



OECD Economic Studies

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OECD Economic Studies



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FOREWORD

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TABLE OF CONTENTS

THE INFLUENCE OF POLICIES ON TRADE AND FOREIGN DIRECT INVESTMENT 7

Giuseppe Nicoletti, Stephen S. Golub, Dana Hajkova, Daniel Mirza et Kwang-Yeol Yoo

This paper assesses the importance of border and non-border policies for global economic integration. The focus is on four widely-advocated policies: removing explicit restrictions to trade and FDI; promoting domestic competition; improving the adaptability of labour markets; and ensuring adequate levels of infrastructure capital. The analysis covers FDI and trade in both goods and services, thus aiming to account for the most important channels of globalisation and dealing with most modes of cross-border services supply. The results highlight that, despite extensive liberalisation over the past two decades, there is scope for further reducing policy barriers to integration of OECD markets. Remaining barriers have a significant impact on bilateral trade and FDI, with anticompetitive domestic regulations and restrictive labour market arrangements estimated to curb integration as much as explicit trade and FDI restrictions. Simulating the removal of such barriers suggests that the quantitative effects of further liberalisation of trade, FDI and domestic product and labour markets on global integration could be substantial.

MEASURES OF RESTRICTIONS ON INWARD FOREIGN DIRECT INVESTMENT FOR OECD COUNTRIES 85

Stephen S. Golub

This paper provides new measures of restrictions on inward foreign direct investment (FDI) for OECD countries. Several different types of restrictions are considered: limitations on foreign ownership, screening or notification procedures, and management and operational restrictions. These restrictions are computed for nine sectors and eleven sub-sectors, most of which are in services, and then aggregated into a single measure for the economy as a whole. According to the aggregate indicators, the last two decades, and especially the 1990s, have witnessed dramatic liberalisation in FDI restrictions. OECD countries are now generally open to inward FDI, although there remain substantial differences between countries and across industries. The most open countries are now in Europe, at least as far as statutory restrictions are concerned. The preponderance of remaining restrictions is in services, with almost no overt restrictions in manufacturing.

THE DECLINE IN PRIVATE SAVING RATES IN THE 1990S IN OECD COUNTRIES: HOW MUCH CAN BE EXPLAINED BY NON-WEALTH DETERMINANTS? 117

Alain de Serres and Florian Pelgrin

The substantial decline in private-sector saving rates observed in several OECD countries in the late 1990s coincided in several cases with a sharp increase in household financial net worth. This was seen by many observers as evidence that the strong rise in equity and residential property prices during the late 1990s had been treated by households as a permanent increase in wealth, leading to an unsustainable drop in saving and raising fears of an eventual negative wealth effect. Applying estimation techniques for systems of dynamic panel equations, this paper

looks at basic determinants of private saving for a sample of 15 OECD countries and finds that the sharp decline in saving observed after 1995 can be largely explained, even in a post-sample fashion, by fundamentals other than financial wealth. Among the determinants, the rise in public-sector saving is found to have contributed the most to the decline in private saving between 1995 and 2000. Based on this investigation, there is little evidence that consumers had gone too far in responding to the stock market boom of the late 1990s, even in countries where private saving rates have fallen to historically low levels. On the other hand, the results suggest that a loosening of fiscal policy may have a limited stimulatory impact on private consumption.

FISCAL RELATIONS ACROSS GOVERNMENT LEVELS 155

Isabelle Joumard and Per Mathis Kongsrud

Despite its apparent advantages, devolution of fiscal responsibilities has not proceeded evenly over the past two decades. Decentralisation can strengthen the democratic process, allow governments to tailor the supply of public goods to local preferences and introduce some competition across jurisdictions, thus raising public sector efficiency. It can, however, entail efficiency losses and make it difficult to implement redistributive policies. On the spending side, local provision may fail to exploit economies of scale and internalise territorial spillovers – a serious issue since few public goods are purely local by nature. On the revenue side, few tax bases can be exploited by sub-national governments without risking making national objectives difficult to achieve and raising serious distributive concerns. This paper, which is largely based on country experiences in mitigating the potential drawbacks of decentralisation while obtaining most of its benefits, provides a framework for assessing fiscal relations across levels of government.

TARIFF BINDINGS, UNUSED PROTECTION AND AGRICULTURAL TRADE LIBERALISATION 231

Peter Walkenhorst and Nora Dihel

Prior quantitative assessments of the effects of agricultural trade liberalisation have assumed that negotiated reductions in bound tariffs translate into corresponding cuts in applied tariff rates. This approach, however, overestimates the actual reduction in applied tariffs and, hence, the benefits of trade liberalisation, since applied rates are often much lower than the tariffs bound in Uruguay Round schedules. This paper uses data on applied and bound tariffs and the GTAP-CGE model to quantify the magnitude of the resulting bias. The findings suggest that the distortion of estimates is particularly pronounced for modest tariff cuts, as well as for countries where the differences between bound and applied rates are substantial. Hence, quantitative policy analysts who aim to inform decision makers on the likely impacts of negotiated tariff cuts should consider the relationship between bound and applied tariff rates in their assessments in order to avoid mistaken advice.

THE INFLUENCE OF POLICIES ON TRADE AND FOREIGN DIRECT INVESTMENT

**Giuseppe Nicoletti, Stephen S. Golub, Dana Hajkova,
Daniel Mirza and Kwang-Yeol Yoo**

TABLE OF CONTENTS

Introduction	8
Recent trends in trade, FDI and the internationalisation of production	9
Trends in FDI	10
Trade developments: goods and services	17
Twin developments in FDI and trade	22
Policy and other determinants of trade and international investment	24
Openness	24
Product-market regulation	33
Labour-market arrangements	37
Infrastructure	38
Geographical and economic factors	40
Empirical evidence	41
Approach	42
Non-policy-related structural factors impinging on trade and FDI	44
The direct and indirect influence of policies	48
Summing up	58
How do policies shape trade and FDI patterns?	59
Accounting for cross-country patterns of trade and FDI	60
The impact of removing impediments to trade and FDI	64
Summary and conclusions	70
Openness: formal trade and FDI restrictions	70
Product-market reforms	71
Labour-market reforms	72
Infrastructure	72
Bibliography	79

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INTRODUCTION

The beneficial effects of foreign trade and foreign direct investment (FDI) on efficiency and growth are generally recognised, and there is a wide consensus that policy should aim at reducing or eliminating hindrances to global trade and FDI integration. Successive multilateral trade rounds, regional trade agreements and bilateral and multilateral investment accords have reduced formal barriers to trade and FDI. The current World Trade Organization (WTO) trade negotiations aim at continuing this trend. However, border barriers are still significant in some countries and industries, in particular in the form of restrictions to FDI. Moreover, there is growing recognition that policies aimed at non-border-related objectives may have a significant impact on the extent of trade and activities of multinational enterprises (MNEs). Thus, unnecessarily restrictive product and labour-market regulations can act as barriers to trade and FDI. The state of the domestic physical infrastructure can also influence countries' capacities to participate in the globalisation of economic activity.

This paper assesses the importance of certain border and non-border policy measures for global economic integration. A number of studies have looked at the influence of economic and/or policy factors on trade and FDI, but most of them tended to deal mainly with geographical and structural factors or focus on a small subset of policy variables (*e.g.* border variables). Building on previous OECD work, this paper takes into account a much broader set of policy variables, including product and labour-market regulation as well as openness to FDI and infrastructure supply. In addition, it looks at both FDI and trade, in a framework in which these two dimensions of global integration respond to similar structural and policy factors. The analysis covers FDI and trade in both goods and services, thus aiming to account for the most important channels of globalisation and dealing with most modes of cross-border service supply.¹ The aim of the paper is threefold:

- First, it describes trends in goods trade, services trade and FDI, as well as border and non-border policies that are likely to affect them. To this end, a large set of policy indicators constructed by the OECD is used, including the new summary indicators for FDI-specific regulations described in Golub (2003). Indicators of tariffs, non-tariff barriers and participation in free trade areas are also used to gauge the stance of policy toward trade openness.²

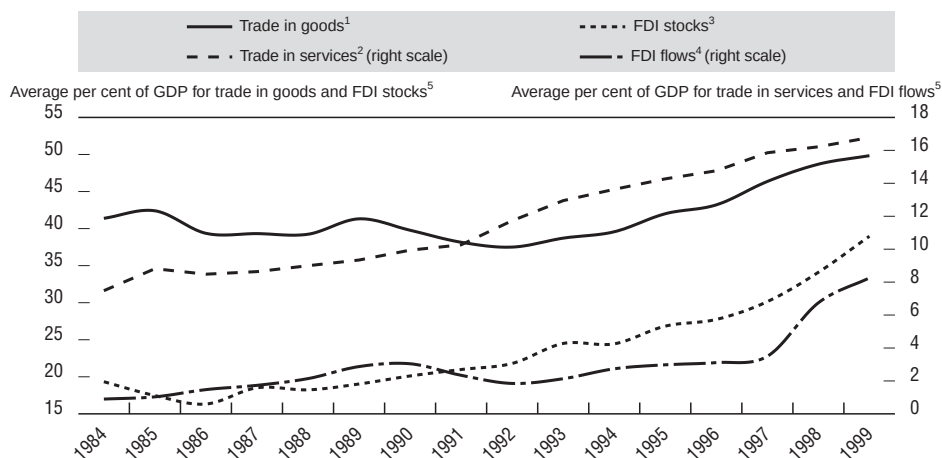
- Second, the paper estimates the impact of these policies on trade and FDI in a framework in which trade flows and the activity of MNEs are seen to be determined jointly and respond to the same market and policy influences.³ The empirical analysis focuses on bilateral trade and FDI patterns, including bilateral trade in services, but also looks at the determinants of multilateral inward FDI to explain the overall ability of individual OECD countries to attract international investment.
- Third, using the results of the empirical analysis, the paper discusses and quantifies the effects on global integration of policies targeted at removing border and non-border barriers and levelling the playing field for FDI in the OECD area. In this context, the focus is on four widely-advocated policies: removing explicit restrictions to trade and FDI; promoting domestic competition; improving the adaptability of labour markets; and ensuring adequate levels of infrastructure capital. It should be noted at the outset that the results of the simulations are only suggestive of what could happen under different policy scenarios, notably because the empirically-estimated models on which they are based are partial equilibrium, reduced-form models that are unable to account for the general equilibrium interactions between policy changes and trade and FDI flows. Notably, to the extent that diversion effects are important, the simulation results may overestimate the effects of policy changes on the variables of interest.

The paper is structured as follows. The next section documents recent trends in foreign trade and internationalisation of production. The following sections, respectively: discuss the main factors that are likely to jointly affect trade and FDI patterns in OECD countries, focusing on the role of policy; present econometric evidence on the impact of these factors on trade and FDI; use the results of this analysis to perform policy simulations; and conclude. Details about empirical results (including their sensitivity to changes in empirical specifications) and the construction of the underlying data sets can be found in Nicoletti *et al.* (2003).

RECENT TRENDS IN TRADE, FDI AND THE INTERNATIONALISATION OF PRODUCTION

Focusing on the OECD area, Figure 1 depicts stylised facts on what is commonly called “globalisation”. Over the past decade, both the trade intensity (defined as the sum of exports and imports over GDP) and the foreign investment intensity (defined as the sum of outward and inward FDI positions over GDP) have increased significantly in the average OECD country.⁴ The upward trend was particularly pronounced since the early 1990s for FDI and trade in goods, which remained significantly more intense than services trade. The aim of this section is

Figure 1. Trade and FDI patterns in the OECD



1. Trade in goods is defined as the sum of exports and imports of goods realised between a reporting country and the OECD area.
2. Trade in services is defined as the sum of exports and imports of services realised between a reporting country and the world (due to the lack of OECD-specific data, services trade cannot be defined relative to the OECD area).
3. FDI stock is the sum of inward and outward positions of the average country in the OECD area.
4. FDI flows are the sum of yearly investment inflows and outflows of the average country to the OECD area.
5. Simple average of the ratios of OECD countries.

Source: OECD.

to illustrate the main cross-country and cross-industry features of these trends and highlight some of the questions that need to be addressed to understand the economic factors that underlie these phenomena as well as the role that policy can play in favouring the trend towards OECD-wide integration.

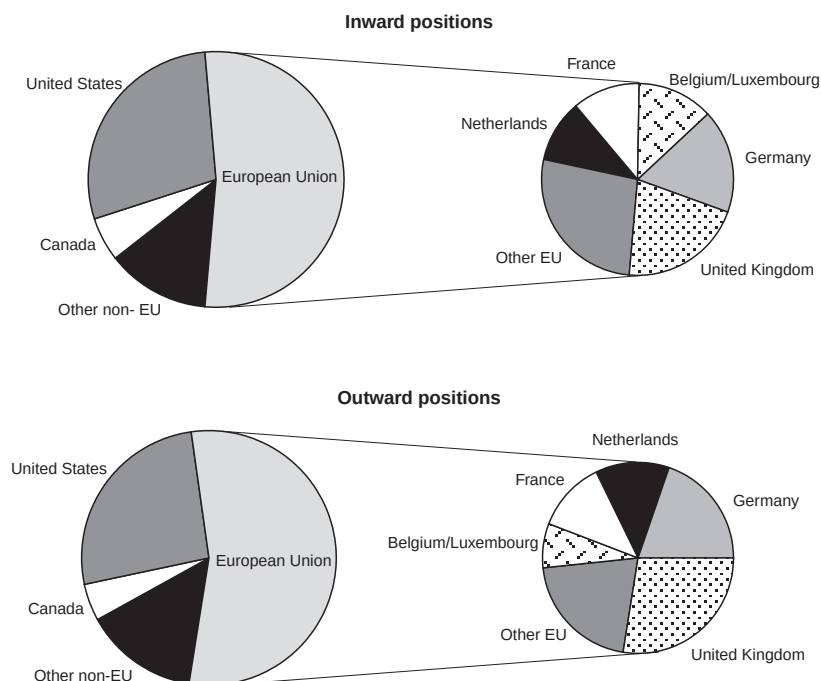
Trends in FDI

Most global international investment activity goes on among OECD countries and takes the form of ownership changes in existing enterprises (mergers and acquisitions, privatisation), with so-called “green-field” investment playing only a minor role (OECD, 2002).⁵ While different forms of FDI might respond to policies differently, the empirical analysis of the paper is based on aggregate financial FDI data since the identification of the different forms of FDI is not possible for many OECD countries. In 1999, the OECD accounted for around 91 per cent of world investment outflows and 74 per cent of world inflows (UNCTAD, 2001). Over the same period, EU countries combined were both the largest recipients and the

largest suppliers of FDI in the OECD area, followed by the United States, Japan, Canada and Switzerland (Figure 2).

The average share of FDI inflows in total business investment went from little more than 3 per cent over the 1980s to almost 11 per cent in the 1990s, bringing about a significant increase in the outward and inward positions of most OECD countries. Given the way these data are constructed (Box 1), part of this increase may be due to a revaluation of existing positions reflecting the sharp increase in equity prices over the same period (OECD, 2002c). Nonetheless, the upward trend in FDI flows points to a rising internationalisation of production over the 1990s. FDI activity dropped sharply in recent years, but most observers attribute the decline to transitory causes rather than to a reversal of the earlier decade-long upward trend.⁶

Figure 2. Distribution of OECD FDI positions in 1998¹



1. The charts are based on bilateral data. As the method used for valuing FDI positions varies across countries, the resulting shares are undervalued for countries that report book values (e.g. the United States).

Source: OECD.

Box 1. Trade and FDI data

Foreign direct investment

Foreign direct investment is a category of international investment made by a resident entity in one country (direct investor) with the objective of establishing a lasting interest in an enterprise resident in another country (direct investment enterprise).¹ This involves both the initial transaction between the two entities and all subsequent capital transactions between them and among affiliated enterprises, both incorporated and unincorporated.

Conventionally, a foreign direct investment enterprise is an incorporated enterprise in which a foreign investor owns 10 percentage or more of the ordinary shares or voting power or an unincorporated enterprise in which a foreign investor has equivalent ownership. Financial FDI data may be geographically biased to the extent that MNEs use strategically-located holding companies to intermediate their investments.

Statistics on FDI transactions and positions are based on the OECD database developed by the Directorate for Financial, Fiscal and Enterprise Affairs (published under the title *International Direct Investment Statistics Yearbook*). These statistics are compiled according to the concepts used for balance of payments (flows) and international investment position (stocks) statistics. Both data sets are available for inward and outward investment with further breakdowns i) by partner country and ii) by economic sector (according to ISIC Rev. 3 classifications).

Generally, information on inward flows and stocks and on outward flows and stocks is available. The data set used in the empirical analysis covers 28 OECD countries (Luxembourg and Belgium report together; data for Slovakia are not included) over the 1980-2000 period and hence comprises 756 country-partner pairs per year for a potential of 15 876 observations. However, some countries are not yet able to provide complete sets of statistics and, therefore, the panel is unbalanced.² An attempt has been made to restore some of the missing data by using available antipodal bilateral data.

Substantial progress has been made towards the agreed international standards for FDI data compilation established by the IMF and the OECD. However, some OECD countries still deviate from the standards in terms of, for instance, the elements included in the disseminated data (income on equity, reinvested earnings and income on debt), the treatment of indirectly-owned investment enterprises or, to a minor extent, definitions used to identify direct investment enterprises resident in the reporting country. The majority of countries report data on investment positions based on book values, but some measure the positions in market values. These issues make the cross-sectional comparability of the data somewhat problematic.

Foreign trade

Information on international trade has been collected from three sources. Data on trade in goods come from the OECD publication *International Trade by Commodity*

Box 1. Trade and FDI data (cont.)

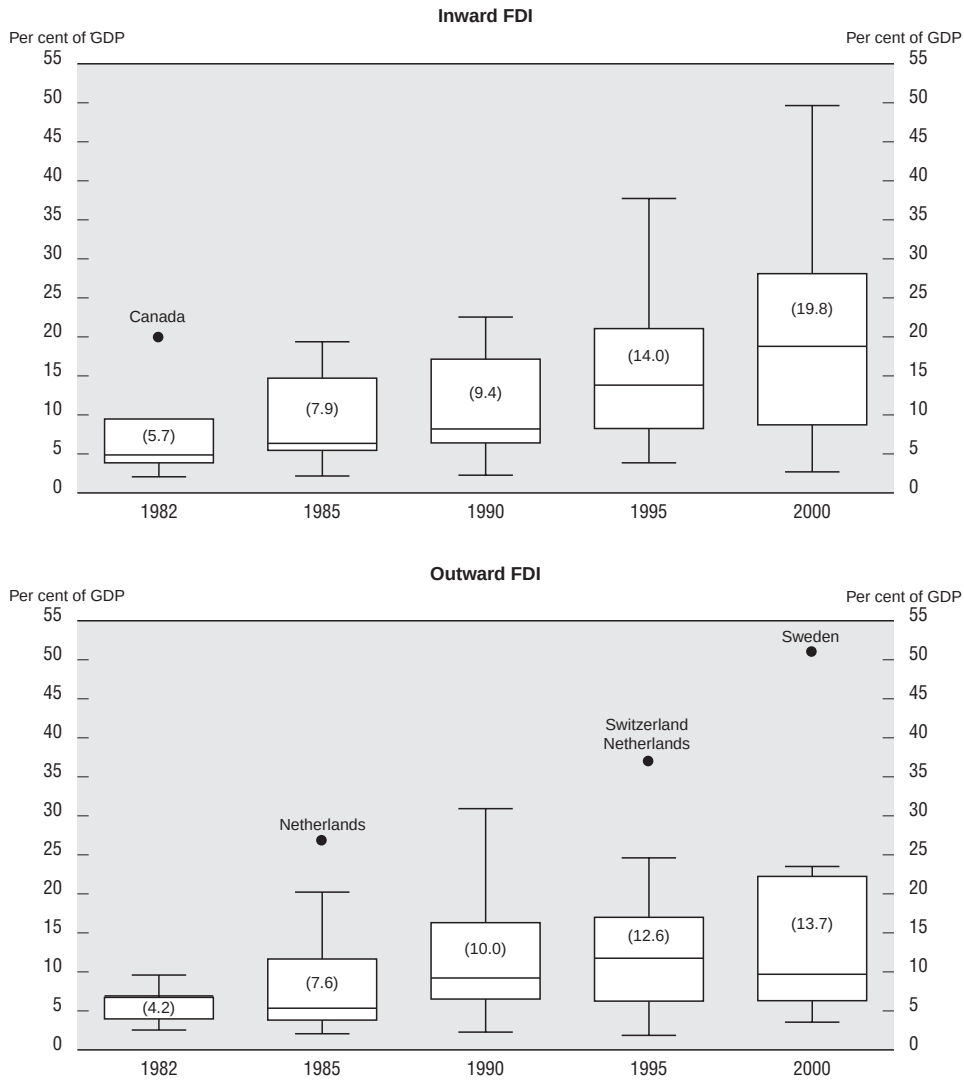
Statistics and match the same format as the financial FDI data, *i.e.* 28 countries and partners during the period 1980-2000. Information on trade in services with partner disaggregation has been taken from the OECD *Statistics on International Trade in Services* 1999-2000. Information is available for two years only, the data covering 20 countries and 27 partners.³ Data on trade in services by sector (bilateral information is not available) are based on the OECD *Statistics on International Trade in Services* 1990-1999. These data have been so far used for descriptive purposes only.

1. "Lasting interest" implies the existence of a long-term relationship between the direct investor and the enterprise and a significant degree of influence by the direct investor on the management of the direct investment enterprise.
2. For the period 1980-2000, no geographic breakdown is available for the stock data for the Belgium-Luxembourg Economic Union, Spain, Ireland and Turkey; for outward stocks for Hungary and Mexico; and for outflows for Greece and Mexico.
3. Balance of payments statistics on services cover cross-border supply (*e.g.* freight and communications) and consumption abroad (*e.g.* tourism). They exclude the exchange of services that take place through commercial presence (*i.e.* the activity of foreign affiliates) and movement of individuals (*i.e.* temporary presence of service suppliers).

The general move towards internationalisation has been matched by an increasing cross-country dispersion of the amount of FDI supplied and hosted relative to the size of the investor and host countries (Figure 3). By the year 2000, the variances of the instock and outstock as ratios to GDP among OECD countries were larger than two decades earlier, though less so for outstocks. Figure 3 also shows that a number of host countries have relatively large instock ratios, while outstock ratios tend to be more evenly distributed across investor countries. Focusing on inward FDI positions, Figure 4 shows the average instock to GDP ratios of individual countries in the 1980s and 1990s. It suggests that the largest contribution to the increase in the cross-country dispersion of the OECD instock was provided by Ireland, Belgium and the transition countries, in which inward FDI surged during the 1990s.

The variance of the multilateral measures masks very different cross-country patterns at the bilateral level. First, in 1998 (the latest year for which bilateral data are reasonably complete) the number of host partners varied across investing countries, ranging from below 10 for Hungary and Turkey to above 20 for many EU countries, the United States and Canada. Second, the extent to which countries

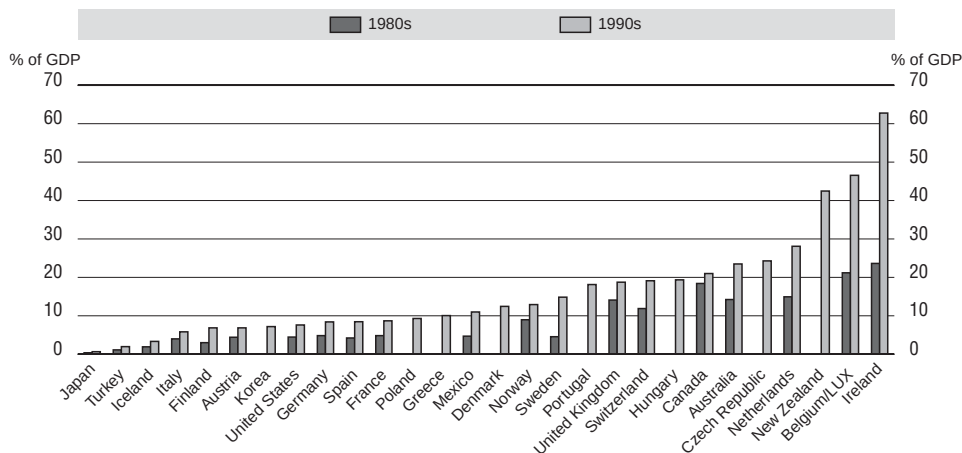
Figure 3. **Inward and outward FDI positions: trends and cross-country dispersion¹**
Unweighted OECD average position²



1. The box plot shows, in each year, the median OECD value of the inward or outward stock of FDI (the horizontal line in the box), the third and second quartiles of the cross-country distribution (the edges of each box) and the extreme values (the two whiskers extending from the box). Dots identify outlier observations.
2. Data in parentheses are unweighted average GDP ratios.

Source: OECD.

Figure 4. Inward FDI positions in OECD countries, 1980s and 1990s¹



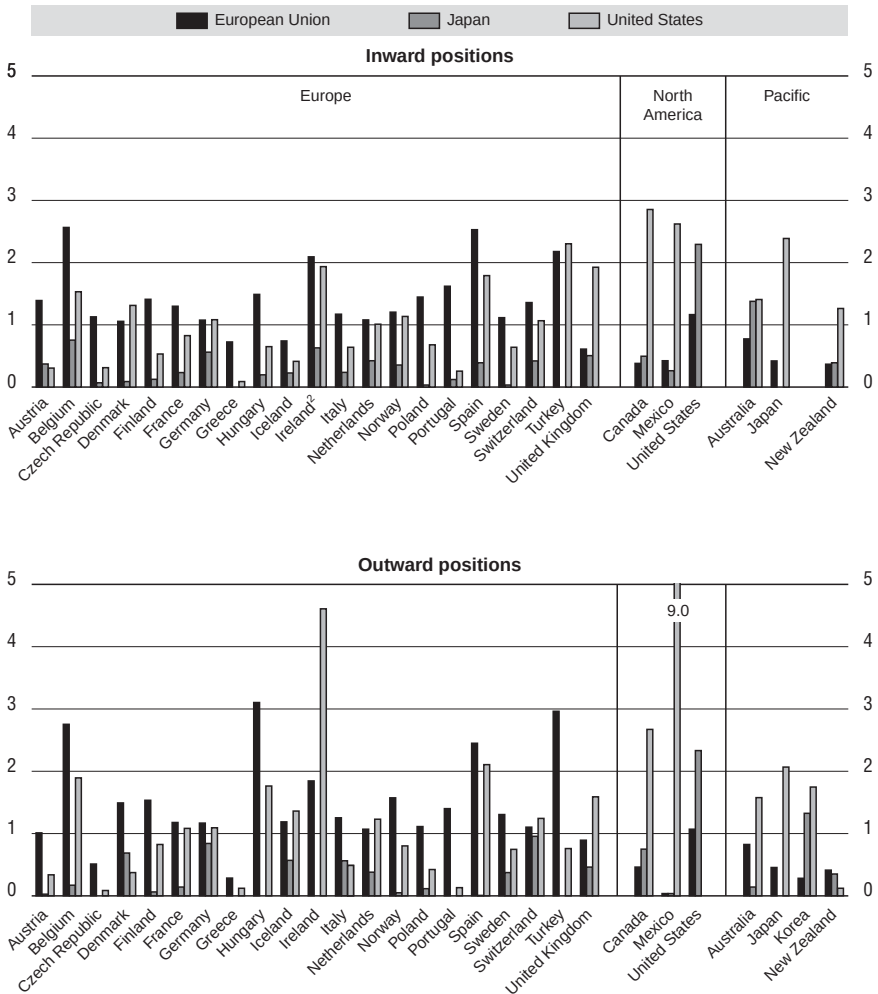
1. Average values over the two periods. For countries where FDI position data are not available, values of bilateral stocks reported by their OECD partners were summed up to obtain an approximate measure of multilateral FDI stocks.

Source: OECD.

geographically specialise their FDI across a given number of partners also differs. While many countries tend to evenly distribute their FDI across partners, some of them (*e.g.* Canada, Korea, Denmark and the United Kingdom) tend to concentrate FDI on a few host countries. Similarly, some countries (Austria, Canada, the United Kingdom and Mexico) mostly host FDI originating from just a few countries.

The indicators depicted in Figure 5 report patterns of geographical specialisation focusing on inward (and outward) FDI from (to) the European Union, the United States and Japan – where specialisation is defined in terms of a country hosting (supplying) a share of FDI from an investor country (to a host country) larger than the share hosted (supplied) by the OECD. Geographical factors are clearly important in explaining patterns of FDI instocks (Panel A): most European countries specialise in hosting FDI originating from EU countries; Canada, Mexico and Ireland specialise in hosting FDI from the United States; and Pacific shore countries specialise in hosting FDI from the United States and/or Japan. Interestingly, however, the degree of geographical specialisation varies significantly both within the same area and relative to countries located outside the area. On the whole, the dispersion of specialisation patterns suggests that geographical factors are important, but they cannot explain the entire variability in the data.⁷

Figure 5. **Patterns of geographical specialisation in inward and outward FDI¹**
Average 1995-1998



1. Inward geographical specialisation is defined as the revealed tendency of a country to host a share of FDI from an investor country (European Union, Japan, United States), which is larger than the share hosted by the OECD as a whole. Outward geographical specialisation is defined as the revealed tendency of a country to invest a share of FDI in a host country (European Union, Japan, United States) which is larger than the share invested by the OECD as a whole. A country is "geographically specialised" in investing to (or in hosting from) another country if the indicator is above unity. For computational details, see Annex.
2. Data for FDI from Japan are for 1991-1994.

Source: OECD.

Trade developments: goods and services

As pointed out in Figure 1, both goods and services trade flows rose faster than GDP over the past decade in the OECD area. At the same time, the intensity of trade in services remained much lower than in goods. Underlying these OECD-wide stylised facts are wide cross-country differences in export and import intensities and in the geographical specialisation of the exports of individual OECD countries.

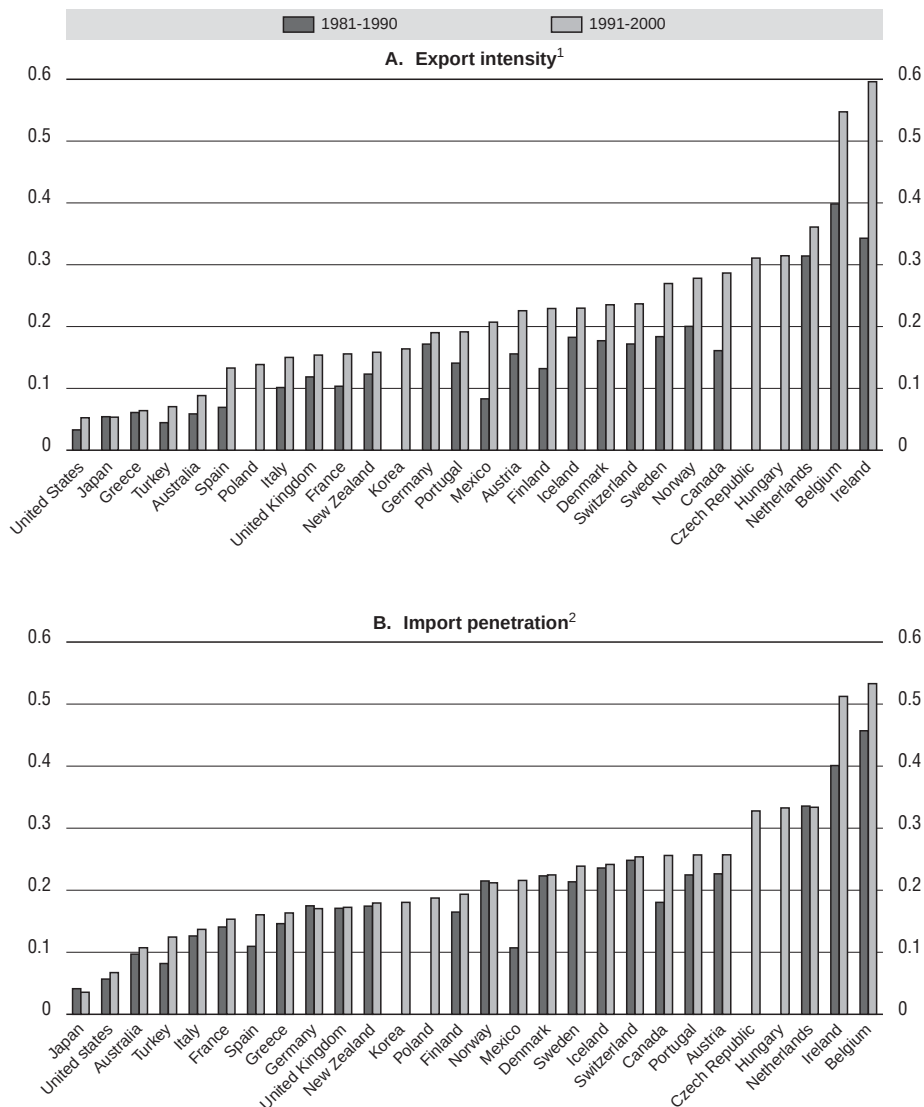
Goods trade

Figure 6 shows average intensities of goods trade within the OECD area for individual member countries over the 1980s and the 1990s. The intensity of exports to OECD countries (defined as the share of exports in GDP) increased in all countries except Japan,⁸ partly reflecting a stronger propensity of the Japanese economy to export to non-member Asian countries over the past decade (Panel A). The increase was particularly noticeable in Ireland and Mexico, which almost doubled their OECD export intensity between the two periods, but significant increases also took place in Canada and the northern European countries. It is also known that the increase in OECD export intensities over the 1990s has been marked for transition member countries.

The increase in trade intensities over the past two decades has probably been matched by rising intra-firm trade related to the widening role played by MNEs in the OECD area (OECD, 2002d). Indirect evidence of this is provided by the rising share of intra-industry trade, especially in transition countries, which parallels the sharp increase in FDI inflows over the same period. Direct measures of intra-firm trade, which are available for only a few countries (notably the United States, Japan and some Nordic countries), also point in this direction. The available data suggest that intra-firm trade among MNEs and foreign affiliates located in high-income OECD countries mainly involved the export of final goods for sale in local markets, reflecting horizontal-type FDI, while trade between MNEs located in high-income countries and their affiliates in middle-income OECD countries also involves imports of intermediate goods to be further manufactured and sold in the country of the parent company (or other countries), reflecting vertical-type FDI.

A cursory view at Figure 6 also suggests that both the location and the size of the countries are important factors determining the propensity to trade. For instance, economies that are large, such as Japan and the United States, or geographically remote relative to major OECD markets, such as Australia, have relatively low trade intensities, reflecting either a wide internal market or high transport costs. By contrast, economies that are small and well-connected to large

Figure 6. Intensity of goods trade within the OECD area, 1980s and 1990s



1. Export intensity is defined as the ratio of exports to GDP.

2. Import penetration is defined as the ratio of imports to domestic absorption.

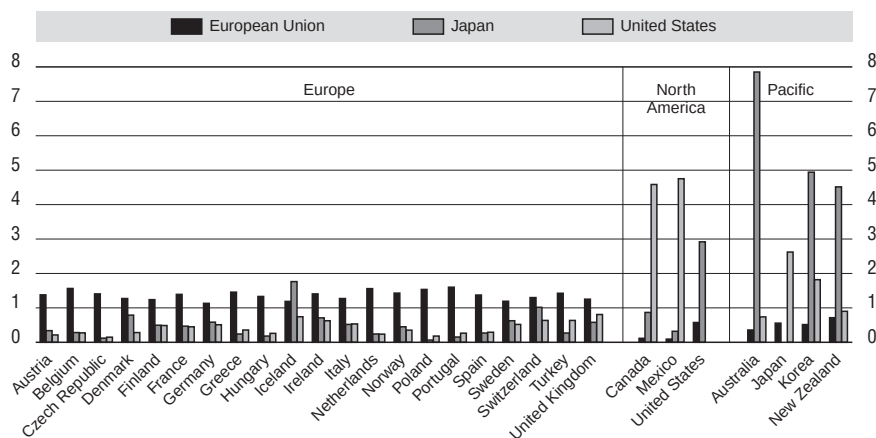
Source: OECD.

neighbouring countries, such as Belgium and the Netherlands, have high trade intensities. However, location and size cannot fully explain the cross-country patterns of export intensities, because there are small countries with low intensities, such as Greece, and relatively remote countries with higher intensities, such as New Zealand and Korea.

Using the same indicator as for FDI, Figure 7 shows the patterns of geographical specialisation over the 1990s in exporting to the European Union, Japan and the United States. The relative distance of each country from the three destinations seems to matter. Japan is the favourite destination of exports from Australia, New Zealand and Korea; and the United States is the favourite destination of exports from Canada and Mexico. Exports from European countries are more uniformly distributed, though still biased towards EU destinations. Clearly, as neighbouring countries are often linked by free-trade agreements (such as the EU Single Market or NAFTA), the transport cost effect underlying these patterns is likely to act in parallel with a free-trade area effect (see below). Indeed, develop-

Figure 7. **Patterns of geographical specialisation in goods exports to the European Union, Japan and the United States¹**

Average of the 1990s



1. Geographical specialisation in goods trade is defined as the revealed tendency of a country to export a share of exports of its total exports to a partner country, which is larger than the share exported to that country by the OECD in total OECD exports. A country is "geographically specialised" when the indicator is above unity.

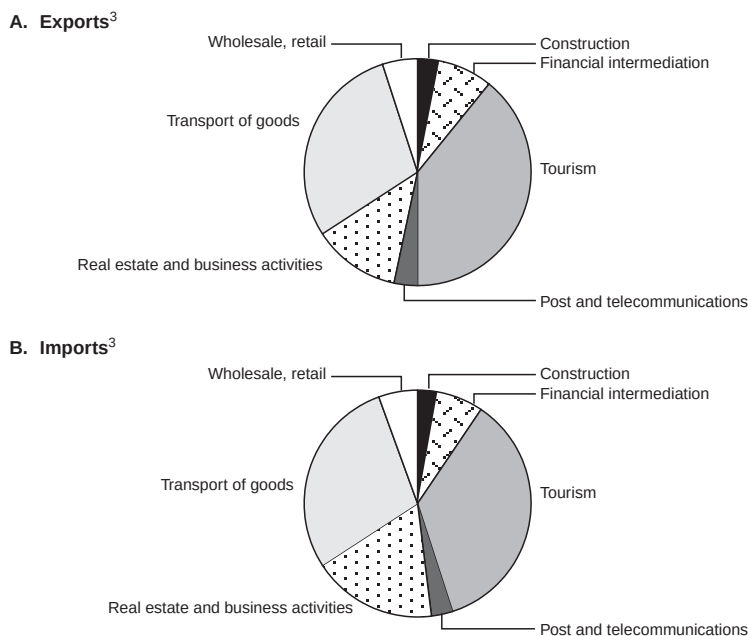
Source: OECD.

ments in both European and North American countries suggest that free-trade agreements such as the EU Single Market and NAFTA may have borne their fruits over the 1990s.

Trade in services

Figure 8 shows the average industry structure of OECD trade in services in 1999 as recorded in balance of payments statistics on multilateral trade, which cover only a subset of modes of cross-border services supply (notably excluding commercial presence and movement of individuals) (see Box 1). According to these figures, most services trade, whether exporting or importing, relates to tourism (around 30 per cent) and transport (around 25 per cent), followed by business

Figure 8. **Composition of services trade in the OECD area,¹ 1999**
OECD average²



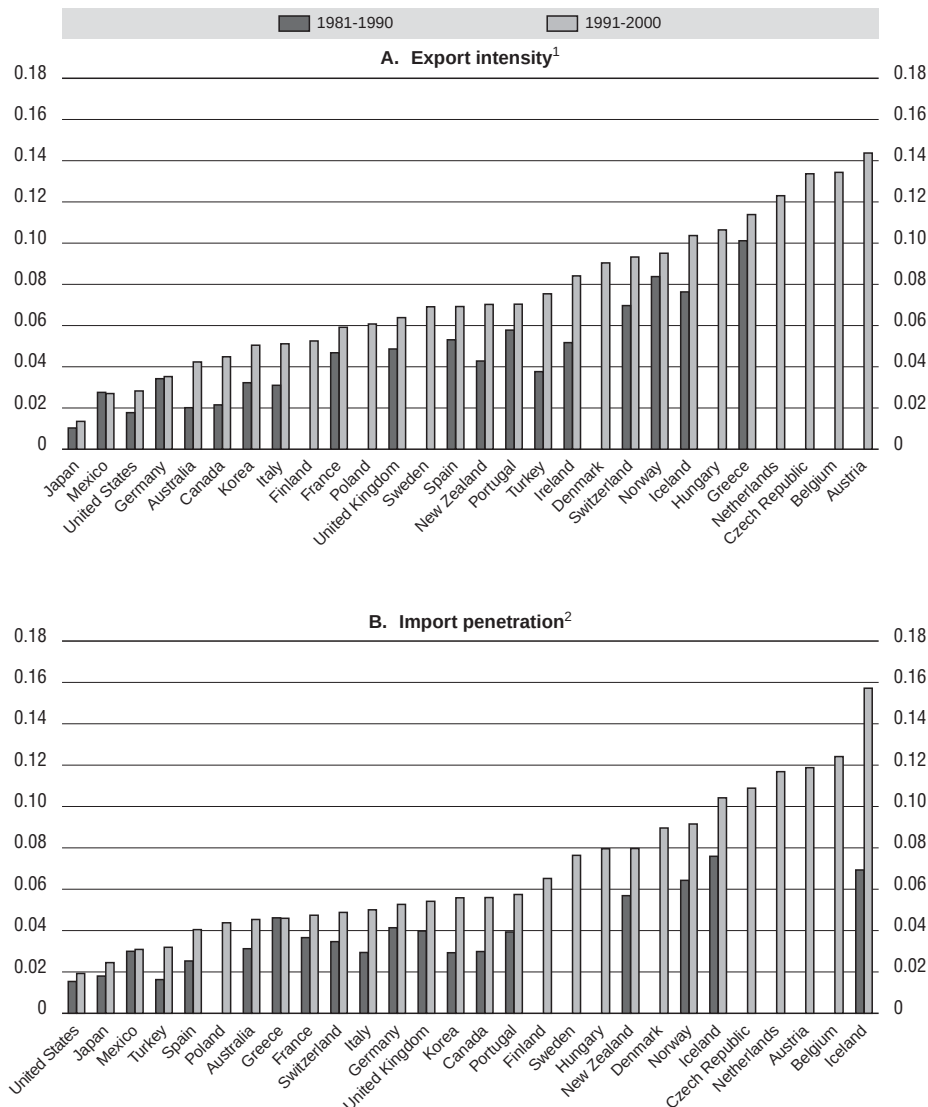
1. Service trade reported by balance of payments statistics includes only cross-border supply and consumption abroad. Service supplied through commercial presence or movement of individuals are excluded.

2. Simple average.

3. Ratio of exports or imports in each industry to total exports or imports.

Source: OECD.

Figure 9. Intensity of global trade in services, 1980s and 1990s



1. Export intensity is defined as the ratio of exports to GDP.

2. Import penetration is defined as the ratio of imports to domestic absorption.

Source: OECD.

services (12 per cent) and financial services (6 per cent). The composition of services trade is similar at the individual country level. In other words, a large share of trade in services is related to international movements of people and manufactured goods. Yet, the most striking feature of services trade is that both export and import intensities are several times lower than the corresponding trade intensities for goods in all OECD countries for which data are available, with the ratio of manufacturing to services trade flows generally ranging from three to six in most countries. Even though such gaps could be narrowed once cross-border supply through commercial presence (*i.e.* FDI) is taken into account, differences in the trade intensities of goods and services are puzzling.

Lower services trade intensities are often related to the cost of transport, which is, for some services, much higher than the cost of shipping manufactured goods.⁹ Also, the influence of geographical and structural factors, such as location and size of the economy, on trade in services and goods may differ. Cross-country patterns of export intensities and import penetration ratios suggest that these factors play partly the same role as for trade in goods (Figure 9). Trade is strong in relatively small and well-located countries – such as Austria, Belgium, the Netherlands and Ireland – and weak in relatively large or remote countries – such as the United States, Japan and Australia. However, these patterns are less clear than for goods trade and, indeed, the cross-country correlation between export intensities in goods and services is relatively low (around 0.2), though the correlation of import penetration ratios is higher (around 0.6). This suggests that other forces are impinging on the openness of OECD economies to trade in services.

Twin developments in FDI and trade

The discussion of trends and patterns in FDI and trade offers *prima facie* evidence that the two phenomena are closely linked: both increased sharply over the past decade; both seem to be at least partly affected by factors related to distance, location and size of the economy; and in some cases trade openness seems to go hand in hand with high FDI and foreign affiliate activity, such as in Ireland and Belgium. Table 1 provides further evidence concerning this stylised fact at a finer level of detail. It reports the correlations between different measures of bilateral trade and bilateral FDI over the period 1980-2000 as well as in sub-period averages. All correlations are positive and significant at conventional levels, with particularly high coefficients between trade measures and FDI outstocks and instocks.

Although these correlations may imply a testable hypothesis that to some extent trade and FDI may be driven by the same set of economic factors, they are not necessarily evidence in favour of complementarity between FDI and trade. As discussed in the next section, at the firm or industry level the relation-

Table 1. Bivariate correlations between bilateral trade and FDI¹

Bilateral FDI measures	Outward position	Inward position	Outward investment	Inward investment	Outward position (% of GDP)	Outward investment (% of GDP)
Bilateral trade measures						
A. All available years						
Manufacturing exports	0.64	0.57	0.39	0.34		
	(5 998)	(5 963)	(7 930)	(7 610)		
Manufacturing imports	0.59	0.63	0.34	0.37		
	(5 997)	(5 961)	(7 930)	(7 610)		
Services exports²	0.81	0.83	0.50	0.58		
	(344)	(347)	(559)	(498)		
Services imports²	0.77	0.67	0.45	0.53		
	(344)	(347)	(559)	(498)		
Total exports	0.64	0.58	0.36	0.40		
(manufacturing plus services)	(344)	(347)	(559)	(498)		
Total imports	0.61	0.63	0.35	0.41		
(manufacturing plus services)	(344)	(347)	(559)	(498)		
B. Average 1990-2000						
Manufacturing exports (% of GDP)					0.73	0.71
					(298)	(321)
C. Average 1998-2000						
Total exports (% of GDP)					0.61	0.57
					(67)	(76)

1. Number of observations in parentheses. All correlations are significant at 5 per cent levels.

2. Balance of payments definition.

Source: OECD.

ship between FDI and manufacturing trade crucially depends on whether FDI is aimed at accessing foreign markets or fragmenting production in stages. Aggregate evidence concerning FDI and trade is, therefore, the result of conflicting influences and may only be interpreted as suggesting that, overall, one type of FDI dominates the other or, alternatively, that both FDI and trade are correlated to a third variable (*e.g.* income). By contrast, services trade and FDI can be expected *a priori* to be complementary, because establishing commercial presence abroad generally brings stronger services trade in terms of transport (*e.g.* supplying goods to foreign affiliates in the distribution sector), communications (*e.g.* data transactions with foreign affiliates in the financial, telecommunications or tourism sectors), etc. FDI in the services sectors indeed accounted for up to 65 per cent of total FDI flows (OECD, 2002c). In this connection, it is interesting to note that, among the correlations in Table 1, those between FDI and services exports and imports (which due to lack of data focus on the most recent period) are the highest.

POLICY AND OTHER DETERMINANTS OF TRADE AND INTERNATIONAL INVESTMENT

Two broad sets of factors jointly affect trade and FDI: *non-policy factors* – including the effects of gravity (*e.g.* market size and distance) and factor proportions (*i.e.* relative endowments of different inputs) – and *policy factors*. The influence of these factors (*i.e.* the sign of the relationship and its intensity) is not necessarily the same across FDI and trade. In particular, it may depend on whether FDI is of the horizontal or vertical type (Box 2). Moreover, their influence may also differ in some cases across trade in goods and trade in services.

With an eye to the interdependency between trade and FDI, this section principally looks at key policy factors, grouping them into four categories: openness, product-market regulation, labour-market arrangements and infrastructure.¹⁰ Some of these policy channels restrict market access by exporters and foreign investors. For instance, non-tariff barriers and FDI restrictions raise border obstacles to trade and investment. Other border and non-border policies make trade and investment unprofitable, for instance by increasing the relative cost of foreign *versus* home goods (*e.g.* tariffs or regulations that raise production costs) or decreasing the net returns of MNEs when they invest abroad. Finally, policies can also raise the overall cost of the transaction by affecting the costs of inputs that both the exporter and importer must use in order to implement the exchange (*e.g.* transport or communication services). Alternatively, policies can facilitate trade and FDI, for example by creating areas of free trade, improving the business environment in which exporters and MNEs operate or reducing the cost of transactions through the development of the necessary infrastructure.¹¹ This section shows by means of newly-developed indicators that approaches often differ across countries in each of the four policy categories and, when possible, offers *prima facie* evidence that these differences may be relevant for trade and FDI.

Openness

As noted above, openness of a country to trade and FDI is assessed here in terms of policies that create (or eliminate) border barriers for exporters or investors, measured by indicators of tariff and non-tariff barriers, statutory restrictions to FDI and multilateral agreements that create areas of free trade among signatory countries.

Tariff and non-tariff barriers

Figure 10 reports the evolution of average (import-weighted) most-favoured-nation (MFN) tariff rates and import coverage of non-tariff barriers from 1988 to 1996, the latest year for which time-series data are available.¹² The conclusion

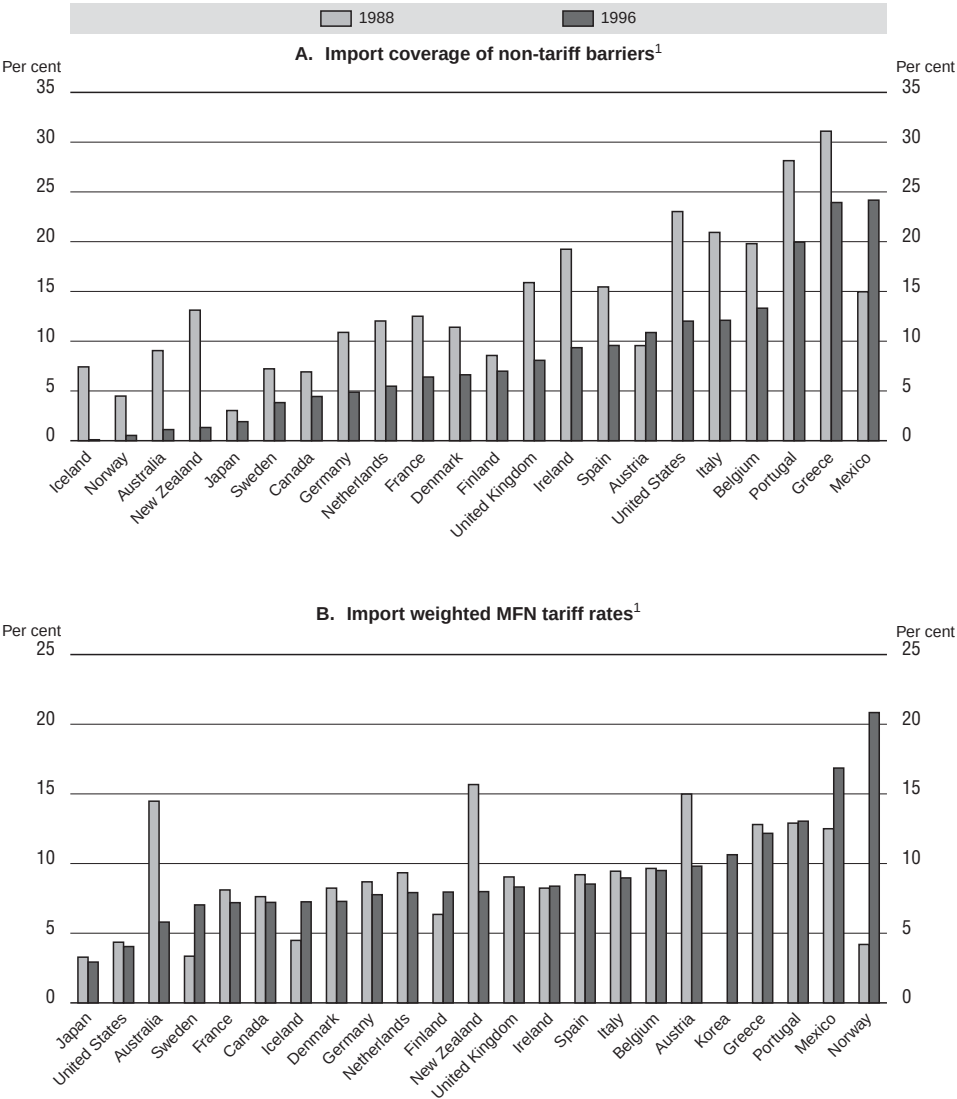
Box 2. Trade and different types of FDI

As pointed out by recent research, the interdependence of trade and FDI derives from the fact that the decision to export or invest abroad for producing locally is increasingly taken by the same unit, the multinational enterprise. This is clearest in the so-called “knowledge-capital” theory of the MNE (Markusen, 2002; Markusen and Maskus, 2001), which builds on previous work by Dunning (1981) and Buckley and Casson (1985). This theory notes that three types of firms exist in each country: purely domestic firms, which have headquarters and plants that produce only at home for local or export markets; the horizontal MNEs, which have headquarters at home and production plants both at home and abroad that produce the same goods; and the vertical MNEs, which fragment different stages of production by having headquarters at home and production plants in different foreign countries that produce different intermediate or final goods. Since the objective of the horizontal MNEs is to access foreign markets, trading or investing abroad are two substitute activities. They will choose one or the other depending on their relative returns, which depend among other things on the cost of trade, the cost of FDI and the firm-level economies of scale they can enjoy by duplicating production plants in foreign countries.* By contrast, the objective of vertical MNEs is to take advantage of cross-country comparative advantage patterns by locating plants in different countries in order to specialise in different stages of production. Therefore, trade and FDI are complementary activities: vertical MNEs will typically export components to foreign affiliates and re-export to the home (or other) markets the goods produced abroad. Recent evidence suggests that horizontal MNEs may be prevalent in the OECD area, partly reflecting the increasing similarity in factor costs and endowments among member countries (OECD, 2002d). However, MNEs’ strategies have also been shown to vary across OECD countries, with horizontal strategies dominating in the United States (Markusen and Maskus, 1999) and vertical strategies dominating in Sweden (Mathä, 1999) and France (Soubaya Camatchy Ariguelou, 2002). See OECD (2002e) for a discussion of the relationship between trade and FDI.

* Firm-level economies of scale arise when two-plant firms have fixed costs that are less than the double those of a single-plant firm. Firm-level economies of scale and trade costs are crucial elements for explaining the existence of horizontal FDI, as first pointed out by Markusen (1984).

of global and regional trade agreements (Box 3) during this period was reflected in a decline of both non-tariff and, to a lesser extent, tariff barriers within the OECD area. However, cross-country differences in average barriers still persist. Indeed, using a recent data set that includes a wider set of tariffs at the bilateral level, Figure 11 shows that in 2001 the dispersion of average (unweighted) applied tariff

Figure 10. Manufacturing trade liberalisation in the OECD area, 1988-1996



1. OECD calculations based on UNCTAD data. Aggregation from 2-digit level tariffs to national level using sectoral value-added weights. See annex for details on sources and methodologies.
Source: UNCTAD, OECD.

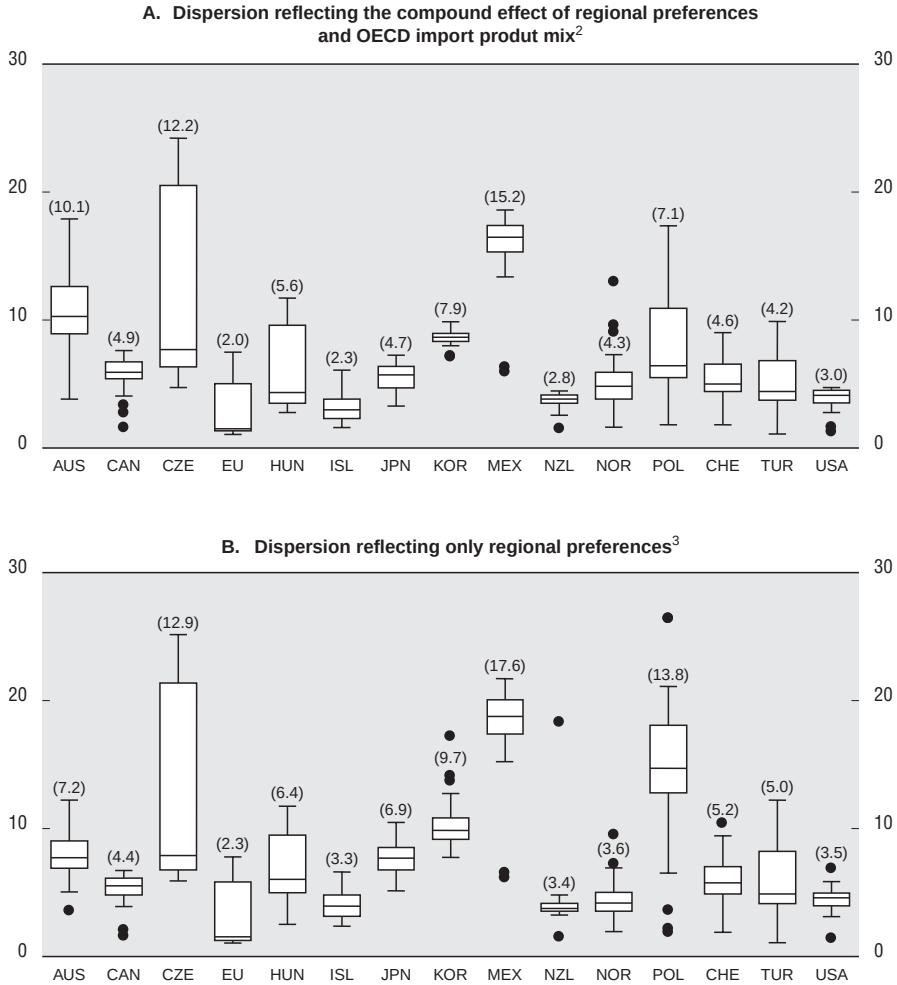
Box 3. Trade agreements

Almost all countries participate in one or more regional agreements, either as regional members or by virtue of bilateral agreements between regional groups and individual countries. In addition, there are bilateral agreements between countries (*e.g.* the accord between the United States and Chile). These agreements involve preferential trade provisions. However, the degree of integration they imply varies considerably. The main agreements can be classified, in order of increasing integration, as follows:

1. *Agreements to consult and co-operate*, without any binding harmonisation of policies, such as the Asia Pacific Economic Co-operation Group (APEC), signed in 1989, or the Association of South-East Asian Nations (ASEAN), signed in 1967 (whose members are currently planning to create a free trade area).
2. *Free-trade areas*, in which trade is liberalised within the group, but no common external tariff is adopted, such as the North American Free Trade Agreement (NAFTA), signed in 1994, the European Free Trade Area (EFTA), signed in 1960, and numerous bilateral agreements. Such arrangements require the establishment of rules of origin for imported products. They may cover different sets of transactions and imply different levels of integration among signatory countries. For instance, NAFTA includes both trade and FDI provisions.
3. *Customs unions*, whose members agree to common external tariffs, such as Mercado Común del Sur (MERCOSUR), signed in 1995, and several other agreements in developing countries.
4. *Common markets*, with free movement of labour and capital, and where economic integration transcends a customs union towards a fuller harmonisation of economic regulations, such as the 1992 European Single Market.
5. *Economic unions*, involving full harmonisation across a range of economic policies, a direction taken in 1998 by the European Union with the Maastricht treaty and the single currency.

Economic theory suggests that preferential trade liberalisation can increase welfare when it results in “trade creation” – trade that is consistent with comparative advantage – or reduce welfare in the case of “trade diversion” – when trade is diverted to less efficient partner countries. Dynamic gains resulting from scale economies and increased competition are also important, as is the potential for “deeper integration” amongst participating countries. On the other hand, complex rules of origin can lead to high administrative costs and possibly corruption. Another point of contention is whether regional blocs are “building blocks” or a “stumbling blocks” towards multilateral liberalisation. Regional integration is, in principle, contrary to the fundamental GATT/WTO principle of non-discrimination, but the WTO does allow such agreements in practice as long as substantially all trade is liberalised (art. XXIV). For more details, see OECD (2001c and 2002f), Panagariya (1999) and Hoekman and Schiff (2002)

Figure 11. **Median and dispersion of bilateral applied tariffs by importing countries in 2001¹**
(Average values in parentheses)



1. The box plot shows, for each country, the variation in the tariffs imposed on imports from partner countries. The median value of the tariff is depicted by the horizontal line in the box, the third and second quartiles of the cross-country distribution by the edges of each box, and the extreme values by the two whiskers extending from the box. Dots identify outlier observations.

2. ISIC rev. 3 two-digit industry-level tariffs were aggregated to national level using the weights of the OECD import product mix.

3. National levels represent a simple average of ISIC rev. 3 two-digit industry-level tariffs.

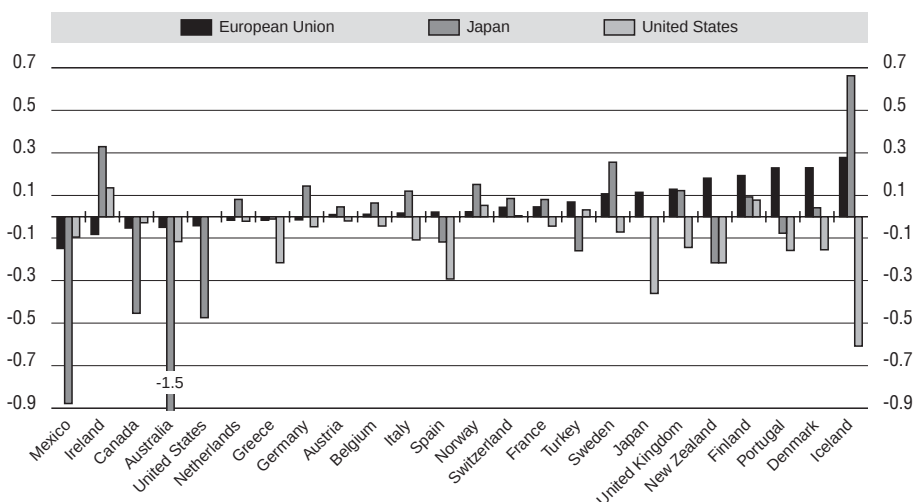
Source: International Trade Center, Geneva and CEPII, Paris.

rates was indeed wide across OECD country pairs. This reflects tariff discrimination across trading partners, which may well contribute to explaining differences in bilateral trade intensities among OECD countries.¹³

Trade agreements tend to match and accentuate the gravity forces (see below) that affect bilateral trade among signatory countries.¹⁴ The positive influence of free-trade areas on trade could be less pronounced for services, since non-border barriers may be more relevant for this kind of products. Suggestive evidence on the positive effects of regional agreements on bilateral goods trade flows among signatory countries is provided in Figure 12, which shows the change in geographical specialisation of exports to the European Union, the United States and Japan over the past two decades. With a few exceptions, EU countries have increased their specialisation towards the European Union, probably reflecting increasing market integration under the Single Market Programme.

In addition to influencing trade openness, tariff barriers can also affect bilateral FDI relationships. Vertical FDI aimed at re-importing to the home country or

Figure 12. **Changes in the geographical specialisation of goods exports to the European Union, Japan and the United States, 1990s vs. 1980s^{1, 2}**



1. Geographical specialisation in goods trade is defined as the revealed tendency of a country to export a share of exports of its total exports to a partner country, which is larger than the share exported to that country by the OECD. For computational details, see Annex.
2. Change in the average value of the specialisation indicator in the two sub periods. A positive change implies an increase in geographical specialisation. Data are ranked on the European Union figures.

Source: OECD.

exporting to third-party countries the final or intermediate goods produced by foreign affiliates can be depressed by high bilateral tariffs between the host and investor country or between the host and third-party countries. On the other hand, high bilateral tariffs can generate so-called “tariff-jumping” behaviour by MNEs. Horizontal FDI that is prompted by tariff-jumping could be positively related to the level of tariffs in the host country. The same kind of relationship could *a fortiori* be expected between horizontal FDI and non-tariff barriers, since the latter often raise absolute barriers to market access (*e.g.* quantitative restrictions). Therefore, non-tariff barriers are likely to have a positive effect on FDI.

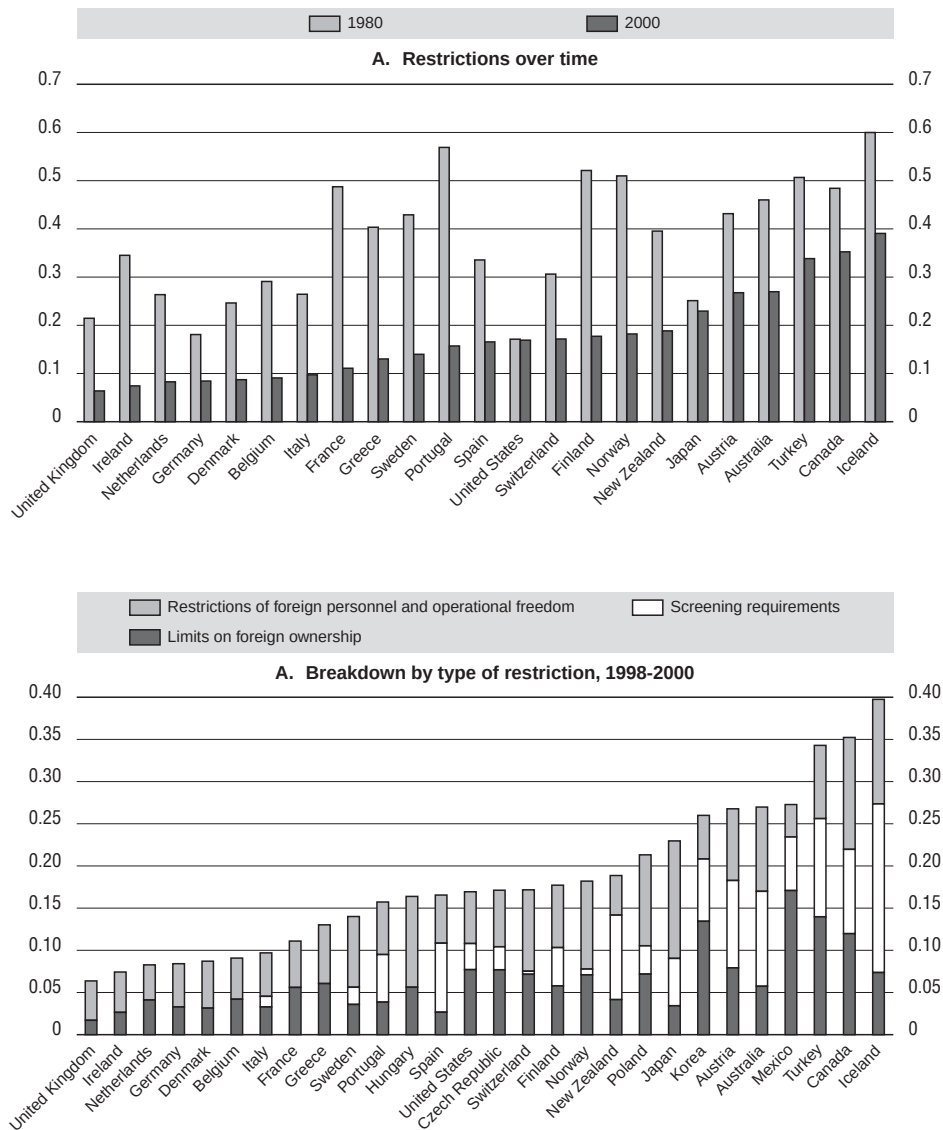
The effect of free-trade agreements on bilateral FDI transactions is more complex.¹⁵ By substantially lowering trade costs among signatory countries, free-trade agreements make trade more advantageous than local production, tending to reduce horizontal FDI flows at any given level of fixed costs. However, by enlarging the overall size of the market in the free-trade area, these agreements also increase the scope for reaping firm-level economies of scale through horizontal FDI.¹⁶ Moreover, the reduction in trade costs tends to increase vertical FDI flows that are aimed at re-exporting products into the home country or into other signatory countries. Furthermore, free-trade agreements tend to have a positive effect on horizontal FDI flows from non-signatory countries, because they enlarge the size of the market that they can access by producing locally at any given level of trade costs.¹⁷ In conclusion, the effect of free-trade agreements on FDI flows among signatory countries is ambiguous, while it is presumably positive on FDI flowing from non-signatory countries. These effects are empirically tested in the next section.

FDI restrictions

Although formal international agreements on FDI have been far less extensive than on international trade, global negotiations and regional free-trade agreements often cover some aspects of international investment as well (*e.g.* capital-market liberalisation within the European Union and provisions on commercial presence in the GATS), generally leading to lower barriers to FDI. Moreover, a number of bilateral investment treaties have been signed among OECD countries, aiming at curbing barriers to FDI. A new set of indicators of FDI restrictions was assembled by the OECD to summarise and quantify such barriers and their evolution over time. The indicators, which are described in detail in Golub (2003), cover mainly statutory barriers, ignoring most of the other direct or indirect obstacles impinging on FDI, such as those related to corporate governance mechanisms and/or hidden institutional or behavioural obstacles that discriminate against foreign firms.¹⁸

According to these indicators (Figure 13), liberalisation of FDI flows has been substantial over the past two decades in all OECD countries except the United

Figure 13. FDI restrictions in OECD countries,¹ 1980-2000



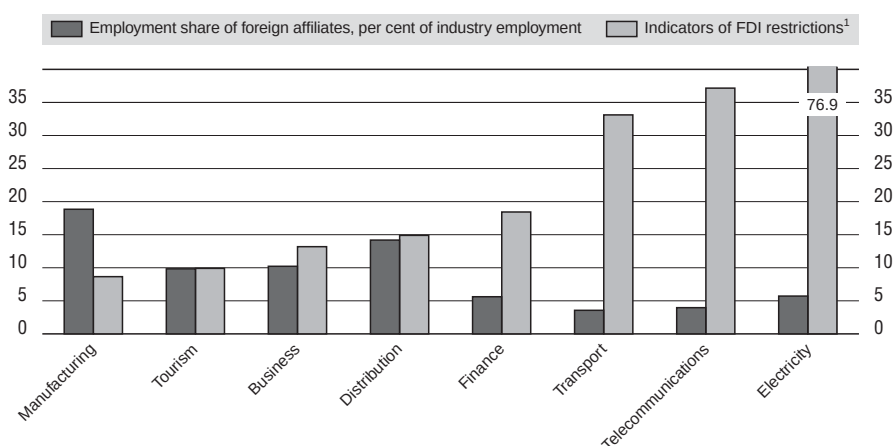
1. The indicator ranges from 0 (least restrictive) to 1 (most restrictive). The most recent year for which data are available varies across countries between 1998 and 2000.

Source: Golub (2003).

States and to a lesser extent Japan, both of which had relatively low statutory restrictions to begin with.¹⁹ Despite the easing of restrictions and their generally much lower level at the end of the 1990s, cross-country differences remain significant, with most EU countries showing greater openness than the United States and Japan, and a few OECD countries maintaining a relatively restrictive approach (Iceland, Canada and Turkey). In most countries, restrictions on control of domestic firms by foreign residents (through either ceilings on foreign-owned equity or limitations on management and business choices) dominate those related to screening procedures (*e.g.* economic benefits or national interest tests).²⁰ On average, the bulk of restrictions are found in non-manufacturing industries.²¹ FDI inflows into manufacturing are almost completely unrestricted, aside from economy-wide restrictions such as notification or screening requirements. Within non-manufacturing, electricity, transport and telecommunications are the most restricted industries, followed by finance, while the other service industries are on average relatively unrestricted.

Variable FDI restrictions across countries, industries and time are a natural candidate for explaining the dispersion observed in bilateral FDI transactions. These restrictions clearly raise barriers to foreign investment of MNEs and are likely to influence their choice among different investment locations. Some evidence of this is provided by Figure 14, which suggests that in very broad terms

Figure 14. **Foreign affiliates and FDI restrictions in the selected industries**
OECD average



1. For this figure, the indicator ranges from 0 (least restrictive) to 100 (most restrictive).
Source: Golub (2003) and OECD.

there is a weak but visible inverse relationship between the sectoral shares of employment in foreign affiliates and the level of FDI restrictions across a number of selected sectors.²²

FDI restrictions may also be expected to influence bilateral trade much in the same way as tariff barriers are expected to influence bilateral FDI. By increasing the fixed costs of local production, they may make it *ceteris paribus* more profitable for horizontal MNEs to access local markets through exports. However, they also tend to decrease vertical FDI and the related export flows. Therefore, the aggregate effect on goods exports is ambiguous *a priori*. FDI restrictions represent an obstacle to services trade because they hinder service provision through commercial presence (through the establishment of foreign affiliates) and could also affect other modes of services trade because exports and commercial presence are complementary in certain industries, such as tourism.

Currency unions

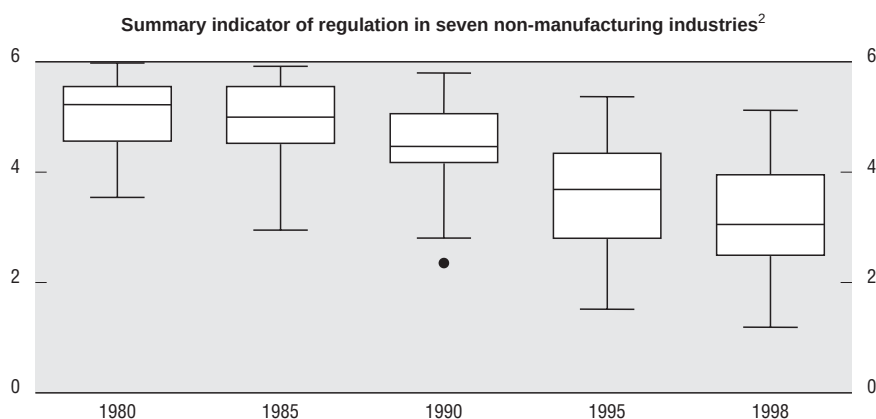
Exchange-rate variability may increase the transaction costs involved in trading goods and services and the risk premia on the returns to FDI. By eliminating those costs and reducing investment risk, currency unions can be expected to increase trade flows and expand FDI. Theoretical and empirical research has shown, however, that the impact of exchange-rate variability on trade is uncertain (for reviews, see McKenzie, 1999, and Taglioni, 2002), though recent evidence tends to find a positive effect of currency unions (Rose, 2000). At the same time, as suggested by Cushman (1985), the effects of reduced exchange-rate volatility on FDI depend on whether the firm sells its output in the host country or abroad, uses the host country or foreign inputs and finances its capital at home or abroad.²³ Therefore, the effect of exchange-rate variability on FDI is ultimately an empirical issue.

Product-market regulation

Using a summary indicator of regulatory reform that ranks regulations in seven non-manufacturing industries from least to most restrictive of competition, Figure 15 suggests that OECD product markets have become increasingly open to competition over the past two decades. At the same time, the cross-country dispersion in regulatory approaches has increased, due to differences in initial conditions and/or in the scope and pace of reforms implemented by OECD countries. As a result, in 1998 (the last year for which cross-country regulatory data are available) regulations still differed substantially both at the economy-wide level and, especially, at the industry-level in several non-manufacturing industries.²⁴

Product-market regulations can affect foreign trade and FDI in multiple and at times conflicting ways. Here, the focus is on regulations in the exporter (investor)

Figure 15. **Regulatory reform in OECD countries,¹ 1980-1998**
 Summary indicator of regulation in seven non-manufacturing industries²



1. The box plot shows, in each year, the median OECD value of the regulatory indicator (the horizontal line in the box), the third and second quartiles of the cross-country distribution (the edges of each box) and the extreme values (the two whiskers extending from the box). Dots identify outlier observations.
2. The indicator ranges from 0 (least restrictive) to 6 (most restrictive). It covers 25 OECD countries.

Source: Nicoletti and Scarpetta (2003).

country or the importer (host) country that curb market forces where competition is viable and/or impose unnecessary costs on the firms involved in the bilateral trade (or investment) transaction.²⁵ Domestic regulation generally does not discriminate between local and foreign firms, but it may have distorting effects on bilateral trade and FDI flows by affecting the relative prices of different products (*e.g.* tradable *versus* non-tradable or home *versus* foreign) or the relative rates of return expected from investing in different locations.

A way in which relative prices can be affected is when the introduction of anti-competitive regulation in one country increases its production costs, for instance by discouraging efficiency enhancements and productivity growth. In the short run, this tends to make the products exported by this country less competitive in foreign markets. Conversely, cost-increasing regulation in the importer country may tend *ceteris paribus* to make the products supplied by the exporter country more competitive. With wage, price or exchange-rate rigidities, these effects may tend to carry over to the medium to long run. Moreover, cost-increasing regulations (which usually differ across industries) may also induce a reallocation of resources in both the exporter and importer countries, affecting their respective abilities to trade. Another way in which regulations can affect trade patterns is by

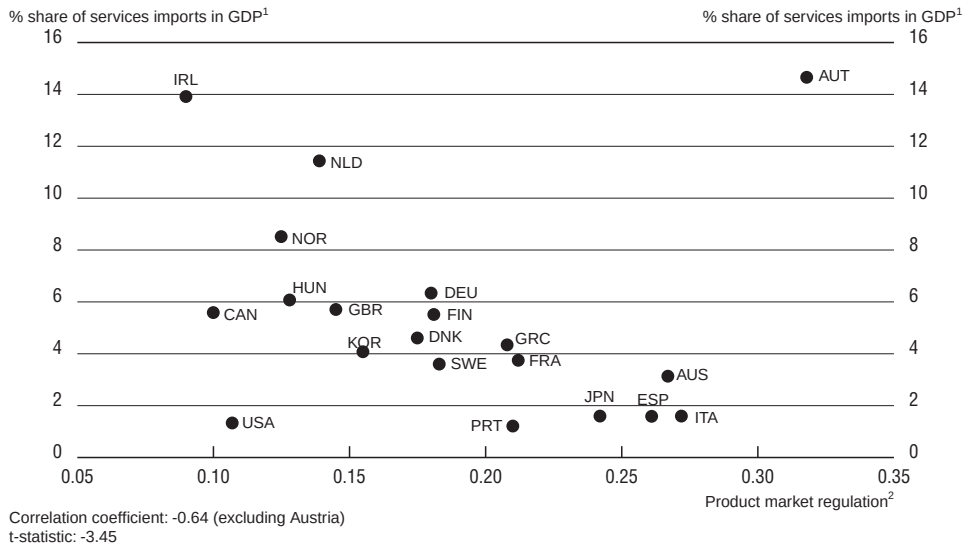
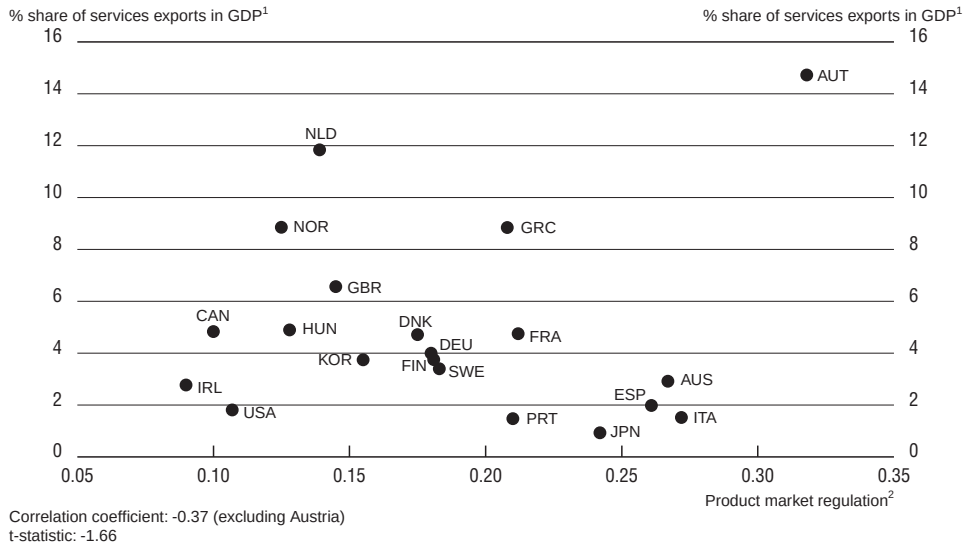
raising barriers to entry that reduce the number of suppliers, and hence the number of different goods offered, in an export market. This may have negative repercussions on intra-industry trade. Thus, strict product-market regulation in the foreign country potentially has conflicting influences on exports from the home country: on the one hand, it may stimulate exports through a competitiveness effect (at least in the short run); on the other hand, it may depress exports by limiting access to the foreign market.

A joint negative influence on bilateral trade can be exerted, in both the source and destination countries, by cost-increasing or barrier-raising regulations that affect industries in which inputs from both countries are needed to produce the traded product. This is the case, for instance, of many traded services – such as transportation, communications and business services – in which capital and labour from both the exporter and importer country are used to supply the service. In these situations, it is the combination of regulations in the countries involved in the transaction that is likely to affect trade flows.²⁶ Suggestive evidence of a negative correlation between anti-competitive services regulation and the intensity of services trade is provided in Figure 16, which plots the services export and import intensities of OECD countries against a summary indicator of regulation in non-manufacturing (which is increasing in restrictions to competition).²⁷

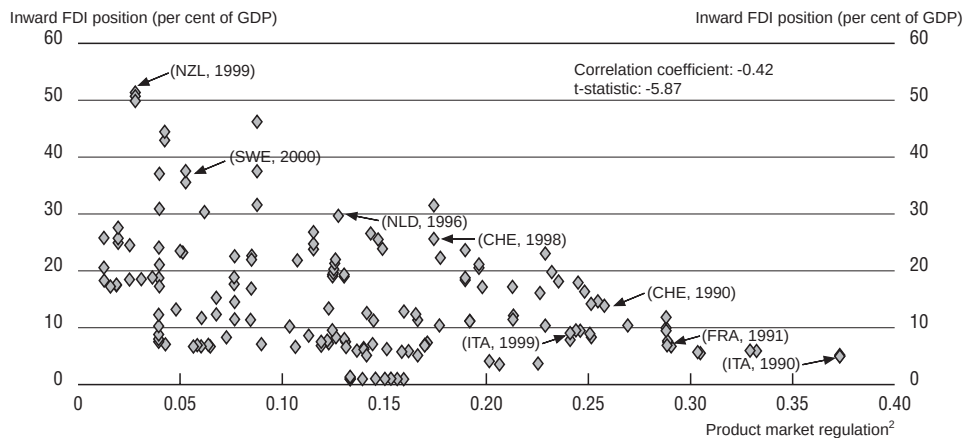
Product-market regulations can also influence FDI by raising production costs or entry barriers, but their effect is more ambiguous:

- Cost-increasing regulations in the host country can deter FDI by lowering its expected rate of return if the foreign subsidiary is used as a platform for re-exporting final or intermediate goods back home or to other less regulated countries (the case of the vertical MNE). However, if FDI aims at accessing the local market (the case of the horizontal MNE), cost-increasing regulations in the host country may encourage FDI because the foreign affiliate can take advantage of the production structure of the parent firm, which may be more efficient than in local firms if regulations in the home country are more pro-competitive. Cost-increasing regulations in the home country may also stimulate outward FDI by favouring the delocalisation of production plants in countries with less costly regulations. On the other hand, the costs implied by these regulations may cripple the ability of home-country firms to internationalise production to the desired level.²⁸
- Similar conflicting influences can be exerted by regulations that raise entry barriers in host countries. Such entry barriers clearly deter “greenfield” FDI aimed at establishing new firms or creating new production plants. However, by endowing local firms with market power, they can actually encourage inward FDI aimed at acquiring (or merging foreign parents with) existing local firms.

Figure 16. Non-manufacturing regulation and trade in services, 1998



1. The position of Austria reflects the exceptionally high share of service trade accounted for by tourism.
2. Weighted average of regulatory indicators in 12 non-manufacturing industries. 0-1 scale from least to most restrictive of competition.
Source: Nicoletti and Scarpetta (2003) and OECD.

Figure 17. Product market regulation and FDI, 1990-1998¹

1. Each point shows the combination of regulation and FDI in a given country and period. Some of these country/period contributions are shown for illustrative purposes.
 2. Product of the indicator of economy-wide regulation in 1998 and the indicator of barriers to entry in seven non-manufacturing industries over the 1980-1998 period. 0-1 scale from least to most restrictive of competition.
- Source: Nicoletti and Scarpetta (2003) and OECD.

Despite the potentially conflicting linkages between regulation and FDI, *prima facie* evidence suggests that, on the whole, barriers to entry and cost-increasing regulations in the host country, as summarised by the product of the 1998 indicator of economy-wide regulation with the summary 1980-1998 indicator of barriers to entry in seven non-manufacturing industries, are inversely related with the intensity of inward FDI in OECD countries over the 1980-2000 period (Figure 17).

Labour-market arrangements

A wide set of policies and institutions affect the functioning of the labour market impinging on trade or FDI transactions. In this study, the focus is restricted to employment protection legislation (EPL), collective bargaining mechanisms and labour income taxation, for which comparable cross-country data are available.²⁹ The OECD (1997c, 1999) has extensively documented cross-country differences in labour-market policies and institutions. Both employment protection and labour income taxation are driven by important policy objectives, but could also have side effects on the level and geographical allocation of trade and FDI.

The main channel through which EPL and labour tax wedges can affect trade and FDI is the influence they may have on the adaptability of labour markets and

on the cost of labour.³⁰ In the absence of offsetting mechanisms, EPL and labour taxes can affect trade and FDI patterns for largely the same reasons as cost-increasing product-market regulations do, *i.e.* by adversely affecting the relative prices of different products, or by adversely affecting relative returns from investing in the country that has stringent EPL or high wedges.³¹

However, the effects of EPL and labour income taxation on trade and FDI may also depend on the regime of industrial relations in place in each OECD country. Previous research has shown that some collective bargaining arrangements can provide an effective offsetting mechanism for the costs implied by labour income taxation and EPL. Specifically, regimes in which bargaining is done at the national (*i.e.* centralised) level and with a tight co-ordination among employers and unions operating in different industries may make it possible to shift the implicit costs of wedges and EPL onto wages, much in the same way as may happen in decentralised and uncoordinated labour markets, provided wage resistance is not encouraged through other arrangements (such as high income replacement rates in unemployment benefit systems).³² Thus, to the extent that this offsetting mechanism is operating, effects of EPL or tax wedges on trade and FDI should be found mainly in situations in which bargaining is neither co-ordinated nor decentralised, as it is found for instance in countries where negotiations are implemented at the industry level.

The potential offsetting mechanism provided by certain bargaining institutions is likely to be effective for neutralising the adverse effects of high EPL and tax-related costs in the home country on the relative prices of tradable vs. non-tradable goods. Its offsetting effect on the tendency of international investors to divert investment towards locations in which risk-adjusted expected returns are relatively low is more doubtful. This is because strict EPL is likely to affect not only the returns expected from foreign investment (*e.g.* through effects on labour costs that can be offset by bargaining institutions) but also their variability (*e.g.* by influencing the capacity of foreign affiliates to respond to supply or demand shocks), thereby increasing the risk that investors face in the host country. Since MNEs can choose *ex ante* where to locate their investment, they may still tend to move where the risk/return ratio is lowest, independent of the features of bargaining institutions in potential host countries.³³ Similarly, the potential for shifting the costs implied by labour taxation onto wages may be limited in MNEs whose highly-skilled employees and managers are likely to be more mobile across borders than their homologues in local firms.

Infrastructure

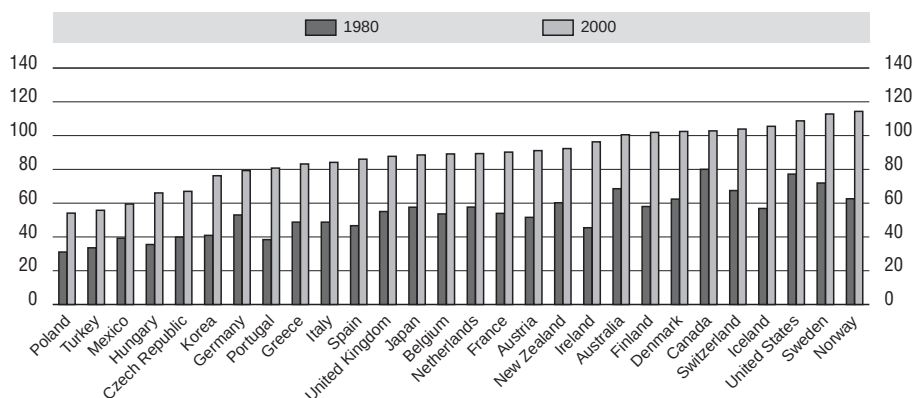
Trade and FDI may also be affected by factors that are, or have been, closely-related to government policies regarding transportation, communica-

³⁸

tions and energy supply. Indeed, due to their public good and natural monopoly characteristics, some fixed network infrastructures are financed through public investment.³⁴ Figure 18 uses a new set of indicators to show the evolution of infrastructure endowments of OECD countries over the past two decades. The indicators are increasing in the quality and quantity of infrastructure and summarise information about transport, communication and energy supply infrastructure (Box 4). There have been substantial increases in infrastructure capital over the period in all OECD countries. By the year 2000, the Nordic countries, the United States, Canada, Australia and other small European countries, such as Switzerland and, to a lesser extent, Ireland had the highest levels of infrastructure. New OECD members and transition NScountries, such as Mexico, Turkey, Poland and to a lesser extent Hungary, the Czech Republic and Korea, were estimated to have relatively low levels of infrastructure.

The provision of infrastructure may affect comparative and absolute advantage and, therefore, cross-country patterns of trade and FDI (Findlay, 1996). Infrastructure is likely to be particularly important for trade in services, because the main items traded (travel, freight, communications, banking and business services) depend heavily on the existence of high capacity and efficient networks in

Figure 18. **Infrastructure endowments¹**
United States 1998 = 100



1. The indicator is the crossing of the quality and quantity of infrastructure in transport, telecommunications and electricity. It increases with infrastructure endowments and is expressed relative to the 1998 level of the indicator in the United States.

Source: OECD.

Box 4. Infrastructure indicators

The infrastructure indicator summarises, on a 0-1 scale, the quality and quantity of telecommunications, transport and electricity infrastructure. Items covered include mainlines per capita, mobile phones per capita, the share of digital lines in total lines, answer seizure ratios (*e.g.* the percentage of successful international phone calls) and fault rates (*e.g.* the percentage of faults repaired within 24 hours) in telecommunications; length of motorways per capita, length of paved roads per capita and aircraft departures per capita in transport; transmission losses, generating capacity per capita and reserve margins in electricity supply. The relevant data were drawn from the OECD, the European Conference of Ministry of Transportation, International Energy Agency and World Bank sources. Each sectoral indicator is a weighted average of the corresponding items. The overall infrastructure indicator is a weighted average of the three sectoral indicators. Weights assigned to items and sectors reflect judgements about the economic relevance of each component. A time-series of the indicator was calculated for the 1980-2000 period.

countries that are at both ends of the transaction. Thus, the combination of infrastructure conditions in the exporter and importer countries is likely to be relevant for services trade, much in the same way as for product-market regulation (see above). The availability and the quality of infrastructure may also positively affect inward FDI because good infrastructure lowers transactions costs, facilitating international specialisation and the location choices of footloose industries (Jones, 2000).³⁵ However, a possible complication is that FDI in infrastructure has increased in recent years. Thus, it is possible that countries with weaker infrastructure might attract FDI, implying a reverse relationship between FDI and infrastructure endowments.

Geographical and economic factors

As already mentioned, a number of factors unrelated to government policies can impinge on trade and FDI. Gravity factors are mainly related to market size and distance: the volume of transactions between two countries tends to increase as their incomes get larger, but decreases with the distance between them due to transport costs.³⁶ Total and relative market sizes are also important determinants of horizontal FDI, because the returns from such investment depend on economies of scale at the firm level (see Box 2). On the other hand, factor proportions are important because they determine each country's comparative advantage in trading goods and services, and also affect the extent to which vertical FDI is

implemented.³⁷ In general, geographical and economic factors are expected to affect trade and FDI in the following ways:

- Exports and outward FDI both tend to be positively affected by the combined market size of the countries involved in the transactions, due to both gravity effects and economies of scale.
- Exports and *horizontal* outward FDI also tend to be positively affected by the size similarity of the two countries. Size similarity stimulates intra-industry trade and favours firm-level economies of scale of horizontal MNEs, which have multiple production plants at home and abroad producing the same good (or service) (see Markusen, 2002).
- Exports tend to be negatively affected by distance and transport costs. However, their effects on FDI are unclear because they also imply transaction costs for investors, and these costs could offset any advantage that FDI may have over trade when dealing with distant and ill-connected countries.³⁸
- Exports tend to be stimulated by differences in factor endowments of trading partners, because these make it possible to exploit comparative advantages. For broadly the same reason, dissimilarities in factor endowments also encourage vertical FDI. Conversely, horizontal FDI is discouraged by factor dissimilarities because they may make production of the same good in different countries difficult.

EMPIRICAL EVIDENCE

This section presents evidence on the impact of policy and other factors on bilateral outward FDI positions (henceforth FDI outstocks), multilateral inward FDI positions (henceforth total FDI instocks), bilateral exports of goods and bilateral exports of services of OECD countries. Thus, the focus is on the determinants of exports or outward FDI from a country to its partners and the determinants of the global attractiveness of a country for international investors. For ease of exposition, only the results from “preferred” regression specifications are reported below (for detailed results, see Nicoletti *et al.*, 2003). It should be noted at the outset that, due to limitations in data coverage, the data sets on which the results are based vary across the dependent variables and the policies considered. FDI outstock and instocks as well as goods exports cover 28 OECD countries and partners over the 1980-2000 period at the bilateral and multilateral levels. However, a long enough time-series of total FDI instocks is only available for a smaller set of OECD countries. Bilateral exports of services cover 20 reporting countries and

27 partners over the 1999-2000 period. All trade and FDI variables are expressed in dollars at 1996 purchasing power parity values.³⁹

Approach

The estimated equations are reduced forms relating trade in goods, trade in services and FDI outstocks to broadly the same set of factors. This is in line with recent research that stresses the joint determination of trade and FDI transactions.⁴⁰ Bilateral exports and outward FDI from the home country to the partner country (henceforth partner for brevity) were related to i) geographic and non-policy-related structural factors, and ii) the relative costs of trading and investing implied by policies in the home country or partner. FDI regressions focus on bilateral outstocks and multilateral instocks; results for bilateral outflows are broadly the same.⁴¹

Thus, the building blocks of the estimated equations are *geographical and non-policy-related structural factors* including:

- *Variables expressing gravity forces*: total GDP (the sum of home country and partner GDPs in bilateral equations) proxying for total market size; an index of similarity of GDPs proxying for size similarity; distance (from capitals); and transport costs (computed as the difference between CIF imports in the partner and FOB exports by the home country).⁴²
- *Variables expressing factor proportions*: dissimilarity in capital-labour ratios; and dissimilarity in human capital endowments (taking into account the share of population by different education levels and average years of schooling in each level).
- *Other economic variables likely to affect trade or FDI*: R&D intensity in the home country or partner, defined as the ratio of business R&D expenditure to GDP; bilateral exchange rates, defined as nominal exchange rates in bilateral equations and effective (import-weighted) nominal exchange rates in total instock equations; and exchange rate variability, defined as the standard error of the monthly exchange rates.⁴³

As in the previous section, *policy factors* are grouped in four categories:

- *Openness*: multilateral and bilateral tariffs; multilateral indicators of non-tariff barriers; dummies for free-trade agreements (henceforth FTA); and the indicator of FDI restrictions described in Golub (2003).
- *Product-market regulation*: this covers two broad areas – protection of intellectual property rights (henceforth IPR) and regulations curbing competition. The former is proxied by the Ginarte and Park (1997) cross-section indicator of protection of IPR in 1997. Anti-competitive regulation is proxied in two different ways. FDI and trade in goods are related to a time-series indicator that combines barriers to entry in seven non-manufacturing industries over

the 1980-1998 period with economy-wide regulation in 1998. Trade in services is related to an indicator summarising barriers to entry in twelve non-manufacturing industries in 1998.

- *Labour-market arrangements*: the tax wedge on labour income; an indicator of employment protection legislation (EPL); and an indicator of the degree of centralisation and co-ordination of the bargaining regime. The latter two indicators are interacted to account for the possible influence of bargaining institutions on the costs implied by EPL (see above).
- *Infrastructure*: the indicator of infrastructure supply in transport, telecommunications and electricity.

All indicators are normalised and range from 0 to 100. The scale of all policy indicators is from least to most restrictive, except for the indicator of IPR which is increasing in the *lack of* protection. The infrastructure indicator is increasing in the quality and quantity of infrastructure. Details on all variables and indicators used in the regressions, including sources, definitions, methodologies, sensitivity analyses and a description of cross-country patterns are contained in Nicoletti *et al.* (2003).

The empirical estimates are based on panel regressions that take into account four different kinds of effects potentially unexplained by the above set of variables and indicators: *i*) time invariant effects that are specific to each home country and partner (*e.g.* institutions, data collection and reporting methods); *ii*) time invariant effects that are specific to each country pair involved in bilateral transactions (*e.g.* common language, cultural affinity); *iii*) time-varying factors common to all home countries and partners (*e.g.* global demand, supply or technology shocks); and *iv*) time-varying factors specific to each home country and partner (*e.g.* business cycle, country-specific technology shocks).⁴⁴ The econometric approach takes into account these factors either explicitly (by estimating the relevant parameters) or implicitly (by transforming the data prior to estimation) as in Erkel-Rousse and Mirza (2002).⁴⁵ In the analysis of bilateral trade or FDI, the observations are home country-partner pairs in each period; in the analysis of total FDI instocks observations are countries in each period. The analysis of total FDI instocks accounts for the possibility that the adjustment of actual to desired stocks of FDI is costly and takes time. Therefore, equations for total FDI instocks are of the dynamic partial adjustment kind, with the total FDI instock in each period also depending on the realised instock in the previous period (see Cheng and Kwan, 2000, for a similar specification). Moreover, the estimations also account for the possibility that some of the variables explaining FDI might be endogenous to outcomes (*e.g.* while the FDI instock may depend on infrastructure conditions in the country, infrastructure conditions themselves may depend on FDI in infrastructure) by using an appropriate instrumental variables estimation approach. Finally, the total instock equations also account for the possibility that investments in FTAs are the outcome of a two-stage

process in which, first, the decision is made to invest in the FTA, and, second, locations within the FTA are chosen based on the relative attractiveness of member countries.⁴⁶ Estimation methods are briefly summarised in Box 5.

All the results reported below are based on full-model specifications including both non-policy related variables and policy variables. However, the results are generally robust to the omission of subsets of policy variables. It is important to keep in mind that the results for the total FDI instock are based on a dynamic specification, which is significantly different from the static bilateral one, and covers a more limited set of countries.⁴⁷

Non-policy-related structural factors impinging on trade and FDI

Table 2 reports the estimates of the basic equations that include only non-policy-related structural factors. Four main features stand out:

- First, as expected, the coefficients of the gravity variables are correctly signed and significant in all equations. Thus, market size, market similarity, distance and transport costs affect in the same way FDI and exports of goods and services.⁴⁸
- Second, the estimated effect of market size on trade in services and FDI is stronger than in goods trade, while the effect of transport costs (proxied by distance in the services trade equations) is smaller. While a smaller effect of transport costs on FDI is expected, because these should affect (indirectly) only vertical MNEs, the smaller effect on services is surprising, because such costs are often quoted as the reason for the lower intensity of trade in this sector. Thus, neither gravity nor transport cost factors seem able to explain the different trade intensities observed for goods and services.
- Third, the effects of differences in endowments of labour and physical or human capital vary across FDI, trade in goods and trade in services. Differences in endowments positively affect trade in goods, as would be expected from comparative advantage considerations. However, factor dissimilarities negatively affect outward FDI, though a high level of human capital tends to attract inward FDI. Taken together, the findings of a positive effect of market size similarity and a negative effect of factor dissimilarity support the conjecture that FDI by horizontal MNEs is prevalent among OECD countries. Finally, factor dissimilarities have no statistically significant impact on services trade. This finding may be interpreted as suggesting that the various kinds of services respond unevenly to those differences (*e.g.* while comparative advantage factors could sometimes be playing a positive role in tourism, similarity in endowments could be needed in financial or communication transactions).

Box 5. Empirical methods

Regression results are obtained from single-equation estimation of reduced forms for bilateral FDI outstocks, goods exports and service exports as well as for total FDI instocks. To appropriately account for both the cross-section and time-series dimensions of the data, panel data estimation methods are used.

In bilateral equations, panel data methods require controlling for unobserved factors that are specific to each country, each partner, each country-partner pair and each period, as well as for shocks that are common to all countries over time. However, estimating dummies for all these factors is not viable, due to an excessive loss of degrees of freedom. Therefore, the “transformed least squares” (TLS) approach (Erkel-Rousse and Mirza, 2002) was employed, which simplifies the equation to be estimated while at the same time preserving the desirable properties of the relevant coefficient estimates. This approach expresses all variables as deviations from the mean investor (or exporter) or, alternatively, the mean host (or importer). Thus, for instance, two equations for bilateral FDI outstocks are obtained: a “country” equation, in which bilateral outstocks and all explanatory variables are expressed as deviations from their values for the average investor; and a “partner” equation, in which bilateral outstocks and all explanatory variables are expressed as deviations from their values for the average host. The advantage is that in the country equations partner-specific unobserved effects (and common time trends) are accounted for prior to estimation in a non-parametric way and only country-specific effects have to be estimated, while in the partner equations it is the country-specific unobserved effects (and common time trends) that are accounted for non-parametrically and the partner-specific effects that are estimated. This reduces the number of parameters to be estimated in each equation.* The downside is that, due to the transformation of the data, no time-invariant partner-specific variables can be included in the country equations and, symmetrically, no time-invariant country-specific variables can be included in the partner equations. Finally, additional degrees of freedom are gained by assuming that, in each of the two equations, the incremental information provided by the unobserved country pair effect over the “pure” country or partner effect is random and can be included in the error term.

Total instock equations are estimated using a panel data procedure that controls for the possible inconsistency of estimates implied by the presence of the lagged dependent variable and the potential endogeneity of some of the explanatory variables (Bond, 2002). To this end, the equations are first-differenced, the lagged dependent variable and endogenous explanatory variables are instrumented by the lagged values of the variables themselves and the parameters are estimated applying a generalised method of moments procedure (Arellano and Bond, 1991). Serial correlation tests and Sargan tests for over-identifying restrictions were performed to ensure that the regression specifications reported in the main text were supported by the data.

* To check the robustness of regression results to this transformation, each equation was also estimated using a standard fixed effects regression, including all unobserved effects save the country-partner pair effects.

Table 2. **Non-policy-related structural factors impinging on trade and FDI**

Dependent variable (ln)	Export of:				FDI		
	Goods		Services		Outstock		Total instock
Specification	Bilateral TLS ¹		Bilateral TLS ¹		Bilateral TLS ¹		Multilateral dynamic IV ²
	Country	Partner	Country	Partner	Country	Partner	
Total GDP ³	1.284 [14.95]**	0.78 [9.19]**	1.926 [11.49]**	1.677 [13.66]**	1.928 [4.89]**	1.903 [5.37]**	0.135 [2.02]*
Size similarity	0.627 [11.89]**	0.38 [7.47]**	0.948 [9.70]**	0.694 [9.22]**	1.436 [7.50]**	1.247 [7.22]**	
Factor dissimilarity	0.084 [2.64]**	0.046 [1.50]	0.386 [1.41]	0.032 [0.30]	-0.199 [3.18]**	-0.43 [7.05]**	
Human capital dissimilarity	0.415 [2.63]**	0.338 [2.51]*	-0.177 [0.29]	0.66 [1.19]	-2.122 [9.43]**	-2.153 [10.28]**	
Human capital endowment							1.873 [4.38]**
Transport costs	-0.813 [18.02]**	-0.792 [18.64]**			-0.722 [5.95]**	-0.506 [3.86]**	
Distance	-1.106 [27.74]**	-1.126 [30.63]**	-0.843 [10.47]**	-0.762 [10.34]**			
R&D intensity	0.107 [3.79]**						0.36 [5.42]**
Bilateral exchange rate	-0.583 [11.14]**	-0.237 [4.40]**			0.637 [3.78]**	-0.701 [4.34]**	
Effective exchange rate							0.005 [4.70]**
Exchange rate variability ⁴					-0.003 [1.94]	-0.002 [1.65]	
Lagged dependent variable							0.688 [17.11]**
Constant	1.92 [9.58]**	0.96 [5.92]**	-0.60 [4.94]**	-0.10 [0.98]	-2.13 [4.31]**	-1.06 [2.76]**	0.00 [0.34]

Table 2. **Non-policy-related structural factors impinging on trade and FDI** (cont.)

Dependent variable (ln)	Export of:				FDI		
	Goods		Services		Outstock		Total instock
Specification	Bilateral TLS ¹		Bilateral TLS ¹		Bilateral TLS ¹		Multilateral dynamic IV ²
	Country	Partner	Country	Partner	Country	Partner	
Notes:	28 countries and partners		17 countries, 26 partners		28 countries and partners		19 countries
Period	1980-2000		1999-2000		1980-2000		1980-2000
Observations ⁵	7 780	7 768	540	534	4 521	4 517	174
R-squared ⁶	n.a.	n.a.	n.a.	n.a.	0.72	0.65	n.a.
Country effects	Yes	Implicit	Yes	Implicit	Yes	Implicit	Yes
Partner effects	Implicit	Yes	Implicit	Yes	Implicit	Yes	
Common time trend	Implicit	Implicit	Implicit	Implicit	Implicit	Implicit	
Country-specific trend	Yes	Implicit	n.a.	n.a.	Yes	Implicit	
Partner-specific trend	Implicit	Yes	n.a.	n.a.	Implicit	Yes	
Bilateral effect	Random	Random	Random	Random	Fixed	Fixed	
Sargan test ⁷							224 (340)
Autocorrelation in first-differenced residuals							
First-order ⁸							-3.940
Second-order ⁸							-2.160

Absolute value of t or z-statistics in brackets. * significant at 5% level; ** significant at 1% level; n.a. = not applicable.

- Equations estimated using the Transformed Least Squares (TLS) approach (Erkel-Rousse and Mirza, 2002). "Country" indicates the use of data expressed as deviations from the mean host that allows for estimation of investor-specific variables, "partner" indicates the use of data expressed as deviations from the mean investor that allows for estimation of host-specific variables.
- The dynamic panel specification was estimated using the Arellano and Bond (1991) generalized method of moments estimator.
- Defined as domestic absorption in the total instock regressions.
- Coefficients multiplied by 100.
- Samples are adjusted for outliers based on the Welsch distance cut-off (Chatterjee and Hadi, 1988).
- The R-squared is reported only in fixed effects regressions.
- The Sargan statistic tests the null hypothesis that all moment conditions are satisfied. The statistic is χ^2 -distributed with degrees of freedom in parenthesis.
- These tests check the assumption that residuals are serially uncorrelated. This assumption implies that their first differences follow an MA(1) process having non-zero first-order correlation but no higher-order correlation. Reported statistics, both distributed $N(0,1)$, test the null hypothesis of zero first-order and second-order autocorrelation, respectively.

Source: OECD.

- Fourth, the sizeable coefficient estimate for the lagged FDI instock in the dynamic total instock regressions suggests that there is a high persistence present in the data, with FDI flowing to countries that already have relatively high bilateral instocks. This phenomenon may reflect the presence of “agglomeration effects”, whereby FDI is attracted to locations in which important investments by home country MNEs have already been made (see, for related evidence, Barrell and Pain, 1998 and 1999).⁴⁹

R&D intensity in the home and partner countries and the level and volatility of bilateral and effective exchange rates have the expected influence on trade and FDI. R&D in the home country is a common proxy for product differentiation, which positively affects intra-industry trade. At the same time, the overall level of R&D expenditure in the host country increases its attractiveness for total inward FDI. For given relative prices (whose effect is captured by relative factor endowments and, in later regressions, by the product and labour-market regulation variables), an exchange rate appreciation curbs the competitiveness of home country exports of goods, as pointed out by the negative and significant estimates of its coefficient in bilateral export equations. However, it has two opposing effects on FDI. On the one hand, it reflects a pure valuation effect, with the US\$ value of assets held by the home country in the host country decreasing; on the other hand, it reflects an asset effect, increasing the attractiveness of investment in the host country, as its assets become cheaper for foreigners. The results are ambiguous. The estimated effects change sign across bilateral FDI specifications, though the valuation effect seems to prevail in most regressions (see Nicoletti *et al*, 2003). At the multilateral level (as captured by the dynamic total instock regressions), the asset effect seems to prevail, perhaps due to composition effects.⁵⁰ The effects of exchange rate variability are discussed below.

The direct and indirect influence of policies

Table 3 reports the results of regressions that include policy variables. The reported specifications generally include all of them. However, some policy variables are sometimes omitted when the inclusion of all variables would imply either significant changes in country coverage (such as in the total instock equations) or excessive multicollinearity (such as in the cross-section services trade regressions). Most of the variables are expressed in ratios, but country or partner-specific policy variables in trade equations are expressed in level terms in line with trade literature (*e.g.* Helpman and Krugman, 1995). To highlight similarities and differences in the way policies may influence trade in goods, trade in services and bilateral or multilateral FDI, it is useful to look at the estimated effects of each policy across the different measures of trade and FDI. Therefore, the effects of each of the four sets of policies covered in this paper are analysed in turn under the usual headings.

Openness

FDI restrictions by the partner are estimated to have a significant negative impact on bilateral FDI outstocks (Table 3, Panel A). For instance, the semi-elasticity estimates imply that such barriers could be depressing FDI outstocks by between 10 and 80 per cent, depending on the restriction considered (see Table 4).⁵¹ FDI restrictions are also found to significantly depress the inward position of a host country in the dynamic total instock regressions, which are based on a smaller set of OECD countries. However, this effect appears to be sensitive to changes in the country coverage, probably due to a relative lack of variability of restrictions across subsets of OECD countries, and to the inclusion of additional policy variables in the regression, reflecting the close correlation between FDI and product-market liberalisation over the sample period.

Similarly, border barriers directly affect trade in goods (Table 3, Panel B). Applied bilateral tariff rates have a significant negative effect on exports, with the estimated elasticities implying around 1 per cent increase in exports as tariffs decline by 1 percentage point. Moreover, the estimates suggest that a decrease by 1 percentage point of the import coverage of (multilateral) non-tariff barriers in the partner may also increase bilateral exports of the home country by around 1 per cent. These results should be interpreted with caution because, due to data limitations, both the tariff and non-tariff measures are not fully appropriate: applied bilateral tariffs are available for only one recent year, and cover therefore only the cross-section dimension, while the available non-tariff measures are multilateral, and therefore do not accurately account for the influence of border barriers on bilateral trade.⁵²

Table 3 also reports estimates of the potential cross-effects of border barriers on trade and FDI. To this end, tariff and non-tariff barriers were included in the FDI equations (to test for the tariff-jumping hypothesis) and, conversely, FDI restrictions were included in the trade equations. Estimation results for bilateral FDI outstocks and, especially, total instock equations provide some evidence that FDI may be aimed at bypassing non-tariff barriers, which often establish limits to market access (*e.g.* quotas), rather than tariff barriers, which generally add to the cost of trade without necessarily foreclosing exports. Indeed, tariff barriers appear to have a negative effect on FDI outstocks, perhaps reflecting their discouraging effect on the intra-firm trade related to vertical FDI. Some evidence of cross-effects is also found in services trade equations, with FDI restrictions negatively affecting trade in some regressions, perhaps reflecting the complementarity between commercial presence and consumption abroad or cross-border supply for some services (*e.g.* tourism). Cross effects are not found for exports of goods, suggesting that goods trade is not frequently resorted to as a means of bypassing FDI restrictions.

As regards FTAs, the empirical analysis considered the impact of different situations of the home and partner countries: i) the two countries belong to *any* FTA;

Table 3.a. The influence of policies on foreign trade and investment

Dependent variable (ln)	FDI				
	Outstock		Total instock		
Specification	Bilateral TLS ¹		Multilateral Dynamic IV ²		
	Country	Partner			
Total GDP ³	3.342 [8.39]**	1.328 [3.78]**	0.283 [3.76]**	0.389 [5.01]**	0.363 [4.56]**
Size similarity	2.187 [11.43]**	0.968 [5.64]**			
Factor dissimilarity	-0.059 [0.63]	-0.794 [6.90]**			
Human capital dissimilarity	-0.844 [3.57]**	-1.383 [6.08]**			
Human capital endowment			1.248 [2.83]**	0.658 [1.42]	1.219 [2.67]**
Transport costs	-0.662 [5.39]**	-0.743 [6.14]**			
R&D intensity			0.323 [4.93]**	0.403 [5.71]**	0.485 [6.66]**
Bilateral exchange rate	0.283 [1.61]	-0.97 [5.70]**			
Effective exchange rate			0.004 [4.15]**	0.003 [3.33]**	0.004 [3.70]**
Exchange rate variability ⁴	0.024 [5.45]**	-0.0001 [1.23]	-0.008 [1.33]	-0.008 [1.47]	-0.011 [1.80]
Lagged dependent variable			0.626 [15.19]**	0.558 [12.42]**	0.519 [10.98]**
Free trade area	0.366 [5.22]**	0.482 [5.84]**			
FDI restrictions		-0.019 [3.06]**	-0.007 [2.62]**	-0.002 [0.50]	0.006 [1.58]
Bilateral tariff barriers	-0.1 [6.08]**	-0.059 [4.07]**			
Non-tariff barriers		0.011 [1.89]	0.112 [3.55]**	0.143 [4.44]**	0.166 [4.89]**
Employment protection ratio ⁹	-0.032 [2.62]**	-0.053 [5.37]**		-0.007 [2.91]**	-0.007 [2.46]**
Labour tax wedge ratio ⁹	-0.925 [9.20]**	-2.297 [11.65]**		-0.005 [1.10]	-0.008 [1.75]
Regulation ratio ⁹	-0.142 [8.25]**	-0.1 [6.11]**		-0.006 [1.53]	-0.010 [2.53]**
Infrastructure			0.008 [2.12]**	0.013 [2.92]**	0.006 [1.35]
Constant	-0.87 [1.75]	-3.29 [7.97]**	-0.008 [1.07]	-0.007 [0.88]	0.009 [1.04]

Table 3.a. The influence of policies on foreign trade and investment (cont.)

Dependent variable (ln)	FDI				
	Outstock		Total instock		
Specification	Bilateral TLS ¹		Multilateral Dynamic IV ²		
	Country	Partner			
Notes:	28 countries and partners		16 countries	14 countries	10 countries
Period	1980-2000		1980-2000		
Observations ³	3 792	3 601	169	163	134
R-squared ⁶	0.71	0.72	n.a.	n.a.	n.a.
Sargan test ⁷			223 (340)	205 (693)	151 (338)
Autocorrelation in first-differenced residuals					
First-order ⁸			-3.45	-3.30	-3.30
Second-order ⁸			-1.93	-1.94	-1.73

Absolute value of t or z-statistics in brackets. * significant at 5% level; ** significant at 1% level.

n.a. = not applicable.

Country, partner, bilateral and time effects as in Table 2.

Notes 1-8 as in Table 2.

9. The ratio increases as employment protection, regulation or the labour tax wedge become more restrictive in the host country.

Source: OECD.

ii) the partner belongs to *any* FTA; iii) the two countries belong to the *same* FTA; iv) the two countries belong to the EU, NAFTA or EFTA; and v) the partner (but not the home country) belongs to the EU, NAFTA or EFTA. Only results concerning the latter three situations and, for services trade regressions, membership in the EU or NAFTA are reported, since the dummies for membership of both countries or the partner in any FTA were insignificant in most cases. The analysis of situations iv) and v) omitted policy variables unrelated to openness to avoid multicollinearity problems, but the results are broadly unchanged in specifications including all policy variables. The three main findings were:

1. Membership in the *same* FTA increases both exports of goods and FDI outstocks (Table 3);
2. Bilateral exports of goods and outward FDI to partners belonging to a different FTA tend to increase only when the partner is a EU country (Table 5);
3. The effect of FTA membership on exports of services is insignificant. In particular, close integration under the Single Market Programme does not appear to have boosted services trade among EU countries (Table 5).

Thus, FTAs that eliminate border barriers appear to be unsuccessful in raising services trade, perhaps because the latter is often impeded by non-border barriers.

Table 3.6. The influence of policies on foreign trade and investment

Dependent variable (ln)	Export of						
	Goods		Services				
Specification	Bilateral TLS ¹		Bilateral TLS ¹		Bilateral TLS ¹		Bilateral TLS ¹
	Country	Partner	Country	Partner	Country	Partner	Partner
Total GDP	1.006 [11.15]**	0.747 [8.77]**	1.759 [29.53]**	1.614 [31.88]**	1.569 [27.51]**	1.464 [27.22]**	1.623 [11.31]**
Size similarity	0.539 [9.52]**	0.44 [8.19]**	0.897 [13.31]**	0.676 [11.94]**	0.803 [13.41]**	0.571 [9.97]**	0.659 [7.80]**
Factor dissimilarity	0.153 [3.87]**	0.112 [2.72]**	0.26 [1.93]	0.193 [1.67]	0.137 [0.97]	0.198 [1.36]	0.099 [0.92]
Human capital dissimilarity	0.54 [2.80]**	0.46 [2.69]**	-0.788 [2.24]*	-0.852 [2.21]*	-0.415 [1.08]	0.31 [0.70]	0.729 [1.25]
Distance	-0.972 [18.18]**	-0.991 [20.63]**	-0.928 [19.44]**	-0.806 [18.81]**	-0.895 [23.42]**	-0.795 [19.36]**	-0.751 [7.43]**
Transport costs	-0.71 [11.37]**	-0.683 [11.75]**					
R&D intensity	0.208 [7.89]**						
Bilateral exchange rate	-0.489 [8.33]**	-0.285 [5.53]**					
Free trade area	0.109 [4.77]**	0.134 [4.96]**					-0.02 [0.07]
FDI restrictions		-0.039 [0.84]					-0.399 [3.03]**
Bilateral tariff barriers	-0.137 [3.69]**	-0.145 [4.08]**					
Non-tariff barriers		-0.08 [4.23]**					
<i>Country or partner-specific policy variables</i>							
Regulation	-0.253 [3.85]**	-0.118 [2.06]*					
Labour tax wedge	-0.399 [5.54]**	0.194 [2.94]**	-0.608 [3.83]**	-0.726 [4.70]**			

Table 3.b. **The influence of policies on foreign trade and investment** (cont.)

Dependent variable (ln)	Export of					
	Goods		Services			
Specification	Bilateral TLS ¹		Bilateral TLS ¹		Bilateral TLS ¹	
	Country	Partner	Country	Partner	Country	Partner
Employment protection					-0.011 [4.85]**	-0.022 [8.10]**
With high-level corporatism	0.002 [1.85]	0.001 [0.92]			0.034 [4.34]**	0.01 [1.86]
With mid-level corporatism	-0.003 [2.52]*	-0.002 [1.43]			-0.011 [1.47]	-0.003 [0.32]
With low-level corporatism	0.001 [0.60]	-0.001 [0.80]				
Combined country/partner policy variables						
Regulation ⁷			-0.258 [2.57]*	-0.241 [2.26]*	-0.236 [2.18]*	-0.258 [2.18]*
Transport infrastructure ⁷			0.212 [2.39]*	0.365 [5.70]**		
Constant	1.50 [6.20]**	1.21 [6.98]**	-0.63 [10.39]**	-0.06 [1.57]	-0.53 [11.02]**	0.09 [1.88]
Notes:	28 countries and partners		17 countries and 26 partners			
Period	1980-2000		1999-2000			
Observations ⁵	6 107	6 119	480	477	435	432
R-squared ⁶	n.a.	n.a.	0.79	0.76	0.79	0.76
						519 n.a.

Absolute value of t-statistics in brackets. * significant at 5% level; ** significant at 1% level; n.a. = not applicable.

Country, partner, bilateral and time effects as in Table 2.

Notes 1, 5 and 6 as in Table 2.

7. Product of indicators in home and host countries.

Source: OECD.

Table 4. **FDI positions: the hypothetical effect of removing FDI restrictions¹**

Average across countries

	Per cent change in inward FDI position
Removal of foreign equity ceilings	77.9
Removal of approval and national interest tests	21.2
Easing of nationality requirements on management ²	10.1

1. The simulations are based on coefficients estimated in panel regressions of bilateral outward FDI positions on non-policy factors (distance, transport costs, market size, similarity in size and factor endowments, and other country and time-specific effects) and policy influences (FDI restrictions, tariff and non-tariff barriers, participation in free trade areas, and product and labour market arrangements). The regressions cover bilateral FDI relationships between 28 OECD countries over the 1980-2000 period.

2. From majority of domestic managers to only one or more domestic managers.

Source: OECD.

Moreover, FTAs appear to benefit principally goods trade among their members, but have little impact on trade with third-party countries (independent of their membership in another FTA), except when trading with a EU member. While FTAs also benefit FDI among their members, FDI outstocks are stimulated as well when the partner belongs to the European Union, though this effect is only weakly significant. In other words, the European Union appears to be more attractive for third-party FDI and exports than other FTAs, such as NAFTA. This may be related to lower average tariffs, closer integration (*i.e.* a custom union *versus* a free-trade area) in the Single Market and/or the different role played by rules of origin in the two areas.⁵³

Exchange rate variability can be interpreted as capturing the effect of economic unions to the extent that these generally require stable exchange rate arrangements or a single currency. In most regressions, a reduction of both bilateral and multilateral exchange rate volatility tends to increase FDI in the host country. Though this effect is not significant at conventional levels in the regressions reported in Tables 3 and 5, it is significant in other bilateral and multilateral specifications of the FDI outstock and outflow equations (see Nicoletti *et al.*, 2003). In some specifications, however, the sign is reversed, suggesting a positive relationship between exchange rate volatility and FDI, and no effects of volatility could be found on goods or services exports (the variable was therefore omitted from the preferred bilateral trade specifications reported in the tables). Whether currency unions stimulate economic integration among their members remains, therefore, a largely unresolved empirical issue.

Product-market regulation

Product-market regulations that curb competition are estimated to have a negative and significant effect on both trade and FDI (Table 3). However, the results suggest that they do so in different ways for FDI, trade in goods and trade

in services. What is relevant for bilateral FDI outstocks is the ratio of the regulatory indicators in the host and home countries. As regulation in the host country becomes more restrictive than regulation in the home country, outstocks of the latter decrease. This is confirmed by the significantly negative impact of anti-competitive regulations in the host country (relative to the OECD average) on its total FDI instock.⁵⁴ Put simply, the net effect of regulations that curb competition is to make the host country less attractive for international investors located in countries where regulations are less restrictive. No robust effect of the lack of intellectual property rights protection in the host country could be found on FDI outstocks, perhaps due to the crude proxy used to test for this potential effect of policies, which varies only in the cross-section dimension.⁵⁵ Hence, this variable was omitted from the preferred specifications reported in Table 3.

Conversely, what is most relevant for bilateral exports of goods is the level of regulation in the home country, which increases production costs, curbing the competitiveness of exports, distorts relative prices and possibly reduces also opportunities for intra-industry trade by narrowing product variety. To a lesser extent, regulations in the partner countries also tend to depress exports, suggesting that their effect on market access dominates the possible stimulating effect on the competitiveness of foreign *versus* home goods.

Finally, estimation results point to an identical effect of regulations in the home and the partner country on bilateral services exports. In other words, statistical tests suggest that it is the *product* of the regulatory indicators in the two countries that has a negative and significant effect on services trade. This probably reflects the need for using efficiently inputs in both countries to produce many of the services that are traded (*e.g.* travel, freight, tourism, communication, banking). Moreover, regulation is estimated to have a stronger impact on services trade, as measured by the size of the estimated coefficient, than on both goods trade and FDI. The fact that anti-competitive regulations are generally more widespread in services, that these regulations combine in both the exporter and importer countries to lower service exports and that their combined impact is stronger than in goods trade, could contribute to explain not only cross-country patterns of services trade but also observed differences in trade intensities of goods and services.

Labour-market arrangements

The tax wedge on labour income appears to influence FDI in much the same way as anti-competitive regulation. What appears to be relevant for bilateral FDI outstocks is the ratio between wedges in the partner and the home country: the higher this ratio, the lower the outstock of FDI from the home country to the partner. This latter result is only partially confirmed by the dynamic total instock estimates, in which the wedge is estimated to have a negative, but weakly significant,

Table 5. The influence of free-trade agreements

Dependent variable (ln)	FDI		Exports of			
	Outstock		Goods		Services	
Specification	Bilateral TLS ¹		Bilateral TLS ¹		Bilateral TLS ¹	
	Country	Partner	Country	Partner	Country	Partner
Total GDP	1.89 [4.86]**	1.918 [5.42]**	1.33 [14.59]**	0.662 [7.74]**	1.999 [14.57]**	1.692 [18.21]**
Size similarity	1.414 [7.51]**	1.255 [7.25]**	0.702 [12.94]**	0.369 [6.98]**	0.981 [12.20]**	0.71 [9.57]**
Factor dissimilarity	-0.176 [2.79]**	-0.395 [6.41]**	0.164 [4.36]**	0.12 [3.27]**	0.444 [1.60]	0.259 [2.78]**
Human capital dissimilarity	-1.906 [8.56]**	-1.934 [9.34]**	0.216 [1.26]	0.093 [0.62]	-0.152 [0.23]	0.571 [0.98]
Transport costs	-0.693 [5.75]**	-0.479 [3.74]**	-0.749 [13.74]**	-0.72 [14.16]**		
Distance			-1.042 [20.97]**	-1.058 [22.14]**	-0.844 [7.44]**	-0.73 [6.84]**
R&D intensity			0.119 [4.12]**			
Bilateral exchange rate	0.711 [4.26]**	-0.718 [4.47]**	-0.58 [10.20]**	-0.346 [6.39]**		
Exchange rate variability ⁴	-0.003 [1.50]	-0.002 [1.26]				
FDI restrictions				-0.107 [2.33]*		-0.139 [1.00]
Bilateral tariff barriers			-0.097 [2.31]*	-0.105 [2.69]**		
Non-tariff barriers				-0.074 [3.78]**		
Infrastructure					0.355 [1.59]	0.381 [3.19]**
European Union	0.529 [7.73]**	0.808 [3.89]**	0.058 [1.85]	0.163 [3.34]**	0.194 [0.83]	0.26 [0.74]
NAFTA	1.578 [7.37]**	1.754 [7.69]**	0.485 [2.43]*	0.495 [3.58]**	-0.367 [1.21]	-0.508 [1.54]
EFTA	0.466 [2.53]*	0.5 [1.49]	0.183 [3.12]**	0.239 [3.12]**		
Partner in:						
European Union		0.376 [1.79]		0.144 [3.16]**		
NAFTA		-0.048 [0.27]		0.033 [0.64]		
EFTA		0.264 [0.98]		0.027 [0.46]		
Constant	-2.21 [4.53]**	-0.85 [2.05]*	2.08 [9.94]**	0.82 [4.76]**	-0.70 [4.65]**	-0.09 [1.31]

Table 5. **The influence of free-trade agreements** (*cont.*)

Dependent variable (ln)	FDI		Exports of			
	Outstock		Goods		Services	
Specification	Bilateral TLS ¹		Bilateral TLS ¹		Bilateral TLS ¹	
	Country	Partner	Country	Partner	Country	Partner
Notes:	28 countries and partners		28 countries and partners		17 countries and 26 partners	
Period	1980-2000		1980-2000		1999-2000	
Observations ⁵	4 521	4 517	6 958	6 945	525	519
R-squared ⁶	0.73	0.66	n.a.	n.a.	n.a.	n.a.

Absolute value of t or z-statistics in brackets. * significant at 5% level; ** significant at 1% level; n.a. = not applicable. Country, partner, bilateral and time effects as in Table 2.

For notes 1, 4, 5 and 6: see Table 2.

Source: OECD.

impact on the ability of the host country to attract OECD-wide FDI. As with product-market regulation, bilateral exports of goods are significantly depressed by a high tax wedge in the home country, suggesting that its impact on production costs is not fully offset by wages. In this case, however, a symmetric (though weaker) reverse effect is found for a high tax wedge in the partner, which *ceteris paribus* raises the competitiveness of the home country exports. Finally, high tax wedges in both the home country and the partner are estimated to have depressing effects on bilateral service exports, confirming that traded services may use labour inputs in both countries involved in the transaction.⁵⁶

Results for EPL are similar but more nuanced, because some of them depend on the bargaining regime in place in the home country and the partner. The effect of EPL on bilateral FDI outstocks and total FDI instocks mirrors that of anti-competitive regulations and wedges: host countries in which EPL is stricter than in their investing partners tend to attract significantly less FDI. Here, the bargaining regime plays no moderating role, perhaps due to the influence of EPL regimes on the risk-adjusted returns to foreign investment or differential information costs for domestic and foreign investors (see above). On the other hand, strict EPL in the home country depresses goods exports by increasing production costs, thus curbing the competitiveness of exported goods, and distorting relative prices, but only in countries where industry-level bargaining (labelled “mid-level corporatism” in Table 3) discourages the shift of those costs to wages. At the same time, no effect of strict EPL in the partner is found, independent of the level of corporatism.

Finally, in services trade strict EPL in the home country and the partner both have a negative effect on exports, further confirming the pattern already observed for regulation and wedges. However, this effect vanishes in highly corporatist home countries.

Infrastructure

Table 3 looks only at the influence of infrastructure provision on FDI and trade in services, because the role of infrastructure for trade in goods is indirectly captured by transport costs and, therefore, is not modelled explicitly.⁵⁷ Even though the coefficient estimated for infrastructure has the expected sign, the estimation results provide little evidence that the quality and quantity of infrastructure in the partner, as captured by the indicator described in the previous section, significantly affects bilateral patterns of FDI. Therefore, this variable was omitted from the “preferred” specifications reported in Table 3. The lack of any definite result for this variable may also be related to its potential endogeneity to FDI (see above). Indeed, total instock regressions, which control for endogeneity through instrumental variable estimation, suggest that infrastructure tends to improve the overall attractiveness of a host country for international investors, though this result is sensitive to changes in country coverage.⁵⁸ Moreover, transport infrastructure is estimated to have a sizeable and significant positive effect on trade in services. Here, infrastructure in both the country and partner is relevant for trade and, therefore, transport infrastructure is defined as the product of the indicator values in the two countries.⁵⁹ The results suggest that the elasticity of bilateral service exports with respect to transport infrastructure provides a significant offset to the negative effect of distance. Poor or inefficient infrastructure is therefore a supplementary explanation of both cross-country services trade patterns and the relatively low trade intensity observed in the service sector.

Summing up

Empirical results broadly support the influences expected from both non-policy related and policy factors on trade and FDI. The main insights are the following:

- Gravity forces affect trade and FDI in the same way. However, the effect of market size and transport costs on FDI and trade in services is, respectively, stronger and weaker than in goods trade. Thus, economic and geographic considerations alone are unable to explain the significant difference in the intensity of trade in goods and services.
- Border barriers have a direct depressing effect on both trade and FDI, but there is also evidence that MNEs may be able to bypass non-tariff barriers, which limit the access of exporters to local markets, by increasing the activity of their foreign affiliates in these markets. Conversely, no such bypass

seems to occur for tariff barriers, which raise the cost of trade for both exporters and vertical MNEs.

- Participation in a FTA enhances trade and FDI amongst its members, but the only FTA that appears to have benefited also from an increase in trade and FDI from third parties is the European Union, perhaps due to its closer degree of integration. Moreover, FTAs do not appear to have affected positively services trade among their members, which might be due to limited coverage of the agreements and remaining non-border barriers.
- There is some evidence that the supply of high quality infrastructure enhances the overall appeal of a host country with respect to inward FDI. Moreover, good infrastructure conditions in both the home country and partner have a powerful positive effect on services exports.
- Anti-competitive regulations curb FDI and trade, with a particularly strong negative effect on services trade, which is sensitive to regulatory conditions in both the home country and the partner.
- High tax wedges on labour income and strict EPL also curb FDI and trade, but the effect of EPL on trade depends on the bargaining regime. Again, services trade is particularly sensitive to conditions in both the home country and the partner.
- Taken together, the results for services trade suggest that poor or inefficient infrastructure, lack of competitive pressures and adverse labour-market arrangements in trading partners could contribute to explain the low services trade intensities relative to goods trade observed in many OECD countries.

HOW DO POLICIES SHAPE TRADE AND FDI PATTERNS?

The impact of policies on trade and FDI is significant, but how much of the observed differences in bilateral trade and FDI transactions among OECD countries can actually be explained by differences in policies? What are the policies that play the largest role in explaining such differences? What would be the effect of changing policies on trade and FDI? Bearing in mind the illustrative nature of any policy simulation based on regression results, empirical estimates can be used to provide tentative answers to these questions.⁶⁰ Specifically, this section quantifies i) the relative contributions of policies and other factors to the observed deviations of exports (of goods and services) and FDI from OECD averages; and ii) the long-run impact on total FDI instocks and export flows of changes in policies that affect border barriers, labour taxation and product-market regulation. It is important to notice that the quantitative effects highlighted in the policy

simulations depend on the specification of the estimated models as well as on the configuration of policies and the distribution of FDI stocks and trade flows in the baseline scenario. This is particularly the case for simulations concerning domestic regulatory policies in product and labour markets. Finally, given the specification of some of the policy variables, which entail a comparison between policies of the home country and the partner, diversion effects are not taken into account. To the extent that these effects are important, the simulation results may overestimate the effects of policy changes on the variables of interest.

Accounting for cross-country patterns of trade and FDI

Figures 19-21 show the contributions of policies to the deviation (in logarithms) of total FDI instocks, services exports and goods exports in each country from the OECD average over the 1990s. The figures also show how much of these deviations is explained on average by non-policy-related factors – including gravity forces, factor endowments and all effects that are not accounted for by the policy and non-policy-related variables in the regressions (*i.e.* the country and partner-specific fixed effects and the bilateral effects) – and the unexplained regression residual.⁶¹ The decompositions shown in the figures are based on the results of the bilateral equations averaged over the estimation period and investor countries (for FDI instocks) or importer countries (for exports of goods and services). The precise specifications on which the simulations are based are reported in the figures.

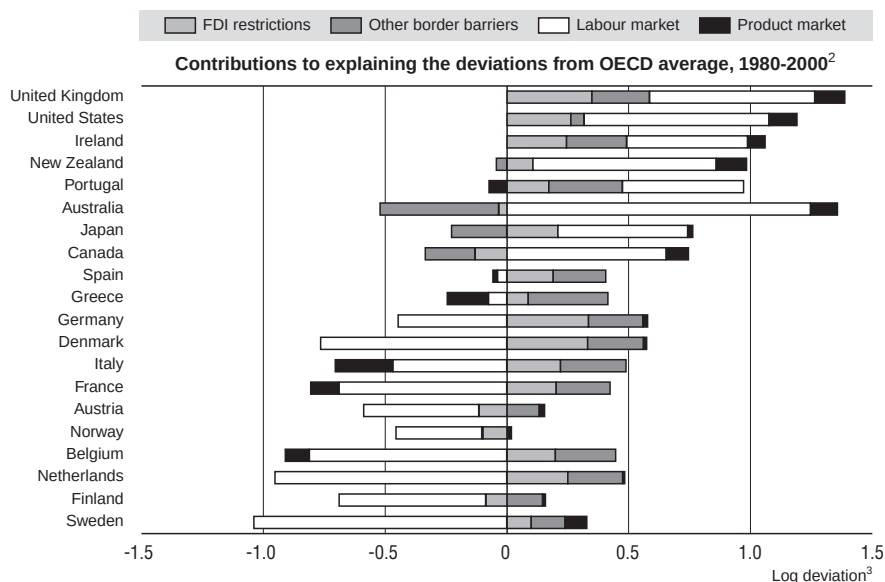
Policies influence bilateral FDI positions across member countries almost as much as all other (“non-policy”) factors taken together (Figure 19).⁶² The most important policy effects come from labour-market arrangements and openness factors. A more detailed analysis shows that the labour tax wedge is the most influential component of these arrangements, with EPL playing a lesser role. Anti-competitive product-market regulations explain a smaller part of the deviations of FDI instocks from the OECD average. However, these policy influences play different roles in different countries. For instance, while labour-market arrangements have a relatively positive influence on FDI instocks in English-speaking countries, Japan and Portugal, they tend to depress them in other European countries. Similarly, while in most European countries and the United States openness factors play a positive role, comparatively restrictive border measures depress FDI instocks relative to the OECD average in Canada, Australia and, to a lesser extent, Japan. The contribution of product-market regulation is significant for countries having either a relatively liberal approach (the United States, the United Kingdom, Australia, New Zealand, Canada and Sweden), where it pushes up relative FDI instocks, or a relatively restrictive approach (continental European countries), where it pulls down relative FDI instocks.

Policies also play an important (though smaller) role in explaining why services exports are above or below the OECD average (Figure 20). In this case, the

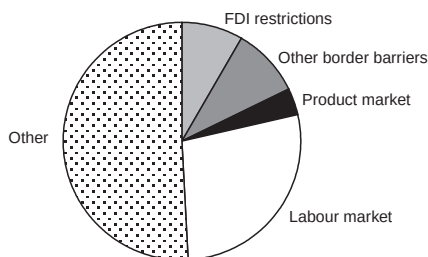
⁶⁰

Figure 19. Policies and inward FDI positions¹

Contributions to explaining the deviations from OECD average, 1980-2000²



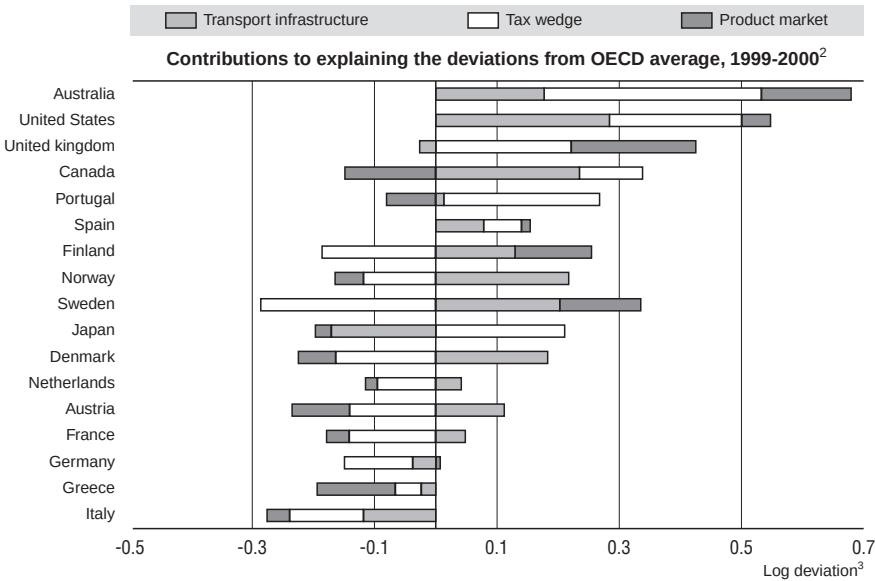
Average contributions (absolute values)



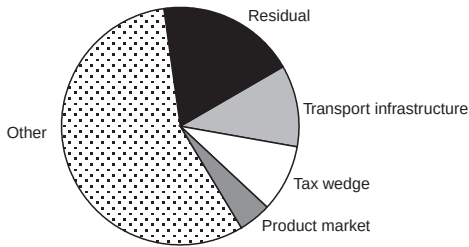
1. *Other border barriers* contains the contribution of tariff and non-tariff barriers of membership in a free-trade area. *Labour market* contains the contributions of the relative indicator of the tax wedge on labour income and of the relative indicator of employment protection legislation. *Product market* contains the contribution of the relative level of barriers to entry. *Other* include the contribution of the structural variables and dummy variables.
2. The contributions are based on coefficients estimated in panel regressions of bilateral outward FDI positions on non-policy factors (distance, transport costs, market size, similarity in size and other country and time-specific effects) and policy influences (FDI restrictions, tariff and non-tariff barriers, participation in free trade areas, and product and labour market arrangements). The regressions cover bilateral FDI relationships between 28 OECD countries over the 1980-2000 period.
3. Average is computed on countries included in the sample.

Source: OECD.

Figure 20. **Policies and services exports¹**
Contributions to explaining the deviations from OECD average, 1999-2000²



Average contributions (absolute values)



1. *Product market* contains the contribution of the level of barriers to entry. *Other* include the contribution of the structural variables and dummy variables. *Residual* contains the unexplained part of the variation.

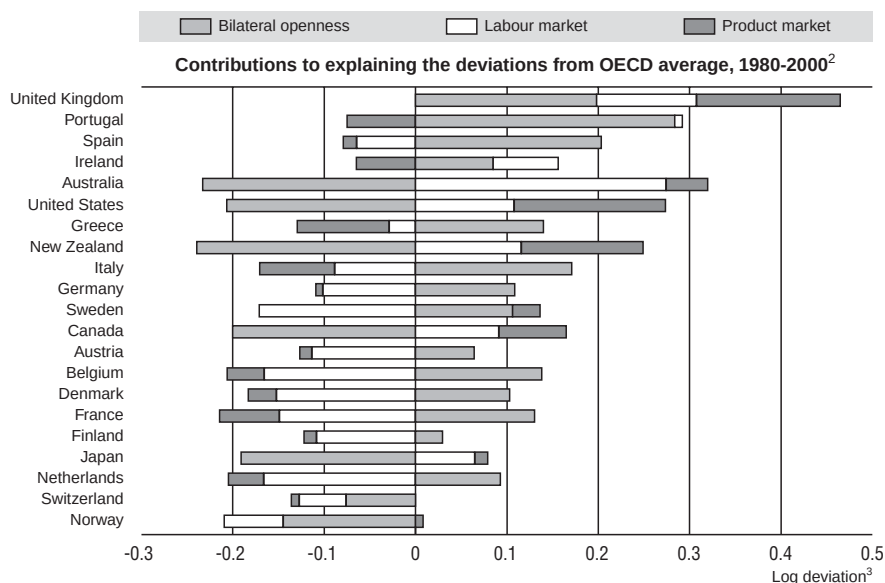
2. The contributions are based on coefficients estimated in panel regressions of bilateral outward FDI positions on non-policy factors (distance, transport costs, market size, similarity in size and other country and time-specific effects) and policy influences (FDI restrictions, tariff and non-tariff barriers, participation in free trade areas, and product and labour market arrangements). The regressions cover bilateral FDI relationships between 28 OECD countries over the 1980-2000 period.

3. Average is computed on countries included in the sample.

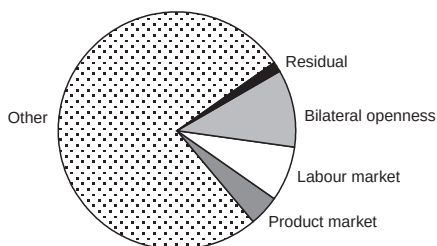
Source: OECD.

Figure 21. Policies and goods exports¹

Contributions to explaining the deviations from OECD average, 1980-2000²



Average contributions (absolute values)



1. *Openness* contains the contributions of bilateral tariffs of membership in a free-trade area. *Labour market* contains the contributions of the relative indicator of the tax wedge on labour income and of the relative indicator of employment protection legislation. *Product market* contains the contribution of the relative level of barriers to entry. *Other* includes the contribution of the structural variables and dummy variables. *Residual* contains the unexplained part of the variation.
 2. The contributions are based on coefficients estimated in panel regressions of bilateral outward FDI positions on non-policy factors (distance, transport costs, market size, similarity in size and other country and time-specific effects) and policy influences (FDI restrictions, tariff and non-tariff barriers, participation in free trade areas, and product and labour market arrangements). The regressions cover bilateral FDI relationships between 28 OECD countries over the 1980-2000 period.
 3. Average is computed on countries included in the sample.
- Source: OECD.

contribution of other factors is inflated by unexplained regression residuals, which are larger than for FDI. The contribution of policies to explaining services trade is more evenly distributed than for FDI among product-market regulation, the tax wedge, and infrastructure provision though the latter tends to predominate. The tax wedge favours services exports relative to the OECD average particularly in Australia, Japan, Portugal, the United Kingdom and the United States, while it penalises them in France, Austria, Finland, Denmark and, especially, Sweden. Having comparatively liberal product markets in services industries enhances services exports relative to the OECD average in the United Kingdom, Australia, Sweden, Finland and the United States, while relatively restrictive markets curb them in Canada, Greece, Portugal and Austria. Finally, relatively poor transport infrastructure endowments depress services exports in Japan and Italy, while its effect is either positive or close to zero in other countries.

Policies can explain only a relatively small part of the cross-country variance in goods exports (Figure 21). Most of this variance is explained by geographical and other non-policy-related factors (such as market size and distance from major OECD markets). The main policy influences come from bilateral openness (*e.g.* the border barriers faced by the exporter country when trading with its partners) and labour-market arrangements, while product-market regulations generally play a lesser role. Exports of EU countries are pushed up relative to the OECD average by bilateral openness with trading partners, which are mainly within the Single Market, while non-EU countries suffer from a relative lack of bilateral openness with respect to their EU trade partners. A closer look at the impact of policies in each country suggests that, in many cases, offsetting effects are at work. For instance, Australia, New Zealand, the United States, Canada and Japan are penalised by a relative lack of bilateral openness, but relatively liberal labour and/or product-market policies help to offset this negative bilateral openness. Conversely, while goods exports in European countries are stimulated by gravity factors, they are negatively affected by a relatively restrictive policy stance in labour and product markets. The only countries in which all policy factors depress goods exports relative to the OECD average are Switzerland and, to a lesser extent, Norway.

The impact of removing impediments to trade and FDI

The lifting of border and non-border barriers to trade and investment figures significantly on both national and international policy agendas (see, for instance, World Bank, 2002, 2003; and OECD, 2001d, 2003). To quantify the likely impact of such policy changes, the preferred equations described above have been used to simulate the following hypothetical policy scenarios:

- *Policies aimed at lifting border barriers.* These include i) the OECD-wide alignment of FDI restrictions and multilateral non-tariff barriers on those of the

least restrictive OECD country; ii) the alignment of bilateral tariff rates on those of the least restrictive trading partner or the least restrictive country pair; and iii) the accession to the European Union by the Czech Republic, Hungary and Poland;

- *Domestic competition-oriented policies in product markets* that result in an alignment of product-market regulations on those of the least restrictive OECD country;
- *Domestic labour tax reforms* that result in the alignment of the labour tax wedge on that of the OECD country with the lowest wedge.

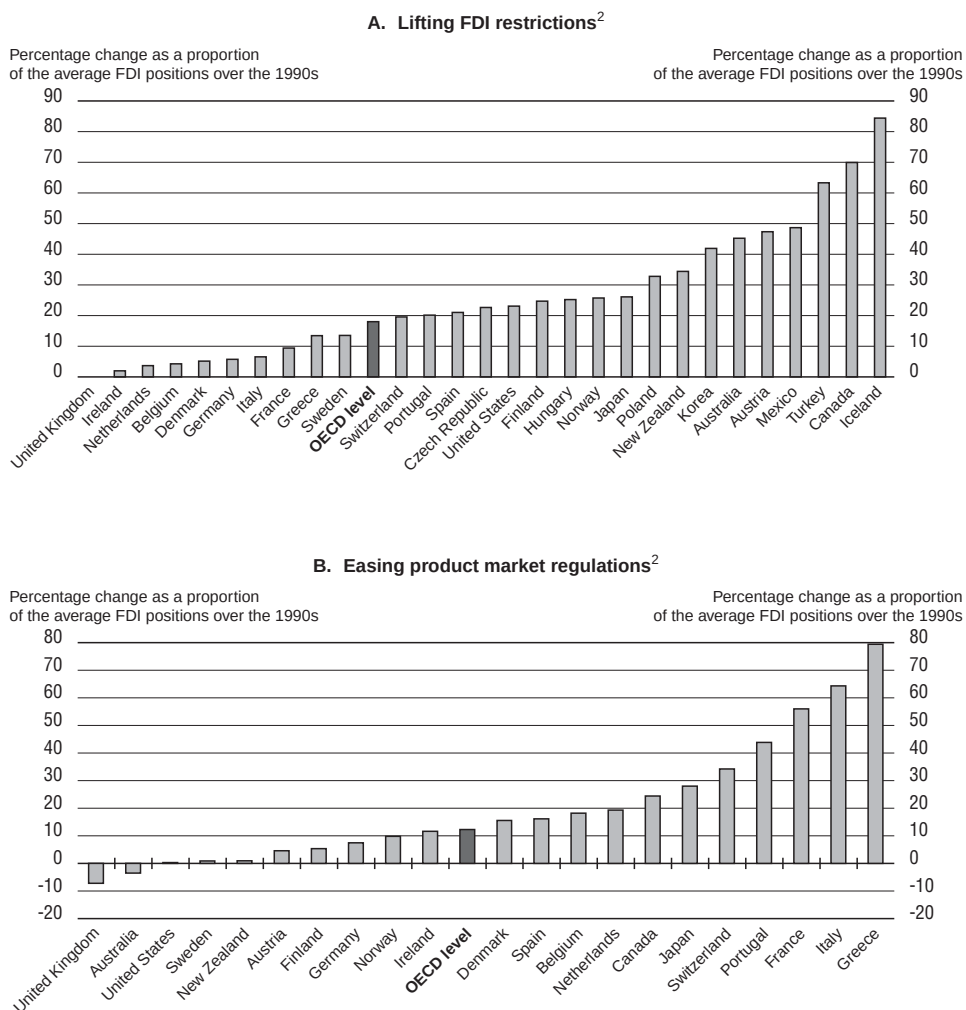
Policies and FDI

Figure 22 (Panel A) shows the effect of bringing FDI restrictions in all OECD countries down to the level of restrictions in the United Kingdom, the least restrictive country according to the indicator described in Golub (2003). This move would require country-specific reforms that differ in content and scope depending on the patterns of FDI restrictions in place, but typically they would imply lifting screening requirements and restrictions on foreign shareholdings, and substantially reducing other restrictions (*e.g.* on the nationality of management, board composition and movement of people). The effects of such reforms on FDI instocks depend on how restrictive each country was before the policy move. Relatively restrictive countries could increase their total FDI instock by between 40 and 80 per cent, but even in countries that are estimated to be already relatively liberal the gains could amount to around 20 per cent of their initial instock.⁶³ Overall, such policy reforms could increase OECD-wide instocks by almost 20 per cent.

Reducing anti-competitive product-market regulations is also likely to increase significantly FDI instocks (Figure 22, Panel B). If all OECD countries were to reduce the level of their product-market regulations to that in the United Kingdom (the least restrictive country), OECD-wide instocks would increase by over 10 per cent relative to the initial instock. Since bilateral FDI outstocks are estimated to depend on the relative stringency of regulation in the home and host countries, relatively restrictive host countries – such as Greece, Italy and France – that host FDI from relatively liberal countries could increase their FDI instocks by as much as 60 to 80 per cent through regulatory reform. Conversely, countries that are relatively liberal would see the relative attractiveness of their product markets either unchanged (such as in the United States, New Zealand and Sweden) or even reduced (such as in the United Kingdom and Australia).

Policies and trade

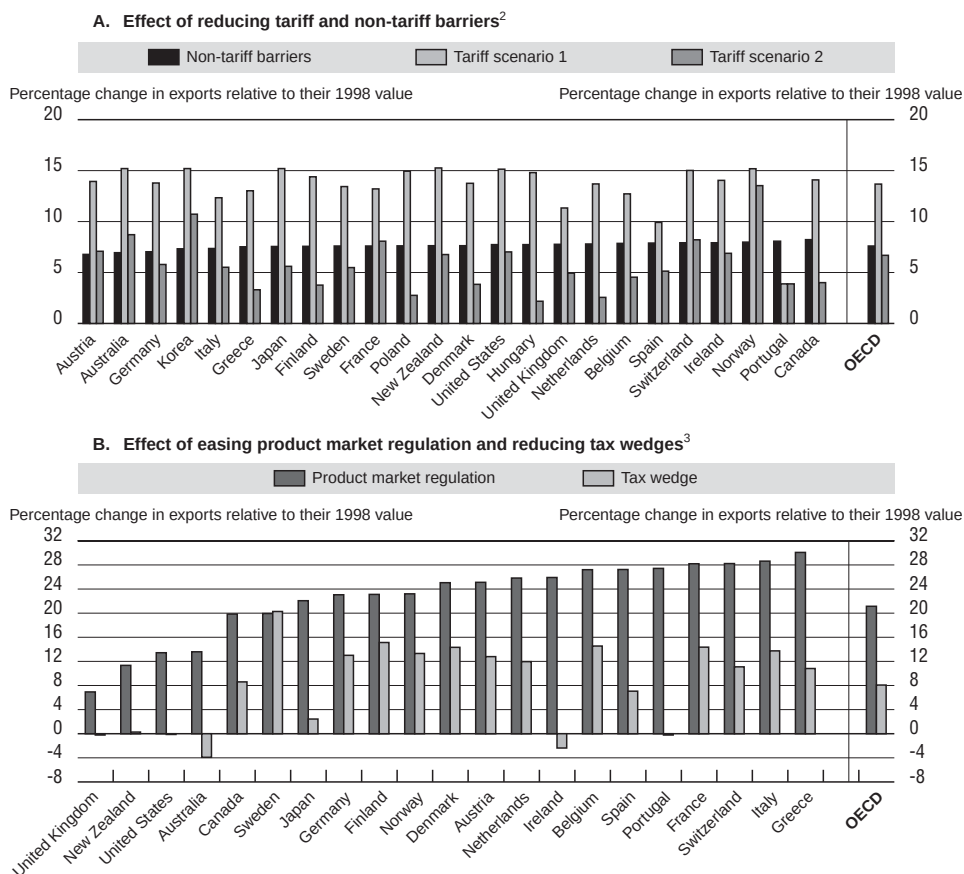
Figure 23 looks at the effects of three different policies – reducing tariff and non-tariff barriers (panel A), liberalising product markets and reducing the tax wedge on labour income (panel B) – on country-specific and OECD-wide goods

Figure 22. Policies and inward FDI positions: the scope for further integration¹

1. The simulations are based on coefficients estimated in panel regressions of bilateral outward FDI positions on non-policy factors (distance, transport costs, market size, similarity in size and factor endowments, and other country and time-specific effects) and policy influences (FDI restrictions, tariff and non-tariff barriers, participation in free trade areas, and product and labour market arrangements). The regressions cover bilateral FDI relationships between 28 OECD countries over the 1980-2000 period.

Source: OECD.

Figure 23. **Change in goods exports from reducing tariff and non-tariff barriers, product-market regulation and the tax wedge on labour income¹**



1. The simulations are based on coefficients estimated in panel regressions of bilateral outward FDI positions on non-policy factors (distance, transport costs, market size, similarity in size and factor endowments, and other country and time-specific effects) and policy influences (FDI restrictions, tariff and non-tariff barriers, participation in free trade areas, and product and labour market arrangements). The regressions cover bilateral FDI relationships between 28 OECD countries over the 1980-2000 period.
2. *Tariff scenario 1*: bilateral tariffs are reduced to the least restrictive average bilateral tariff in the OECD (0.057% in 2001). *Tariff scenario 2*: for each country bilateral tariffs are reduced to the least restrictive average tariff it faces when trading with its OECD partners in 2001. *Non-tariff scenario*: the import coverage of multilateral non-tariff barriers is aligned in all countries to that of the least restrictive country in 1996 (Iceland). For Iceland, simulations cannot be presented as this country is present in the sample only as a partner.
3. The simulation shows the effects of an easing of regulations in all countries to the level of the least restrictive country and a decrease in tax wedges to the level of the lowest wedge country in 2000 (Australia).

Source: OECD.

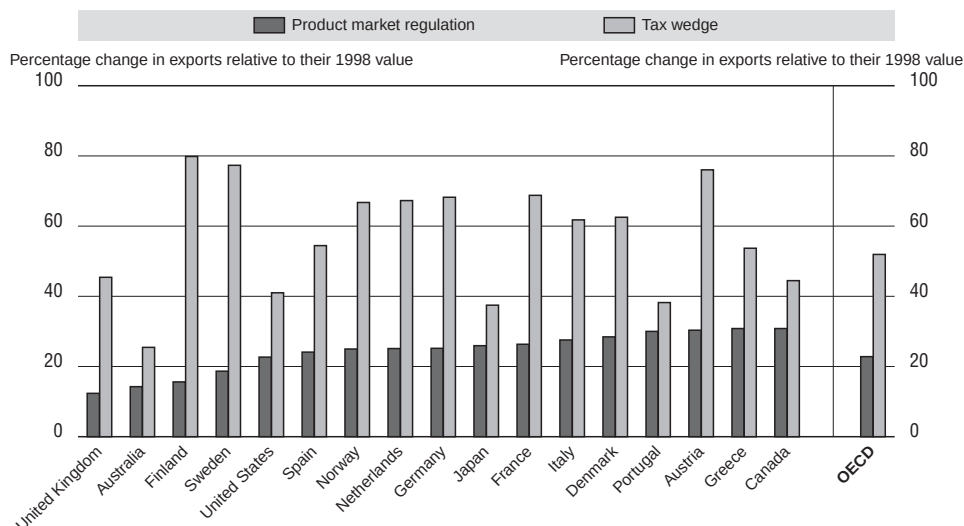
exports. Countries are ordered according to the cumulative gains obtained by implementing these policies. For bilateral tariffs, two scenarios are simulated: the decrease of tariffs to meet the lowest tariff among each country's trading partners; and the equalisation of all tariffs at the level of the lowest bilateral tariff observed in the OECD area. Consistent with regression results (see above), the liberalisation and labour tax reduction scenario take into account the cumulative effects on exports of policy changes in both the exporter and importer countries.

The increase in the level of total exports within the OECD area ranges from 6 to 20 per cent, depending on the policy package implemented. Unsurprisingly, the largest and most widespread gains are obtained by setting all bilateral tariffs to their minimum OECD level (close to zero), but significant large gains are also obtained when the import coverage of non-tariff barriers is reduced to the level found in the least restrictive country (Iceland according to the indicator presented above). Country-specific gains from these policies (relative to the level of exports in 1998) depend on the initial geographical distribution of a country's exports, but generally lie within a range of 10 to 15 per cent. The alignment of tariffs on those of the least restrictive partner would imply smaller gains (ranging from 4 to 10 per cent for most countries), partly because trade with high-tariff partners is usually weak. Simulated export gains from easing multilateral non-tariff barriers are more uniform across countries (around 7 to 8 per cent), partly reflecting the smaller cross-country differences due to the lack of the bilateral dimension in the available data.

Large OECD-wide gains are also obtained by aligning regulatory restrictions on those of the least regulated OECD country in 1998. The increase in exports implied by such policy for relatively restrictive countries – such as Greece, Portugal, Italy, France, Switzerland and Ireland – is about 30 per cent. Finally, curbing tax wedges to meet those of the lowest tax wedge country in 2000 (Australia) yields smaller, but still noticeable, OECD-wide gains. Indeed, in several European countries, where wedges are relatively high, this policy yields gains that are comparable to those obtained by reducing non-tariff barriers. Interestingly, the export losses implied by this policy scenario in a few countries (notably Australia and Ireland) reflect the relative loss in competitiveness of these countries' exports to countries that experience a large drop in the tax wedge as a result of the policy. On the whole, changes in policies have significant effects on goods exports in most countries, even though their absolute contribution to explaining deviations of exports from the OECD average is small (see above).

Figure 24 reports the results of a similar simulation for exports of services.⁶⁴ In this case, the gains implied by non-manufacturing product-market liberalisation and lower labour tax wedges are larger, reflecting the stronger estimated effect of policies on bilateral service exports. Tax and product-market reform could increase total services exports among OECD countries by 50 and 20 per cent, respectively.

Figure 24. **Change in services exports from easing product-market regulation and reducing the tax wedge on labour income^{1, 2}**



1. The simulations are based on coefficients estimated in panel regressions of bilateral outward FDI positions on non-policy factors (distance, transport costs, market size, similarity in size and factor endowments, and other country and time-specific effects) and policy influences (FDI restrictions, tariff and non-tariff barriers, participation in free trade areas, and product and labour market arrangements). The regressions cover bilateral FDI relationships between 28 OECD countries over the 1980-2000 period.

2. The simulation shows the effects of easing regulation in non-manufacturing industries to the level of the least restrictive country in 1998 (the United Kingdom) and aligning wedges to that of the lowest wedge country in 2000 (Australia).

Source: OECD.

EU accession, FDI and trade

Empirical results suggest that participation in free-trade agreements has had significant effects on both trade and FDI, especially within the European Union. Quantifying these effects is particularly important for OECD countries that will join the European Union in 2004, as established in the recent Athens EU Council Meeting. Table 6 suggests that the gains from EU accession for the Czech Republic, Hungary and Poland will indeed be sizeable in terms of trade integration and FDI stocks. This is due to both increased transactions with other EU countries and (to a lesser extent) increased trade and investment flows from non-EU countries. Trade flows are estimated to increase by around 10 per cent in both directions while FDI outstocks and instocks are estimated to double relative to average levels in

Table 6. **The effects of European Union accession on trade and FDI^{1, 2}**

	Per cent increase in exports ³	Per cent increase in imports ³	Per cent increase in the FDI outstock ⁴	Per cent increase in the FDI instock ⁴
Czech Republic	11.5 (47.2)	10.9 (49.7)	103.0 (0.4)	112.0 (24.2)
Hungary	11.2 (45.0)	10.4 (47.8)	28.1 (1.6)	107.0 (19.3)
Poland	11.6 (15.0)	10.7 (26.0)	92.2 (0.3)	104.9 (9.3)

1. The simulations are based on coefficients estimated in panel regressions of bilateral outward FDI positions on non-policy factors (distance, transport costs, market size, similarity in size and factor endowments, and other country and time-specific effects) and policy influences (FDI restrictions, tariff and non-tariff barriers, participation in free trade areas, and product and labour market arrangements). The regressions cover bilateral FDI relationships between 28 OECD countries over the 1980-2000 period.

2. Initial levels relative to GDP are in parentheses.

3. Relative to 1998 values.

4. Relative to the average level over the 1990s.

Source: OECD.

the 1990s in most countries. However, these simulation results are likely to over-estimate the actual post-accession gains to the extent that trade and FDI stocks have already been affected by the expectation of EU membership.

SUMMARY AND CONCLUSIONS

The results of the empirical analysis suggest that border openness to trade and investment and competition-oriented domestic policies have important implications for OECD trade and FDI patterns. The main conclusions in each of the broad policy areas examined in the paper are reviewed below under four headings.

Openness: formal trade and FDI restrictions:

- The empirical results suggest that eliminating remaining tariff and non-tariff barriers could increase significantly exports of goods within the OECD. The removal of border barriers in existing free-trade areas, such as the European Union (EU) Single Market or the North American Free-Trade Agreement (NAFTA), is estimated to have boosted both goods trade and overall FDI flows among participating countries. Likewise, simulations suggest that prospective EU membership may be associated with increasing trade flows and booming inward FDI positions for new EU members. By contrast, free-

trade areas do not seem to have increased significantly cross-border supply of services.

- A number of countries (especially outside the European Union) still have a relatively restrictive FDI environment in some important non-manufacturing industries, such as electricity, transport and telecoms. Aligning FDI restrictions on those of the most liberal country would increase significantly the OECD-wide inward FDI position.
- There is some limited evidence that stable exchange-rate arrangements may positively affect the inward FDI position of participating countries. Through this channel, countries that are members of currency unions (such as the European Monetary Union) experience further integration of their markets in both the union itself and globally. The complexity of the relationship between FDI and exchange-rate variability suggests, however, that this aggregate result may mask a variety of different responses of MNEs to the establishment of currency unions.

Product-market reforms:

- The countries with relatively restrictive and costly product-market regulations will tend to have lower stocks of foreign capital. Thus, product-market reforms that reduce the relative restrictiveness of regulations are likely to increase the level of inward FDI in a given country. OECD-wide product-market reform can raise the *overall* stocks of inward and outward FDI outstanding, thereby increasing global integration.
- Exports are negatively affected by both home and destination country anti-competitive regulations. Such home regulations may reduce both productive efficiency and the range and quality of goods supplied in foreign markets (*e.g.* through their negative effects on entry and innovation), thus regulatory reform in the home country is likely to positively affect exports. Restrictive regulations in the destination (importer) country also curb exports from the home country by making access to markets more difficult for foreign suppliers. All else equal, a general convergence of regulation in the OECD area towards the regulatory environment of the most liberal country would tend to increase within-OECD exports markedly.
- In services trade, the combined negative influence of restrictive regulations in the exporting and the importing countries is even stronger, because it affects for instance the ability of the exporting country to sell air transport, tourism or banking services to a trading partner. Unilateral or concerted efforts by OECD trading partners to implement significant competition and efficiency-enhancing reforms at both ends of the transactions are likely to boost the global volume of trade in services.

Labour-market reforms:

- Estimates suggest that strict employment protection legislation (EPL) and high tax wedges on labour income may sometimes affect the labour market in the home country in ways that curb its exports, for instance by making the reallocation of labour across firms, industries and occupations difficult. Similarly, by raising the cost of investment in the host country, they tend to lower its inward FDI. There are, however, important interactions between EPL and the institutional set up in the labour market as was pointed out by Calmfors and Driffill (1988) and Elmeskov *et al* (1998). When collective bargaining and other labour-market arrangements favour wage adjustments that fully offset the costs of EPL, the potentially negative effect on exports can be neutralised. In other regimes where such compensation is difficult, strict EPL is associated with significantly lower exports. By contrast, the collective bargaining regime can hardly moderate the negative influence of strict EPL on FDI. If EPL increases the risk/return ratio on foreign investment, foreign investors are likely to choose locations where this ratio is lowest, irrespective of the potentially offsetting effect of the collective bargaining regime. Empirical estimates suggest that labour-market reforms easing employment protection legislation and lowering tax wedges on labour income would boost global economic integration.

Infrastructure:

- Improving network infrastructure has ambiguous *a priori* effects on FDI, because inadequate infrastructure may motivate foreign investment in these industries. However, good infrastructure conditions are likely to be important for reducing transport and communication costs and increasing trade, especially in some services where international transactions require such conditions to be good in both origin and destination countries (*e.g.* freight, tourism, finance). Thus, policies that improve infrastructure can significantly increase both the bilateral and global volumes of service trade.

NOTES

1. The other important channel of globalisation is movement of people. For a discussion of migration trends, determinants and policies see OECD (2002a). Temporary movement of personnel is also an important mode of service supply that is not covered in this study.
2. The willingness of businesses to expand cross-border activity and their localisation decisions are likely to depend to some extent also on the taxation of profits of foreign subsidiaries. Patterns of FDI taxation and their effects on global integration are studied in two companion papers (Yoo, 2003; and Hajkova *et al.*, 2003).
3. This is in line with recent economic research (OECD, 2002a; Markusen and Maskus, 2001a, 2001b) that stresses the joint determination of trade and FDI flows. However, it is important to note at the outset that, due to the level of aggregation at which the analysis is performed, the long-standing issue concerning the substitutability or complementarity of trade and FDI is only dealt with tangentially in this document. This issue has been recently (and repeatedly) addressed elsewhere in the OECD by means of literature surveys (OECD 1995, 2002b) and empirical analyses using sectoral (OECD 1996, 1997a) and aggregate data (OECD 1998a).
4. Outward and inward positions are multilateral measures of FDI activity that cumulate for each investor country the bilateral stocks held in all FDI partner (host) countries (henceforth, outstocks) and for each host country the bilateral stocks held by all partner (investor) countries (henceforth, instocks).
5. FDI activity can in principle be decomposed into *i*) mergers and acquisitions, *ii*) greenfield investments, *iii*) reinvested earnings, and *iv*) capital transfers between related enterprises. In practice, available data rarely allow such decomposition to be made.
6. For instance OECD (2002c) considers the drop as a “correction” of the investment and stock market bubble that occurred at the turn of the century. High levels of FDI flows were also partly related to a flurry of unprecedented privatisation activity.
7. Geographical specialisation indicators for FDI inflows and outflows are broadly characterised by the same patterns. However, inflows indicators suggest that a “catch up” phenomenon is taking place in some countries, such as Greece *vis-à-vis* the European Union and Korea *vis-à-vis* Japan; and outflow indicators show that several countries (including a few EU members, Canada, the United States, New Zealand and Korea) had developed a specialisation in investing in Japan over the 1995-1998 period.
8. Data for the 1980-1990 period is incomplete or missing for transition countries and Korea.
9. For instance, services provided by a barber are hardly tradable between cities or regions within a country, not to mention across borders. However, the provision of

many other services, including some of the most dynamic ones over the past two decades (such as communication, financial intermediation and business services) involves lower transportation costs, which are further decreasing as information and communication technologies (ICT) spread out. Moreover, ICT are also decreasing transportation costs for services that were traditionally not tradable, such as retail distribution (see, for instance, OECD 2001b).

10. The effects of FDI taxation are studied in Hajkova *et al* (2003).
11. Policies can also affect trade and FDI indirectly, through their effect on factor proportions, for example by improving the quality of a country's infrastructure capital or the skills of its labour force.
12. Non-tariff barriers include so-called "core" measures, such as price controls (voluntary export restraints, variable charges, anti-dumping and countervailing actions) and quantitative restrictions (non-automatic licensing, export restraints, quotas and prohibitions). See OECD (1997b) for details.
13. *Multilateral tariff and non-tariff barriers* are derived from detailed data on *ad valorem* MFN tariff rates and the frequency of non-tariff barriers in 6-digit industries of the Harmonised System of Classification (UNCTAD, 1998). The data are aggregated using average 1998 OECD import weights up to the 2-digit ISIC Rev. 3 level and average 1998 OECD value-added weights thereafter. Information about cross-country differentials in import shares for different goods (net of intra-EU imports) was exploited to differentiate trade barriers across EU countries. *Bilateral tariffs* are based on the new MacMaps data produced jointly by the Centre d'Etudes Prospectives et d'Informations Internationales and the International Trade Center (Bouet *et al.*, 2001, 2002). The MacMaps data report information on MFN duties, other *ad valorem* duties, specific duties, preferential margins, prohibitions, tariff quotas and anti-dumping (specific or *ad valorem*) duties. These are aggregated to the 2-digit ISIC Rev. 3 level using average import weights differentiated by group of trading partners. Despite the use of *average* import weights in aggregation, both the multilateral and the bilateral indicators may tend to underestimate the extent of trade barriers if import shares are depressed in industries with high barriers.
14. Moreover, by enlarging the size of the market accessed at equal trade cost by third-party countries, they could also tend to increase bilateral trade between the free-trade area and non-signatory countries, all the more so if non-signatory countries are themselves members of a different free-trade area (because the reverse phenomenon may apply). In particular, intra-industry trade may increase due to enhanced economies of scale.
15. See Markusen (2002) for an extensive discussion of the conflicting forces acting on bilateral FDI flows as trade liberalisation is implemented.
16. This could partly explain the wave of within EU mergers and acquisitions that followed the Single Market Programme.
17. Neary (2002) argues that this tendency takes the form of consolidation of different plants into a single location within the free-trade area. He also notes that the increased competition from MNEs of signatory countries can have an opposite influence on third-party investors, leading them to *reduce* investment in the free-trade area.
18. Non-statutory barriers to FDI are very difficult to ascertain and quantify. However, some of them were included in the indicators, such as the absolute barrier repre-

- sented by full state ownership of business enterprises and hidden institutional or behavioural barriers documented in official reports.
19. To a large extent, the generalised decline in restrictions reflects full liberalisation of capital flows within the European Union (completed in the early 1990s) and the concomitant extensive privatisations both in the European Union and elsewhere (*e.g.* Mexico), which have opened up previously sheltered public firms and monopolies to foreign capital.
 20. The indicators are unable to capture differences in the enforcement of restrictions, which might be particularly important for screening requirements. Also, several countries have further eased restrictions since the data were last collected.
 21. A simple count of restrictions affecting different industries shows that 67 per cent of all restrictions concern the services sector (Sauvé and Steinfatt, 2003).
 22. The simple bivariate correlation across countries between the sectoral indicators of FDI restrictions and the sectoral shares of employment in foreign affiliates is negative and significant.
 23. Clearly the more these activities are centred in the host country, the less sensitive FDI is to changes in exchange-rate volatility. In Goldberg (1993) the effect of reduced volatility on FDI is ambiguous. On the other hand, Darby *et al.* (1999) stress the possibility of a negative impact.
 24. Details on the regulatory indicators shown in the figures can be found in Nicoletti *et al.* (1999), Nicoletti *et al.* (2001) and Nicoletti and Scarpetta (2003).
 25. While regulations that bar entry or raise costs may deter FDI, regulations that are aimed at protecting intellectual property rights (IPR) may increase the attractiveness of the host country for international investors, because protection of IPR makes it more difficult to imitate their firm-specific knowledge assets (*e.g.* through the movement of managers or employees from the foreign affiliate to local firms). See Smith (2001).
 26. This idea and related empirical evidence are explored in detail in Mirza and Nicoletti (2003).
 27. The summary indicator is the GDP-weighted average of the indicators of regulation in 12 non-manufacturing industries.
 28. For instance, there is evidence that certain product market regulations can hinder firm growth and curb R&D spending (Nicoletti *et al.*, 2001; Bassanini and Ernst, 2002). Both factors can constitute a handicap for internationalisation.
 29. Other important factors include, for instance, coverage of collective agreements, minimum wages and health and safety regulations, for which cross-country data are patchy or lacking.
 30. EPL and the social expenditures that are financed through labour income taxation may also lower transaction costs in the relationship between workers and firms, reduce labour market frictions and smooth out the social costs associated with adverse labour market outcomes. Through these channels, EPL and labour income taxation can actually have positive repercussions for export prices and expected investment returns. However, these effects are difficult to measure and, in this study, the focus is on the role they play in pushing up production costs.
 31. Moreover, in the same way as product market regulations, stringent EPL and high wedges in the home country may also encourage firms to localise production in countries where labour market rules and taxation are more favourable to business, thereby

- stimulating outward FDI; but at the same time EPL may handicap firms that want to do so by hindering their potential for reorganising production or growing in size. Nicoletti *et al.* (2001) find that the average size of firms is negatively related to the stringency of EPL in a panel of OECD countries and industries.
32. This idea was first put forth by Calmfors and Driffill (1988). See Elmeskov *et al.* (1998) for evidence on the interaction between EPL and bargaining mechanisms and Daveri and Tabellini (2000) for the interaction between labour income taxation and bargaining mechanisms.
 33. It is also possible that foreign investors may find the implications of restrictive EPL provisions more difficult to ascertain than domestic investors (due to an asymmetry of information) and hence have to face higher costs.
 34. More importantly, government policies (*e.g.* access regulations) are crucial for ensuring a regulatory and business environment which is conducive to efficient private investment in infrastructure. See Gönenç *et al.* (2000) and OECD (2001b) for a detailed discussion of these issues.
 35. Yeaple and Golub (2002) attempt to test these hypotheses and provide some support for the effects of infrastructure on comparative and absolute advantage.
 36. Deardorff (1995) shows that this relationship emerges from virtually all models of trade.
 37. The role of factor proportions in explaining trade flows is clearest in Heckscher-Ohlin models of trade. Moreover, in a general gravity framework relative endowments of human and physical capital also provide information on the supply of differentiated goods, which are usually skill and capital intensive (Evenett and Keller, 2002). Their role in determining vertical FDI is emphasised in Helpman (1984) and Helpman and Krugman (1985).
 38. Markusen (2002) notes that FDI has only a *relative* advantage over trade with distant countries. Therefore, distance and transport costs may well have a negative influence on the intensity of outward FDI.
 39. As mentioned above, the “financial” FDI data used in the analysis suffer from several drawbacks (*e.g.* they do not distinguish between mergers and acquisitions and green-field investment, and may be geographically biased to the extent that MNEs use strategically-located holding companies to intermediate their investments), but the period and country coverage of the data on foreign affiliates was too limited for the purposes of empirical analysis. As regards services trade, the countries excluded are Belgium, Luxembourg, the Czech Republic, Iceland, Poland, Turkey, New Zealand, Mexico, Switzerland. Belgium and Luxembourg are excluded from partners. The Slovak Republic was also excluded from the analysis because data for other variables are missing.
 40. For similar specifications see, for instance, Markusen and Maskus (1999) and Egger (2001). The reduced form approach implies that the estimated coefficients incorporate both direct and indirect effects of the explanatory variables. For example, the parameter of tariffs in the trade equations reflects both the direct effect on trade and the indirect effect operating through the effect of tariffs on FDI and the possible impact of the induced effect of FDI on trade.
 41. The focus on FDI outstocks or instocks (instead of outflows or inflows) is justified by the fact that the decision of firms concerns the level of local production, which is a function of the desired level of the local stock of FDI.

42. The year-on-year difference of transportation costs was smoothed out to eliminate excessive volatility in the data.
43. In FDI equations, bilateral and effective exchange rates capture valuation and asset effects. In trade equations, nominal exchange rates together with the determinants of relative prices (*i.e.* relative factor endowments and policies that affect production costs) capture real competitiveness effects.
44. In addition a specific dummy for English-speaking countries was introduced to test for the possible influence of "language" effects, but no such effect was detected perhaps due to the presence of the bilateral fixed effect.
45. This transformation involves expressing the data as deviations from the values for the average home country or the average partner, which eliminates partner-specific or home country-specific effects, respectively.
46. Thus, in preliminary regressions, FDI instocks were related to both the average restrictiveness of policies in the host-country's FTA and their restrictiveness in the host country relative to other countries within the same FTA.
47. Due to data limitations, the total instock regressions covered only 10 to 19 OECD countries, depending on the policy variables included.
48. Distance could not be estimated in bilateral FDI equations because of its purely cross-section nature. Its effect is captured by the bilateral fixed effects which are accounted for non-parametrically. Transport costs were omitted from the bilateral service trade equations for two reasons. First, the measure used in this study is constructed as the difference in CIF-FOB in manufacturing trade, which may have little relevance for trade in services. Second, transport is one component of service trade, hence transport costs are likely to be endogenous to it.
49. Related to this, persistence could be also driven by the large share of reinvested earnings in FDI flows.
50. In the total instock regressions the relevant variable is the nominal effective exchange rate, which is a trade-weighted average of bilateral exchange rates. A depreciation of this rate does not necessarily imply a depreciation of all bilateral rates. Thus, the overall effect depends on the interaction of depreciation with the country mix of bilateral trade flows.
51. The estimated effect of restrictions is similar for FDI flows, with the reduction in flows implied by the restrictions varying between 9 and 70 per cent. The estimation results for FDI outflows are reported in Nicoletti *et al* (2003).
52. Available non-tariff measures are partner-specific variables that express MFN import protection against the average OECD exporter. Thus, they do not account for bilateral arrangements and other special regimes, including non-MFN treatment and anti-dumping measures. Bilateral tariffs do account for some of these factors, but are available only for the year 2001. It should be noticed, however, that results for bilateral tariffs are robust to the adjustment of standard errors for repeated observations over the time dimension.
53. The finding that FDI is boosted by EU membership is consistent with related evidence by Pain (1997) and Pain and Lansbury (1997). Positive effects of EU membership on FDI from third-party countries were also found by Dunning (1997) and Barrell and Pain (1998).

54. In the total instock equation regulation can be interpreted as being expressed relative to the OECD average.
55. Results for IPR are not robust to the adjustment of standard errors for repeated observations over the time dimension. The relationship between IPR protection and FDI is discussed in OECD (2002g).
56. In this case, however, statistical tests rejected the hypothesis that the effect is identical in both countries. Therefore, separate coefficients were estimated for wedges in the home country and the partner.
57. Transport would seem to be the main relevant infrastructure for trade in goods. It also plays an important role in trade in services, both directly through the freight and travel components of this trade and indirectly through the tourism component.
58. Excluding the low infrastructure countries yields insignificant (though correctly signed) estimates, probably due to the lack of sufficient cross-country variability in the data.
59. The restriction that the coefficients of (the log of) infrastructure in the country and partner are the same is supported by statistical tests.
60. In particular, this kind of simulations assumes that policy moves do not change the estimated average relationships (*i.e.* the estimated regression coefficients) between trade, FDI and policies and are thus subject to the Lucas critique (Lucas, 1976). Moreover, it is assumed that these average cross-country relationships are representative of relationships in each country.
61. Since differences in the level of trade and FDI across countries are captured by dummy variables, it is not surprising that policy variables appear to play a relatively small role in contributing to the overall variance in the data.
62. The unexplained residual is generally very small in the FDI equations.
63. In the simulations, the initial stock is defined as the inward FDI position in 1998.
64. Here regulation is specific to non-manufacturing and the most liberal country in 1998 is again estimated to be the United Kingdom.

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MEASURES OF RESTRICTIONS ON INWARD FOREIGN DIRECT INVESTMENT FOR OECD COUNTRIES

Stephen S. Golub

TABLE OF CONTENTS

Introduction	86
Method of quantifying restrictiveness	90
Data sources	93
Results	94
Cross-section results	95
Time series results	105
Conclusions	107
<i>Annex I.</i> Comparisons with Hardin and Holmes (1997)	110
<i>Annex II.</i> Sensitivity analysis to changes in assumptions	112
Bibliography	115

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INTRODUCTION

Attitudes and policies towards liberalisation of international capital flows in general and foreign direct investment (FDI) in particular have been subject to considerable controversy and flux (OECD 2002a). Recognition of the economic benefits afforded by freedom of capital movements sometimes clash with concerns about loss of national sovereignty and other possible adverse consequences. FDI, even more than other types of capital flows, has historically given rise to these conflicting views, because FDI involves a controlling stake by often large multinational corporations (MNCs) over which domestic governments, it is feared, have little power. The controversies have mostly focused on inward FDI, due to sensitivity about foreign control over domestic industry. In the last few years, outward FDI from OECD countries to developing countries has also been the focus of criticism by NGOs and others who view such FDI as a cause of depressed labour and environmental standards. For an effective rebuttal of such criticisms of outward FDI, see Graham (2000).

Countries facing increased inflows of FDI have often experienced unease. Many developing countries have until recently been wary of inward FDI. Even in the United States, the surge of Japanese FDI in the 1980s led to widespread concerns about excessive foreign control and adverse effects on national security, as expressed in the popular press, and in legislative action.¹ Critics of inward FDI argue that there are adverse economic and political effects on the host country. The alleged economic effects include balance of payments deficits, reduced domestic research and development, diminished competition, crowding-out of domestic firms and lower employment. Economic analysis has shown that most of the alleged economic drawbacks of FDI are of little merit (Graham and Krugman 1995). FDI has little long-run effects on employment and the trade balance, as these are determined by macroeconomic factors. While negative micro-economic effects on domestic competition and local research and development are conceivable, FDI inflows are more likely to enhance competition and local technical capabilities. Indeed, most studies suggest that the benefits of inward FDI are substantial (OECD 2002c). FDI is a form of international economic integration that brings gains to both parties according to the principle of comparative advantage. In contrast to international trade which involves arms' length transactions, FDI involves intra-firm trade and transactions in intangible assets such as

knowledge and reputation. Beyond the standard gains from trade, FDI inflows can provide dynamic gains from technology transfer and skill-building. These benefits are especially important in developing countries where foreign technology and managerial expertise are lacking. As a source of outside capital, FDI has been seen increasingly as advantageous relative to portfolio flows, due to the instability of the latter.

The political concerns relating to threats to national security and excessive political influence exerted by foreign firms are of possibly greater validity, although Graham and Krugman (1995) argue that these too are sometimes exaggerated. In times of war, foreign ownership of strategic industries by enemy countries poses a clear danger to national security, but the practical import of this consideration is negligible today, given that FDI flows occur overwhelmingly among friendly countries. A more serious danger is the potentially adverse effects of foreign control of industries important for defence capability. This issue is further complicated by the difficulties of identifying such industries, given dual-use civilian and military technologies, *e.g.* for electronics and aviation. To the extent that FDI increases efficiency of such industries, however, it could also enhance domestic defence capability, and in any case the number of industries involved is limited. High levels of FDI could also be associated with increased political pressure from foreign interest groups. While there may be some negative consequences associated with lobbying by foreign firms, these are usually no worse than those associated with pressures from domestic special interest groups. A much more diffuse argument is that foreign control of high profile industries such as airlines and telecommunications disturbs nationalistic sensitivities. Satisfying such non-economic predilections must be balanced against the economic cost of restrictions on FDI.

Overall, economic analysis suggests that with rare exceptions the appropriate policy towards FDI is neutrality between foreign and domestic firms, neither favouring nor discriminating against foreign investors. Neutrality involves both right of establishment for foreign firms and national treatment of such firms once they are established. Right of establishment signifies that there are no discriminatory obstacles to foreign green-field investment or mergers and acquisitions. National treatment involves non-discrimination in conducting business. Thus, from an economic point of view, both discriminatory restrictions and special incentives are of questionable merit, at least in developed countries with well-functioning markets.

Notwithstanding any remaining concerns about the adverse effects of FDI, there can be little doubt that the general trend has been towards liberalisation, especially in the past two decades. Throughout the world, policymakers have increasingly been persuaded of the merits of inward FDI in terms of employment, capital and especially transfer of technology. Consequently, many countries have

reduced restrictions on FDI and adopted incentives to encourage FDI (UNCTAD 1996). Still, some restrictions remain in place even in countries that generally welcome FDI.

This paper focuses on the nature and extent of these restrictions in OECD countries and their evolution over time. It attempts to classify and quantify discrimination against foreign firms regarding right of establishment and national treatment. There are several important reasons for such a study. First, there is little comprehensive information on national policies towards FDI. In contrast to tariff, and even non-tariff barriers to trade, there have been very few studies quantifying restrictions on FDI. The existing literature is discussed below.

Second, and related, information on the extant barriers to FDI could be helpful for international negotiations of investment rules. There have been a number of recent initiatives aimed at formulating international investment agreements (Box 1), although these suffered a blow with the failure of the Multilateral Agreement on Investment (MAI) at the OECD in 1998. According to Graham (2000, p. 187), greater knowledge of the costs and benefits of liberalisation of investment would be conducive to the success of such negotiations. Of course, the nature and magnitude of the restrictions in force is a starting point for any such calculations of costs and benefits.

Third, restrictions on FDI are identified as a key variable in the recent theoretical knowledge-capital model of the multinational corporation (Markusen and Maskus, 2001). In this literature, as in previous models of the MNC, firms choose where to produce according to the costs and benefits of alternative locations. Barriers to FDI raise the costs of foreign investment. In econometric tests of the knowledge-capital model, researchers have used measures based on surveys of investor opinion reported in the *World Competitiveness Report*, rather than objective measures. Although these subjective measures are usually statistically-significant in FDI regressions, it is also useful to develop objective indicators that are comparable across countries and over time. This paper is part of a larger OECD project on the determinants of FDI (Nicoletti *et al.* 2003). The effects of the computed restrictions on FDI patterns are studied in Nicoletti *et al.* but are not discussed in this paper.

FDI restrictions are but one of a set of policies that discriminate between foreign and domestic inventors. Corporate taxes have been the focus of considerable research and a comprehensive study for OECD countries is presented in Yoo (2003). It would also be highly desirable to assemble information about specific FDI incentives, but such information is even more difficult to obtain than for FDI restrictions and falls beyond the scope of the present study.

A serious drawback is that the present study is primarily limited to overt restrictions on FDI, mostly ignoring non-policy institutional restrictions, such as

Box 1. International investment agreements

Formal international agreements on foreign direct investment are far less extensive than on international trade, despite the importance of FDI in the world economy. However, the 1990s have seen a substantial rise in the number of bilateral investment protection treaties, and regional and bilateral trade agreements in which investment disciplines figure prominently. These agreements include NAFTA, the recent agreements concluded by Singapore with EFTA, Japan and Australia and the Association Agreement between the European Community and Chile. The European Union had already completely liberalised intra-EU capital movements in the late 1980s.

The OECD has been an important actor in international discussions and agreements on FDI.* At present the OECD Code of Liberalisation of Capital Movements forms the only multilateral framework in force on international capital flows, including FDI. Under the Code, countries bind themselves to agreed measures liberalising capital movements. Moreover, under the OECD Declaration on International Investment and Multinational Enterprises, the 30 OECD countries and 7 non-OECD adhering countries are committed to accord national treatment to foreign enterprises operating in their territories and to encourage their multinational enterprises to engage in responsible business conduct in a variety of areas.

There are several investment-related provisions in the agreements related to the World Trade Organisation. The Uruguay Round led to an agreement on Trade Related Investment Measures (TRIMS) that restricts *inter alia* domestic-content requirements. The General Agreement on Trade in Services (GATS) covers all modes of service delivery, including “commercial presence” which is closely related to FDI. The GATS commitments, however, apply only to industries where countries have explicitly agreed to open their markets to foreign providers. In 1996, the WTO also created the Working Group on the Relationship Between Trade and Investment, a forum for discussion among WTO countries. At the Doha Ministerial Conference in November 2001, the WTO members agreed on the principle of undertaking negotiations on a multilateral framework after the 2003 WTO ministerial meeting at Cancun (see OECD 2002b).

* Further discussion of OECD experience with investment rules and multilateral initiatives concerning FDI can be found at www.oecd.org/daf/investment and in Graham (2000), Robertson (2002) and Sauvé and Wilkie (2000).

the nature of corporate governance, as well as policies that indirectly impinge on FDI, notably economic and social regulation. In some instances, however, allegations of government obstruction to foreign investment were considered. Despite these limitations, the present study is the most comprehensive to date in terms of country, time and sectoral coverage of FDI restrictions.

METHOD OF QUANTIFYING RESTRICTIVENESS

In this section the method of quantifying restrictions is discussed. There are several issues involved in computing the restriction scores. A classification of various types of restrictions and a system of weighting are needed. These tasks are greatly complicated by the disparate nature of restrictions across countries and the inconsistent reporting of these restrictions. Sometimes it is difficult to determine the exact nature and incidence of a particular restriction without detailed knowledge of a country's productive structure and regulatory environment. Given the difficulties in classifying and ranking the various restrictions, some studies such as Sauvé and Steinfatt (in progress) and Hoekman (1995) are limited to counting the number of restrictions. While this has the advantages of simplicity and lack of arbitrariness, some restrictions are more important than others. For example, a ban on foreign ownership is much more restrictive than a screening or reporting requirement. It therefore seems preferable to attempt to weight different restrictions according to their significance, even though such a procedure surely entails some arbitrary judgements and errors.

This study adopts a variant of the methodology of the Australian Productivity Commission (APC) which carried out a similar study for the APEC countries, *Service Trade and Foreign Direct Investment* (Hardin and Holmes 1997, 2002, referred to hereafter as HH, available at www.pc.gov.au/ic/research/information/servtrad/index.html). In the HH study, indices for FDI restrictions were calculated for 15 APEC countries for 11 service sectors, as classified by the GATS.

There have also been a number of other studies of restrictions on trade in services, mostly also by the APC, for particular service sectors (for example Nguyen-Hong 2000, Kalirajan 2000, a number of studies in Findlay and Warren 2000, and the survey by McGuire 2002). Most APC and other studies present two sets of measures of restrictions: 1) *domestic*, i.e. limitations on market access for all firms and 2) *foreign*, i.e. discrimination against foreign firms in the form of limitations on national treatment or most favoured nation (MFN). Here, however, the focus is limited to the latter. Non-discriminatory policies that affect market access and operations for both domestic and foreign firms are not barriers to FDI *per se*. Also, these domestic barriers are incorporated in the other policies considered in the quantitative analysis of FDI for which these calculations were undertaken, and would duplicate these other indicators. An exception, however, was made for state-owned monopolies, which by their very nature preclude foreign ownership, and were considered to be tantamount to a ban on foreign investment.

Restrictions on foreign ownership are the most obvious barriers to establishment for FDI. They typically take the form of limiting the share of companies' equity capital in a target sector that non-residents are allowed to hold, *e.g.* to less than 50 per cent, or even prohibit any foreign ownership. Examples of majority

domestic ownership requirements include airlines in the European Union and North American countries, telecommunications in Japan, and coastal and freshwater shipping in the United States. Exclusive domestic ownership is also often applied to natural resource sectors with the aim of giving citizens access to the associated rents. For example, foreign ownership is banned in the fishing and energy sectors in Iceland, and in the oil sector in Mexico.

Obligatory screening and approval procedures can also be used to limit FDI though their constraining effects depend on the implementation of such practices. Stipulations that foreign investors must show economic benefits can increase the cost of entry and therefore may discourage the inflow of foreign capital. Such provisions apply, for instance, for a few industries in Japan and for the acquisition of more than 49 per cent of any existing enterprise in Mexico. Prior approval of FDI, such as mandated for all FDI projects in a few OECD countries, could also limit foreign capital inflow if it is taken as a sign of an ambivalent attitude towards free FDI, even though it may not be vigorously enforced. Simple pre- or post-notification (as required in *e.g.* Japan) is, however, unlikely to have much direct impact on capital inflows, but could have a negative signalling effect.

Other formal restrictions that can discourage FDI inflows include constraints on the ability of foreign nationals either to manage or to work in affiliates of foreign companies and other operational controls on these businesses. Stipulations that nationals or residents must form a majority of the board of directors, as in insurance companies in member countries of the European Union, in financial services industries in Canada and in transport industries in Japan, may undermine foreign owners' control over their holdings and hence make them more hesitant to invest under such circumstances. Similarly, if regulations restrict the employment of foreign nationals (as *e.g.* in Turkey), investors may judge that they cannot make use of the necessary expertise to make their investment worthwhile. Also, operational requirements, such as the restrictions *vis-à-vis* non-members on cabotage in most European Union countries for maritime transport may limit profits of foreign-owned corporations, and hence the amount of funds foreign investors are willing to commit.

Apart from the formal barriers discussed above, FDI flows can be held back by opaque informal public or private measures. Indeed, claims abound that such practices are used systematically to limit foreign ownership of domestic businesses. Thus, the US Special Trade Representative (2003) has frequently stated that the system of corporate control in Japan has hampered investment by US companies and that regulatory practices in telecommunications in the European Union work as *de facto* FDI restraining measures. Similarly, Japanese Ministry of Economy, Trade, and Industry (2003) claims that FDI in financial services in the United States is restricted by the diverse and complex set of regulations at the state level and that barriers relating to interconnections hamper foreign entry into

telecommunications in the European Union. Also, the European Union cites the continuing role of administrative guidance to firms in Japan by government officials as a practice that hampers foreign ownership of Japanese enterprises.

Table 1 presents the scoring system used to calculate the overall restrictiveness indicators for each industry and country based on regulations in each of the three areas: equity, screening, and other restrictions. The total score ranges between 0 and 1. Equity limitations and screening are related to right of establishment, whereas the others pertain to national treatment of established firms. The methodology and weighting scheme are broadly similar to those used by HH, in particular the high weight given to equity restrictions. The latter are weighted

Table 1. **Coefficients on FDI restrictions**
Maximum 1.0

Type of restriction	Scores
<i>Foreign equity limits</i>	
No foreign equity allowed	1
1 to 19 % foreign equity allowed	0.6
20-34% foreign equity allowed	0.4
35-49 % foreign equity allowed	0.3
50-74% foreign equity allowed	0.2
75-99% foreign equity allowed	0.1
No restriction but unbound	0.05
<i>Screening and approval</i>	
Investor must show economic benefits	0.2
Approval unless contrary to national interest	0.1
Notification (pre or post)	0.05
<i>Other restrictions</i>	
Board of directors/Managers	
Majority must be nationals or residents	0.1
At least 1 must be national or resident	0.05
Must be locally licensed	0.025
Movement of people	
No entry	0.1
Less than one year	0.075
One to two years	0.05
Three to four years	0.025
Input and operational restrictions	
Domestic content must be more than 50%	0.1
Other	0.05
Total ¹	Between 0 and 1

1. If foreign equity is banned, then the other criteria become irrelevant, so that the index is at 1.0. It is possible that various scores sum to slightly more than 1.0 when foreign equity is not totally banned, and in such cases, the index is capped at 1.0.

Source: OECD, adapted from Hardin and Holmes (1997).

highly in view of the fact that foreign ownership is a necessary and essential condition for FDI. Screening and limitations on management are generally less important. Also, non-linearities are built into the scoring system to reflect the idea that a total ban on foreign ownership is significantly more restrictive than allowing a small foreign equity stake. Similarly, requiring an investor to demonstrate economic benefits is much more stringent than quasi-automatic approval, which in turn is considerably more demanding than simple notification. Other restrictions include constraints on the nationality or residency of executives and managers, duration of permissible work permits for expatriate executives, input restrictions, and miscellaneous other restrictions, such as discriminatory government regulations or approval processes. See Annex I for further discussion and a comparison with the HH weighting system.

Restrictiveness is calculated at the industry level and then a weighted-average is obtained using FDI and trade weights. The inclusion of trade flows in the weighting scheme is meant to partially alleviate the problem of endogeneity associated with FDI weights: highly restricted sectors will tend to experience less FDI. OECD and EU average restrictions are simple averages of country scores. Annex II further discusses the sectoral weights and provides some sensitivity analysis.

DATA SOURCES²

*GATS Commitments.*³ HH and most other studies of restrictions on trade in services use the GATS commitments as their primary database, supplemented by other sources. The GATS schedules (WTO, 2002) are well organised, easy to understand, and authoritative. There is a close connection between the GATS classification of services and those used in this project (Table 2). As HH and others note, a limitation of the GATS commitments is that they are mostly “positive” in nature, *i.e.* they are commitments to open markets. This is in contrast to “negative” lists of exceptions to liberalisation. A problem with the GATS positive lists is that the absence of a positive commitment in some sector cannot necessarily be construed as a restriction. A country may simply have failed to list this sector in its schedule. Or, if the sector is restricted, GATS may be silent on the nature of the restriction. A more obvious limitation of the GATS schedules is that they only cover the service sectors. While services are undoubtedly the most highly restricted sectors, there are some restrictions in other sectors too.

*OECD Code of Liberalisation and related OECD documents.*⁴ The OECD Code of Liberalisation of capital movements contains a succinct list of “reservations” for FDI (item I-A in the Code). This Code has the advantage of being “negative”, *i.e.* any non-listed sectors can be assumed free of restrictions, and are thus not subject to the ambiguity of interpretation as in the GATS. Also, the Code covers all sectors,

Table 2. **Correspondence between OECD FDI project, GATS and Australian Productivity Commission studies in the service sectors**

OECD FDI project	GATS and Hardin-Holmes	Australian Productivity Commission studies ¹
Real estate and business	Business services	Accounting, architectural, legal, engineering
Post and telecommunication	Communication services	Telecommunications
Construction	Construction	n.a.
Wholesale and retail trade, repairs	Distribution (wholesale, retail)	Distribution
Financial intermediation	Finance	Banking
Transport and storage	Transport	Maritime transport
Hotels and restaurants	Tourism	n.a.
Memo: Other GATS and Hardin-Holmes sectors²		
Education		
Environmental		
Health and social services		
Recreation, culture and sporting		
Other (repairs)		

1. Covers all countries in OECD FDI project except for the Czech Republic, Hungary, Iceland and Poland. n.a. indicates no study is available.

2. Hardin and Holmes's study covered all GATS sectors except for "Other".

Source: OECD, GATS and Australian Productivity Commission studies in the service sectors.

not just services. A further major advantage of the Code is that it is possible to construct a time series of restrictions as the Code goes back to the 1960s (OECD 1992, 1987, 1982). In addition, the results were cross-checked against reservations submitted by member countries in the course of the negotiations for the Multilateral Agreement on Investment (MAI).

Other sources. The United States Special Trade Representative (USTR), Japanese Ministry of Economy, Trade and Industry (METI), and the European Union (EU) issue analyses of barriers to trade and FDI in their major partners and these are available on the internet (see references). An additional source is a CD from Price-Waterhouse-Coopers (2001) that Wei (2000) has used in his research on FDI. The Australian Productivity Commission has made available on its website a comprehensive tabulation of all of its sector-specific findings for a large group of countries, which includes almost all OECD countries.⁵

RESULTS

It should be again acknowledged that despite efforts to rely on multiple sources and objective reports, there is inevitably an arbitrary and subjective aspect to some dimensions of the scoring. In particular, hidden institutional or

behavioural barriers to FDI are very difficult to ascertain and quantify and the scoring reported here mostly ignores such barriers. A case in point is the allegation that the Japanese market is difficult to enter due to covert collusion between government and *kereitsu* business groups. Some attempt to include such hidden barriers was made, if such arguments are noted and documented in the USTR, METI or EU reports, but these received relatively little weight in relation to the statutory barriers, given the difficulties of quantifying these allegations.⁶ Also, the extent of enforcement of statutory restrictions is difficult to determine and was not factored into the calculations. The stringency of screening requirements could be particularly variable across countries.

It is possible that some countries are more forthcoming than others in self-reporting their restrictions. It could then be that more transparent countries receive higher scores, not because they are in fact more restrictive, but because they are more complete in their reporting.

Finally, reported restrictions are not standardised and there are difficulties in evaluating idiosyncratic restrictions in individual countries and putting them into context. For example, the United States does not have a direct limitation on foreign investment in telecommunications but instead has equity restrictions on companies holding broadcast and common carrier radio licenses. According to several sources (the European Union, PriceWaterhouseCoopers), this is an important *de facto* restriction on foreign investment in US telecoms, particularly for mobile telephony. There are numerous such instances requiring judgements about the relative severity of restrictions, given that this study covers 28 countries, 9 sectors, and 11 sub-sectors.

FDI restrictions can be either across-the-board, applying to all sectors, or sector-specific. The limitations on foreign equity levels are usually specified on an industry-by-industry basis, whereas notification and authorisation requirements are usually across-the-board.

The sectoral scores were aggregated with a combination of import and FDI weights, as noted earlier (the “adjusted FDI” weights in Table A.2). See Annex II for more detail and a comparison to value-added weights.

Cross-section results

Overall scores. A full set of FDI restrictions measures for 28 OECD countries were determined for the period 1998-2000. Table 3 presents the detailed results and Figure 1 provides an overview. Panel A of Figure 1 presents the baseline results, while Panel B excludes the effect of screening as an alternate measure, in view of the difficulties of assessing the impact of screening. There have been important changes in some countries since 2000 that are not reflected in the results. In the

Table 3. Indices of FDI restrictions, 1998-2000

	Australia	Austria	Belgium	Canada	Czech Republic	Denmark	Finland	France	Germany	Greece	Hungary	Iceland	Ireland	Italy
Business services														
Legal	0.200	0.225	0.025	0.225	0.125	0.125	0.110	0.036	0.025	0.025	0.100	0.325	0.025	0.025
Accounting	0.200	0.575	0.025	0.225	0.450	0.125	0.110	0.036	0.025	0.069	0.100	0.325	0.025	0.025
Architecture	0.200	0.175	0.025	0.225	0.150	0.025	0.110	0.036	0.025	0.025	0.100	0.325	0.025	0.025
Engineering	0.200	0.225	0.025	0.225	0.150	0.025	0.110	0.036	0.025	0.025	0.100	0.325	0.025	0.025
Total	0.200	0.300	0.025	0.225	0.219	0.075	0.110	0.036	0.025	0.036	0.100	0.325	0.025	0.025
Telecommunications														
Fixed	0.492	0.375	0.375	0.625	0.550	0.075	0.290	0.251	0.275	0.425	0.400	1.000	0.125	0.075
Mobile	0.200	0.225	0.075	0.225	0.550	0.075	0.110	0.251	0.075	0.125	0.100	0.325	0.125	0.075
Total	0.419	0.338	0.300	0.525	0.550	0.075	0.245	0.251	0.225	0.350	0.325	0.831	0.125	0.075
Construction	0.200	0.175	0.025	0.225	0.100	0.025	0.110	0.025	0.025	0.025	0.100	0.325	0.025	0.025
Distribution	0.200	0.258	0.092	0.225	0.050	0.092	0.160	0.125	0.092	0.125	0.117	0.392	0.075	0.092
Finance														
Insurance	0.200	0.275	0.075	0.275	0.150	0.075	0.330	0.119	0.119	0.119	0.150	0.765	0.119	0.119
Banking	0.300	0.175	0.075	0.575	0.150	0.075	0.110	0.075	0.075	0.119	0.100	0.325	0.075	0.175
Total	0.277	0.198	0.075	0.506	0.150	0.075	0.161	0.085	0.085	0.119	0.112	0.427	0.085	0.162
Hotels and restaurants	0.200	0.175	0.025	0.225	0.050	0.025	0.110	0.025	0.025	0.025	0.100	0.325	0.025	0.025
Transports														
Air	0.500	0.615	0.425	0.625	0.350	0.157	0.242	0.201	0.207	0.257	0.400	0.457	0.157	0.201
Maritime	0.500	0.307	0.157	0.375	0.200	0.157	0.454	0.369	0.207	0.257	0.400	0.325	0.069	0.157
Road	0.200	0.414	0.130	1.000	0.200	0.163	0.154	0.072	0.080	0.503	0.188	0.380	0.069	0.122
Total	0.437	0.432	0.240	0.590	0.250	0.158	0.320	0.250	0.180	0.309	0.355	0.381	0.098	0.164
Electricity	0.700	0.615	0.275	0.725	1.000	0.775	0.860	1.000	0.525	1.000	0.600	1.000	1.000	1.000
Manufacturing	0.200	0.175	0.025	0.225	0.050	0.025	0.110	0.025	0.025	0.025	0.100	0.325	0.025	0.025
TOTAL	0.270	0.268	0.091	0.352	0.171	0.087	0.177	0.111	0.084	0.130	0.164	0.390	0.074	0.097

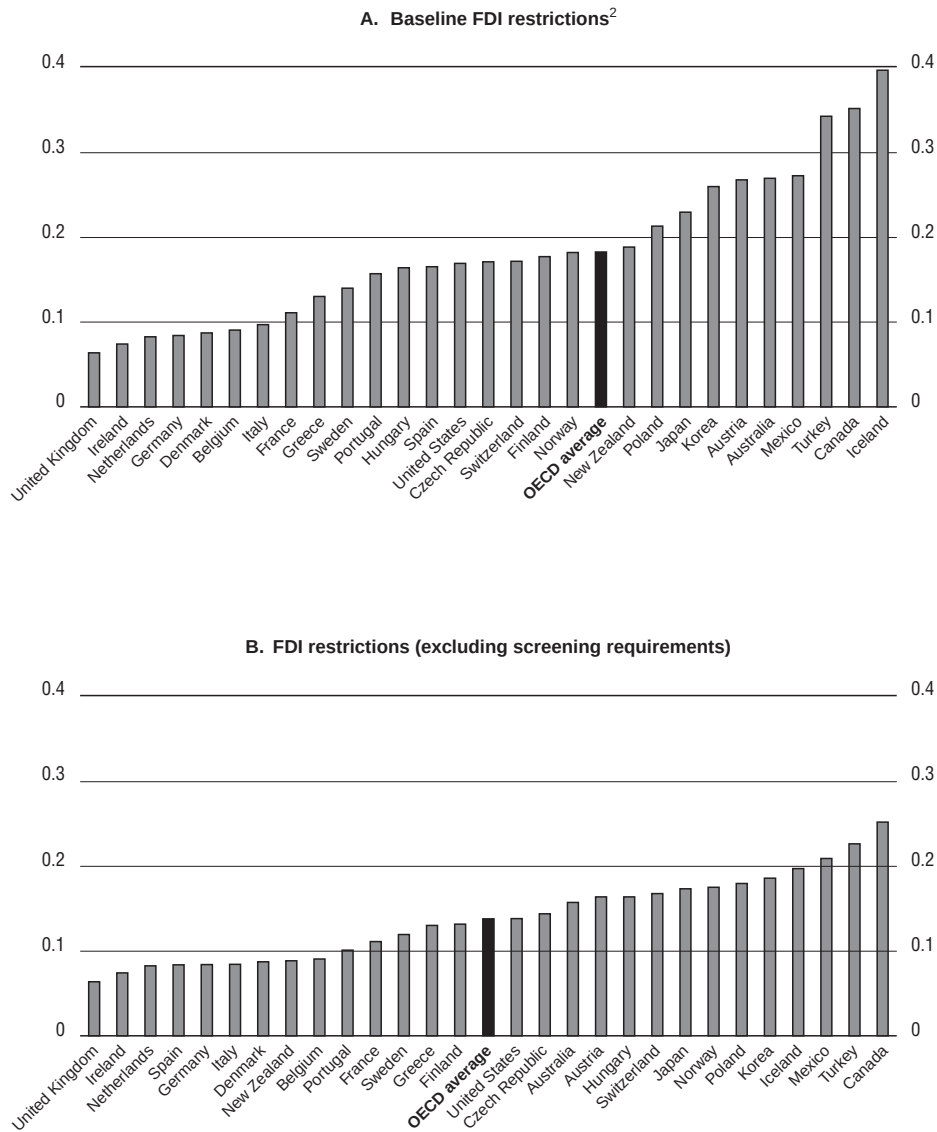
Source: See section on data sources.

Table 3. Indices of FDI restrictions, 1998-2000 (cont.)

	Japan	Korea	Mexico	Netherlands	New Zealand	Norway	Poland	Portugal	Spain	Sweden	Switzerland	Turkey	United Kingdom	United States
Business services														
Legal	0.250	0.100	0.525	0.025	0.125	0.119	0.225	0.075	0.125	0.119	0.100	0.250	0.025	0.050
Accounting	0.250	0.275	0.400	0.025	0.125	0.119	0.175	0.119	0.119	0.119	0.075	1.000	0.025	0.050
Architecture	0.250	0.075	0.225	0.025	0.125	0.069	0.075	0.075	0.075	0.069	0.075	0.150	0.025	0.050
Engineering	0.250	0.075	0.225	0.025	0.125	0.069	0.075	0.075	0.075	0.069	0.075	0.150	0.025	0.050
Total	0.250	0.131	0.344	0.025	0.125	0.094	0.138	0.086	0.099	0.094	0.081	0.425	0.025	0.050
Telecommunications														
Fixed	0.750	0.525	0.425	0.185	0.525	0.469	0.675	0.351	0.275	0.469	0.375	1.000	0.025	0.350
Mobile	0.250	0.525	0.325	0.025	0.125	0.069	0.675	0.351	0.275	0.169	0.075	0.450	0.025	0.550
Total	0.625	0.525	0.400	0.145	0.425	0.369	0.675	0.351	0.275	0.394	0.300	0.863	0.025	0.400
Construction	0.150	0.075	0.325	0.025	0.125	0.069	0.075	0.075	0.075	0.069	0.075	0.250	0.025	0.050
Distribution	0.150	0.325	0.242	0.025	0.125	0.119	0.175	0.142	0.125	0.069	0.092	0.350	0.092	0.050
Finance														
Insurance	0.150	0.375	0.325	0.119	0.125	0.119	0.100	0.169	0.207	0.119	0.125	0.250	0.119	0.150
Banking	0.200	0.475	0.325	0.075	0.125	0.119	0.325	0.175	0.163	0.119	0.125	0.250	0.075	0.150
Total	0.188	0.452	0.325	0.085	0.125	0.119	0.273	0.174	0.173	0.119	0.125	0.250	0.085	0.150
Hotels and restaurants	0.150	0.075	0.375	0.025	0.125	0.069	0.075	0.075	0.075	0.069	0.075	0.150	0.025	0.050
Transports														
Air	0.650	0.475	0.500	0.257	0.625	0.569	0.375	0.307	0.501	0.301	0.475	0.450	0.201	0.550
Maritime	0.250	0.425	0.525	0.157	0.225	0.469	0.375	0.307	0.401	0.301	0.525	0.550	0.201	0.650
Road	0.150	0.225	0.372	0.080	0.125	0.407	0.175	0.138	0.075	0.219	0.175	0.342	0.025	0.280
Total	0.362	0.399	0.484	0.174	0.337	0.489	0.333	0.271	0.365	0.284	0.434	0.473	0.164	0.539
Electricity	0.150	1.000	1.000	1.000	1.000	0.819	1.000	0.825	0.575	0.569	1.000	1.000	0.025	0.500
Manufacturing	0.150	0.075	0.025	0.025	0.125	0.069	0.075	0.075	0.075	0.069	0.075	0.150	0.025	0.050
TOTAL	0.230	0.260	0.273	0.083	0.189	0.182	0.213	0.157	0.165	0.140	0.172	0.338	0.064	0.169

Source: See section on data sources.

Figure 1. FDI restrictions in OECD countries, 1998-2000¹

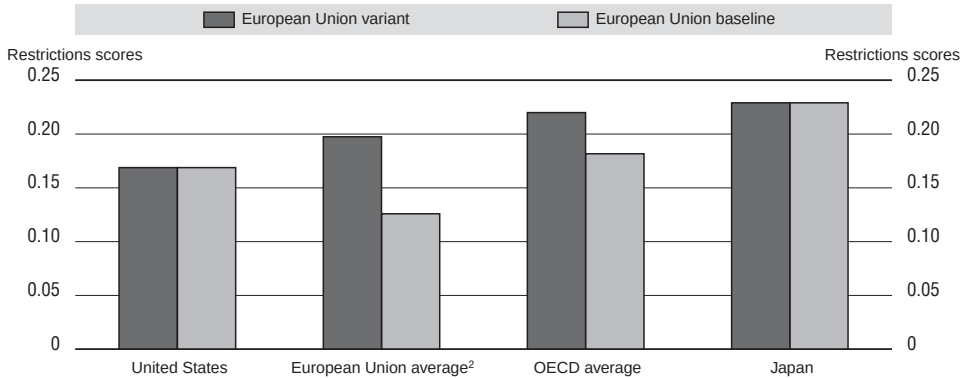


1. The indicator ranges from 0 (least restrictive) to 1 (most restrictive).
2. Includes limits of foreign ownership, restrictions on foreign personnel and operational freedom, screening requirements.
Source: See Section on data sources.

transition countries in particular, restrictions have been substantially eased or even eliminated in sectors such as telecommunications in the last few years.

The most basic observation is that on the whole the OECD countries are now quite open to foreign direct investment inflows. No country has an overall index above 0.4 and most are well below. There are, however, significant differences between countries and across sectors. The most open countries are in Europe. Since the late 1980s, intra-EU FDI flows are almost completely unrestricted and the EEA has also liberalised intra-bloc investment to some extent. In addition, a number of European countries have minimal overt restrictions on inflows from non-EU and non-EEA countries. The countries with the highest levels of overall restrictions are Iceland, Canada, Turkey, Mexico, Australia, Austria and Korea, with restriction scores above 0.25. The United States is a bit below the OECD mean, and Japan is above the OECD mean. The US score may seem surprising. But it should be remembered that the coefficients here do not represent all barriers to doing business but rather discriminatory barriers against foreign firms. The United States may have relatively unregulated markets on the whole but it does have discriminatory barriers to FDI in several sectors.⁷ Excluding screening requirements (Figure 1, panel B) has little effect on the ordering. New Zealand, and to a lesser extent Australia and Spain become relatively more open.

Within Europe, there are some important differences in restrictions. Even the European Union is not a completely unified bloc in terms of policies towards inward FDI. Substantial harmonisation and intra-EU liberalisation has occurred, however. Countries with the lowest levels of restrictions include the United Kingdom, Ireland, the Netherlands, Germany, Denmark, Belgium, and Italy. Norway, Finland and Spain have among the highest restrictions in Europe, with Iceland having the highest of all countries. Overall, however, restrictions in most European countries are well below the OECD average, as further shown in Figure 2 (baseline case). An important reason for this is that the calculations adjust for preferences granted to intra-EU or intra-EEA investment. These adjustments consisted of scaling down European country scores in cases where such intra-European preferences were granted.⁸ Figure 2 shows the effect of alternatively including or excluding this adjustment, which could be viewed as understating Europe's restrictions. It could be argued that the European Union should be considered an individual country for these purposes – just as it would be inappropriate to consider the absence of intra-State restrictions in the United States as an indication of freedom of international investment flows. Even after excluding the adjustment, European restrictions are on average below the OECD mean, and several EU countries remain the least restricted in the OECD. Under the alternative scenario of disregarding intra-EU preferences, average EU restrictions now exceed those of the United States, but remain below Japan's. There are substantial differences in the effect of excluding this adjustment on individual European countries,

Figure 2. **Effects of removing intra-European preferences on FDI restrictions¹**

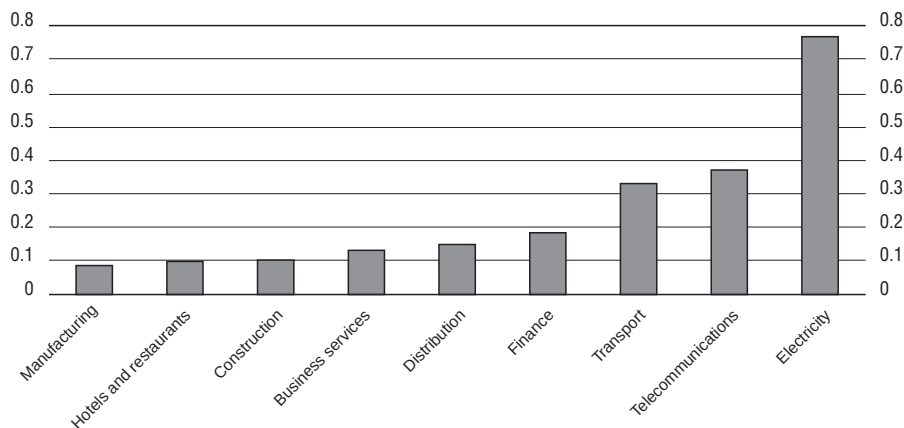
1. The European Union variant ignores intra-European preferences in calculating European restrictions. The European Union baseline incorporates intra-European preferences.

2. Simple average.

Source: See Section on data sources.

as shown in Annex II, although the ranking of countries within Europe by degree of restrictiveness is not greatly altered.

Sectoral scores. It can be seen from Table 3 and Figures 3 and 4 that services are far more restricted than manufacturing. FDI inflows into manufacturing are almost completely unrestricted, aside from economy-wide measures such as screening. In fact, many countries seek to encourage foreign investment in manufacturing.⁹ Construction and hotels and restaurants are also relatively lightly restricted. Some “sensitive sectors”, notably telecoms, transport, electricity, and finance are often highly or significantly restricted. Electricity has the highest score, but this derives more from public ownership than overtly discriminatory barriers against foreign investment. Airline transport, fixed line telecommunications, and banking in particular are subject to substantial explicit barriers against FDI in many countries, as shown in Table 3 and Figure 4. Media, such as newspapers and broadcasting, are also highly restricted but were not included in this study due to lack of data for some countries. Figure 4 shows the pattern of restrictions for selected countries in comparison to the OECD average pattern, for the service sectors. Most countries have relatively restricted electricity, transport, telecommunications and finance. The sectoral variation of restrictions is quite marked in the United States where some sectors are almost completely unrestricted whereas others have relatively high levels of restrictions. For some countries such as Iceland and Canada all sector scores are high, usually reflecting the presence of across-the-board screening

Figure 3. Cross sectoral patterns of FDI restrictions, 1998-2000¹

1. The indicator ranges from 0 (least restrictive) to 1 (most restrictive).

Source: See Section on data sources.

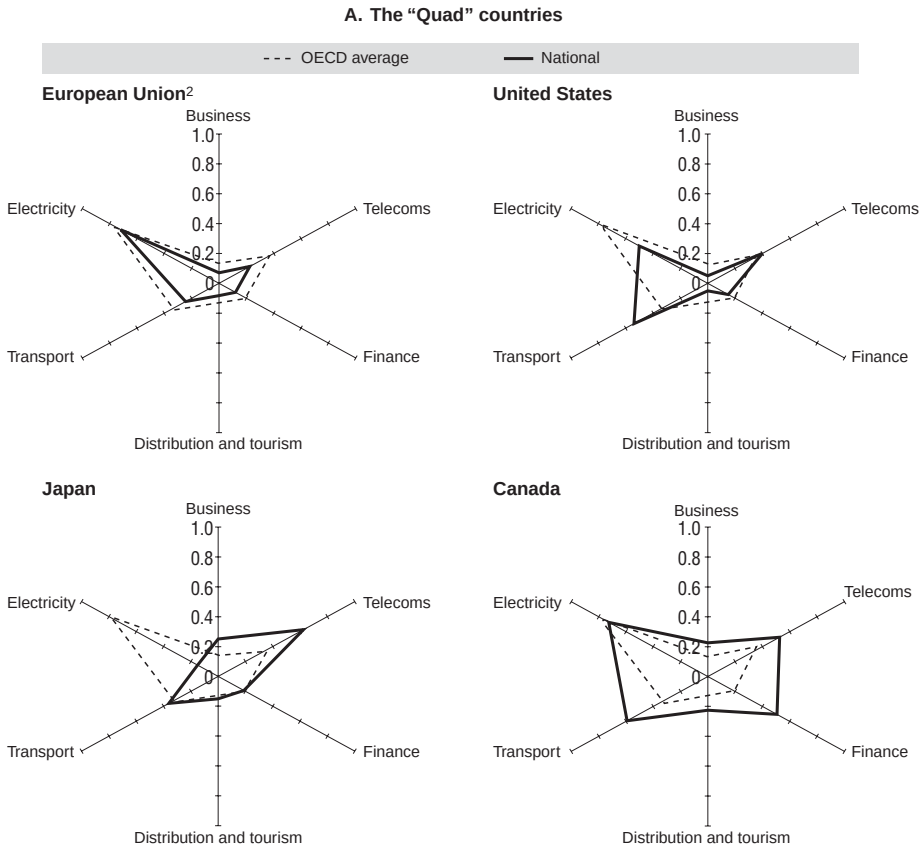
requirements. Even the most open countries have restrictions on a few sectors, particularly airlines, and some across-the-board restrictions, such as limitations on movement of people.

Decomposition by type of restriction. Figure 5 presents the results for the whole economy by type of restriction: limitations on foreign ownership (equity), screening, and other (management and operational restrictions). The greatest variations are in equity restrictions and screening. The differences in scores between countries reflect both the extent to which countries make use of these measures and their severity.

Some countries, notably in Europe, have no or very limited discriminatory screening of foreign investment. Screening is minor in the United States and Japan. Iceland was deemed to have the most restrictive screening requirement, with Australia, New Zealand, Turkey, Canada, Austria and Spain also having relatively extensive screening.

All countries have equity restrictions, but these vary substantially. These equity restrictions are concentrated in a few sensitive sectors, namely transport, telecommunications, finance and electricity. It is these restrictions that account for the bulk of the sectoral variation in OECD average restrictions observed in Figure 3. Almost all countries have some equity restriction in airline and maritime transport, although the severity varies. The NAFTA countries have among the highest

Figure 4. Cross-sectoral patterns of FDI restrictions,¹ 1998-2000

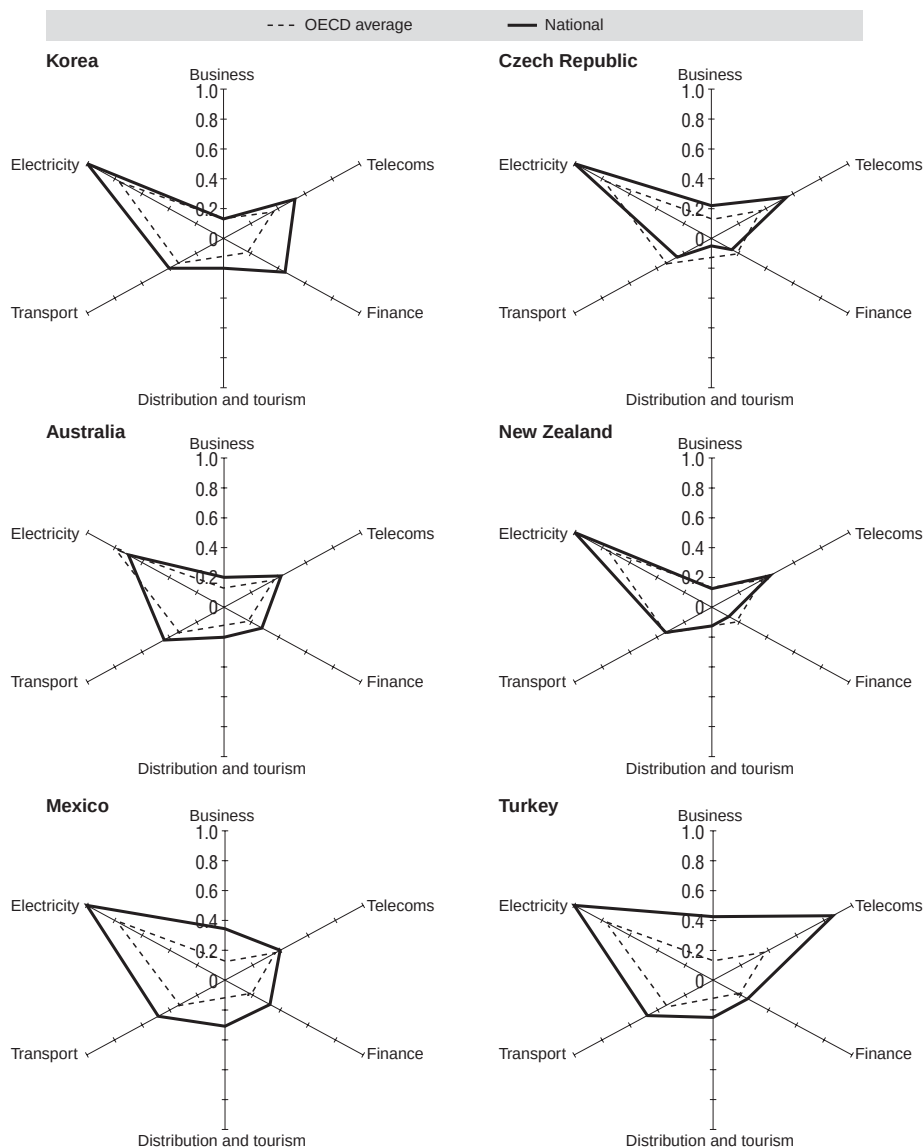


1. The indicator ranges from 0 (least restrictive) to 1 (most restrictive).
2. Average of EU nations.
Source: See Section on data sources.

level of equity restrictions, and there are no intra-NAFTA waivers of these restrictions. Mexico is one of the few countries where these equity restrictions apply to most service sectors. In the United States equity restrictions are confined to a few sectors, but are relatively high in these instances. Turkey and Korea also had relatively stringent equity restrictions in 1998, although some of these have been liberalised since then or are scheduled to be. European equity restrictions are usually but not always waived for investors from other EU or EEA countries, which largely explains the low equity scores in Europe. Also, some of these countries,

Figure 4. Cross-sectoral patterns of FDI restrictions,¹ 1998-2000 (*cont.*)

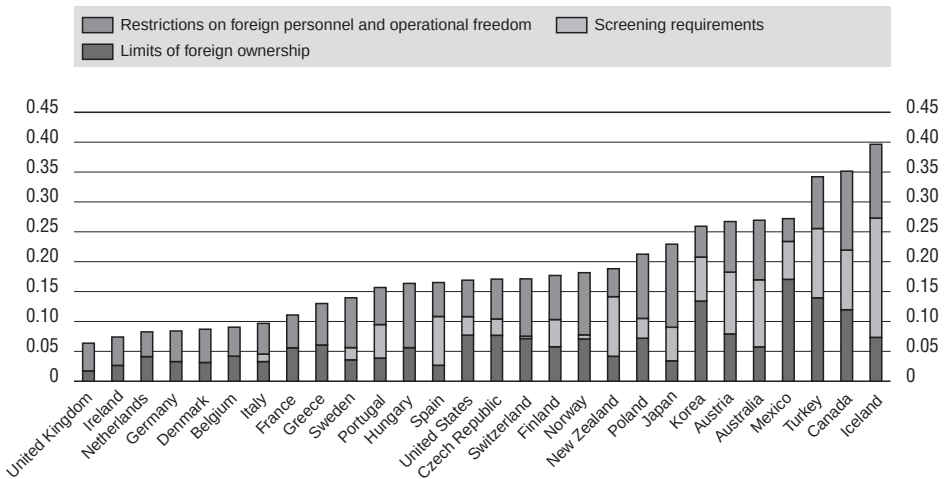
B. Other OECD countries



1. The indicator ranges from 0 (least restrictive) to 1 (most restrictive).

Source: See Section on data sources.

Figure 5. **FDI restrictions in OECD countries, 1998-2000: breakdown by type of restriction¹**



1. The indicator ranges from 0 (least restrictive) to 1 (most restrictive).

Source: OECD.

such as Ireland, the Netherlands, the United Kingdom, Denmark, and Germany, have hardly any such restrictions to begin with.

Japan has the highest level of “other” restrictions, partly reflecting the allegations of lack of transparency and procedural delays documented in some sectors in USTR and EU reports. This is one of the instances where intangible barriers to FDI were taken into account in the scoring. Similar allegations by USTR about European telecommunications markets and Japan’s METI about the United States were also factored into the US score.

The effect of switching to value-added weights (each sector’s share of GDP) in aggregating sectoral restrictions scores had minimal effects for most countries, with the United States being the major exception. With value added weights, most countries FDI restriction scores fall modestly as value-added weights tend to give greater weight to services that are not heavily restricted such as business services, distribution, and hotels and restaurants. Since United States restrictions are unusually concentrated in a few sectors, the use of value added weights significantly lowers the US restrictions score. A number of European countries, however, still have lower scores than the United States. See Annex II for further results.

Time series results

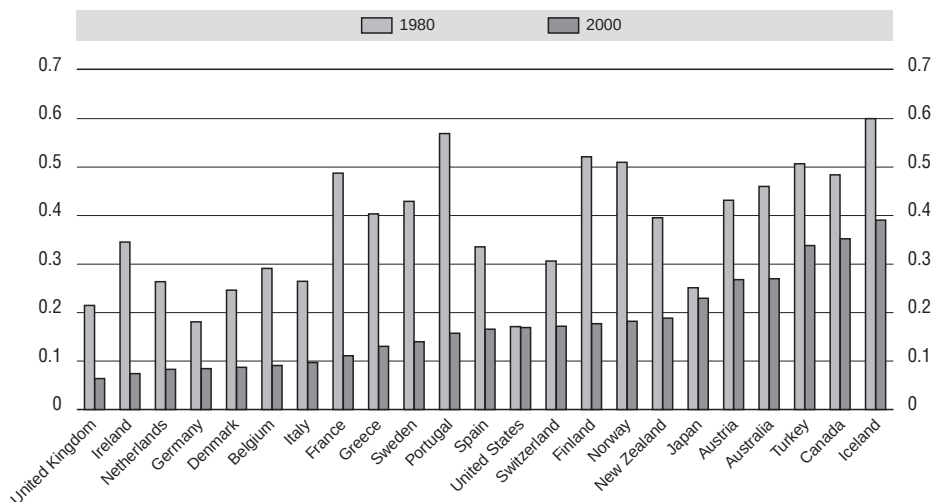
The cross-section restriction measures were extrapolated backward in time using OECD documents. This could only be done for long-standing OECD countries, however, and the findings should be viewed with greater caution than the cross-section results, due to lesser available information and reliance on a less varied set of sources. The results are found in Table 4 and Figure 6.

It can be observed that restrictions on FDI have decreased markedly over time for most countries. A major exception is the United States, which in the early 1980s was one of the most open countries but was in the middle of the pack by the late 1990s. This reflects the fact that there have been almost no changes in the United States, while most other countries have greatly liberalised access for foreign investors. In the early 1980s, a number of countries had total scores in the

Table 4. **Indices of FDI restrictions over time**
Total economy

	1980	1990	2000
Australia	0.460	0.332	0.270
Austria	0.432	0.432	0.268
Belgium	0.291	0.291	0.091
Canada	0.484	0.379	0.352
Denmark	0.246	0.161	0.087
Finland	0.521	0.463	0.177
France	0.487	0.233	0.111
Germany	0.181	0.174	0.084
Greece	0.404	0.332	0.130
Iceland	0.600	0.481	0.390
Ireland	0.345	0.250	0.074
Italy	0.264	0.264	0.097
Japan	0.251	0.237	0.230
Netherlands	0.264	0.243	0.083
New Zealand	0.396	0.237	0.189
Norway	0.510	0.466	0.182
Portugal	0.569	0.223	0.157
Spain	0.336	0.230	0.165
Sweden	0.429	0.335	0.140
Switzerland	0.306	0.278	0.172
Turkey	0.507	0.391	0.338
United Kingdom	0.215	0.167	0.064
United States	0.171	0.170	0.169
Mean	0.377	0.294	0.175
Maximum	0.600	0.481	0.390
Standard deviation	0.128	0.101	0.094

Source: See section on data sources.

Figure 6. FDI restrictions in OECD countries, 1980-2000¹

1. The indicator ranges from 0 (least restrictive) to 1 (most restrictive).

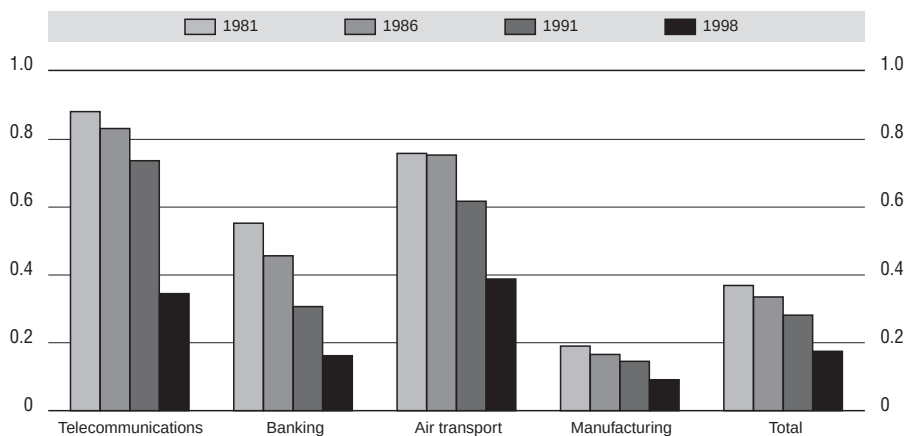
Source: See Section on data sources.

0.4 to 0.6 range. The changes have been particularly dramatic in several European countries, notably Portugal, France, Norway, and Finland.

The liberalisation of inward foreign investment reflects a number of trends. First, as noted earlier, the European Union has greatly liberalised intra-EU FDI, and since about half of FDI into the EU is from other EU countries, this is tantamount to a substantial overall liberalisation. Second, most countries have liberalised both their economy-wide and sector-specific restrictions, to varying degrees. Third, the prevalence of public monopoly in sectors such as telecoms, banking and transport has greatly diminished as privatisation has been pursued throughout the OECD.¹⁰ This is one reason why FDI restrictions have changed less in the United States than elsewhere: in the US there was much less to privatise and demonopolise to begin with.

Figure 7 shows the time series for selected sectors. Air transport and telecoms were almost completely closed to FDI in the early 1980s and are still more restricted than other sectors, as noted in the previous section. But the change has been even more dramatic in these industries than for the economy as a whole. Figure 7 also shows that while there has been a steady trend towards liberalisation, the pace accelerated in the 1990s.

Figure 7. **FDI restrictions over time in selected sectors, 1981-1998¹**
 OECD average²



1. The indicator ranges from 0 (least restrictive) to 1 (most restrictive).

2. Average for 23 OECD countries.

Source: See Section on data sources.

CONCLUSIONS

The last two decades, and especially the 1990s, have witnessed significant liberalisation in FDI restrictions. OECD countries are now generally open to inward FDI, although there remain substantial differences between countries and across industries. The most open countries are now in Europe, at least as far as statutory restrictions are concerned. The preponderance of remaining restrictions is in services, with almost no overt restrictions in manufacturing. On the contrary, many countries provide incentives for manufacturing investment, although systematic evidence is lacking.

This paper has not evaluated the effects of restrictions, but Nicoletti *et al.* (2003) uses the findings of this paper in an econometric model of FDI, and finds a statistically important effect of the computed restrictions on FDI patterns.

The most heavily restricted sectors are those that are highly sensitive to national security or national sovereignty considerations: telecommunications, air and maritime transport, finance, public utilities, and media (the latter not considered in this study). Whether or not these restrictions are justified on social cost-benefit grounds is a difficult issue beyond the scope of this paper, involving tradeoffs between national sovereignty and economic efficiency. From an eco-

conomic point of view, non-discrimination between domestic and foreign investors is generally the best policy in the absence of a clear-cut market failure or threat to national security. Liberalisation of remaining restrictions can be facilitated by continued discussions at the OECD and the WTO on multilateral rules for investment. Further liberalization of restrictions discriminating against FDI could be accompanied by efforts to discipline incentives that discriminate in favour of FDI.

This study has focused on statutory restrictions. Informal public or private barriers remain mostly unaccounted for in the measures provided here. Future research should focus on such non-transparent practices and institutional obstacles. For example, free float in stock market capitalisation could be used as a proxy for effective openness to acquisitions of minority shareholdings. The ongoing development of codes, guidelines and best practices in areas with direct impact on public and private sector governance practices may enhance the possibilities of pin-pointing and measuring non-conforming practices that affect relative openness to FDI.

NOTES

1. A number of bills were considered by the US Congress but the more restrictive measures did not pass, reflecting the still-strong support for openness to foreign investment in the United States. The Exon-Florio Provision of the 1988 Omnibus Trade Act gave the President the authority to restrict foreign investment for national security reasons. This provision gave rise to considerable alarm, but the grounds for restricting FDI are narrow and specific and it has almost never been invoked. See OECD (1992, p. 22) and Graham and Krugman (1995).
2. See Golub (2003) for further discussion.
3. The GATS schedules reflect commitments as of January 2000. Subsequent policy changes are not incorporated.
4. See OECD (2002) for further discussion of the Code.
5. The OECD countries covered by this FDI study but not included in the APC studies are the Czech Republic, Hungary, Poland, and Iceland.
6. For example, the USTR alleges “exclusionary practices” in Japan in some sectors and discriminatory barriers against US firms in some European countries’ telecommunications markets. Similarly, METI cites “procedural delays” in the issuance of operating licenses in telecommunications in the United States. In such cases, restriction scores were increased by 0.1.
7. Switching to value-added weights, however, significantly lowers the US score, as discussed below.
8. Where restrictions on intra-European investments are waived, the restriction is weighted by 0.44, reflecting the fact that 56 per cent of FDI inflows into European countries were intra-European in 1998. This could overstate the effect of the waiver to the extent that this waiver endogenously raises the share of intra-European FDI.
9. In manufacturing, social and regulatory policies such as health and safety regulations, environmental standards, and technical standards undoubtedly also can act as indirect restrictions, but these are not considered here.
10. Electricity, however, has remained under public ownership in many countries.

Annex I

COMPARISONS WITH HARDIN AND HOLMES (1997)

This annex provides more detail on the computation of the FDI Restrictions Indices, in particular comparing the Hardin-Holmes (HH) methodology to the one adopted here. As noted in the text, the weights used here are broadly similar to those of HH, in particular placing a high importance on equity restrictions. The HH weights are shown in Table A.1.

The main difference is that HH distinguish between restrictions on all firms from those on existing firms only (mergers and acquisitions). But this distinction is of little consequence as the bulk of FDI in OECD countries concerns existing firms. Also, few OECD countries distinguish between green-field and mergers and acquisitions in their statutory FDI restrictions.

Table A.1. **Hardin and Holmes coefficients on FDI restrictions**
Maximum 1.0

Type of restriction	Scores
<i>Foreign equity limits on all firms</i>	
No foreign equity allowed	1
0-49 % foreign equity allowed	0.5
50-99 % foreign equity allowed	0.25
<i>Foreign equity limits on existing firms, none on Greenfield</i>	
No foreign equity allowed	0.5
0-49 % foreign equity allowed	0.25
50-99 % foreign equity allowed	0.125
<i>Screening and approval</i>	
Investor required to demonstrate net economic benefits	0.1
Approval unless contrary to national interest	0.075
Notification (pre or post)	0.05
<i>Control and management restrictions</i>	
All firms	0.2
Existing firms, none for Greenfield	0.1
<i>Input and Operational Restrictions</i>	
All firms	0.2
Existing firms, none for Greenfield	0.1
Total	
Source: Hardin and Holmes (1997).	

On the other hand, the equity limits were broken down into smaller ranges. In cases where no equity restriction was listed, but the country had no GATS commitment, the lack of equity restrictions is considered "unbound" and a score of 0.05 was given. Second, the HH weight on screening seemed low, especially in the case where the burden of proof is on the investor to demonstrate benefit, and was therefore raised. Third, in aggregating sub-sectors HH use simple rather than weighted averages. Instead this study weights by economic importance, using FDI weights for the OECD as a whole. Fourth, in HH multiple restrictions of the same type are counted only once, which could possibly lead to an underestimate of FDI restrictiveness for countries that apply multiple restrictions, as they note. With a somewhat more detailed breakdown of the types of restrictions here, following other studies of the Australian Productivity Commission, this problem is partially circumvented. These include restrictions on the residency and nationality of board members and duration of permissible stay for expatriate personnel. Finally, this study covers a smaller set of services industries, but includes electricity and manufacturing, a larger group of countries and a richer set of data sources.

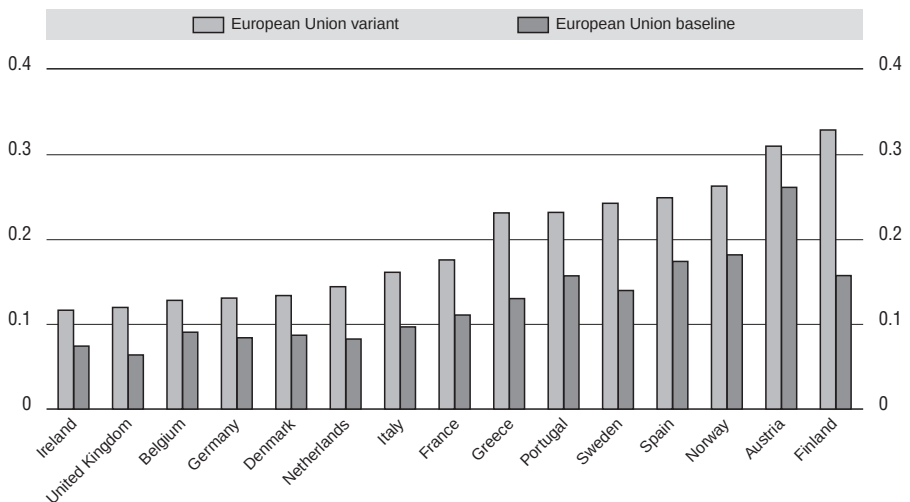
HH limited their study to APEC countries. Several other APC studies examined particular sectors: telecommunications, banking, maritime services, professional services and distribution. The APC studies evaluated all modes of service delivery, rather than just FDI, and comparison with this study therefore required re-weighting the components of the APC scores. After doing so, the correlation coefficient between this study's results and those of the APC for telecoms, banking, and maritime services were quite high at 0.58, 0.57 and 0.56 respectively. For distribution and business services it is lower but still positive (0.28 and 0.10 respectively). The low correlation for professional services is not surprising given that commercial presence plays a minor role in the APC weighting indices and therefore is ill-suited for the purpose of measuring FDI restrictions, even after attempts to re-weight them. Annex I of Golub (2003) provides a more detailed comparison.

Annex II

SENSITIVITY ANALYSIS TO CHANGES IN ASSUMPTIONS

Intra-European FDI liberalisation. Figure A.1 shows the effects of removing of intra-European FDI preferences, as discussed in the text. The effects are substantial, although they vary somewhat by country. For some countries, *e.g.* the United Kingdom, the Netherlands, Ireland, Sweden, and Greece, removing the effects of FDI preferences roughly doubles the country's restrictions score. Intra-European preferences are weakest in Austria and also relatively small in Spain and Portugal, reflecting differences in the extent to which preferences are granted to other European countries. For example, Austria's screening requirements apply to all foreign investments, including those from other European countries.

Figure A.1. Effects of removing intra-European preferences on FDI restrictions, 1998-2000¹
European countries



1. The European Union variant ignores intra-European preferences in calculating European restrictions. The European Union baseline incorporates intra-European preferences.

Source: See Section on data sources.

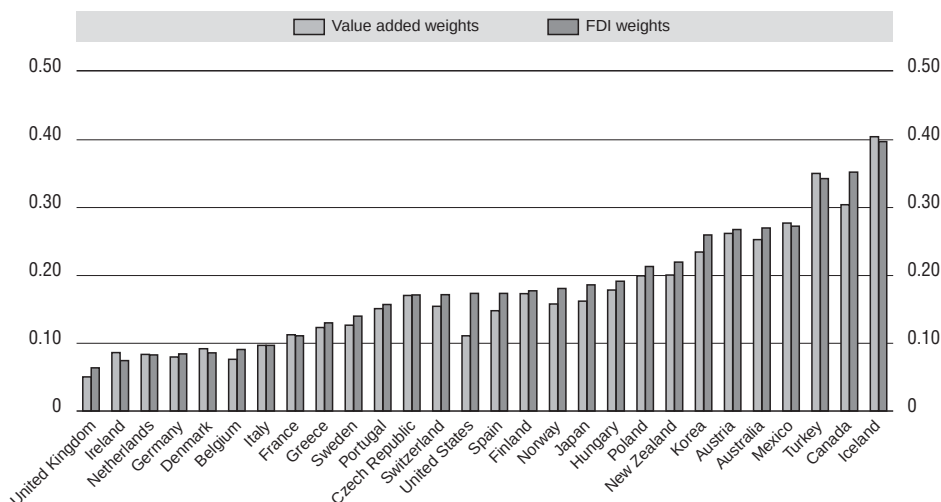
Table A.2. **Sector weights**

	FDI	Adjusted FDI ¹	Value added
Business	0.18	0.18	0.22
Telecommunications	0.05	0.04	0.04
Construction	0.01	0.02	0.08
Wholesale, retail	0.13	0.09	0.17
Finance	0.25	0.16	0.07
Hotels, restaurants	0.01	0.01	0.04
Transport	0.01	0.14	0.07
Electricity	0.02	0.02	0.04
Manufacturing	0.35	0.35	0.28
Total	1.00	1.00	1.00

1. For the service sectors, an average of FDI and trade weights; for manufacturing, FDI weight.

Source: OECD.

Alternative Sector Weights. Table A.2. shows alternative weights for aggregating the sectoral restrictions. The use of FDI weights raises a problem of endogeneity: highly restricted sectors may experience less FDI and hence receive too low a weight. As noted above, services are much more highly restricted than manufacturing, so any such problem of endogeneity is concentrated in the former. To deal with this problem, for the service sectors, an average of FDI and trade weights was employed. The inclusion of cross-border trade in the weighting scheme may be justified insofar as cross-border trade can substitute for FDI when the latter is restricted. As an alternative, Figure A.2 shows the effects of using value-added weights

Figure A.2. **FDI restrictions measures under alternative weighting methods**

Source: See Section on data sources.

rather than FDI weights in aggregating the sectoral FDI restrictions measures into an aggregate measure for the economy. As noted in the text, the use of FDI weights tends to slightly lower most countries' restriction scores. The largest effect is on the United States, which has a substantial decline in restrictiveness. Canada also has a moderate decline in its restriction score. In all other countries, the effect is minimal. The large effect on the United States reflects the unusually skewed pattern of restrictions shown in Figure 4.

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THE DECLINE IN PRIVATE SAVING RATES IN THE 1990S IN OECD COUNTRIES: HOW MUCH CAN BE EXPLAINED BY NON-WEALTH DETERMINANTS?

Alain de Serres and Florian Pelgrin

TABLE OF CONTENTS

Introduction	118
Stylised facts and determinants of saving rates in OECD countries	119
Development in international saving rates in the 1990s	119
The influence of revaluation effects and financial wealth on personal saving rates	119
Fundamental determinants of private saving rates: Looking beyond the wealth effect	124
Determinants of private saving: empirical strategy	128
Variable definition and data sources	128
Estimation method	129
Empirical results	133
Main findings	133
How these results compare with previous studies using panel data	137
Tests of robustness of the specification and out-of-sample simulation	140
Sensitivity to the inclusion of other potential determinants of private saving	142
Conclusions	147
Bibliography	152

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INTRODUCTION

Private-sector saving rates have declined in the majority of OECD countries in the 1990s, in particular during the second half, with the decline being largely concentrated in the household or personal sector. In those countries where it has occurred, the sharp decline observed in household saving has been accompanied by a significant rise in private debt as a proportion of GDP and has coincided with a sharp increase in household's financial net worth. This was particularly the case in the United States, Germany, Italy and the United Kingdom for which data of financial net worth exist. To many, this was seen as evidence that the strong rise in equity and residential property prices during the late 1990s had been treated by households as a permanent increase in wealth, leading to an unsustainable drop in saving.

This raised concerns that a substantial fall in equity prices would leave households in poor financial health, prompting them to rebuild savings at a time when strong consumption would be needed to avoid a deep recession. Fears of a negative wealth effect have so far not materialised though it is possible that the continuing strength of property market has been a key factor cushioning the stock market blow. An alternative explanation is that the decline in private saving may have been more sustainable than suggested by the simple correlation with measures of household net financial wealth. In order to shed some light on this issue, this paper has used recent estimation techniques for systems of dynamic panel equations to analyse the contribution of a set of basic determinants of private saving rates for a pool of 15 OECD countries over the period 1970-2000.

In line with a recent study by Haque *et al.* (1999), the paper applies the pooled mean group estimation method (PMG) to estimate a dynamic specification that imposes homogeneity restrictions only on long-run coefficients and only when such restrictions are not statistically rejected. However, the paper goes one step further and uses the method to examine how accurately the evolution of private saving over time can be traced to the determinants as well as to assess the contribution of individual determinants in each country. More specifically, the empirical analysis indicates that private-sector saving rates in OECD countries have been significantly influenced by public-sector saving rates, the demographic structure of the population (as measured by the old-age dependency ratio), the growth rate of labour productivity, changes in the terms of trade and the real interest rate. Among these, the change in the public-sector saving rate has contributed the most to the evolution of

private saving between 1995 and 2000. Overall, even in countries where private saving rates have fallen to particularly low levels, the decline seems to be mostly accounted for by determinants that do not include measures of financial or housing wealth and that have themselves evolved in a sustainable way. In this respect, risks of a significant negative wealth effect seem remote. The flip side of the coin, however, is that a loosening of fiscal policy may have a limited impact on private consumption and end-up in higher private savings.

The rest of the paper is organised as follows: The next section provides an overview of international developments in saving rates in the 1990s and discusses a number of explanatory factors. The empirical strategy as well as the econometric methodology and dataset are introduced in the third section, followed by the key results from estimation and sensitivity analysis and, finally, the conclusions.

STYLISTED FACTS AND DETERMINANTS OF SAVING RATES IN OECD COUNTRIES

Development in international saving rates in the 1990s

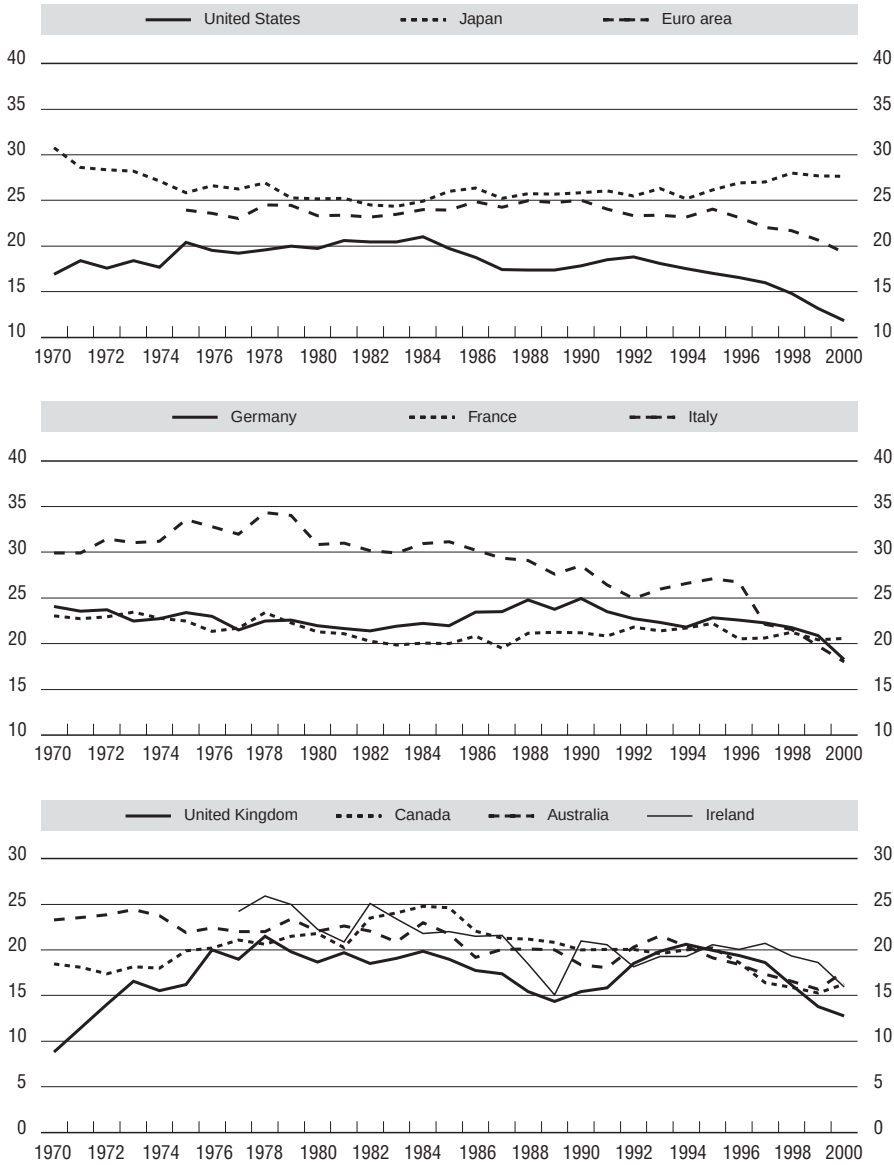
Gross private-sector saving rates have fallen substantially in a number of countries during the 1990s and although they have generally rebounded somewhat since 2000, they remain below longer-term average levels (Figure 1). In some countries, the decline of the 1990s probably reflected a cyclical adjustment following the sharp rise observed in the previous years (United Kingdom, Spain, Sweden and Finland). In other cases, however, private saving rates have been trending down since the mid-1980s and by year 2000, the decline had pushed those rates to low levels by historical standards in the United States, Italy, Canada and Australia.

The reduction in private saving has largely been concentrated in the household or personal sector, especially in the United States, Italy, Canada and Australia, where levels in per cent of GDP have been significantly lower on average in the 1990s than in the 1980s. In some cases, the decline in household saving has been partly offset by an increase in corporate saving, whose relative importance has risen considerably since the 1980s – notably in Canada, Australia and Finland – to the point of surpassing the size of household saving in the vast majority of countries.¹ In Japan, the drop in household saving was even more than offset by the rise in corporate saving, leading to a slight increase in private saving.

The influence of revaluation effects and financial wealth on personal saving rates

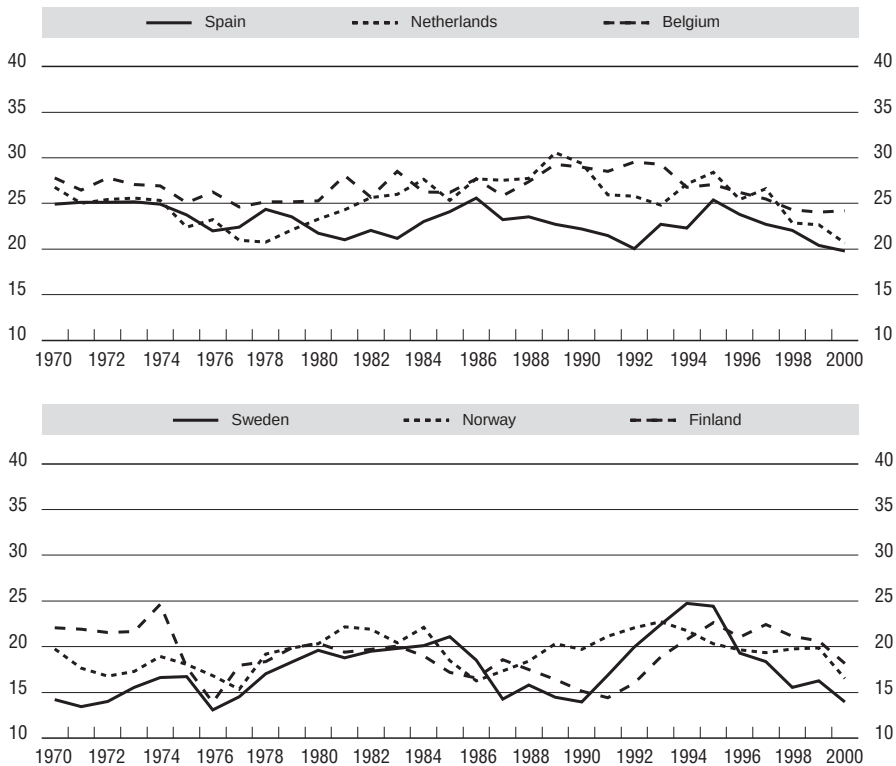
In those countries where it has occurred, the decline in personal saving rates has coincided with a sharp increase in households' financial net worth, as indicated by the strong negative correlation between the two series, at least in most

Figure 1. **Gross private saving rates**
In per cent of GDP



Source: OECD.

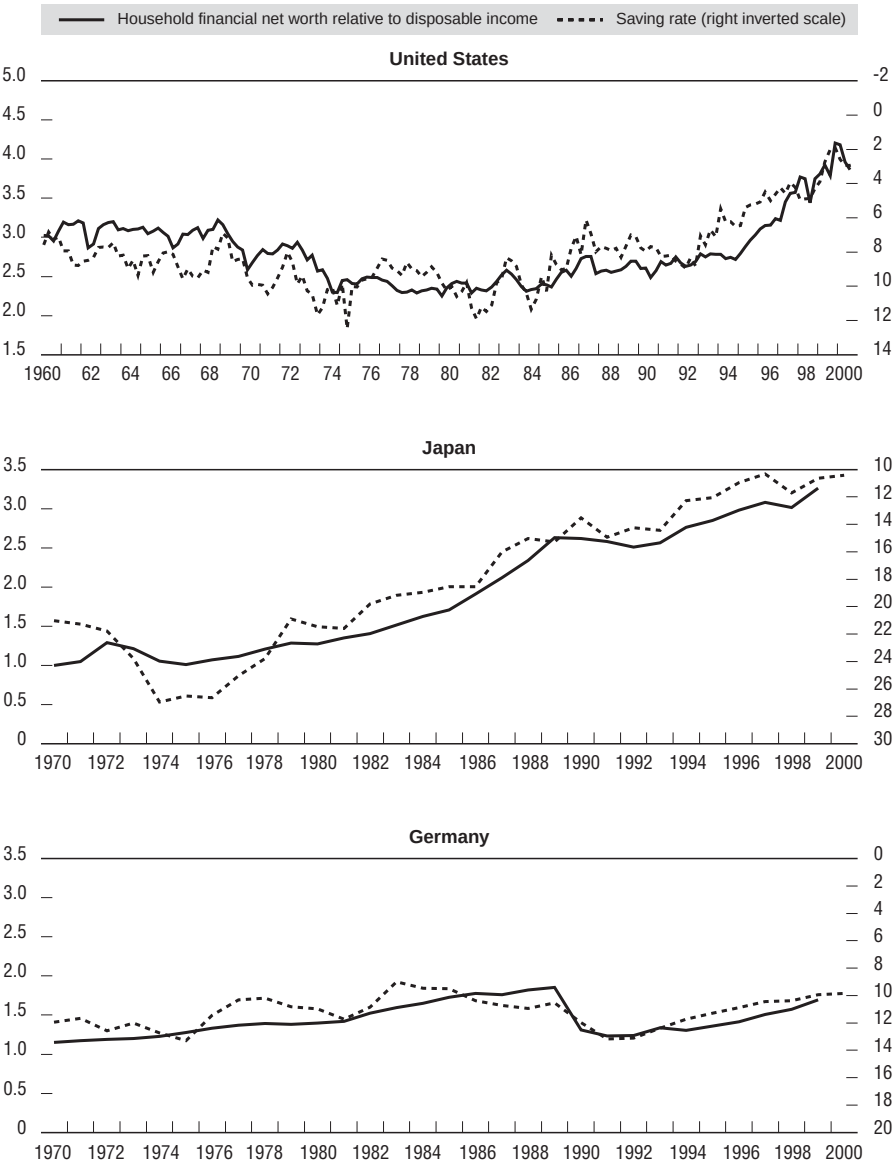
Figure 1. **Gross private saving rates (cont.)**
In per cent of GDP



Source: OECD.

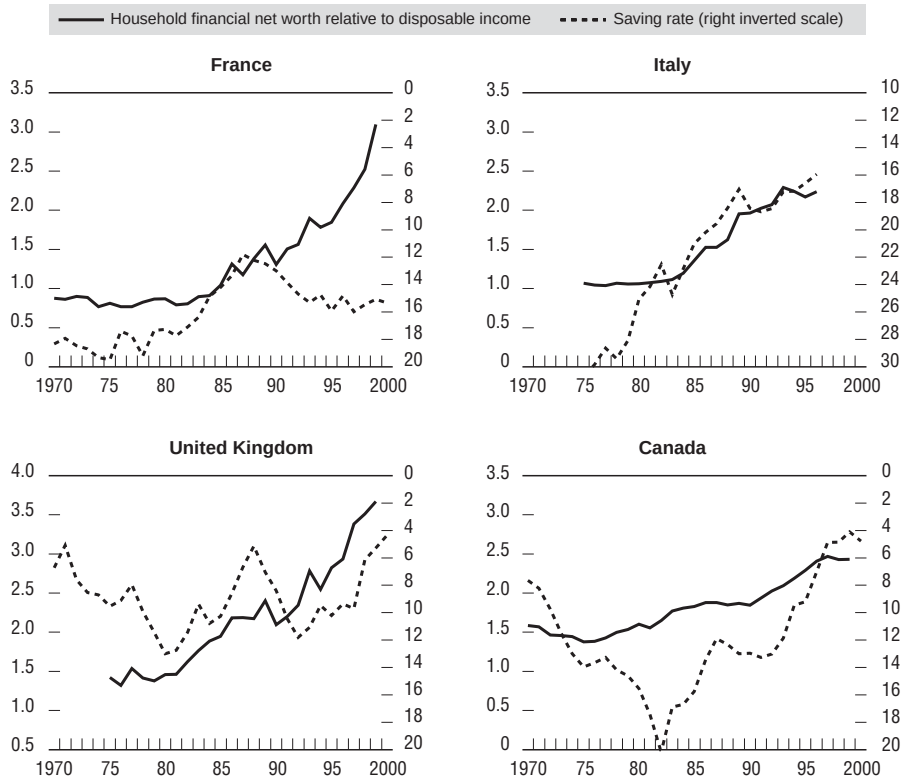
of the G-7 countries (Figure 2).² Several studies have indeed related the declines in private saving rates in the late 1990s to the substantial rise in financial wealth in particular in the United States.³ While this could be seen as evidence that the strong rise in equity prices during the late 1990s had been treated by households as a permanent increase in wealth – hence leading to an unsustainable drop in saving – several factors argue for a more cautious interpretation. First, given the divergence between the economic definitions of the two main variables entering the calculation of saving – income and consumption – and their respective treatment in the National Accounts, it may well be that the negative correlation between household saving and financial wealth is partly spurious. For instance,

Figure 2. **Household financial net worth and saving rates**
In per cent of household disposable income



Source: National flow of funds or financial accounts statistics, OECD.

Figure 2. **Household financial net worth and saving rates (cont.)**
In per cent of household disposable income



Source: National flow of funds or financial accounts statistics, OECD.

while realised capital gains are not included in personal income in the National Accounts, taxes paid on them are fully deducted, implying a shift of income and, thereby, saving from the household to the public sector when substantial gains occur.⁴

Second, recent evidence from both household surveys and empirical analysis has shown that the sensitivity of consumption and/or saving to wealth can vary quite substantially depending on the source of capital gains (*e.g.* housing vs. stock-market)⁵ and whether such gains are realised or not.⁶ Third, the fears that a substantial stock market correction would impart a significant negative wealth effect in

the United States have to a large extent been proved unfounded by the resilience of private consumption, even as the economy went through a mild recession followed by an un-typically weak recovery. All this suggests that the concerns that households had gone too far in responding to the stock market boom of the late 1990s might have been misplaced. The latter interpretation is also consistent with recent empirical findings indicating that only *permanent* changes in wealth affect consumer spending and that a very large proportion of the post-war variation in household net worth is transitory (Lettau and Ludvigson, 2001).

Fundamental determinants of private saving rates: Looking beyond the wealth effect

A more systematic attempt to explain private saving patterns and assess their sustainability consists in looking beyond direct measures of wealth and to examine the extent to which recent trends can be accounted for by fundamental determinants which in many cases affect consumption *via* their impact on wealth. To do so, a panel of dynamic saving equations was estimated across a large number of OECD countries for which a reasonably complete set of reliable data could be assembled. Following previous empirical cross-country studies, the set of determinants includes variables aimed at capturing the influence of demographics, the level and growth rate of income or productivity, the inter-temporal relative price of consumption, uncertainty, the relative price of domestic vs. foreign goods and public finance. More specifically, the final system specification includes the public sector saving rate introduced to capture possible Ricardian effects, the old-age dependency ratio, the percentage change in terms-of-trade, the growth rate of labour productivity, the real interest rate and the inflation rate.

Direct measures of wealth are therefore intentionally left out of the basic specification for two reasons. One is to see whether the movement in saving can be tracked closely in an out-of-sample fashion by fundamental determinants less prone to sharp, unsustainable movements. The rationale is that in the event that wealth has had a significant effect over and above what is explained by fundamental determinants, the basic equation is likely to over-predict private saving rates in most countries where wealth has risen sharply in the post-1995 period. This question is examined below. The second reason is that while in principle measures of financial wealth could be introduced to see whether they have an impact independently from the effect captured by other determinants, relevant data on the stock of wealth are available only for a few countries.⁷

For most of these variables, the effect on private saving is theoretically ambiguous, especially as regards the long-run effect, since it often depends on the assumed consumption behaviour as well as on specific model characteristics such as the strength of inter-temporal substitution and the importance of general

equilibrium considerations. The following provides a brief overview of the main channels whereby these determinants can affect saving.

Productivity growth

In a life-cycle framework, an increase in the growth rate of income per capita is likely to benefit workers more than retirees. Given the higher saving rates of workers, this would generate an increase in aggregate saving provided that the saving rates per age remain unchanged (Modigliani, 1966). However, once the latter condition is relaxed, there is an alternative channel working in the opposite direction. For instance, assuming a significant proportion of private agents are able to shift consumption inter-temporally, a sustained increase in productivity growth may lead to a larger-than-proportional adjustment in consumption, as consumers attempt to spread over time the benefits of a higher and steeper expected income profile (Tobin, 1967). To the extent that future productivity gains are discounted into equity prices, the benefits from an anticipated acceleration in income per capita could be transmitted to current consumption and saving via their impact on financial wealth, as was the case in the United States in the late 1990s. In this context, a higher growth rate of productivity would lead to a decline in the saving rate.

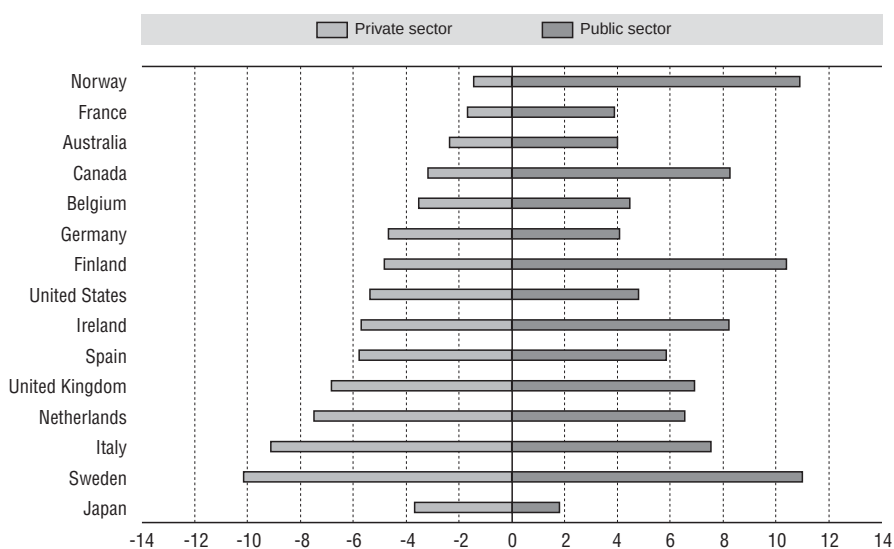
Demographics

Likewise, the impact of population ageing on aggregate saving depends largely on the importance of life-cycle effects on household behaviour. If consumers behave as predicted in simple life-cycle models, a significant decline in saving rates could result from the rise in old-age dependency ratios, as an increasing share of the population is drawing down financial assets to sustain consumption.⁸ However, household surveys reveal that people often continue to accumulate savings well after retirement and that in some cases, the saving rate is only marginally lower than that of prime-age worker categories (Borsch-Supan and Brugianni, 2001). The effect of ageing on private saving behaviour is also complicated by the nature of pension regimes in place, as well as by current and prospective levels of public debt and deficits. Considering in addition the high degree of heterogeneity over time and across countries in the composition of households, savings rate per age cohorts, the link between the aggregate saving rate and total dependency ratio is highly uncertain. Indeed, while the empirical evidence of the life-cycle effect tends to vary quite considerably across studies, the bulk of the more recent evidence, based on more sophisticated estimation techniques, points towards a relatively small, albeit significant, positive response of aggregate saving to different measures of dependency ratios (Turner *et al.*, 1998).

Public sector saving

The general decline in private saving rates in the second half of the 1990s coincided in most cases with a substantial improvement in government budget balances (Figure 3). Such opposite movement in public and private saving is consistent with the Ricardian equivalence hypothesis (REH) under which forward-looking private agents with altruistic motive *vis-à-vis* their descendants fully internalise the fact that government borrowing implies higher future debt service and, hence, deferred taxation. Given their desire to smooth consumption over time, private agents prefer to adjust their own saving behaviour so as to fully offset changes in government saving rather than temporarily adjusting consumption. In this respect, private agents do not regard their holdings of government bond as net wealth under the REH. Given that the proposition rests on very stringent conditions unlikely to be met in the real world, few really expect private saving to offset one-for-one changes in public debt, as predicted under strict Ricardian equivalence (Seater, 1993).⁹ Even though each of these conditions (except the altruism motive) taken in isolation may only be of second-order importance, a substantial departure from Ricardian equivalence might turn out if several of them

Figure 3. **Change in gross saving positions between 1995 and 2000**
In per cent of GDP



failed to be met, as is likely to be the case. In this regard, the extent of the private saving offset remains an empirical issue that cannot be easily resolved considering the multitude of factors simultaneously affecting the private saving behaviour.

Changes in the terms of trade

Earlier Keynesian models predicted that an adverse shift in the terms of trade will generate a decline in saving and a deterioration in the trade balance (the so-called Harberger-Laursen-Meltzler effect). This is because the decline in the relative value of exports corresponds to a fall in income which, in such flow models, is not matched by a drop in consumption given the less-than-unit marginal propensities to consume and save. This prediction was later challenged with the development of inter-temporal general equilibrium models of consumption and external balances (Obstfeld, 1982). According to inter-temporal models based on an infinitely-lived, representative agent, savings would adjust as predicted in the basic Keynesian analysis only if the terms-of-trade shocks were perceived as transitory. A permanent shock would have little effect on saving (as well as on the trade balance) as households would quickly adjust consumption to the lower level of income. In overlapping generation models, forward-looking households may adjust savings to smooth consumption even in the case of permanent shifts in terms-of-trade. However, the decline in saving in the short and medium run leads to a de-cumulation of financial wealth (Macklem, 1990). The adjustment to the lower stock of financial wealth requires, in the longer run, a net increase in the saving rate and the trade balance position as a ratio of income. In sum, most models would predict a positive relationship between the terms of trade and savings in the short run, but the long-run effect is theoretically ambiguous as it may depend on the perceived persistence of the shock and/or the importance of the wealth effect in consumption decisions.

Real interest rate

The direction and size of the impact of the real interest rate on saving in the short and long run depend on the offsetting influences of substitution, income and human wealth effects. A rise in the real interest rate raises the cost of current consumption relative to future consumption, providing an incentive to raise saving. The strength of this effect depends on both the elasticity of inter-temporal substitution and the proportion of households who face liquidity constraints. Re-enforcing this substitution effect, an increase in real interest rate reduces the present value of the future stream of labour income, causing a decline in human wealth. While a small change in the real interest rate can lead to a substantial change in human wealth and although the size of the latter is potentially much larger than non-human or financial wealth, the importance of this channel is difficult to assess,

not least owing to serious measurement difficulties. These impacts on saving can be offset by the income effect. Given that the private sector is typically a net creditor, a rise in interest rates raises income, consumption and lowers saving. Overall the net effect is ambiguous, but the larger the proportion of households who are liquidity constrained, the more the income effect is expected to prevail over the substitution and human wealth effect.

Inflation

There are several ways in which inflation can affect saving independently from its influence via the real interest rate. Given the high correlation between the level and variance of inflation, the latter may capture the effect of uncertainty on saving. In such a case a rise in inflation would be expected to raise savings for precautionary motives. Also, an unexpected rise in inflation may lead households to raise savings to compensate for the capital losses on a fixed-income imperfectly indexed asset. But even in absence of behavioural response to capital gains or losses, a spurious positive correlation between inflation and the private saving rate may be induced by the interaction of inflation, taxation and the omission of capital gains or losses from the National Accounts (Jump, 1980). For a given real return on assets fixed in nominal terms, higher inflation raises nominal interest receipts but also erodes their real value, leaving the level of wealth and consumption unchanged in real terms for the asset holders. However, given that the rise in nominal interest receipts is reflected in measured income (and is taxed accordingly) but not the capital loss on the assets, the personal (net lender) saving rate tends to rise artificially with inflation at the expense of both the government and corporate (net borrowers) saving rate. Regardless of the prevailing channel, a positive relation between inflation and saving is expected.

DETERMINANTS OF PRIVATE SAVING: EMPIRICAL STRATEGY

Variable definition and data sources

This section provides a description of the data and the methodology used to assess the contribution of fundamental determinants in the evolution of private saving rates over time and across countries. Two measures of gross national saving rates (expressed in terms of GDP) are used to derive residually the two measures of *gross private saving rates* used in the empirical analysis. One is taken directly from the OECD National Accounts database (SNA) and the other is constructed from the balance of payments statistics (BOP). In the latter case, the gross national saving rate is obtained by adding the total investment rate (including inventories) to the current account balance (as a ratio of GDP) from the BOP statistics. In both cases, a

gross private saving rate is then calculated residually by subtracting the *gross public sector saving rate* from the gross national saving rate. The gross public sector saving rate is measured as the sum of the general government financial balance (net lending as a per cent of GDP) and the gross public sector investment rate.

The *old-age dependency* ratio is calculated as the ratio of the population over 64 years to the population between the age of 20 and 64 years. The data on population per age categories are taken from the United Nations demographic database. *Labour productivity* is measured as the ratio of real GDP to total employment. The *terms-of-trade* are measured as the ratio of goods export to import prices (customs basis). The *real interest rate* is measured by subtracting a moving average of past inflation rates (based on the consumption price deflator) from a nominal long-term government bond rate. The *inflation rate* is measured by the percentage change in the level of the consumption deflator.

The sample is based on annual data spanning from 1970 to 2000 and includes 15 OECD countries: The United States, Japan, Germany, France, Italy, the United Kingdom, Canada, Australia, Belgium, Finland, Ireland, the Netherlands, Norway, Spain and Sweden.

Estimation method

The analysis of the determinants of private saving across time and countries has been the subject of several studies in the last few years (Table I). Even though most of them pursue a similar objective of identifying the key determinants of private savings, the specific methodology used is, in some cases, quite different. Callen and Thimann (1997) study the household saving behaviour among 21 OECD countries over the period 1975-95. They use static fixed effect regressors and only a limited degree of dynamics or heterogeneity in some of their specifications. Masson *et al.* (1998) also examine the determinants of the private saving rate in a sample of 21 OECD countries over 1971-93. Edwards (1995) examines the determinants of the private saving rate in a sample of developed and industrial countries over the period 1970-92. In both papers, the modelling strategy relies on pooled OLS or static-fixed effect regressors. In contrast, Loayza *et al.* (2000) and Haque *et al.* (1999) focus on dynamic panel estimators. Loayza *et al.* (2000) use different generalised-method-of-moments (GMM) estimators. They consider a dynamic specification that allows them to discriminate between short- and long-run effects. They also take into account the possible presence of unobserved country-specific effects correlated with the regressors and for the possible joint endogeneity of explanatory variables.

However, even if they take dynamics into account, Loayza *et al.* assume that the slope coefficients as well as the short-run coefficients are homogenous.¹⁰ This may cause some problems of robustness when heterogeneity is neglected. In

Table 1. Selected empirical panel studies on saving rates in OECD countries

Authors	Sample	Method	Interest
Edwards (1995)	36 countries (including 12 OECD countries) (1970-1992)	Instrumental variables techniques	What are the determinants of private and public savings?
Callen and Thimann (1997)	21 OECD countries (1975-1995)	Cross-sections and Static Fixed Effects	Have public policies an impact on the household saving decisions?
Masson, Bayoumi and Samiei (1998)	21 OECD countries (1971-1993)	Cross-sections and Static Fixed Effects	What are the determinants of private savings to GDP?
Haque, Pesaran and Sharma (1999)	21 OECD countries (1971-1993)	Pooled Mean Group, Mean Group and Static Effects	How can neglected heterogeneity and neglected dynamics affect inference about the key determinants of savings behaviour?
Loayza, Schmidt-Hebbel and Serven (2000)	20 OECD countries (1966-1995)	GMM, Systems Estimators	What are the determinants of national and private savings?

addition, as pointed out by Haque *et al.* (1999), the use of lagged values or lagged first differences of the regressors as instruments might be problematic in the case of the saving process when one needs to include dynamics.¹¹ In effect, any lagged value of the regressors might be a factor explaining the short-run dynamics of the private saving rate.

Following the work of Haque *et al.* (1999), the empirical model used in this paper is specified in a panel error correction form and estimated with a technique developed by Pesaran, Shin and Smith (1999). The main advantage of this approach over more traditional alternatives based on time averaging is to give more freedom with respect to the choice of dynamics and the degree of heterogeneity across countries. More specifically, one feature of the approach is the possibility to treat the long-run determinants of private saving rates distinctly from the short-run adjustment, even though both long and short-run effects are jointly estimated from a general auto-regressive distributed-lag (henceforth ARDL) model.¹² In the estimation results reported below, one lag was chosen for the gross private saving rate, the real interest rate and the inflation rate and no lag for the other variables.¹³

General specification

Given the following unrestricted specification:

$$gps_{i,t} = \mu_i + \lambda_i gps_{i,t-1} + \delta_{1i}^t X_{i,t}^{(1)} + \delta_{2i}^t X_{i,t-1}^{(2)} + \varepsilon_{it} \quad (1)$$

where $X_{i,t}^{(1)}$ includes all explanatory variables and $X_{i,t-1}^{(2)}$ includes those (real interest rate and inflation rate) that enter the equation also with a lag. Equation (1) can be re-written in an error-correction form (ECM) as follows:

$$\Delta gps_{i,t} = \mu_i + \phi_i (gps_{i,t-1} - \theta_{1i} gprod_{i,t} - \theta_{2i} odr_{i,t} - \theta_{3i} gpub_{i,t} - \theta_{4i} rir_{i,t} - \theta_{5i} inf_{i,t} - \theta_{6i} pctl_{i,t}) + \delta_{4i} \Delta rir_{i,t} + \delta_{5i} \Delta inf_{i,t} + \varepsilon_{i,t} \quad (2)$$

where $gprod_{i,t}$, $odr_{i,t}$, $gpub_{i,t}$, $rir_{i,t}$, $inf_{i,t}$ and $pctl_{i,t}$ are the labour productivity growth rate, the old-age dependency ratio, the gross public saving rate, the real interest rate, the inflation rate and the change in the terms of trade, respectively.

$\theta_{j,i} = \frac{\delta_{j1,i}}{1 - \lambda_i}$ for $j = 1, 2, 3$ and 6 are the long run coefficients of the labour productivity growth rate, the old-age dependency ratio, the gross public saving rate and the change in terms of trade;

$\theta_{j,i} = \frac{\delta_{j1,i} + \delta_{j2,i}}{1 - \lambda_i}$ for $j = 4, 5$ are the long-run coefficients of the real interest rate and the inflation rate; $\phi_i = -(1 - \lambda_i)$ is the adjustment coefficient, and Δ is the first-order difference operator.

As in the case of error-correction specifications having only a time-series dimension, a number of conditions have to be met in order to obtain valid parameter estimates. The main requirements are that a long-run relationship among the variables of interest exist, that the regressors are strictly exogenous and that the residuals are not serially correlated.¹⁴ Strict exogeneity is required to ensure that the long-run relationship is unique.¹⁵ However, in contrast to error-correction models having only a time-series dimension, standard estimation and inference methods can be used regardless of whether the regressors are stationary or integrated of order one, as long as the model is stable, which implies that the adjustment parameter turns out negative (Pesaran *et al.*, 1999).

The goal consists of estimating both the long and short-run coefficients when the empirical sample is characterised by times-series (T) and cross-sections (N) dimensions that are both relatively large and comparable in size. Under these conditions, a variety of alternative methods can be applied allowing for different degrees of parameter heterogeneity across countries. More specifically, three approaches can be distinguished according to the restrictions imposed.

Polar cases: mean group and pooled estimators

At one extreme, the fully-heterogeneous coefficient model imposes no cross-country restrictions and can be estimated on a country-by-country basis, provided the time dimension is sufficiently large. In this case, the mean group estimator (henceforth MG) consists in estimating the N separate regressions based on equation (2) and then in calculating the coefficients as unweighted means of the estimated coefficients for the individual countries. At the other extreme, the fully-homogenous coefficient model assumes that all slope and intercept coefficients have to be the same across countries. This is the pooled estimator.

Between the extremes: dynamic fixed effect, static fixed effect and pooled mean group estimators

Between these two extremes, lie a number of estimators, which vary according to the number of homogeneity restrictions imposed. The dynamic fixed effect estimator (henceforth DFE) imposes the equality of all slope coefficients and errors variances, allowing only the intercepts to differ across countries. The specification is as follows:

$$\Delta gpr_{i,t} = \mu_i + \phi(gpr_{i,t-1} - \theta_1 gprod_{i,t} - \theta_2 odr_{i,t} - \theta_3 gpub_{i,t} - \theta_4 rir_{i,t} - \theta_5 inf_{i,t} - \theta_6 pctt_{i,t}) + \delta_{41} \Delta rir_{i,t} + \delta_{51} \Delta inf_{i,t} + \varepsilon_{i,t} \quad (3)$$

A special case of the dynamic fixed effect estimator is the static fixed effect (SFE) estimator, which as its name indicates, abstracts from all dynamic terms:

$$gpr_{i,t} = \mu + \theta_1 gprod_{i,t} + \theta_2 odr_{i,t} + \theta_3 gpub_{i,t} + \theta_4 rir_{i,t} + \theta_5 inf_{i,t} + \theta_6 pctt_{i,t} + \varepsilon_{i,t} \quad (4)$$

Compared with the DFE estimator, the pooled mean group estimator (henceforth PMG) imposes the same long-run restrictions but allows the short-run coefficients to vary across countries. The rationale is that slope homogeneity has better chances to be valid in the long run than in the short run given that cross-country differences in adjustment costs and institutional characteristics are likely to have a larger influence on the short-term dynamics. Hence, the PMG estimator can be interpreted as an intermediate procedure between the DFE and the MG estimators since it involves a mixture of pooling and averaging. The specification is as follows:

$$\Delta gpr_{i,t} = \mu_i + \phi(gpr_{i,t-1} - \theta_1 gprod_{i,t} - \theta_2 odr_{i,t} - \theta_3 gpub_{i,t} - \theta_4 rir_{i,t} - \theta_5 inf_{i,t} - \theta_6 pctt_{i,t}) + \delta_{41} \Delta rir_{i,t} + \delta_{51} \Delta inf_{i,t} + \varepsilon_{i,t} \quad (5)$$

The choice among these estimators is a trade-off between consistency and efficiency. In effect, estimators that impose restrictions dominate the heterogeneous models in terms of efficiency, if the restrictions are valid. For instance, if long-run coefficients are indeed similar across countries, then the PMG estimates will be consistent and efficient, whereas the MG estimates will be consistent but not efficient. In contrast, if long-run restrictions are wrongly imposed, then PMG

estimates will be inconsistent, whereas MG estimates will provide consistent estimates of the mean of the long-run coefficients across countries. In addition, imposing non-valid parameter homogeneity in dynamic models typically leads to downward-biased estimates of the speed of adjustment (Robertson and Symons, 1992; Pesaran and Smith, 1995). However, the PMG approach is sufficiently flexible to allow for a subset of long-run homogeneity restrictions to be imposed. Furthermore, compared with the MG estimator, the PMG estimator is much less sensitive to the inclusion of outliers due to the weighted-averaging scheme. For these reasons it represents a good compromise in the search for consistency and efficiency among the class of estimators considered.

Final specification

In order to help select the appropriate set of restrictions, tests of homogeneity of long-run coefficients have been carried out using the Hausman's statistic.¹⁶ Based on the results, equality restrictions were imposed on the old-age dependency ratio, the public gross saving rate and the change of the terms of trade, but not on the other three determinants. The model estimated with the PMG estimator is thus specified as follows:

$$\Delta gpr_{i,t} = \mu_i + \phi_1(gpr_{i,t-1} - \theta_1 gpr_{i,t}) - \theta_2 \Delta odr_{i,t} - \theta_3 \Delta gpub_{i,t} - \theta_4 \Delta rir_{i,t} - \theta_5 \Delta inf_{i,t} - \theta_6 \Delta pctt_{i,t} + \delta_{4i} \Delta rir_{i,t} + \delta_{5i} \Delta inf_{i,t} + \varepsilon_{i,t} \quad (6)$$

The estimation procedure can be briefly described as follows. Assuming the normality of the disturbance terms, the likelihood of the panel data model can be written as the product of the likelihood for each group. A concentrated maximum likelihood procedure jointly estimates the long-run and adjustment coefficients across countries since these are the parameters of interest. Using the estimated long-run coefficients, the estimations of short-run coefficients as well as the country-specific error variances are then performed on a country-by-country basis through a maximum likelihood procedure.

EMPIRICAL RESULTS

Main findings

Long-run parameter estimates from pooled regressions are presented in Table 2 which shows the results for saving rates based on both the SNA and BOP measures. While the analysis focuses on the PMG results, those obtained from the SFE, DFE and MG estimators are also presented for comparison purposes. The main findings are the following:

- The PMG estimates show that five of the six determinants of gross private saving rate (SNA measure) come out with the expected sign and are

Table 2. Results from dynamic panel regressions of private saving rates (1970-2000)¹

Mean group and pooled MG estimates

	Gross private savings (SNA measure)				Gross private savings (BOP measure)			
	Static fixed effects ²	Dynamic fixed effects ²	PMG estimates ²	MG estimates ²	Static fixed effects ²	Dynamic fixed effects ²	PMG estimates ²	MG estimates ²
Average error correction term		-0.334* (0.047)	-0.489** (0.044)	-0.559** (0.048)		-0.388** (0.042)	-0.480** (0.040)	-0.550** (0.041)
Restricted long-run coefficients (common)								
Percentage change in terms of trade	0.063** (0.014)	0.136** (0.029)	0.132** (0.017)	0.184** (0.046)	0.057** (0.011)	0.098** (0.028)	0.132** (0.019)	0.107** (0.026)
Old-age dependency ratio	-0.220** (0.101)	-0.346 (0.147)*	-0.638** (0.086)	-0.692** (0.146)	-0.192* (0.093)	-0.260* (0.132)	-0.585** (0.085)	-0.618** (0.182)
Gross public saving rate	-0.523** (0.065)	-0.914** (0.102)	-0.691** (0.041)	-0.698** (0.186)	-0.529** (0.062)	-0.823** (0.089)	-0.718** (0.085)	-0.629** (0.130)
Unrestricted long-run coefficients (average)								
Per capita productivity growth rate	0.075 (0.069)	0.364** (0.129)	0.401** (0.111)	0.417** (0.132)	0.142** (0.058)	0.343** (0.098)	0.416** (0.110)	0.367** (0.107)
Real interest rate	-0.201** (0.053)	-0.321** (0.082)	-0.280* (0.144)	-0.249 (0.269)	-0.156** (0.056)	-0.273** (0.071)	-0.224 (0.156)	-0.077 (0.191)
Inflation rate	-0.059 (0.061)	-0.112 (0.079)	-0.192 (0.145)	-0.212 (0.222)	0.057 (0.037)	0.022 (0.066)	-0.082 (0.130)	-0.058 (0.150)
Memorandum Items								
Hausman test								
h_test			1.47				2.16	
p-value			[0.69]				[0.54]	

1. The dependent variable is the gross private saving/GDP ratio (SNA and BOP basis). Regressions are estimated using 1970-99 data for 15 OECD countries, which are listed in the second part of this table. ** and * indicate significance at the 1 and 5 per cent level, respectively.

2. Heteroskedasticity-corrected standard errors are in parentheses.

3. PMG and MG estimates are based on an ARDL (1, 0, 0, 0, 1, 1, 0) specification, i.e. one lag was chosen for the gross private saving rate, the real interest rate and the inflation rate and no lag for other variables.

Source: OECD Secretariat estimates.

Table 2. **Results from dynamic panel regressions of private saving rates (1970-2000)¹ (cont.)**

For gross national saving rate (SNA basis): individual country results

	Average error correction term	Percentage changes terms of trade	Old-age dependency ratio	Gross public saving rate	Per capita productivity growth rate	Real interest rate	Inflation rate	$\overline{R^2}$
United States	-0.717** (0.145)	0.193** (0.065)	-1.260** (0.261)	-0.512** (0.102)	-0.087 (0.181)	0.114 (0.097)	0.301** (0.112)	0.71
Japan	-0.482** (0.121)	0.037 (0.034)	0.473* (0.247)	0.001 (0.150)	0.782** (0.301)	0.056 (0.3741)	0.398 (0.448)	0.74
Germany	-0.357* (0.197)	0.252 (0.191)	-0.975 (0.475)	-0.806 (0.451)	0.089 (0.158)	0.074 (0.903)	0.184 (0.401)	0.38
France	-0.788** (0.208)	0.180** (0.072)	0.076 (0.207)	-0.374** (0.159)	0.570* (0.295)	-0.638** (0.169)	-0.158 (0.099)	0.43
Italy	-0.611** (0.154)	0.061 (0.094)	-0.423** (0.181)	-0.900** (0.255)	0.405 (0.259)	-0.404** (0.168)	-0.060 (0.156)	0.58
United Kingdom	-0.495** (0.127)	0.239 (0.142)	-1.582 (1.160)	-1.028** (0.230)	0.722* (0.369)	0.402 (0.243)	0.287 (0.165)	0.69
Canada	-0.364** (0.104)	0.394** (0.159)	-0.522 (0.386)	-0.613** (0.215)	1.039 (0.657)	-0.023 (0.347)	0.689** (0.286)	0.57
Australia	-0.787** (0.139)	0.086** (0.030)	-0.990** (0.243)	-0.523** (0.151)	0.223 (0.211)	-0.196 (0.119)	-0.144 (0.122)	0.62
Belgium	-0.350** (0.125)	-0.092 (0.285)	-0.495 (0.847)	-2.044** (0.851)	0.880 (0.700)	-3.223* (1.403)	-2.674** (1.034)	0.42
Finland	-0.633** (0.175)	0.010 (0.096)	-0.154 (0.352)	-0.352 (0.164)	0.256 (0.318)	-0.286 (0.240)	-0.395 (0.347)	0.60
Ireland	-0.395* (0.198)	0.341 (0.607)	-0.863 (2.041)	0.947 (1.079)	-0.622 (0.509)	1.518 (1.908)	0.181 (0.298)	0.32
Netherlands	-0.288** (0.098)	0.630 (0.539)	-0.518 (1.699)	-2.017** (0.810)	1.433* (0.651)	-1.442 (1.115)	-1.403* (0.660)	0.48
Norway	-0.553** (0.138)	0.096* (0.042)	-1.510 (1.090)	-0.697** (0.225)	0.349 (0.275)	0.527 (0.519)	0.456 (0.264)	0.54
Spain	-0.707** (0.177)	0.117* (0.058)	-1.001** (0.316)	-0.907** (0.284)	-0.048 (0.248)	-0.410** (0.128)	-0.754** (0.211)	0.53
Sweden	-0.857** (0.122)	0.209** (0.083)	-0.635* (0.309)	-0.649** (0.072)	0.265 (0.269)	0.198 (0.234)	-0.086 (0.141)	0.75

1. The dependent variable is the gross private savings/GDP ratio (SNA and BOP basis). Regressions are estimated using 1970–99 data for 15 OECD countries, which are listed in the second part of this table. ** and * indicate significance at the 1 and 5 per cent level, respectively. Individual estimates are based on an ARDL (1, 0, 0, 0, 1, 1, 0) specification, i.e. one lag was chosen for the gross private saving rate, the real interest rate and the inflation rate and no lag for other variables.

Source: OECD Secretariat estimates.

Table 3. Contributions to the changes in private saving rates between 1995 and 2000

	Percentage points							
	United States	Japan	Germany	France	Italy	United Kingdom	Canada	
Change in: Gross private saving rate	-3.9	0.6	-4.8	-0.5	-8.3	-7.2	-3.8	
Contributions from:								
Old-age dependency rates	0.3	-2.8	-1.1	-0.9	-1.4	0.0	-0.5	
Gross public saving rate	-3.8	2.2	-3.0	-1.6	-5.2	-4.8	-5.8	
Percentage change of terms of trade	-0.4	-0.6	-1.0	0.3	-0.7	0.4	0.4	
Productivity growth rate	0.6	0.1	0.0	0.5	-1.1	-0.4	1.2	
Real interest rate	0.0	0.6	-0.4	1.0	1.1	-0.3	0.6	
Inflation rate	0.3	0.6	0.0	0.4	0.0	-0.1	0.3	
Total¹	-3.0	0.1	-5.4	-0.3	-7.3	-4.4	-3.9	
	Australia	Belgium	Finland	Ireland	Netherlands	Norway	Spain	Sweden
Change in: Gross private saving rate	-1.1	-3.8	-4.1	-0.7	-7.5	-3.8	-0.1	-10.6
Contributions from:								
Old-age dependency rates	-0.3	-1.3	-0.7	0.0	-0.4	0.8	-1.1	0.3
Gross public saving rate	-2.5	-2.9	-7.2	-1.1	-4.5	-8.4	-1.9	-7.8
Percentage change of terms of trade	0.3	-0.1	-1.7	-0.2	-0.1	3.5	0.5	-0.8
Productivity growth rate	0.1	0.2	0.7	1.3	2.0	0.2	-0.3	-0.3
Real interest rate	1.1	2.8	1.1	-1.3	-1.1	-0.3	0.7	-0.5
Inflation rate	0.0	-1.4	-1.0	0.2	-0.4	0.2	1.5	0.1
Total¹	-1.2	-2.7	-8.8	-1.2	-4.6	-4.1	-0.6	-9.1

1. May not exactly add up due to rounding.

Source: OECD Secretariat estimates.

significant at the 5 per cent level. Of these, four are significant at the 1 per cent level. The private saving rate is negatively related to the public saving rate, the old age dependency ratio and the real interest rate, and positively linked to a change in the terms-of-trade and productivity growth. The inflation rate is not found to have a significant independent effect on private savings. Similar results are obtained with the private saving rates based on BOP data, except that the real interest rate is only significant at the 10 per cent level.

- The results from the Hausman's test confirm that the assumption of homogeneity of long-run coefficients could not be rejected in the case of the terms of trade, old-age dependency ratio and gross public saving rate.
- The average estimated coefficient associated on the error-correction term is negative and significant, confirming the existence a long-run equilibrium relationship between the saving rate and the set of significant determinants. And, even though the size of the parameter indicates a fairly strong error-correction mechanism, the degree of persistence in private saving rates is sufficiently important to induce a bias in long-run parameter estimates if it is ignored.
- In all cases except the real interest rate, the short-run impact on private saving goes in the same direction as the long-run effect and is of smaller magnitude.¹⁷
- The relatively high precision of the grouped parameter estimates reflects in large part the efficiency gains of pooling observations across countries. Indeed, the results from the individual country regressions in Table 2 show that most of the explanatory variables are significant in only about one-third of the cases – the exception being public saving. Such a result is far from being unusual in pooled samples using a common set of determinants.¹⁸
- A simple calculation of contributions based on long-run parameter estimates show that in many countries, the net decline in private saving between 1995 and 2000 has been mainly driven by the rise in public saving, resulting from the significant fiscal consolidation efforts pursued during that period (Table 6). In some countries (Japan, Germany, Italy, Spain and Belgium), the old-age dependency ratio also had a non-negligible contribution to changes in private saving rates.

How these results compare with previous studies using panel data

The results indicate that while private-sector saving rates do respond to changes in those of the public-sector, the degree of offset is considerably less than unity (around 0.7), suggesting a significant departure from pure Ricardian equivalence.¹⁹ This finding is consistent with recent empirical studies that have

also generally found fairly strong evidence of partial offsetting private saving behaviour (larger than 0.5), although the degree of offset has varied across studies (Table 4). One exception is Loayza *et al.* (2000) who found a very small – albeit statistically significant – degree private saving offset.

The relatively strong effect of the old-age dependency ratio can not be directly compared with previous studies given that in most cases demographic changes are measured by the total dependency ratio, which usually comes out with a much smaller coefficient. One explanation is that even though the life-cycle model predicts that an increase in either the youth or the elderly dependency ratio will reduce aggregate saving, the effect appears to be empirically much weaker and hence harder to detect in the case of the young-age ratio. In fact, an analysis of the sensitivity of the results to the introduction of additional determinants reported below show that the negative coefficient on the old-age dependency ratio is not robust to the simultaneous introduction of the youth ratio (although it is not sensitive to the inclusion of other determinants).

In contrast to the findings of most studies reported in Table 4, the real interest rate has a significant negative impact on the private saving rate, suggesting that the income effects outweigh the sum of substitution and human-wealth effects. While such a long-run negative effect can be justified theoretically, the absence of a significant positive effect even in the short run is perhaps more difficult to rationalise. In any event, the real interest rate is the only variable that clearly lacks robustness among the determinants, which may reflect both a problem of identification – potentially more severe in the context of a reduced-form application – and the difficulties in constructing an *ex-ante* measure of the real rate. The identification problem could arise, for instance, if the process of financial liberalisation in OECD countries has resulted in an outward shift of the saving function that has not been matched by a similar shift in investment.²⁰ In addition, in the case of many countries, savings may have become more responsive to foreign rather than domestic interest rates given the closer linkages of international capital markets.

Both the percentage change in the terms of trade and the growth rate of labour productivity have a positive and significant effect on the private saving rate, largely in line with the findings of previous studies. In the former case, this provides support to the Harberger-Laursen-Metzler effect even in the long run, although the magnitude remains relatively small. In the case of productivity growth, the result suggests that the cohort effect dominates the consumption smoothing effect and thus a 1 percentage point increase in productivity growth would generate a 0.4 percentage point rise in the saving rate.

Table 4. Results from other studies on private savings using panel data

Variables	Masson, Bayoumi and Samiei (1998) ¹	Edwards (1995)	Callen and Thimann (1997)	Haque, Pesaran and Sharma (1999) ²	Loayza, Semidt-Hebell and Serven (2000) ³
	Fixed effect	Instrumental variables	Fixed effects	PMG	Systems estimator
Income					0.29**
Growth rate of GDP per capita		0.31* (1.8)			(2.0)
GDP growth	0.01 (0.3)		0.15*** (2.9)	0.03 (0.5)	
Percentage change in Terms of trade	0.04*** (4.7)			0.08** (2.4)	0.07*** (3.6)
Rates of return and uncertainty					
Real interest rate	0.11*** (2.7)	-0.05 (-0.5)	0.85* (1.7)	0.14* (1.7)	0.02 (0.3)
Inflation rate	0.08** (2.2)	-0.01 (-0.3)	-0.38 (-0.8)	0.10 (1.1)	0.16*** (3.0)
Fiscal policies					
Gross public saving		-0.54*** (-7.5)	-0.32*** (-4.7)		
Government net lending	-0.77*** (16.0)			-0.87*** (19.8)	-0.11*** (2.8)
Demographics					
Old-age dependency ratio			-0.22** (-2.4)		
Dependency ratio	-0.18*** (3.6)	-0.09*** (-2.6)		0.05 (0.39)	-0.22 (1.4)

Note: t-value in parentheses. ***, ** and * indicate significant at 1, 5 and 10 per cent level, respectively.

1. Masson *et al.* (1998) also use some additional variables: government current expenditures to GDP (-)*, wealth to GDP (+)*, per capita GDP relative to US (0) and per capita GDP squared (-)*.
2. Haque *et al.* (1999) use the same variables in Masson *et al.* (1998) and finds respectively statistically significant negative effect of the government current expenditures to GDP in each method, a significant positive effect of the wealth variable in the case of the fixed effects and dynamics fixed effects estimators, and no significant effect of both the per capita GDP relative to the United States and the per capita GDP squared.
3. Loayza *et al.* (2000) also use the following variables: real per capita GDPI (0), M2/GDP (0), urbanisation ratio (0150)* and private credit flows to GDPI (-)*.

Tests of robustness of the specification and out-of-sample simulation

*Tests of residual properties, functional form and parameter stability*²¹

As outlined in the third section, the consistency and efficiency of the PMG estimates depends on several conditions regarding the specification. In order to assess the robustness of the empirical model, the usual battery of statistical tests was applied to the individual country equations, including the Godfrey's test of residual serial correlation, the Ramsey's RESET test of functional form, the Jarque-Bera's test of normality of regressions residuals and the Breusch-Pagan Lagrange-multiplier test for homoskedasticity. The results indicate that except for some evidence of serial correlation in the United Kingdom and misspecification of the functional form in Finland and in Sweden, the equation residuals appear to have all the basic desirable properties.

Likewise, in order to assess the stability of the specification over time, the system of panel equations was re-estimated over the period 1970-1990 and parameters re-estimated after extending the sample by one year at a time. The results suggest that long-run parameter estimates are fairly stable over time except for the old-age dependency ratio, which jumps after 1992 and remains stable thereafter. In general, the coefficients become particularly stable for periods ending after 1995.

Out-of-sample tracking performance

Another way of assessing the stability of the relationship consists in re-estimating the equations over a sample ending in 1995 and to perform an out-of-sample dynamic simulation so as to evaluate the ability of the model to track the development in private saving in individual country since 1995. The choice of 1995 is motivated by the desire to have a sufficiently large number of post-sample years and also by the fact that it precedes the period of large stock-market led increase in financial wealth. The point is that in the event that wealth has had a significant effect over and above what is captured by the set of determinants included in the specification, the equation is likely to over-predict private saving rates in the post-1995 period marked by the sharp increase in financial wealth.

The specification used to perform the out-of-sample simulation is as follows:²²

$$\hat{y}_{i,1995+h} = \hat{\lambda} \hat{y}_{i,1995+h-1} + \hat{\mu}_i + \hat{\delta}'_1 X^{(1)}_{i,1995+h} + \hat{\delta}'_2 X^{(2)}_{i,1995+h} \quad \forall h = 1, \dots, 5$$

where $\hat{y}_{i,1995} = y_{i,1995}$

First, the results from re-estimating the equations reported in Table 5 show that the parameter estimates are not very sensitive to the re-estimation over a

Table 5. Results from dynamic panel regressions of private saving rates (1970-1995)¹

Mean group and pooled MG estimates

	Gross private savings (SNA measure)				Gross private savings (BOP measure)			
	Static fixed effects ²	Dynamic fixed effects ²	PMG estimates ³	MG estimates ³	Static fixed effects ²	Dynamic fixed effects ²	PMG estimates ³	MG estimates ³
Average error correction term		-0.317** (0.046)	-0.480** (0.043)	-0.598** (0.069)		-0.392** (0.034)	-0.485** (0.041)	-0.606** (0.066)
Restricted long-run coefficients (common)								
Percentage changes in terms of trade	0.068** (0.017)	0.148** (0.031)	0.135** (0.020)	0.125** (0.056)	0.0597** (0.013)	0.095** (0.028)	0.129** (0.022)	0.066 (0.047)
Old-age dependency ratio	-0.216 (0.130)	-0.324 (0.202)	-0.555** (0.108)	-0.378 (0.198)	-0.171 (0.101)	-0.217 (0.151)	-0.428** (0.104)	-0.287 (0.181)
Gross public saving rate	-0.460** (0.074)	-0.855** (0.113)	-0.645** (0.050)	-0.661** (0.128)	-0.454** (0.067)	-0.722** (0.076)	-0.621** (0.045)	-0.562** (0.085)
Unrestricted long-run coefficients (average)								
Per capita productivity growth rate	0.086 (0.076)	0.381** (0.137)	0.401** (0.146)	0.442** (0.160)	0.166 (0.065)	0.348** (0.102)	0.492** (0.149)	0.381** (0.133)
Real interest rate	-0.163** (0.072)	-0.331** (0.122)	-0.429** (0.212)	-0.392 (0.214)	-0.126* (0.060)	-0.270** (0.092)	-0.325** (0.124)	-0.201 (0.131)
Inflation rate	-0.045 (0.085)	-0.185 (0.128)	-0.175 (0.171)	-0.192 (0.220)	0.056 (0.052)	-0.042 (0.097)	-0.111 (0.148)	-0.050 (0.162)
Memorandum Items								
Hausman test								
h-test			1.17				2.50	
p-value			[0.76]				[0.47]	

1. The dependent variable is the gross private savings/GDP ratio (SNA and BOP basis). Regressions are estimated using 1970–99 data for 15 OECD countries (** and *) indicates significance at the 1 and 5 per cent level.

2. Heteroskedasticity-corrected standard errors are in parentheses.

3. PMG and MG estimates are based on an ARDL (1, 0, 0, 0, 1, 1, 0) specification, *i.e.* one lag was chosen for the gross private saving rate, the real interest rate and the inflation rate and no lag for other variables.

Source: OECD Secretariat estimates.

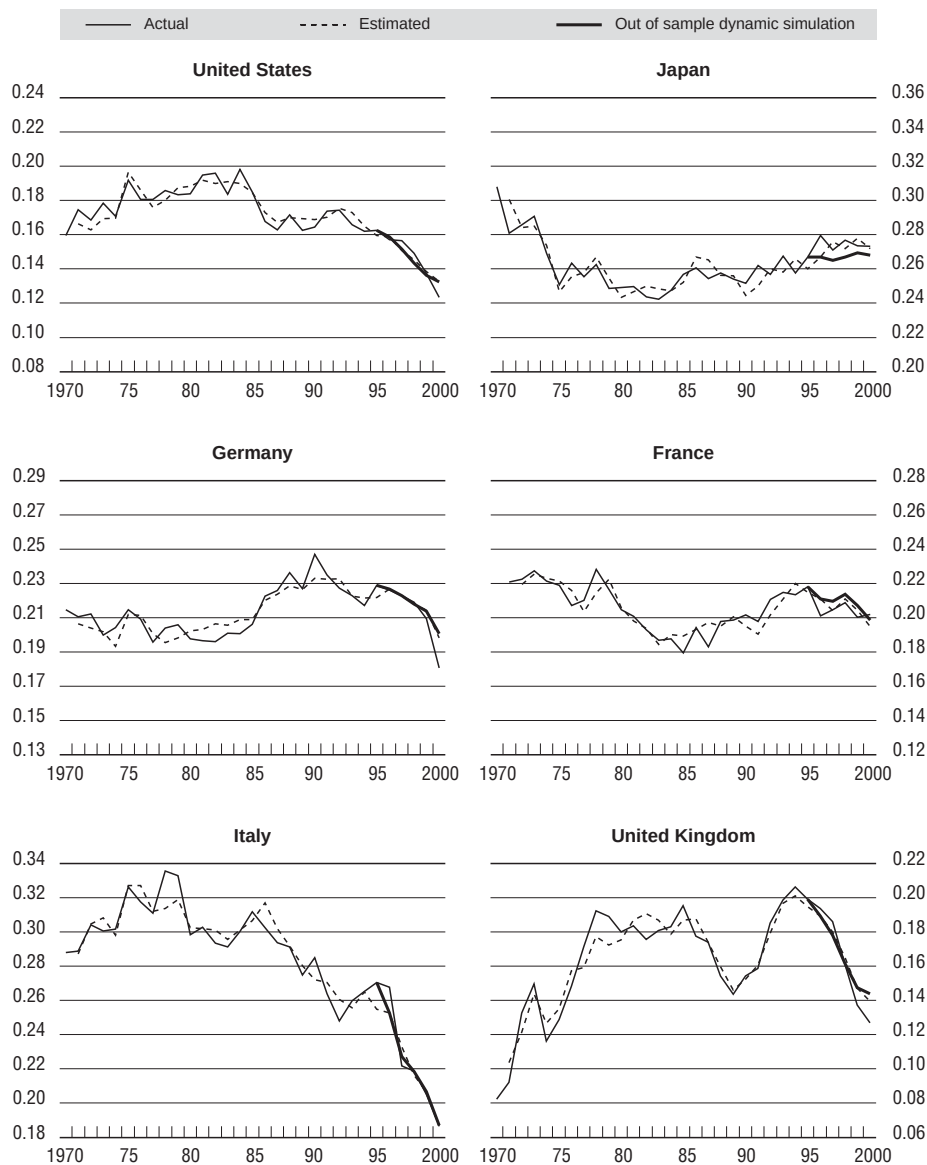
shorter sample period, with the exception of the coefficient on the real interest rate which drops substantially and becomes less significant. Second, the results from out-of-sample dynamic simulations show that the declines in private saving rates during the second half of the 1990s are well captured by the equations in the United States, Italy, Canada, Australia, Sweden and, to a lesser extent, the United Kingdom, Germany and the Netherlands (Figure 4).²³ In the cases of Finland and Norway, the equations even predict a larger decline in private saving than the one actually observed. In contrast, the equations tend to over-predict the movement in saving after 1995 in France and Belgium. Finally, in the case of Japan, where the equation performs less well, the rise in private saving from around the mid-1990s cannot be completely accounted for by the set of determinants. Taken at face value, the implication from these simulations results is that private saving patterns in a number of countries, including in many where a substantial decline has been observed since 1995, appear to be reasonably well explained by a small set of determinants that does not include financial wealth.

Sensitivity to the inclusion of other potential determinants of private saving

The robustness of the basic results is also assessed by looking at the sensitivity of parameter estimates and equation properties to the introduction of alternative measures of the existing determinants or other potential determinants that have been used in previous studies. The changes in measures considered include using net rather than gross public saving²⁴ (with and without public investment added separately), using the growth rate of GDP per capita instead of labour productivity growth and adding the young-age dependency ratio to the old-age ratio so as to have a broader measure of demographics. As for the alternative determinants three proxies for possible wealth effects are considered: net public transfers, real housing prices and real equity prices, entered separately. Net public transfers are introduced to capture the effect of social security or pension wealth on private saving decision. To the extent that public pensions are perceived as a substitute for private saving a negative relationship between the two variables is expected.²⁵ Likewise, previous studies have found a significant effect of housing wealth on household saving, even though it is not clear to what extent capital gains on residential properties should be considered as net wealth *on aggregate*.²⁶ Finally, equity prices deflated by the consumption deflator are introduced to capture potential re-valuation effects on financial wealth.²⁷ All these changes are made sequentially and the results are reported in Table 6.

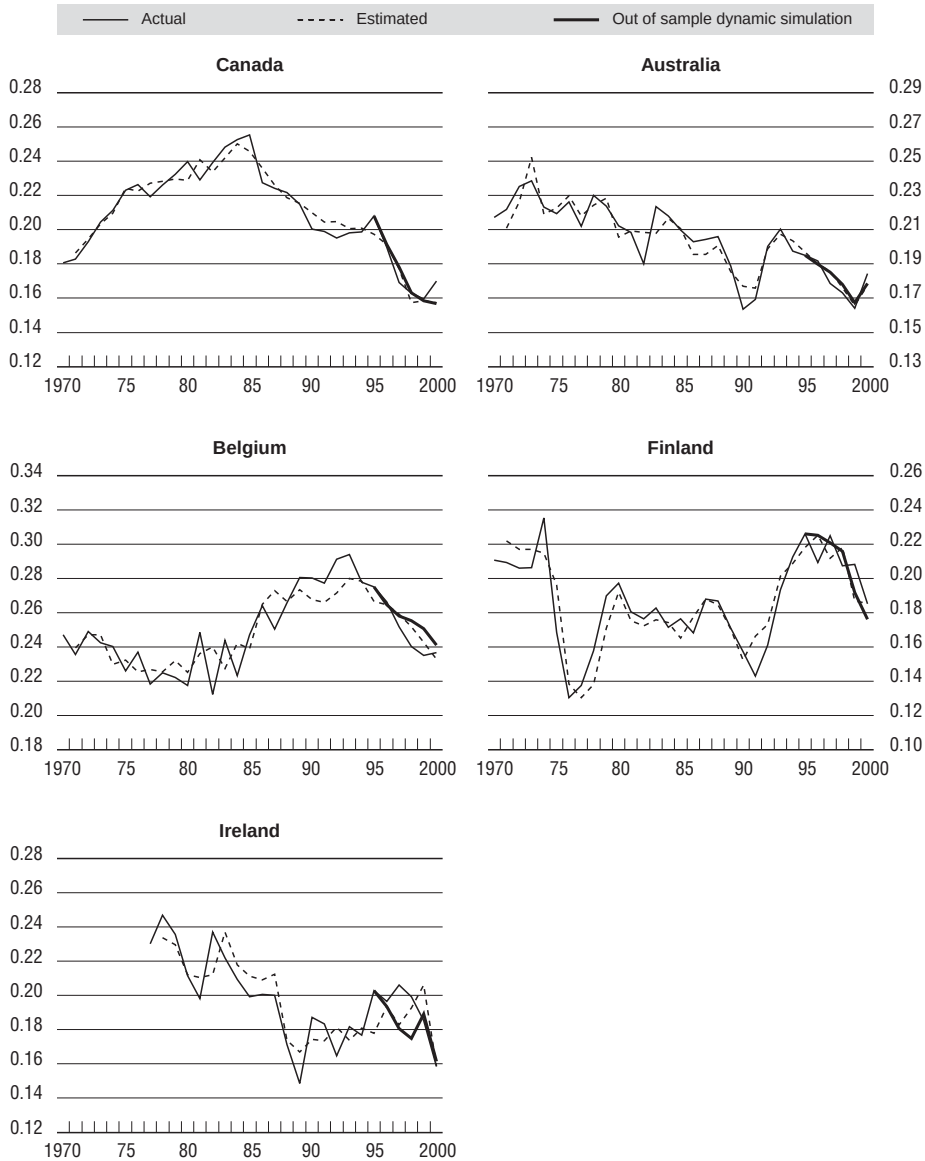
As mentioned earlier, the influence of the old-age dependency ratio is not very robust to the addition of the young-age ratio, which comes in significant but with the wrong sign (Column 1). On the other hand, overall parameter estimates are not very sensitive to the use of the net instead of gross government budget position (Columns 2 and 3). In particular, the estimated degree of offset (or Ricardian

Figure 4. **Gross private saving rates: actual and simulated**
Based on individual PMG estimates over the period 1970-95



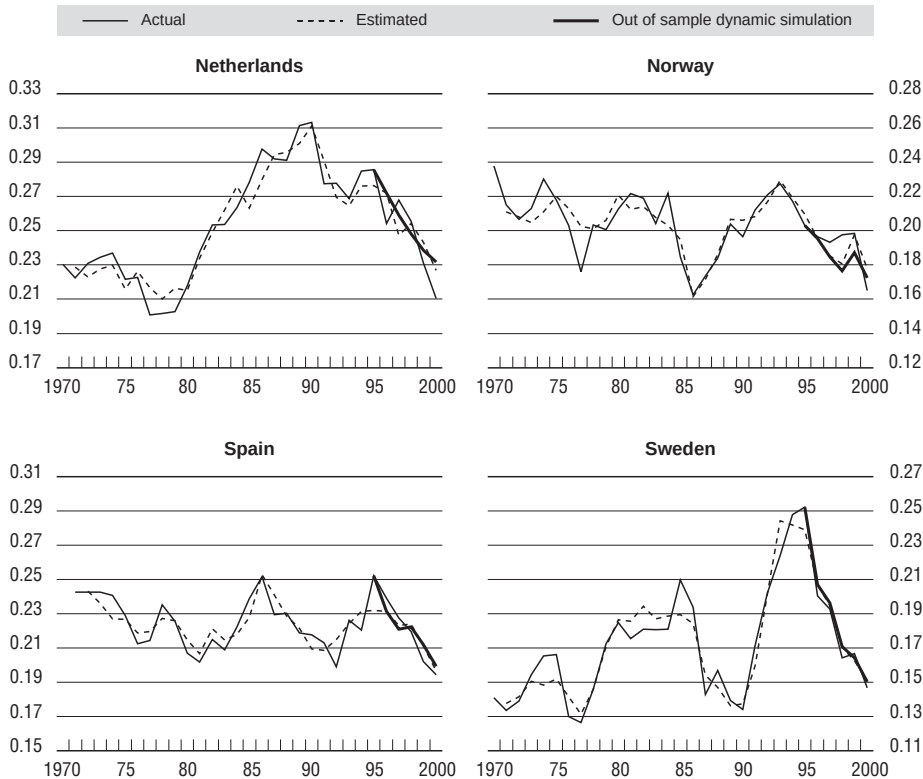
Source: OECD estimates.

Figure 4. **Gross private saving rates: actual and simulated (cont.)**
Based on individual PMG estimates over the period 1970-95



Source: OECD estimates.

Figure 4. **Gross private saving rates: actual and simulated (cont.)**
Based on individual PMG estimates over the period 1970-95



Source: OECD estimates.

effect) is very similar in either case. Somewhat surprisingly, the results suggest that a rise in public investment has a significant net negative effect on private saving. Similar results are obtained also when income growth is measured by growth in GDP per capita instead of labour productivity (Column 4). In fact, both the real interest rate and inflation rates come in more significant than in the basic regressions. Moreover, the coefficients on the latter two variables are almost identical suggesting that the nominal, rather than the real, interest rate is the relevant determinant of private saving.

As regards the three variables used to capture possible wealth effects, only one of them, net transfers, is found to be significant with the predicted negative

Table 6. Sensitivity to other potential determinants

	Pooled Mean Group estimates							Memo: basic specification
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	
Average error correction term	-0.485*** (0.057)	-0.463*** (0.042)	-0.491*** (0.046)	-0.540*** (0.051)	-0.565*** (0.037)	-0.556*** (0.048)	-0.499*** (0.048)	-0.489*** (0.044)
Restricted long-run coefficients (common)								
Percentage change terms of trade	0.131*** (0.016)	0.143*** (0.018)	0.128*** (0.017)	0.123*** (0.015)	0.075*** (0.013)	0.119** (0.015)	0.143*** (0.021)	0.132*** (0.017)
Old-age dependency ratio	0.017 (0.109)	-0.503*** (0.044)	-0.673*** (0.091)	-0.552*** (0.071)	-0.255*** (0.074)	-0.399*** (0.093)	-0.446*** (0.123)	-0.638*** (0.086)
Young-age dependency ratio	0.186*** (0.033)							
Gross public savings rate	-0.699*** (0.039)			-0.680*** (0.036)	-0.686*** (0.048)	-0.727*** (0.046)	-0.813*** (0.061)	-0.691*** (0.041)
Net government position		-0.673*** (0.018)	-0.683*** (0.043)					
Public investment ratio			-0.932*** (0.204)					
Unrestricted long-run coefficients (average)								
Growth rate of labour productivity	0.366*** (0.127)	0.409*** (0.108)	0.397*** (0.113)		0.377*** (0.218)	0.378*** (0.102)	0.394*** (0.128)	0.401*** (0.111)
Growth rate of GDP per capita				0.242*** (0.038)				
Real interest rate	-0.042 (0.264)	-0.223 (0.140)	-0.278* (0.145)	-0.274** (0.135)	-0.153 (0.137)	-0.165 (0.156)	0.016 (0.176)	-0.280** (0.144)
Inflation rate	-0.153 (0.127)	-0.212 (0.143)	-0.174 (0.145)	-0.278* (0.133)	-0.066 (0.016)	-0.211 (0.140)	-0.004 (0.130)	-0.192 (0.145)
Net transfers					-0.499** (0.218)			
Residential prices						0.040 (0.027)		
Equity prices							0.015 (0.010)	
Memorandum items:								
Hausman's test	9.23	0.95	1.47	3.50	9.24	6.04	8.03	1.47
p-value	[0.06]	[0.81]	[0.83]	[0.32]	[0.03]	[0.11]	[0.05]	[0.69]

Note: Standard errors in parentheses.

***, ** and * indicate significant at 1, 5 and 10 per cent level, respectively.

Source: OECD Secretariat estimates.

sign.²⁸ However, when the variable is introduced, the joint homogeneity restrictions on the terms-of-trade, old-age dependency and public saving rate are no longer accepted. And, when all homogeneity restrictions are relaxed (not shown), net transfers no longer have a significant effect on private saving. Both the housing and equity price variables are significant in the case of a few countries (not shown) but the average estimate is not significant. These results are consistent with earlier evidence based on out-of-sample simulations indicating only limited wealth effect at the margin, *i.e.* over and above the effect already captured by fundamentals.

CONCLUSIONS

This paper has applied the pooled mean group estimation method to a system of dynamic equations to analyse the contribution of a set of basic determinants of private saving rates for a panel of 15 OECD countries over the period 1970-2000. The empirical analysis indicates that private-sector saving rates in OECD countries have been significantly influenced by public-sector saving rates, the demographic structure of the population (as measured by the old-age dependency ratio), the growth rate of labour productivity, changes in the terms of trades and the real interest rates. For three of these determinants – public saving, dependency ratio and terms-of-trade – the hypothesis that the long-run effect is the same across countries could not be rejected.

Among the determinants, the change in the public-sector saving rate has generally contributed the most to the evolution of private saving between 1995 and 2000. Nevertheless, the results indicate that while private-sector saving rates do respond to changes in public-sector in a significant way, the degree of offset is considerably less than unity, suggesting a significant departure from complete Ricardian equivalence. Private savings are also negatively related to the old-age dependency ratio and the real interest rate, and are positively linked to a change in the terms of trade and productivity growth. Except for the negative coefficient on the real interest rate, these results are broadly in line with recent studies based on panel data.

A series of tests of specification and parameter stability indicate that the overall estimation results are fairly robust. In particular, results from an out-of-sample dynamic simulation have shown that the system of equations tracks remarkably well the change in private saving in most countries during the period 1995-2000. The implication is that private saving patterns in a number of countries, including in many where a substantial decline has been observed since 1995, appear to be reasonably well explained by a small set of determinants that does not include financial wealth. In this regard, fears that a negative wealth

effect imparted by the stock market collapse could compromise the recovery in the United States and elsewhere should not be exaggerated. However, given that, where they have occurred, the declines in private saving rates in the late 1990s were largely induced by the substantial rise in public-sector saving, fiscal stimulus may fail to boost consumption as households may respond by re-building their savings.

NOTES

1. See Figure 4 in de Serres and Pelgrin (2002). A strong negative relationship between the two main components of private saving should not be surprising given that households ultimately own businesses, either directly *via* shareholding or indirectly *via* mutual funds or pension fund participation. That said, given that business saving is calculated residually, this may also partly reflect a rise in measurement errors or statistical discrepancies.
2. The saving rate appears in Figure 2 with an inverted scale.
3. Based on a conservative estimate of the propensity to consume out of wealth (3 per cent), Lusardi *et al.*, (2001) indicated that the rise in the stock market value in real terms between 1988 and 2000 could account for 3.5 percentage points of the decline in the US personal saving rate over the same period. Moreover, using data disaggregated across income groups and education levels, Maki and Palumbo (2001) showed that the households which benefited the most from stock market gains were also the ones which accounted for most of the decline in the aggregate saving rate.
4. In countries where fully-funded pension regimes account for a large proportion of overall retirement benefits, the NA measure of personal saving rates may also be sensitive to significant capital gains or losses on invested funds, particularly in the case of regimes based on defined benefits. For a broader and more detailed discussion of the conceptual issues linked to the measurement of saving in national accounts see the Appendix in de Serres and Pelgrin (2002).
5. See Case *et al.* (2001) who find on the basis of a pooled sample of 14 countries that housing wealth has a more significant impact on consumption than equity wealth. However, their measure of wealth is based on prices. In contrast, Boone *et al.* (2001) use stock data on financial and housing wealth for six countries (G-7 minus Germany) and find a larger impact of housing wealth only in the cases of Japan and Canada.
6. See Edison and Sløk (2001) who have found that in the United States, the United Kingdom and Canada, capital gains on new economy shares (Telecommunication, Media and Information Technology) have had a lesser impact on consumption than those on old economy stocks, while they found the reverse to hold in the case of Continental Europe.
7. Alternative measures based on price data are nevertheless introduced as part of the sensitivity tests performed below.
8. This is assuming that the rise in the old-age dependency ratio comes more from a decline in fertility than from an increase in longevity. Under the life-cycle hypothesis, a rise in life expectancy leads individuals to save more during their working years in order to maintain consumption over a longer retirement period, generating a higher aggregate saving rate. In contrast, a decline in population growth due to lower fertility

leaves individual savings profiles unchanged, but leads to lower aggregate savings as the proportion of the elderly in the population rises.

9. The main conditions are the existence of bequests motivated by altruism, the absence of liquidity constraints and differential in borrowing rates between private consumers and governments, the absence of uncertainty regarding the future path of income and the presence of a non-distortionary tax system.
10. In fact, they consider different sub-samples within each of which, the coefficients are assumed to be the same.
11. Moreover, the number of instruments used becomes restricted when the number of time periods and countries included in the sample is large.
12. In addition, averaging the data induces a loss of information that can be exploited under a more flexible model and the choice of an averaging period may not always properly eliminate the cyclical component.
13. The lag orders were chosen using the Schwarz Bayesian criterion as well as the results of individual model specification.
14. Pesaran *et al.* (1999) make the following assumptions: The $\varepsilon_{i,t}$'s are independently distributed across i and t , with zero means, positive variances and finite fourth-order moments. They are also distributed independently from the regressors. In particular, in order to ensure that the residuals are distributed independently across groups, omitted common effects which impact all groups must be controlled for. When the long-run coefficients are identical across groups, the common time-period effect can be eliminated by a cross-sectional demeaning procedure. When they differ, the common effect can be reduced but not eliminated.
15. While the existence of a unique long-run relationship may be directly assessed through panel cointegration tests (Kao and Baltagi, 2001; Pedroni, 2000), strict exogeneity of the regressors can be controlled for by use specification tests or by augmenting the dynamic specification of the model.
16. An alternative procedure is to use classical tests, as for instance the likelihood ratio test. Based on such tests, homogeneity restrictions imposed simultaneously on error variances and/or slopes coefficients of all determinants are rejected at conventional levels. However, this feature may be discussed (Pesaran, Shin and Akiyama, 1998).
17. Short-run coefficients are not shown for space reasons. However, in the case of the variables which only enter the equation in levels (all except the real interest rate and the inflation rate), the impact coefficient is equal to the negative of the product of the long-run coefficient and the error-correction parameter. In the case of the real interest rate, the impact effect is negligible.
18. For instance, Haque *et al.* (1999) obtain similar results at the individual country level.
19. Based on a Wald test, the hypothesis that the long-run coefficient on public-sector saving is not statistically different from unity (pure Ricardian equivalence) was rejected at the 5 per cent level. However, this result should be interpreted with caution given that it represents an average outcome over time and across different types of changes in government saving. In fact, the degree of offset may vary depending on whether a given change in the level of public debt is expected or unexpected, perceived to be temporary or permanent, factors which can not be easily controlled for in reduced-form analysis (Bernheim, 1987).
20. This might be the case if financial deregulation generates better risk-adjusted returns.

21. The results from test of residual properties, functional form and parameter stability are not shown here for space considerations. However, they appear in Table 5 and Figure 6 of the Working Paper version (de Serres and Pelgrin, 2002).
22. The simulation is performed using the PMG estimates *i.e.* based on the specification that has common coefficients on the determinants where cross-country homogeneity is imposed and on individual coefficients obtained in each country equations on the other variables.
23. In the case of Germany, the large drop in private savings in 2000 partly reflects large payments made by telecom firms to the government for the purchase of UMTS licenses.
24. Net public saving is defined as gross saving less public investment and is therefore close to the SNA's net lending/borrowing.
25. For instance Rossi and Visco (1995) found that net government transfers have substantially contributed to the decline of the household saving rate in Italy until the early 1990s.
26. See Girouard and Blöndal (2001) for recent evidence.
27. Neither of the two price variables (housing and equity) provides an ideal substitute for stock-based measures of wealth. However, for many countries measures of housing and holdings of equities by households are not available.
28. Callen and Thimann (1997) obtained a similar result in their equation for private saving even though they used gross rather than net transfers.

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FISCAL RELATIONS ACROSS GOVERNMENT LEVELS

Isabelle Joumard and Per Mathis Kongsrud

TABLE OF CONTENTS

Introduction	156
Scope and rationale.....	156
Summary of findings.....	157
Forces shaping fiscal relations across government levels and recent trends	163
Extent of decentralisation.....	163
Recent trends	166
Forces shaping fiscal relations across government levels.....	169
Issues determining the allocation of spending responsibilities	173
Local provision may fail to exploit economies of scale	176
... and to internalise territorial spillovers	176
The risk of under-provision of welfare benefits and redistributive services.....	177
Inefficiencies due to overlapping responsibilities across government levels	178
Frequent approaches include: amalgamations or a “two-speed” system.....	179
... centralisation or norms imposed on sub-national spending programmes.....	180
... co-operation agreements across and between levels of government.....	180
Funding principles to promote efficiency	182
Tax assignment issues	182
Sub-national government use of taxing powers	191
Intergovernmental grants.....	193
Macroeconomic management in a decentralised setting.....	198
Overall fiscal discipline could be at risk.....	198
Strategies to secure fiscal discipline vary	199
Transparency should be improved.....	207
<i>Annex.</i> Ensuring fiscal discipline at sub-national level: strategies and mechanisms.....	216
Bibliography	226

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INTRODUCTION

Scope and rationale

OECD economies face the common challenge of raising allocative and administrative efficiency in the public sector. In this regard, well-functioning fiscal relations between central and sub-central governments – defined broadly to cover such relations whether constitutionally federal or non-federal – are important. In principle, decentralisation can make governments more accountable, allowing a better matching of resources to preferences. It may also introduce competition across jurisdictions and thus raise public sector efficiency. Political factors also often militate for decentralisation since, by bringing government closer to the people, it can strengthen the local democratic process.

Despite its apparent advantages, devolution has not proceeded evenly over the past two decades and the current state of central-local relations among OECD countries remains very heterogeneous. This may be because decentralisation can entail efficiency losses and/or make it difficult to implement redistributive policies. The weight given to nationwide policy objectives, including distributional ones, may differ across countries while significant – and, in some countries, growing – regional income disparities may make some of the issues and trade-offs raised by the decentralisation process more acute. The choice between central and local provision and financing is thus often not clear-cut, and general conclusions about best practice are not easy to draw from a review of country experiences in this area. A forward-looking perspective is also required, in particular since the fiscal consequences of population ageing may have different impacts across government levels, while increasing trade and financial integration as well as people mobility may change the balance between positive and adverse effects of fiscal decentralisation. OECD countries do, however, face common issues and trade-offs and these are the subject of this paper.

The most notable issues relating to central and sub-central relations to have emerged from recent OECD work, and which are developed in this paper, are threefold:

- On the spending side, how can sub-national government tailor the supply of public goods, which may have different constituencies, to local prefer-

ences while ensuring efficient provision and the fulfilment of distributional objectives?

- On the revenue side, how should financing schemes for sub-national governments be designed so as to allow them to respond to local preferences without creating efficiency concerns and compromising distributional objectives nationwide?
- From a macroeconomic perspective, how can sufficient co-ordination across government levels be engineered, using fiscal rules, co-operation arrangements or market forces, so as to ensure compatibility with national fiscal targets?

Based on these sets of issues, this paper evaluates practices across a number of areas and consists of four parts. The first describes the relative importance of central and sub-central governments in public finance, as evidenced by aggregate tax and spending indicators, and assesses the forces promoting, or militating against, greater decentralisation. This is followed by an examination of the practical issues which determine the assignment of responsibilities on the spending side. The third section looks at financing issues, from the perspective of individual taxes, and the arrangements for grants and for fiscal equalisation schemes. The fourth section evaluates the arrangements required to achieve consistency between sub-national government fiscal strategies and overall macroeconomic policy aims.

Public spending and tax systems have been reviewed in in-depth chapters in OECD *Economic Surveys* for more than half of the OECD countries.¹ In this context, the issues of tax and spending assignment across government levels and of fiscal co-ordination in a decentralised framework have surfaced for a number of countries. Work on these issues has also been carried out for some non-OECD countries,² extending the geographical scope of the evidence available beyond the OECD area; pertinent conclusions from this work are included in this paper. The work on fiscal relations across government levels is, however, far from comprehensive and this paper has been constrained to draw on information that is incomplete. Further country reviews on these issues are envisaged, Box 1 providing the checklist that would be the starting point for these reviews.

Summary of findings

Recent trends in decentralisation. On the basis of aggregate revenue and spending data, sub-national spending and revenues display contrasting trends. The sub-national government share of public spending has increased in a majority of countries. However, central governments have increasingly countered this tendency by imposing norms and minimum quality standards on the public goods provided locally. And on the revenue side, the sub-national government share in general

Box 1. A checklist for assessing fiscal relations across levels of government

Based on the issues which have emerged in the context of recent OECD work, a checklist of criteria has been compiled, in the form of questions to be addressed, in order to assess the effectiveness of fiscal relations across government levels.

Spending assignment issues

- *Extent of decentralisation*: How are responsibilities for public service provision shared across government levels? Are some jurisdictions, or special zones, given special spending responsibilities (and, symmetrically, revenue-raising powers)? To what extent can and do sub-national governments tailor their supply to local citizens' preferences? In particular, in which areas are national standards and norms binding and is the central government frequently engaged in micro-managing sub-national governments (*e.g.* setting wages and job status for sub-national government employees)? And are "unfunded mandates" for sub-national government an important issue?
- *Size of jurisdictions*: What have been the strategies so far implemented to exploit scale economies and internalise spillover effects and are there still some problems? Under what circumstances are amalgamations an attractive option? Are co-operative approaches used, such as joint-provision or the concentration of supply in some jurisdictions with others buying services? If so, how are such arrangements designed? In particular, how are provision costs shared across jurisdictions? Do these co-operative approaches promote cost-efficiency, *e.g.* by introducing some competitive pressures across providers?
- *Overlapping responsibilities*: Are there domains where spending responsibilities overlap? If so, to what extent does such overlapping create incentives to shift the financial burden to another government layer and result in the sub-optimal or inefficient provision of public services? What are the instruments in place to avoid such strategies?
- *Social transfers and redistributive goods*: To what extent are sub-national governments responsible for delivering social assistance programmes and redistributive services? In particular, do they set eligibility criteria and benefit levels? Is there any evidence of "welfare migration" to jurisdictions providing more generous services and social transfers? Do sub-national governments react to (the threat of) such migration by lowering the generosity of these benefits and/or restricting eligibility to reduce demands from non-residents?

Sub-national government funding principles

- *Taxation powers*: How extensive are sub-national government revenue-raising powers? In particular, with respect to which taxes can sub-national governments set the bases and rates? Is there room for devolving more taxing

**Box 1. A checklist for assessing fiscal relations
across levels of government (cont.)**

powers without destabilising sub-national government budgets (*e.g.* as a result of excessive volatility of local tax revenues), raising overall administrative and compliance costs, hindering inter-jurisdictional trade and investment flows, and/or harming distributional objectives? What role is there for user charges?

- *Tax competition*: Do local tax rates and bases vary significantly across jurisdictions and what are the main factors contributing to, or limiting, cross-jurisdiction differences? In particular, how does the grant system influence sub-national government tax policies? Is tax competition important and what are the positive and adverse effects of such competition (disciplining sub-national government fiscal behaviour *versus* an excessive fragmentation/complexity of the tax system and potential distortions to trade and investment patterns)?
- *Earmarked grants*: Do earmarked grants account for a substantial part of the sub-national government budget? If so, how are these grants designed and what are the impacts on sub-national government incentives and overall outcomes? In particular, how is the central government participation rate defined and are spillover effects correctly accounted for? Is the contribution based on actual *ex post* costs as opposed to standard *a priori* costs? Is there evidence that earmarked grants have resulted in poor cost-efficiency and had adverse distributional consequences? Has there been a trend to reform the design of earmarked grants (*e.g.* by giving sub-national governments more flexibility as to how to reach the strategic objectives, by merging earmarked grants which are too narrowly defined and/or by shifting towards a more outcome-oriented approach)?
- *Equalisation schemes*: Through what channels does redistribution across jurisdictions take place (including explicit equalisation schemes but also progressive income tax systems and social insurance and welfare systems) and how large are these redistributive transfers? What are the main objectives of the equalisation system and the criteria (potential or actual tax revenues, specific topographic and socio-demographic factors influencing sub-national government provision costs, etc.)? How important is central government discretionary financial support to sub-national governments as opposed to formula-based grants? To what extent does the intergovernmental grant system promote or hinder the growth prospects of poorer jurisdictions? Do the design and reform of the grant system face serious equity-efficiency trade-offs? Are central government grants used to minimise fluctuations in sub-national government tax revenues?

Macroeconomic management in a decentralised setting

- *Macroeconomic consistency*: What mechanisms are in place, or should be envisaged, to secure consistency between sub-national government fiscal behaviour and overall macroeconomic policy objectives? Have sub-national

**Box 1. A checklist for assessing fiscal relations
across levels of government (cont.)**

governments experienced fiscal slippage or pro-cyclical behaviour? If so, how have other government tiers and/or the financial market reacted? Do sub-national governments facing financial problems receive financial support from the central government (in extreme cases being bailed-out)? If so, how is this support designed and what are the consequences for sub-national government behaviour?

- *Fiscal rules:* What fiscal rules apply at a sub-national level? Have they been imposed by the central government or negotiated with sub-national governments? What kinds of rules best avoid fiscal slippage, whether as an increase in sub-national government debt or higher taxes (balanced-budget rules, expenditure ceilings or limitations on borrowing)? Is the framework credible and flexible enough to cope with unexpected events, cyclical developments and investment needs? Have sufficient enforcement mechanisms been introduced? In particular, is there a role for peer-pressure and sanctions and, if so, how should such instruments be applied (*e.g.* do sanctions require political approval in parliament or in a co-operative institution)?
- *Market discipline:* Are sub-national authorities allowed to raise money on the financial market? If so, is sub-national debt guaranteed – explicitly or implicitly – by the central government? Is there evidence that financial markets play a role in disciplining sub-national government fiscal behaviour (*e.g.* lending conditions depend on the sub-national government fiscal position)? Do economic instruments play a current or prospective role in securing sub-national government fiscal discipline?

Information-sharing and transparency

- Are sub-national government spending responsibilities and revenue-raising powers clearly delineated? Is there scope for improving consistency (*e.g.* all government levels using compatible accounting standards) and transparency (*e.g.* are sub-national government fiscal positions and information on both the quality of local public services and local tax rates easy to obtain and compare)? Is there any forum allowing sub-national governments to share their experiences in managing public services more efficiently? Are sub-national figures readily available and based on common budget and accounting principles? To what extent has decentralisation made it difficult to enforce national regulations and raised corruption problems?

government revenues (excluding grants) has failed to follow pace with developments on the spending side and declined in several OECD countries. At the same time, governments have attempted to improve co-ordination in respect of overall

macroeconomic objectives through the introduction of fiscal rules which limit sub-national fiscal autonomy.³

Assigning spending responsibilities. By being closer to local citizens, sub-national governments are in principle better placed to respond to their demands for services and to target these at the right people. However, allocative and cost efficiency gains may be difficult to attain:

- Economies of scale and scope may prevail in supplying some goods and services currently under the responsibility of sub-national governments in a number of countries (*e.g.* in hospital care and tertiary education).
- Public goods and services provided locally may have spillover effects on other jurisdictions (*e.g.* education, labour market programmes and infrastructure development may affect other jurisdictions, and more generally the growth potential of the country).

A failure to account for spillover effects may result in sub-optimal public good provision, while the threat of migration across jurisdictions may also prompt sub-national governments to set welfare benefits too low from society's point of view. A similar risk also emerges when spending and financing responsibilities overlap – as is often the case in health care, labour market and social assistance programmes – so that a given level of government may try to minimise its costs at the expense of another. To counter these incentive problems and exploit scale economies, central governments have sometimes encouraged sub-national governments to merge (often against fierce political resistance), but optimal boundaries may vary significantly between services. The alternatives to exploit scale economies are joint provision of public services or co-operation approaches, these latter displaying attractive features meriting to be given more consideration in several countries. However, they may be difficult to implement for some services (in particular those for which benefits cannot be easily individualised, *e.g.* roads).

Funding principles play a key role in shaping sub-national government spending behaviour, but their design raise difficult issues and trade-offs. Most importantly, matching revenue-raising powers to spending responsibilities is desirable to allow sub-national governments to tailor the supply of public goods to local citizens' preferences and willingness to pay, and hence to be held accountable. Potential welfare gains should, however, be weighted against the risks of efficiency losses associated with local taxing powers as well as distributional objectives. There are few taxing powers which can be transferred to sub-national governments without raising efficiency and/or distributional concerns. Property taxes seems more appropriate in this regard but do not play as important a role as could be expected. Granting sub-national governments discretion in setting bases and rates of general consumption taxes (VAT or sales tax) may increase tax fraud and

evasion and create distortions in inter-jurisdiction trade. Sub-national income taxes may have undesirable spillover effects as sub-national governments fail to account for the impact of their decision on other government levels' finance and on the country's potential growth (as personal income taxes affect individual decisions to work, save and invest). A conflict with the objective of maintaining a redistributive role of personal income tax may also emerge. Corporate income taxes are volatile and the OECD has often recommended reducing sub-national reliance on these. Greater reliance on user fees, by reinforcing market signals, could promote efficiency but may also raise equity issues since sub-national governments are in many cases responsible for the provision of redistributive public services (in particular health care and non-tertiary education).

Viewed against this limited scope for fiscal autonomy, the role of sub-national government taxing capacity in disciplining fiscal behaviour seems to be more uncertain than usually recognised in the literature. The intensity of tax competition varies significantly both across countries and between tax bases but is sometimes weak, sub-national governments rarely fully exploiting powers to cut local taxes when they are available. More work on key factors shaping sub-national government tax decisions is needed. Recent country surveys have however identified several institutional features which may need to be adjusted to facilitate a more effective use of sub-national government taxing powers and to foster accountability. In particular, a clear definition of each government level spending responsibilities and comparative information of tax levels across jurisdictions are of paramount importance. Furthermore, the use of discretionary intergovernmental grants and the design of tax-sharing arrangements may need to be reconsidered.

The grant system has many roles to play, though its design is of paramount importance to avoid conflict between various objectives. Country surveys tend to indicate that the impact of intergovernmental grants on efficiency, fiscal discipline and equity, largely depends on their design. Earmarked grants have been used extensively to minimise the risk of sub-optimal spending in domains characterised by significant spillover effects or to secure minimum standards for specific services. However, co-financing rates above levels which effectively account for spillover effects have often resulted in excessive spending, accompanied by poor cost effectiveness. Given these problems, there has been a move towards general purpose (block) grants, which allow greater local autonomy and should, in principle, generate greater cost-efficiency. Fiscal equalisation schemes – often an intrinsic characteristic of the grant system – can promote economic efficiency by avoiding that regional disparities become self-perpetuating and by creating the ground for a fair and effective fiscal competition. However, they may also impede changes in cost differentials and hinder regional adjustment by creating “poverty traps”. Although options to reduce the potential disincentive effects associated with the grant system exist, they often imply some compromise with equity objec-

tives. Likewise, using the grant system to smooth cyclical shocks may be desirable but care must be taken to maintain appropriate incentives to secure fiscal discipline. A heavy reliance on discretionary grants may be counterproductive in this regard.

Options for securing fiscal discipline have recently received more attention in many countries as fiscal consolidation has become more pressing. Countries have relied on a wide array of strategies. In some cases, fiscal rules (*e.g.* a balanced budget requirement) have been imposed on sub-national governments, while in others, mainly federal countries, fiscal co-ordination has been reinforced through co-operative arrangements. Financial or administrative sanctions have also been introduced in many cases. Taking another approach, some countries have relied on market mechanisms to secure fiscal discipline. Despite these efforts, some problems have emerged. Sub-national governments have experienced fiscal slippages in a number of countries and/or have implemented a pro-cyclical fiscal policy. The recent economic slowdown may further reveal weaknesses in existing fiscal arrangements since sub-national revenues often are highly sensitive to fluctuations in economic activity and asset prices. These problems may indicate a need for revisiting and strengthening the fiscal framework. In several countries, improving the availability, consistency and timeliness of sub-national government public finance data is a prerequisite. Furthermore, there seems to be scope for clarifying and tightening sub-national fiscal requirements and introducing stronger enforcement mechanisms in a number of countries. On the other hand, too rigid rules may risk undermining public support, while to be credible, sanctions must be carefully designed and represent a reasonable policy response to potential problems.

FORCES SHAPING FISCAL RELATIONS ACROSS GOVERNMENT LEVELS AND RECENT TRENDS

Extent of decentralisation

Assessing the degree of fiscal decentralisation and drawing cross-country comparisons are difficult for a number of reasons. Fiscal autonomy has several dimensions – in particular, the authority to decide on the level and composition of spending, revenues and borrowing – which often interact and which are not always easy to rank. Furthermore, relevant data which can be used for international comparisons are seldom available. Against this background, looking at indicators derived largely from national accounts data (Table 1) suggests that:

- As measured by the share of sub-national governments in general government spending and revenue, the degree of decentralisation varies significantly across OECD countries.

Table 1. Indicators of fiscal decentralisation

	Sub-national government spending and employment				Sub-national government revenues			
	Share in general government spending ¹		Employment as a share of total public employment		Share in general government revenues ²		Attribution of tax revenues as percentage of total tax revenue ³	
	1985 ⁴	2001 ⁵	1990 ⁶	2001 ⁷	1985 ⁴	2001 ⁵	1985	2001
Federal countries								
Australia	..	..	76.7	83.3	..	..	18.6	17.2
Austria ⁸	28.4	28.5	62.6	62.3	24.6	21.4	23.8	18.9
Belgium	31.8	34.0	..	..	11.4	11.3	4.8	28.6
Canada ⁹	54.5	56.5	84.7	86.0	50.4	49.9	45.4	44.1
Germany	37.6	36.1	87.6	88.5	31.9	32.4	30.8	29.2
Mexico	..	..	..	..	..	..	1.0	3.1
Switzerland	..	..	..	..	..	..	44.1	40.4
United States	32.6	40.0	81.8	85.5	37.6	40.4	32.7	31.7
Unitary countries								
Czech Republic	..	..	32.3	34.0	..	..	..	10.6
Denmark	53.7	57.8	..	..	32.3	34.6	28.4	33.8
Finland	30.6	35.5	74.7	77.8	24.8	24.7	22.4	22.4
France	16.1	18.6	..	45.8	11.6	13.1	8.7	9.3
Greece	4.0	5.0	..	87.8	3.7	3.7	1.3	1.0
Hungary	..	..	65.5	65.1	..	..	..	5.5
Iceland	..	..	..	..	..	..	18.6	24.3
Ireland ⁹	30.2	29.5	13.2	11.3	32.3	34.6	2.3	1.9
Italy	25.6	29.7	..	20.6	10.7	17.6	2.3	12.2
Japan	46.0	40.7	..	..	26.8	26.0	26.0	25.9
Korea ⁸	..	..	32.3	34.8	..	..	..	17.8
Luxembourg	14.2	12.8	94.8	92.5	8.0	7.4	6.6	5.6
Netherlands	32.6	34.2	27.5	25.6	11.4	11.1	2.4	3.5
New Zealand	..	..	12.2	9.5	..	..	6.5	5.6
Norway ¹⁰	34.6	38.8	..	..	22.5	20.3	17.7	16.3
Poland ⁸	..	..	6.5	6.2	..	..	..	18.3
Portugal	10.3	12.8	..	..	7.6	8.3	3.5	6.5
Slovak Republic	..	..	..	..	..	..	..	3.8
Spain	25.0	32.2	47.1	63.6	17.0	20.3	11.2	16.5
Sweden	36.7	43.4	..	..	34.3	32.0	30.4	30.8
Turkey	..	..	84.2	85.5	..	..	10.2	13.1
United Kingdom	22.2	25.9	..	..	10.5	7.6	10.2	4.1
Average¹¹	29.8	32.2	55.2	57.0	21.5	21.9	16.4	17.8

1. Excluding the transfers paid to other levels of government. National Accounts data.

2. Excluding transfers received from other levels of government and including tax sharing arrangements. National Accounts data.

3. Including tax sharing arrangements. Revenue Statistics data.

4. Or earliest year available: 1986 for Ireland; 1987 for the Netherlands and the United Kingdom; 1990 for Japan, Luxembourg and Norway; 1991 for Germany; 1993 for Sweden; 1995 for Austria, Belgium, Denmark, Finland, Greece, Portugal and Spain.

5. Or latest year available: 1996 for Ireland; 1997 for Canada; 1999 for Portugal; 2000 for Japan, Luxembourg and the United Kingdom.

6. Or earliest year available: 1991 for Germany and New Zealand; 1994 for Poland; 1996 for the Netherlands; 1997 for Czech Republic, Hungary and Turkey.

7. Or latest year available: 1998 for Greece and Italy; 1999 for France; 2000 for Austria, Germany, the Netherlands, Poland, Turkey and the United States.

8. Public sector employment data are registered in full-time equivalent.

9. Data based on SNA68 methodology.

10. The share in general government revenues is expressed in per cent of mainland government revenues.

11. Simple average of federal and unitary countries. Under each heading, the average takes into account only countries for which data are available for both years.

Source: OECD National Accounts database; OECD Public Sector Pay and Employment database; OECD Revenue Statistics, Statistics Norway.

- The institutional structure of a country – whether or not the country is recognised as a federal country – does not directly correspond with the spending and revenue share of sub-national governments. Sub-national governments in some unitary countries are allocated a larger share of public spending than in countries identified as federal countries. Public finance indicators for instance suggest that Denmark and Sweden – recognised as unitary countries – are more “decentralised” than Germany, Mexico and the United States.
- In all countries, sub-national government spending shares widely exceed their revenue share, pointing to the wide use of intergovernmental transfer schemes.

Information derived from public finance data would, taken at face value, lead to a significant overstatement of the degree of fiscal autonomy of sub-national governments in many countries. On the spending side, such data do not give an accurate picture of where responsibilities lie. The effective power of sub-national governments to manage the programmes under their responsibility is often quite limited, with the central government increasingly engaged in setting standards and/or micromanaging sub-national government implementation of various sectoral policies (Austria, Denmark, Germany and Norway). The education sector provides an illustration. Sub-national governments are responsible for providing non-tertiary education in an increasing number of countries. However, in many cases, the central government sets the curriculum, trains teachers and/or sets wages (Italy, Mexico and Norway). Standards in health care provision are also frequent in many countries. The way intergovernmental grants are specified can further influence sub-national government spending behaviour, but internationally consistent information on both the total amount of intergovernmental grants, and the breakdown between block grants and earmarked grants is unfortunately lacking.

Indicators of revenue share allocated to lower levels of government do not provide accurate information on their effective revenue-raising powers. Limits on sub-national government discretion to determine tax rates and tax bases significantly reduce local fiscal autonomy. Few synthetic indicators on sub-national government effective autonomy to set tax bases and rates exist. Information based on an OECD survey for 1995, however, revealed that such taxing powers are rather restricted in several countries – including Austria, Germany, Mexico and Norway (Table 2).⁴ Others have more discretion (Canada, Denmark, Sweden, Switzerland and the United States). Tax-sharing arrangements are prevalent in many countries, though their specification varies substantially and can leave sub-national governments with some or virtually no power to influence the revenues accruing to them individually. When tax-sharing arrangements prevail, the degree of local autonomy will further depend on whether their consent is required before the sharing

Table 2. **Sub-national government taxing powers in selected OECD countries¹**
1995

	Sub-national government taxes relative to:		Discretion to set taxes ²	Summary indicator of taxing powers ³
	Total taxes	GDP		
Sweden	32.6	15.5	100.0	15.5
Denmark	31.3	15.5	95.1	14.7
Switzerland	35.8	11.9	92.4	11.0
Finland	21.8	9.8	89.0	8.7
Belgium	27.9	12.4	57.9	7.2
Iceland	20.4	6.4	100.0	6.4
Japan	24.2	6.8	90.3	6.1
Spain	13.3	4.4	66.6	2.9
New Zealand	5.3	2.0	98.0	2.0
Germany	29.0	11.1	12.8	1.4
Poland	7.5	3.0	46.0	1.4
United Kingdom	3.9	1.4	100.0	1.4
Netherlands	2.7	1.1	100.0	1.1
Austria	20.9	8.7	9.5	0.8
Portugal	5.6	1.8	31.5	0.6
Czech Republic	12.9	5.2	10.0	0.5
Hungary	2.6	1.1	30.0	0.3
Norway	19.7	7.9	3.3	0.3
Mexico	3.3	0.6	11.2	0.1

1. The countries are ranked in descending order according to the value of the summary indicator of taxing powers.

2. The figures show the percentage of their total taxes for which sub-national governments hold full discretion over the tax rate, the tax base, or both the tax rate and the tax base. A value of 100 designates full discretion.

3. The summary indicator is the product of the ratio of sub-national government taxes to GDP and the degree of discretion to set taxes. Thus, it measures sub-national government taxes with full discretion as a percentage of GDP.

Source: OECD Revenue Statistics and OECD (1999).

formula can be changed. Furthermore, in some countries, sub-national governments have some *de jure* autonomy to set the tax bases and rates but rarely use it (including Finland, Korea, Norway and Spain). The benefits from an active use of local taxing powers may be reduced by discretionary elements in the grant system (Norway) and its redistributive nature (Austria and Germany, where the local business tax proceeds are partly shared across jurisdictions). National regulations applying to the scope and level of user charges (*e.g.* in the education sector) further restrict sub-national government revenue-raising powers.

Recent trends

Subject to the above caveats, two contrasting trends emerge from aggregate public finance indicators.

- On the spending side, the sub-national government share has increased in a majority of countries, but by no means all, over the past 15 years

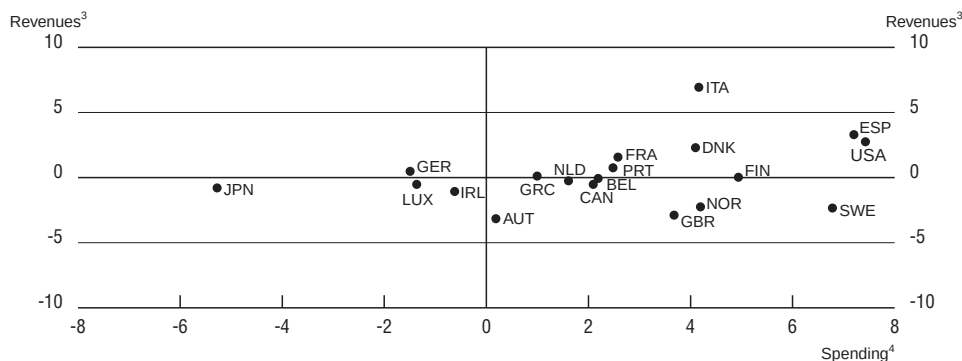
(Figure 1). The rising share partly reflects new responsibilities assigned to them (health care and/or non-university education in Italy, Mexico and Spain; active labour market policies in Canada in 1996; primary education in Hungary; and the management of some welfare programmes in Korea).

- The sub-national government share in general government revenues (both total revenues and tax revenues) has not increased commensurately, thus resulting in a larger “fiscal gap” (defined as the difference between sub-national government spending responsibilities and their revenue-raising powers). In a number of countries, sub-national governments have been granted increased autonomy to set tax bases or rates (such as regional governments in Belgium, Mexico and Spain). However, in other instances effective taxing powers have been restricted, in particular at the local level (France and Germany).⁵

The increasing “fiscal gap” seemingly conflicts with the traditional view that the benefits from fiscal decentralisation arise when the costs of providing local public goods are borne locally (Box 2), at least at the margin. However, it may reflect an unavoidable tension between proliferating local spending demands and a scarcity of tax instruments with the correct characteristics for being levied locally.

Figure 1. Changes in the share of sub-national governments in total public revenues and spending

Changes expressed in percentage points, 1985¹-2002²



1. Or earliest year available: 1986 for Ireland; 1987 for the Netherlands and the United Kingdom; 1990 for Japan, Luxembourg and Norway; 1991 for Germany; 1993 for Sweden; 1995 for Austria, Belgium, Denmark, Finland, Greece, Portugal and Spain.

2. Or latest year available: 1996 for Ireland; 1997 for Canada; 1999 for Portugal; 2000 for Japan, Luxembourg and the United Kingdom.

3. Excluding transfers received from other levels of government.

4. Excluding transfers paid to other levels of government.

Source: OECD National Accounts database; Statistics Norway.

Box 2. Arguments in favour of local provision and financing

Several arguments in favour of fiscal devolution have been developed in the literature, supporting the idea that the provision of public goods and its financing should be assigned to the lowest level of government with the capacity to achieve objectives. These arguments include:

Response to local preferences. The traditional theory of fiscal federalism contends that the central government should have the basic responsibility for macroeconomic stabilisation functions, national public goods, such as defence, and income redistribution in the form of assistance to the poor (Oates, 1972). However, a “one-size-fits-all” approach may not deliver a basket of public goods that is optimal for all citizens. By being closer to local citizens, sub-national governments are, in principle, better placed to respond to their preferences in term of local public goods, to assess willingness to pay and to target services at the right people. Hence, “Pareto efficiency” could be raised – *i.e.* resources can be saved without making anyone worse off – through fiscal decentralisation. Keeping incentives right does not necessarily entail an exact match between spending and revenue-raising powers at each level of government. Central government grants can play a role in sub-national government finances without jeopardising incentives. One important condition, however, is that grants do not accommodate extra spending decided upon by sub-national government, leaving the cost of a marginal change in local spending to be borne locally.

Increased government accountability may enhance the efficiency gain. Since local officials can be easily identified by voters and taxpayers, they are expected to be more accountable, especially if the costs of providing public services are borne locally. Being closer to residents may, however, trigger decisions that favour particular individuals or groups while the public interest sometimes takes a back seat (Tanzi, 1995). Where there is inadequate capacity for the population of some jurisdictions to hold their governments accountable through internal checks and balances, this could spill over into corrupt practices, though the degree of decentralisation and the level of corruption amongst public officials are not directly linked.

Introducing competition across jurisdictions. Diversity in fiscal packages offered by sub-national jurisdictions – in terms of quantity and quality of public goods and the associated tax burden – may introduce some competition across jurisdictions, and thus incentives for governments to raise public sector efficiency. Competition between jurisdictions relies on the assumption of mobile citizens (“citizens vote with their feet”). In practice, several factors limit the mobility of citizens, in particular in European countries, especially taxes on property transactions and other rigidities in the housing sector. Moreover, tax competition in areas where the tax base is mobile may be seen as weakening tax capacity. The introduction of competitive pressures across sub-national jurisdictions has thus increasingly come to be seen as dependent on informational channels. Some countries (including Scandinavian countries) have developed high-quality information to enable citizens to benchmark the performance of their administration against others and to allow local governments to identify best practices.*

Box 2. Arguments in favour of local provision and financing (*cont.*)

Supply-side efficiency. Decentralisation may allow for experimentation in the management of public responsibilities (Oates, 1999). In some decentralised countries, sub-national governments have taken the lead in designing innovative measures to increase public spending effectiveness. In Spain for instance, some regional pilot programmes focusing on containing pharmaceutical costs and reducing public hospitals' waiting lists have shown promising results (OECD, 2000a). In Switzerland, new public management principles have been introduced by some cantons and communes and latter replicated at the Confederation level. In many countries however, an information-sharing forum is lacking, reducing the benefits of these experimentation gains.

* Norway and Sweden have developed a comprehensive dataset, available on Internet, providing indicators on the coverage and costs of public services for each municipality.

This tension has been reinforced by several forces, which are likely to continue to shape fiscal relations across government levels. One of these is that sub-national governments may sometimes be more eager to take over new spending responsibility than taxing powers, as they would have to bear the political cost of raising taxes.

Forces shaping fiscal relations across government levels

The forces underlying the above trends are both economic and political and derive from domestic and international sources. At a macroeconomic level, they include the efforts to involve local authorities in the drive for fiscal consolidation and to distribute the burden of population ageing, which will result in higher national and sub-national government spending without adding to the resource base. The process of globalisation has also had an impact, increased international co-operation having a counterpart in a decentralising tendency emanating from a heightened cultural awareness at local and regional levels. Indeed, the political dimension inherent in the decentralisation process is as important as economic factors to an understanding of developments in central/sub-central relationships.

Globalisation has had a centralising effect...

Increasing trade and financial integration has made for increased centralisation, particularly on the revenue side. Competitiveness concerns associated with cascading turnover and retail sales taxes have reinforced the attractiveness of

value added tax systems. Several countries (including Australia, China and Switzerland) have recently moved away from turnover and/or retail sales taxes – some of them formerly under the responsibility of sub-national governments – towards value added tax systems managed by the central government. Enhanced international co-operation in tax policy has been seen as an option to counteract the erosion of internationally mobile tax bases, in particular corporate and financial income. Some of the recent international agreements can be seen as impinging on the tax autonomy of sub-national governments. As an illustration, the EU Code of conduct for business taxation identified 66 harmful tax measures, some of them being implemented by sub-national governments.⁶

... but regional disparities remain marked...

The reduction of trade barriers, by increasing opportunities to exploit scale economies and potential agglomeration benefits, may have heightened regional income disparities, creating tensions in fiscal equalisation schemes.⁷ As an illustration, recent evidence suggests that the convergence in *per capita* income among countries in the EU has not been paralleled by a convergence across regions. Indeed, variations in inter-regional *per capita* income have increased, for example in Italy, West Germany and France (Decressin, 2002). Within regions, also, urban and intermediate areas are likely to benefit most from increased trade openness since they offer various key resources (including proximity to markets, quality and availability of labour and efficient transport and network systems). Regions with a low population density, a lack of critical mass and geographical isolation may benefit least.⁸ Dealing with increased regional income disparities may in turn call for a greater central government role, since it is typically involved in redistribution.

... with greater local and civic awareness...

Against a background where wider international considerations and bodies are increasingly shaping local economic conditions, the awareness of regional, local and civic identities has tended to grow, providing a momentum towards decentralisation in a number of countries. Empowering sub-national governments with more responsibilities, by bringing government closer to the people, is seen as strengthening the local democratic process following a period when civic involvement in decision-making tended to be weak or even declining. Elected sub-national authorities have been established recently in several countries. In Italy, the Parliament voted for the direct election of mayors and presidents of provinces in 1993. In Korea, sub-national government representatives are no longer nominated by the central government since 1995, but are elected locally. In Ireland, two regional assemblies were created in 1999 and in the United Kingdom,

a new Parliament and elected assembly, respectively, have been established in Scotland and Wales.

... linked partly to heightened mobility across jurisdictions

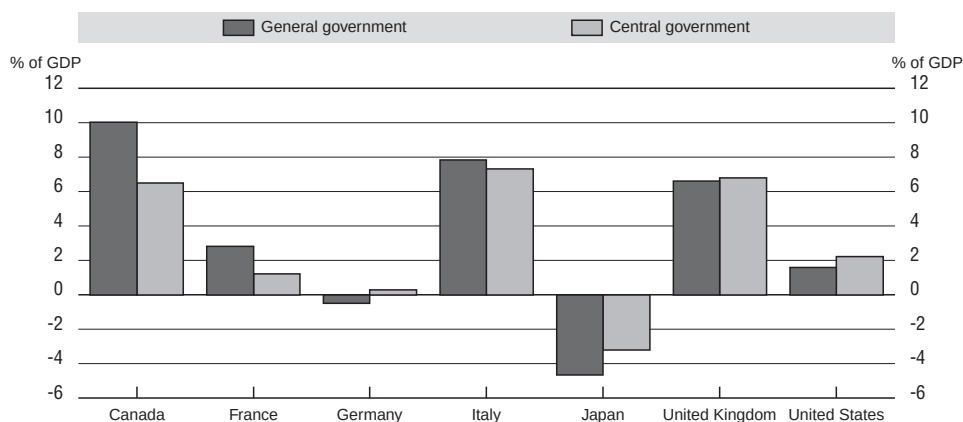
The potential benefits of, and issues related to, fiscal federalism may increase as economies develop. Several factors are at play. First, income growth may spur the demand for a more diversified basket of public goods or, put differently, the “one-size-fits-all” approach may increasingly fail to deliver a basket of public goods that is optimal for all citizens. Second, the rise in human capital (in particular higher education attainment) has raised the ability of local citizens and their representatives to manage efficiently local affairs and participate in the nation’s decision process. Third, the spread of new information and communication technologies, together with more efficient transport modes, may increase the mobility of citizens across jurisdictions. Increased mobility of people may reinforce competitive pressures on sub-national government to deliver good public services, at a low cost. It also reinforces spillover-related issues and the need for co-ordination mechanisms to mitigate their potential adverse effects (*e.g.* how to share the cost of transportation infrastructure between city centres and residential suburb areas? How to account for students residing in one jurisdiction but attending schools or universities in another?).

Fiscal consolidation has brought the need for co-ordination...

This greater involvement has coincided with a period when the limits on available fiscal resources have become increasingly constraining. Fiscal consolidation efforts have significantly influenced fiscal relations across government levels, as governments have sought to apportion the pain of retrenchment. While changes in fiscal balances since the early 1990s indicate that central governments have contributed most to fiscal consolidation (Figure 2), cuts have often been effected by devolving spending responsibilities to lower levels of government without providing commensurate financial resources.⁹ Central government grants to sub-national governments have also sometimes been reduced. In the United States for instance, through much of the 1990s, Congress kept a tight rein on grants to the states, while state income tax revenues increased rapidly. In Canada, the large cuts in federal expenditures included substantial cuts in federal transfers to the provinces.

Fiscal consolidation efforts have also made it necessary to reinforce co-ordination across government levels, especially in euro zone countries, where the compliance with the Stability and Growth Pact (SGP) rules is assessed by reference to general government performance. The central government is held responsible for non-compliance, both in terms of financial sanctions and credibility loss.

Figure 2. **Central government contribution to fiscal consolidation efforts¹**
Financial balance changes, 1993-2002



1. Financial balances used to measure fiscal consolidation efforts are not cyclically-adjusted since no such data exist for central government.

Source: OECD (2003a).

But to address potential free-rider problems, fiscal co-ordination across government layers has recently been strengthened in many EU countries, some introducing an internal SGP (including Austria, Germany, Italy, Portugal and Spain), sometimes with sanctions in case of non-compliance.

... while ageing populations also have consequences for central-local relations

Population ageing is also exerting strong upward pressures on public spending, with differential effects on government tiers, reflecting spending responsibilities.¹⁰ Accommodating these pressures will require changes in the distribution of revenue-raising responsibilities and/or in the volume and design of intergovernmental transfers. In some countries, strong demand and/or cost pressures in the health and elderly care sectors have driven up the sub-national government spending share.¹¹ In Canada, population ageing is projected to result in a slightly faster increase in spending by the provinces and territories over the period 2001-2020 than for the federal government, largely reflecting their responsibility for financing health care services (Table 3). By contrast, in countries such as Australia and Switzerland, upward pressures will largely be felt by the central government since it finances a large part of social insurance and assistance schemes.

Table 3. **The consequences of demographic changes on fiscal outcomes in Canada**
Average annual changes over the 2001-2020 period, at current prices

	Federal government	Provinces and territories
Revenues	3.5	3.4
<i>of which:</i> Intergovernmental transfers	–	3.8
Spending	2.5	4.0
<i>of which:</i>		
Intergovernmental transfers	3.8	–
Elderly benefits	4.2	–
Employment insurance benefits	4.2	–
Education	–	3.2
Health care	–	5.2
Debt service	–6.7	3.0

Source: The Conference Board of Canada, 2002.

ISSUES DETERMINING THE ALLOCATION OF SPENDING RESPONSIBILITIES

This section presents the main issues that have arisen in allocating spending responsibilities to sub-national government levels and the expedients which have been adopted to deal with them. The economic issues raised are common to federal and non-federal states. They may also apply to the allocation or the use of authority within the EU, although fiscal relations differ considerably from those within both federations and unitary countries (Box 3).

The fiscal federalism literature contends that the provision of public goods at sub-central level can promote allocative efficiency and democratic choice. However, the key conditions for this to hold are not always fulfilled, in particular the absence of significant scale economies and spillover effects. In practice, there is often potential for scale economies, even though they are difficult to measure. In addition, few public goods are purely local by nature. In many cases, the quality and quantity of public goods provided locally have effects on economic performance in other jurisdictions. Where people in outside jurisdictions cannot be excluded from locally-provided services (education for example) sub-national governments can indulge in a “strategic game”, resulting in the under-provision of public goods and/or in an inefficient reliance on some public services. (The financing of local public spending may also have spillover effects on other jurisdictions which are discussed in the next section.) At the same time, responsibility for providing redistributive public goods and services often lies at sub-national government levels, whereas it is typically seen as a central government task in the fiscal federalism literature. Health care, social assistance and education account for the bulk of sub-national government spending in many countries (Table 4), often with

Box 3. Fiscal relations within the European Union

Fiscal relations between national authorities and community institutions within the European Union differ considerably from those between levels of government in mature federations or in decentralised unitary countries.

- Under the subsidiarity principle, powers or tasks rest with the sub-units unless a central unit is more effective in achieving certain specified goals. In the EU case, the principle results in EU member countries having retained most of their fiscal powers. The European Community does not provide core public services, such as defence, and has no specific revenue-raising powers. Spending on agriculture (appropriations for commitments) accounted for 44 per cent of the general budget of the EU for 2000.
- The European Union's own budget is too small (less than 1.3 per cent of EU-wide GNP in 2000) to allow the pursuit of union-wide macroeconomic stabilisation objectives or to address country-specific shocks. It is mainly made up of a fixed share of VAT revenues collected by EU member countries and a contribution proportional to each member country's GNP. The estimated revenue for a financial year must be equal to the appropriations for payments of that year: no borrowing is allowed to cover a budget deficit. The bail-out of a member country is explicitly forbidden in the Maastricht Treaty.

There are, nevertheless, similarities between fiscal relation issues arising at the EU level and within an individual country, particularly with respect to enforcement of budget discipline, the co-ordination of tax practices and the regional distribution of funds:

- The introduction of the single currency by 12 EU countries has reinforced the need to co-ordinate fiscal policies within the euro area, as fiscal profligacy in some countries could lead to a risk premium for the area as a whole. The Stability and Growth Pact, which embodies fiscal rules agreed by EU countries is supported by multilateral surveillance and peer pressures.
- On the revenue side, creating the appropriate conditions for the free movement of people, goods, services and capital, has entailed some co-ordination of national tax practices across EU countries. In particular, the sixth VAT directive has brought the harmonisation of the VAT bases across EU countries, a key condition to reduce administrative and compliance costs for companies engaged in intra-EU trade. In addition, securing fair competitive conditions has underpinned several initiatives by the European Commission, including the EU Code of Conduct on business taxation, the arrangements on the taxation of e-commerce transactions, the proposed directive on the taxation of pensions and the proposed directive on the taxation of cross-border savings of individuals.
- Inter-regional redistribution schemes are also in place at the EU level, with EU Cohesion and Structural Funds aimed at promoting the growth potential of lagging countries and regions. Structural and cohesion funds amounted to about one-third of the general budget of the EU for 2000. *Per capita* GDP differences at the European national level are much higher than among the US states and Canadian provinces (Hoeller *et al.* 1996) and will widen further after the accession of new Eastern European countries.

Table 4. **Spending by sub-national governments by main categories**
In per cent of total sub-national governments' expenditure 2001 or latest year available

	General public services		Public order and safety		Education		Health		Social security and welfare		Housing and community amenities		Transport and communication ¹		Other	
	State, Region or Province	Local	State, Region or Province	Local	State, Region or Province	Local	State, Region or Province	Local	State, Region or Province	Local	State, Region or Province	Local	State, Region or Province	Local	State, Region or Province	Local
Federal countries																
Australia (1998)	10.7	13.7	8.2	2.4	29.4	0.4	20.1	2.1	4.8	6.3	3.4	18.7	8.8	27.5	14.7	28.9
Austria	13.0	17.6	0.5	1.9	19.9	16.1	23.3	12.3	18.4	21.4	4.1	3.9	17.8	17.8	3.0	9.0
Belgium	14.6	20.7	0.2	10.0	42.9	20.5	0.8	2.0	16.9	15.9	2.5	2.4	17.2	13.0	5.0	15.7
Canada	1.8	6.1	3.5	8.9	23.2	40.5	31.9	1.1	16.3	7.4	1.4	5.5	3.7	12.6	18.1	17.8
Germany (1996)	5.8	7.4	8.0	3.4	21.9	13.0	8.0	14.5	17.1	24.6	4.1	15.3	5.7	6.0	29.4	15.9
Switzerland (2000)	5.1	8.4	8.2	4.5	24.7	23.0	16.6	18.3	17.8	14.8	2.1	8.2	9.8	7.2	15.8	15.5
United States (2000)	3.4	5.8	4.5	10.8	31.0	44.1	21.9	8.7	18.1	7.5	0.7	2.1	7.9	6.1	12.6	14.9
Non-weighted average	7.8	11.4	4.7	6.0	27.6	22.5	17.5	8.4	15.6	14.0	2.6	8.0	10.1	12.9	14.1	16.8
Unitary countries																
Czech Republic		12.3		1.8		24.2		1.1		8.2		20.9		15.8		15.7
Denmark		4.1		0.4		13.1		16.5		57.2		0.9		4.2		3.6
France		36.2		2.3		16.4		0.7		9.9		6.2		10.3		18.0
Hungary (2000)		15.7		1.1		27.9		16.4		13.3		13.8		3.6		8.1
Iceland (1998)		4.2		1.2		28.2		0.9		15.5		5.3		9.1		35.7
Ireland (1997)		2.3		1.8		11.3		45.5		5.2		14.9		11.3		7.8
Luxembourg		19.5		1.7		16.1		0.9		4.6		9.1		21.0		27.1
Netherlands ² (1997)		9.4		3.4		17.9		2.6		22.6		20.0		6.7		17.4
Norway (1999)		5.5		0.9		22.2		32.5		17.6		6.4		4.5		10.4
Poland		7.0		4.2		27.8		24.8		8.0		11.4		10.1		6.7
Slovak Republic		28.4		3.2		0.3		0.7		1.7		41.5		12.7		11.4
Spain ² (2000)		25.3		5.7		25.8		4.2		3.9		6.5		18.2		10.5
Sweden		12.0		1.0		21.0		25.6		27.6		2.9		5.5		4.3
United Kingdom (1998)		4.0		12.3		28.7		0.0		32.5		5.4		4.9		12.2
Non-weighted average		13.3		2.9		20.1		12.3		16.3		11.8		9.8		13.5

1. Economic services in the case of Austria, Belgium, Denmark, France, Luxembourg, Spain and Sweden.

2. Provincial and local governments.

Source: OECD National Accounts database for Austria, Belgium, Denmark, France, Luxembourg, Spain and Sweden; IMF (2002) for the others.

significant discretionary powers to set social assistance benefit levels and/or to assess the eligibility for some social benefits (Denmark, the Netherlands, Norway, Spain, Sweden, Switzerland and the United States).

Local provision may fail to exploit economies of scale

The smallness of local jurisdictions often implies that they are below the critical size for cost-efficient provision of public goods. Few studies provide direct estimates of the economies of scale attaching to the provision of public services at sub-national levels.¹² However, core services – in particular education and health care – provided by lower levels of government are characterised by scale economies. In the education sector, the recent PISA study reveals that a low student-teaching staff ratio – a common feature in small jurisdictions – may not improve education outcomes.¹³ In the health care sector, many countries are rationalising their supply of hospital care services. Small hospitals or clinics are being closed down or transformed to deliver services of a more specialised nature, thereby contributing to economies of scale and scope, with the aim of improving health care quality (Canada: British Columbia, Finland, France and Italy). For public procurement, country surveys also reveal that sub-national governments tend rarely to rely on competitive tendering, as information and transaction costs act as a serious barrier for the smallest jurisdictions (*e.g.* in Denmark, Norway but also in Switzerland where regulatory fragmentation further raises inter-jurisdiction transaction costs).¹⁴ In addition, small jurisdictions may not be able to carry out the professional administration of complex tasks such as assessing eligibility for early retirement pension (Denmark), providing active labour market programmes (Switzerland and Denmark), developing appropriate benchmarking between the quality and costs of services by different providers (Hungary) or monitoring the implementation of regulations in the construction sector (Turkey).

... and to internalise territorial spillovers

The absence of a close match between local benefits and costs may result in a sub-optimal provision of public services and goods. This issue can often arise in the case of public services and infrastructure provided by cities which benefit suburban residents who use inner centre services and transport facilities.¹⁵ Commercial centres and leisure facilities located in central areas but used by suburban residents do indeed generate extra financial resources for city administrations, but these may be insufficient to compensate for the costs of building and maintaining city-centre services and infrastructure. This problem will be more acute when income taxes assigned to the jurisdiction of residence and/or property taxes are a key sub-national financial resource. Other territorial spillover issues may arise when education and training programmes are managed at a sub-national

level. If they are too targeted on local needs, they may not respond adequately to countrywide needs and hinder the mobility of employees. In Switzerland for instance, primary and secondary education programmes are set under the responsibility of the cantons. The close proximity of managers to the communities which they serve facilitates feedback and adaptation of the system to clients' preferences. However, the absence of a nationwide school curriculum may contribute to reducing the geographical mobility of the parents once they have made a choice of the school for their children, thus hampering labour mobility.

The risk of under-provision of welfare benefits and redistributive services

Devolving welfare state programmes to sub-national governments may bring some benefits but also entails some risks. Local provision allows for experimentation and innovation which generate valuable information and has the potential to promote progress in public policy nationwide (Oates, 1999). In the United States, experimentation was key to the success of the waiver programmes for the pre-Temporary Assistance for the Needy Families (TANF) and the replacement of the Aid to Families with Dependent Children (AFDC) with TANF. Local provision also allows for tailoring welfare programmes to local conditions. In particular, the optimal mix of assistance across cash, childcare, training, housing and transportation to facilitate work might be very different across urban and rural areas. In addition, centrally-decided levels of social assistance may result in significant inequalities if benefits are not adjusted for purchasing power (as for instance minimum pensions in Spain). However, local welfare provision and financing may result in even higher differences in living standards for those in need of assistance, raising horizontal equity concerns.¹⁶ Assigning responsibility to finance these programmes to the sub-national authority can destabilise local finances, especially when the poor are concentrated in city centres and/or rural areas – an issue in Switzerland and the United States. Moreover, raising local taxes in these jurisdictions would fail to restore sound public finance, but rather may trigger a vicious circle of urban sprawl with middle and upper income groups migrating from inner cities.

A risk of under-provision of public services may emerge when jurisdictions providing better quality services attract residents from other jurisdictions. The perceived threat of welfare-induced migration may even trigger a strategic game, whereby sub-national governments set welfare benefits and the quality of social services too low from the society's point of view. Welfare-induced migration in the United States, where the states deliver core social welfare programmes, is a case in point. Though evidence on welfare-induced migration remains mixed, the empirical findings suggest that states do act as if welfare migration was common.¹⁷ They may either set benefits at a low level, so as to avoid becoming a "welfare magnet" or institute "two-tier" schemes with less generous benefits to migrants from other states. The relatively low mobility of people in European countries

reduces the need for such devices. However, a reluctance by municipalities to welcome new elderly residents has been reported in Finland (Hemmings *et al.*, 2003) while, in France, municipality discretionary powers in the domain of social housing and elderly welfare benefits have recently been curtailed. The risk of under-provision could also materialise even in the absence of (a threat of) migration flows, when eligibility for local public services is not conditional on residence, while the costs are born by individual sub-national governments. In Brazil, for instance, municipalities are responsible for providing, and financing, most health care services for any citizen, whether or not he/she resides in the municipality. This is an inducement to reduce their services and push people to rely on other municipalities' services (Varsano *et al.*, 2002).

Inefficiencies due to overlapping responsibilities across government levels

The lack of a clear division between the spending responsibilities of higher and lower-level spending authorities may result in an inefficient use of resources. Responsibilities for implementing and financing health care, for example, are often shared across government levels. In Germany, the statutory health funds finance operating costs for hospitals, the *Länder* finance hospital investment and regulate hospital capacity while the municipalities provide local health care services. This has created incentives for the *Länder* to expand hospital capacity, thereby creating local employment, while leaving part of the operating bill to health funds (Wurzel, 1999). In Norway, the central government is responsible for managing and financing the hospital care sector while municipalities are responsible for primary care. Since municipalities do not pay the costs of hospital treatment received by their residents, they have an incentive to under-supply preventive and outpatient care. They may also postpone the reintegration of patients who are no longer in need of hospital-based care into the health care services they finance (Joumard and Suyker, 2002a). This creates a risk of an over-reliance on costly hospital resources while waiting lists to get hospital treatment remain long. In the Netherlands, the interaction of local welfare benefits with central government schemes has created poverty traps and sub-national government discretionary powers in these domains are being curtailed.

Duplication of tasks, or attempts to shift the financial burden to another government layer, are also frequent when labour market and social assistance programmes are under the responsibility of different levels of government. In Norway, some municipalities have complained about the strategic failure of the public employment service (PES) to reduce the number of unemployed. The concern is that, because the government-managed PES fails to take account of the cost of unemployment assistance paid for by municipalities, it tends to underestimate the benefits of investing in active labour market policies. This has led some of the Oslo districts to start their own "miniature employment offices" (Joumard and

Suyker, 2002a). In Germany, municipalities are responsible for administering and financing social assistance while unemployment assistance is managed by the Federal Labour Office and financed by the central government. The fact that means-tested benefits, based on different rules, are processed by two different layers of administration increases administrative costs. Splitting budgetary costs for assistance programmes across government layers might also have a negative impact on job placement efforts by the labour office.¹⁸ Furthermore, each government level also has an incentive to shift the financial burden for these programmes to the other layer. At the federal government level, lowering unemployment assistance benefits (as occurred in 1999) effectively shifts part of the costs to municipalities (Wurzel, 2003). Municipalities also have an incentive to induce unemployed social assistance recipients to participate in work provision schemes offered by the Federal Labour Office, which re-establishes eligibility for unemployment benefits. A similar “carousel strategy” on social assistance was common until recently in Finland.¹⁹

Frequent approaches include: amalgamations or a “two-speed” system

Merging sub-national governments is one option to exploit scale economies and internalise spillovers. Amalgamations can also help to reduce the duplication of tasks, in particular administrative ones, and to balance intra-regional disparities in income levels with the needs of public services (in particular between city centres and suburban areas). Recent mergers have led to fewer authorities of larger size in a number of countries (including Belgium, Canada, Iceland, Netherlands and Sweden). The upper government tier often contributes financially to improve the attractiveness of amalgamation (Finland, Japan, Norway, and some cantons in Switzerland), as it may benefit from lower costs at a local level through the grant system. However, what may be considered appropriate policy for urban areas may not help much in dispersed rural communities when the delivery of high quality public services is an important tool used for regional development objectives (*e.g.* Norway). Optimal boundaries also vary significantly between different public services (*e.g.* water management *versus* health care provision), implying that the redefinition of borders will never lead to an “optimal area” division for service provision. Amalgamations often meet fierce political resistance, due to vested interests or because sharing taxes and expenditures in a new and larger entity almost inevitably produces winners and losers.²⁰

Designing a “two-speed”, or asymmetric, assignment of spending responsibilities could be an option, by transferring spending responsibilities only to jurisdictions with a critical mass and/or sufficient human and technical knowledge. In practice, however, few countries have used such an asymmetric assignment (the exceptions including Brazil, Italy, Russia and Spain) and then mostly for political or geographical reasons.

... centralisation or norms imposed on sub-national spending programmes

Strategies to internalise spillovers and exploit scale economies have also included the reassignment of spending responsibilities to an upper government tier. In Norway, responsibility for hospital care was transferred from the counties to the central government in 2002. In Switzerland, professional regional placement offices managed by the Swiss cantons substituted municipal labour offices (over 3 000 before 1995) with low professional abilities and a too local orientation of their training programmes. In Ireland, local government environment responsibilities have largely been transferred to central government agencies and the management of sewage facilities will be transferred from town councils to county councils from 2004.

In many countries, the central government and/or Parliament has increasingly been engaged in setting standards on the coverage, quality and price of public services provided by lower levels of government. These standards and norms are particularly frequent in the health care and education sector, as well as in welfare programmes (which in most countries account for the bulk of sub-national public spending). They potentially address equity issues but rarely scale economies. In the education sector, rather detailed regulations on the curriculum are imposed by the central government in most decentralised systems (*e.g.* Denmark, Spain and Mexico). In Germany and Switzerland where education is under the sole responsibility of sub-national governments, most of them have gradually agreed some common rules. For social assistance programmes, where they have significant autonomy, the Swiss cantons have been increasingly involved in setting eligibility criteria as well as benefit levels, as well as in their financing which have long been the sole responsibility of the municipalities. Micro-managing the implementation of sub-national government spending programmes goes quite far in some countries, leaving them, for instance, with virtually no flexibility to set wage levels for their own employees (Germany, Italy, Norway and Portugal).

... co-operation agreements across and between levels of government

Ad hoc co-operation agreements among levels of government have increasingly been used to achieve “optimal” functional areas specific to each public service. There are two broad approaches to such co-operation. The first relies on a purchaser/provider split. The supply of public services is concentrated in some jurisdictions, which receive some compensation from other jurisdictions benefiting from the services. This approach has been implemented in Switzerland, in particular for hospital care services and tertiary education through co-operation agreements between cantons (Journard and Giorno, 2002).²¹ Similar horizontal arrangements, with compensation for the providers’ costs, are in place in Denmark

and Sweden for hospital care where patients have a legal right to choose hospital treatment outside their county of residence. Such a co-operative approach based on a purchaser/provider split can also be extended between levels of governments when spending responsibilities overlap. As an example, the financial responsibility for long-term care in Sweden was shifted to the municipalities in 1992. Municipalities are now required to pay the hospital for care services for patients who are no longer in need of hospital-based treatment (Roseveare, 2002). Apart from allowing the exploitation of scale economies and the internalising of spillover effects, this approach has the advantage of introducing some competition between providers of public-funded services, whether public or private, inducing greater cost-efficiency.

The joint provision of public services, through jurisdiction associations, has been another form of co-operation. In some countries, such co-operation arrangements have been encouraged by the government. In Hungary for instance, the central government promotes joint service supply organisations created by municipalities through the Act on Municipal Associations and Inter-Municipal co-operation passed in 1997 (Cekota *et al.*, 2002). Financial incentives amount to an additional 1 per cent top-up to central government grants. In many countries, this form of association has been used to provide public utilities – *e.g.* waste water treatment, water provision, and energy distribution – and for regional public transport system. These associations can contract out by tendering the service or provide it themselves, generally through a jointly owned public corporation. However, in some cases, the lack of division between purchasers and providers has hampered competition to develop and has made it difficult to improve cost-efficiency. As an example, Finnish municipalities acquire services from hospital districts (an association between several municipalities) that they are themselves responsible for running. Since hospital districts are also large local employers, municipalities may not be in a position to force cost-effectiveness (Hemmings *et al.*, 2003). Transferring the responsibility for the provision of a service to an intergovernmental body may also lower democratic accountability, leaving citizens with little influence on local public services.

There are two main constraints for the co-operative arrangements to develop further. First, it requires appropriate and transparent cost accounting – which in many cases is not available in the smallest jurisdictions – so as to set the financial compensation for the “buying” jurisdictions at a “fair” level. This has led the Swiss confederation to set up a model contract, containing minimal standards with respect to cost transparency, rights and obligations of the partners, and overall democratic accountability (OECD, 2002c). Second, it may be difficult to apply to public services which are non-rival and non-excludable (*e.g.* roads) since free riding could not be discouraged.

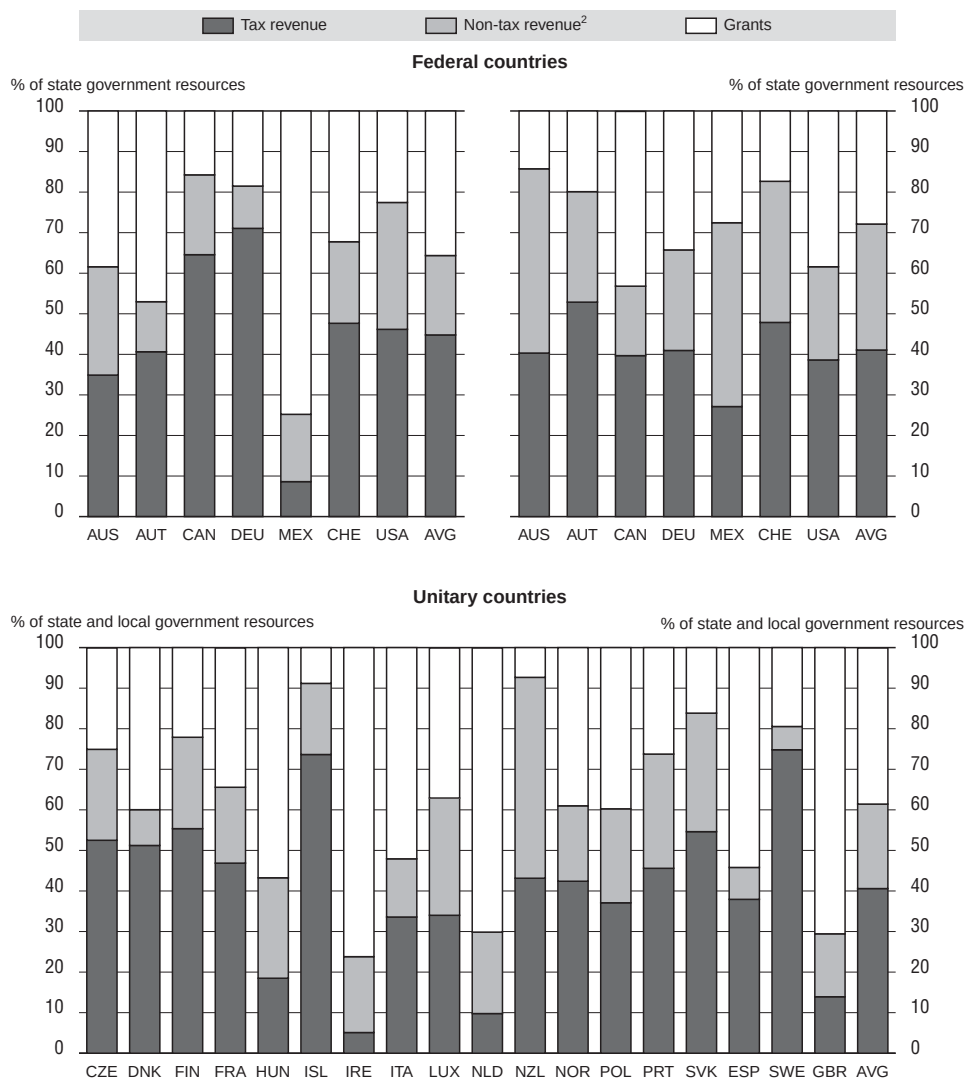
FUNDING PRINCIPLES TO PROMOTE EFFICIENCY

Funding principles play a key role in influencing sub-national government spending behaviour. To be “optimal”, financing patterns should meet several, sometimes conflicting, objectives. On the one hand, sub-national governments may better respond to local citizens’ preferences where local taxation allows spending to be matched with costs. On the other hand, the need to smooth volatile local tax revenues, efficiency of tax collection, minimisation of compliance costs often argues in favour of some co-ordination/centralisation of taxing powers.²² In practice, sub-national governments rely on very different mixes of resources – grants, tax and non-tax revenues (Figure 3). Moreover, the autonomy they are granted to set tax bases and rates varies significantly across countries. In some cases, sub-national government tax revenues derive mostly from tax-sharing arrangements, whereby sub-national governments receive a share of the taxes collected within their jurisdiction, or nationwide, but have virtually no right to set tax parameters (*e.g.* Austria and Germany) (Box 4). Both federal and unitary countries show great variation. The design of intra-governmental transfers also varies substantially. This section discusses both the extent to which control over tax instruments can be decentralised and the issues that arise in designing intra-governmental transfer systems.

Tax assignment issues

While it is commonly agreed that some congruence between spending responsibility and revenue-raising powers is needed to exercise fiscal autonomy and improve accountability, there are few taxing powers which can be transferred to subordinate levels of government without raising efficiency and/or distributional concerns. The literature on fiscal federalism contends that sub-national governments should minimise the use of mobile tax bases, redistributive taxes, unevenly distributed tax bases (*e.g.* on natural resources) and taxes subject to sharp cyclical fluctuations.²³ It thus excludes corporate income taxes and redistributive personal income taxes. Consumption taxes could be candidates, but administrative considerations (compliance and collection costs) and the mobility of the base (cross-border shopping in boundary areas and inter-jurisdiction trade) reduce their attractiveness. Property taxes avoid some of these pitfalls, making them attractive for sub-national government use, but raise equity issues and their yield is low: revenues from property taxes amounted to less than 2 per cent of GDP in the OECD area in 2000 (Figure 4). For countries with significant devolution of expenditure powers, this is insufficient. Thus, sub-national governments rely on other tax bases, most often on a shared basis with the central government. Income taxes predominate in the Nordic countries and some Eastern European countries

Figure 3. Composition of sub-national government financial resources
As a percentage of total financial resources, 1999¹



1. For non-tax revenue: 1984 for Switzerland, 1997 for France, Ireland, Luxembourg, the Netherlands and Spain, 1998 for Iceland, Norway, Portugal and the United Kingdom.

2. Non-tax revenues include: operating surpluses of public enterprises controlled by sub-national governments; property income; fee, sales and fines; contributions to government employee pension funds and capital revenues.

Source: OECD Revenue Statistics.

Box 4. Tax-sharing arrangements

Tax-sharing arrangements take various forms across countries, entailing significantly different degrees of effective sub-national influence on the tax revenues accruing to them:

- Sub-national governments may tax the same base as the central government, but may decide on their own tax rates. Such “piggyback” tax-sharing is in place in the United States for the income taxes and in most Nordic countries for the personal income tax.
- Tax-sharing can mean that sub-national governments are entitled to a given percentage of the tax revenues arising in their jurisdiction. This form of tax sharing is in place for the personal income tax in Spain and the corporate income tax in Finland. By designing the appropriate framework conditions, sub-national governments can promote economic activity within their jurisdictions and thus their own tax revenues.
- Tax sharing can sometimes just be a share of nation-wide tax receipts, rather than the tax collected in each particular jurisdiction. This form of tax sharing resembles a grant as sub-national governments have virtually no power to influence the revenues accruing to them individually.

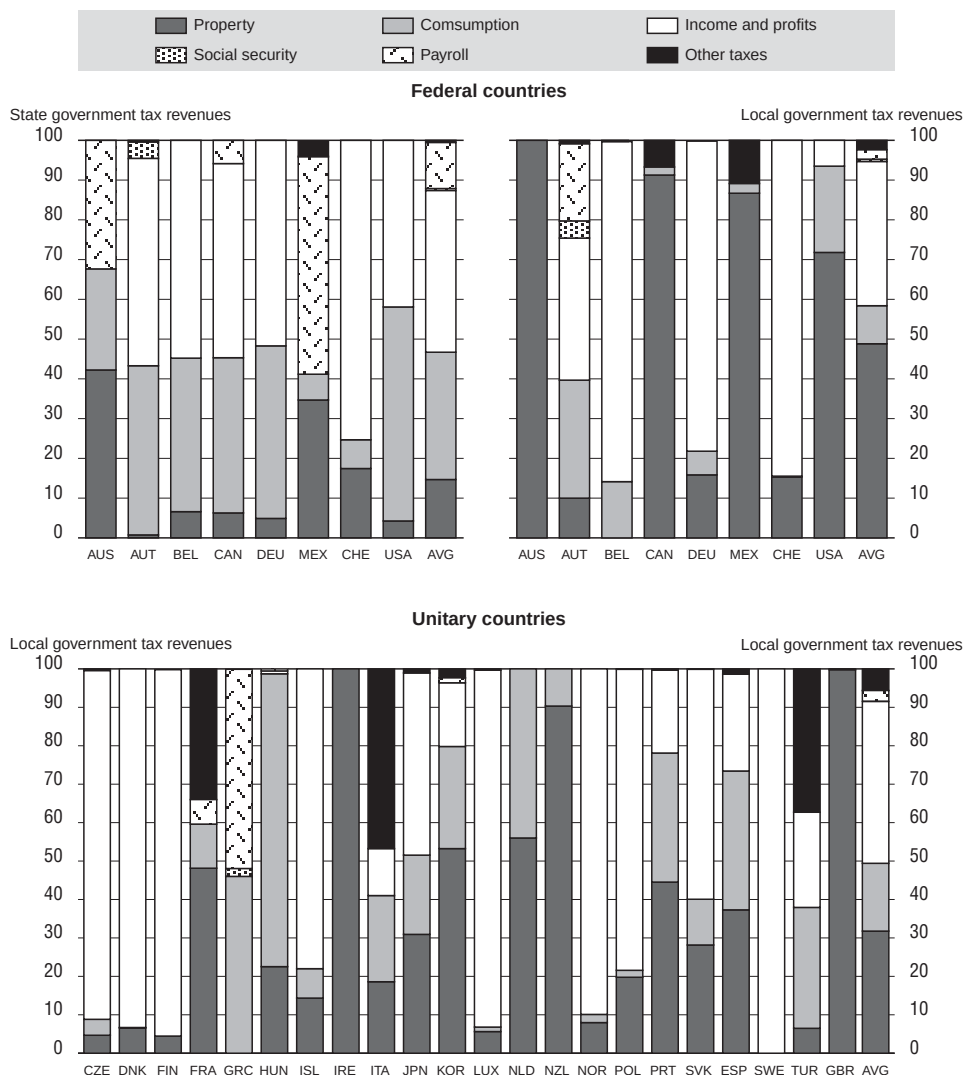
(Poland and Slovak Republic), while consumption taxes play some role in many countries.

User fees and charges

User charging follows closely the benefit principle, whereby local households and businesses pay for what they get and get what they pay for. They may also act as price signals, reducing excess demand and encouraging customer-oriented management by subjecting public bodies to a market test. Information on sub-national government revenues from user fees and charges is seldom available, let alone on which services they apply. For some countries however, piecemeal information reveals that user fees and charges account for a significant share of sub-national government financial resources. They are frequent for waste collection and wastewater treatment, while a number of municipalities have introduced road toll systems.²⁴

Further reliance on user fees and charges by sub-national governments, however, faces two main constraints. *First*, increasing sub-national government reliance on user charges may raise equity concerns, especially where applied to core goods and services (namely education, health care and social assistance).

Figure 4. **Composition of tax revenues of sub-national governments**
As percentage of total tax revenue, 2000¹



1. 1999 for Poland.

Source: OECD Revenue Statistics.

Sub-national governments are frequently bound by legal constraints in setting the level of charges. In most countries, they are not entitled to introduce tuition fees for public primary and secondary education, with frequent limitation on user fees for childcare and educational facilities (Denmark and Norway). *Second*, user charging is an attractive option only if the implementation costs (including administrative costs but also, in some cases, the investment necessary to “individualise” consumption) are lower than the expected efficiency gains. Implementation costs are also likely to reflect scale economies and thus be high in the smallest jurisdictions. Waste collection provides an example of this trade-off between implementation costs and efficiency gains from user charging – sub-national governments having adopted rather different approaches. In some countries, including Australia, Canada, Denmark, Sweden and the United States, certain municipalities have implemented weight- or volume-based charging for household waste, and there is some evidence that this has resulted in reduced waste generation. These charges, however, involve rather high implementation costs.²⁵ In other countries, waste collection costs are reflected in a resident base tax (*e.g.* on a per household basis in Ireland) or incorporated into property taxes paid by residents (*e.g.* through a surcharge on the *Taxe d’habitation* in France). These formulae provide fewer incentives to reduce the generation of waste but are less costly to implement. Overall, there are serious limits to how much revenue can be generated from user fees at a sub-national level.

Property taxes

Property taxes have key advantages as sub-national taxes. Most notably, the tax base is highly immobile, there is no ambiguity about which authority is entitled to the tax on any given property, the tax is difficult to evade and efforts to improve local infrastructure are likely to be reflected in property values, thus increasing the tax yield for sub-national governments. Property tax revenues are also relatively predictable. These advantages have been exploited in many countries. Property taxes account for all, or most, local government tax revenues in Australia, Canada, Mexico, Ireland, New Zealand, the United Kingdom, and to a lesser extent in France, Korea, the Netherlands and the United States. Furthermore, contrasting with most other tax revenues allocated to them, sub-national governments have significant autonomy in setting property tax rates, though less frequently in setting the base (OECD, 1999). In the context of the *OECD Economic Surveys*, the OECD has recommended that sub-national government reliance on property taxes be increased in a number of countries (Czech Republic, Finland, Greece, Japan, Mexico, Norway, Poland, and Portugal), *e.g.* by lowering the administrative barriers to their wider use, by giving sub-national governments greater autonomy in setting property tax rates or by updating the land and housing register.²⁶

General consumption taxes

Giving sub-national governments discretionary powers with respect to general consumption taxes, either sales taxes or value added taxes, may entail high compliance and administrative costs to contain tax fraud and evasion and may create distortions in inter-jurisdiction trade. The United States is the only OECD country not to have a national value added tax (VAT). Instead, the sales tax accounts for a large share of sub-national government revenues (about one third of state tax revenues in 2000). Each state and municipality has its own exemption rules and its own definition of product and services and they set their own tax rates. The lack of a uniform tax base has however made it difficult to enforce out-of-state collection without increasing significantly compliance costs, and thus hindering interstate commerce. The Supreme Court has ruled that it is illegal for states to attempt to enforce the collection of sales taxes from enterprises that do not have a physical presence in that state (Herd and Bronchi, 2001). This has created significant distortions in competition across jurisdictions while the provision allowing companies to claim exemption from upstream sales tax at the point of sale has not worked well, resulting in tax cascading and tax exporting.²⁷ To reduce the barriers to trade caused by differential sales tax regulations, thirty-eight states are currently involved in the *Streamlined Sales Tax Project*, which is an effort to modernise and simplify sales taxes. In particular, the Project's proposals will incorporate uniform definition of tax bases. In Canada, where a dual federal value added tax system (GST) and provincial sales tax co-exist, some harmonisation across provinces has also taken place.²⁸

Value added taxes, which in principle alleviate the cascading problem associated with turnover and sales taxes, can also be administratively cumbersome and create economic distortions when managed in a decentralised manner. This may explain why some countries with a strong federalist tradition (Australia and Switzerland) have opted for a central government VAT system in the 1990s, with no discretionary powers at a sub-national level. In most countries where VAT revenues account for a share of sub-national government resources, tax bases and rates are determined centrally (Austria, Belgium, Germany, Mexico and Spain). In contrast, Brazilian states do have discretionary powers over VAT rates. This has increased the scope for tax evasion and fraud, made the system cumbersome to administer and comply with, and raised the contentious issue of how VAT revenues should be shared across jurisdictions. Similar issues have arisen between countries within the EU area, in particular after the removal of border controls (Box 5).

Personal income taxes

Personal income tax revenues account for a substantial component of sub-central government financial resources in a large number of countries (including

Box 5. Issues in implementing a decentralised VAT system

A central question in designing a decentralised VAT system is what to do with trade between jurisdictions. Two principles could be applied – the destination or origin principles. Not only do they differ in their treatment of inter-jurisdictional trade, but they have different impact on incentives for tax fraud and evasion, on administrative and compliance costs, and on the distribution of VAT revenues.

Under the *destination principle*, consumption taxes are levied where the products are consumed. Goods and services travel tax-free across jurisdictions. In the absence of internal barriers, the destination principle increase the scope for tax fraud, since it creates strong incentives to overestimate exports (zero-rated) and understate imports (since VAT should be paid). Administrative co-operation could help to reduce it. In the EU area, where the destination principle is in place for the business sector, the system is however administratively cumbersome and has been identified as a barrier to trade across countries.

The *origin principle* implies that goods and services are taxed where they are produced. It has advantages in that it can be applied without borders. Since goods do not travel tax free, the potential for tax fraud is lower.

Sharing of VAT revenues across jurisdictions. To ensure that VAT receipts accrue where consumption takes place, a mechanism to redistribute VAT revenues across regions/countries is required when the origin principle applies. This redistribution issue has been contentious at the EU level and in Brazil. With the elimination of customs controls within the EU area in 1993, a move from the destination to the origin principle was envisaged. This would have induced significant changes in the distribution of VAT resources across countries. EU countries with a trade surplus *vis-à-vis* the EU area would have collected extra revenues compared to the existing regime of zero-rating for exports while deficit countries would have lost VAT revenues. In Brazil, the consistent implementation of the origin principle would result in a regressive redistribution of VAT revenues to the relatively prosperous south where imports enter to the poorer north which rebate taxes on exports. To mitigate this regressive effect, rates on exports from wealthier states to poorer ones are taxed at a lower rate than goods moving in the opposite direction. This has however made the Brazilian system a quite complicated system (McLure, 2000) and prone to tax fraud.

Austria, Belgium, Canada, Czech Republic, Germany, Japan, the Nordic countries, Poland, Spain, Switzerland and the United States). Such a reliance on personal income tax could be seen as broadly in line with the “benefit principle” since core public services provided by sub-national governments serve residing individuals (in particular, education, health care and social welfare). However, it could make it difficult to secure a minimum or average standard of merit goods in poorer jurisdictions with a weak taxing capacity. Furthermore, the objective of maintaining a

redistributive role of the personal income tax could be weakened. In fact, very few countries have made it possible for lower levels of government to alter the progressive rate structure. In Austria and Germany, they have no autonomy to set the personal income tax base and rates though part of the personal income tax revenues collected within sub-national government boundaries accrues to them. Belgian regions are not entitled to institute surtaxes or rebates which would diminish the progressivity of the federal personal income tax. In Spain, the recently reformed personal income tax system provides more flexibility to sub-national governments but still requires the Spanish regions to impose a progressive (though loosely defined) rate structure. The difficulties in maintaining a progressive income tax at a local level has been recognised in the Nordic countries. There, sub-national governments are allowed only to set a flat tax rate on personal income (subject to band limits set by the central government in Iceland and Norway). In the United States, states have much more freedom in setting the personal income tax base and rate structure. Nine states levy only limited or no individual income taxes and six apply a flat rate.

Local governments may not fully take into account the national externalities resulting from their income tax policies. An increase in local tax rates will lower incentives to work, save and seek education and thus affect the national growth potential. It can further result in lower tax revenues and higher spending for other government tiers (vertical fiscal externalities): higher local tax rates, by reducing work efforts, could result in lower social security contributions and central government tax revenues, combined with higher welfare benefits. Rather limited or non-existent tax autonomy can serve to prevent sub-national governments setting personal income tax “too high”. The upward bias issue for local income tax has, however, been an important cause of concern in Denmark and Sweden, where, contrasting with Iceland and Norway, there is no ceiling on local personal income tax rates. To avoid an upward drift in personal income tax rates, in 1996 the Swedish central government introduced “a tax on local government tax”, for any municipality increasing its tax rate but this tax was abolished in 1998.²⁹ In Denmark, a “tax freeze” was instituted in 2002 as an agreement between the central government and the County Council Association regarding their tax levels. Since the West Zealand County violated the agreement by raising taxes by 0.4 per cent, the central government announced in November 2002 that block grants to all counties would be reduced in 2003.³⁰

Corporate income taxes

Corporate income tax revenues account for a rather large part of total sub-national government tax revenues in several OECD countries (Canada, Czech Republic, Finland, Germany, Japan, Switzerland, Turkey and the United States). This has raised a number of issues, including: the high volatility of the associated

revenues, the potential for tax competition, high administrative and compliance costs and distortions in production and trade patterns within the countries. The volatility of corporate income tax revenues compared with other tax revenues (Table 5) is problematic for sub-national government financing needs since their core expenditure is often either largely unresponsive to the economic cycle (*e.g.* education) or tend to increase during downturns (*e.g.* social assistance transfers).

Table 5. **Volatility of tax revenues**
Standard deviation of the real growth rate of tax revenues, 1985-2000¹

	Personal income	Corporate income	Social security contributions	Property income	Consumption	Total
Australia	6.51	11.26	..	2.83	9.21	3.87
Austria	6.05	14.32	1.44	2.98	4.74	1.98
Belgium	4.23	8.91	1.73	6.06	2.66	1.82
Canada	4.83	13.84	3.97	3.12	3.11	2.31
Denmark	2.80	19.46	14.86	9.63	4.39	3.18
Finland ³	7.34	91.05	5.83	7.49	4.99	5.02
France	12.82	7.78	3.23	19.60	2.27	1.26
Germany	6.90	13.07	5.12	2.97	5.49	4.79
Greece	10.67	20.23	6.50	105.14	6.01	4.35
Hungary ²	5.24	22.47	4.98	28.95	4.58	3.55
Iceland	7.18	19.53	30.40	6.23	5.74	4.72
Ireland	6.06	16.53	4.86	7.41	4.16	3.92
Italy ³	5.52	12.45	5.77	4.41	4.75	3.03
Japan	9.52	11.65	3.61	3.76	4.48	4.62
Korea	8.93	26.18	41.09	11.68	9.34	5.73
Luxembourg	4.71	12.95	3.21	3.65	5.15	3.86
Netherlands	10.03	9.38	5.29	3.27	2.85	3.15
New Zealand	5.18	21.58	..	6.06	11.35	4.66
Norway	6.71	37.86	6.11	8.97	6.25	4.03
Poland ⁴	7.43	8.50	8.68	4.67	9.96	5.41
Portugal ⁵	10.52	26.17	4.33	7.06	8.49	4.84
Spain ⁶	10.78	19.76	2.91	5.34	7.62	4.18
Sweden	6.27	23.52	7.49	25.02	3.85	4.61
Switzerland	5.58	8.12	2.64	3.11	5.11	2.24
Turkey	13.53	18.92	21.65	..	9.89	8.51
United Kingdom	6.55	14.31	4.77	14.75	2.66	3.89
United States	4.34	8.59	1.71	1.61	1.80	2.14
OECD non weighted average	2.75	6.20	1.69	2.14	1.23	1.35

1. Using GDP deflator. The volatility measured here reflects both tax revenues variations throughout the cycle and discretionary tax changes.

2. Over the period 1991-2000.

3. Over the period 1993-2000 for property income.

4. Over the period 1992-2000.

5. Over the period 1989-2000 for personal income tax and corporate income tax, 1990-2000 on property income.

6. Over the period 1987-2000 for property income.

Source: OECD, Revenue Statistics.

Constraints on sub-national government recourse to borrowing further limit their ability to smooth revenues over the cycle. This may destabilise sub-national government public finance and may give rise to spending during upswings that may be difficult to prune in less favourable times. In conjunction with balanced budget requirements in place in many countries at the sub-national levels (see below), reliance on volatile corporate tax revenues may generate an undesirable procyclicality in fiscal policy stance. Recognising these drawbacks, Norway abolished the corporate income tax sharing arrangement between municipalities and the central government in 1998. In the context of the *Economic Surveys*, the OECD has further recommended reducing sub-national government reliance on corporate income tax in a number of countries (including Finland and Japan).

The need to split corporate income tax revenues when a company operates in several jurisdictions has posed some problems. In Finland, revenues are shared between municipalities according to the number of employees in each of them. Since municipal public services are more closely related to where people live than where people work, this could create financial imbalances across municipalities.³¹ In the United States, there is no co-ordination in the apportionment formula. In determining corporate income tax on the profit earned by a company in a given state, states have long used a formula that accords equal weight to three factors: payroll, property and sales. Recently, individual states have increased the weight of the sales factor and reduced the weight on payroll and property, resulting in a *de facto* partial transformation of the corporate income tax into a quasi sales tax. This is partly paid by companies and households from other jurisdictions and represents an attempt to generate economic development at the expense of other states and, in particular, the hope of attracting new employment (OECD, 2001c). While on average, the states that have lowered the payroll weight have increased employment, aggregate employment effects across the whole country are close to zero (Goolsbee and Maydew, 1998). In this context, promoting uniformity in the apportionment formula, as among the Canadian provinces, has been recommended by the OECD (OECD, 2001c).

Sub-national government use of taxing powers

Varying intensity of tax competition

The intensity and form of tax competition vary significantly across countries and tax bases, largely reflecting differences in the mobility of citizens and companies but also in the degree of discretionary powers over taxes granted to sub-national governments. While competitive pressures across jurisdictions can help to limit the overall tax burden and public spending, they may also make the tax system more complex, thus raising compliance costs and introducing distortions. Competition to attract companies, and hence create employment, has often been

more intense than competition to attract households. In the United States, every state has either enacted or significantly expanded one or more tax incentives in recent years with respect to business location (OECD, 2000b). This has caused other states to adopt retaliatory measures, imposing high costs, further shrinking the tax base and increasing the complexity of the tax system. Similar forces have been at play in Canada, where several provinces have instituted tax credits that reduce the cost of equity financing for businesses which have a presence in their territories above a certain minimum threshold.³² Such credits can segregate the capital market, providing an incentive for firms to relocate so as to access large capital pools to the detriment of economic activity in smaller provinces. In Switzerland, while corporate income tax bases have been harmonised across cantons since 2001, some of them reportedly negotiate special tax rebates and the overall tax burden on companies has tended to decline while those on individuals has increased over the past 15 years.³³

Tax competition to attract companies has also been at play in some countries where sub-national governments have no power to adjust the corporate tax base and rates but receive a share of taxes paid by companies within their jurisdiction. This form of tax-sharing arrangement creates incentives for sub-national governments to improve the framework conditions for economic activities to develop. In Finland, municipalities compete to attract companies by building modern business centres and/or offering business premises, low-priced public services and logistic services (Joumard and Suyker, 2000b). In this context, competition across jurisdictions creates more pressures to increase public spending than to contain taxes. In Germany, tax competition sometimes take the form of a differential interpretation of the provisions of federal tax laws by the *Länder* (Wurzel, 1999). The *Länder* indeed bear the cost of tax administration and tax auditing, but since only a small fraction of additional tax revenues accrues to them, it hardly pays from the individual *Länder* perspective to strengthen their audit procedures, raising the issue of which government level should collect and audit taxes.

Under-utilisation of sub-national taxing powers

Sub-national government powers to adjust less mobile tax levels have not been fully exploited in a number of countries. OECD Economic surveys (including those for Finland, Korea and Norway) point out that variations in personal income and property tax rates across sub-national governments are surprisingly small. In Korea, most sub-national governments stick to the guidelines issued by the central government for setting property-related taxes, the inhabitant tax and the tobacco tax, while in Norway the municipalities have all kept the marginal personal income tax rate at the maximum level set by law since 1979. This is all the more surprising as fiscal equalisation schemes in these two countries are based on actual tax revenues collected in their jurisdiction, and not on potential revenues

(or taxable income) – the fall in tax revenues resulting from a cut in a jurisdiction's local tax rate is largely paid for by other jurisdictions. The apparent absence of tax competition could reflect several factors, in addition to rather low population mobility, in contrast to the situation in the United States. *First*, sub-national governments may be reluctant to enter into aggressive tax competition, as it could be seen as compromising fruitful economic co-operation in a number of areas. This has been considered as one possible explanation for Finland where variation in municipal rates for the personal income tax is low considering the freedom municipalities enjoy (Hemmings *et al.*, 2003). *Second*, comparative information on tax levels across jurisdictions may be lacking, thus reducing pressures for jurisdictions to compete. Tax-sharing arrangements – whereby several government tiers rely on the same tax base – may make it difficult for individuals to assess performance at the individual government level and thus further reduce sub-national government accountability.³⁴ *Finally*, central government transfers to sub-national governments often contain discretionary features (Finland, Hungary, Korea and Norway), and sub-national governments may be reluctant to cut local taxes because they fear becoming ineligible for these discretionary supports.

Intergovernmental grants

Externalities associated with local taxation and provision of public goods, large disparities in fiscal capacities across jurisdictions combined with the society's objective to secure minimum standards in the quality of public services across the whole country, have led many countries to rely extensively on intergovernmental grants.³⁵ The design of intergovernmental grants varies significantly from one country to another. However, two broad categories can be distinguished as they have a different impact on sub-national government fiscal autonomy and incentives. Earmarked grants have been defended on the ground that they could serve to internalise externalities. On the other hand, by providing strong incentives to spend in specific domains, they may result in overspending. By contrast, block grants leave sub-central government with discretion as to how to organise local provision in the most effective way. They are often seen to be the most appropriate for equalisation purposes, though earmarked grants often contain a redistributive element. The design of formal fiscal equalisation schemes, however, differs significantly from one country to another, making it difficult to draw cross-country comparisons on the amount of public resources mobilised to reduce fiscal disparities across regions.

Earmarked versus block grants

Earmarked grants have been used extensively to minimise the risk of suboptimal spending in domains characterised by significant positive spillover effects or

to secure minimum standards for specific services across the country. Conditions attached to earmarked grants effectively require that they be used to provide particular services. In several countries, sub-national government incentives to spend in these services are increased by topping up their funding via a national/central contribution.³⁶ In practice, however, measuring economic externalities or defining minimum spending levels to reach a given quality for public services – so as to set the contribution rates from the central government at an appropriate level – has proved to be extremely difficult.³⁷ In Korea, only one fifth of the projects financed by earmarked grants actually demonstrate spillover effects (OECD, 2003b), while in Switzerland, Confederation contribution rates to cantonal expenses primarily reflect the Confederation's fiscal position when specific earmarked grants were introduced (Journard and Giorno, 2002). For the United States, federal matching shares are typically much larger than justifiable by any plausible level of spillover benefits.³⁸ Managing earmarked grants also entails high administrative costs (Germany, Switzerland, and United Kingdom).³⁹ Furthermore, since externalities extend both between and within layers of government, extensive reliance on earmarked grants to internalise spillover effects would probably lead to a too complicated transfer system.

Earmarked grants have resulted in excessive spending and/or poor cost-effectiveness in many countries. In Italy, earmarked grants have largely been set by reference to the previous year's expenditures and without reference to objective performance criteria. This has weakened incentives to contain costs and been a major source of regional over-spending (Bibbee and Goglio, 2002), prompting reforms whereby health care transfers to the regions are now partly based on demographic factors and conditional to the introduction of efficiency- and quality-enhancing measures. In Mexico, the basic education grant from the federal government to the states – the largest earmarked grant – is largely determined on the basis of wage costs negotiated at the central government level. This creates an incentive for states to increase the number of teachers instead of putting the weight on school enrolment or educational attainment. It has also resulted in significant variations across states in amounts transferred per pupil (OECD, 2003c). In other countries (including Czech Republic, Ireland, Poland, and Switzerland), earmarked grants are largely based on *ex post* actual costs, instead of *a priori* standard costs, dulling incentives to contain costs. Furthermore, since every expenditure eligible for matching must be defined precisely, earmarked grant systems may limit a sub-national government's ability to be innovative.

A potential conflict between allocative and redistributive objectives can arise from an extensive reliance on earmarked grants. Earmarked grants could have adverse distribution consequences, since sub-national governments are often required to match the grants together with a certain amount of local funds. Because poorer jurisdictions may lack this matching ability, this system has been

identified as benefiting wealthier jurisdictions in some countries (*e.g.* China). To mitigate this bias, earmarked grants have been designed to contain an element of redistribution in some countries. In the United States, the Medicaid programme managed by the states is largely financed through earmarked grants, with the federal contribution rate in state spending varying from one state to another to reflect their income *per capita*.⁴⁰ In Germany, co-funding from the federal government for some investment programmes is conditional on the recipient state having a financing capacity below the federal average or its economy being subject to structural changes (Wurzel, 1999). Similarly, at the EU level, GDP *per capita* in individual countries and regions is a key eligibility criteria for most EU structural and cohesion funds.⁴¹ In Switzerland, the Confederation's participation rate varies from one canton to another to reflect their fiscal capacity. Nevertheless, in some cases the part which the poorer cantons have to pay remains too high for them to benefit from federal grants, thus undermining the redistribution objective (Journard and Giorno, 2002).

Given these problems, many countries have recently reduced their reliance on earmarked grants or redesigned them. In the 1990s, Canada, Finland, Iceland, Norway and Sweden drastically reformed their grant system, replacing most earmarked grants by general-purpose grants.⁴² In Japan, the 2002 budget significantly reduced the matching rate for local government spending on public works.⁴³ In Ireland the share of earmarked grants in local government revenue declined from over 40 per cent in the early 1990s to between 25 and 28 per cent in the late 1990s. Greater emphasis on outcomes (as opposed to inputs) has also been built into the grant system in some countries, with the objective of raising cost-effectiveness of earmarked grants. In the United Kingdom, Public Service Agreements (PSAs) – setting out objective outcome-focused targets and linking funding to service delivery – were extended to local government grants in 2000.⁴⁴ In Canada, after abandoning the system of cost-sharing tied to specific expenditure in the 1990s, the central government made federal funding to the Provinces conditional on respect for comprehensiveness and universality in the health care system. Australia has made some grants contingent on States adhering to certain general principles of the National Competition Policy implementation targets. In Brazil, the transfer of resources to sub-national governments for education and health has been conditional on the quality of services provided since the late 1990s.

Over time, this conditionality could create incentives to improve the quality of services, by rewarding co-operative behaviour. The OECD has recommended similar initiatives to improve the incentive structure of the grant system for a number of countries, including Germany for the transfers to new *Länder* under the Second Solidarity Pact (Wurzel, 2003) and Mexico (OECD, 2003c).⁴⁵ It remains an open question, however, as to how central governments should react to any sub-national failure to meet the objectives of such grant schemes, especially for those services which affect

the whole country's performance. Sanctioning poor performance by cutting grants would exacerbate any deterioration in the quality of services.

Fiscal equalisation schemes: an equity-efficiency trade-off?

There are significant differences in the design of fiscal equalisation schemes. In many countries, they take the form of the direct allocation of a share in nationally collected taxes. In others, formal fiscal equalisation schemes do not exist. In the United States for instance, they were abolished for states in 1981. However, redistribution across jurisdictions can stem from many channels. As noted above, earmarked grants often contain means-tested elements. Progressive federal income taxes also introduce some form of redistribution across jurisdictions, by taking more from jurisdictions with wealthier inhabitants. Specific rebates on national taxes and/or social security contributions for poorer and/or remote jurisdictions also exist in many countries (France, Italy and Norway). In addition, national social insurance schemes – and in particular unemployment insurance – do not set differentiated risk premiums across regions. In Canada, the national Employment Insurance programme further discriminates in favour of high unemployment regions by making it easier to qualify for benefits with the same contribution rates (OECD, 2001d). In the United States, the extended benefits provisions of the federal-state unemployment insurance system also provide an additional 13 weeks of benefits to unemployed workers in states that have recently experienced a sharp increase in unemployment.

The impact of fiscal equalisation schemes on economic efficiency has been an important issue in many countries. Equalisation could promote efficiency for at least two main reasons. *First*, inter-regional transfers may avoid regional disparities becoming self-perpetuating and help to promote growth in the rest of the country/area. Within the EU area, EU structural funds have for instance played an important role in the modernisation and restructuring of Greece, Ireland, Portugal and Spain, allowing advances in the convergence process and “crowding in” private investments as well as employment.⁴⁶ *Second*, fiscal equalisation transfers could be considered as a prerequisite for effective fiscal competition, by allowing levels of public service to be compared at comparable resource levels. By reducing *ex ante* disparities across jurisdictions in providing comparable levels of public services at comparable taxation levels, they act to level the playing field between poor and rich jurisdictions and/or between jurisdictions with differences in costs of providing public services reflecting exogenous reasons (including population density, geographical factors and endowment in natural resources). In the absence of equalisation transfers, rich jurisdictions or those with cost advantages would dominate and competitive pressures would be lower.⁴⁷ In a number of countries, large cities also receive some financial compensation through fiscal equalisation schemes to account for the higher costs of producing services and/or the demand

from neighbouring jurisdictions (spillover effects).⁴⁸ This puts them in a fairer position to compete on the quality of public services and/or the level of taxes with suburban jurisdictions.

Individual country OECD Economic surveys, however, have revealed cases where fiscal equalisation schemes have failed to improve public sector efficiency and/or reduce regional disparities. In Italy for instance, an over-dependence on transfers appears to have obstructed development in the poorer regions, while equalisation of *per capita* resources produced no convergence in service quality and gave no incentives for better governance (Bibbee and Goglio, 2002). Similarly in Germany and Japan, the high level of investment in poorer areas has had little success in achieving convergence of economic performance (Wurzel, 1999 and OECD, 2000c). At the same time, by impeding changes in cost differentials and reducing migration flows across regions, fiscal equalisation transfers may hold back growth in more dynamic regions and hinder necessary adjustment in less dynamic ones.⁴⁹

Fiscal equalisation transfers may also create poverty traps, by reducing sub-national government incentives to introduce growth-promoting policies. Of particular concern are schemes that largely offset changes in local government own revenues by fiscal equalisation transfers. The risk of poverty traps associated with fiscal equalisation schemes has been considered an important issue in some countries, including Australia, Austria, Canada, Germany and Japan. In Austria, Schneider (2002) estimated that on average 55 per cent of additional revenues from the communal tax (which is the most important of a local government's own taxes) are compensated by a loss of equalisation grants. In extreme cases, Austrian local governments can lose up to 144 per cent of the additional tax yields resulting from a larger tax base of the municipality. This reduces local government incentives to adapt local conditions so as to facilitate new companies within their jurisdiction (see also OECD, 2001e). In Canada, it has been argued that equalisation can adversely affect economic expansion in the have-not provinces, particularly the lowest-income Atlantic Provinces, and therefore stand in the way of badly needed regional adjustments that would reduce horizontal imbalances. In Japan, also, an increase in local revenues reduces the level of the general grant from the central government: municipal governments only retain 25 per cent of the increase in revenues and the prefecture 20 per cent (OECD, 2000c). While such schemes offer few fiscal rewards for developing local tax base, disincentive effects could be muted by policy makers' efforts to attain other objectives, including employment creation.

Countries have implemented two strategies to reduce potential disincentive effects associated with fiscal equalisation schemes, implying in each case some compromise with equity objectives. In the new Spanish transfer system from the central government to the regions, transfers are designed to fill the gap between

revenues and expenditure needs for each region for a base year (1999) and will not be adjusted to reflect actual growth performance of individual regions. The OECD has recommended that Germany adopt a similar approach, so as to increase the incentive structure of the equalisation system by relying more on “equalising lump sum transfers”, *i.e.* fixed over a multi-annual period.⁵⁰ A consequence of this “freezing” of the grant system is likely to be that the equalisation component will gradually be reduced and eventually lost. Another approach has recently been followed by Italy. There, a new equalisation scheme based on national VAT receipts was introduced in 2000, abolishing almost all transfers to the regions. The VAT fund is intended to equalise up to 90 per cent of the differences in standardised *per capita* revenues (contrasting with the previous system with full equalisation), leaving room for incentives to develop local tax bases. Partial equalisation schemes are also in place in Nordic countries, though with significant variations among them.

MACROECONOMIC MANAGEMENT IN A DECENTRALISED SETTING

Several macroeconomic management issues emerge in a decentralised fiscal policy setting. One key issue is how to ensure the sustainability of public finances while maintaining a stabilisation role for fiscal policy. A number of countries have experienced fiscal slippage at the sub-national government level, often procyclical. Against this background, this section discusses the use of fiscal co-ordination mechanisms between the different tiers of government and provides an overview of different country strategies. The questions addressed include: Is there a role for sub-national fiscal rules, such as balanced budget or “golden” rules, expenditure ceilings, or limits on the ability to raise money on the financial market? And to what extent could market mechanisms enhance fiscal discipline? Problems of transparency, related to the availability and consistency of relevant public finance data across government levels are also of importance here.

Overall fiscal discipline could be at risk

Several factors make it difficult to secure fiscal discipline in a decentralised setting. One problem is that sub-national governments do not take account of all effects at the national level in their decision-making. Higher public spending could have adverse spillover effects on the rest of the economy. Financed through sub-national borrowing, it may affect lending conditions for other public and private agents. Financed by higher taxes, it can undermine incentives to work and invest. Strategic behaviour could also develop in a decentralised setting. In many countries, the central government has provided discretionary financial support to sub-national governments running into financial difficulties (Finland, Germany,

Norway, Italy and Sweden) or has bailed them out (Brazil, Italy and Mexico). Expectations of a “rescue package” create a moral hazard problem and make it more likely that sub-national governments implement fiscal policies which are unsustainable. In Sweden for instance, an empirical survey of municipalities’ behaviour revealed that those that previously received discretionary financial support failed to comply later on with the balanced budget requirement as they expected their deficit to be covered by future grants from the central government (ESO, 2002). Finally, overlapping responsibilities and the lack of a clear match between decision-making and financial responsibility could weaken accountability and create an upward bias in public spending. Conversely, central authorities have raised minimum standards or transferred spending responsibilities to sub-national levels without taking full account of all the costs at the sub-national level (including Brazil, Denmark, Norway, Russia and the United States). These “unfunded mandates” may force sub-national authorities to raise taxes or to run deficit.

Strategies to secure fiscal discipline vary

To address the risks of a loose fiscal policy, countries have relied on a wide array of instruments. Country approaches can roughly be divided into four “stylised” categories (Table 6 and Annex, which presents a more detailed overview of strategies in selected countries).⁵¹ In some countries, the central government exercises tight control on sub-national authorities by imposing strict administrative controls. In Greece and Turkey for instance, sub-national government budgets are controlled by higher levels of government while any local authority borrowing is subject to approval by the central government in Ireland, Japan, Korea and the United Kingdom. Combined with little sub-

Table 6. **Strategies for ensuring fiscal discipline**¹

Administrative control ²	Centrally imposed rules	Formalised co-operation	No institutional co-ordination
France, Greece, Ireland, Japan, Korea, Luxembourg, Turkey, United Kingdom	Brazil, Finland, Hungary, Italy, ³ New Zealand, Norway, Poland, Portugal, Slovak Republic, Sweden	Australia, Austria, Belgium, Denmark, Germany, Iceland, Netherlands, Spain	Canada, ⁴ Czech Republic, Mexico, Switzerland, ⁴ United States

1. This table emphasises the main co-ordination strategy in place in different countries. However, the relationship between different government tiers is complex and the division of countries in this table is therefore not clear-cut.

2. In practice such controls result in limited fiscal autonomy at the sub-national level.

3. A domestic stability pact has been imposed by the central government, but the enforcement of the pact is left to a co-operative institution.

4. Canada and Switzerland have loose and informal budget co-ordination mechanisms.

Source: Annex.

national taxing power, this leaves sub-national authorities with limited fiscal autonomy. At the other extreme, a limited number of countries have maintained extensive fiscal autonomy at a sub-national level, while relying on market forces to secure fiscal discipline. In Canada, Czech Republic and the United States, financial markets play a major role in enhancing fiscal discipline. In Canada and the United States, many intermediate government tiers have voluntarily adopted some sort of balanced budget rules to improve their credit rating.⁵² Furthermore, sub-national fiscal policy is subjected to the scrutiny of citizens through popular referenda in Switzerland.⁵³

A majority of countries have relied on fiscal co-ordination, either through fiscal rules imposed by the central government (including Brazil, New Zealand, Finland, Italy, Poland, and Portugal) or by setting up co-operative institutions (including Australia, Belgium, Denmark, Germany and Spain). While these two approaches often result in similar fiscal arrangements their implementation is likely to differ. In a co-operative approach, fiscal objectives are established through a negotiation process involving central and sub-national authorities, usually represented by the regional level and/or local government associations. This approach is found in most federal countries, reflecting the constitutional role of the regions, and in unitary countries like Denmark and Iceland. It has also prevailed in the European Monetary Union for designing the Stability and Growth Pact, where participating countries have agreed on a deficit limit, a debt ceiling and procedures in case of non-compliance. This contrasts with the practice in most unitary countries where fiscal rules are imposed by the central government.

A co-operative approach offers several advantages. First, it gives a political platform for discussions in an area of significant public interest and importance. It may also help to strengthen political commitments, and hence fiscal discipline, through a consensus-building strategy. Peer-pressure may further act as a control mechanism, with local awareness of the macroeconomic implications of policy choices, making circumvention less likely. On the other hand, it may be difficult to reach an agreement on common fiscal policy objectives and, not least, sufficient enforcement mechanisms. In Germany, for example, a Domestic Stability Pact was finally agreed in 2002 after having been on the agenda since the mid-1990s. No sanction applies in case of non-compliance in Germany. In Austria, the financial sanction is subject to the unanimous decision of a body consisting of representatives from all government tiers.⁵⁴ In Denmark, a system implying financial sanctions in case of non-compliance was abolished in the late 1980s after the Local Government Association threatened to withdraw from the negotiations (Lotz, 1991). In some cases, sub-national governments are represented through an association, which may lack legal authority to enforce the agreement, putting it at risk. As an example, local government income tax rates have increased by 5 percentage

points in Denmark since the mid-1980s, of which only 1¼ percentage points were foreseen in the agreements with central government (Daugaard, 2002). Furthermore, political compromises may also result in inconsistencies and loopholes in the negotiated agreements, undermining its role as a steering instrument. In particular, there is a risk that agreed fiscal objectives – once they are biting – could be waived or changed in the following negotiation round.

A variety of fiscal rules have been implemented

A large variety of fiscal rules for sub-national governments exist.⁵⁵ Fiscal rules targeting the overall budget deficit (including Austria, Belgium, Finland, Sweden and Spain) or the operating deficit (including France, New Zealand and Norway) are most frequently used (Table 7). A deficit target has the advantage of simplicity and of being easily understood by the wider public, but could fail to prevent debt accumulation due to off-budget items. A recent survey on Swedish municipalities, for example, revealed a very low correlation between deficit and debt accumulation.⁵⁶ In some other countries, the fiscal rule takes the form of a ceiling on sub-national debt (Hungary, Portugal and Poland) or debt service (Brazil). These targets may be better suited to addressing considerations of long-term sustainability and inter-generational equity. A debt ceiling can still be circumvented, however, by sales of assets, outsourcing of debt to local public enterprises outside the governmental sector or by selling and leasing back fixed capital. When assessing long-term fiscal sustainability, debt targets should in principle be defined in net terms, but the value of publicly-held assets is uncertain and volatile, making a net debt target unreliable.

An important drawback of both debt and deficit targets is that they can be satisfied through higher spending and taxes, with attendant negative conse-

Table 7. **The use of fiscal rules and sanctions in selected countries**

	Sanctions in case of non-compliance		
	No sanctions	Administrative sanctions	Financial sanctions
Deficit target ¹	Finland, Sweden	Belgium, Spain	Austria
Operating deficit target ²	Italy, New Zealand, Portugal	Norway	Slovak Republic
Debt ceiling ³	Hungary	Poland	Brazil, Portugal
Expenditure ceiling	Germany	Belgium	

1. Usually takes the form of a balanced budget requirement.

2. May also take the form of a “golden rule”.

3. Limits on debt service, debt-to-revenue ratio or debt-to-GDP ratio.

Source: Annex.

quences for economic growth affecting all jurisdictions. This points towards restrictions in taxing autonomy at a sub-national level (in most countries, see above) and/or an expenditure target (implemented in Belgium and Germany). However, expenditure and debt levels may justifiably vary between different government bodies, making a common ceiling less useful and more difficult to implement on the sub-national level than a deficit target. And, as with a deficit constraint, an expenditure target does not necessarily prevent debt accumulation as spending can be pushed below the line. To prevent mere *pro forma* consistency with the rules, constraints may be needed on both flows and stocks. Hence, in practice, multiple fiscal regulations are usually applied to sub-national governments, with fiscal rules being combined with restrictions on taxing rights and/or borrowing constraints.

Fiscal rules: a trade-off between credibility and flexibility

The delicate trade-off between credibility and flexibility in designing fiscal rules is also an issue at the sub-national level. Rigid fiscal rules focusing on the overall annual budget position or debt holding are attractive because they are well defined, simple to understand and to communicate, and because they are transparent and can be readily assessed. These advantages have been considered as important criteria in designing optimal fiscal rules (Box 6). The drawback is that they may lack the flexibility to cope with unexpected events or cyclical downturns, reducing their credibility when they come under strain. A too flexible fiscal rule, on the other hand, could be easy to circumvent and may fail to secure fiscal discipline. Sub-national authorities may even misuse the flexibility provided to increase spending and indebtedness during upturns, augmenting future adjustment problems.

Some degree of flexibility has been built into the fiscal framework in most countries. In some, the fiscal rule mainly functions as an *ex ante* budget restriction, and not as an *ex post* requirement on sub-national accounts (including Germany, Italy and some US states). In other countries, the fiscal rule has to be complied with over the medium term, usually two to four years (including Finland, Norway, Sweden and some Canadian provinces and Swiss cantons). Furthermore, certain expenditure categories – public investment in particular – have been excluded from the fiscal target in a number of countries (including France, Italy, New Zealand and Norway). Others have combined simple fiscal rules with mechanisms to increase flexibility. Escape clauses, providing flexibility under special circumstances, have been introduced in Austria, Brazil, Italy, Poland and some Canadian provinces and in the EU Stability and Growth Pact. In the United States, all but five states have budget stabilisation funds (“rainy day funds”) and most have contingency funds set aside to provide for unforeseen expenditures.⁵⁷ At the EU level, several countries have also introduced more ambitious fiscal targets than the

Box 6. Designing fiscal rules

The literature on fiscal rules has suggested that an “optimal” fiscal rule should met several – and sometimes conflicting – criteria (see for example OECD, 2002d; Kopits and Symansky, 1998; and Buti *et al.*, 2002).

- Fiscal rules should be adequate relative to the final goal. To achieve fiscal consolidation, for example, the overall debt level should be targeted, or an indicator strongly correlated with debt accumulation. Similarly, an expenditure ceiling might be best suited to curb public spending.
- Fiscal rules should be *consistent* with other policy objectives. Conflicts between fiscal targets and other main policy goals are likely to undermine the fiscal rule as a steering instrument as sub-national governments may try to find ways around it.
- The fiscal target and possible escape clauses should be *well-defined*. A target on the overall budget deficit or debt level may, in this respect, be better than a more sophisticated target focusing on the structural position or excluding special expenditure or debt categories (*e.g.* a golden rule), since such targets may suffer from measurement weaknesses.
- The framework should be *transparent*. In particular, the division of responsibilities across governments should be clearly stated and the availability and quality of data should be assured. Increased transparency helps to make the rule less easy to circumvent by *ad hoc* measures and creative accounting techniques and may alleviate the trade-off between accountability and flexibility in designing fiscal rules.
- Rules should be *simple to understand*. By being easy to communicate, simple fiscal rules may be more appealing to the public than complicated rules and thus may gather stronger popular support.
- Fiscal rules should be *flexible* and able to handle unexpected events, cyclical downturns (letting automatic stabilisers work) and reasonable investment needs. This can be obtained by focusing on cyclically-adjusted targets, introducing a medium term framework or specifying escape clauses.
- Fiscal rules should be *enforceable*. This may call for a simple and well-defined fiscal rule. However, a too simple fiscal rule may risk prescribing a harmful fiscal policy reaction in certain circumstances, eroding the political and public support for the rule.

3 per cent deficit ceiling and the “close-to-balance budget” over the cycle enshrined in the Stability and Growth Pact. This partly reflects the need to cope with fiscal pressures stemming from an ageing population, but it is also designed to provide more flexibility for the operation of automatic stabilisers.

Fiscal rules have been supported by enforcement mechanisms

A number of enforcement mechanisms are in place across countries to strengthen sub-national incentives to comply with fiscal regulations.⁵⁸ In Austria, Brazil and Slovak Republic, sub-national governments failing to reach the fiscal target can be fined, while in Italy and Spain, a region causing the country to breach EMU fiscal rules would have to pay the associated penalty. In Denmark, grants to the counties were cut in 2003 in response to a violation of the agreed tax freeze. Similarly in Portugal, state transfers are to be reduced in 2003 if spending ceilings are exceeded or if financial information is not provided in time. The use of financial sanctions raises problems. In particular, it may not be time-consistent, as fining a sub-national authority already facing financial problems could be politically difficult or even unconstitutional. In fact, sub-national governments in financial distress usually receive increased financial support. In addition, a major requirement for the effective implementation of sanctions is independent arbitration. But it is not obvious that this requirement is met in many countries, in particular when the application of sanctions requires unanimously approval in a body consisting of all involved governments (*e.g.* Austria) or has to be approved through a majority in Parliament (Brazil and Denmark). Alternatively, financial sanctions may be imposed on the representatives of sub-national government. In Brazil, a comprehensive set of sanctions was introduced in the aftermath of three major state debt crises in the 1990s, including fines or impeachment and imprisonment for individuals responsible for violating the rules (World Bank, 2002).

A number of countries have introduced some type of "administrative" sanction or procedure. Sub-national authorities in Norway for example, are placed under central administration in cases of non-compliance,⁵⁹ while in Belgium and Brazil, central authorities may limit sub-national borrowing. A number of countries have introduced auditing or co-operative bodies to deal with sub-national authorities who fail to comply with fiscal targets. In Finland and Spain, defaulting authorities are obliged to present a plan for correcting any fiscal deficit, while Italy and France have introduced co-operative bodies to deal with sub-national governments which fail to comply with the regulations. Administrative sanctions imply costs in terms of loss of reputation and administrative freedom and are more likely to be implemented than financial sanctions. On the other hand, designing such sanctions is difficult, partly because of information asymmetries. Differences in municipality size, as well as historical and cultural aspects, also make it difficult to design sanctions that fit all sub-national authorities.⁶⁰

Problems have emerged

Efforts to co-ordinate fiscal policy across government levels have encountered fairly widespread problems. In Norway, 18 per cent of municipalities had a

deficit each year during the period 1980-98, on average (Borge and Rattsø, 2002), and currently 95 out of 434 municipalities and five out of 19 counties are facing administrative sanctions due to non-compliance with the balanced-budget requirement. Likewise, in Sweden and Finland, only approximately two-thirds and three-quarters of the municipalities, respectively, achieved balance in 2001. Fiscal rules have in some cases been circumvented by creative accounting techniques. In Italy, local deficits have partly been financed by arrears to suppliers. Similarly in China, sub-national governments have borrowed from local banks, enterprises, and wealthy individuals although they are not, in principle, allowed borrowing on their own account. Country experiences thus reveal both the difficulty in designing and implementing appropriate fiscal regulations and the need for them to be regularly reassessed and, if necessary, reformed. In Australia, for example, the co-operative framework was rearranged and strengthened in the mid 1990s in response to the increased use of sophisticated financing techniques, such as financial leases, to circumvent Loan Council borrowing limits. And, as a consequence of local bankruptcies in the aftermath of transition, Hungary tightened borrowing restrictions in 1995.

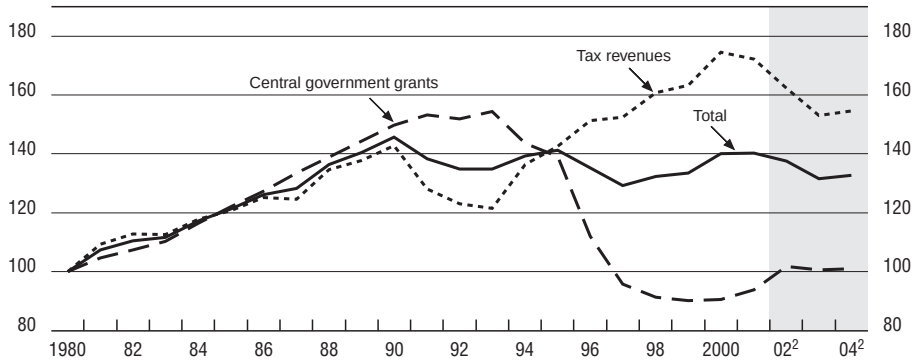
Despite the flexibility embodied within existing fiscal frameworks, coping with cyclical developments has not always been satisfactory. In Switzerland, cantons and municipalities have displayed a pro-cyclical fiscal policy in the past three decades (Journard and Giorno, 2002), while both Canada and the United States have invariably experienced periods of pro-cyclical fiscal policy at the sub-national level. In some countries (including Finland, Hungary and Norway), temporarily higher tax revenues have been transformed into permanently higher sub-national spending while lower revenues have been reflected in a deterioration in the sub-national government fiscal position and/or higher intergovernmental transfers (*e.g.* Spain up to the 2002 reform). Letting automatic stabilisers work in a decentralised setting has, however, been made possible in several countries where central government grants and/or tax shares are adjusted over the cycle to smooth variations in sub-national tax revenues. In Denmark and Norway, sub-national government grants and tax shares are adjusted through the annual budget process to reflect macroeconomic developments. In Finland, the central government has tended to offset the rise in municipal tax revenues in the late 1990s when the economy was booming by reducing state grants (Figure 5).

Market mechanisms could play a role in enhancing fiscal discipline

Market mechanisms could play a more prominent role in enhancing fiscal discipline at the sub-national level. In Canada and the United States, for example, credit ratings in bond market seem to act as a disciplining factor at all levels of government (Poterba and Ruben, 1997).⁶¹ Financial markets also play a part in disciplining sub-national authorities in countries like Czech Republic, Hungary,

Figure 5. **Finance resources of municipalities: tax revenues and central government grants in Finland**

Volume indices, 1980 = 100¹



1. 1995 constant prices using the deflator for government final consumption expenditure.

2. Estimates for 2002 and projections for 2003-2004.

Source: OECD, *National Accounts*, Statistics Finland and the Association of Finnish Local and Regional Authorities.

Finland and New Zealand, as sub-national debt is not guaranteed by the state. In Norway, restrictions on sub-national borrowing were relaxed in 2000 in an attempt to increase the role of the financial markets in disciplining sub-national government fiscal behaviour.⁶²

For financial markets to exert effective discipline on sub-national government borrowing, several conditions need to be satisfied.⁶³

- Sub-national authorities should not have privileged access to borrowing in any form. One implication of this is that public loans should be obtained in the private market, and not from publicly owned credit institutions with administratively-decided interest rates,⁶⁴ and should not be guaranteed by higher levels of government.
- Adequate information on the borrower's existing liabilities and repayment capacity must be readily available, so that potential lenders can correctly discriminate between borrowers. Information shortages impair the market's usefulness as a steering mechanism as reactions might be too slow or too abrupt and disruptive, with possible contagion effects on other sub-national authorities.
- No bailout of sub-national authorities facing problems must be anticipated. In practice, however, this is not politically tenable in many countries

because of equalisation objectives. There are very few examples of sub-national governments going bankrupt and causing huge losses for their creditors.⁶⁵

- The borrower must respond to market signals. This may not be the case in practice as short election periods may foster a short-sighted conduct of fiscal policy.

An alternative way to strengthen the role of market mechanisms would be to create a market for tradable deficit permits or taxing rights. A trading mechanism would recognise that fiscal policy slippage – in terms of deficit or higher sub-national taxes – creates negative externalities, by putting aggregate financial stability or efficiency goals at risk, while minimising the compliance costs of achieving a global target.⁶⁶ Such schemes have serious drawbacks, however, which limit their practicality. The initial allotment of permits could be contentious and the supply of permits difficult to change in response to economic shocks without penalising those jurisdictions that have exercised greatest discipline or bought permits at high price. More fundamentally, in a thin market, the price of such permits could be volatile and would not necessarily reflect spillover costs or be high enough to prevent a subsidiary level government from running into an unsustainable fiscal position. It should, however, be noted that a system of *transferable* deficit rights is in place in Austria. Based on agreed fiscal targets for each individual *Land* and for municipalities as a group in each *Land*, a mechanism is in place allowing the transfer of an overshoot to another participant.⁶⁷ Such transfers are likely to take place by political agreement between the parties involved, and may include some sort of compensation, although this is not made public. As an alternative economic instrument to limit tax hikes, central authorities could put a tax on sub-national tax increases and a subsidy on tax cuts. In Sweden from 1996, any tax increases by sub-national authorities resulted in a cut in central government transfers amounting to half of the extra revenues raised from the tax increase. This system of a “tax on taxes” was, however, abolished on constitutional grounds in 2000.

Transparency should be improved

Transparency is crucial if fiscal rules, co-operative agreements or financial markets are effectively to discipline subsidiary government fiscal behaviour. Budget reports should be comprehensive, encompassing the information needed for the relevant trade-offs between different policy options to be assessed.⁶⁸ An important element of fiscal transparency is an accounting system that delivers as accurate and timely a picture as possible, at both budgeting and reporting stages, of the impact of the government’s activities on its overall financial positions. In a number of countries, sub-national public finance data are often available with a significant time lag (Brazil, Germany, Italy, Mexico, Poland, Portugal and Spain) and

are not consistent with those for the central government (Korea and Switzerland). This makes it difficult to set a consolidated budget and thus to exert effective fiscal control or to determine the stance of fiscal policy. In most countries, sub-national public finance data are on a cash basis. Traditional cash accounting can lead to a misleading picture of commitments undertaken, since payments can be accelerated or deferred. In contrast, accrual accounting recognises the financial implications of transactions when they occur, irrespective of when cash is paid or received.⁶⁹ In general, measures to improve transparency by improving data availability and quality are to be strongly recommended. Applying and enforcing fiscal regulations is a political-economy as much as a technical issue. To pre-empt pressures for regulations to be inappropriately modified or set aside, governments should adopt a pedagogic approach. In this effort, transparency is a key issue.

NOTES

1. Since 1999, the tax system of 15 OECD countries (Belgium, Czech Republic, Finland, Greece, Korea, Iceland, Japan, Mexico, New Zealand, Norway, Poland, Portugal, Spain, Switzerland and the United States) has been reviewed – Economic Surveys for these countries containing a special chapter on tax reform. Public expenditure reform has been a special chapter for 21 OECD countries since 2000 (Canada, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Korea, Mexico, New Zealand, Norway, Poland, Portugal, Sweden, Switzerland and the United Kingdom). In addition, two special chapters on fiscal federal relations have been reviewed for Germany since 1996.
2. This paper relies in particular on the 2001 OECD *Economic Survey of Brazil*, the 2002 OECD Study on China as well as on the 2000 and 2002 OECD *Economic Surveys of the Russian Federation*.
3. The existence of information asymmetries, the reliance on incomplete contracts and the presumption that individual agents will put their own interest first when interacting with others are at the core of the co-ordination problems. In this respect, principal-agent theories are relevant for better understanding fiscal relations across levels of government.
4. This publication provides some information on the degree of sub-national taxing power for 19 OECD countries in 1995, OECD (1999). Fiscal discretion is considered as greatest if sub-national governments are free to determine both the taxable base and the rates of a particular tax, without any limits on revenues, base or rate enforced by the central government. Since 1995 however, sub-national government discretion has changed significantly in a number of countries. In particular, Spanish and Belgium regions have been granted more discretion in setting tax rates and rebates, in particular on the personal income tax base, while Mexican States are allowed since 2002 to levy a retail sales tax and to add a surcharge on the individual income tax under specific regimes. Similar data have been produced for Estonia, Latvia and Lithuania for 1997 and 1999 (OECD, 2002a).
5. In France, the local business tax and one property tax (*Taxe d'habitation*) – which accounted for the bulk of the municipalities' tax revenues and over which they have had significant effective taxing powers – are gradually phased out and replaced by central government grants. In Germany, the abolition of the business turnover tax in the late 1990s reduced municipalities' effective taxing powers.
6. Among the 66 harmful tax measures (which unfairly encourage businesses to locate in one EU country at the expense of another) identified by the EU Code of Conduct groups were: the Aland Islands Captive Insurance regime in Finland, the Basque country and Navarra co-ordination centres in Spain and the Santa Maria (Azores) Free Zones in Portugal.

7. Such a process of agglomeration and regional specialisation has been discussed by Krugman (1993) and Krugman and Venables (1993). New growth theories argue that positive externalities at the local level generate increasing returns on investment, such that capital and other production factors are likely to flow to the most advanced regions, leaving poorer regions further behind.
8. A discussion on the likely uneven regional distribution of the benefits of trade liberalisation (WTO accession) for China is provided in OECD (2002b) and for Brazil by Haddad *et al.* (2002).
9. The fall in nominal and real interest rates during the 1990s also benefited most central governments through reduced debt-related interest payments since, in many countries, the central government holds the larger share of the public sector debt.
10. Estimations of the fiscal consequences of ageing for the period 2000-2050, with a breakdown for old-age pensions, early retirement programmes, health care and long-term care, and child/family benefits and education, can be found in OECD (2001a).
11. Assuming constant coverage and quality of elderly care services in Norway, municipality employment on these services is projected to rise by 4 per cent over the 1998-2030 period (Joumard and Suyker, 2002a).
12. In Denmark, the Ministry of Interior has estimated the "economically optimal size" for a municipality (providing childcare, primary schools, elderly care and administrative functions) to be around 20 000 to 30 000 inhabitants. If all municipalities were of an optimal size, the potential permanent efficiency gains have been estimated at around 1¼ per cent of total local government outlays (about 0.5 per cent of GDP). In Japan the size needed for obtaining the lowest unit costs of public services has been estimated to be a population of 120 000.
13. The impact of the student-teaching staff ratio on performance may be non-linear. The recent PISA survey estimates that schools with an average student-teaching staff ratio below ten score about five to ten points below the OECD average. Differences in student-teaching staff ratios ranging from ten to 25 are associated with relatively small effects. However, as the student-teaching staff ratio rises above 25, there is a continuous decline in school performance (OECD, 2001b).
14. In some cases sub-national government have not actively sought to rely more on competitive tendering and to encourage the performance of the bidding system because one of their objectives is to support local companies (Japan and Switzerland). This may however hinder cost efficiency.
15. There are only few papers trying to quantify these effects. However, Haughwout (1998) found that city-centre infrastructure raises housing prices in the suburbs while Solé Ollé and Viladecans Marsal (2002) estimated that increases in operating spending and in the capital stock in the central areas of Spanish cities have had positive effects on long-run output growth in the suburbs.
16. A recent survey on minimum income support for families, under the responsibility of the regions in Spain, provides an example. This support varies significantly across regions once adjusted for differences in purchasing powers (de Ayala Cañón *et al.* 2001). For a household with three children, the benefits in the most generous region (the Basque country) were in 1998 more than twice those in the least generous (Castilla y León).
17. For a survey on these issues, see Brueckner (1998).

18. In Austria, the sharing in responsibilities for social and unemployment assistance across government levels is broadly similar and raises the same issues.
19. In Finland, municipalities are responsible for providing “bottom rung” social assistance for those who do not qualify or have used up their rights to the safety net provided by the Social Insurance Institution (KELA). Until recently, it was apparently not uncommon for municipalities to wait until the long-term unemployed are close to the end of their KELA benefits and then offer a job (partly subsidised by the central government) until they re-qualify for KELA benefits, thus avoiding payment of municipality social assistance (Hemmings *et al.*, 2003). In the late 1990s, the required working period to qualify for unemployment insurance was raised, making it less attractive for the municipalities to offer subsidised jobs to the unemployed.
20. This has often been the main reason for the rejection of mergers of municipalities through referendums in Switzerland.
21. Since 1981, inter-cantonal agreements have provided payments from cantons without a university in proportion to the number of students they send to other cantonal universities. The compensation varies across study fields to reflect tuition costs. The inter-cantonal agreements recognise that host cantons do benefit from having a university in their jurisdictions and thus set *per capita* compensation slightly below tuition costs.
22. These costs and risks associated with the devolution of revenue-raising powers to sub-national governments has led Tanzi (1995) to raise the following question: “If decentralisation is defended because it improves the allocation of resources on the expenditure side, how much of this efficiency is lost when the financing of that expenditure is highly distorted?”
23. On this issue, see McLure (2000) and Oates (1999).
24. According to information available in individual countries’ Economic survey, in 2000 user fees and charges accounted for 26 per cent of Finnish municipalities’ financial resources; 14 per cent for Norwegian municipalities and counties; and 23 per cent for Danish local governments. Toll systems have been introduced in some countries (*e.g.* in some large city centres in Norway, the United Kingdom and the United States).
25. O’Brien and Vourc’h (2001) discuss the use of various policy instruments by OECD countries to encourage environmentally sustainable growth. Linderhof *et al.* (2001) estimated the costs of implementing weight-based pricing in a Dutch municipality: the annuity costs of investment in weight-based pricing technology amounted to 10-15 per cent of waste collection costs.
26. A serious constraint to a wider reliance on property taxes has been the difficulty in assessing land and housing value in some countries, as a land and housing register is lacking (Greece and Poland) or the cadaster is out of date (Austria, France, Mexico, Portugal and Spain).
27. Residents of states with high sales taxes undertake more mail-order purchases – as well as internet purchases – than those living in states with low sales taxes. Moreover, this system gives out-of-state retailers a competitive advantage over in-state retailers and deters mail-order and electronic commerce sellers from having a physical presence in a large number of states (Herd and Bronchi, 2001).
28. Three Canadian Atlantic Provinces agreed to harmonise their sales tax with the federal GST from 1997. Comprehensive Integrated Tax Co-ordination Agreements (CITCAs) are used to achieve consumption tax harmonisation (in terms of base and rate structure)

under the CITCAs. The federal government applies a 15 per cent tax rate, rather than the 7 per cent GST rate applying in non-participating provinces, and turns over to the participating provinces their shares based on aggregate consumption estimates (OECD, 1997).

29. A 50 per cent surtax on municipal tax increases was decided in 1996, by which individual municipalities were to pay half the revenue raised from increases in their income tax rates to the central government. However, in 1998 the Supreme Court ruled that this violated the municipalities constitutional right to impose income taxes.
30. In case of the tax freeze agreement being violated at the county level, block grants will be adjusted both at an individual county level and collectively in the first two years. In the first round, counties raising their tax rates will have their block grants reduced by 50 per cent of the amount of extra tax revenues, while counties lowering their tax rates will have their block grants increased by 50 per cent of the amount of lost tax revenues. In the second round, block grants will be cut for all counties, this collective punishment amounting to half of the net extra tax revenues resulting from changes in the counties' tax rates and distributed proportionally across counties. From the third year, all net extra tax revenues resulting from changes in county tax rates will be confiscated through a reduction in general block grants.
31. In Finland, the need to share revenues has raised additional problems: it contributes to the delays in redistributing tax revenues to municipalities and generates some mistrust in the tax administration.
32. Investors earn a tax credit determined as a percentage of their investment, provided that the wages and salaries of the firm paid in the province concerned are above some predetermined minimum, (OECD, 1997).
33. See www.croise.ch/prestations/journal/sept2000p23.pdf
34. In Norway, for instance, taxpayers are largely unaware of what proportion of their personal income tax liability accrues to local *versus* central governments.
35. In some countries (including Finland, Germany, Mexico, Norway, Spain and Switzerland), intergovernmental grants also aim at regional development objectives, with formula-based grants including criteria on population dispersion and topographical characteristics.
36. Earmarked grants, however, do not always involve matching funding arrangements. In Australia for instance, the quantum of most special purpose grants is determined without relation to the level of State or local government funding.
37. See for instance Brueckner (1998). For welfare programmes, he argues that the theory indicates a qualitative need for matching grants but does not indicate the proper size of the matching rates, which cannot be computed reliably using existing information.
38. Oates (1999).
39. For Switzerland, administrative costs were estimated to range from 1.6 to 10 per cent of the grant for four conditional grant programmes (Jeanrenaud, 1994).
40. The US State Children Health Insurance Programme introduced in 1997 provides another example. It is a partnership between the federal and state governments. Funds from the federal government are allocated to each participating state according to the number of uninsured and low-income children.
41. EU Structural and Cohesion funds (euro 195 billion and 18 billion, respectively) will account for one third of the European Community budget for the period 2000-06. The

Cohesion Fund contributes to investment which benefits the environment and transport infrastructure in Spain, Greece, Portugal and Ireland, all of which have a *per capita* GDP of less than 90 per cent of the EU average. (Their eligibility will be reconsidered at the end of 2003 in the light of their GDP levels.) The bulk of the EU Structural Funds are directed at regions whose “development is lagging” (defined as those regions whose GDP *per capita* does not exceed 75 per cent of the EU average). For more information, see: www.europa.eu.int/comm/regional_policy/index_en.htm

42. In Sweden, 90 per cent of the grants were earmarked in 1992. Currently, some 25 per cent of total grants remain earmarked (Roseveare, 2002). The earmarking of housing assistance transfers accruing to the states has also recently been relaxed in Austria. Canada moved from a system of cost-sharing for health and post-secondary education to a system of block funding in the late 1970s. Cost-sharing of social assistance was changed to block funding in the 1990s.
43. The matching rate has been brought down from 60 to 70 per cent for some public infrastructure, to 30 per cent for public works such as river and coastal protection and agricultural roads, and to 45 per cent for ports and dams (OECD, 2003d).
44. In 2000, PSAs were concluded between the central government and 20 local authorities as a pilot exercise, containing a package of 12 key outcome targets. If they perform well, local authorities will be rewarded through financial benefits and increased autonomy. The government intended to extend local PSAs to 130 of the largest jurisdictions in 2002 (Van den Noord, 2002).
45. For Germany, Wurzel, 2003, suggested that the Solidarity Pact II with the new *Länder* could make funding by the federal government conditional on the presentation of appropriate outcome-oriented evaluations of infrastructure investment projects. For Mexico, the Territorial Development Policy Committee has recommended that education and health transfers from the central government to sub-national governments be based on output and outcomes – rather than input indicators or past expenditures.
46. According to the European Commission, EU structural funds contributed about ½ per cent per year to economic growth in these countries between 1989 and 1999. The cumulative effect added about 10 per cent to GDP in Greece, Ireland and Portugal and over 4 per cent in Spain (http://europa.eu.int/comm/regional_policy/intro/regions10_en.htm). On the impact of infrastructure investment partly financed by EU structural funds in Portugal, see Bronchi (2003). Recent OECD work (OECD, 2003e) also reveals that the modernisation of a country's infrastructure may also promote trade in services.
47. As an example, richer sub-national governments deriving substantial revenues from natural resources (Canada and Norway) should, in principle, only lower their tax rates if they were able to improve the cost-efficiency of their public spending programmes.
48. In Germany, the inhabitants of the city *Länder* are weighted at 135 per cent in the equalisation scheme whereas the larger *Länder* are weighted at 100 per cent. The 2001 Austrian *Finanzausgleichsgesetz* mandates that the population of cities with more than 50 000 inhabitants be weighted at 233 per cent before calculating inter-regional transfers according to population criteria (Fenge and Meier, 2002). In Australia, the grant system accounts for the estimated spillover in demand for the Australian Capital Territory from residents of adjacent communities.
49. As a general point, such an efficiency loss would need to be evaluated in the context of regional development objectives (such as retaining people in sparsely populated areas, *e.g.* in Norway).

50. It should be noted however that transfers under the “Solidarity Pact” for the new *Länder* in Germany are already independent of each individual Land’s growth performance. In addition, the reform of the inter-state equalisation system – to be effective in 2005 – introduces a “premium” designed to reward *Länder* whose increase in tax receipts (measured against the year before) exceeds the average revenue increase of all *Länder* combined (Wurzel, 2003).
51. The classification of country approaches into these four categories is not always clear-cut. In particular, the distinction between “administrative control” and “fiscal rules” imposed by the central government involves an element of judgement. A system of fiscal rules imposed on sub-national governments, combined with close monitoring and enforcement by central authorities, could be easily described as a system of “administrative control”. The classification in this paper is thus based on various sources of information, including the degree of autonomy of sub-national governments in drawing up their budget (*e.g.* right to borrow) and the degree of revenue-raising powers.
52. A majority of 45 states in the United States require the governor to present a balanced budget, while 40 states require the legislature to pass a balanced budget and 34 states require the governor to sign a balanced budget. Most states also have ceilings on debt issuance, and about 30 states have tax and expenditure limitations (National Association of State Budget Officers, 2002). In Canada, nine provinces and territories apply some sort of fiscal rules (Kennedy and Robbins, 2001).
53. A general referendum is also required to approve major taxation initiatives in Ontario, Manitoba, Alberta and the Yukon in Canada (Kennedy and Robbins, 2001) and Colorado, Michigan and Missouri in the United States (National Association of State Budget Officers, 2002).
54. Similarly, within the EU area, the Council – composed of one representative at ministerial level from each member state – decides whether to endorse the early warning procedure and sanctions in case of individual country fiscal slippage.
55. See OECD (2002d) for a discussion of fiscal rules at the national level.
56. Based on data from Swedish municipalities for the years 1987-99, Söderström (2002) calculates a correlation of only -0.101 between the financial balance and the change in local debt.
57. “Rainy day funds” are however rarely able to fully meet the costs associated with an economic downturn (National association of State Budget Officers, 2002).
58. Sanctions have also been introduced to enhance the credibility of fiscal rules decided on at the sub-national level. In Canada, for example, four provinces have legislated penalties for not achieving the fiscal targets, in the form of a significant cut in wages for ministers or members of the executive council (Kennedy and Robbins, 2001).
59. In Norway, a municipality that has not been able to cover an operating deficit over the following two years must obtain the approval of the Ministry of Local Government and Regional Development before raising any loan or enter into a long-term contract (*e.g.* renting offices).
60. In Switzerland, for example, cantonal governments have in a few cases forced the amalgamation of a municipality unable to repay its debt with a neighbouring one.
61. According to Poterba and Rueben (1997), those states with weak anti-deficit provisions face, in the US market for tax-exempt bonds, borrowing costs ten to fifteen basis

points higher than similar states with stricter anti-deficit rules. Furthermore, a state with binding tax limitation rules would face, on average, a borrowing rate fifteen to twenty basis points higher than those which do not have a tax limitation law. A state with an expenditure limitation law in contrast, will face a borrowing rate several basis points lower than that of states without any fiscal limits.

62. Since 2000, sub-national budgets and borrowing no longer have to be approved by the central government as long as the authorities comply with the overall fiscal guidelines. As a consequence, credit institutions are likely to get stronger incentives to check local finances before lending money (Borge and Rattsø, 2002).
63. See Lane (1993) for a thorough discussion on market discipline and Balassone *et al.* (2002).
64. In United Kingdom, the Public Works Loan Bank has been the most significant source of loans to local government (Watt, 2002). The reliance on public banks has been common in Brazil, Finland, Germany, Italy, Mexico and Sweden.
65. In the Czech Republic, a municipality (Rokytnice) recently went bankrupt and some of its assets were auctioned off by creditors.
66. A system of deficit permits has been suggested by Casella (1999) in the context of the EU stability and Growth Pact. Tradeable tax rights have been discussed in Denmark (Dansk Økonomi, forår 2002).
67. In 2001, there were two such transfers of deficit rights. In one case, an overshoot of the fiscal balance target was transferred from one *Land* to the municipalities in the same *Land*, while in the other case the transfer was from the municipalities to the *Land* level.
68. See OECD (2001f) for a thorough discussion on best practices for budget transparency.
69. The move to accruals should not be seen as a move away from cash, since the cash flow statement is an inherent part of an accruals framework, but rather as enriching the information available on government finances. It should also be recognised that a number of issues arise when introducing accruals (*e.g.* recognition criteria, valuation methods). These issues are discussed in OECD (2002e). Despite potential problems, a number of governments have already moved to accruals, or plan to do so (*e.g.* in the Netherlands, the municipalities budget system will follow the accrual accounting principles from 2004).

Annex

ENSURING FISCAL DISCIPLINE AT SUB-NATIONAL LEVEL: STRATEGIES AND MECHANISMS

The purpose of this annex is to highlight some key features of the framework in place to co-ordinate fiscal policy across government levels in different countries. In general, the relationship between governmental tiers is complex and varies substantially across countries. In some, sub-national authorities seem to enjoy relatively limited fiscal autonomy due to strong central involvement in the sub-national budget process and weak revenue-raising powers. In others, sub-national government discretion on fiscal affairs (the power to set spending priorities, take on loans and/or set tax parameters) is combined with different types of “control mechanisms” to co-ordinate fiscal policy across government tiers. Separating country strategies is not clear-cut and involves an element of judgement. Furthermore, this annex must also be viewed in light of possible information shortages as country surveys have put different emphasis on discussing and describing fiscal relations across government tiers, underlining the need for more work in this area.

Fiscal framework and enforcement mechanisms for ensuring budget discipline at the sub-national level

Country	Fiscal framework	Enforcement mechanisms
Australia	• A co-operative approach. Federal and state borrowing are co-ordinated by The Australian Loan Council, taking into account each jurisdiction's fiscal position and infrastructure needs as well as macroeconomic objectives. Most states have adopted some sort of balanced budget rules.	• Market discipline: States has to borrow on their own account, and the Loan Council provides information to the financial market on public sector borrowing plans. • Peer pressure: If non-financial operating receipts are exceeded by more than 2 per cent in either direction, states are obliged to provide an explanation to the Loan Council. This explanation will be made public. The Loan Council is not empowered formally to approve any change, but it could pursue any concerns in the Loan Council.

Country	Fiscal framework	Enforcement mechanisms
Austria	• A co-operative approach. An explicit Domestic Stability Pact was introduced in 1999 and the present arrangement, covering the period 2001-2004, was agreed on in October 2001. According to the Pact, municipalities as a group have to balance their budget over the period 2001-2004, while regions as a group have to produce annual surpluses of at least 0.75 per cent of GDP. This commitment is not binding for any individual municipality, but for municipalities grouped according to the <i>Land</i> they belong to. The pact allocates obligations to each <i>Land</i>. The targets have to be complied with <i>ex post</i>. The pact provides a possibility to transfer surplus/deficit rights to other governments. No specific reference is made to the financing of public investments. • Borrowing: No explicit restrictions on borrowing by <i>Länder</i>. For municipalities, borrowing is only allowed to cover extraordinary expenditures. The <i>Länder</i> are obliged by law to regulate local borrowing, but the regulation put in place varies significantly among different <i>Länder</i>.	• Peer pressure through a co-operative framework. • Financial sanctions: Governments that fail to reach the target would have to pay a fixed and a variable fine totalling 8 per cent of the stability contribution and 15 per cent of the shortfall, respectively, up to a ceiling.¹ Application of sanctions depends, however, on the unanimous decision of a commission involving the federal government on the one hand, and the <i>Länder</i> and the municipalities on the other. If compliance is re-obtained within one year, the fine is returned; otherwise, the money is allocated across the complying governments. • Escape clause: In case of a serious economic slowdown, the sanctions do not apply.
Belgium	• A co-operative approach: Permissible deficit and expenditure growth levels for the different government levels are established on the basis of recommendations by the High Council of Finance. These recommendations are published in annual reports. The deficit target refers to the overall fiscal balance. • Borrowing: Regions and communities can issue bonds, but they must have the approval of central government.	• Peer pressure through a co-operative framework. • Administrative procedures: The federal government is allowed by law to limit the borrowing of regions for a period of two years, following a recommendation from The Supervisory Council and a consultation with the regional governments. The regional level monitors the municipalities' budgets and has the power to enforce expenditure cuts or tax increases if necessary.

Country	Fiscal framework	Enforcement mechanisms
Brazil	• Fiscal rule: States and municipalities are required to maintain debt stocks below ceilings established by the Senate. The Fiscal Responsibility Law (Lei de Responsabilidade Fiscal) and its companion legislation (approved in 2000) sets out a range of controls and enforcement measures to improve sub-national fiscal discipline. The law requires sub-national governments to establish annual targets for revenues, expenditures, the primary balance and changes in the stock of debt. Compliance with fiscal targets is to be made public every fourth months. • Borrowing: States are free to borrow as long as they comply with the overall guidelines.	• Sanctions: A range of sanction mechanisms is provided in the Fiscal Responsibility Law. Sub-national governments failing to comply with ceilings on debt, personnel ceilings or transparency requirements will face financial sanctions. Furthermore, contracts or administrative decisions that violate the terms of the Law will be nullified, while individuals responsible for violations are subject to fines and Governors and mayors may also risk impeachment and imprisonment. • Escape clauses: Debt limits are established by the federal senate, though they may be revised in the context of the annual budget and adjusted to macroeconomic conditions.
Canada	• No formal co-ordination. A loose budget co-ordination exists via a dialogue among ministers, which takes place once a year. Most provincial and territorial governments have introduced some sort of balanced-budget legislation, while municipal governments are not allowed to show a deficit. • Borrowing: Provincial and territorial governments have unrestricted access to borrowing, while municipal governments can only borrow for investment projects.	• Market discipline: The federal government does not guarantee sub-national debt. • Escape clauses: In most provinces, a surplus in one year can provide an accounting reserve to be drawn on if a deficit is incurred in a subsequent year. In addition, the legislation in many provinces builds in exemptions for special events.
Czech Republic	• No formal co-ordination: Sub-national governments are free to take on debt and may approve a deficit budget if municipal guaranties or collateral to cover the planned shortfall is provided. • Borrowing: No explicit restrictions on sub-national borrowing.	• Market discipline: Sub-national debt is not guaranteed by the state.

Country	Fiscal framework	Enforcement mechanisms
Denmark	• A co-operative approach: A system of formalised budget co-operation between the central government and the Local Government Association has its roots in the early 1970s. Sub-national governments have to run balanced budgets, but have substantial taxing rights. However, the central government has recently announced a tax freeze, which applies also at the sub-national level. • Borrowing: Counties and municipalities have, as a general rule, no access to borrowing. However, there are important exceptions. For counties, long term borrowing within 25 per cent of the total net outlays for investment for the fiscal year is accepted, while municipalities have free access to borrowing for investments in specified sectors that are to a large extent financed by user charges. Furthermore, the Ministry of the Interior could grant municipalities discretionary permissions to borrow.	• Peer pressure. The agreement between the central government and the Local Government association is not legally binding, and the association has no efficient instruments to ensure aggregate compliance. • Financial sanctions: In case of violation of the tax freeze all net extra tax revenues will be confiscated through a reduction in individual and general block grants.
Euro area/ EU countries	• Fiscal rule: The fiscal framework consists of two main requirements; the Treaty requirement to avoid excessive deficit position – whereby a deficit above 3 per cent of GDP is considered excessive except it is temporary and exceptional – and the requirement of the Stability and Growth Pact to achieve and maintain a budgetary position “close to balance or in surplus” over the medium-term, but also in each year in cyclically-adjusted terms.	• Administrative procedures: Member states submit annual stability or convergence programmes in which they set their short and medium-term fiscal strategies. The programmes are regularly updated and are subject to peer review and monitored by the Commission and Council. • Financial sanctions apply only following a continued failure to take corrective measures in response to Council recommendations. They consist of a non-bearing interest deposit, to be converted into a fine (which cannot exceed 0.5 per cent of GDP) if two years later the excessive deficit persists.
Finland	• Fiscal rule: A law requiring municipalities to achieve a balanced budget in the medium term was introduced in 2001. • Borrowing: No explicit restrictions on local borrowing. All borrowing is co-ordinated by the municipalities’ organisation and is not guaranteed by the state.	• No sanctions: Municipalities are obliged to make a plan of how to cover any deficit in the balance sheet.

Country	Fiscal framework	Enforcement mechanisms
France	• Fiscal rule: Local governments are not allowed to show an operating deficit.² • Borrowing: French local authorities are allowed to borrow in order to finance capital investments.	• Administrative procedures: The local central government representative annually controls local budgets. If the budget breaks legal requirements, it is sent to the <i>Chambre Régionale des Comptes</i> (CRC). The auditing procedure involves both an <i>ex-ante</i> and an <i>ex post</i> check. If a deficit appears (above a given ceiling) the Regional Chamber of Accounts has to propose appropriate fiscal measures to the local government.
Germany	• A co-operative approach: The major instrument for policy co-ordination is the intergovernmental Financial Planning Council (Finanzplanungsrat), consisting of the federal government, the <i>Länder</i> and representatives of the communities. A Domestic Stability Pact with spending caps for 2003 and 2004 has been agreed. • Borrowing: Most of the sixteen <i>Länder</i> have adopted a golden rule; <i>i.e.</i> borrowing is only allowed for investment expenditure. Municipalities can only use borrowing to finance capital investments if other financing is not feasible or appropriate and it is subject to regional approval.	• Peer pressure: The Financial Planning Council (Finanzplanungsrat) is attributed the tasks of monitoring fiscal development at all levels of governments and of making recommendations for restoring fiscal discipline in cases of non-compliance.
Greece	• Limited fiscal autonomy at the sub-national level. Lower levels of government (prefectures and municipalities) prepare their budgets and submit them to regional representatives for the central government for approval. • Borrowing: All borrowing is subject to the approval of the Ministry of Economy and Finance.	
Hungary	• Borrowing: Municipalities are authorised to borrow only to finance capital outlays, up to a ceiling of 70 per cent of their yearly net (after interest payments) own revenues.³	• Market discipline: Sub-national debt is not guaranteed by the state.
Iceland	• A co-operative approach: Regular consultative meetings between the central government and the Association of Local Authorities. • Borrowing: No restrictions on borrowing by sub-national authorities.	• Administrative procedures: If a municipality is unable to pay its debt, it can be put under the direct administration of the Ministry of Social Affairs.

Country	Fiscal framework	Enforcement mechanisms
Ireland	• Limited fiscal autonomy at the sub-national level. Sub-national governments have to run balanced budgets. These are monitored and controlled by the Department of the Environment and Local Government. • Borrowing: This is governed by the Local Government Act, which requires the approval of the appropriate Minister (normally the Minister for the Environment and Local Government) to any borrowing proposal.	• Administrative procedures: Defaulting authorities could be removed from office and replaced by a commissioner appointed by the central government.
Italy	• Fiscal rule: A Domestic Stability Pact was enacted in 1999, imposing deficit reductions <i>vis-à-vis</i> a no-policy-change baseline on sub-national governments.⁴ Debt service cannot exceed 25 per cent of current revenues. • Borrowing: Regional and local authorities are allowed to borrow to finance capital investments.	• Peer pressure: The Pact has a co-operative mechanism, mainly in the context of the regional and mayor's conferences, to deal with corrections of eventual overshoots. • Financial sanctions: European sanctions will be shared among non-complying governments according to their contribution to the overshoot. • Escape clauses: In case of unexpected events, borrowing limits can be relaxed.
Japan	• Limited fiscal autonomy at the sub-national level. • Borrowing: Guidelines for borrowing are set out in the annual Local Government Fiscal Plan. The Ministry of Home Affairs supervises and controls all local authority borrowing.	• Administrative procedures: The Ministry of Home Affairs takes control of the local government if borrowing limits are exceeded.
Korea	• Limited fiscal autonomy at the sub-national level. Sub-national governments have to run balanced budgets. These are monitored and controlled by the Ministry of Government Administration and Home Affairs. • Borrowing: All local borrowing has to be approved by the central government.	
Luxembourg	• Limited fiscal autonomy at the sub-national level. Municipalities are not allowed to show an operating deficit. Municipal accounts are scrutinised by the District Commissioners and audited by the municipal audit division of the Minister of the Interior. • Borrowing: Loans exceeding certain limits are subject to the approval of the Minister of the Interior.	• Administrative procedures: The Constitution provides for a system of local government control exercised by the Grand Duke, the Minister of the Interior and central government through the District Commissioners. The Grand Duke can annul any general or specific act of local government that is contrary to the law or the public interest and can declare void both regulatory acts and specific decisions of the council, board or mayor.

Country	Fiscal framework	Enforcement mechanisms
Mexico	• A system of administrative control has gradually been replaced by a system relying more on the financial markets to secure sub-national fiscal discipline. State authorities approve their own budgets and control local government budgets and accounts. • Borrowing: States are allowed to borrow domestically to finance capital investments, while borrowing by municipalities is subject to the approval of state authorities.	• Market discipline: Sub-national debt is not guaranteed by the central government. New rules were introduced in 2000 to limit states' access to borrowing, increase transparency and to strengthen the central government's commitment not to bailout sub-national authorities.
Netherlands	• A co-operative approach: Regular meetings are held between central authorities and the Dutch Association of municipalities on financial issues. Sub-national governments have substantial taxing rights, but have to run balanced budgets. These are closely monitored and controlled by higher levels of government. Provincial authorities are obliged by law to take over the financial control of a municipality if it has a budget deficit which is likely to be sustained in the years to follow. • Borrowing: Sub-national authorities are free to borrow as long as they run balanced budgets (on an accrual accounting basis).	• Administrative procedures: Central authorities will only lend help to a municipality in financial distress if the municipality itself has taken sufficient measures to increase its income through higher taxes. In exchange for the financial help, the municipality gives up its financial independence.
New Zealand	• Fiscal rule: Local authorities are required by law to set operating revenues at a level sufficient to cover operating expenses in any financial year (with a relatively narrow exception to run deficits). Local authorities are largely self-funded and the central government has no formal role in reviewing or approving the budgets of local authorities. • Borrowing: No restrictions on borrowing.	• Market discipline: Sub-national loans are not guaranteed by central government.

Country	Fiscal framework	Enforcement mechanisms
Norway	• Fiscal rule: Counties and municipalities are not allowed to show an operating deficit. If a budget deficit is recorded <i>ex post</i>, this has to be covered over the following two years. • Borrowing: No explicit restrictions on sub-national borrowing.	• Administrative procedures: If a county or municipality does not manage to cover an operating deficit over the following two years, any resolution to raise a loan or to enter into a long-term contract (<i>e.g.</i> tenancy agreement) is not valid until the Ministry of Local Government and Regional Development approves it. The Ministry publishes a list of sub-national governments under administration.⁵
Poland	• Fiscal rule: The constitution prohibits the public debt from exceeding 60 per cent of GDP, and the Act on Public Finance requires that both central and sub-national authorities take steps to stabilise the debt at less than 50 per cent of GDP. Sub-national governments are also subject to specific limits on their debt and debt service expenditure, which may not exceed 60 per cent and 15 per cent of their total revenues, respectively.	• Administrative procedures: Sub-national governments are required to submit their draft budgets to Regional Clearing Chambers (RIOs), which are agencies of the central government. The RIOs assess the draft budgets to ensure that each sub-national government has the means to finance any proposed deficit and make an overall assessment of the sustainability of their liabilities. If the opinion of the RIO is negative, the budget in question must be amended as it directs. • If debt exceeds 55 per cent of GDP, the Council of Ministers must present to Parliament a fiscal consolidation plan aimed at lowering the public debt. If the public debt reaches 60 per cent of GDP, no new state guarantees may be issued and the council of Ministers must submit a fiscal consolidation plan to Parliament, while sub-national governments must pass balanced budgets. • Escape clauses: The procedure could be bypassed in the case of an emergency.
Portugal	• Fiscal rule: The Local Finances Law states that current spending cannot exceed current revenues and sets a ceiling on annual debt servicing and short-term loans. In addition, the annual Budget Law may set ceilings on the level of indebtedness according to the Budgetary Stability Law approved in July 2002. • Borrowing: Local authorities are free to borrow in order to finance fixed capital investments.	• Financial sanctions: According to the Budgetary Stability Law, central government transfers can be reduced or suspended if sub-national governments exceed the limits on indebtedness or if financial information is not provided in time.

Country	Fiscal framework	Enforcement mechanisms
Slovak Republic	• Fiscal rule: Municipalities and higher territorial authorities have to balance current spending against current revenues. From 2005, sub-national debt and debt service (principal and interest) cannot exceed 60 and 25 per cent, respectively, of current revenues of the previous year. • Borrowing: Sub-national authorities are only allowed to borrow to finance fixed capital investments. Approval from the Ministry of Finance is required if credits amount to more than 75 million SKK. Sub-national debt is not guaranteed by the central government.	• Administrative procedures: Municipalities that are unable to pay their liabilities can be placed under central administration. • Financial sanctions: The Ministry of Finance can impose a penalty amounting to one million SKK on sub-national authorities failing to comply with the fiscal requirements. • Market discipline: Sub-national debt is not guaranteed by the state.
Spain	• Fiscal rule: According to the Budgetary Stability Law enacted in 2001 all governments are obliged to maintain at least a balanced budget. • Borrowing: Borrowing by regional governments should be used to finance capital expenses. An authorisation from the Ministry of Finance may be required if annual debt service and repayments exceeds 25 per cent of current revenues. The central government can set additional limits and constraints on sub-national borrowing for reasons of macroeconomic policy.	• Administrative procedures: In cases of non-compliance the Law requires the faulty region to present a financial plan to make up for the deficit over-run. This plan must be approved by the Fiscal and Financial Policy Council. • Financial sanctions: If the financial behaviour of a Region were to cause Spain to breach EMU fiscal rules, that region would have to take care of European sanctions.
Sweden	• Fiscal rule: Local government budgets are not allowed to show a deficit.⁶ If a deficit occurs, it may be carried over, but has to be repaid within 2 years. • Borrowing: No restrictions on sub-national borrowing.	
Switzerland	• No formal co-ordination: But informal co-ordination takes place between the Confederation and the cantons for the preparation of the budget. • Borrowing: Borrowing by cantons and communes is restricted to investment projects and requires popular referenda for approval.	• Sub-national fiscal policy is subjected to the scrutiny of citizens through popular referenda.

Country	Fiscal framework	Enforcement mechanisms
Turkey	• Limited fiscal autonomy at the sub-national level. Local budgets and accounts are monitored by central government. • Borrowing: Loans exceeding certain limits are subject to the approval of the central authorities.	
United Kingdom	• Limited fiscal autonomy at the sub-national level.⁷ • Borrowing: Sub-national borrowing is subject to approval by central government.	
United States	• No formal co-ordination: However, most states have introduced balanced budget rules as a legal requirement. • Borrowing: No centrally imposed restriction on borrowing by the states.	• Market discipline: The federal government does not guarantee sub-national loans.

1. For *Länder* and municipalities, temporary shortfalls of -0.15 and -0.10 per cent of GDP, respectively, are allowed. However, the average stability contribution has to be delivered for the whole period of the pact. If Austria breaches the Maastricht targets, EU sanctions will also be distributed across domestic governments.
2. The legal rule of "balance in accounts" implies that the primary balance plus the incomes of the locally owned capital must be at least equal to the annual repayments of the borrowings (interest plus capital).
3. New borrowing by municipalities for housing development purposes has been freed from borrowing caps. Municipalities have created local holdings and utility companies, including in the area of housing and other public services, whose revenues and expenditures are off-budget and therefore outside general government accounts.
4. The deficit governed by the rule is on a cash basis and excludes health, capital spending and interest payments on the expenditure side and central government transfers on the revenue side. The pact was continued under the financial laws for both 2000 and 2001. The latter included for the first time the obligation by regional and local governments to show, *ex ante*, that budgets submitted for approval to local and regional assemblies meet the targets assigned to them (Bibbee and Goglio, 2002).
5. A complete list showing sub-national governments under administration could be found at <http://odin.dep.no/krd/engelsk/p10002454/p10002455/p10002456/index-b-n-a.html>
6. The balanced budget requirement was reintroduced in 1997, after the removal of a balanced budget requirement in the beginning of the 1990s.
7. The administrations of Scotland, Wales and Northern Ireland "have freedom to make their own spending decisions on devolved programmes within the overall totals" (Watt, 2002).

Source: OECD.

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TARIFF BINDINGS, UNUSED PROTECTION AND AGRICULTURAL TRADE LIBERALISATION

Peter Walkenhorst and Nora Dihel

TABLE OF CONTENTS

Background	232
Issues in agricultural tariff liberalisation.....	233
Tariff liberalisation in the URAA	233
Tariff protection in the agri-food sector	234
Bound <i>versus</i> applied tariff rates	235
Modelling the impact of agricultural tariff liberalisation	240
Model specification and data.....	240
Simulation scenarios	241
Discussion of simulation results	242
Conclusions	244
Bibliography	248

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BACKGROUND

The Uruguay Round Agreement on Agriculture (URAA), signed in April 1994, brought trade in agricultural products for the first time within the ambit of GATT rules. Signatory countries committed themselves to reductions in border protection, export subsidies, and domestic support. Follow-up negotiations on further agricultural trade liberalisation were launched as part of the URAA's built-in agenda in March 2000. Moreover, as a result of the WTO Ministerial Meeting in Doha/Qatar in November 2001, the agriculture negotiations became part of a single undertaking in which virtually all the linked trade negotiations are to conclude by the end of 2004.

There have been a number of studies that have evaluated and quantified the effects of the URAA and prospective further reform steps on agricultural markets. These include descriptive accounts of the implementation of the existing Agreement (OECD, 2001a), as well as model-based analysis of impacts of agricultural trade liberalisation on production, consumption, and trade. Examples of the latter include Zhu, Cox, and Chavas (1999), who simulate the market equilibrium impacts of the URAA and full trade liberalisation in the world dairy sector; Blake, Rayner, and Reed (1999), who assess the effects of the URAA in the context of reforms of the European Union's Common Agricultural Policy; and Hertel, Anderson, Francois, and Martin (2002), who explore the extent to which multilateral liberalisation of both farm and non-farm policies would affect agricultural markets and welfare.

Given the complexity of the URAA, it is difficult to fully represent its features in economic models. Analysts therefore generally make simplifying assumptions regarding the process of trade liberalisation. One such assumption is that the tariff ceilings that were bound in the URAA and that form the basis for tariff reduction commitments equal the tariffs that are actually applied in WTO member countries. This assumption implies that a negotiated cut in the bound rates would translate into a similar reduction in the rates faced by traders across all countries and commodities. However, in this paper it is argued that taking into account that policy reforms apply to bound rather than applied rates can have important consequences for the modelling results. In particular, the existence of "unused protection" in the form of bound rates exceeding applied rates can considerably alter the magnitude and structure of the benefits from trade liberalisation.

The paper uses information on bound and applied tariffs from the Agricultural Market Access Database, and the Global Trade Analysis Project (GTAP) computable general equilibrium model to assess the effects of tariff reforms under alternative assumptions concerning how fully applied tariffs reflect negotiated reductions in bound tariffs. Conditional applied tariffs – defined as the minimum of bound rates after negotiated tariff cuts and initial applied rates – are calculated and integrated into the GTAP database. Based on this information, several trade policy reform scenarios are evaluated, comparing the outcome of model-runs in which tariff reductions are based on conditional applied rates with ones in which the reforms are represented through cuts in either initial applied or initial bound tariffs. The results highlight the circumstances under which a detailed representation of tariff structures in applied economic models seems particularly warranted.

The remainder of the paper is structured as follows. The second section briefly reviews the market access provisions of the URAA and reports on the level and structure of applied and bound agriculture and food (“agri-food”) tariffs in OECD countries. The third section presents the analytical framework for the liberalisation scenarios, as well as the results of the analysis. The final section concludes this study.

ISSUES IN AGRICULTURAL TARIFF LIBERALISATION

A central issue for trade in agri-food products concerns the rules that govern market access. As an outcome of the URAA, import quotas and variable levies on agri-food products were converted into their tariff equivalents. Tariffs were bound and reduced by an average of 36 per cent (24 per cent for developing countries) over the implementation period 1995-2000 (1995-2004 for developing countries). In parallel, so-called tariff rate quotas were established that allow imports of certain quantities of agri-food products at reduced tariff rates. The process of tariff liberalisation is likely to continue beyond the end of the URAA implementation period, as WTO ministers agreed in November 2001 to “substantial improvements in market access” as one of their objectives for the ongoing negotiations on agricultural trade.

Tariff liberalisation in the URAA

Several analysts have pointed out that the tariff reductions under the URAA have not led to substantial improvements in market access (Hathaway and Ingco, 1995; Wainio, Hasha, and Skully, 1998). The limited effects of the URAA have been attributed to several factors. One aspect has been that the practice of converting non-tariff measures into bound tariffs was not tightly administered, which has often resulted in bound tariffs being set at rates higher than the tariff equivalents

of quantitative constraints. Hence, at least initially the scheduled tariff reductions under the URAA had to cut out the artificial protection generated through “dirty tariffication”. Also, some countries have set their tariffs as a combination of specific (*i.e.* per unit) and *ad valorem* rates, which can be a means of protecting particular segments of markets very effectively (Bureau, Fulponi and Salvatici, 2000).

Another factor concerns the method of allocating tariff cuts across commodities. Countries had considerable flexibility in applying tariff cuts, as the tariff-cutting formula was based on simple averages. Tariffs for agri-food products that were less important domestically or that were already set at low levels were often cut by above-average percentages, while tariffs on politically sensitive products were reduced only by the required minimum of 15 per cent. As a result, the expected effects of the tariff reductions were mitigated to a significant extent (Josling and Tangermann, 1994).

A further important reason for the limited impact of the URAA tariff reductions is simply the absolute level of border protection for some agri-food products. Agri-food tariffs have remained much higher than those in the manufacturing sector, amounting not infrequently to several hundred per cent (OECD, 1999). Many tariffs have indeed been prohibitively high, and have remained so even after the URAA cuts. These cuts have often merely squeezed out some of the existing “water in the tariffs”.

Tariff protection in the agri-food sector

World-wide, the simple average of bound agri-food tariffs (not including preferential trading arrangements) has been estimated to amount to 62 per cent (Gibson, Wainio, Whitley, and Bohman, 2001). Developing countries generally tended to have higher bound rates than developed countries. Across commodities, tobacco, meat, dairy, sugar, and sweetener products showed the highest average tariff rates, while horticultural products and fruit were relatively least protected. However, there is considerable variation in tariffs across countries and commodities, so that region-wide and world-wide averages should be interpreted with care.

Bound tariffs represent the maximum allowable tariffs that WTO members have scheduled as part of their Uruguay Round commitments. These rates are used as the basis for the negotiated tariff reductions. Application of import duties above bound rates is not allowed, unless trading partners adversely affected by the tariff change are compensated.

On the other hand, countries are free to apply import duties that are lower than the bindings. Indeed, some OECD members and many non-OECD countries apply tariffs that are below their bindings. Unlike bound tariffs, applied rates may be changed without formal notice to the WTO or compensation of trading partners as long as they do not exceed the bindings.

Bound versus applied tariff rates

For analytical purposes, it is important to distinguish between bound and applied rates. Bound tariffs are at the centre of discussion in trade negotiation and form the benchmark for negotiated tariff cuts. In comparison, applied rates are the import duties that traders face and that determine trade flows. As applied tariffs can be lower than bound tariffs, a negotiated cut in bound rates does not necessarily translate into a corresponding cut in applied rates. There can be no impact on applied rates, a reduction by a smaller percentage than in the bound rate, or a cut of the same proportion as in the bound rate, depending on the difference between bound and applied rates and the size of the negotiated tariff cut.¹ The conditional applied tariff after a negotiated tariff cut is determined by equation (1):

$$AR_{t+1} = \begin{cases} BR_t - TC & \text{if } BR_t - TC < AR_t \\ AR_t & \text{if } BR_t - TC \geq AR_t \end{cases}; \quad (1)$$

where AR and BR stand for the applied rate and bound rate, respectively, and TC is the tariff cut that has been negotiated in the base period t to be implemented in the later period $t + 1$.

Conditional applied tariffs after hypothetical tariff cuts can be calculated from the data on bound and applied tariffs that are available from the Agricultural Market Access Database (AMAD). This database contains tariff data for a large number of WTO members, including all OECD countries. The database is publicly available and can be accessed through its internet site www.amad.org

AMAD contains data on bound tariffs in the base URAA implementation period (*i.e.* 1995) and the final implementation period (*i.e.* 2000; for developing countries 2004). As countries have been required to reduce their tariffs in equal steps, it is possible to derive the bound rates for any year during the implementation period by weighting the base and final bound rates appropriately. In addition, AMAD reports information on applied tariff rates in most countries for selected years during 1995-2000.

One major challenge when analysing applied and bound tariffs for agri-food products across commodities and countries is to express the tariff rates in a comparable format. Some countries rely exclusively on ad valorem (*i.e.* percentage) tariff rates, while other use specific tariffs, expressed for example in US dollars per kg, or compound rates that combine an ad valorem and a specific element. A methodology for converting these specific and compound tariffs into their ad valorem equivalents using AMAD information has been described in Gibson, Wainio, Whitley, and Bohman (2001). In particular, information on world import unit values is used to convert specific tariffs into ad valorem equivalents.

Another issue concerns the level of aggregation at which tariffs are reported. WTO members specify their tariff schedules at various levels of commodity detail.

Some countries use narrow product definitions [at the 8-digit or 10-digit level of the World Customs Organization's Harmonized System (HS)] and report a large number of tariff lines, while others describe their tariff schedules on more broadly based definitions (*e.g.* at the HS 6-digit level). Also, in some cases applied tariffs are provided at a different level of aggregation than bound rates. In order to be able to compare tariffs across countries and commodities, some form of aggregation is required. The question that arises in this context is which weights might best be used when aggregating individual tariff lines. Some analysts have argued in favour of using trade flows as aggregation weights in order to capture the differing importance of products (Gehlhar and Wainio, 2002), while others have preferred simple averages of tariff lines to avoid bias from the interdependence of tariff levels and trade flows (OECD, 1999 and 2002; Gibson *et al.*, 2001). One means to both take the different economic importance of products into account and avoid giving small weights to tariff lines that are subject to very high tariffs and, hence, low trade volumes would be to use consumption shares as weights for the individual tariff lines. However, there is no consistent data available at the necessary level of disaggregation that would make it possible to calculate consumption weighted tariff indicators.

This study uses simple averages of tariff lines and follows the procedure outlined in Gibson *et al.* to calculate *ad valorem* equivalents for bound and applied tariffs in all OECD countries and selected non-OECD countries in 1997. The year 1997 was chosen so as to coincide with the base year of the GTAP-5 database. Where AMAD did not contain information on applied tariffs in particular countries for 1997 (Czech Republic, Iceland, Korea, Norway, Poland, Turkey), corresponding information for 1996 was used, and in cases where the 1996-applied rates exceeded the 1997-bound rates, the applied rates were adjusted to equal the corresponding bindings. Moreover, to correct for the fact that Japan and Korea did not schedule and report tariffs for rice, rice market protection in the two countries was estimated by using information on differences between border and domestic prices from the OECD's PSE/CSE database (OECD, 2001b).

The information on agri-food tariffs at the six or eight digit commodity level of the Harmonised System was aggregated into nine product groups (grains; oilseeds and vegetable oils; sugar; fruit and vegetables; dairy; beef and sheep; pork and poultry; fibre and wood; prepared food) by taking the mean of the tariff lines within the group. In contrast to Gibson *et al.*, both in-quota and out-of-quota tariffs are considered for products that are subject to tariff rate quotas (TRQs). The motivation for including in-quota tariffs in the calculations is that many TRQs are only partially filled (OECD, 2001a and 2002), so that the in-quota tariffs in these cases represent the marginal binding constraint on additional trade. The results concerning tariff protection for different products and the relationship between bound and applied rates are shown in Table 1.

Table 1. **Average tariffs for agri-food products in OECD countries, 1997**

Per cent

	Grains	Oilseeds and vegetable oil	Sugar	Fruit and vegetables	Dairy	Beef and sheep	Pork and poultry	Fibre and wood	Prepared food
Applied rates (<i>ad valorem</i> equivalents)									
ANZCERTA	0.2	1.1	5.0	1.2	8.4	0.8	1.5	0.3	4.5
Canada	12.0	9.0	8.8	2.6	136.0	51.7	39.3	1.2	16.8
CSEEC	33.7	10.1	51.2	23.7	69.4	28.3	21.4	7.2	27.4
EFTA	46.1	56.3	57.1	39.8	141.5	139.5	92.1	4.0	55.3
EU-15	64.1	12.1	126.8	14.1	122.5	78.7	37.1	1.2	40.3
Japan	142.2	11.6	81.1	12.0	77.6	19.8	8.5	5.9	20.7
Korea	227.5	30.2	6.9	91.7	77.9	24.7	13.7	6.8	72.2
Mexico	31.6	14.6	7.4	13.3	42.4	32.6	16.6	8.9	15.0
United States	3.3	7.6	23.6	4.5	48.0	4.6	2.4	3.1	10.8
ROW	3.4	17.5	16.4	13.7	19.5	16.2	13.3	9.8	22.6
Bound rates (<i>ad valorem</i> equivalents)									
ANZCERTA	1.0	2.4	10.2	3.5	12.8	3.6	5.0	1.3	10.7
Canada	12.0	9.0	8.8	2.6	136.0	51.7	39.3	1.2	16.8
CSEEC	57.5	19.6	77.3	29.6	87.6	40.8	29.7	11.4	43.9
EFTA	163.0	136.6	129.5	89.3	357.8	303.1	169.7	17.8	126.8
EU-15	64.1	12.1	126.8	14.1	122.5	78.7	37.1	1.2	40.3
Japan	175.1	24.4	115.2	35.4	280.0	46.9	51.4	14.6	54.4
Korea	263.2	44.0	22.9	102.1	85.3	27.9	24.4	13.5	90.3
Mexico	60.4	46.8	102.3	41.5	67.1	80.7	39.7	40.8	54.1
United States	3.3	7.6	23.6	4.5	48.0	4.6	2.4	3.1	10.8
ROW	35.5	74.0	97.5	60.5	91.9	83.0	65.5	48.5	84.9

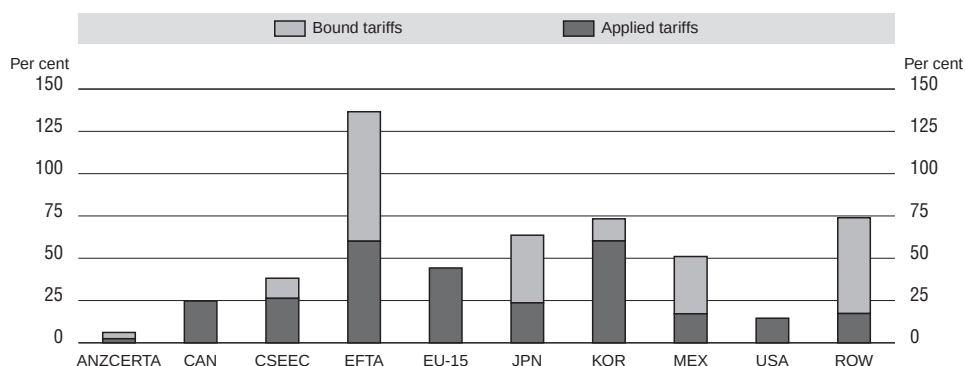
Note: ANZCERTA: Australia and New Zealand Closer Economic Relations Trade Agreement; CSEEC: Central and South-Eastern European Countries (Czech Republic, Hungary, Poland, Turkey); EFTA: European Free Trade Area (Iceland, Norway, Switzerland); ROW: Average of tariff rates in the biggest agricultural trading countries in Africa (South Africa), Asia (India) and Latin America (Brazil). See text for explanation of methodology.

Source: Authors, based on AMAD information.

There is considerable diversity of agri-food market protection among OECD countries, but tariff rates and structures vary considerably even within countries.² For example, in Korea average bound and applied tariffs for grains exceed 200 per cent, while average import duties on fibre and wood are lower than 15 per cent. Moreover, the ratio of applied to bound rates varies widely, with average applied tariffs for dairy products in Korea being less than 10 per cent lower than bound tariffs, while the applied rates on sugar are more than two-thirds lower than bound rates. This means that a negotiated tariff cut of 10 per cent would already force reductions in applied tariffs on dairy and open the corresponding markets, while the “concession” would have to be bigger than 65 per cent before forcibly lowering tariff protection in the Korean sugar market. Hence, uniform reductions of bound tariffs have the potential to affect agri-food sectors very differently.

Figures 1 and 2 provide a summary of average applied and bound agri-food tariffs by country/region and product group, respectively. In both cases, the tariff indicators are computed as simple averages across, respectively, product categories and countries. The country comparison highlights the relatively low tariff protection in Australia, New Zealand and North America, compared with the high import duties in Japan, Korea, and the EFTA members. It also illustrates the substantial variety in applied to bound tariff ratios in different countries. For example, in Canada, the European Union, Switzerland and the United States,

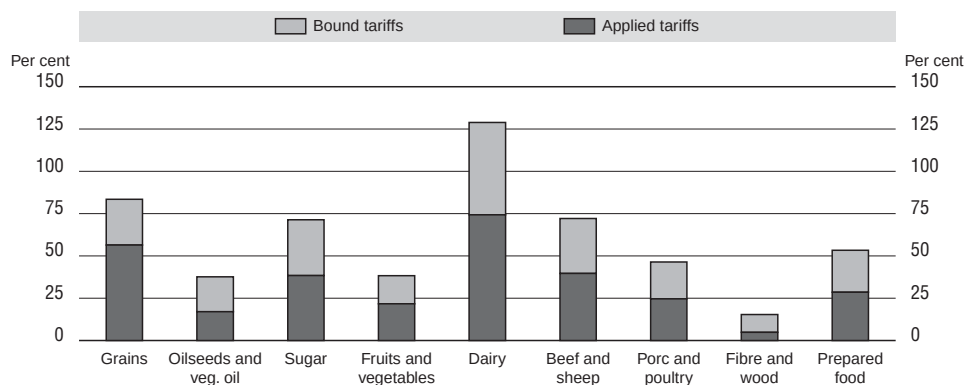
Figure 1. **Average tariffs for agri-food products in OECD countries, 1997**
Per cent



1. ANZCERTA: Australia and New Zealand Closer Economic Relations Trade Agreement; CSEEC: Central and South-Eastern European Countries (Czech Republic, Hungary, Poland, Turkey); EFTA: European Free Trade Area (Iceland, Norway, Switzerland); ROW: Rest of the World. The country/region-wide averages were calculated as simple means of average tariffs in the nine agri-food product groups listed in Table 1.

Source: Authors, based on AMAD information.

Figure 2. **Average tariffs for agri-food products in the OECD by product group, 1997**
Per cent



Note: The product group-wide averages were calculated as simple means of average tariffs in the corresponding product groups in the ten countries/regions shown in Table 1.

Source: Authors, based on AMAD information.

MFN-applied tariffs equal bound rates, while in Mexico applied rates are on average two-thirds below bound rates.³ The largest relative difference between applied and bound rates can be observed for “Rest of the World”, which is an aggregate of Brazil, India, and South Africa. This finding is consistent with Gibson et al. (2001), who reported particularly high levels of “unused protection” in many developing countries.

Across commodities, the highest average tariffs are applied to dairy products and the lowest ones to fibre and wood. The commodity-specific averages of applied rates are all more than 40 per cent below bound rates. The largest divergence between the average rates occurs for fibre and wood (applied rates 62 per cent below bound rates) and the smallest for fruit and vegetables (applied rates 41 per cent below bound rates).

It should be noted that the differences between bound tariffs and the duties actually paid at the border will, in practice, tend to be bigger than those shown in Table 1, because many countries allow imports under preferential trading arrangements at tariffs below the MFN rates. Examples are regional trade agreements or the General System of Preferences that facilitates access of developing country exporters to developed countries’ markets. The difference between bound and MFN-applied rates has, therefore, to be seen as a lower bound for the amount of “unused protection” in existing tariff schedules.

The preceding discussion highlighted the differences between bound and applied tariffs for agri-food products in OECD countries. These differences are, in principle, well known and analysts should be aware that negotiated tariff cuts apply to bound rates and do not necessarily translate into corresponding cuts in actual border protection. However, most quantitative studies do not take the existing differences between bound and applied rates into account when evaluating the effects of negotiated trade liberalisation. Accounting for the dichotomy of tariff rates through *ad hoc* adjustments to the analysis seems in general to be difficult and unsatisfactory, given the considerable diversity of bound to applied tariff ratios across commodities and countries.⁴ This is all the more the case as complementarity and substitutability between products, the importance of international agri-food trade, and general equilibrium effects, including changes in terms of trade, create linkages across products and countries that are difficult to evaluate without the help of applied economic models.

MODELLING THE IMPACT OF AGRICULTURAL TARIFF LIBERALISATION

Computable general equilibrium models can cope with prohibitively high applied tariffs, *i.e.* the existence of “water in the tariffs”, and accurately reflect the non-impact of small tariff changes. On the other hand, the existence of a dual tariff system of trade policy relevant bound rates and trade flow relevant applied rates, which can give rise to “unused protection”, requires adjustments to the underlying model database. In the following, such adjustments are described and undertaken in order to evaluate how consideration of differences between bound and applied tariffs alters quantitative estimates of the welfare gains from trade liberalisation.

Model specification and data

The quantitative analysis is carried out by using the well-established GTAP database and model. The latter is a static, multi-region, computable general equilibrium model that operates under assumptions of perfect competition and constant returns to scale. The model reflects bilateral trade flows, international transport margins, and country and sector-specific rates of import protection. GTAP thereby makes it possible to determine changes in production, consumption, trade, and economic welfare for particular trade policy reform scenarios. A full description of the model can be found in Hertel (1997).

The following investigation uses information from the GTAP-5 database to specify ten regions and ten sectors, corresponding to the aggregation structure used in the description of tariffs above. Nine of the ten regions refer to OECD country groupings, and the tenth to an aggregate of non-OECD countries. Of the ten sectors, nine represent agri-food product groups, while mining, non-food man-

ufacturing, and services are aggregated into the tenth one. The correspondence of the regions and sectors modelled and their GTAP-5 components is identical to that described in Walkenhorst and Dihel (2002).

The data on agri-food tariffs in the standard, unaltered GTAP-5 database consists for some countries of the rates that were applied in 1997 or 1998, while for others of the final bound rates of the URAA. For the trade liberalisation scenarios described below, the GTAP-5 data were adjusted to reflect either initial applied or initial bound rates given in Table 1.⁵ Since there is no comprehensive information on bound and applied tariff rates available in the AMAD database for non-OECD countries, the tariffs for the “Rest of the World” country aggregate were taken to be equal to the average of the bound and applied rates, respectively, in Brazil, India, and South Africa, which are the biggest agricultural trading countries in Latin America, Asia and Africa. The GTAP-5 tariff information for the non-agri-food sector was kept unchanged. The existing data on non-tariff protection was left unaltered in all countries and sectors.

Simulation scenarios

Several experiments are carried out to analyse the differences in the simulated impacts of tariff liberalisation under a unique tariff system compared with a dual system of bound and applied rates. The experiments concern exclusively tariff reductions, abstracting from particular post-URAA features, like the existence of tariff rate quotas, or reduction commitments concerning export subsidies and domestic support. Also, the simulated tariff cuts are hypothetical and not directly related to the implementation of the URAA.

Three scenarios were evaluated that use differing data on agri-food tariff rates to simulate negotiated tariff cuts in consecutive 10 per cent steps from zero to 100 per cent:

- **Conditional applied tariffs:** The agri-food tariffs used in the simulations are the minimum of the bound rates after a negotiated tariff cut and the initial applied rates [see equation (1)]. Hence, the analysis considers both initial bound and initial applied rates and their relationship.
- **Tariffs derived from initial applied rates:** The tariffs used in the simulations are derived from the initial applied rates by applying the negotiated tariff cuts. The analysis considers only initial applied tariffs.
- **Tariffs derived from initial bound rates:** The tariffs used in the simulations are derived from the initial bound rates by applying the negotiated tariff cuts. The analysis considers only initial bound tariffs.

Discussion of simulation results

The results from the simulations reveal considerable differences among scenarios. Figure 3 shows the predicted welfare gains (Hicksian equivalent income variation) under the three tariff liberalisation scenarios in absolute terms, as well as relative to each other. World income would increase if agri-food tariffs were to be reduced and full liberalisation would result in annual welfare gains of more than \$30 billion.

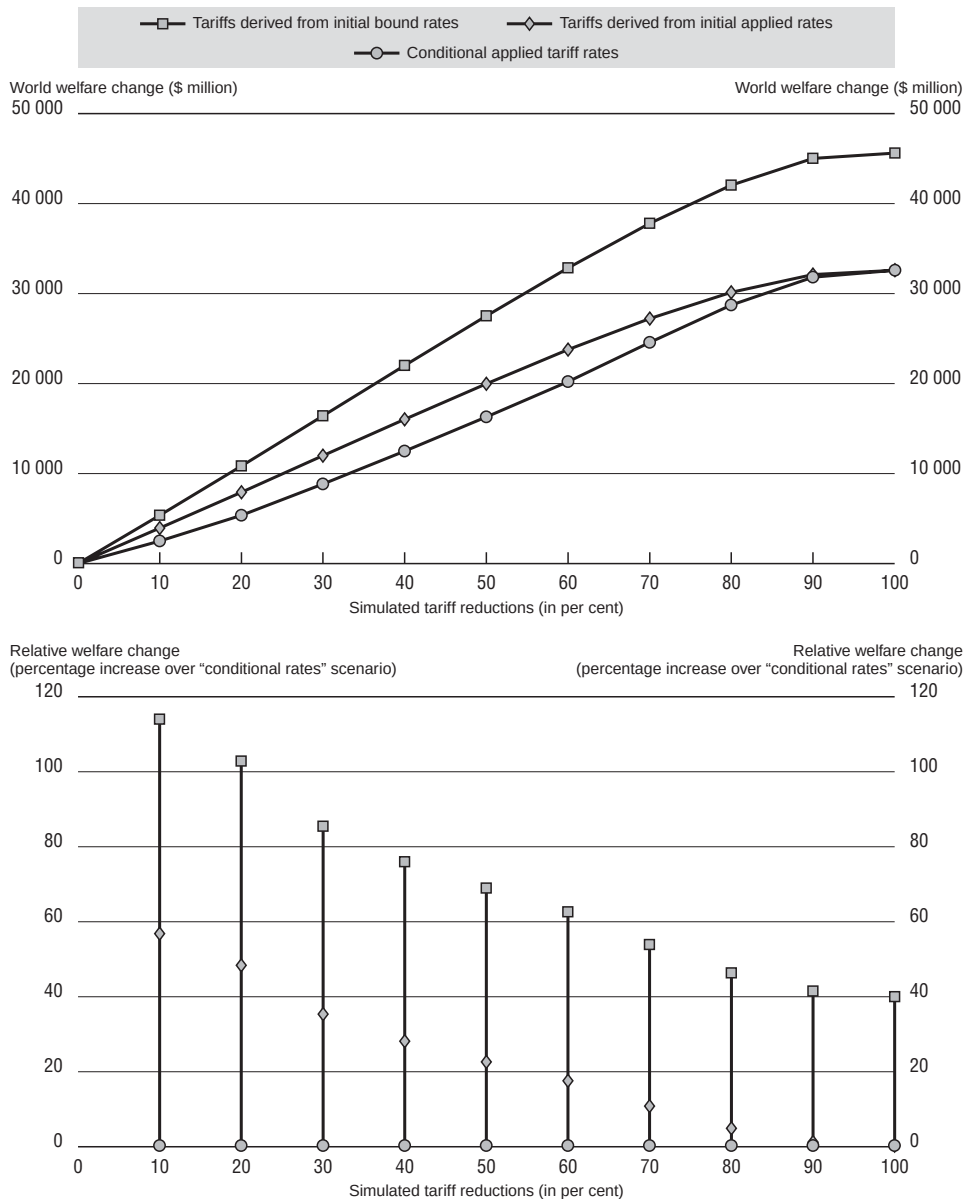
The largest welfare gains are predicted in the scenario in which the tariffs modelled are derived from bound rates. This finding was to be expected. Bound tariffs are higher than applied ones, so that their use in the modelling analysis implies higher levels of initial protection and consequently larger distortions in the economy. Removing these distortions through tariff reductions will naturally result in bigger welfare gains than corresponding tariff cuts in the scenarios that were calibrated on the lower applied rates.

The lowest impact from tariff reductions occurs in the scenario that is based on conditional applied tariffs. Again, this was to be expected, as reductions in bound rates do not necessarily translate into corresponding cuts in applied tariffs, but first merely squeeze out unused protection. Indeed, it might seem surprising that a modest cut of, for example, 10 per cent generates substantial welfare gains at all in the “conditional applied tariff scenario”. But a large share of these welfare gains comes from adjustments in Canada, the European Union and the United States, where bound tariffs equal applied rates.

The difference between the scenarios becomes even more apparent when the gains are compared in relative terms, as in the lower part of Figure 2. The predicted welfare increases of a 10 per cent tariff cut under the scenario “tariffs derived from initial applied rates” are more than 55 per cent larger than if conditional applied tariffs are used in the modelling analysis. The difference between these two scenarios becomes smaller in relative terms as larger tariff cuts are simulated, but still remains bigger than 10 per cent up to simulated tariff cuts of 70 per cent.

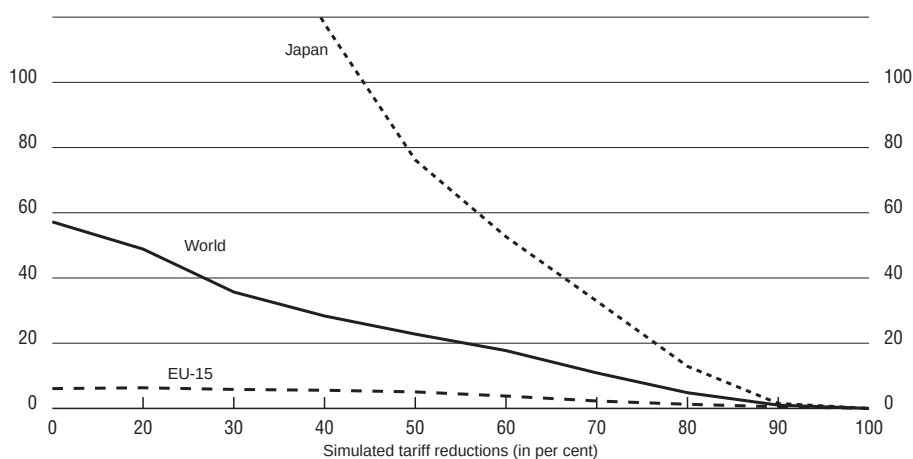
The over-estimation of welfare gains is not uniform across countries. Figure 4 illustrates the variation of liberalisation outcomes from tariff cuts in the “conditional applied rates scenario” compared with the “initial applied rates scenario” in selected countries. It shows that for the European Union the difference in welfare estimates between the scenarios is small. This finding is a result of the EU’s bound rates equalling its applied rates, so that the same tariff cuts are generated in both scenarios. The small difference in welfare effects is, therefore, exclusively triggered through feedback effects from adjustments in other countries. By contrast, in Japan, where important differences between bound and applied rates exist,

Figure 3. Predicted world welfare gains from tariff reductions



Source: Authors.

Figure 4. **Deviation of predicted welfare gains in selected countries in the “tariffs derived from initial applied rates scenario” from the results of the “conditional applied tariffs scenario”**
Per cent



Note: See text for explanation.

Source: Authors.

predicted welfare gains from tariff cuts in the “initial applied rates scenario” significantly exceed the predictions in the “conditional applied rates scenario”.

These results suggest that simulating negotiated cuts in agricultural tariffs solely as a reduction from initial applied tariff rates significantly overestimates the resulting welfare gains and trade effects. The distortion of estimates is particularly pronounced for simulations that assume modest tariff cuts, as well as for countries and commodities where the differences between bound and applied rates are substantial. In order to obtain more realistic predictions of the impact of potential WTO negotiation outcomes, both bound and applied tariffs and their relationship need to be considered.

CONCLUSIONS

This paper used AMAD data on agri-food tariffs and the GTAP model to assess the effects of tariff reforms under alternative assumptions concerning bound and applied tariff rates. In many countries, bound tariff rates exceed applied rates, so

that negotiated tariff cuts that apply to bound rates are not necessarily fully translated into the tariffs that traders face at the border. The analysis in this study investigated how important it is to consider the differences between bound and applied rates when simulating the impact of negotiated tariff cuts.

Three trade policy reform scenarios were evaluated, comparing the outcome of simulations in which tariff reductions are based on conditional applied rates, which are obtained as the minimum of bound rates after a negotiated tariff cut and initial applied rates, with ones in which the reforms are represented through linear cuts in either initial applied or initial bound tariffs. The results show that consideration of relationships between bound and applied tariff rates in applied economic models can improve impact estimates considerably and seems particularly warranted if modest negotiated tariff cuts are evaluated. Moreover, when applying tariff cuts directly to initial applied rates or initial bound rates, the scenario analysis reveals that trade and welfare effects tend to be substantially overestimated for countries, such as Japan, for which marked differences between initial bound and applied rates exist.

Even though the results of the analysis differ considerably across scenarios, with the welfare effects of a 10 per cent tariff cut in the “tariffs derived from initial applied rates scenario” being more than 55 per cent larger than in the “conditional applied tariffs scenario”, the findings have to be seen as lower bounds of the actual estimation errors. This qualification is motivated by the observation that many countries allow imports at tariff rates lower than the MFN-applied rates under preferential trading arrangements. Hence, the difference between bound rates and actually applied import duties is larger than the one between bound and MFN-applied rates, modelled in this paper. As a result, the reported results from the “conditional applied tariffs scenario” overstate the welfare improvements in this scenario and, hence, reduce the difference to the other scenarios.

This study does not show that it is wrong to simulate a reduction in agri-food tariffs as a cut in applied tariff rates. Such investigations seem entirely appropriate, if the underlying question concerns the effects of reducing protection in agri-food markets and the magnitude of potential welfare gains from liberalisation. However, if the research question is related to how a tariff reduction agreed in WTO trade negotiations will affect countries and sectors, calculating conditional applied tariffs and using these in the analysis seems desirable.

Further research on the subject of unused protection in agri-food markets might first of all focus on determining *ad valorem* equivalents of bound and applied tariffs in a larger number of non-OECD countries and integrating these into modelling analysis. Enlarging the number of countries that are explicitly considered with their particular bound and applied tariff structures will make it possible to get better, more realistic results concerning the effects of negotiated cuts in agri-food

tariffs. Many developing countries have expressed a certain ambivalence with respect to further steps of trade liberalisation. This stance is in part motivated by disappointed expectations concerning the gains from implementation of the URAA. Quantitative policy advice that takes into account the dichotomy of policy relevant bound tariff rates and trade flow relevant applied rates can contribute to improved estimates of the prospective impacts of trade policy reform and thereby help to avoid inflated expectations concerning the gains from WTO agreements on tariff cuts.

NOTES

1. Countries would, of course, be free to lower their applied tariffs by more than their bound rates as an act of unilateral trade liberalisation. However, the subsequent analysis is limited to the discussion of the results of tariff reform in a multilateral context.
2. These patterns of protection largely reflect the relative strength of producer and consumer interest groups, as well as societies' general attitude towards agricultural policy.
3. Most favoured nation (MFD) tariffs signify normal trade relations, not considering preferential trade agreements.
4. The analysis by Harrison, Rutherford and Tarr (1995) provides an example of taking unused protection into account on an *ad hoc* basis. In particular, the authors assume zero tariff reductions in the EU as an outcome of the URAA, arguing that the new bindings are above the existing tariff levels.
5. The tariff data for the selected regions presented in Table I was introduced into GTAP using the "Altertax" option, which makes it possible to change tariff rates in the model database. This procedure is designed to incorporate additional information on policy variables into existing GTAP data aggregations (Malcolm, 1998). Tariffs were adjusted, while maintaining the internal consistency of the database and minimising the impact of the tariff change on the value of commodity and financial flows. The two updated databases containing the applied and bound tariff rates form the basis for the policy experiments.

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