 US imports from partners (USD bn)	1,294	1,294	1,294	1,294	1,294	1,294	1,294	1,294	1,294	1,294	1,294	1,294
Export price elasticity	–1.17	–1.17	–1.17	–1.17	–1.17	–1.17	–1.17	–1.17	–1.17	–1.17	–1.17	–1.17
Import price elasticity	–1.30	–1.30	–1.30	–1.30	–1.30	–1.30	–1.30	–1.30	–1.30	–1.30	–1.30	–1.30
Applicable elasticity	Export	Import	Export	Import	Export	Import	Export	Import	Export	Import	Export	Import
Applicable trade flow	Export	Import	Export	Import	Export	Import	Export	Import	Export	Import	Export	Import

Impact on trade (Tariff/AVE change *elasticity)	11.12	2.00	16.29	4.54	1.28	1.43	4.08	1.59	11.91	10.22	7.45	4.14
Hypothetical trade after tariff/AVE change (USD in bn)	629	1,268	592	1,235	698	1,276	678	1,273	623	1,162	655	1,240
Impact of tariff/ AVE Change (USD in bn)	79	26	115	59	9	19	29	21	84	132	53	54

Sources: Kee et al. (2004, 2005); Hummels (2007); TRAINS via WITS (2008); UNComtrade via WITS (2008); authors' calculations.

Table 17.7 Increase in US trade due to policy liberalisation, declining transport costs and GDP growth, 1980 to 2005 (USD bn)

Subject	Exports	Imports	Total Trade
Trade with 17 partner estimates			
Observed US merchandise trade in 1980 with 17 partners	166	173	338
Observed US merchandise trade in 2004 with 17 partners	707	1,294	2,001
Observed increase in trade from 1980 to 2004 in merchandise trade	542	1,121	1,663
Trade growth explained by GDP growth and income elasticities of trade	413	970	1,384
Trade growth explained by appreciation of US dollar and price elasticities of trade	–53	77	24
Trade growth not explained by GDP growth or exchange rate change	181	74	255
Trade growth explained by traditional trade policy liberalisation (i.e., tariffs) (Scenario 2)	115	59	174
Trade growth explained by lower transport costs (Scenario 3)	9	19	28
Trade growth explained by NTB Cuts (Scenario 5)	84	132	216
Trade with world estimates (extrapolated from above)			
Observed US merchandise trade in 1980 with 17 partners	221	253	474
Observed US merchandise trade in 2004 with 17 partners	818	1,525	2,343
Observed increase in trade from 1980 to 2004 in merchandise trade	597	1,272	1,869
Trade growth explained by GDP growth and income elasticities of trade	447	1,152	1,599
Trade growth explained by appreciation of US dollar and price elasticities of trade	–64	88	24
Trade growth not explained by GDP growth or exchange rate change	215	32	246
Trade growth explained by traditional trade policy liberalisation (i.e., tariffs) (Scenario 2)	135	69	204
Trade growth explained by lower transport costs (Scenario 3)	11	22	33
Trade growth explained by NTB Cuts (Scenario 5)	99	155	253
Memorandum (GDP growth rate 1980 to 2004):			
	Growth (%)		
Weighted average (by 1990 GDP) of 18 country GDP growth	312		
World GDP growth	253		
Memorandum (income and price elasticities):			
	Export	Import	
Price elasticities (Author: Kee et al., (2004)	–1.17	–1.30	
Income elasticities (Author: Hooper et al., 2000)	0.80	1.80	

Table 17.7 (continued)

Subject	Exports	Imports	Total Trade
Memorandum (Exchange rate change):			
	Change in index value		
Real equilibrium exchange rate change 1980–2004	10.88		

Note: Exchange rate effect is calculated by: [10.88/86.88]*[relevant price elasticity]*[relevant one-way US 1992 trade] –{times –1 for imports}

Sources: Hooper et al. (2000); Kee et al. (2004); Hummels (2007); IMF (2008a, 2008b); TRAINS via WITS (2008); UNComtrade via WITS (2008); authors' calculations.

NTBs (that is, scenario 2 plus scenario 5), overshoot the remaining amount of US trade growth after accounting for GDP growth and exchange rate changes. However, if we focus solely on scenario 2 – that is, the impact of just tariff liberalisation since the Tokyo Round – we see that this dimension of policy liberalisation explains roughly 70 per cent, or $175 billion out of the $250 billion in two-way trade growth not explained by GDP growth or exchange rate changes. This works out to roughly 11 per cent of total US two-way trade growth. Changes in transport costs explain a small portion of US trade growth over the period.

Since the 17 partners account for roughly 85 per cent of US trade in 2004, we can extrapolate from the 17 partner results to the whole world. These results suggest that tariff liberalisation since the Tokyo Round has boosted US two-way trade by roughly $200 billion per annum. The decline in transport costs adds another $30 billion. Our estimates of NTB liberalisation suggest a further $250 billion impact on two-way trade – quite a large figure. Either this NTB estimate has to be sharply discounted, or the income elasticity of trade with respect to GDP has been substantially overestimated. Since income elasticities have a far stronger econometric basis than NTB estimates, we are inclined to discount the large NTB figure.

The Benefit of Trade Expansion

Our estimates of the US trade expansion induced by policy liberalisation can be converted into income effects. Bradford et al. (2006) have investigated the benefit for US economic welfare of US trade expansion since the 1950s. The authors draw on methods and key results from several studies to produce a range of estimates. We follow one of the methods set out in Bradford et al. to make our estimate of the income effects of trade growth induced by policy liberalisation.

In an effort to understand the effect of various policies and characteristics on per capita income growth, among other results an OECD (2003) study found that a 10 per cent rise in a developed country's long-term trade exposure leads to a 2 per cent increase in the level of annual per capita income – as measured by GDP per capita. A standard measure of trade exposure is exports plus imports divided by GDP.[12]

Using the 0.2 OECD coefficient, we can estimate the per capita income effect under each of the six scenarios. To do so we must first scale up the export and import effects

displayed in the last line of Table 17.6. We do this because these estimates cover only about 85 per cent of US trade. We then calculate the actual US trade exposure – merchandise exports plus imports divided by GDP – in 2004 (20.1 per cent) and the hypothetical trade exposures if we took away the benefit accrued under each of the six scenarios.[13] We then multiply the percent increase between each of the six hypothetical trade exposures and the actual trade exposure by the OECD coefficient of 0.2. This arithmetic gives us a factor that we multiply by actual US 2004 GDP per capita ($39,811) to determine an effect under each scenario.

The estimated annual increases to GDP per capita under each scenario are as follows:

- 1: unilateral and preferential tariff liberalisation since the Uruguay Round: increase of $441;
- 2: multilateral, unilateral and preferential tariff liberalisation since 1980: increase of $759;
- 3: declining transport costs since 1980: increase of $114;
- 4: preferential tariff liberalisation since the start of the Canada–US FTA: increase of $205;
- 5: non-tariff barrier liberalisation: increase of $964; and
- 6: unilateral and preferential tariff liberalisation since 1990: increase of $449.

Using this approach, Bradford et al. (2006) calculate the benefits of *all* US trade expansion since 1950 (induced by both technology and policy) and arrive at a figure of $5,000 per capita in 2003.

3 FOREIGN DIRECT INVESTMENT GROWTH

FDI, both into and out from the United States, has boomed over the last two and a half decades. A certain pace of FDI growth is not surprising, since countries grow wealthier over time and all investment stocks expand.[14] Yet the growth of US FDI stocks, both inward and outward, substantially exceeds this 'expected' rate of growth.

What explains the FDI boom? Conceptually it can be attributed to three broadly defined factors: expansion of the economy, as mentioned; policy liberalisation; and everything else, a combination of market forces (especially the application of firm-specific advantages on a global scale) and technological change (notably better communications and transport). The first factor, economic expansion, is roughly captured by GDP growth in the United States and abroad, allowing us to narrow our inquiry to the rising ratio of FDI stocks to GDP. We are primarily concerned with policy liberalisation and its role in raising the ratio of FDI to GDP; once we make a rough accounting of the policy liberalisation component, what is left goes in the 'everything else' or 'market forces plus technology' basket.

Literature Review

Before proceeding to our calculations we take a brief look at the literature concerning the response of FDI to policy liberalisation – measures such as the removal of explicit

FDI restrictions, the relaxation of capital controls, reduced tariff and non-tariff barriers, and lower corporate taxes. Blonigen (2005) provides an extensive review of the literature on the impact of policy liberalisation on FDI as well as other FDI determinants not discussed here. His central finding is that the literature still leaves a great deal to be explained. In his words, 'the empirical literature . . . is still young enough that most hypotheses are still up for grabs' (p. 398).

Most of the relevant literature takes a historical approach, analysing past episodes of policy liberalisation, both over time and across countries. Since the FDI policies of OECD countries (including the United States) are relatively non-restrictive, empirical work has focused on policy changes in developing countries. Nicoletti et al. (2003) is an exception. The model designed by these authors enables them to forecast the effect of policy liberalisation on FDI into the United States. They estimate that, if the United States adopted the same low level of FDI restrictions prevailing in the United Kingdom – including screening requirements, foreign shareholding requirements, nationality of management, and visa limitations – the inward FDI stock in the United States would increase by approximately 20 per cent.[15]

The Nicoletti et al. study also speculates on the effect of completely removing individual FDI restrictions. The authors calculate that the average inward FDI stocks of OECD countries would have risen roughly 80 per cent above observed levels, over the period from 1980 to 2000, if foreign equity ceilings had been completely abolished. Other findings include: if national interest tests were completely ignored, average OECD inward FDI stocks would have been 20 per cent higher over the period, and if nationality requirements on management were relaxed, average OECD inward FDI stocks would have increased by roughly 10 per cent over the period.

Several studies take a detailed look at the impact of capital controls on FDI. Asiedu and Lien (2004) analyse three different types of capital controls – capital account restrictions, exchange rate distortions, and controls to ensure the repatriation of export proceeds – in the 1970s, 1980s and 1990s, across 96 developing countries. In the most recent period (1990 to 2000), they find that removing controls on the repatriation of export proceeds would have increased annual FDI inflows (into developing countries), expressed as a share of GDP, by slightly more than 1 per cent; capital account liberalisation would have about the same effect; and a unitary exchange rate would increase the ratio by about half a per cent (ibid.).[16] However, these are average coefficients and the authors find a range of results depending on the region. For example, in East Asia the estimated effect of capital account liberalisation was an increase of roughly 4 per cent in FDI inflows as a share of GDP; while the impact of capital account liberalisation was not significant in Latin America, or the Middle East and North Africa (MENA). In fact, none of the estimated impacts from policy liberalisation is statistically significant for MENA. In Latin America, however, both a unitary exchange rate and a liberalisation of repatriation policy would have increased the annual ratio of FDI flows to GDP by about 1 per cent over the period.

Desai et al. (2006) also investigate the impact of capital control liberalisation on FDI. The authors look exclusively at the foreign activities of US multinational firms from 1982 to 1997. They find that US multinational firm assets grew about 8 per cent faster in the years following capital control liberalisations.[17]

De Mooij and Ederveen (2005) carried out a 'meta-analysis' of several empirical works

on the tax elasticity of FDI.[18] The authors consider four types of empirical techniques: cross-sectional analysis, time-series analysis, discrete-choice models and panel-data analysis. On average, negative elasticities are found for all four types, indicating that a reduction in corporate taxes increases FDI flows. After averaging the estimates of each category the authors find a semi-elasticity for the response of FDI to taxation of –3.72, suggesting that, *ceteris paribus*, a 1 percentage point tax rate reduction (for example, lowering a 25 per cent corporate tax rate to a 24 per cent corporate tax rate) would lead to a 3.72 per cent increase in annual FDI flows.

Lesher and Miroudot (2007) investigate the role of FTAs with significant investment provisions on FDI flows. They conclude that such agreements are associated with 50 per cent higher FDI flows between the members.[19] Dee (2006) finds that the investment provisions and the cross-border service provisions in FTAs sponsored by large countries (including the United States) are positively related to inward FDI.

Sauvant and Sachs (2009) have authored the introduction to a volume on bilateral investment treaties (BITs), double taxation treaties (DTTs) and FDI. They find that the growth in worldwide FDI flows in the past two decades coincides with a proliferation of both BITs and DTTs. After reviewing the literature to investigate the causal relationship, if any, between treaties and FDI, they find no consensus on the role of BITs in FDI promotion. A few studies – including Neumeyer and Spess (2009), Salacuse and Sullivan (2009) and Buthe and Milner (2009) – find that BITs increased FDI flows. However, these works are contradicted by Hallward-Driemeier (2009), Aisbett (2009) and Yackee (2009), who report that BITs have little or no effect on FDI. Sauvant and Sachs (2009) suggest that these diverse findings could reflect the varying structures of different BITs, structures which are not distinguished in the empirical studies. As for the connection between DTTs and FDI, Sauvant and Sachs find a similar lack of consensus. Blonigen and Davies (2009) found that DTTs have an insignificant effect on US inward and outward FDI between 1980 and 1999; while Neumeyer (2009) reports that developing countries can increase FDI inflows by signing DTTs with capital-exporting developed countries.

Data Analysis

The foregoing literature review suggests that policy liberalisation has exerted a positive impact on FDI growth, but does not provide a definitive way to gauge what portion of FDI growth can be attributed to policy liberalisation. We therefore draw on stylised facts – more evident when the figures for US inward and outward FDI stocks are disaggregated by industry – to gauge the role of policy liberalisation.

In nominal terms, the US outward FDI stock grew from roughly $200 billion in 1982 to over $2.3 trillion in 2006. The inward stock grew from around $82 billion in 1982 to almost $1.8 trillion in 2006. Table 17.8 shows US outward and inward FDI stock data disaggregated by industry. Most industries show the strong upward trend exhibited in the overall data, but the reasons for growth likely vary by industry.

Technological improvements have sharply boosted FDI in several manufacturing industries. The computer industry for example, has witnessed tremendous technology gains and an explosion of proprietary knowledge over the last 25 years. Both forces have caused the industry to expand globally. The US inward FDI stock in electronic and

Table 17.8 US FDI stock by industry, 1982–2006 (current USD in bn)

	Outward						Inward					
	1982	1987	1992	1997	2001	2006	1982	1987	1992	1997	2001	2006
All industries total	208	326	502	871	1,460	2,384	124	260	428	680	1,349	1,785
Petroleum related	58	61	59	84	89	143	18	40	38	36	102	121
Food	6	10	15	21	21	33	3	6	17	16	19	22
Beverages	2	3	6	12	12	35	4	9	7	13	8	13
Tobacco products	2	4	4	4	1	1	0	0	0	−1	2	4
Chemicals	18	28	45	76	79	130	14	26	52	90	129	183
Machinery (non-electrical)	14	29	28	30	18	32	2	2	8	17	43	60
Electronic and computer equipment and products	7	10	16	31	68	92	6	12	20	36	108	69
Transport equipment	11	19	25	36	40	56	2	3	5	18	62	69
Primary and fabricated metals	5	6	10	16	22	23	5	8	12	17	20	34
Textiles and apparel	1	2	2	3	4	5	0	1	3	3	3	3
Wood and wood products	1	1	1	3	5	6	0	1	1	1	2	3
Paper	4	6	11	11	14	11	1	2	3	5	11	9
Plastics and rubber	3	5	6	10	11	14	0	2	5	9	13	16
Non-metallic mineral products	2	3	4	6	7	14	2	7	8	15	28	48
Medical equipment	1	1	4	7	11	25	0	2	3	11	3	41
Miscellaneous manufacturing	1	1	2	3	4	6	1	4	5	2	6	5
Wholesale trade	21	34	53	65	108	161	18	37	60	78	116	185
Retail trade	4	5	9	12	23	60	5	8	11	16	23	33
Banking	10	18	25	38	56	68	8	14	22	40	67	149
Finance except banking	−9	7	32	86	182	366	0	4	10	35	69	100
Insurance	7	12	19	43	58	119	9	18	35	69	105	158
Real estate	1	2	2	1	5	8	12	22	32	40	44	43
Holding companies	20	35	83	168	449	710	2	3	4	10	72	81
Agriculture services	1	1	1	1	1	1	1	1	1	2	3	2
Mining (except oil and gas)	7	7	8	12	10	21	2	6	9	14	11	9
Utilities	0	0	1	14	26	11	0	1	3	2	26	47

Table 17.8 (continued)

	Outward						Inward					
	1982	1987	1992	1997	2001	2006	1982	1987	1992	1997	2001	2006
Communications	0	0	4	15	13	16	0	0	1	6	56	43
Construction	1	1	1	1	2	2	4	1	2	3	7	10
Transport	2	2	4	5	7	15	1	2	3	9	17	17
Hotels	0	1	1	3	8	9	0	2	12	11	24	25
Business services	2	3	10	29	54	91	1	5	8	12	73	108
Publishing services	1	1	2	3	7	13	2	5	10	24	20	28
Motion pictures and television services	1	1	2	3	5	17	0	1	11	11	43	21
Architecture and engineering services	0	1	1	1	3	2	0	3	1	1	2	8
Health services	0	1	0	0	0	1	0	0	1	6	5	9
Legal services	0	0	0	0	1	2	0	0	0	0	0	0
Education services	0	0	0	0	0	0	0	0	0	0	0	0
Other services	3	4	6	18	27	69	0	1	3	4	7	8

Note: Several entries are not disclosed by the data source. We extrapolate from the overall trend to fill in missing entries.

Source: BEA (2008).

computer equipment and products grew by $64 billion over the period. The US outward stock grew even more – by $85 billion. General policy liberalisation can explain only a small part of this growth.

Policy liberalisation plays a clearer role in other industries. In the case of outward FDI, policy liberalisation has opened up several regulated industries over the past 25 years to US firms – including finance, communications, utilities, insurance, transport and banking. For inward FDI, the United States has opened the same six industries, plus motor vehicle manufacturing (transport equipment in our database).[20]

Tables 17.9 and 17.10 contain calculations of FDI stock growth after making allowances for GDP growth. When accounting for US outward FDI growth (Table 17.9) world GDP growth is used;[21] when accounting for US inward FDI growth (Table 17.10) US GDP growth is used. The far right column of both tables indicates how much of the growth in FDI stocks is left unexplained after taking GDP growth into account. Based on these columns, two-thirds of the growth in total US outward FDI stock, and three-quarters of the growth in total US inward FDI stock, remain to be explained after making allowances for GDP growth. But of these unexplained shares, what portion can be attributed to policy liberalisation?

Our approach to explaining the role of FDI growth induced by policy liberalisation is to apply 'all-or-nothing' arithmetic. We attribute *all* the 'residual expansion' of FDI stocks, after accounting for GDP growth, in industries indentified as lead beneficiaries of policy liberalisation, to that factor. These industries were heavily regulated by most countries 25 years ago, and several are still subject to extensive regulation. Using all-or-nothing arithmetic, it seems reasonable to attribute all the residual expansion in these industries to internal deregulation and greater openness to foreign investment. FDI in a few industries also suffered from policy tightening – US outward FDI in the petroleum-related industry being the clearest example.[22] All the 'residual contraction' in petroleum is scored as a negative offset, the result of policy deliberalisation. In all other industries we attribute *none* of the residual expansion of FDI stocks to policy liberalisation or policy tightening. In Appendix 17A2 we explain which industries were called out to make our estimate of the role of policy liberalisation.

Certainly, our all-or-none methodology is crude. However, there are three reasons for believing that the methodology is more likely to *under*estimate, than *over*estimate, the impact of policy liberalisation on FDI. First, our literature review revealed that several broad policy measures – such as the removal of capital controls and reduction of corporate tax rates – contributed to overall FDI growth. By restricting our measure of the impact of policy liberalisation to a few regulated industries, we disregard the impact of broad policy changes on other industries. Second, we are conservative in choosing which regulated industries might have benefited from policy liberalisation. For example, we do not consider the growth of FDI stocks in the wide-ranging 'industry' known as 'holding companies' to be driven by policy liberalisation, despite its close link to the finance sector.[23] Third, when accounting for GDP growth we disregard the endogenous relationship between GDP and policy liberalisation. Policy liberalisation (independent of any expansion in FDI) has undoubtedly contributed to GDP gains over the past 25 years; by ignoring this aspect of the policy picture we slightly underestimate the role of policy in FDI growth.[24]

Table 17.11 shows our calculations of the role of policy liberalisation. The table starts

Table 17.9 Growth calculations for US outward FDI stock by industry, 1982–2006 (current USD in bn)

	Actual 1982 level	Predicted 2006 level (based on world GDP growth)	Actual 2006 level	FDI growth 1982 to 2006	FDI growth explained by GDP growth	FDI growth not explained (total)[a]	FDI growth not explained (share %)
All industries total	207	964	2,389	2,183	757	1,426	65
Petroleum related	58	269	143	85	212	–126	–148
Food	6	28	33	27	22	5	20
Beverages	2	8	35	34	6	27	81
Tobacco products	2	9	1	0	7	–7	<0
Chemicals	18	85	130	112	67	45	40
Machinery (non-electrical)	14	65	32	18	51	–32	–50
Electronic and computer equipment and products	7	34	92	85	27	58	69
Transport equipment	11	51	56	45	40	4	10
Primary and fabricated metals	5	25	23	18	20	–2	–13
Textiles and apparel	1	6	5	3	5	–2	–56
Wood and wood products	1	3	6	5	2	3	60
Paper	4	19	11	6	15	–9	–141
Plastics and rubber	3	16	14	10	12	–2	–17
Non-metallic mineral products	2	9	14	12	7	5	38
Medical equipment	1	3	25	24	3	21	89
Miscellaneous manufacturing	1	4	6	5	3	2	33
Wholesale trade	21	97	161	140	76	64	46
Retail trade	4	17	60	57	14	43	76
Banking	10	48	68	57	38	19	34
Finance except banking	–9	0[b]	366	375	0	375	109
Insurance	7	34	119	112	27	85	76
Real estate	1	3	8	8	2	6	74
Holding companies	20	91	710	691	72	619	90
Agriculture services	1	2	1	0	2	–1	–333
Mining (except oil and gas)	7	31	21	15	25	–10	–69
Utilities	0	2	11	11	2	9	84
Communications	0	1	16	16	0	16	97
Construction	1	5	2	1	4	–2	–173

Table 17.9 (continued)

	Actual 1982 level	Predicted 2006 level (based on world GDP growth)	Actual 2006 level	FDI growth 1982 to 2006	FDI growth explained by GDP growth	FDI growth not explained (total)[a]	FDI growth not explained (share %)
Transport	2	8	15	13	6	7	51
Hotels	0	2	9	9	2	7	80
Business services	2	9	91	89	7	82	92
Publishing services	1	2	13	12	2	10	84
Motion pictures and television services	1	3	17	16	3	14	85
Architecture and engineering services	0	2	2	2	2	0	6
Health services	0	0	1	1	0	1	73
Legal services	0	0	2	2	0	2	97
Education services	0	0	0	0	0	0	79
Other services	3	14	69	66	11	55	84

Notes:

a. Negative unexplained growth could reflect market forces or tighter policy, or it could simply reflect the low responsiveness of investment in this industry to economic growth.
b. If the 1982 FDI stock was negative we arbitrarily assume that the predicted 2006 level is zero.

Sources: BEA (2008); IMF (2008a); authors' calculations.

with the 1982 FDI stock and the appropriate GDP growth over a span of 25 years (either US or world growth) to arrive at a predicted 2006 FDI stock. The predicted 2006 stock level is subtracted from the actual 2006 FDI stock to determine what portion of FDI stock growth is not explained by GDP growth, that is, the residual expansion of the FDI stock. The same method was followed in Tables 17.9 and 17.10. The residual expansion of FDI stocks in the identified industries is then added up and expressed as a share of total 'unexplained' FDI growth to estimate the impact of policy liberalisation (the last columns in the tables).

According to the judgemental estimates in Table 17.11, roughly 27 per cent of the unexplained US outward FDI stock growth over the past 25 years can be attributed to policy liberalisation. Table 17.11 also shows the corresponding guesses for US inward FDI stock. Here the judgemental estimate of policy liberalisation is larger, roughly 39 per cent of the unexplained inward FDI stock growth. 'Everything else' or 'market forces plus technology' accounts for the remaining unexplained shares of US outward FDI stock growth (73 per cent) and of US inward FDI stock growth (61 per cent). The role of financial deregulation in the United States and abroad has been dramatic both for US and for foreign firms. In dollar terms, the calculated impact of policy changes on all US inward FDI, roughly $500 billion, exceeds the calculated impact on US outward FDI,

Table 17.10 Growth calculations for US inward FDI stock by industry, 1982–2006 (current USD in bn)

	Actual 1982 level	Predicted 2006 level (based on US GDP growth)	Actual 2006 level	FDI growth 1982 to 2006	FDI growth explained by GDP growth	FDI growth not explained (total)[a]	FDI growth not explained (share %)
All industries total	124	504	1,785	1,660	380	1,281	77
Petroleum related	18	72	121	103	54	50	48
Food	3	12	22	19	9	10	52
Beverages	4	17	13	9	13	–4	–45
Tobacco products	0	0	4	4	0	4	100
Chemicals	14	58	183	169	44	125	74
Machinery (non-electrical)	2	9	60	58	7	51	89
Electronic and computer equipment and products	6	23	69	64	18	46	72
Transport equipment	2	6	69	68	5	63	93
Primary and fabricated metals	5	21	34	29	16	13	46
Textiles and apparel	0	1	3	2	1	1	56
Wood and wood products	0	1	3	3	1	2	77
Paper	1	6	9	8	5	3	43
Plastics and rubber	0	2	16	16	1	14	91
Non-metallic mineral products	2	9	48	46	7	39	85
Medical equipment	0	0	41	41	0	41	100
Miscellaneous manufacturing	1	4	5	4	3	1	33
Wholesale trade	18	71	185	167	54	113	68
Retail trade	5	21	33	28	16	12	43
Banking	8	32	149	141	24	117	83
Finance except banking	0	2	100	100	1	98	99
Insurance	9	35	158	149	26	123	82
Real estate	12	47	43	32	35	–3	–11
Holding companies	2	7	81	79	5	73	93
Agriculture services	1	4	2	1	3	–2	–156
Mining (except oil and gas)	2	8	9	7	6	1	17
Utilities	0	0	47	47	0	47	100
Communications	0	1	43	42	1	41	98
Construction	4	15	10	7	11	–5	–71
Transport	1	4	17	16	3	13	80

Table 17.10 (continued)

	Actual 1982 level	Predicted 2006 level (based on US GDP growth)	Actual 2006 level	FDI growth 1982 to 2006	FDI growth explained by GDP growth	FDI growth not explained (total)[a]	FDI growth not explained (share %)
Hotels	0	2	25	24	1	23	94
Business services	1	3	108	108	3	105	98
Publishing services	2	7	28	26	5	21	80
Motion pictures and television services	0	1	21	21	1	20	97
Architecture and engineering services	0	1	8	8	0	8	94
Health services	0	0	9	9	0	8	97
Legal services	0	0	0	0	0	0	100
Education services	0	0	0	0	0	0	100
Other services	0	1	8	7	1	6	86

Note: a. Negative unexplained growth could reflect market forces or tighter policy, or it could simply reflect the low responsiveness of investment in this industry to economic growth.

Sources: BEA (2008); IMF (2008a); authors' calculations.

$385 billion. A major reason for the difference is the negative impact of nationalistic forces abroad on US petroleum investment.

Expressed as a share of *total* inward and outward FDI stock growth (not just the residual expansion), world GDP growth accounted for roughly 35 per cent of US outward FDI stock growth and US GDP growth accounted for roughly 23 per cent of US inward FDI stock growth. Policy liberalisation, under our calculations, accounted for roughly 18 per cent of US outward FDI stock growth and 30 per cent of US inward FDI stock growth. The 'everything else' or 'technology' category, accounted for roughly 48 per cent of US outward FDI stock growth and roughly 47 per cent of US inward FDI stock growth.[25]

The Benefit of FDI Expansion

Graham and Krugman (1995) identified two broadly defined avenues through which an economy can benefit from inward FDI: increased international integration and spillover effects. Increased integration comes from the impact of FDI on trade in goods, services and knowledge (for example, headquarters coordination). Technological spillovers occur when domestic firms imitate the best practices of foreign firms. In our effort to quantify the benefit of US inward FDI stock growth, and ultimately the role of policy liberalisation, we consider only technological spillovers. This evaluation of technological spillovers only gauges the role of FDI in providing a one-time shock to economic growth

Table 17.11 Impact of policy calculations for US FDI stock growth, 1982–2006 (USD in bn, %)

	Actual 1982 level	Predicted 2006 level (based on world GDP growth)	Actual 2006 level	FDI growth 1982 to 2006	FDI growth explained by GDP growth	FDI growth not explained by GDP growth (total)[a]	FDI growth not explained by GDP growth (share %)
			Outward FDI Stock				
All industries total	207	964	2,389	2,183	757	1,426	65
Banking	10	48	68	57	38	19	34
Finance except banking	–9	0[b]	366	375	0	375	109
Insurance	7	34	119	112	27	85	76
Utilities	0	2	11	11	2	9	84
Communications	0	1	16	16	0	16	97
Transport	2	8	15	13	6	7	51
Subtotal: Positively policy affected industries	11	93	595	584	73	511	88
Petroleum related	58	269	143	85	212	–126	–148
Subtotal: Negatively policy affected industries	58	269	143	85	212	–126	–148
Total: Policy affected industries	68	362	738	670	285	385	58
		Share of unexplained FDI growth attributed to FDI growth in policy affected sectors[c]					27
			Inward FDI Stock				
All industries total	124	504	1,785	1,660	380	1,281	77
Transport equipment	2	6	69	68	5	63	93
Banking	8	32	149	141	24	117	83
Finance except banking	0	2	100	100	1	98	99
Insurance	9	35	158	149	26	123	82
Utilities	0	0	47	47	0	47	100
Communications	0	1	43	42	1	41	98
Transport	1	4	17	16	3	13	80
Subtotal: Positively policy affected industries	20	80	582	562	60	502	89
Total: Policy affected industries	20	80	582	562	60	502	89
		Share of unexplained FDI growth attributed to FDI growth in policy affected sectors[d]					39

Table 17.11 (continued)

Memorandum: Share of total FDI growth explained by				
	In dollar terms ($ bn)		Share of total FDI growth (%)	
	Out	In	Out	In
US/world GDP growth	757	380	35	23
Policy liberalisation[a]	385	502	18	30
'Everything Else'	1,041	779	48	47

Notes:
a. Negative unexplained growth could reflect market forces or tighter policy, or it could simply reflect the low responsiveness of investment in this industry to economic growth.
b. If the 1982 FDI stock was negative we would expect the 2006 level to be zero in 2006, not a larger negative amount.
c. The two numbers differ because one is the policy share of total *unexplained* FDI growth (namely the 27% figure), while the other is the policy share of all FDI growth over the 1982–2006 period (namely the 18% figure).
d. The two numbers differ because one is the policy share of total *unexplained* FDI growth (namely the 39% figure), while the other is the policy share of all FDI growth over the 1982–2006 period (namely the 30% figure).

Sources: BEA (2008); IMF (2008a); authors' calculations.

via improvements in productivity; Cline (2008) explores the role of FDI in boosting the long-term rate of economic growth, principally a developing-country phenomenon.

In an effort to quantify the benefit of US outward FDI growth, and the role of policy liberalisation, we rely on a relatively simple measure: the income received by US firms from their direct investments abroad. Since this measure does not speak to either of the avenues proposed by Graham and Krugman (1995), we believe that the calculation represents a low-end estimate of the economic benefit to the United States from US outward FDI. In the next two subsections we tackle benefits from US inward and outward FDI growth separately.

Inward FDI

In a pioneering study, Keller and Yeaple (2005) estimated the impact of US inward manufacturing FDI on US manufacturing sector productivity growth between 1987 and 1996. To gauge the role of inward FDI in productivity growth – that is, the spillover effect – the authors applied a sophisticated econometric technique to microeconomic data (1,277 US-owned firms) to relate firm-specific productivity growth to the rising share of employment by foreign firms in each firm's industry. They conclude that approximately 11 per cent of US manufacturing productivity growth, between 1987 and 1996, could be attributed to US inward FDI in the manufacturing sector overall.

The Keller and Yeaple estimate can be extrapolated to produce a rough estimate of the expansion of total US inward FDI on US GDP growth over the longer period, 1982 to 2006. This exercise entails considerable guesswork because Keller and Yeaple examined only the manufacturing sector. Much of the growth of inward FDI took place in other

sectors, finance being prominent.[26] We discuss only the major points and results from our extension of Keller and Yeaple here, leaving a detailed discussion to Appendix 17A3.

Keller and Yeaple find that if foreign employment – their way of gauging inward FDI – in a firm's industry increased by 10 percentage points that firm's productivity will, on average, increase by 5.2 per cent. Drawing from this estimate, we consider the growth of total factor productivity (TFP) – the sum of all firms' productivity – in the entire US economy between 1982 and 2006. We find that approximately 2.14 per cent of the increase in TFP over the period can be attributed to the increase in inward US FDI.

Earlier we calculated that roughly $500 billion of the increase in the US inward FDI stock between 1982 and 2006 could be attributed to policy changes, or about 30 per cent of the total growth in the inward FDI stock ($1,660 billion).[27] Applying this share, we conclude that approximately two-thirds of 1 per cent (0.30*2.14 = 0.64 per cent) of the increase in US TFP over the last 25 years can be explained by the growth of US inward FDI induced by US policy liberalisation.[28]

US real private GDP in 2006 was approximately $9,338 billion. In the absence of the 30 per cent increase in TFP observed over the last 25 years, US private GDP would presumably be 30 per cent lower, or roughly $7,186 billion. In other words, a GDP gain of $2,152 billion can be attributed to TFP growth over the past 25 years.[29] Applying the 2.14 per cent estimate cited earlier, we conclude that, in the year 2006 an annual TFP gain of about $46 billion can be attributed to the growth over 25 years in the US inward FDI stock (calculated as 0.0214*$2,152 billion).

The share of this $46 billion figure attributable to policy liberalisation is about 30 per cent, or roughly $14 billion annually. According to our earlier calculations, the share attributable to the expected rate of FDI growth (as measured by US GDP growth) is about 23 per cent or roughly $11 billion,[30] and the share attributable to 'everything else' or 'market forces plus technology' is roughly 47 per cent or $22 billion annually.

The foregoing calculations generate a minimalist estimate of the benefits to the US economy from inward FDI. In this chapter, we do not attempt to offer a comprehensive estimate, but it is worth noting three benefit channels that are overlooked:

- Inward FDI adds to the private US capital stock, and more capital per employee generates higher compensation per employee.[31]
- Inward FDI reinforces US trade links with the global economy, and more intense trade boosts productivity and lowers prices.[32]
- Foreign multinationals operating in the United States have a record of paying better wages and conducting more R&D than US firms in the same industry.[33]

Outward FDI

In terms of outward FDI, the spillover effects previously described mainly accrue to FDI host countries, so the type of analysis used to determine the impact of US inward FDI does not seem applicable. Certainly, an argument can be made that US firms increase their own productivity inside the United States by discovering new ways of doing business from their operations abroad. However, in this exercise we rely on a relatively basic figure of the benefits of outward FDI, namely income receipts to US-based multinational firms. This approach generates a low-end estimate of the benefits to the United States from policy-induced growth in US outward FDI.

For the purpose of these calculations we acknowledge that, if the US outward FDI stock had been invested domestically, the US economy might benefit from a larger capital stock.[34] However, this benefit would not include the 'extra' profits from FDI – namely, the payoff from application of firm-specific know-how to new foreign markets (usually through M&A). These extra profits show up in various forms, including: retained earnings, dividends, interest, royalties and fees.[35] To account for the forgone returns if the US outward FDI stock had been invested entirely in the United States, we subtract from FDI income receipts the income that might have been earned had the outward FDI stock in a given year been invested at the prevailing US Treasury bill rates.

We attribute income flows on outward FDI, minus the forgone returns evaluated at the Treasury bill rate, as a benefit to the US economy. This money would not have been earned in the absence of foreign investment by US-based MNEs. Table 17.12 shows US income receipts from US outward FDI between 1982 and 2006. Income receipts (expressed in current dollars) have expanded roughly tenfold over the last 25 years, up from below 1 per cent of US GDP in 1982 to above 2 per cent in 2006. Table 17.12 also shows our estimates of the forgone returns from placing capital stock abroad rather than in the United States. The calculation applies the US one-year Treasury bill rate to the whole US outward FDI stock on a year-by-year basis. A simple rationale for this calculation can be expressed as follows: US outward FDI is indirectly financed by inward flows of portfolio capital; at the margin, these inward flows earn the Treasury bill rate.

Between 1982 and 2006, US income receipts from FDI, less the forgone returns on the outward capital stock, grew by $188 billion. We take this figure to show a conservative estimate of the benefit of the expansion in outward FDI. Earlier we determined that roughly 18 per cent of the growth in outward FDI can be explained by policy liberalisation abroad. Consequently we assume that policy liberalisation created roughly 18 per cent of the growth in US income receipts from FDI. Since the *total* dollar amount of growth in inward receipts was $188 billion, our arithmetic leads to the conclusion that US outward FDI stock growth attributable to policy liberalisation contributed roughly $34 billion to US GDP in 2006 (0.18*$188 billion). Our earlier calculations suggest that about 35 per cent of the $188 billion gain, or roughly $66 billion is attributable to world GDP growth, and 48 per cent of the $188 billion gain, or roughly $90 billion, is attributable to 'everything else' or 'market forces plus technology'.[36]

4 SUMMING UP

Table 17.7 summarises our results from the trade analysis. We determined that roughly 11 per cent of US trade growth over the period from 1980 to the present can be explained by traditional trade policy liberalisation ($204 billion/$1,869 billion). Another 14 per cent ($253 billion/$1,869 billion) might be explained by NTB liberalisation, although we are not highly confident in this estimate. Around 2 per cent of US trade growth can be explained by transport cost declines ($33 billion/$1,869 billion). General economic expansion – measured by GDP growth – explains the greatest portion of US trade growth, possibly more than 80 per cent.

Table 17.13 summarises our results from the FDI analysis. Using stylised facts from FDI data disaggregated by industry, we determined that roughly 30 per cent of US

Table 17.12 Impact of US outward FDI on US economic growth, 1982–2006

Year	US income receipts from FDI (current USD bn)	Share of nominal GDP (%)	1-year T-bill rate annualised (%)	US outward FDI stock (current USD bn)	Forgone return (current USD bn)	Net US income receipts (current USD bn)
1982	29	0.91	12.27	208	25	4
1983	32	0.90	9.58	212	20	11
1984	35	0.90	10.91	218	24	12
1985	35	0.84	8.42	238	20	15
1986	37	0.83	6.45	270	17	19
1987	46	0.98	6.77	326	22	24
1988	58	1.15	7.65	347	27	32
1989	62	1.13	8.53	382	33	29
1990	66	1.14	7.89	431	34	32
1991	59	0.98	5.86	468	27	31
1992	58	0.91	3.89	502	20	38
1993	67	1.01	3.43	564	19	48
1994	77	1.09	5.32	613	33	45
1995	95	1.29	5.94	699	42	54
1996	103	1.31	5.52	795	44	59
1997	115	1.39	5.63	871	49	66
1998	104	1.19	5.05	1,001	51	53
1999	132	1.42	5.08	1,216	62	70
2000	152	1.55	6.11	1,316	80	71
2001	129	1.27	3.49	1,460	51	78
2002	146	1.39	2.00	1,617	32	113
2003	186	1.70	1.24	1,770	22	164
2004	239	2.05	1.89	2,125	40	199
2005	269	2.17	3.62	2,135	77	192
2006	310	2.35	4.94	2,384	118	192

Addendum:

	Total growth of net income receipts (current USD bn)	Share attributable to policy liberalisation (%)	Benefit of FDI policy liberalisation (current USD bn)
1982–2006	188	18	33

Sources: BEA (2008); Federal Reserve System Board of Governors (2008).

inward FDI stock growth and 18 per cent of US outward FDI stock growth between 1982 and 2006 can be attributed to policy liberalisation. These policy-impact estimates reflect an allowance for the expected rate of FDI growth, as determined by GDP growth. After identifying the share of FDI stock growth caused by these two factors, our estimates suggest that about half of the growth in the US inward and outward FDI stocks can be explained by what we call 'everything else' – a combination of market forces and technological change.

Table 17.13 Summary of FDI calculations

	Attributable to GDP growth[a]	Attributable to policy liberalisation	Attributable to 'market forces plus technology'	Total gains
Parsing the growth in US inward and outward FDI stock, 1982–2006 (bn)				
Total inward FDI stock gain	380	502	779	1,660
(share of total gain in parentheses)	(23%)	(30%)	(47%)	(100%)
Total outward FDI stock gain	757	385	1,041	2,183
(share of total gain in parentheses)	(35%)	(18%)	(48%)	(100%)
Annual gain to US GDP in 2006 from US inward and outward FDI stock growth, 1982–2006 (bn)				
Gain from inward stock growth [b]	11	14	22	46
Gain from outward stock growth[c]	66	34	90	188
Total gain to US GDP	77	48	112	234

Notes
a. When considering inward stock growth US GDP growth is used; when considering outward stock growth the GDP growth of the world except the United States is used.
b. Estimates made using the Keller and Yeaple (2005) approach.
c. Estimates drawn from direct investment income receipts of US-based MNEs.

Source: Authors' calculations.

Using these FDI stock estimates, we went on to assess the benefits to the United States, measured by GDP gains, from each of the three sources of FDI growth. We estimate that, in *total*, and as a conservative measure, US inward and outward FDI stock growth between 1982 and 2006 contributed roughly $234 billion annually to the level of US real GDP in 2006. Of the total $234 billion annual gain, roughly $77 billion results from the expected rate of FDI stock growth (as a simple consequence of GDP growth); $48 billion is attributable to FDI stock growth from policy liberalisation; and $112 billion is attributable to FDI stock growth from 'everything else' – a combination of market forces and technological change.[37]

SUMMARY

Over the last three decades the global economy has expanded remarkably. While nominal world GDP has increased four times, world bilateral trade flows have grown more than sixfold, and the stock of foreign direct investment (FDI) has grown by roughly 20 times since 1980. The sources of global trade and investment growth are well known – general economic expansion, policy liberalisation, and better communications and technology – but the impact of each source is unclear. In this chapter we attempt to uncover the contribution of policy liberalisation to the rising ratios of merchandise trade and FDI to GDP over the last three decades for the United States.

In the case of merchandise trade, tariff reductions and the conversion of tariffs to

quotas by the United States and its major trading partners, have been a boon for US trade. To measure the impact of policy liberalisation on US trade we rely on a computable general equilibrium (CGE) model and companion, but rougher calculations. The role of policy liberalisation in the expansion of FDI since the 1980s is less clear. Policies related to FDI have undoubtedly been liberalised since the 1980s, but unlike tariffs these policies are not easily quantified, making an assessment of their impact on FDI more difficult. To get around this obstacle, we rely on stylised facts about US inward and outward FDI stocks and an unorthodox calculation method to approximate the role of policy liberalisation on FDI growth.

Keywords

Tariff liberalisation, foreign direct investment, international economic integration.

JEL Classification

F10, F13, F15, F21.

NOTES

1. This chapter draws heavily from Adler and Hufbauer (2008 and 2009).
2. Statistics from BEA (2008), IMF (2008a) and UNComtrade (2008).
3. The 17 trading partners that we consider throughout our analysis are: Australia, Brazil, Canada, China, the EU, Hong Kong, India, Indonesia, Japan, Korea, Malaysia, Mexico, the Philippines, Singapore, Taiwan, Thailand and Venezuela.
4. To keep the exercise manageable, we did not evaluate the effect of eliminating preferential tariffs in other US FTAs, for example, the US–Chile FTA.
5. While in reality there is easing of NTBs under US FTAs, the method used to calculate NTB tariff equivalents by Kee et al. (2005), the study from where we obtain the bulk of our NTB data, does not lend itself to differentiation of preferential NTBs from general NTBs. The method uses shortfalls in expected imports when NTBs are present to calculate the restrictiveness of NTBs for every tariff line for every country analysed.
6. Yi's analysis was drawn to our attention by Alan Deardorff, Professor of Economics, University of Michigan.
7. Yi (2003) analyses the export growth of manufactures in a two-country model, where the two countries are the United States and the rest of the world treated as a single country.
8. We assume a 51.1 per cent increase in the rate of NTB protection for all countries and sectors from past to present; the method behind these figures is explained in the data discussion that follows Table 17A1.1 in Appendix 17A1.
9. See Yi (2003) and Bradford et al. (2006) for discussion.
10. A larger income elasticity for US imports than US exports is a finding that can be traced to Houthakker and Magee (1969).
11. Weighted by 1990 GDP. The 18 countries are: the 17 partners used throughout the chapter, plus the United States.
12. OECD (2003) uses a slightly different measure, exports divided by GDP plus imports divided by GDP minus exports plus imports. Bradford et al. (2006) use the sum of exports plus imports divided by GDP, and we do the same here.
13. The hypothetical trade exposures without each of the six scenarios are as follows: 1: 19.0 per cent; 2: 18.3 per cent; 3: 9.8 per cent; 4: 19.5 per cent; 5: 17.9 per cent; 6: 19.0 per cent.
14. The ratio between the US stock of fixed assets (valued in terms of historical acquisition cost) relative to nominal GDP was 3.6 in 1982. The ratio dipped down to about 3.0 in the late 1990s, but rose to roughly 3.4 in 2006 (BEA, 2008).
15. The analysis in Nicoletti et al. (2003) uses 1998 inward FDI stocks as the base level. The forecast applies

the same FDI restrictiveness indicator found for the United Kingdom to the United States and other OECD countries.

16. The estimated coefficients suggest, for example, that if the initial level of FDI inflows was 5 per cent of GDP annually, removing restrictions on repatriation would increase FDI inflows to 5.05 per cent of GDP annually. The results for the 1970s and 1980s periods also show positive relationships between policy liberalisation and FDI flows, but the results lack significance (Asiedu and Lien, 2004).
17. Two earlier studies, Montiel and Reinhart (1999) and Carlson and Hernandez (2002), found that capital controls were actually associated with more FDI. In defence of this outcome, the authors suggest that capital controls are instrumental in altering the composition of capital attracted by a country, bringing more FDI in place of short-term debt, but not changing the overall amount of capital very much.
18. De Mooij and Ederveen (2005) focus on the impact on FDI of *percentage point* changes in tax rates – that is, semi-elasticities – rather than simple elasticities. A simple elasticity would show the FDI response to a 1 per cent cut in tax rates – for example, lowering a 20 per cent corporate tax rate to 19.8 per cent. A semi-elasticity shows the FDI response to a 1 percentage point change – for example, lowering a 20 per cent corporate tax to 19 per cent. Since we normally think of tax rates in percentage point terms, De Mooij and Ederveen prefer the expression in semi-elasticity terms.
19. Lesher and Miroudot (2007) also include bilateral investment treaties (BITs) in their analysis, but they find that the effect of BITs on FDI is insignificant.
20. In the automotive industry, US 'policy liberalization' took the form of *not* blocking the entry of Toyota, Nissan and Honda in the 1980s, despite strident objections from US unions and some established auto firms.
21. For the US outward FDI stock calculations, 'world growth' means GDP growth of all countries except the United States.
22. Over the past 25 years, national oil companies have seriously squeezed the 'seven sisters', in terms of control over petroleum reserves and production levels.
23. From 1982 to 2006, the residual expansion (after accounting for GDP growth) of US outward FDI in the BEA category holding companies was $619 billion. If all of this growth was added to our estimate, the role of policy liberalisation in increasing the US outward FDI stock would more than double. Even if we just attributed half the increase in outward FDI of holding companies ($310 billion) to policy liberalisation, that would increase our estimate of the overall impact of policy liberalisation on US outward FDI by over 60 per cent. The residual expansion of the US inward FDI stock in the holding company industry was $73 billion over the period. Attributing this growth to policy liberalisation would also enlarge our estimates.
24. One factor that we do not consider, which may inflate our estimates, is the role of the stock market. Mergers and acquisitions (M&As) make up a large portion of US FDI flows (both inward and outward) and they are closely tied to stock market fluctuations. In fact, the correlation between the annual New York Stock Exchange (NYSE) composite price index and annual US M&A purchases (a component of outward FDI) between 1987 and 2006 was 0.95. The correlation between the same NYSE composite price index and US M&A sales (a component of inward FDI) was 0.70.
25. In dollar terms, the estimated impact of 'market forces plus technology' on the outward FDI stock, about $1 trillion, exceeds their impact on the inward FDI stock, about $800 billion.
26. Since Keller and Yeaple (2005) only look at productivity spillovers within a given industry, their estimates do not include the impact of inward FDI across industries (that is, vertical spillovers). In this regard, by using the Keller and Yeaple coefficient ('0.516'), we may underestimate the impact of inward FDI on US productivity growth.
27. The similarity between the figure for US TFP growth between 1982 and 2006 and the figure for the portion of US inward FDI stock growth attributable to policy changes is coincidental. The productivity growth figure is 29.95 per cent and the policy share figure is 30.24 per cent; we present both as '30 per cent' in the discussion.
28. The corresponding impact attributable to 'technology' is roughly 1.01 per cent. This comes from our earlier calculation that 'technology' accounted for $784 billion of the $1,660 billion (47 per cent) gained in the US inward FDI stock between 1982 and 2006. Stated more fully, the 'technology' calculation is: 0.516*(0.0124*0.42)/0.30 = 1.01.
29. Assuming full employment, the increase in US TFP over the last 25 years is fully reflected in US GDP growth over the period.
30. We acknowledge that attributing a gain to US GDP from the growth in the inward FDI stock which was predicted by US GDP growth has a circular quality. Bear in mind, however, that we use US GDP growth between 1982 and 2006 to predict the expected FDI stock in 2006. In turn, that expansion in FDI is calculated to raise the GDP level by $11 billion annually in 2006 and subsequent years.
31. This is a standard result from modelling the US economy with Cobb–Douglas or CES (constant elasticity of substitution) production functions.
32. See Bradford et al. (2006).
33. See Graham and Krugman (1995) and Lipsey (2004).

34. Work by Desai et al. (2005) suggests that outward FDI by US firms may actually complement domestic investment rather than displace it. However, to be cautious we still take domestic investment stock displacement into consideration.
35. It is doubtful that this way of looking at outward FDI will allay the concerns of the AFL-CIO, Lou Dobbs and other opponents of multinational enterprise operations, who assert that, when US firms move their operations abroad instead of investing in the United States, the result is to stifle US economic growth.
36. These figures do not sum to $188 billion because of rounding.
37. These figures do not sum to $234 billion because of rounding.

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APPENDIX 17A1 TRADE DATA METHODS

Applied Rates

MFN applied tariff rates are the rates that any World Trade Organization (WTO) member (and at times non-WTO members) apply to all non-preferential trade partners – namely, trade with countries that are not linked by a free trade agreement or customs union. The MFN applied tariff figures that are detailed in Table 17.1 (see main text), columns I and II are taken from the Trade Analysis Information System (TRAINS, 2008). The data were retrieved using the World Integrated Trade Solution (WITS) software developed by the World Bank. The TRAINS database is standardised at the Harmonized System (HS) 6-digit level and the rates listed in Tables 17.1 and 17.3 in the main text are the simple averages of rates at this level.

When relevant and available, we include *ad valorem* equivalents of specific tariff rates. Keeping with the methodology of GTAP, *ad valorem* equivalents of specific tariffs are calculated using the United Nations Conference on Trade and Development (UNCTAD) Method 2. This method considers specific tariff rates and import unit values for OECD countries at the HS 6-digit level (FAO, 2004).[1]

Bound Rates

Bound tariff rates are the rates that WTO members agree as the cap for their MFN applied tariff rates. Traditionally countries agree to bind their tariffs either during multilateral trade negotiations, like the current Doha Round, or during their accession process. We use the Uruguay Round raw tariff schedules (accession schedules for China and Taiwan) supplied by the 18 members directly to the WTO. These schedules include both a pre-Uruguay bound rate (usually the Tokyo Round binding) and a post-Uruguay bound rate. In a few cases the tariff schedules require extensive cleaning because the tariffs are not uniformly coded. The United States, for example, lists tariff codes predominantly at the HS 8-digit level; however, in some instances an 8-digit code contains several underlying tariff lines denoted by letters, usually with different tariff rates. We assign the same 8-digit code to all of these underlying codes. Once we have the bound tariff schedules appropriately cleaned at the tariff line level (usually at the HS 8-digit level but occasionally at the 10- or 12-digit level) we collapse the tariffs into the HS 6-digit level and take the simple average of all tariff lines under each 6-digit code.

Countries also have specific bound tariffs. Rather than go through the laborious exercise of calculating our own *ad valorem* equivalents of bound specific rates, we splice into the HS 6-digit bound tariff schedule the *ad valorem* equivalent of MFN applied tariffs from a corresponding time period (*circa* 1990 for pre-Uruguay Round and *circa* 2003 for post-Uruguay Round) whenever there was a specific bound tariff at the tariff line level below any HS 6-digit code. The *ad valorem* equivalents of the MFN applied rates are derived in the same manner as the MFN applied rates discussed above.

Preferential Tariffs

The method used for calculating preferential tariff rates parallels the applied tariff rate method. Using the WITS software and TRAINS database we query effectively applied tariffs, which gives preferential tariffs when they are in effect and MFN applied tariffs otherwise. For this exercise, we used the preferential rates for the United States and its partners under the Mexican and Canadian segments of NAFTA, the Australia–US FTA, and the Singapore–US FTA.

Non-tariff Barriers

Efforts by scholars to estimate *ad valorem* tariff equivalents of NTBs – the data we need to analyse the impact of NTB liberalisation on trade – have been limited. Ferrantino (2006) surveys the work that has been done in this field; Deardorff and Stern (1997) provide an earlier assessment of NTB data work. Creating *ad valorem* equivalents of NTBs involves considerable guesswork. In general, authors try to determine the level of NTB protection from either the wedge between domestic and international prices caused by the NTB, or from the shortfall in expected imports caused by the NTB. The level of sophistication varies widely between estimates, and most efforts have been limited to either a few countries or a few sectors. However, a recent database published by the World Bank created by Kee et al. (2005) provides *ad valorem* equivalents at the HS 6-digit level for over 4,500 commodities for 91 countries. Their approach is to 'predict import [values] using factor endowments and observe [the] deviations in the presence of NTBs' (p. 4). The authors then convert the deviations to price effects to calculate *ad valorem* tariff equivalents of each NTB for each country.

The underlying data for the Kee et al. estimates of *ad valorem* tariff equivalents of NTBs is compiled from the TRAINS NTB database, various WTO Trade Policy Reports, a European Union dataset created by the Groupe d'Économie Mondiale at Science Po (Paris), and notifications from WTO members of their domestic support programmes. The following types of NTBs are included in the analysis: non-automatic licences, quotas, prohibitions, administrative pricing, voluntary export price restraints, variable charges, monopolistic measures, technical regulations and domestic support subsidies. Estimates of *ad valorem* equivalents of NTBs are made for each tariff line for one year for each country using data from the most recent year available. The underlying NTB data roughly corresponds to the year 2000 for every country we consider; other data in their model (for example, tariffs and trade) are more recent. The simple average of tariff line estimates of NTB rates for each of the 17 countries in our analysis is the 'present' NTB rate for each country displayed in Table 17.1 in the main text. For 'past' NTB rates we assume the same rate of change for NTB rates for each country – namely a 51 per cent decrease – from 'past' to 'present'. Therefore, to construct past NTB rates we multiply each country's present rate by 1 divided by $(1 - 0.51)$.

The 51 per cent decrease figure comes from our analysis of the few historical estimates of *ad valorem* equivalents of NTBs. Resource and data limitations rule out replicating the Kee et al. analysis for the past, so we rely on available estimates. Specifically, we create a concordance between past estimates of *ad valorem* equivalents of NTBs by sector with corresponding present estimates, drawing on several sources: for the United States

(Linkins and Acre, 2004), for the European Union (Messerlin 2001), for China (Shuguang et al., 1998), and for Japan (Sazanami et al., 1995). The concordance reveals examples of the change in *ad valorem* equivalents of NTBs from past to present. From these few examples we estimate one rate of change for all NTB protection in every sector and every country from past to present – namely a 51 per cent decline in the level of protection.

Admittedly, this is a very rough approach, but the data limitations for NTBs left few options; we thus caution readers that estimates concerning NTB liberalisation should be considered very rough.

Table 17A1.1 shows the end result of our concordance for the NTB figures. The US and EU estimates have a time dimension; specifically there are estimates from roughly the same source of *ad valorem* equivalents of NTBs from about 1990 and 2000. The Chinese and Japanese estimates are for only one year. To estimate an average change in tariff equivalents of NTBs we consider the change across the US and EU estimates and the change from the Japanese and Chinese estimates to matched estimates derived from the Kee et al. (2005) database. We then calculate a weighted average (weighted by total 1990 imports for each country) from the simple average of percent changes in the tariff equivalents of NTBs for each of the four countries. This arithmetic produces the 51 per cent figure.[2]

Transport Costs

To calculate *ad valorem* equivalents of transport costs we use a database from Hummels (2007) that contains the transport costs and value of US imports from over 100 countries from 1974 to 2004. The database is disaggregated at the leaf level (that is, the most disaggregated level, which is either 4- or 5-digit depending on the good) of the Standard International Trade Classification (SITC) revision 2. We sum up transport costs and the value of imports from each country in every year and divide costs by value to create an *ad valorem* equivalent. We average the rates – from 1979, 1980 and 1981; from 1989, 1990 and 1991; and from 2002, 2003 and 2004 – to control for fluctuations in transport costs. These rates are displayed in Table 17.2.

Comparable data for the transport costs on US exports (that is, imports of the 17 partner countries) would be cumbersome to work with if possible to find. We therefore make the assumption that the past and present estimates of transport costs on US imports from a specific country are identical to past and present transport costs on US exports from that specific country.

Notes

1. The UNCTAD Method 1 for calculating *ad valorem* equivalents of specific tariffs prefers the specific tariff and the national import unit value at the tariff line level (that is, potentially more detailed than the HS 6-digit level). If national import unit values at the tariff line level are not available, the specific tariffs and national import unit values at the HS 6-digit level are used. If the first two options are not available, the specific tariffs and OECD import unit values at the HS 6-digit level are used.
2. We were also able to observe the percent change in the *ad valorem* equivalents of Norwegian NTBs from past to present. Interestingly, the average percent change, namely a 51 per cent decline, was nearly identical to our estimate. This does prove that our estimate is right, but it is an interesting result. The Norwegian data are presented in Deardorff and Stern (1997), and were originally calculated by Holmoy and Haegeland (1995).

Table 17A1.1 Estimates of ad valorem equivalents of non-tariff barriers from various studies

Estimates of the NTBs in the United States (Source: Linkins and Acre, 2004)					
GTAP code	GTAP sector name	1991 NTB AVE	2002 NTB AVE	% change	% point change
5	Oilseeds	10.0	0.0	–100.0	–10.0
6	Raw Sugar	124.8	107.1	–14.2	–17.7
11	Raw Milk	60.3	0.0	–100.0	–60.3
19	Bovine Meat	6.5	1.1	–83.1	–5.4
20	Meat nec	2.6	0.0	–100.0	–2.6
22	Dairy Products	40.9	19.0	–53.5	–21.9
24	Sugar products	10.0	0.0	–99.6	–10.0
26	Beverages and tobacco	13.2	6.9	–47.7	–6.3
27	Textiles	4.5	2.4	–46.5	–2.1
28	Apparel	5.9	2.4	–60.2	–3.6
29	Leather products	2.6	0.0	–100.0	–2.6
	Average			–73.2	
Estimates of the NTBs in the European Union (Source: Messerlin, 2001)					
GTAP code	GTAP sector name	1990 NTB AVE	1999 NTB AVE	% change	% point change
3	Cereals (excluding rice)	63.0	5.0	–92.1	–58.0
4	Vegetable, fruits, nuts	10.5	11.2	6.7	0.7
19	Bovine meat	74.0	64.8	–12.4	–9.2
22	Dairy products	104.0	100.3	–3.6	–3.7
24	Sugar products	117.0	125.0	6.8	8.0
25	Food products nec	15.0	5.0	–66.7	–10.0
26	Beverages and tobacco	5.0	5.0	0.0	0.0
27	Textiles	11.0	8.0	–27.3	–3.0
28	Apparel	12.0	19.0	58.3	7.0
29	Leather products	5.0	5.0	0.0	0.0
35	Ferrous metals	15.0	4.0	–73.3	–11.0
38	Motor vehicles	6.1	4.0	–34.4	–2.1
42	Other industries	2.0	2.0	0.0	0.0
	Average			–18.3	
Estimates of the NTBs in China (Source: Shuguang et al. 1998 and Kee et al. 2005)					
GTAP code	GTAP sector name	1994 NTB AVE	2001 NTB AVE	% change	% point change
2	Wheat	72.4	34.4	–52.4	–38.0
21	Vegetable oils and fats	88.6	14.1	–84.1	–74.5
24	Sugar products	111.4	39.9	–64.1	–71.5
26	Beverages and tobacco	40.6	6.3	–84.6	–34.3
27	Textiles	7.0	4.1	–41.1	–2.9
27/28	Textiles/apparel	4.2	3.0	–28.3	–1.2
30	Wood products	26.1	1.9	–92.7	–24.2
32	Petroleum and related products	20.5	42.0	104.5	21.5
33	Chemicals, plastic, rubber	27.5	5.8	–79.0	–21.7

Table 17A1.1 (continued)

GTAP code	GTAP sector name	1994 NTB AVE	2001 NTB AVE	% change	% point change
36/37	Metals/metal products	8.4	4.3	–49.0	–4.1
37	Metal products	23.8	0.4	–98.3	–23.4
38	Motor vehicles	24.2	17.4	–28.0	–6.8
39	Transport equipment	11.2	5.3	–53.1	–5.9
40	Electrical equipment	19.7	4.9	–75.3	–14.8
41	Machinery nec	14.7	5.6	–62.2	–9.1
	Average			–52.5	
Estimates of NTBs in Japan (Source: Sazanami 1995 and Kee et al. 2005)					
GTAP code	GTAP sector name	1989 NTB AVE	2001 NTB AVE	% change	% point change
2	Wheat	477.8	28.8	–94.0	–449.0
4	Vegetable, fruits, nuts	117.8	35.0	–70.3	–82.8
5	Oilseeds	526.1	30.5	–94.2	–495.6
17	Gas	113.4	53.0	–53.2	–60.4
19/20	Bovine meat/meat nec	63.2	37.4	–40.8	–25.8
22	Dairy products	211.0	69.5	–67.0	–141.5
23	Processed rice	737.1	27.1	–96.3	–710.0
25	Food products nec	266.0	34.3	–87.1	–231.7
26	Beverages and tobacco products	246.1	22.6	–90.8	–223.6
27	Textiles	17.2	15.5	–9.9	–1.7
28	Apparel	144.8	0.6	–99.6	–144.2
30	Wood products	19.1	1.3	–93.1	–17.8
31	Paper products	18.8	2.3	–87.6	–16.5
32	Petroleum and related products	223.5	13.6	–93.9	–209.9
33	Chemicals, plastic, rubber	157.2	6.9	–95.6	–150.3
36/37	Metals/metal products	68.0	2.8	–95.9	–65.5
40	Electrical equipment	256.5	13.3	–94.8	–243.2
41	Machinery nec	45.8	7.1	–84.6	–38.7
	Average			–80.5	
Four country weighted average of averages (based on total 1990 imports, not shown)				–51.1	

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APPENDIX 17A2 RATIONALE BEHIND SELECTED INDUSTRIES

Efforts to measure FDI restrictions across industries have been limited, and very little work has been aimed at measuring the change in restrictions over time. Scholars have been deterred by the laborious and imprecise task of categorising the restrictiveness of FDI policies. Unlike tariffs on merchandise imports, which are reported according to standard HTS codes, no such classification exists for evaluating the impact of FDI policies on investment flows. For example, it is hard to judge how much investment is deterred by a policy that requires a majority of the board of directors to be nationals of the FDI host country.

Brushing these conceptual difficulties aside, we draw on the work of Stephen Golub (2003) to identify industries where policy liberalisation has had a significant impact on the expansion of US outward FDI. His index figures are plagued with the same problems that visit any effort to measure FDI restrictions, but his work has the advantage of covering several industries over time and across countries. This allows us to identify industries where restrictions were materially eased over the last 25 years. To calculate the index for a specific industry, Golub combines country-specific GATS (General Agreement on Trade in Services) commitments and OECD commitments with various official sources (for example, USTR) and corporate sources (for example, PricewaterhouseCoopers). Golub's index ranges between zero and one, with an index score of one indicating the most restrictive FDI policies.

Table 17A2.1 shows the average FDI restrictiveness indexes for 20 OECD countries, in selected years between 1981 and 2005, for several industries. Restrictions have been significantly eased on telecommunications, finance (both insurance and banking), electric utilities and transport. Restrictions have been eased only slightly for business services, construction, distribution, tourism and manufacturing. These changes inform our selection of industries where policy liberalisation positively affected US outward FDI; Table 17.11 in the main text lists the industries in question. We list the petroleum industry as an industry where policy changes had a *negative* effect on US outward FDI. Golub did not cover the petroleum industry, but measures taken by various national oil companies against the 'seven sister' oil companies were severe over the past 25 years.

While Golub's dataset covers the United States, his indexes show little change in US restrictiveness between 1981 and 2005. This is mostly because explicit US FDI policies – the ones covered in Golub's indexes – have not changed much since 1981. However, drastic policy and regulatory changes – like the Bell Telephone breakup or electric utility deregulation – have taken place in a few US industries. In our opinion, these changes have exerted a positive influence on FDI to the United States since 1982.

Table 17.11 lists the affected industries. Transport equipment is included because the US government basically changed course in the 1980s and permitted large-scale investment by Japanese automakers. Banking, finance and insurance are included because of various legislative acts that liberalised the financial sector, most notably the Foreign Bank Supervision and Enhancement Act of 1991 and the Financial Services Modernization Act of 1999 (Tschoegl, 2003). Utilities are included largely because of the reforms under the Public Utility Regulatory Policies Act of 1978 and the Energy Policy Act of 1992 (USNRC, 2004). The communications industry is included because of the Bell

Table 17A2.1 Average FDI restrictiveness indexes for 20 OECD countries, 0 to 1 scale (1 = most restrictive)

Industry	1981	1986	1991	1998	2005	1981 to 2005 change
Legal business services	0.20	0.22	0.20	0.10	0.10	–0.10
Accounting business services	0.21	0.25	0.21	0.12	0.12	–0.09
Architecture business services	0.14	0.17	0.14	0.08	0.08	–0.06
Engineering business services	0.15	0.17	0.15	0.09	0.09	–0.06
Total business services	0.18	0.21	0.18	0.10	0.10	–0.08
Fixed telecommunications	0.82	0.90	0.82	0.34	0.20	–0.62
Mobile telecommunications	0.62	0.79	0.62	0.15	0.12	–0.50
Total telecommunications	0.77	0.87	0.77	0.29	0.18	–0.59
Construction	0.14	0.16	0.14	0.08	0.08	–0.06
Distribution	0.19	0.20	0.19	0.12	0.12	–0.06
Insurance	0.27	0.31	0.27	0.15	0.14	–0.13
Banking	0.30	0.45	0.30	0.13	0.13	–0.17
Total finance	0.29	0.42	0.29	0.14	0.13	–0.16
Tourism	0.14	0.15	0.14	0.08	0.08	–0.06
Air transport	0.63	0.76	0.63	0.37	0.32	–0.31
Maritime transport	0.41	0.49	0.41	0.29	0.26	–0.15
Road transport	0.55	0.58	0.55	0.22	0.14	–0.40
Total transport	0.51	0.60	0.51	0.30	0.25	–0.26
Electric utilities	0.79	0.80	0.79	0.72	0.51	–0.28
Manufacturing	0.14	0.16	0.14	0.08	0.08	–0.06

Note: The included countries are Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Japan, the Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, and the United Kingdom. The index scores presented here are the simple averages of the individual countries' indexes for each industry.

Source: Golub (2003); authors' calculations.

Telephone divestiture, effective in 1984, and the reforms under the Telecommunications Act of 1996 (USFCC, 2004; AT&T, 2008). Transport is included because of the various deregulations that occurred in the 1980s, most notably the Aviation Deregulation Act of 1978, the Motor Carrier Act of 1980, the Staggers Rail Act of 1980, and the Ocean Shipping Act of 1984 (USDOT, 2005). The full effect of these transport deregulations were not fully realised until after the first year of our analysis, 1982.

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APPENDIX 17A3 KELLER AND YEAPLE CALCULATIONS

The 11 per cent estimate by Keller and Yeaple (2005) rests on the estimated coefficients of the variables used to gauge the FDI spillover effect of foreign MNEs. The authors find a positive impact (coefficient of 0.213) for the increase in the share of foreign employment in firm *i*'s industry in the current year on firm *i*'s productivity growth for the year. They find a similar impact (coefficient of 0.303) for the increase in the share of foreign employment in firm *i*'s industry in the previous year – that is, a one-year lag – on firm *i*'s productivity growth in the current year. Keller and Yeaple also test for a two-year lag effect, and report a coefficient that is negative but insignificant. The authors conclude that the total impact of foreign employment in a firm's industry on that specific firm's TFP can be summarised by a coefficient of 0.516 (0.203 + 0.313). The '0.516 coefficient' says that if foreign employment in a firm's industry increased by 10 percentage points (for example, from 0.15 to 0.25) that firm's productivity would increase by 0.516 times 10 per cent or 0.0516 (that is, 5.2 per cent).

Keller and Yeaple use the 0.516 coefficient to estimate the impact of inward FDI on productivity growth in US manufacturing over the length of their sample (from 1987 to 1996). They multiply 0.516 times the percentage point increase in foreign employment in US manufacturing between 1987 and 1996 (4.0 percentage points) divided by the average TFP increase among the 1,277 US manufacturing firms in their sample (19 per cent). From this calculation (namely 0.516*0.04/0.19) the authors conclude that roughly 11 per cent of the growth in US manufacturing productivity between 1987 and 1996 can be explained by the spillover effect from inward FDI.

We extend Keller and Yeaple's analysis to the whole economy and to a longer time period in order to estimate the gain from policy-induced US inward FDI growth over the last 25 years. First, we apply the 0.516 coefficient, estimated from the experience in US manufacturing, to the whole private US economy.[1] Second, we replace their productivity growth estimate (namely 19 per cent for the average manufacturing firm between 1987 and 1996) with an estimate of TFP growth for the entire economy between 1982 and 2006 (namely 30 per cent).[2] Third, we replace their 'change in foreign employment' in US manufacturing (namely 4.0 per centage points) with a broader figure: the change in the share of foreign employment in the whole private US economy between 1982 and 2005 (namely 1.24 percentage points).[3]

Using these figures we can apply Keller and Yeaple's approach to calculate benefits for the full 25-year time period and whole private US economy. The resulting estimate is that approximately 2.14 per cent of the increase in US TFP between 1982 and 2006 can be explained by the total increase in the US inward FDI. The calculation is: 0.516*0.0124/0.30 = 0.0214.

Notes

1. This is a bold extrapolation, but many of the avenues for technological spillovers in the manufacturing sector are present in other private sectors as well. Keller and Yeaple (2005) conjecture that, within manufacturing, spillovers are more likely in industries that develop proprietary knowledge, and proprietary knowledge is certainly prominent in advanced service industries. Keller and Yeaple report that the estimated spillover effect is significant in manufacturing industries with high R&D intensity, but insignificant in industries with low R&D intensity.

2. Based on OECD (2008), since US TFP data were only available from 1985 to 2006, we use the average growth rate over this period to obtain a TFP growth figure between 1982 and 2006. The source refers to TFP as multifactor productivity.
3. We use non-bank foreign affiliate data for 1982 and 2005, bank foreign affiliate data for 1980 and 2002, and total US private employment figures for 1982 and 2005. Bank foreign affiliate data is only collected by the Bureau of Economic Analysis during their benchmark surveys, which are completed about every 5 years. Using these figures we find the share of foreign employment (by majority-owned foreign firms) in the whole private US economy was about 4.67 per cent in 2005, up from 3.43 per cent in 1982.

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18 GATT/WTO membership and its effect on trade: where do we stand?

*Andrew K. Rose**

1 INTRODUCTION

In 2002 I began to work on the effects of the World Trade Organization (WTO) and its predecessor the General Agreement on Tariffs and Trade (GATT).[1] I was interested in quantifying the effects of membership in these multilateral trade organisations on international trade. I fully expected to find a large positive effect, and was primarily interested in comparing this to the effects of other things that enhanced trade (particularly the effects of currency unions). However, I was astonished to find that a naive look at the data yielded little evidence that membership in the GATT/WTO had an effect on trade that was either economically or statistically substantive. In this chapter, I review the state of the small literature that developed around this issue, as of April 2006.

This chapter is structured as follows. Section 2 reviews the author's contribution, Sections 3–5 raise key criticisms of the author's work: excessive pooling; fixed effects and variation across countries and time; and selection bias. Sections 6–8 issue various challenges to the critics: beyond bilateral trade flows; beyond trade flows; and what does the WTO do? Section 9 concludes.

2 WHAT I DID

My initial (2004a) entrée used bilateral data to estimate the effect of membership in the GATT/WTO on trade. Since this paper has generated the most heat, it is worth explaining my methodology a little. I used a standard 'gravity' model of bilateral trade augmented with additional controls:

$$\ln(T_{ijt}) = \beta_D \ln D_{ij} + \beta_Y \ln(Y_i Y_j)_t + \beta_X X_{ijt} + \gamma_1 Bothin_{ijt} + \gamma_2 Onein_{ijt} + \varepsilon_{ijt} \qquad (18.1)$$

where: the regressand (T) is (real) trade between countries i and j at year t, D denotes great-circle distance between the countries, Y denotes real GDP, X denotes a vector of other controls (population, dummies for common language, money, and border, geographic characteristics, colonial characteristics, time dummies, and so forth), $\{\beta\}$ denotes a set of nuisance coefficients, and ε is a (hopefully well-behaved) residual. The coefficients of interest to me were γ_1 (especially) and γ_2, which measure the effects on trade of GATT/WTO membership by both countries and one country, respectively, *ceteris paribus*.

I estimated $\{\gamma\}$ in my benchmark regressions with ordinary least squares (OLS) using a large panel of data covering over 50 years of data and 175 countries. To my surprise,

I found that both coefficients were economically small and statistically insignificant (estimates are tabulated below). I also convinced myself that the results seemed to be insensitive to the exact econometric assumptions I made; more on that below. In passing, I also used multilateral data and event studies to verify the same points; more on that too, later.

For a while I did not understand this negative result or think it plausible; it struck me as odd that membership in as apparently important an institution as the WTO could have a negligible impact on trade. But thanks to a moment of inspiration provided by my son, I realised that if GATT/WTO membership had little effect on trade *policy*, it might also have little effect on trade *flows*.[2] Accordingly, I checked out this explanation in Rose (2004b). In that paper, I used almost 70 measures of trade policy and liberalisation – all that I could find – to see if membership in the GATT/WTO was actually associated with more liberal trade policy. With one exception – the Heritage Foundation's index of economic freedom – the answer was a resounding no; members of the GATT/WTO just did not seem to have measurably more liberal trade policy than outsiders. This was consistent with my initial results on actual trade flows; it also seems to twin with the notions of many colleagues, as I discovered in subsequent presentations.

I also wrote two more narrowly focused follow-ups on the topic. Since some think that a big part of membership in the GATT/WTO concerns the stability and predictability of trade policy, in Rose (2005a), I examined the second moment of trade flows, not their first moment. Again, I found little evidence of any large membership effect. In Rose (2005b), I compared the GATT/WTO with two other significant international institutions that are in the business of liberalising trade, the International Monetary Fund (IMF) and the Organisation for Economic Cooperation and Development (OECD). I found that membership in the OECD had a consistently large positive effect while accession to (but not membership in) the GATT/WTO was also associated with increased trade. The latter effect stems from inclusion of country or country-pair specific fixed effects; more on that below.

In passing, I note that essentially all of the critiques to my work focus on my 2004a paper; no one, to the best of my knowledge, has investigated the follow-up papers. This is unfortunate; to me, their consistency provides a reassuring part of the larger story.

What I Did Not Do (and No one Can)

I do not want to claim that the existence of the GATT/WTO has been irrelevant to trade or trade policy. No reasonable person could ever claim that, for a somewhat metaphysical reason. The GATT/WTO *could* have acted as an international provider of public goods in the form of providing global trade policy that is more liberal than it would have been in the absence of the system. One can never test this hypothesis, since we have only experienced (even in California) one history. Since there is no post-war span of time without the GATT/WTO, the counterfactual is not measurable; thus the basic idea cannot be tested or rejected. The GATT/WTO *could* have acted as a 'globo-cop', providing more liberal trade to *all* the world, independent of membership. This does not strike me as a plausible idea; why the fuss over, for example, China's accession to the WTO? In any case, since this topic is intrinsically untestable, I do not consider it to be interesting. Accordingly, the literature has stuck to a testable notion, namely the effect

of membership in the GATT/WTO on trade. Since there is a lot of variation across both countries and time on this, estimating the effect of membership on trade is completely feasible.

Quick Survey of the Preceding Literature

What happened afterwards

Generally, I have succeeded in my objective; there is now a small but growing body of scholarly research that investigates the impact of the international trade institutions on trade. Of course, it is early days, there is much dispute, and more remains to be done: as Evenett (2005, p. 1) writes: 'we know much less about the effects of WTO accession than we probably should . . . Generally, little is known about the effects of WTO accession on developing countries . . . The scholarly community is not alone in its lack of attention to WTO accession matters'. But at least we have started.

And a propos, I want to thank my critics. To have a critique published on one's paper is a high honour. Only those who care, actually take the pains to work on a dispute.

Reasons why I might be right

In the remainder of this chapter, I shall respond to my critics, organising my thoughts by theme rather than paper.[3] But before I go into defensive mode, let me lay out a few reasons why you might conceivably think I am right, namely that membership in the GATT/WTO does not deliver more trade. These facts are mostly conventional wisdom that lie beyond the narrow confines of econometric estimates:

1. *Developing countries* There is essentially universal agreement that the GATT historically made few demands on most countries in terms of trade liberalisation, since most entrants were developing countries eligible for 'special and differential treatment' (references are below). The GATT/WTO has always been a relatively toothless institution (by design), and has few levers to encourage liberalisation. If accession to the GATT/WTO does not force countries to liberalise, why should one expect accession to have a measurable impact on trade? And if accession is not the time when the GATT/WTO forced countries to liberalise, is the GATT/WTO really an effective agent of liberalisation?
2. *Sectors* The GATT/WTO has made almost no progress in liberalising areas of great protectionism, such as agriculture and textiles.
3. *MFN status* Most favoured nation (MFN) status might seem like the great prize of GATT/WTO membership. It turns out that MFN status is often given away freely.[4]
4. *NTBs* Tariffs have been lowered by developed countries under the auspices of the GATT. But most are also well aware of the (deplorable) fact that non-tariff barriers have often been increased as substitute protectionism.
5. *Liberalisation and accession* In the voluminous and controversial literature on trade and growth, no scholar, to my knowledge, has ever dated trade liberalisation with GATT/WTO accession. If accession means liberalisation and trade growth, why has no one ever tried to discover whether growth follows accession? Simple: liberalisation dates have little to do with GATT/WTO accession.

Table 18.1 Replicating the impact of joint GATT/WTO membership on bilateral trade

Source	γ_1 (se)	Notes
Rose (2004a)	–0.04 (0.05)	Table 1, default
Subramanian and Wei (2006)	–0.25 (0.04)	Imports, Table 6 col. 1
Tomz et al. (2005)	–0.17 (0.03)	Table 2, col. 2
Liu (2006)	–0.08 (0.01)	Table 2, positive trade
Felbermayr and Kohler (2005)	0.09 (0.08)	Table 2, intensive margin
Leeson (2005)	0.12 (0.06)	Table 2, default
Gowa and Kim (2006)	0.04 (0.03)	Table 1, col. 2.

6. Ceteris non paribus There are many other reasons why trade has grown, including declining transport/communication costs, higher productivity growth in tradables, and so forth.

Replication

I note in passing that a number of others have been able to confirm my benchmark results. A quick tabulation of γ1 coefficients estimated in a manner similar to (18.1) is presented in Table 18.1. A number of these are negative; none is significantly positive. The primary objective of a number of these projects was not the relevance of the GATT/WTO. For instance, Felbermayr and Kohler (2005) are primarily interested in resolving the 'distance puzzle' of an elasticity of bilateral trade with respect to distance that seems to be increasing over time.[5] Leeson (2005) is primarily interested in the importance of the New York Convention for trade. I conclude that plain vanilla estimation of the effect of GATT/WTO membership on bilateral trade does not deliver a large positive effect; one has to look more subtly for that result.

Reasons why I might be wrong

There are three key criticisms of my work: inappropriate data pooling; inappropriate handling of fixed effects; and selection bias. Below, I summarise the arguments and respond. Then I present a few challenges to my opponents.

Piermartini and Teh (2005, pp. 47–9) provide an alternative summary of different criticisms of my work. These include:

1. the fact that the GATT did not require significant reductions in trade barriers for developing countries acceding before the creation of the WTO in 1995;
2. the fact that transition periods for tariff reductions are allowed;
3. the fact that many countries already benefited from MFN before accession;
4. the fact that many countries liberalised beforehand in order to facilitate accession; and
5. the fact that less-developed countries (LDCs) often export fuels and minerals which face little protectionism (although agriculture, in which they have a comparative advantage, does).
6. Finally, the first five facts imply that the impact of membership should be higher in developed countries.

They also summarise the work of others, especially Tomz et al. (2005), Subramanian and Wei (2006), and the work of authors concerned with zero-trade observations. See also Evenett et al. (2004) and Evenett and Gage (2005). I have collected some key estimates of the effect of GATT/WTO membership on trade in Appendix Table 18A.1.

3 CRITICISM 1: EXCESSIVE POOLING

A number of my critics have argued that looking at all trade simultaneously masks the effects of the GATT/WTO. The fine work of Subramanian and Wei (2006) is especially forceful on this point. Their argument is that if you disentangle by country/time/sector and so on, you can find significant trade effects of membership for subsets of the data.[6] Subramanian and Wei show convincingly that different pieces of the data can certainly deliver significant and plausible effects of membership on trade.

This is certainly a serious critique, but I am not sure that it is a wholly legitimate argument. What do we learn when we study the trade patterns of countries and sectors that have liberalised, and ignore those that have not? Subramanian and Wei claim that the GATT/WTO has been successful, since there has been liberalisation by some countries in some sectors over some periods of time. Why cannot we equally declare failure since most countries have not liberalised most of their trade by now? To put it a different way, the GATT has worked well, if you ignore the countries, sectors and times when it has not. We are all agreed that if its failures are ignored, the GATT/WTO has been successful. But that is hardly a ringing endorsement of the institution.

Pooling Across Countries

There are two critiques of relevance here, both associated with handling developing countries. The view of many, most notably Subramanian and Wei (2006), is that the GATT was essentially a club for developed countries.[7] Subramanian and Wei argue that by including developing countries that are GATT members technically but not in spirit, I have rigged the analysis to make the GATT look irrelevant. Combining data on developing and developed countries masks the impact of the GATT on the latter. Their powerful conclusion is that the GATT/WTO has more than doubled global trade, much more than a statistical nicety.

On the other hand, Tomz et al. (2005) argue that some developing countries informally participated in the GATT and seemed to trade more than outsiders. Their statistical analysis relies on a carefully constructed dataset that includes not only formal members of the GATT, but also a number of other categories for countries that participated in other capacities. Their argument is that I ignored these informal GATT participants, and thus underestimated its impact. So while Subramanian and Wei criticise me for including any developing countries at all, Tomz et al. say the opposite, which strikes me as odd, at least prima facie. Their view is that the relevance of the GATT can be rescued *only* by including developing countries, in particular those that are not formally members, but are in spirit. Both critiques are well-crafted and serious, but it is hard to see how they can both be right simultaneously.[8]

I prefer the Subramanian and Wei interpretation, since Tomz et al. seem incongruous

with the literature.[9] Let me include a couple of typical excerpts that illustrate my discomfort. In *Free Trade Agreements*, Schott states (2004, pp 9–10):

> Why are developing countries so interested in FTAs? In the past, these countries were able to obtain improved access to industrial markets through GATT negotiations that did not require them to reciprocate by opening their own markets to foreign competition. While useful, prior GATT rounds had two major shortcomings: they did not prompt policy changes in developing countries that would induce adequate flows of investment and transfers of technology (apart from extractive industries), and competitive agricultural and manufactured exports of developing countries often were excluded from the reforms. In short, developing countries were free riders on the GATT system until the Uruguay Round, but derived only modest benefits from their own minimal contributions to GATT negotiations. They protected their own markets, but in turn had to accept the maintenance of high foreign trade barriers against their most competitive exports.

Alternatively, Krueger writes in the introduction to *The WTO as an International Organization* (2000, p. 7):

> Developing countries' attitudes and trade policies during the 1950s and 1960s generally resulted in heightened walls of protection as industrialization through 'import substitution' was attempted. That generally meant that developing countries were not benefiting as much as they might have from the growth of the world economy, while the 'balance-of-payments' provisions of the GATT were liberally interpreted to enable developing countries to maintain quantitative restrictions, often including import prohibitions, on their imports. Moreover, the GATT articles were amended in the early 1960s to provide non-reciprocal preferential treatment of imports from those countries. One consequence was that developing countries (the East Asian newly industrializing countries being a prominent exception) were losing shares of their world markets.

It is worth stressing that developing countries really are key to Tomz et al. The second row of their Table 4 indicates that GATT participation has a statistically weak (though positive) effect on trade when you look only at industrial countries. The effect is significant only when you include developing countries.

Another uncomfortable feature of the results of Tomz et al., is that *informal participation* in the GATT consistently matters more for trade than *formal membership*. This does not seem wholly plausible to me (at least not without some explanation), and is a cause for concern. I simply do not understand why informal participation could create more trade than actual membership in the GATT. This is especially true in light of the recent work by Tang and Wei (2006) who show that more rigorous entry requirements for WTO membership are associated with better results.

So I do not really accept the argument of Tomz et al. that reclassifying certain developing countries as informal GATT participants can rescue the importance of the institution. That said, it seems inappropriate to ignore developing countries. There seems to be little doubt that the GATT made little impact on the trade policy of many developing countries. Personally, I think this cannot be counted as an indicator of the institution's success, so really I just disagree with the interpretation of Subramanian and Wei.

Time and Industries

Just as Subramanian and Wei argue that I inappropriately bundle together developing and developed countries, they also argue that aggregating across sectors of the economy

can disguise the true effectiveness of the GATT/WTO. In particular, they argue that key sectors (critically agriculture, but also textiles, clothing and footwear) have not been included in the GATT's liberalisation efforts, so that including these industries in the analysis gives a false impression that the institution has been ineffective.

Again, my interpretation is different. Agricultural produce is highly tradable, and has historically been the battleground for commercial policy. The beginning of the modern era of commercial policy is commonly considered to be the repeal of the British 'Corn Laws' while the failure to liberalise agriculture remains a key reason why the Doha Round has thus far met with limited success. If the GATT/WTO has been such a successful liberaliser, it does not seem legitimate simply to ignore its failures in agriculture.[10]

On aggregation over time, I have little to say. I hope that the WTO (established to succeed the GATT in 1995) has been and will be a more effective liberaliser than the GATT. Nevertheless, I have not been able to see it in the data myself.[11] Is China the new norm (and if it sticks to the spirit of its accession deal), or the exception? I think we need more time and more post-GATT accessions to resolve this issue. The preliminary evidence, as summarised in, for example, Drabek and Bacchetta (2004) and Ferrantino (2006) exists, but seems rather weak. Tang and Wei (2006) have found positive results of recent WTO entry on growth and investment, though they do not look directly at trade.

4 CRITICISM 2: FIXED EFFECTS AND VARIATION ACROSS COUNTRIES AND TIME

A number of my critics note that most of my regressions do not include country-specific fixed effects in my gravity equations. When I did include them (in the *first* table of my paper!), the point estimate for the effect of joint membership in the GATT/WTO on trade was 0.15 (robust standard error of 0.05), implying that two countries inside the GATT/WTO trade about 16 per cent more, *ceteris paribus*.[12] I dismissed this as 'small compared to other effects (e.g., regional trade associations), the long-term growth of trade, intuition, and the hype surrounding the GATT/WTO'. That still seems right to me.

Many of my critics include fixed effects for either countries or country pairs, thus using only time-series variation, the 'within' estimator. They usually find significantly positive estimates of the effect of membership on trade. Since the within estimator does not use variation across countries, these estimates answer the question 'What is the effect of accession to the GATT/WTO on trade *ceteris paribus*?' Hausman tests can be used to test the equality of the time series within and cross-sectional 'between' estimators. They typically reject equality of the two, so relying exclusively on OLS estimates (which assume equality) is statistically problematic. So while membership in the institution (which is partly a cross-sectional question) may not have a big positive effect on trade, joining it may (the latter is a time-series issue).

A couple of questions in passing. Using the within estimator is tricky, since liberalisation may not coincide with accession. There are at least two reasons, both well known. First, countries may liberalise *beforehand* in order to facilitate accession.[13] Second,

joining members are often granted phase-ins so that liberalisation may instead *follow* accession. A different issue altogether is whether the gravity model works well with fixed effects. Many coefficients change a lot when fixed effects are included. For instance, many of the GDP terms seem small.[14]

The more important question is how to interpret the evidence. I think we learn something from comparing the trade of members and non-members in the cross-section. That is, even if the within estimate is not equal to the between estimate, the latter should not be discarded. Cross-sectional estimates often indicate a *negative* insignificant effect of GATT/WTO membership on trade. For instance, in my 2004a paper, I found the cross-sectional estimator of γ_1 to be –0.50 (with a standard error of 0.21), while Tomz et al. (2005) estimated it to be –0.51 (0.24). I have still not heard a good explanation of why such findings are consistent with an important role for the GATT/WTO in stimulating trade.[15]

5 CRITICISM 3: SELECTION BIAS

In Rose (2004a), I followed the tradition in the field in essentially ignoring observations where there was no trade between a pair of countries. I reported some cursory Tobit estimates, but did not really try to model or understand country pairs with zero trade. That turns out to be a potentially serious issue if countries that belong to the GATT/WTO systematically trade with more countries than they otherwise would. That is, I did not explicitly deal with the *extensive* margin of trade (whether a pair of countries trades at all), instead focusing on the *intensive* margin (that is, how non-zero trade varies across pairs of countries). Three papers have emerged since then that focus on this interesting and potentially important problem: Felbermayr and Kohler (2005), Helpman et al. (2005) and Liu (2006). Each argues that members of the GATT/WTO have systematically more trading relationships, so that ignoring the effect of membership on the extensive trade margin leads one to underestimate the impact of the GATT/WTO. This has been a fruitful insight and is a promising area of research. It has led to a number of different econometric techniques for handling the intensive and extensive margins of trade simultaneously.

The reason why I basically ignored the zero trade observations was not silly, and is worth stating. My view was that missing regressor data (especially for GDP, which seemed vital for an empirical gravity model) was more important than censoring the dependent variable.[16] Now you can do without country-specific variables (such as GDP) in certain models; that is one of the nice features of Helpman et al. or any other technique that includes time-varying country-specific fixed effects. But for others working in the area, missing regressor observations seems to be an issue; for example, Felbermayr and Kohler, and my original work.

Whether modelling the extensive margin of trade turns out to be important is unclear. If you add up the number of observations where a pair of countries actually trades and divide it by the number of potential bilateral trade relationships, you get a small number (for example, Helpman et al. show that only around half of all potential country pairs actually trade). But that treats all trade relationships the same. If you weight by GDP or population, the ratios probably look much larger. Helpman et al. (2005, p. 6) write

'the enlargement of the set of trading countries did not contribute in a major way to the growth of world trade'. Liu (2006) disputes this conclusion, since he finds that much of the trade growth occurred between trading partners that did not trade in 1948.[17] Currently, it is unclear to me just how important this issue is in practice.

There are at least a couple of other issues in the area. Some of the gravity effects estimated with the newer models seem to have changed a lot, at least to me. It would also be interesting to see the effects of Tomz et al.'s informal participation combined with the careful selection bias techniques that have been developed.

Nevertheless, the GATT/WTO may well have played an important role in fostering the development of trade linkages that might not have existed in its absence. I expect further work on this issue in the future, but consider it to be a serious criticism of my initial analysis.

6 CHALLENGE 1: BEYOND BILATERAL TRADE FLOWS

Many of my critics argue that the GATT/WTO has liberalised trade flows, if one looks carefully at *bilateral* data. Are these results apparent in *multilateral* data? My finding of a non-effect of GATT/WTO membership on trade seems to be apparent in the data, at least to me. In Rose (2004a), I presented both event studies and regression results that delivered basically the same result as my bilateral work. The question is: does GATT/WTO membership raise trade when we look at aggregate trade data appropriately? This is an interesting and important question that my critics have thus far not pursued (or at least not presented in print).

To make this all a little more concrete, in Table 18.2 I present some multilateral results that have been taken from Rose (2004a). These examine the determinants of a country's trade with the rest of the world (rather than a country's trade with an individual trading partner, as in a bilateral gravity model). When I look at the results, I see no big impact of GATT/WTO membership on trade.[18]

In Figure 18.1 I also present a set of four event studies, similarly lifted from Rose (2004a). These examine aggregate openness – the ratio of export plus imports to GDP – around the dates of GATT/WTO entry. I show raw openness in the top-left figure. The other three are analogous, but portray the residuals once openness has been regressed on the natural logarithms of both real GDP and real GDP per capita, and different fixed effects. Again, there is little evidence that GATT/WTO entry has a strong significant effect on the ratio of aggregate trade to GDP in any of the figures.

Here is the first challenge to my critics: if the GATT/WTO matters, where is the evidence that it affects multilateral trade? Man does not live by the gravity model alone.

7 CHALLENGE 2: BEYOND TRADE FLOWS

If the GATT/WTO has liberalised trade, one might imagine that this should be visible in measures of trade *policy* as well as trade. Looking at the success of the GATT/WTO by relying completely on trade *outcomes* is problematic since there are many determinants

Table 18.2 Aggregate openness and the GATT/WTO

	Member of GATT/WTO	Log Real GDP p/c	Log Pop	Remoteness	R^2
	–0.11				0.12
	(0.02)				
	–0.01	0.13	–0.22	–1.86	0.53
	(0.01)	(0.01)	(0.004)	(0.39)	
With extra controls*	–0.00	0.13	–0.16	–0.51	0.56
	(0.01)	(0.01)	(0.006)	(0.44)	
Without year effects	–0.01				0.00
	(0.02)				
Without year effects	0.032	0.16	–0.21	–5.92	0.47
	(0.014)	(0.01)	(0.003)	(0.34)	
Without year effects, extra controls*	0.006	0.15	–0.14	–4.96	0.51
	(0.015)	(0.01)	(0.006)	(0.39)	
Level of openness	–5.95				0.08
	(1.12)				
Level of openness	–0.21	9.61	–12.63	82.5	0.40
	(0.92)	(0.52)	(0.26)	(33.2)	
Level of openness, extra controls*	–0.58	9.65	–4.59	243.0	0.48
	(1.01)	(0.50)	(0.59)	(36.0)	
Remoteness using levels	0.00	0.12	–0.22	–1547.0	0.53
	(0.01)	(0.01)	(0.004)	(390.0)	

Notes
Regressand: log of openness (i.e., ratio of exports plus imports to GDP in percent) unless noted.
Data from PWT6; 158 countries, 1950–1998; 5,499 observations unless noted.
OLS with year effects (intercepts not reported).
Robust standard errors in parentheses.
* 'Extra Controls' are: (a) currency union dummy; (b) dependency dummy; (c) log of area; (d) island dummy; and (e) landlocked dummy. Extra controls reduce observations to 4,803.

of trade. It is difficult to measure trade policy, so one should be careful; but surely more noisy indications of the GATT/WTO's success are better than fewer? I analysed trade policy in Rose (2004b) and found almost no differences in a variety of measures of trade policy between GATT/WTO members and non-members. Again, I think it is incumbent on my critics to examine trade policy and show why my analysis is wrong or misleading.[19]

Table 18.3 shows the weak linkages between measures of trade policy and membership in the GATT/WTO. This is simply taken from my 2004b paper; interested readers can refer to that paper for further details. I also present in Figure 18.2 some analogous event studies, again taken from Rose (2004b). There is little evidence that GATT/WTO entry has a strong significant effect on trade policy.

My second challenge is: where is the convincing evidence that membership in the GATT/WTO has affected trade policy?

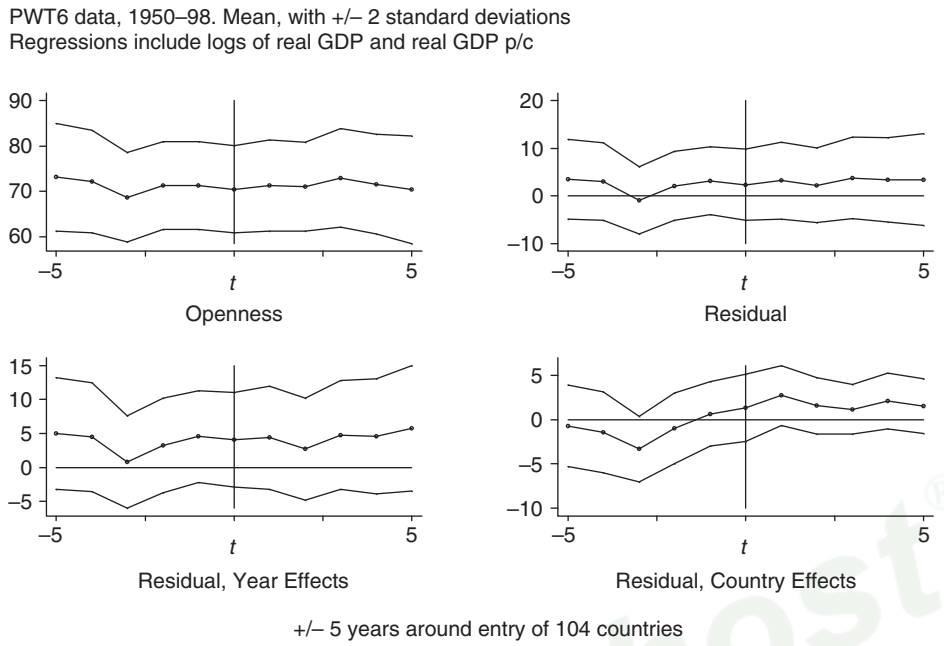

Figure 18.1 Effect of GATT/WTO entry on aggregate openness $(X + M)/Y$

8 CHALLENGE 3: WHAT DOES THE WTO DO?

Until recently there has been something of a problem of understanding the basic rationale for the GATT/WTO. After all, the most primitive argument for trade liberalisation is unilateral; why does one need a multilateral institution at all?[20]

In an influential series of articles summarised in a monograph, Bagwell and Staiger (2003) have now provided an answer: negotiation through the GATT/WTO solves a terms of trade externality. Otherwise liberalising countries might worry that unilateral elimination of protection might hurt their terms of trade.

This is a fine theoretical argument, and I admire and applaud the excellent work of Bagwell and Staiger. But is it of obvious empirical relevance? Thus far it has not been subjected to rigorous empirical analysis. Doing so is far beyond the scope of this chapter, but let me provide a little evidence of relevance. In particular, I present in Figure 18.3 a set of plots that look at the World Bank's 'barter terms of trade' (indexed so that they are all equal to 100 in the year 2000) during the three years before and after the completion of the Uruguay Round. I do this on a country-by-country basis, for 16 big economies, 12 OECD and four developing.

Now these figures are rough. They are aggregate in that they cover the whole economy. Further, they are raw and a host of other features undoubtedly affected the terms of trade. Furthermore, the counterfactual is not known; how would the terms of trade be expected to move without the GATT/WTO? That is, it is not clear what the Bagwell–Staiger theory leads one to expect for the terms of trade. All that said, the

Table 18.3 Trade policy and GATT/WTO membership: panel measures

	Bivariate	Augmented	IV
Import Duties as % imports	2.1	1.8	–45.0
	(1.7)	(1.8)	(0.9)
NBER trade liberalisation phase	0.2	–0.5	–2.7
	(0.3)	(1.0)	(0.3)
Index economic freedom	–0.0	0.0	–4.6
	(0.2)	(0.0)	(1.7)
Trade policy measure from IEF	–0.7	–0.1	–18.0
	(1.1)	(0.2)	(1.6)
Index from FX and commercial policy	0.00	0.00	0.26
	(0.0)	(0.1)	(0.6)
Index from tariffs and NTBs	0.5	0.4*	–4.3
	(1.8)	(2.0)	(0.4)
Indirect counter-agricultural bias	0.0002	0.0001	0.010
	(0.6)	(0.4)	(1.0)
Gravity-residuals, basic model	–1.8	–1.8	–117.0
	(1.8)	(1.9)	(0.2)
Gravity-residuals, augmented model	–1.5	–1.6	–122.0
	(1.7)	(1.7)	(0.3)
Movement to international prices	0.01	0.01	0.06
	(0.4)	(0.5)	(0.2)
Modified price distortion index	–0.01	–0.01	–3.4
	(0.3)	(0.3)	(1.5)
Black market premium	–0.26	–0.15	–13.0
	(1.8)	(1.5)	(1.9)

Notes:
Independent variable is membership in GATT/WTO.
Augmenting regressors: log(population); log(real GDP p/c); and remoteness.
Instrumental variable: Polity IV score of autocracy/democracy.
Absolute *t*-statistics (computed with standard errors robust to clustering by countries) in parentheses, except for IV estimates which use conventional standard errors.
* indicates significance at 5%.
Year and country fixed effects included throughout.

terms of trade do not look particularly stable around the completion of the Uruguay Round.

The analogous event study is presented in Figure 18.4. It pools data across all formal and de facto members of the GATT/WTO (using the Tomz et al. membership data) and all four GATT rounds for which there are terms of trade data. The mean terms of trade is presented in between lines that delimit a confidence interval of +/– two standard errors. It shows that there is typically an improvement of the terms of trade that is both economically and statistically significant. There is a striking amount of time-series variation of the terms of trade around the completion of GATT rounds.

I want to stress that this is the opposite of definitive empirical work. No other factors are taken into account, and it is not clear what the hypothesis of interest is. And this is not a challenge to my critics; it is a challenge for anyone interested in understanding

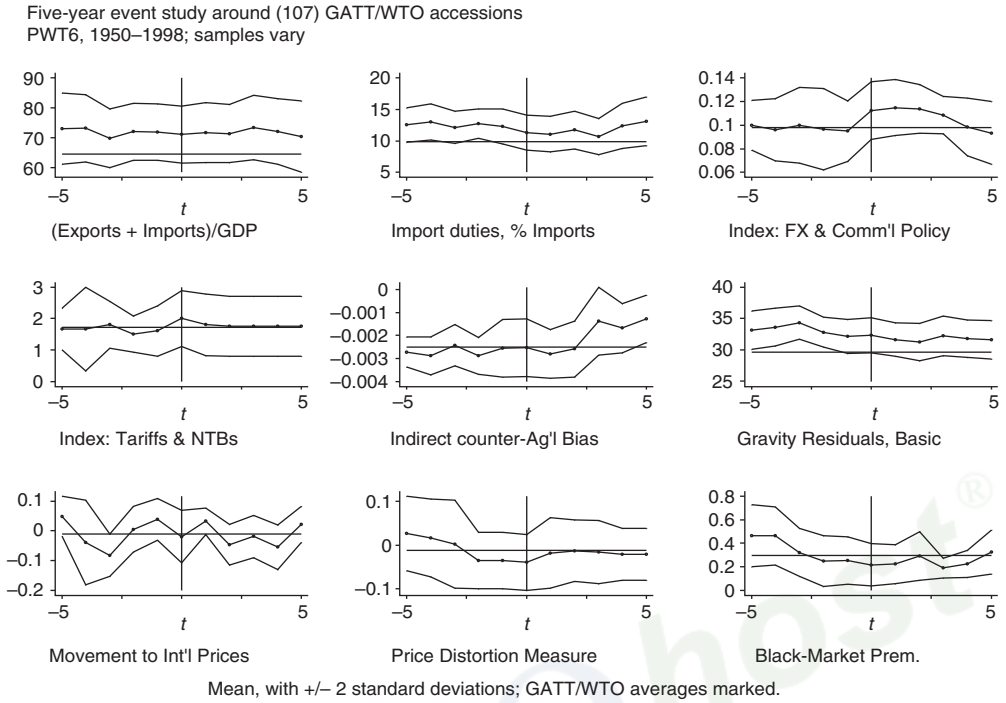

Figure 18.2 Effect of GATT/WTO accession on trade policy

the GATT/WTO and the terms of trade. Still: is there evidence that membership in the GATT/WTO stabilises or otherwise affects the behaviour of the terms of trade?

9 FINAL NOTES

There may be publication bias in this area of research. Publishing negative results is more difficult than positive ones. That is especially true in this context, since in Rose (2004a) I simply presented a non-finding of a large effect of GATT/WTO membership on trade. People who find similar results may simply discard them; accordingly, researchers may be tempted to stretch their work towards finding positive conclusions.

I shall not provide a conclusion. Personally, I still think the evidence of a strong positive effect of GATT/WTO membership on trade is lacking. I do not see its effects on aggregate trade or trade policy. That said, my initial pessimism about the impact of the institution has been tempered by the subsequent work. I find the work of especially Subramanian and Wei (2006) but also Tomz et al. (2005) relevant if not completely convincing. A more important gap in my initial work was the fact that I did not take the extensive margin seriously. I am now persuaded that membership in the GATT/WTO encourages the creation of trading links where none might otherwise exist. How important this is to world trade and welfare is currently unclear to me; I look forward to more work in the area.

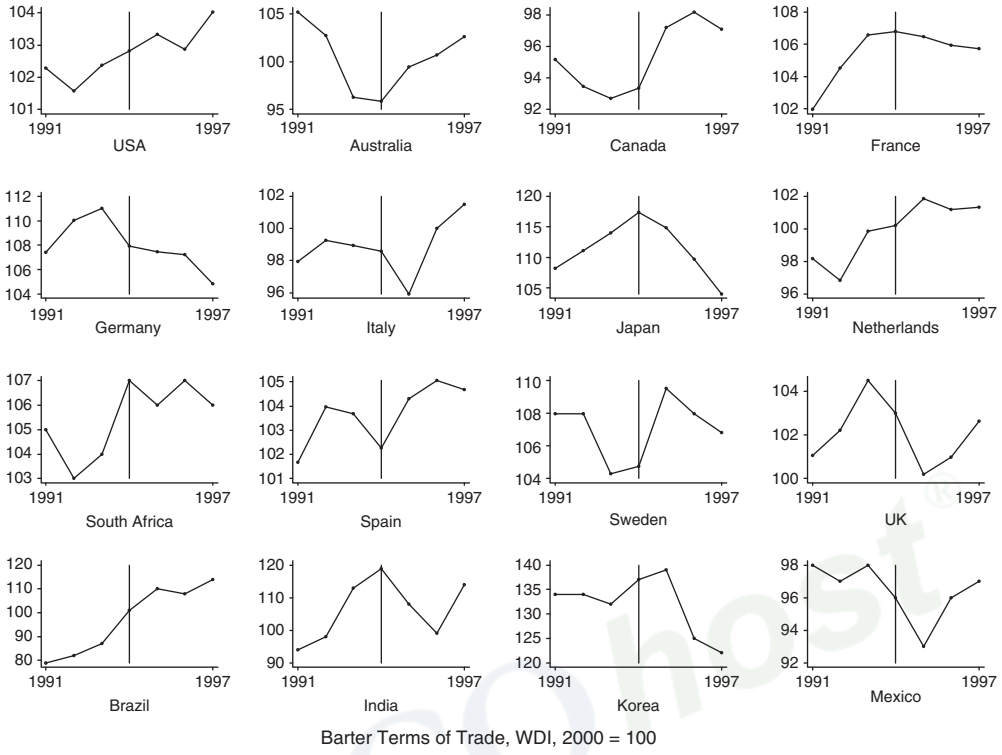

Figure 18.3 Terms of trade around completion of final GATT round

SUMMARY

This chapter reviews the recent literature that quantitatively assesses the effect on international trade of membership in the World Trade Organization (WTO) and its predecessor, the General Agreement on Tariffs and Trade (GATT). In my 2004a paper, I show that a straightforward look at the data does not find a strong effect of GATT/WTO membership on bilateral trade. I present and analyse three serious criticisms of this work: (i) inappropriate pooling of data across countries, sectors, and time; (ii) inappropriate econometric techniques, especially regarding fixed effects; and (iii) selection bias, since membership in the GATT/WTO may encourage pairs of countries to trade when they otherwise would not. I also present my critics with a couple of challenges, including finding a substantive effect of membership on multilateral trade and measures of trade policy.

Keywords

Empirical, model, data, bilateral, gravity, multilateral, policy, international.

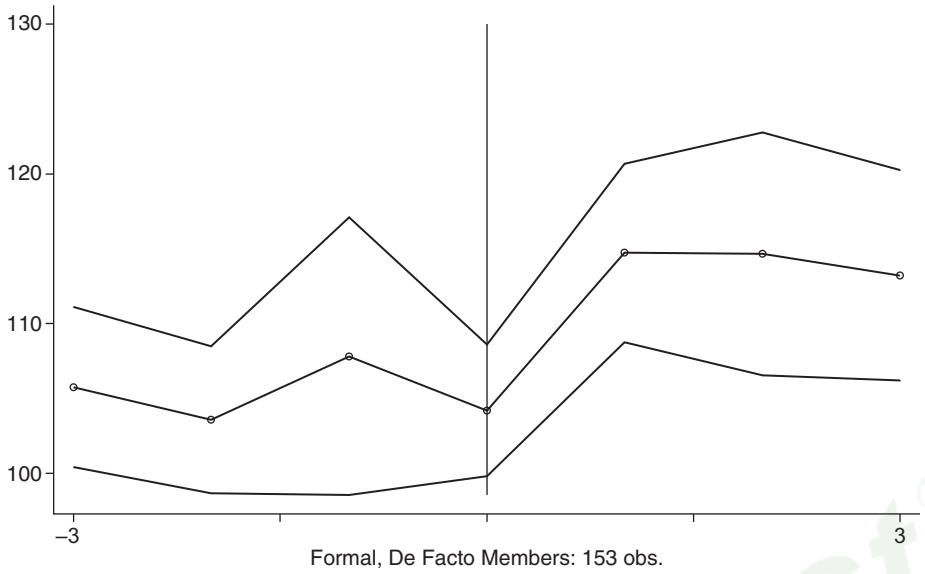

Figure 18.4 Event study on terms of trade and completion of 4 GATT rounds

JEL Classification

F13.

NOTES

* I thank Zdenek Drabek for comments and discussion. A current version of this chapter is available at my website. This chapter is closely based on my currently unpublished paper 'The effect of membership in the GATT/WTO on trade: where do we stand?'

1. My inspiration came from Li and Wu (2004).
2. The story is entertaining, and revolves around a trip I took with my family from San Francisco to Singapore. We had to stop for a couple of hours in Hong Kong to change planes, and my wife and I gave our son Asher (who happened to be turning three that day) the choice of either playing at the airport playground or going to one of the lounges (as a United Premier Executive, he was entitled to the Gold lounge even at age three). He wisely chose the playground and I watched him while Miriam went to the lounge. He played, ran, shouted, and let off steam while I tried (and again failed) to work out why I could not find any effect of GATT/WTO membership on trade. After a while, Asher told me that he had had enough and wanted to go to the lounge. Fine, I explained, but in the lounge you have to be calm, quiet, orderly and so forth. He agreed. We went to the lounge and sure enough, he went wild as soon as we got in, tearing around, yelling and having fun (as three-year-olds do). I reminded him that we had agreed a deal, and he was supposed to behave when we entered the lounge. 'Yes,' he said to me, 'but now I'm in.'
3. My responses to two significant critiques – Tomz et al. (2005) and Subramanian and Wei (2006) – are available on my website as Rose (2005b) and (2004c), respectively. I borrow from them freely in what follows.
4. For instance, in 2003 only four countries (Cuba, Laos, North Korea and Serbia) did not have normal trade relations (the equivalent of MFN status) with the United States, even though many countries were not in the WTO (Russia and Saudi Arabia being perhaps the most prominent non-members). Symmetrically, WTO incumbents have not always extended MFN status to acceding countries; Drabek and Bacchetta (2004, pp. 1094–95).
5. Gowa and Kim (2006) are concerned to 'show that the GATT had a large, positive, and significant impact on trade between only five of its member states: Britain, Canada, France, Germany, and the United

States'. They note: 'When Japan acceded to the GATT in 1955, more than 40 percent of its members denied it MFN treatment in order to protect their markets against a flood of textiles and other labor-intensive products in which Japan held a comparative advantage' and find that policy towards Italy was similar. They also argue that goods were defined so narrowly that most concessions were essentially bilateral, not multilateral. For instance, they state (p. 11):

> As in the interwar era, however, the products on which tariffs were cut were defined as narrowly as possible in an effort to restrict their benefits to a single country. In 1948, for example, when the United States reduced its tariff on feldspar china, it simultaneously added 'value brackets' to its tariff schedule, making the new rate applicable 'only to plates, cups, saucers and other items *valued at more than specified amounts*.' This precluded their application to the 'bulk' of Japanese imports. That very few products appear on the concessions list of more than one pair of countries also attests to efforts to privatize tariff cuts. During the 1955–56 trade round, for example, the United States cut its tariff on a total of 59 imports from Britain, Canada, France, and Germany. With one exception, no concession seems to have applied to a good produced by more than one of these countries (original italics).

6. I did cut the data in over 40 different ways in the original paper, but obviously I may have missed the right way.
7. Tang and Wei (2006, p. 3) state: 'In the first four decades of the GATT, developing countries were not asked to do much reform if they wanted to join the club. Indeed, many of them retained very high bound tariff rates even after becoming GATT members'.
8. The criticism of Tomz et al. (2005) is not inappropriate pooling, but measurement error in my GATT/WTO membership variable.
9. Tomz et al. (2005, p. 6) write '*De facto* participants were "expected to observe the substantive provisions of the General Agreement." But they had fewer administrative responsibilities than formal members . . . *De facto participants* received MFN treatment, were invited to participate in multilateral trade negotiations, and could observe the annual GATT sessions'. By way of contrast Tang and Wei (2006, p. 5) state: 'Up to the end of 1994, a subset of developing countries were eligible to join the GATT under article XXVI 5(c) by essentially sending a notification to the GATT without having to promise reforms'.
10. There is little doubt that the GATT/WTO has failed in this area. Consider Dam (1970, pp. 257–8) who states: 'It would be difficult to conclude that the GATT's record in the sphere of temperate agriculture commodities is other than one of failure . . . [Agricultural protectionism, especially NTBs] cannot be justified under the provisions of the General Agreement . . . there can be little doubt that few of the nontariff barriers on imports of agricultural commodities can be justified under . . . special dispensations'.
11. In Rose (2004a), I found that $\gamma 1$ tended to fall in the last part during the WTO era; for example, Tables 2 and 3; Tomz et al. (2005) find comparable results in their Tables 3 and 5.
12. In passing: in Rose (2004a), I included only one set of bilateral estimates with country-specific fixed effects, but over a dozen with *country-pair-specific* ('dyadic') fixed effects. These take into account not multilateral 'trade resistance' and other unobservable features *of individual countries*, but trade resistance (and other unobservable features) of the relationship *between each pair of countries*. This seems much more general.
13. Ferrantino (2006) analyses liberalisation during the run-up to recent WTO accessions and American FTAs. He notes the long lags between a country's initial application for WTO membership and its actual accession.
14. Thus, for example, the log product real GDP term falls from 0.93 (standard error of 0.01) in column 3 of Table 2 of Tomz et al. to 0.18 (0.05) when country fixed effects are added and 0.47 (0.05) when dyadic fixed effects are added in columns 4 and 5.
15. In fact the problem may be worse, since countries that are naturally open to international trade may tend disproportionately to join. This biases the cross-sectional coefficient upwards, making it especially likely to be positive. But it has been found to be negative, by both me and my critics.
16. Usually when you are missing data to model trade between the United States and 'nowhereland' it is not the trade data that are missing (or zero), but GDP.
17. However, it is unclear whether this growth occurred because of the appearance of new countries, or because countries that exited in 1948 chose not to trade then but did trade afterwards; see also Felbermayr and Kohler (2005).
18. This is consistent with Drabek and Bacchetta (2004, pp. 1092–3), who find that recently countries 'have been able to negotiate the terms of their WTO accession within the scope of measures already taken' so that 'almost all countries in our sample actually applied lower tariffs than those bound in the WTO'. They later conclude (p. 1105) that 'very little' of the tariff decline was brought about by accession to the WTO.
19. Ferrantino (2006, p. 21) writes: 'The ongoing WTO accessions, in fact, show more cases of deterioration than improvement in five of the six indicators [of national governance], showing a balance of improvement only for "government effectiveness." This is not encouraging, as it suggests only more efficient repression

and corruption'. Later on (p. 22) he writes: 'In 10 out of the 11 cases of a change in score associated with WTO accession the [trade] score [of the Heritage Foundation's Index of Economic Freedom] in fact declines'.

20. Drabek and Bacchetta (2004) provide a number of other reasons for joining the WTO, but these do not seem particularly compelling to me, since they do not seem intrinsically international. For instance, they argue (pp. 1089–91) that WTO membership enhances the credibility of both domestic and foreign governments' policy. But domestic institutions are almost always more important and credible than international commitments.

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Table 18A.1 Benchmark estimates, effect of GATT/WTO membership on bilateral trade

	No FE	Country FE	Dyadic FE	Other	Notes
Rose (2004a)	–0.04	0.15	0.13		
	(0.05)	(0.05)	(0.02)		
Subramanian and Wei (2006)		1.08			Industrial country imports
		(0.10)			
Tomz et al. (2005)	0.17	0.54	0.48		Formal members
	(0.07)	(0.06)	(0.06)		
Tomz et al. (2005)	0.80	0.86	0.88		Nonmember participants
	(0.14)	(0.12)	(0.09)		
Liu (2006)	–0.08		0.04		Positive imports
	(0.01)		(0.01)		
Liu (2006)	2.09		1.45		All imports
	(0.02)		(0.02)		
Felbermayr and Kohler (2005)		0.09			Positive trade
		(0.08)			
Felbermayr and Kohler (2005)		0.50			All trade
		(0.09)			
Helpman et al. (2005)		0.30		0.14	Other is ML
		(0.04)		(0.04)	
Leeson (2005)	0.12	0.13	0.13		
	(0.06)	(0.05)	(0.05)		
Gowa and Kim (2006)			0.04		
			(0.03)		

Notes:
Estimates of γ_1 from regressions of type:

$$\ln(T_{ijt}) = \beta_1 \ln D_{ij} + \beta_2 \ln(Y_i Y_j)_t + \beta X_{ijt} + \gamma_1 Bothin_{ijt} + \gamma_2 Onein_{ijt} + \varepsilon_{ijt} \quad (18.1)$$

Standard errors in parentheses.
Dyadic fixed effects refer to inclusion of country-pair specific fixed effects.

19 Do economic integration agreements lead to deeper integration of services markets?[1]

Juan A. Marchetti[2]

1 INTRODUCTION

Preferential liberalisation of trade in services is not a new phenomenon, but has become a more common and prominent feature of the latest generation of bilateral preferential trade agreements (PTAs) negotiated in this decade. As of 1 September 2009, 73 economic integration agreements (EIAs) have been notified to the World Trade Organization (WTO) under Article V of the General Agreement on Trade in Services (GATS). This list includes all types of EIAs, including *inter alia* the successive European Union (EU) enlargements, the European Economic Area (EEA), the European Free Trade Association (EFTA), the North American Free Trade Agreement (NAFTA), the South American Common Market (MERCOSUR), the Association of South East Asian Nations (ASEAN) and more recent bilateral or plurilateral PTAs covering services. Most of those notifications arrived before the year 2000 – 61 compared to 12 before that year.[3] And many more agreements are currently being negotiated.

One might expect that countries entering these PTAs do so with the objective of eliminating barriers to trade in services, but more importantly, in the hope that the agreements will actually increase bilateral services trade between the parties. Lack of reliable data on trade in services (especially of bilateral flows) has made it almost impossible to carry out empirical studies of the determinants of bilateral services trade flows and – in particular – of the effects of PTAs on trade flows in services. However, the availability of statistics on trade in services has improved over the last year, particularly among OECD countries. Taking those developments in the statistical field into account, the main purpose of this chapter is to provide an initial quantitative estimate of the effect of PTAs on bilateral trade in services, using the standard gravity model. At the same time, the chapter will provide an opportunity to look into other – not institutionally or politically motivated – determinants of services trade 'in the standard gravity tradition'. Thus it will be a way of gauging how well the gravity model works for services trade.

This chapter is structured as follows. Section 2 gives a brief overview of the basic economics of trade and trade policy in services. Section 3 provides an overview of services trade flows. Section 4 looks into the law of PTAs. In doing so, the chapter takes a broad view of preferential integration in services in order to cater for not only negative integration agreements, basically the new generation PTAs, but also positive integration agreements, such as the European Communities. Section 5 provides a selective survey of the gravity equation in international trade. Section 6 reviews previous literature on the application of the gravity equation to trade in services. Section 7 presents the empirical specification and the data used in this chapter. Section 8 presents the estimation results. The final section concludes.

2 THE BASIC ECONOMICS OF TRADE AND TRADE POLICY IN SERVICES

Simply defined, 'services' are a diverse group of economic activities distinct from manufacturing, mining and agriculture. The term encompasses a broad range of industries that provide the basic economic infrastructure (communications, transport, distribution, energy-related services, construction, water supply, sanitation and sewerage services, waste collection and disposal), financial infrastructure (banking, insurance, financial markets), support to business (advertising, marketing, computer services, professional services), or social infrastructure (education, health and social services).

Services currently represent more than two-thirds of world GDP. The share of services in GDP and employment tends to rise with income, but even for the poorest countries it is now significant. In 2001, service sectors accounted for 45 per cent of GDP in low-income economies; 57 per cent in middle-income economies; and almost 71 per cent in high-income economies. Services activities in low- and middle-income countries have been expanding faster than GDP for the last two decades, and represent on average 5 to 10 per cent points more of GDP than in the early 1980s. An implication of this continuous shift towards services is that the overall growth of productivity in the economy will increasingly be determined by what happens in the services sector.[4]

Economists have long debated the differences between goods and services. Services are usually characterised as intangible, non-storable, and requiring simultaneous production and consumption; while goods, in contrast, are tangible and storable, and hence do not typically require simultaneity of supply and use. Intangibility is a common feature of services. One can physically touch a manufactured product, but services are intangible. One cannot touch a piece of legal advice or a journey, though can often see the results.

Arguably the most important difference between the goods and services is that the latter must be consumed as they are produced, and hence require simultaneous interaction between the producer and the consumer. For many services, whose number is growing due to technological advances, this key feature is of course not necessary. Think of a variety of financial, entertainment, information, professional, education and communication services, which can be produced in one country and delivered to consumers in another, either through electronic means or stored in some medium (for example, paper, CD-ROM). However, a good number of services do require proximity between the consumer and the producer to make trade possible, and therefore call for the movement of one or the other. Examples of such services are construction, tourism, hairdressing, or most medical services, among many others. Even for the services that can actually be supplied at a distance, the personal contact between suppliers and consumers is often seen as necessary to build trust, to complete the transactions, and to remove information asymmetries between suppliers and clients.

The interaction between producers and consumers implies that a definition of trade in services must go beyond our traditional understanding of trade, to encompass provider and consumer mobility across national borders. We shall see in subsequent sections of this chapter that agreements dealing with services trade (both at the bilateral and multilateral levels) have taken account of this specific feature.

The nature of services has critical implications for what we understand as trade

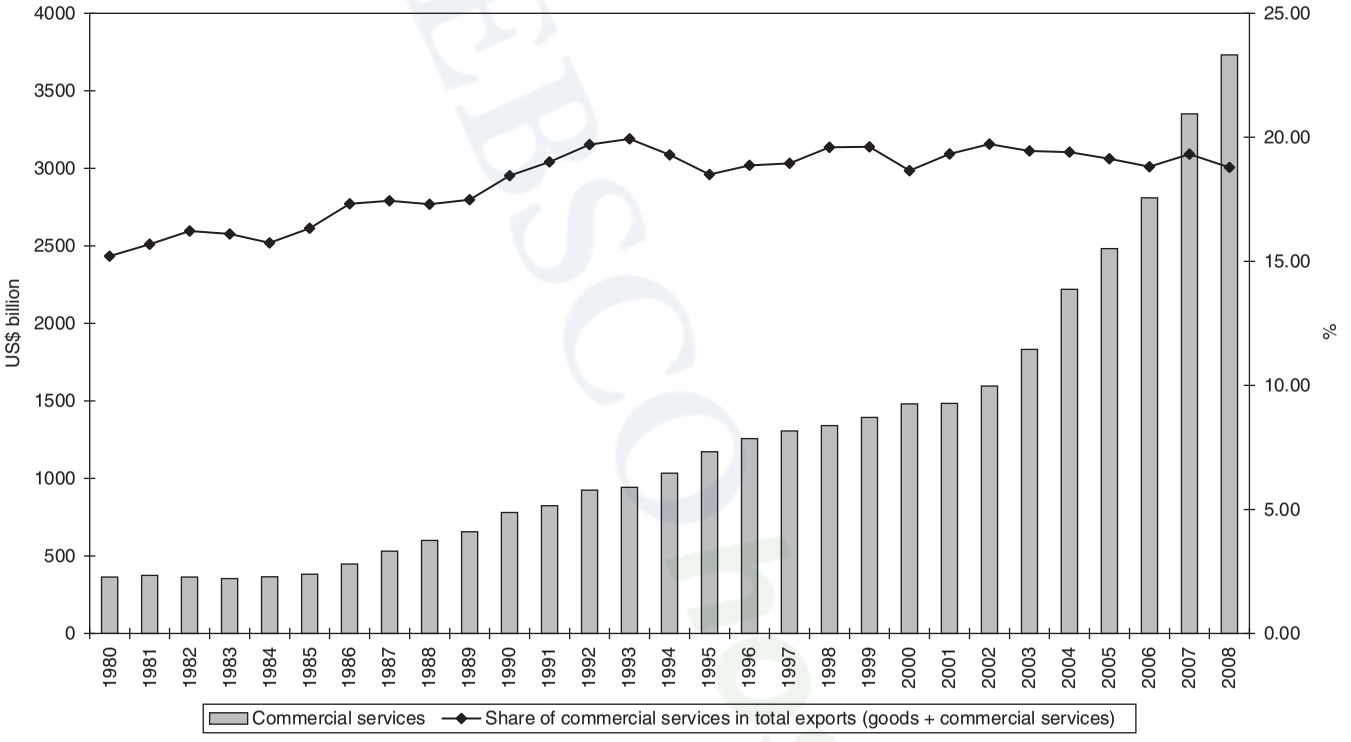
policy in services. Border measures, particularly tariffs, are almost impossible to apply to trade in services for the simple reason that customs agents will not be able to see the service cross the border. What customs agents, as well as most of us, will observe are service suppliers (either firms or persons) or consumers crossing the frontier. Other price-based measures, such as taxes, may be applied to services (including foreign services) although they will not be typically levied at the border but, rather, within a country's borders. Furthermore, if services trade requires the movement of suppliers and/or consumers, then the ability of governments to impede international transactions on services will depend on regulations affecting the entry, establishment and operations of service suppliers (be they firms or persons) or the movement of consumers. Barriers to trade in services may therefore take the form of outright prohibitions, quantitative limitations on services or the number of service suppliers (both natural and juridical persons), local content requirements, foreign equity limitations, discriminatory taxation and subsidisation, and discriminatory access to distribution networks, to name just a few.[5]

What does the economics of services mean for the analysis and granting of preferential treatment in services trade? As explained by Fink and Mattoo (2004), the analysis of preferential agreements in services requires an extension of conventional theory to cater for two specific features of services trade: the need for physical proximity between the supplier and the consumer; and the fact that preferences in services trade will most probably be granted not through tariffs (which are unusual in services trade), but through discriminatory restrictions on the movement of persons and companies, as well as a variety of domestic regulations, such as technical standards, licensing and qualification requirements. This means that while traditional trade theory has focused on the impact of preferences when barriers are tariffs or quotas on sales of products, other forms of discrimination (or preferential treatment) will be more relevant for services trade, such as protectionist measures that increase the variable costs of production without generating rents for government; measures that affect the fixed costs of supply; and quantitative restrictions on the number of service suppliers.[6]

3 AN OVERVIEW OF SERVICES TRADE FLOWS

When analysing the pattern of world trade in services, three aspects stand out. First, services have been the fastest-growing sector of the global economy over the last three decades. After five years of stagnation in the early 1980s, global exports of services grew regularly, reaching US$3,371 billion in 2008, a ninefold value increase compared to 1980. Exports of services grew on average at around 8.61 per cent a year in value terms over the 1980–2008 period, faster than goods exports (7.96 per cent), and definitely much faster than world GDP (6.39 per cent). As a result, the share of commercial services exports in total world exports (goods and services) rose from 15.2 per cent in 1980 to 18.8 per cent in 2008, after reaching an all-time high of 19.7 per cent in 2002 (Figure 19.1).

Second, reflecting new trends in services trade, between 1980 and 2008, the share of travel and transport in total commercial services decreased, to the benefit of other commercial services. Indeed, the share of transport in total commercial services declined



Source: Own elaboration based on WTO statistics database.

Figure 19.1 World exports of commercial services, 1980–2008 (US$ billion and % of total world trade)

Table 19.1 Changing patterns of trade in services (in % of total world trade)

	1980	1995	2008
Transport	37	26	23
Travel	28	34	25
Other commercial services	35	40	51

Source: WTO statistics database.

steadily from 37 per cent in 1980 to 23 per cent in 2008. Exports of travel services expanded vigorously in the 1980s and mid-1990s, going from 28 to 34 per cent of world services trade between 1980 and 1995; but then slowed down, representing 'only' 25 per cent of world services trade in 2008. On the other hand, the share of other commercial services rose from 35 to 51 per cent of world services trade between 1980 and 2008. These other commercial services, which include many services prone to global outsourcing, such as business and computer-related services, have proved to be the most dynamic segment of world trade in the last decades (Table 19.1).[7]

Third, developing countries' share in world trade in services has grown significantly in the last two decades. For example, if we compare OECD with non-OECD countries, we see that the latter's share in world services exports increased from 22.73 per cent in 1980 to 29.80 per cent in 2008. The share of non-high-income countries (both OECD and non-OECD) has grown from 13.87 per cent in 1980 to 20.73 per cent in 2008.[8] Technological advances increasingly allow the spatial fragmentation of goods and services production, and offshoring to operational units abroad and even outsourcing to a foreign third party service supplier has become common practice among multinational corporations. Developing countries are indeed becoming exporters of so-called 'business process outsourcing' (BPO) services. Low labour costs, the availability of a well-educated pool of workers, and the improvement in the quality and price of international telecommunications, have allowed several developing countries, most notably India, to take the lead in this field (Marchetti, 2007).

Having said that, it is worth clarifying that these statistics, which are based on balance-of-payments (BOP) information, greatly underestimate the value of services trade flows covered not only by the WTO GATS but by all PTAs signed so far. This is because BOP statistics provide only a partial picture of trade in services, reflecting only cross-border trade and consumption abroad,[9] but ignoring the supply of services through the presence of juridical and natural persons, which are part of the definition of 'trade in services' in all trade agreements, be they multilateral or preferential. Only a few countries produce statistics reflecting trade in services through the commercial presence of companies (so-called Foreign Affiliates Trade in Services or FATS statistics), while information on the supply of services through the temporary movement of natural persons is still more limited. Maurer and Chauvet (2002) have estimated that trade through commercial presence of firms is as important as BOP-based cross-border trade, and that together they represent 80 per cent of total world trade.[10]

4 THE DIFFERENT LIBERALISATION APPROACHES – FROM SIMPLE PTAs TO DEEPER INTEGRATION

In this chapter, I take a rather broad view of PTAs, going from those providing for deeper integration (positive integration-type agreements seeking harmonisation of at least basic regulatory requirements) to those envisaging the liberalisation of specific restrictions to trade in services without aiming at regulatory harmonisation (negative integration-type agreements). The EU and the EEA belong to the first category; while all the other PTAs negotiated in the last decade belong to the second one. This second category can be further divided into those agreements providing for a GATS-type gradual approach to opening services markets, those adopting a more immediate NAFTA-type liberalisation approach, and those adopting a hybrid approach (a mixture of the previous two). A full analysis of the plethora of agreements covering trade in services would certainly be beyond the scope of this chapter.[11] Instead, I shall focus on the liberalisation modalities and principles adopted by the different groups of agreements now in place.

GATS-type Agreements

GATS-type agreements contain basically one chapter dealing with (almost) all aspects of services trade.[12] These agreements apply to 'measures affecting trade in services', with trade being defined by reference to four modes of supply which, as explained in the previous section, take account of the different modalities through which services can be supplied. The four modes are the following:

- cross-border trade or mode 1, that is, the supplier and the consumer interact over distance, and it is the 'service' that actually 'crosses' the border;
- consumption abroad or mode 2, that is, the consumer 'moves' (most probably physically but possibly also 'virtually' through the internet) to the supplier's jurisdiction and 'consumes' the service there;
- commercial presence or foreign suppliers or mode 3, that is, the producer sells services directly to consumers in the latter's jurisdiction, through commercial establishments such as subsidiaries or branches; and
- temporary presence of foreign natural persons supplying services or mode 4, that is, the supplier (in this case a natural person, either employed or self-employed) supplies services directly to the consumers in the latter jurisdiction, through his/her temporary presence in the consumer's territory.

With only a few exceptions (for example, sectoral exclusions in the PTA between Australia and Thailand, or the exclusion of financial services from the PTA between EFTA countries and Chile), the sectoral coverage of these agreements is the widest possible – all services are covered, except for the bulk of air transport services and 'services supplied in the exercise of governmental authority', which are those supplied neither in competition nor on a commercial basis.[13]

As indicated in the first section of this chapter, protectionist measures in services usually take the form of regulations. As explained elsewhere (Marchetti and Mavroidis, 2004) regulations are very heterogeneous, and while some may have been designed as

protectionist devices, others may be necessary to achieve legitimate economic or social objectives. The GATS, and all the bilateral PTAs including trade in services, deal with the question by distinguishing between trade restrictions and 'domestic regulations'. The disciplines on market access and national treatment are meant to capture the most outrageous or explicit forms of protection of national service industries, that is, discriminatory measures or specifically identified limitations on market access; while the disciplines on 'domestic regulation' deal with more implicit forms of barriers to trade in services stemming from licensing and qualification requirements and procedures, and technical standards.

Market access and national treatment are thus central obligations in PTAs. Market access provisions are aimed at prohibiting a specific set of governmental measures restricting the supply of services. In GATS-type agreements, six types of market access limitations are contemplated: (a) limitations on the total number of suppliers; (b) limitations on the total number of transactions or assets; (c) limitations on the total value of operations or output; (d) limitations on the total number of employees; (e) restrictions on the type of legal entity required to supply services; and (f) restrictions on foreign equity participation. These correspond to the measures listed in Article XVI:2(a)–(f) of the GATS. The national treatment obligation is usually defined in GATS-type agreements as in Article XVII:1 of the GATS, as the obligation to 'accord to services and service suppliers of [the other party], in respect of all measures affecting the supply of services, treatment no less favourable than that it accords to its own like services and service suppliers'. Unlike the market access obligation, the national treatment obligation does not identify specific limitations, and hence any measure applied to the detriment of like foreign service and service suppliers, either *de jure* or *de facto*, would qualify as a departure from national treatment.

Market access and national treatment are not general and unconditional obligations in GATS-type agreements. In other words, these agreements do not contain any obligation to grant access to, or avoid discrimination of, foreign services and services suppliers. Rather, under these agreements the freedom to access the market through any of those modes of supply, as well as the extent of national treatment, are subject to negotiations, and the resulting commitments are entered into national schedules. As a consequence of this approach, unless the agreement provides for periodic rounds of negotiations, such as MERCOSUR and ASEAN, liberalisation of services trade (understood as the granting of access and national treatment to foreign services and services suppliers) may be quite incomplete or, rather, cover a limited number of sectors.

A critical element of any trade agreement covering services is its negotiating modality, which determines the sectoral coverage of those liberalisation commitments, that is, the sectors that will be subject to market access and national treatment obligations, and the extent to which these obligations will apply. GATS-type agreements adopt a so-called 'positive-list' or 'bottom-up' modality whereby the liberalisation obligations (market access and national treatment) apply only to the sectors listed, and subject to any limitations or conditions inscribed in the schedule of commitments. Limitations may be inscribed with respect to any of the six market access measures described above, and with respect to any discriminatory measure.[14] Under a positive list approach, limitations may be introduced for existing non-conforming measures or for future measures. Moreover, since only 'measures' are bound, no indication is given of the relevant laws/

regulations on which these are based, which accentuates the lack of transparency of this scheduling mechanism.

Agreements generally adopting a GATS-type approach include MERCOSUR, ASEAN, Thailand–Australia, Singapore–Australia, Singapore–Japan, New Zealand–Singapore, the PTAs signed by the EC, and the PTAs subscribed to by EFTA countries.

NAFTA-type Agreements

These agreements have both a services chapter ('cross-border trade in services') and an investment chapter. The services chapter applies to measures affecting such cross-border trade in services, which is defined as including the equivalent to GATS modes 1, 2 and 4; but does not cover the supply of a service through foreign direct investment (FDI), which is instead covered by a specific chapter on investment.[15] Further provisions on the movement of some categories of natural persons are also typically found in an additional chapter. And some mode 4-related elements (for example, national treatment obligation for senior managers) are included in the investment chapter.

With regard to sectoral coverage, NAFTA-type agreements also differ from the GATS type in that they list the categories of services that parties to the agreement will not be prevented from supplying, such as law enforcement, correctional services, income security or insurance, social security or insurance, social welfare, public education, public training, health and childcare. Some of the new agreements signed by the US do contain 'governmental services' carve-outs similar to the ones contained in the GATS.

Older PTAs, such as NAFTA and Canada–Chile, do not have a specific provision on 'market access', but contain a somewhat similar discipline addressing 'quantitative restrictions', which are defined as non-discriminatory measures that impose quota-type limitations on (a) the number of service providers, or (b) the operations of any service provider.[16] Depending on the interpretation of the 'limitations on the operations of any service supplier', this apparently more limited list of restrictions (compared to the six included in GATS Article XVI) may have a similar or broader coverage compared to the GATS list of market access limitations.

The new generation of NAFTA-type agreements, including those signed by the US, do contain a market access provision modelled on GATS Article XVI, but excluding foreign equity restrictions from the list of market access limitations. This omission, however, does not seem to modify the liberalisation content of the cross-border services chapter in these agreements since foreign equity limitations may be captured by the national treatment principle, and are largely irrelevant for trade under modes 1, 2 and 4.

NAFTA-type agreements also have a national treatment obligation, defined differently from that in the GATS, as treatment no less favourable than the one accorded 'in like circumstances' to one's own service providers. However, the comparator is different: 'like' services and service suppliers in the GATS, and 'like circumstances' in the NAFTA-type agreements – a difference that may have relevant implications in the protection afforded by the national treatment principle in the different agreements.

As in the GATS, market access (or quantitative restrictions) and national treatment are not immediate and unconditional obligations, but negotiable obligations. In other words, parties to these agreements can impose limitations on market access and/or national treatment when making a liberalisation commitment. In addition, limitations

(or reservations, as they are called in this type of agreement) can be entered with regard to the most favoured nation (MFN) principle and the obligation to refrain from imposing a 'local presence' requirement as a precondition for the cross-border supply of a service.

In terms of their liberalisation modality, NAFTA-type agreements are based on a 'top-down' or 'negative-list' approach, whereby all sectors are supposed to be subject to the obligations on market access, national treatment, MFN and local presence, unless otherwise specified in lists of reservations. Reservations are typically for existing non-conforming measures (Annex 1) and for future measures (Annex 2). In contrast to PTAs following the GATS approach, NAFTA-type agreements provide a high degree of transparency since, save for the normally limited number of Annex 2 reservations, the actual level of openness is spelled out, along with an indication of the piece of legislation (for example, law, regulation) giving ground to the measure. In addition, the PTAs signed by the US, as well as others, contain a 'ratchet mechanism' for the reservations listed in Annex 1. This clause means that if a Party liberalises a non-conforming measure listed in Annex 1 (that is, it makes such a measure less inconsistent with an obligation), then it cannot subsequently make it more restrictive. In other words, the ratchet mechanism means that the liberalised measure becomes 'bound' as part of the Agreement's treaty commitments.

'Deeper Integration' Agreements

This category includes basically the set of legislation providing for the European internal market. The central principles governing the internal market for services are set out in the EC Treaty. This guarantees to EC services suppliers the freedom to establish themselves in other member states, and the freedom to provide services on the territory of another EC member state than the one in which they are established. The free movement of services (complemented by the freedom of establishment) is one of the four fundamental freedoms on which the EC internal market is founded.[17]

Any discrimination concerning the provision of services on the basis of nationality is prohibited directly by the EC Treaty, without the need of specific Community legislation. Services covered under this 'freedom' include all activities of an industrial or commercial character or of craftsmen and the activities of the professions. 'Services' do not include transport, banking and insurance, which have their own liberalisation frameworks.[18]

The EC Treaty provisions have direct effect. This means, in practice, that member states must modify those national laws that restrict the freedom of establishment, or the freedom to provide services; and that the Treaty provisions are directly enforceable via the European Court of Justice. EC member states may only maintain restrictions if these are justified by reasons of general interest (for example, on grounds of public policy, public security or public health), and provided that they are proportionate.

Although the Treaty refers to the freedom to provide services, the European Court of Justice has held that the freedom established by the Treaty includes the freedom for the recipient of services (such as tourists, persons seeking medical treatment, people travelling for business or study purposes) to go to another member state in order to receive the service there. So this freedom is not just the freedom to provide (akin to mode 1 of the GATS) but also the freedom to consume services anywhere across the EU (akin to mode 2 of the GATS).

The principles of freedom of establishment and free movement of services have been clarified and developed over the years through the case law of the European Court of Justice. In addition, important developments and progress in the field of services have been brought about through specific legislation in fields such as financial services, telecommunications, broadcasting and the recognition of professional qualifications.

Home-country regulation and mutual recognition – within a common framework of minimum requirements – are essential to this approach. In other words, if a service is lawfully authorised in one EC member state it must be open to users in the other member states without having to comply with every detail of the legislation of the host country, except those concerning consumer protection. Over the years, however, numerous and diverse national regulations were found to prevent the full development of the internal market, and made it necessary to take specific actions to remove the barriers affecting both the freedom of establishment for providers in member states and the free movement of services between member states. This was the initial aim of the Services Directive adopted in 2006 that sought to establish a general legal framework facilitating the exercise of the freedom of establishment for service providers and the free movement of services.[19]

In the case of the freedom of establishment, the directive provides for a new framework for authorisation schemes including conditions for the granting of authorisation, duration, procedures and so on. Member states will be able to establish or maintain authorisation schemes only if certain conditions are met and these schemes will have to be non-discriminatory, necessary and proportionate. The directive also provides for the creation of single points of contact in each EC (in fact EEA) member state through which providers can complete all procedures and formalities.

In the case of freedom to provide services, member states shall no longer be able to prevent a foreign service provider from offering his/her services on their territory. Member states may still stipulate their own national requirements, but only for reasons of public policy, public security, public health or protection of the environment. Such national requirements must also respect common internal market principles of non-discrimination, proportionality and necessity. In order to make it easier to monitor such requirements, and to give service providers better and easier access to information on national requirements, all member states are obliged to report and justify their national requirements to the Commission.

The sectoral coverage of the directive is limited, though. Services covered by the directive are only business-related services, such as management consultancy services; testing and certification services; advertising and marketing services; distribution services; recruitment services; legal and fiscal advisory services; estate agency services; installation and maintenance services; building and construction services; car rental and travel agency services; and tourism, sport and entertainment services. Public services (water, electricity and gas) and waste management services are covered by the provisions related to the freedom of establishment, but not by the provisions relating to cross-border trade in services. Most importantly, the directive does not apply to the following: services that are already covered by Community legislation (such as financial services, telecommunication services and transport services); services of non-economic general interest (education and health); social services provided for by the state; audiovisual services, including cinematographic services; gambling; activities connected with the exercise of official authority; private security services; and services provided by notaries.

The EEA Agreement, which entered into force on 1 January 1994, brought together the EC member states (now 27) and three EFTA countries (Iceland, Liechtenstein and Norway) in a single market for services.[20]

5 AN INTRODUCTION TO THE GRAVITY EQUATION IN INTERNATIONAL TRADE

Tinbergen (1962) pioneered the use of the gravity equation in international trade. Since then, the gravity equation has been a popular instrument in empirical foreign trade analysis, and it has been successfully applied to flows of varying types such as workers' remittances, FDI cross-border lending, and of course international trade flows. According to this equation, which draws on Newton's law of gravity, exports from country i to country j (X_{ij}) are explained by the economic size of the two countries, typically measured by GDP (Y_i and Y_j), and the geographic distance between them, D_{ij} (usually measured centre to centre):

$$X_{ij} = G\frac{Y_i Y_j}{D_{ij}}.$$

In log-linear form, the equation has usually been expressed in the following manner:

$$\ln(X_{ij}) = \beta_0 + \beta_1 \ln(Y_i) + \beta_2 \ln(Y_j) + \beta_3 \ln(Distance_{ij}) + \varepsilon_{ij} \qquad (19.1)$$

The gravity equation can be thought of as a representation of supply and demand forces. If country i is the origin, then Y_i represents the total amount it is willing to supply to all customers; while Y_j represents the total amount destination j demands. Distance may be interpreted as a sort of tax 'wedge' that imposes trade costs, and results in lower equilibrium trade flows. The expected signs are therefore positive for β_1 and β_2, and negative for β_3.

Over time, the original equation was 'augmented' to include other explanatory variables of foreign trade, such as income per capita, geographical adjacency, common language, colonial links, institutions and infrastructure. The equation has also been used to estimate the effects of various economic integration frameworks, such as the WTO, regional trade agreements and currency unions.

In spite of its empirical success, the equation remained for a long time a purely empirical proposition to explain bilateral trade flows, with little or no theoretical underpinnings. However, since the end of the 1970s, the gravity equation has been 'legitimised' by a series of theoretical articles by prominent economists that demonstrated that the basic equation was indeed consistent with various models of trade. Anderson (1979) made the first formal attempt to derive the gravity equation from a model that assumed product differentiation. Bergstrand (1985, 1989) also explored the theoretical determination of bilateral trade in a series of papers in which gravity equations were associated with simple monopolistic competition models. Helpman and Krugman (1985) used a differentiated product framework with increasing returns to scale to justify the gravity model. More recently Deardorff (1998) has proved that the gravity equation characterises many

models and can be justified from standard trade theories.[21] Finally, Anderson and van Wincoop (2003) derived an operational gravity model that helps solve the so-called 'border puzzle' (more on this below).

In addition, several authors have discussed the econometric specification of the gravity equation, contributing to the improvement of its performance (for example, Egger, 2000; Feenstra, 2003; Cheng and Wall, 2005; Baldwin and Taglioni, 2006).

6 THE GRAVITY EQUATION AND TRADE IN SERVICES

Only a few studies using the gravity equation have been devoted to services, mainly due to the lack of reliable and consistent data on bilateral trade. Grunfeld and Moxnes (2003) apply a gravity equation to bilateral export of services and FDI flows for 1999. Data for services trade come from the OECD, and cover 22 OECD members and their trading partners, including non-OECD countries. Their regressors (or explanatory variables) include the level of GDP and GDP per capita in the importing and exporting countries, the distance between them, a dummy variable if they are both members of a free trade agreement (FTA), a measure of corruption in the importing country, and a trade restrictiveness index (TRI) to measure the barriers to services trade in the importing country. The TRI is the augmented frequency index based on research by the Australian Productivity Commission. Their results suggest that the standard gravity model effects found in studies on trade in goods apply to services, too. Trade between two countries is positively related to their size and negatively related to the distance between them and barriers to services in place in the importing country (measured by the TRI). They find that the presence of an FTA is not significant in the case of services. This result might be expected as many of the FTAs covered at the time did not cover trade in services.

Kimura and Lee (2006, but the original working paper had been circulated in 2004) apply the standard gravity framework to services trade with the aim of comparing the results to the estimates for trade in goods. They also use OECD statistics on trade in services, but for the years 1999 and 2000. They use the standard explanatory variables (GDP, distance), plus adjacency, common language, and the existence of a regional trade agreement (RTA) between the countries concerned. They innovate by including as regressors a measure of remoteness (a trade-weighted measure of the distance between the two countries), and a measure of trade restrictiveness (the Economic Freedom of the World Index developed by the Fraser Institute). Kimura and Lee estimate their gravity equation using a mixture of ordinary least squares (OLS) and time-fixed effects. The major difference they report is that distance between countries is more important in services trade than in goods trade. They suggest that this implies there are higher transport costs for services but fail to provide any reason why this may be the case. Common language between the importer and the exporter is not found to be significant, while RTAs are found to correlate positively with trade in services, which contradicts the finding by Grünfeld and Moxnes. Kimura and Lee argue that while many FTAs do not explicitly cover trade in services, their presence may indirectly facilitate the process.

Walsh (2006) also estimates a gravity equation of services trade, using import data for 27 OECD countries and up to 50 trading partners over a three-year period (1999–2001).

The gravity model is estimated with total services, government services, transport services, travel and other commercial services as dependent variables. Walsh includes a dummy variable to cater for membership in the EU. The standard gravity framework explains the determinants of services well. The GDP per capita of the importing and exporting countries and a common language are found to be the most important determinants of trade between two countries. However, adjacency and membership of the EU are not found to increase services trade. Walsh's results also show that distance is not a significant determinant of services trade flows.

In a more recent paper, Ceglowski (2006) estimated a gravity equation for services trade in a sample of 28 OECD countries, for the 1999–2000 period. Apart from standard gravity variables, the study includes a dummy variable to cater for membership in various PTAs, namely CER (closer economic relations) (between Australia and New Zealand), the EFTA, the EU, NAFTA and the EEA. She finds that geographical and linguistic proximity are key determinants of services trade. Furthermore, common membership in a PTA has a significant, positive effect on bilateral services trade. According to the author, much of this effect of PTAs appears to reflect the impact of bilateral trade in goods on services trade.

7 METHODOLOGY AND DATA

In its most basic form, the gravity model estimates the trade between two countries as a positive function of their economic size and a negative function of the distance between them. As explained above, I shall use an 'augmented' gravity equation, to cater for other determinants of bilateral trade in services, including PTAs. The equation to be used will take the following log-linear form:

$$\ln(X_{ijt}) = \beta_0 + \beta_1 \ln D_{ij} + \beta_2 \ln(Y_{it}) + \beta_3 \ln(Y_{jt}) + \beta_4 Comlang_{ij} + \beta_5 Cont_{ij} + \beta_6 EIA_{ijt} + e_{ijt} \quad (19.2)$$

where i and j denote trading partners (exporter and importer, respectively), t denotes time, and the variables are defined as:

X_{ijt} denotes services exports from i to j at time t;
Y_{it} is the exporter's current GDP in dollars;
Y_{jt} is the importer's current GDP in dollars;
D_{ij} is the distance between the exporter and the importer, measured as the distance between the most populated cities in each country;
$Cont_{ij}$ is a binary 'dummy' variable which is unity if the exporter and the importer share a land border;
$Comlang_{ij}$ is a binary 'dummy' variable which is unity if the exporter and the importer share the same language;
EIA_{ijt} is a binary 'dummy' variable which is unity if both countries are parties to any type of economic integration agreement (that is, free trade area or a common market) covering services trade in year t; and
e_{ijt} represents the omitted other influences on bilateral trade.

We should expect positive signs for all the coefficients of the explanatory variables, except for the one on distance, which should be negative. In the case of GDP, a higher income level in the exporting country should be positively related to the country's ability to produce more services for export, while a higher level of income in the importing country should indicate a higher level of demand for services (produced domestically or imported).

One should also expect the distance variable to yield a negative coefficient. Physical distance may be considered a proxy of various transaction costs affecting trade in services, such as travel costs, costs associated with cultural unfamiliarity with the foreign market, costs associated with communications, costs of market research, and costs of establishing trust and reputation (which are essential in services that in many cases are affected by asymmetric information). Therefore, the larger the distance between the seller and the buyer, the more difficult it is for the former to actually sell (export) his/her services. By the same token, common language and contiguity may be considered as 'positive' forces that would help diminish the adverse effects of transaction costs; thus their expected positive signs.

The sign of more interest to me in this exercise is of course β_6, which measures the effect on bilateral trade if both countries belong to a common market or free trade area covering services trade. This EIA dummy is an all-encompassing variable, capturing every type of agreement on trade in services. The agreements included in this dummy, based on the availability of data on bilateral trade in services, are the following: Australia–New Zealand, Australia–Singapore, Australia–Thailand, Australia–US, Canada–Chile, Hong Kong–China, EC25, EC–Chile, EC–Mexico, EEA, EFTA, Japan–Mexico, Japan–Singapore, NAFTA, US–Chile and US–Singapore. See Table 19.2 for the agreements included in this variable, and the direction of trade flows.

But as has been explained in Section 4 above, free trade agreements (or PTAs *stricto sensu*) and common market initiatives involve different degrees of liberalisation and economic integration. Therefore, in order to isolate the impact of each type of agreement, I also estimate an extension of equation (19.2), where the EIA variable is actually decomposed according to the different types of EIA. Accordingly, I shall also estimate the following equation:

$$\ln(X_{ijt}) = \beta_0 + \beta_1 \ln D_{ij} + \beta_2 \ln(Y_{it}) + \beta_3 \ln(Y_{jt}) + \beta_4 Comlang_{ij} + \beta_5 Cont_{ij} + \beta_6 PTA_{ijt}, + \beta_7 EC_{ijt} + e_{ijt} \quad (19.3)$$

where PTA_{ijt} is a binary 'dummy' variable which is unity if both countries are parties to a PTA (typically known as free trade areas) covering services trade; and where EC_{ijt} is a binary 'dummy' variable which takes the value 1 if the exporter and the importer are both EC member states. The EC variable includes the 10 countries that joined the EC in 2004. In the case of the EC member states then, the internal market will be basically covered by this variable, while the PTAs between the EC and Chile, and between the EC and Mexico will be covered by the PTA variable.

Further detail on the construction of these dummies is warranted. First, the bilateral PTA dummy includes all the bilateral agreements entered into force between 1999 and 2006, or already in force throughout that period, between the pairs of countries for which there are data on bilateral services trade. Agreements such as ASEAN and

Table 19.2 Economic integration agreements covered by the study (and direction of trade flow)

Agreement	Date of entry into force
Australia–New Zealand	1-Jan-89
Australia–Singapore	28-Jul-03
Australia–Thailand	1-Jan-05
Australia–US	1-Jan-05
US-Australia	
Canada–Chile	5-Jul-97
China–Hong Kong, China	1-Jan-04
EC15 (intra-EC15 trade)	1-Jan-95
EC25 (intra-EC25 trade)	1-May-04
EC–Chile (exports from individual EC member states to Chile)	1-Mar-05
EC–Mexico (exports from individual EC member states to Mexico)	1-Oct-00
EEA (exports from EC countries to Iceland, Liechtenstein and Norway)	1-Jan-94
EFTA (exports from Iceland, Liechtenstein and Norway to Switzerland)	1-Jun-02
Japan–Mexico	1-Apr-05
Japan–Singapore	30-Nov-02
NAFTA	1-Jan-94
Canada–Mexico	
Canada–US	
US–Mexico	
US–Canada	
US–Chile	1-Jan-04
US–Singapore	1-Jan-04

Note: The first trading partner mentioned is the exporter. In some cases, two-way flows were available, such as between Australia and the US, Canada and the US, and the trade between individual EC member states.

MERCOSUR, whose members do not report figures of services exports or imports broken down by partner, have therefore been omitted. Other more 'ancient' agreements, such as ANZCERTA (Australia–New Zealand Closer Economic Relations Trade Agreement) and NAFTA, have been included in the sample.

Second, in order to assign the date of entry into force to the different agreements, I used the following rule: the agreement that entered into force before end-June of a given year will carry as the date of entry into force that same year, while the agreement that entered into force as of 1 July of a given year will carry as the date of entry into force the following year. For example, if the agreement entered into force on 1 February 2003, the date of entry into force will be 2003; and if the agreement entered into force on 1 December 2003, the date of entry into force will be 2004. The date of entry into force is the one that prompts the value '1' for the dummy variable.

Third, in the case of European countries, I have used data on individual countries' services exports, which allows us to capture the effect of both intra- and extra-EC trade. Intra-European trade among the 25 EC member states will be captured by the EC dummy, which will, for example, take the value 1 for the 1999–2006 period for France's

exports to Germany, and the value 1 as of 2004 for France's exports to the Czech Republic. Extra-EC trade (for example, France's or the Czech Republic's exports to Chile) will be captured by the PTA dummy.

Some clarifications with regard to the estimation are also in order. First, to be closely aligned with theories surrounding the gravity equation, I focus on unidirectional trade in services, and not on total trade. In particular, I focus on services from country *i* to country *j* as the dependent variable. The reason for this is that, as explained by Baldwin and Taglioni (2006) and Subramanian and Wei (2007), the basic theory tells us that the gravity equation is a modified expenditure function; it explains the value of spending by one nation on the goods produced by another nation. In other words, the gravity equation explains unidirectional bilateral trade. In this case, the choice of exports of services, instead of imports, has been deliberate. Indeed, in contrast to trade in goods, where import figures are generally more reliable than export figures, in the case of services, the contrary is true – export figures are more reliable than import figures, because surveys of domestic exporters in specific sectors are generally more reliable than surveys of importing entities throughout the whole economy.[22]

Second, I use country (importer and exporter) fixed effects, to cater for the so-called 'multilateral resistance' term. As explained by Anderson and van Wincoop (2003), many omitted factors can influence trade between pairs of countries. The most important of these omitted factors is the multilateral resistance term. Trade between any two countries depends negatively on the trade barriers of each country relative to the average barrier of the two countries with all trade partners. In other words, when multilateral trading costs (the barriers *vis-à-vis* the rest of the world) rise relative to bilateral costs (the barriers *vis-à-vis* the bilateral trading partners), trade flows rise between the country pairs *i* and *j*; and vice versa. Anderson and van Wincoop argue that multilateral resistance cannot be measured using remoteness variables based on measures of distance as these do not capture border effects; rather, the gravity equation must be solved by taking into account the impact of barriers on prices. The authors show that the estimation of the gravity equation can be greatly improved by incorporating what they refer to as 'multilateral resistance measures'. The importance of Anderson and van Wincoop's contribution is acknowledged in the literature. However, as Feenstra (2003) and others have noted, it has not been widely adopted in empirical research given the difficulties in its implementation (a customised programme is needed as the endogenous nature of the price terms requires a nonlinear solution). Feenstra shows that the inclusion of country-specific fixed effects generates the same results as Anderson and van Wincoop with little loss of efficiency. Since trade between any two countries depends on the multilateral resistance of both importers and exporters, I shall use time-varying fixed effects for both importers and exporters to account for factors specific to each country, such as the level of barriers (see Subramanian and Wei, 2007 for a similar approach).

Third, following Baldwin and Taglioni's (2006) recommendation, I use (undeflated) nominal trade and GDP data combined with time (year) dummies. As explained by these authors, the usual procedure of deflating trade and GDP figures back to a common year using, for example, the US price index can introduce important biases. They therefore recommend the use of time fixed effects (or time dummies) to cater for variations in inflation. These time fixed effects would also cater for other changing factors, such as the value of the dollar, the global business cycle and so forth.

While data on total services trade, as well as trade in selected BOP categories such as transport, travel and other commercial services, have generally been available for a long time, only a few countries offered a breakdown of these data (at least for total services) by trading partner. This explains the fact that previous gravity studies on services trade were only able to focus on very short periods – one, two or three years at most. However, data availability has improved markedly over the last few years, prompted by initiatives at the international level to improve services data collection with a view to *inter alia* match the GATS definitions of trade and the sectoral classification used in negotiations.[23] There are currently three main sources of BOP services trade data at the international level: Eurostat, OECD and the UN. The country and time coverage offered by these sources is not identical, however.

Briefly, the Eurostat Cronos database offers the longest time series, but focuses only on European countries and their partners (70 in total, including partner regions). The UN Services Trade Database covers around 80 reporters, with data broken down by partner (although not in all cases). Data are available from 2000. This dataset covers many reporters not included in the OECD database. Finally, the OECD Statistics on International Trade in Services includes data since 1999, for 27 OECD countries, plus Hong Kong and the Russian Federation.[24] It contains data broken down by partner, covering 55 partner countries and partner regions. This is the database used in this study. I used data on total services exports for the period available as of the date of writing (1999–2006).

It is worth noting that bilateral BOP figures correspond *grosso modo* to modes 1, 2 (through the category 'travel') and partially 4 (see Maurer et al., 2008 for further details).

Data on GDP were taken from the World Bank World Development Indicators. Data on distance, contiguity and common language were taken from the geographical database compiled by CEPII (Centre d'Études Prospectives et d'Informations Internationales, Paris). The distance variable used in this study is the distance between the most populated cities in the two countries concerned.

As noted above, the regressand is the natural log of services exports. I first estimated the gravity equation using as regressors only the 'traditional' gravity variables: GDP, distance, contiguity and common language. I applied successively OLS with year fixed effects; and then OLS with year, importer and exporter fixed effects. I then repeated the same procedures but adding the dummies capturing the different PTA arrangements. In all cases, I computed robust standard errors.

8 ESTIMATION RESULTS

As can be seen from the results in Table 19.3, the model works well for trade in services, with *R*-squares between 71 and 84 per cent, with 90, 95 and 99 per cent confidence intervals.

The signs of the traditional gravity variables are as expected: negative for the distance variable, and positive for GDP, contiguity and common language. The results improve significantly – in terms of their goodness of fit – with the simultaneous introduction of year, importer and exporter fixed effects. The distance coefficient is significant (around 1), when year, importer and exporter fixed effects are introduced. In all cases, contiguity and common language appear as important determinants of services trade, and in all

Table 19.3 Estimation results

	(1)	(2)	(3)	(4)	(5)	(6)
Log exporter's GDP	0.82*** (0.01)	0.94*** (0.08)	0.82*** (0.01)	1.02*** (0.08)	0.82*** (0.01)	1.02*** (0.08)
Log importer's GDP	0.78*** (0.01)	0.61*** (0.07)	0.77*** (0.01)	0.65*** (0.07)	0.78*** (0.01)	0.64*** (0.07)
Log distance	–0.63*** (0.01)	–0.94*** (0.02)	–0.60*** (0.01)	–0.93*** (0.02)	–0.60*** (0.01)	–0.93*** (0.02)
Contiguity	0.57*** (0.07)	0.61*** (0.07)	0.60*** (0.07)	0.62*** (0.07)	0.59*** (0.07)	0.62*** (0.07)
Common language	1.39*** (0.04)	0.80*** (0.04)	1.39*** (0.04)	0.80*** (0.04)	1.39*** (0.04)	0.80*** (0.04)
EIA			0.27*** (0.03)	0.11*** (0.03)		
PTA					0.39*** (0.05)	0.12*** (0.04)
EC25					0.30*** (0.03)	0.14*** (0.03)
Observations	9,942	9,942	9,942	9,942	9,942	9,942
R^2	0.71	0.84	0.71	0.84	0.71	0.84

Notes: Regressand: log of services exports. OLS estimates of a log-linear gravity model.
Robust standard errors are in parentheses. Equations (1), (3) and (5) have been estimated with OLS and year fixed effects.
Equations (2), (4) and (6) have been estimated with OLS, and year, importer, and exporter fixed effects.
*** Significant at 1 %.

cases more significant than the dummies catering for economic integration agreements, PTAs and the EC.

The estimated coefficients for GDP variables are all significant. When the year, importer and exporter fixed effects are introduced, the exporter's GDP coefficient becomes much larger than the importer's GDP coefficient. This could be interpreted as evidence of a 'home-market effect' in services trade, as derived by Krugman (1980). The 'home-market effect' is the tendency for large countries to be net exporters of products (in this case services) with high transport costs and strong scale economies. In the presence of fixed costs, and thus scale economies, firms prefer to concentrate global production of a product or service in a single location; in the presence of transport costs, it makes sense for this location to be a market with high product demand. The home-market effect implies a link between market size and exports that does not exist in models in which trade is based solely on comparative advantage. In terms of the gravity equation, this effect should translate into a significantly higher coefficient for the exporter's GDP variable than for the importer's GDP (see also Feenstra et al., 1998).

The effect of membership in an EIA, whether a free trade area or a common market, is positive and significant. In column 3, the coefficient of EIA implies that services trade between EIA signatories is 31 per cent higher than for other country pairs, after controlling for economic size, distance, adjacency and linguistic ties.[25] Controlling for country-specific (importer and exporter) fixed effects in column 4 reveals a smaller effect of membership in an EIA, suggesting that intra-bloc services trade is about 12 per cent higher.

An interesting question is whether the effect of membership in an EIA covering services trade depends on the type of agreement. In this empirical estimation, I have distinguished between typical free trade agreements, such as the NAFTA, or the agreement between Australia and the US, and deeper integration agreements, primarily exemplified by the European internal market. A relevant question is: is there any difference in the effect of these different types of agreement on services trade? The answer may be negative, or at least not significant. In column 5, computing only year fixed effects, both types of agreement appear to have very significant effects on bilateral services trade – 35 per cent for the EC and 47 per cent for bilateral PTAs. However, controlling also for importer and exporter fixed effects in column 6 leads again to a smaller effect on bilateral services trade (between 13 and 15 per cent), with a slight advantage to deeper integration agreements.

Why is there not a bigger difference between the EC and other PTAs? At this stage one can only suggest some hypotheses. On the one hand, since the EC is relatively open to the rest of the world, the internal preference margin may thus be smaller than in other PTAs, where trading parties maintain more restrictions towards non-PTA members. On the other hand, intra-EC services trade flows are probably below their potential. Further integration will have to come probably from the reduction of regulatory diversity, for example, elimination and enhanced harmonisation of regulatory barriers.

9 CONCLUDING REMARKS

EIAs on services are on the rise and have become a notable feature of current trade policy for this sector. They are proliferating against a backdrop of profound changes in services

production and trade. However, very little research has been carried out with regard to the impact of these agreements on bilateral services trade – compared to the more extensive research exploring the effects of these agreements on trade in goods. Several factors can explain that apathy, from the novelty of the issue to the paucity of reliable data. With that question in mind, the chapter took a deliberate empirical approach.

Making use of the – still limited but improving – availability of statistics on bilateral trade in services, the main purpose of this chapter was to provide an initial quantitative estimate of the effect of PTAs on bilateral trade in services, using the standard gravity model. At the same time, the chapter also added to the – again still limited – literature on the other – not institutionally or politically motivated – determinants of services trade 'in the standard gravity tradition'.

Although preliminary, and most probably incomplete, the empirical exercise has led to some interesting findings that would certainly deserve further research. First, my findings show that distance (which here probably represents transaction costs in general rather than the costs of physical distance between markets) is relevant for trade in services. In fact, it turns out to be very significant once time and country fixed effects are taken into account. Second, there seems to be evidence of a 'home-market effect' in services, which would deserve further attention with a view to achieving a better understanding of trade in services. Third, and most importantly for this chapter and this Handbook, PTAs appear to have positive effects on bilateral services trade, in the order of 12 to 15 per cent.

However, it has not been possible to find a significant difference – in terms of their effect on services trade – between PTAs and deep integration initiatives such as the European internal market. This may be due to the inherent limitations of the methodology followed in this chapter – the gravity equation – which can give only a partial indication of the effect of agreements on bilateral services trade. But it can also point to more fundamental differences between these two types of economic integration schemes. In fact, while the relative openness of the EC to the rest of the world may imply a smaller internal preference margin than in other PTAs, where trading parties maintain more restrictions towards the rest of the world, the results may also be an indication that intra-EC services trade flows are still below their potential, and that further expansion of those flows will necessarily have to come from more ambitious initiatives intra-EC to reduce regulatory diversity.

Further research is certainly needed. Apart from methodological issues that need to be further explored and eventually tackled in future estimations (such as the existence of zero flows and the endogenous nature of PTAs), it would be interesting to consider other aspects of PTAs in services, such as the effect of PTAs on trade in individual services (particularly taking into account that service sectors differ in their tradability); the effect of PTAs on trade through commercial presence (which is at least as important in value terms as cross-border trade); and the potential diversion effects of PTAs on trade in services. Further analysis along these lines will of course be confronted with significant methodological challenges, but will be essential in order to get a better understanding not only of services trade but also of economic integration in general.

SUMMARY

Economic integration agreements (EIAs) covering services are proliferating against a backdrop of profound changes in services production and trade. After reviewing the basic economics of services trade, and the main features of EIAs in services, the chapter provides an initial quantitative estimate of the effect of these agreements on bilateral trade in services, using the standard gravity model. At the same time, it estimates the effects of other – not institutionally or politically motivated – determinants of services trade 'in the standard gravity tradition'. The chapter shows that services trade between two countries is positively related to their size and negatively related to the distance between them. In fact, there is evidence of a 'home-market effect' in services. Most importantly for this chapter and this volume, preferential trade agreements (PTAs) appear to have positive effects on bilateral services trade, in the order of 12 to 15 per cent. However, it has not been possible to find a significant difference – in terms of their effect on services trade – between PTAs and deep integration initiatives such as the European internal market. This may be pointing to fundamental differences between these two types of EIAs.

Keywords

Services, trade, economic integration, trade barriers, gravity models.

JEL Classification

F13, F15, F17, L80.

NOTES

1. This is a slightly revised version of the chapter 'Do PTAs actually increase parties' services trade?', (forthcoming) in Kyle Bagwell and Petros C. Mavroidis (eds), *Preferential Trade Agreemens: Yesterday's Issues, Tomorrow's Anxieties*, Cambridge: Cambridge University Press. The data, econometric methodology and results are the same, though.
2. The author would like to thank Rolf Adlung, Gene Grossman, Petros C. Mavroidis and Roberta Piermartini for helpful comments, discussions and suggestions on an earlier version of this chapter. All remaining errors are my own. The views expressed are personal and do not necessarily represent those of the WTO members or the WTO Secretariat.
3. The information on notifications was obtained from the WTO database on regional trade agreements.
4. For further discussion on the relationship between services, economic development and the cost of protection, see Marchetti (2007).
5. See Hoekman and Primo Braga (1997).
6. For further analysis of the policy implications involved in preferential liberalisation of services trade, see Fink and Mattoo (2004).
7. See Marchetti (2007) for a discussion of trends in services outsourcing and offshoring.
8. Based on statistics from the WTO statistics database. The World Bank defines 'high-income countries' as those with a GDP per capita above US$11,906 in 2008.
9. For definitions of cross-border trade and consumption abroad in GATS and other PTAs, see the following section of this chapter.
10. For further information on the measurement of trade in services, see Maurer et al. (2008).
11. For an analysis of liberalisation commitments in several PTAs negotiated in this decade, see Marchetti and Roy (2009) and Roy et al. (2007, 2008).

12. See, for example, the following PTAs: EFTA–Korea, EFTA–Chile, EFTA–Mexico, EC–Chile, EC–Mexico and ASEAN, and MERCOSUR's protocol on services.
13. For a discussion on 'services supplied in the exercise of governmental authority', see Marchetti and Mavroidis (2004).
14. Three levels of commitments are possible in GATS-type schedules: (i) full commitments, whereby a country commits itself not to apply any of the six market access limitations and not to discriminate foreign services and service suppliers. This is indicated by inscribing the word 'none' in the sector and model of supply concerned; (ii) partial commitments, whereby the country indicates which market access limitations may apply, and any applicable limitation on national treatment; and (iii) no commitment at all, whereby the country reserves the right to impose any of the six market access limitations or to discriminate, for example, foreign services and service suppliers. This is indicated by inscribing the word 'unbound' in the sector and mode of supply concerned.
15. Article 1201 NAFTA provides that Chapter 12 on 'Cross-Border Trade in Services' applies to measures relating to such trade where it is defined as the 'provision of a service (a) from the territory of a Party into the territory of another Party, (b) in the territory of a Party by a person of that Party to a person of another Party, or (c) by a national of a Party in the territory of another Party, but does not include the provision of a service in the territory of a Party by an investment, as defined in Article 1139 (Investment – Definitions), in that territory'.
16. See NAFTA Article 1213 and Canada–Chile Article H-12.
17. The other freedoms include the free movement of goods, the free movement of persons, and the free movement of capital.
18. The free movement of services rules can also be extended to nationals of a non-EU country who provide services and who are established within the EU.
19. Directive 2006/123.
20. Switzerland is not part of the EEA Agreement, but has a series of bilateral agreements with the EU, including an insurance agreement signed in 1989. The Vaduz Convention between the four EFTA countries, which entered into force in June 2002, introduced provisions on investments and trade in services (defined as covering the equivalent to modes 1, 2 and 4 of the GATS) into the EFTA framework. Under the Convention, trade and investment in services between EFTA states is liberalised, subject to reservations lodged by each EFTA state at the conclusion of the negotiations. Liberalisation was thus subject to a negative list approach. These reservations are to be reviewed with a view to their removal. It is worth noting that Iceland, Liechtenstein and Norway as member states of the EEA had already lifted most of these limitations to investment and trade in services among themselves and *vis-à-vis* the other EC member states, while this is not the case in respect of Switzerland. Most of the reservations maintained by the EFTA states under the revised Convention reflect their current commitments under the GATS.
21. See also Feenstra et al. (2001) and Evenett and Keller (2002).
22. I thank Andreas Maurer and Joscelyn Magdeleine, from the WTO, for pointing this out to me.
23. See the Manual of Statistics of International Trade in Services, issued in 2002 by Eurostat, the IMF, the OECD, the UN, the World Bank and the WTO, and which is currently being reviewed. The new version is expected to be completed in 2009.
24. The 30 member countries of OECD are: Australia, Austria, Belgium, Canada, the Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Korea, Luxembourg, Mexico, the Netherlands, New Zealand, Norway, Poland, Portugal, the Slovak Republic, Spain, Sweden, Switzerland, Turkey, the United Kingdom and the United States. However, Korea, Mexico and Switzerland do not publish data broken down by partner country.
25. The formula to compute these effects is $(e^{\beta_i} - 1) \times 100$, where β_i is the estimated coefficient.

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