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Policies and International Integration

INFLUENCES ON TRADE AND FOREIGN DIRECT
INVESTMENT

Giuseppe Nicoletti, Steve Golub,
Dana Hajkova, Daniel Mirza, Kwang-
Yeol Yoo

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**POLICIES AND INTERNATIONAL INTEGRATION:
INFLUENCES ON TRADE AND FOREIGN DIRECT INVESTMENT**

ECONOMICS DEPARTMENT WORKING PAPERS NO. 359

by
Giuseppe Nicoletti, Steve Golub, Dana Hajkova, Daniel Mirza and Kwang-Yeol Yoo

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ABSTRACT/RÉSUMÉ

Policies and International Integration: Influences on Trade and Foreign Direct Investment

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. It first describes trends in trade, FDI and the four sets of policies using a large set of structural policy indicators recently constructed by the OECD, including the new summary indicators for FDI-specific regulations described in Golub (2003). It then estimates the impact of policies on bilateral trade and bilateral and multilateral FDI. 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 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.

JEL classification: F15, F13, F16, F21, C23, L50

Keywords: International trade, foreign direct investment, services, liberalisation, regulation, panel data

Politique économique et intégration internationale: impact sur les échanges et les investissements directs à l'étranger

Cette étude évalue l'importance des politiques frontalières et non-frontalières pour l'intégration internationale. L'accent est placé sur quatre mesures largement préconisées: suppression des restrictions explicites aux échanges et à l'IDE ; encouragement de la concurrence au plan interne ; amélioration de la capacité d'ajustement des marchés du travail; et mise en place de niveaux adéquats d'équipements d'infrastructure. L'analyse, qui couvre l'IDE et les échanges de biens et de services, prend ainsi en compte les principaux mécanismes de mondialisation et traite de la plupart des modes de fourniture de services transfrontières. L'étude analyse d'abord les tendances du commerce, de l'IDE et des politiques dans les quatre domaines examinés, en utilisant un vaste ensemble d'indicateurs de politiques structurelles récemment assemblé par l'OCDE, qui comprend les nouveaux indicateurs de restrictions à l'IDE décrits par Golub (2003). Elle estime ensuite l'impact de ces politiques sur les flux de commerce bilatéraux et sur les IDE bilatéraux et multilatéraux. Les résultats indiquent que, malgré une libéralisation généralisée des transactions internationales au cours des deux dernières décennies, il est possible de réduire encore les obstacles qui s'opposent à l'intégration des marchés de l'OCDE. Les barrières qui demeurent ont un impact significatif sur le commerce international et l'IDE. Notamment, les estimations suggèrent que les réglementations visant à réduire la concurrence interne et les arrangements restrictifs du marché du travail compriment l'intégration internationale dans la même mesure que les restrictions explicites au commerce et à l'IDE. La simulation de scénarios dans lesquels ces barrières seraient levées fait penser que les effets quantitatifs d'une libéralisation ultérieure du commerce, de l'IDE et des marchés de produits et du travail sur l'intégration internationale pourraient être substantiels.

Classification JEL: F15, F13, F16, F21, C23, L50

Mots clé: Commerce international, investissement direct étranger, services, libéralisation, régulation, données de panel

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POLICIES AND INTERNATIONAL INTEGRATION: INFLUENCES ON TRADE AND FOREIGN DIRECT INVESTMENT¹

by

Giuseppe Nicoletti, Steve Golub, Dana Hajkova, Daniel Mirza and Kwang-Yeol Yoo

1. Summary and conclusions

1.1. Introduction

1. 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 (Box 1). 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.

1. Giuseppe Nicoletti, Dana Hajkova and Kwang-Yeol Yoo work in the OECD Economics Department; Steve Golub and Daniel Mirza are, respectively, Professor of Economics at Swarthmore College (United States) and Research Fellow at University of Nottingham (United Kingdom), and were consultants to the OECD Economics Department when this paper was written. The authors wish to thank Sveinbjorn Blondal, Jorgen Elmeskov, Michael Feiner, Nigel Pain and the many colleagues in the OECD Economics Department and other OECD directorates which contributed to improve this paper with their useful comments. Martine Levasseur and Janice Gabela provided excellent statistical and editorial assistance. The opinions expressed are personal and do not engage the OECD or its Member countries.

Box 1. International integration and growth

Trade, foreign direct investment and the related activity of multinational enterprises are the main channels through which global economic integration is achieved. Maximising such integration is not necessarily the objective of policy. For instance, certain barriers to global integration may serve legitimate policy purposes or would be too costly to remove. However, to the extent that integration may improve global welfare, the elimination of unnecessary policy barriers to trade and investment appears to be desirable. This paper is based on the assumption that, aside from their beneficial effects on the efficient allocation of world resources, both trade and the internationalisation of production are also likely to enhance economic growth. Trade openness increases competitive pressures and stimulates imitation, adoption and innovation, fostering productivity improvements and technical progress (OECD, 2000). Internationalisation of production also increases competitive pressures in OECD markets because, in manufacturing, FDI is closely related to goods trade and, in non-manufacturing, commercial presence is one of the main modes of cross-border service supply. Moreover, FDI is also an important vehicle for technology transfer and a stimulus to innovative activity. Through all these channels (resource reallocation, competition, trade, technology transfer), FDI is considered to be an increasingly important driver of growth (OECD, 2002a, 2002b).

2. This paper assesses the importance of certain border and non-border policy measures for global economic integration. 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.² 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.³
- 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.⁴ 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.

-
2. The other important channel of globalisation is movement of people. For a discussion of migration trends, determinants and policies see OECD (2002c). Temporary movement of personnel is also an important mode of service supply that is not covered in this study.
 3. 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 are studied in a companion paper (Yoo, 2003).
 4. 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, 2002a) and empirical analyses using sectoral (OECD 1996, 1997a) and aggregate data (OECD 1998a).

- 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.

3. The paper is structured as follows. The next section documents recent trends in foreign trade and internationalisation of production. Section 3 discusses the main factors that are likely to jointly affect trade and FDI patterns in OECD countries, focusing on the role of policy. Section 4 presents econometric evidence on the impact of these factors on trade and FDI. Finally, in Section 5, the results of this analysis are used to perform policy simulations. Details about empirical results (including their sensitivity to changes in empirical specifications) and the construction of the underlying data sets are provided in the Annex. The remainder of this section provides a summary of the main findings.

1.2. Main findings and policy implications

4. The analysis in this paper highlights that, despite extensive liberalisation of international transactions and international policy co-ordination (*e.g.* within the European Union) over the past two decades, there is scope for further reducing policy barriers to integration of global markets. 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.

1.2.1. Openness: formal trade and FDI restrictions

5. Border barriers to manufactured goods trade are generally low in OECD countries, but remaining barriers continue to exert a negative influence on trade flows. The empirical results obtained in this paper suggest that eliminating remaining tariff and non-tariff barriers could increase exports of goods within the OECD by around 14 and 7 per cent, respectively. There is also some evidence that, in manufacturing, non-tariff barriers may motivate so-called “tariff-jumping” FDI, aimed at bypassing those barriers while at the same time enjoying the protection that they ensure in the sheltered local markets. However, on balance 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 trade flows increasing by around 10 per cent and inward FDI positions doubling for new EU members. By contrast, free-trade areas do not seem to have increased significantly cross-border supply of services, suggesting either that border barriers persist for such products or that border barriers play a minor role relative to the non-border barriers still hindering trade in services.

6. FDI restrictions have declined substantially in most OECD countries over the past two decades but a number of countries (especially outside the European Union) still have a relatively restrictive environment in some important non-manufacturing industries, such as electricity, transport and telecoms. These restrictions often take the form of explicit limits on the foreign ownership of domestic firms and are estimated to curb significantly FDI stocks in protected countries. Aligning FDI restrictions on those of the most liberal country (the United Kingdom according to the indicators presented in this study) would

increase the OECD-wide inward FDI position by over one-sixth relative to baseline, with gains for individual countries proportional to the extent of current restrictions.

7. There is some limited evidence that stable exchange-rate arrangements may favour market integration by positively affecting the inward FDI position of participating countries. Through this channel, countries that are member 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.

1.2.2. *Product market reforms*

8. Domestic product-market regulations that impose unnecessary costs on businesses and create barriers to entry exert a distinct negative influence on FDI. With potential foreign investors allocating their portfolio on the basis of expected relative returns, 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. Clearly all OECD countries cannot simultaneously increase their *share* of global inward FDI in this fashion, because a uniform move towards reform would leave relative positions unaffected. However, OECD-wide product-market reform can raise the *overall* stocks of inward and outward FDI outstanding, thereby increasing global integration. For instance, simulations based on estimation results suggest that the alignment of regulations on those of the most liberal OECD country would increase the OECD-wide inward FDI position by over 10 per cent.

9. Restrictive product-market regulations are also found to curb bilateral export flows. Exports are negatively affected by both home and destination country regulations. 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). The implied distortions in the allocation of resources may reduce the country's ability to export. 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. Clearly, if all OECD countries were to simultaneously implement identical regulatory reforms (*e.g.* a simplification in administrative procedures that lowers costs in the same way in all countries) export market *shares* would remain unchanged. However, even in this unlikely scenario, there would be *absolute* gains in trade integration from a concerted global move towards reform because trade intensity (*i.e.* the ratio of bilateral trade flows to GDP) can rise for all countries. In practice, all else equal, a general convergence of regulation in the OECD area towards the regulatory environment of the most liberal country is estimated to increase within-OECD exports by over 10 per cent. These effects of regulatory reform on trade integration and their likely positive repercussions on welfare would come on top of the likely improvements in welfare, employment and growth highlighted elsewhere (OECD, 2001a, 2002d and 2002e).

10. 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. The reason is that for such services transactions to develop inputs from both countries are needed. This special feature of services may help to explain why the volume of their trade is so much lower than the volume of trade in goods, even though other determinants of bilateral transactions unrelated to policy (such as proximity or size) appear to have the same effects on the two kinds of products. With regulations in both trading partners having broadly the same effect, 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 increase the global volume

of trade in services. Simulations suggest that such increase could be over 30 per cent for the volume of within-OECD exports.

1.2.4. *Labour-market reforms*

11. Labour-market arrangements also have a bearing for trade and FDI outcomes. For instance, 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. When collective bargaining and other labour market arrangements favour wage adjustments that fully offset the costs of EPL, as may happen in the polar cases of decentralised bargaining systems or highly “corporatist” regimes (*i.e.* regimes where bargaining is co-ordinated and centralised), the potentially negative effect on exports can be neutralised. In other regimes where such compensation is difficult, as in the case of industry-level negotiation, 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 (*e.g.* due to increased uncertainty regarding costs), 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. For instance, an alignment of labour tax wedges on those of the country with the lowest wedge is estimated to increase OECD-wide exports by over 10 per cent.

1.2.5. *Infrastructure*

12. Improving network infrastructure (*e.g.* in telecommunications, transport and electricity) 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 building, either by ensuring efficient public investment or encouraging private investment, can significantly increase both the bilateral and global volumes of service trade. For instance, according to simulations an upgrading of infrastructure in OECD countries to the level of the best-endowed country could increase OECD-wide services trade by around 60 per cent.

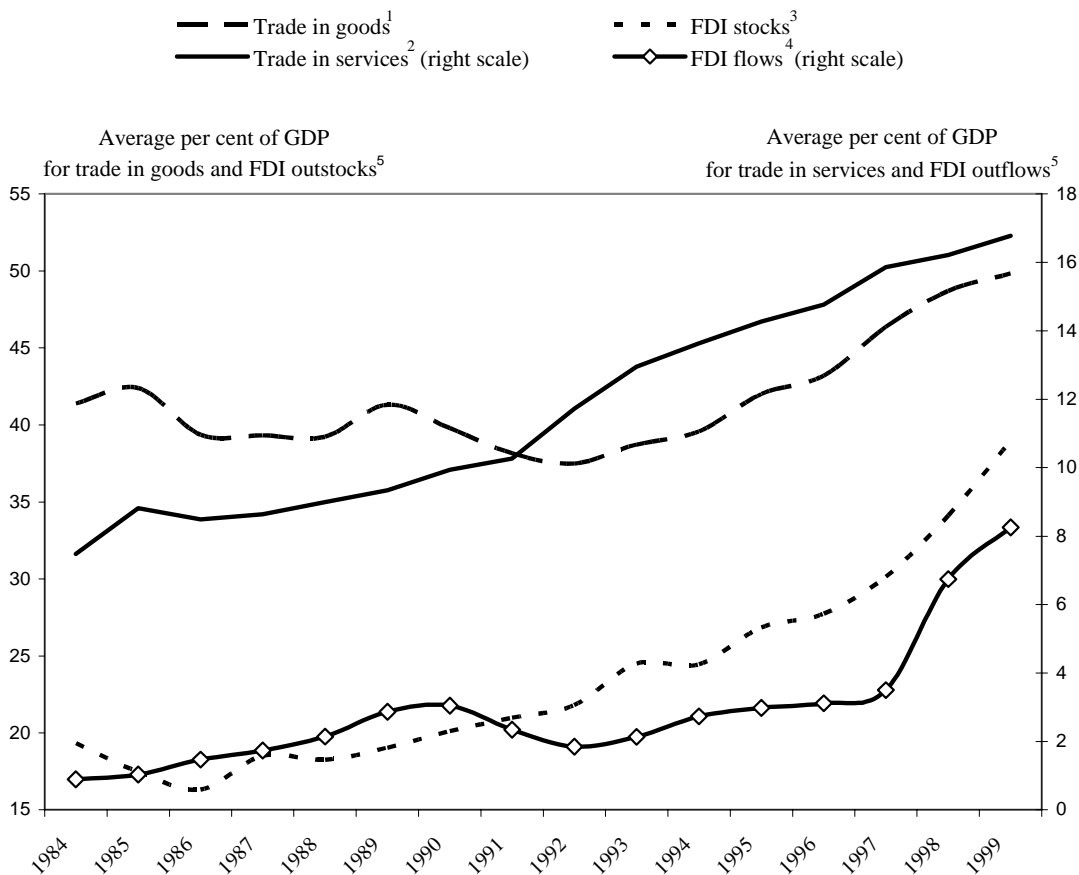
2. **Recent trends in trade, FDI and the internationalisation of production**

13. 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 outward FDI position over GDP) have increased significantly in the average OECD country.⁵ The upward trend was particularly pronounced since the early 1990s for FDI and trade in goods, which remained significantly more intense than service trade. The aim of this section is 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

5. Inward and outward 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 partner (investor) countries (henceforth, instocks).

underlie these phenomena as well as the role that policy can play in favouring the trend towards OECD-wide integration.

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 flow is 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.

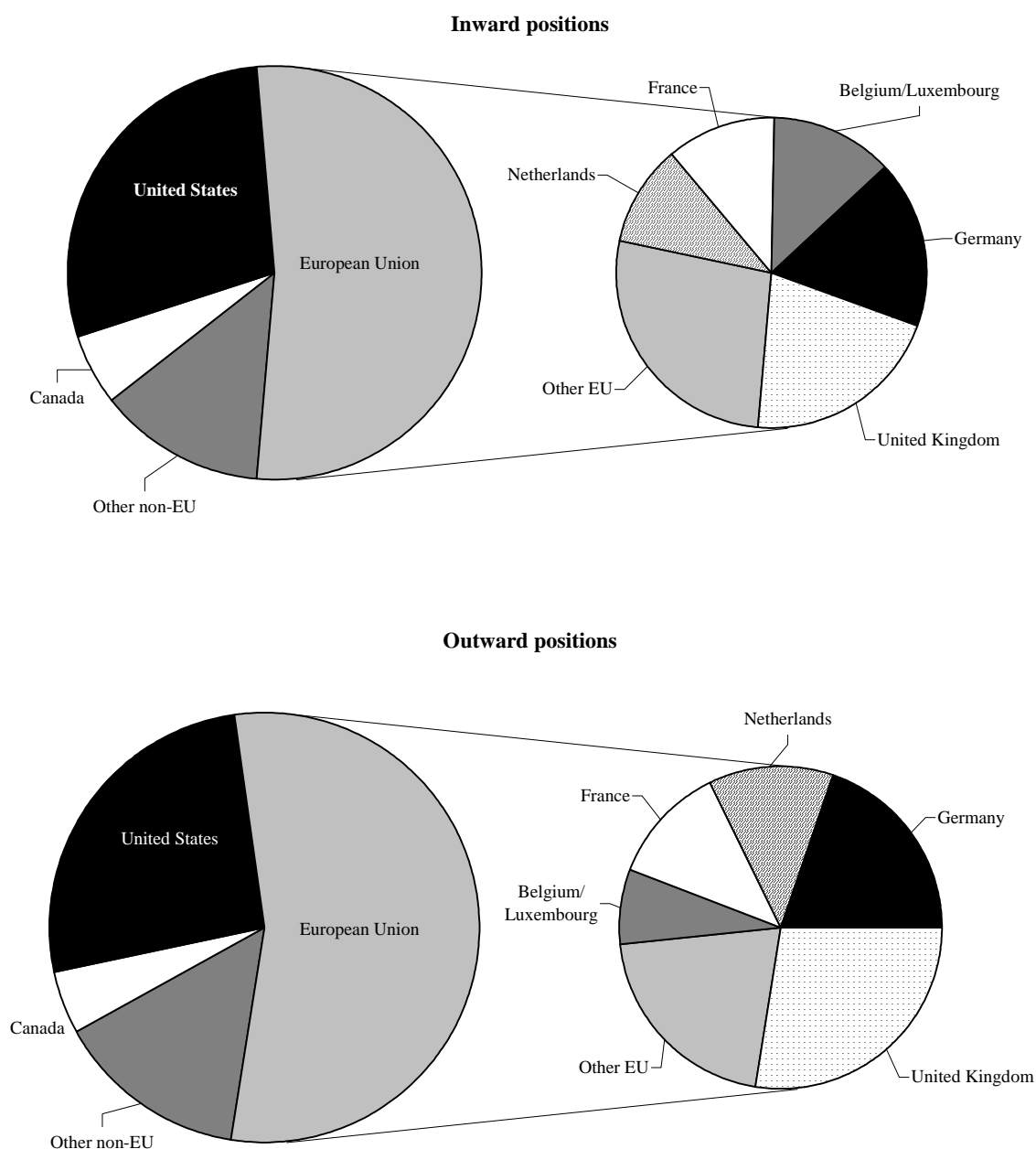
2.1. Trends in FDI

14. 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, 2002f).⁶ In 1999, the OECD accounted for

6. 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.

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).

Figure2. **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.

15. 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 2), 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, 2002f). 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.⁷

Box 2. Trade and FDI data

The database used in this paper combines information on foreign direct investment and foreign trade.

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). "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. Direct investment involves both the initial transaction between the two entities and all subsequent capital transactions between them and among affiliated enterprises, both incorporated and unincorporated.

A foreign direct investment enterprise is an incorporated enterprise in which a foreign investor owns a certain percentage or more of the ordinary shares or voting power or an unincorporated enterprise in which a foreign investor has equivalent ownership. The present study takes advantage of the existence of two qualitatively different sets of data on foreign direct investment, and can thus look at the international investment activity from two perspectives: from the viewpoint of ("financial") investment flows and stocks, and from the viewpoint of "real" activities of foreign affiliates in the OECD countries. The two data sets differ mainly due to their different coverage: while FDI flows and stocks relate to ownership of 10 per cent or more of the shares or voting power, the data on the activities of foreign affiliates include only enterprises with foreign ownership of 50 per cent or more.

Investment flows and stocks

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.¹ An attempt has been made to restore some of the missing data by using available antipodal bilateral data.

7. For instance OECD (2002f) considers the drop as a "correction" of the investment and stock market bubble occurred at the turn of the century. High levels of FDI flows were also partly related to a flurry of unprecedented privatisation activity.

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.

Real activity

The complementary approach to measure foreign direct investment is to use “real” data. The data used in the descriptive part of this study are drawn from a database developed by the OECD Directorate for Science, Technology and Industry and published in *Measuring Globalization: The Role of Multinationals in OECD Economies* that stores information on the activities of foreign affiliates. These data are based on surveys of foreign-owned enterprises and are disaggregated by investing country and by industry.² The reported information includes turnover, employment and value added. Research and development expenditures and intra-firm exports and imports are also reported, but their coverage is very limited.

The cross-sectional coverage of this database is limited to 21 reporting countries, 18 of which can be used for multilateral and 12 for bilateral analysis. Each of these countries reports transactions with 28 partner countries. In general, data pertain to the 1990-1999 period. For most countries, however, data are available for only a few years or even just a single year.

Foreign affiliates are included in the database if foreign investors have majority shareholdings in their capital. Hence, the activities covered represent a subset of all activities originated by “financial” foreign direct investment. Also, the information on real activities is collected at the level of the company and is classified accordingly (*i.e.* all activities of the affiliate are classified according to its main activity), while industrial statistics are usually based on establishment-level surveys. Therefore, direct comparability of employment, turnover and value-added in foreign affiliates to the corresponding sectoral or national account aggregates is impossible. Selected basic ratios relating these foreign affiliates’ statistics to industrial statistics are used for descriptive purposes only in this study.

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 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. 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.

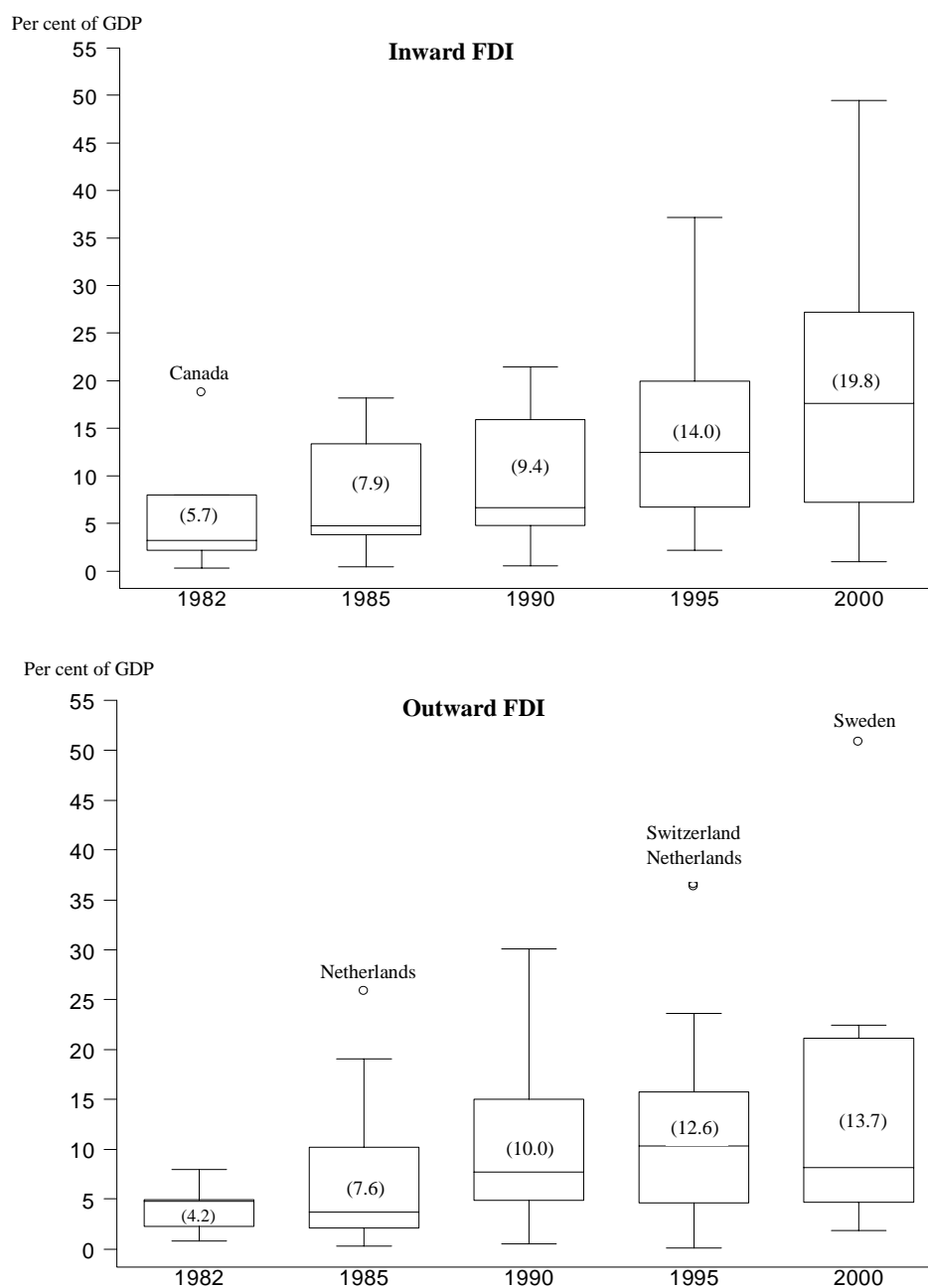
-
1. For the period 1980-2000, no geographic breakdown is available for the stock data for the Belgium-Luxembourg Economic Union, Spain, Ireland and Turkey; for outward stocks for Hungary and Mexico; and for outflows for Greece and Mexico.
 2. Industries are coded according to ISIC Rev.3 classification

16. 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.

Figure 3. **Inward and outward FDI positions: trends and cross-country dispersion**¹

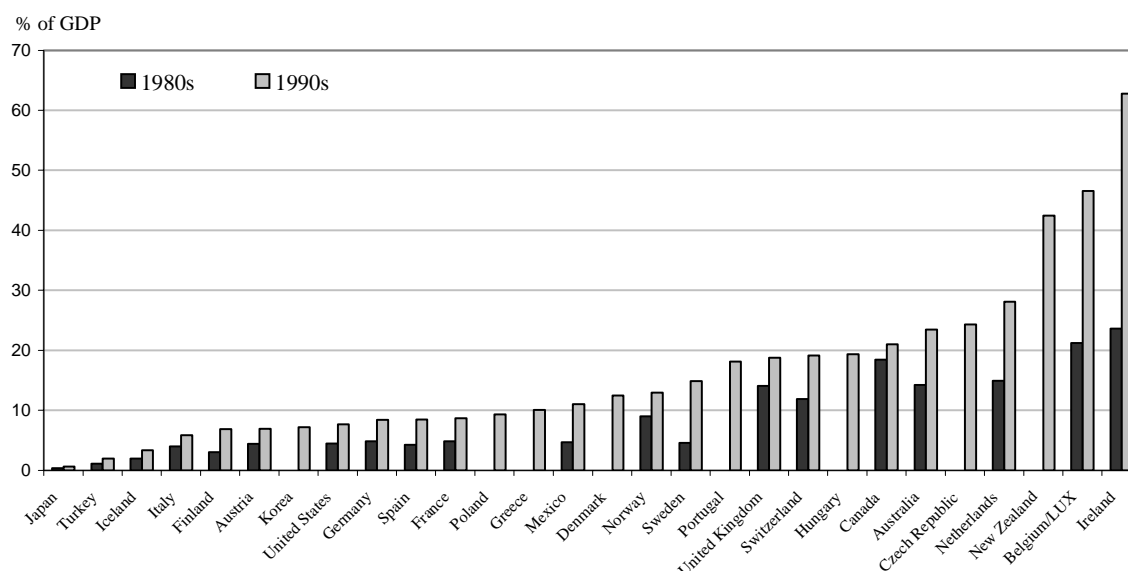
Unweighted OECD average positions²



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.

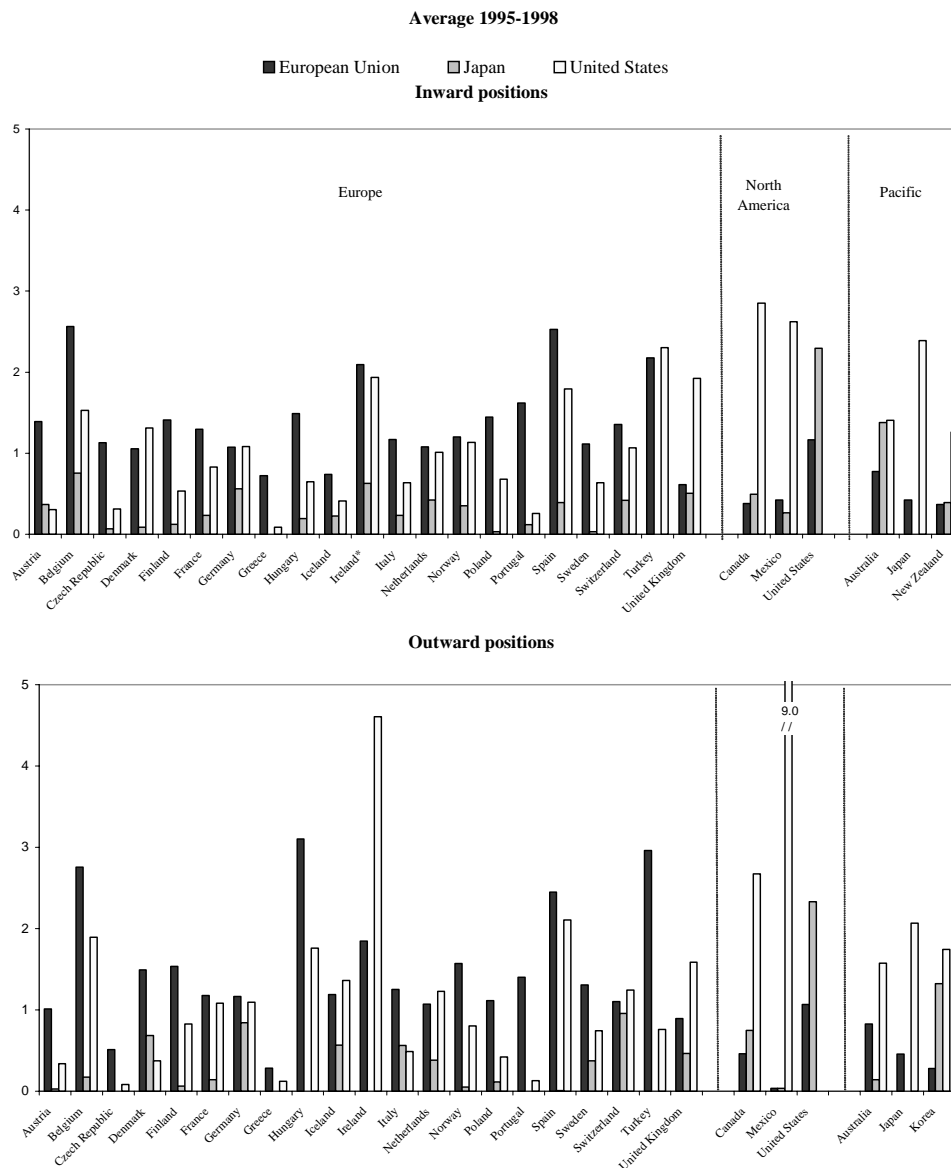
Source: OECD.

17. 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 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.⁸ 18. 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. For instance, Belgium, Spain and Ireland show a clear specialisation in hosting FDI from other EU countries, while Greece, Iceland and the United Kingdom appear to be less specialised. On the other hand, the United Kingdom, Spain, Belgium and Turkey seem better placed to receive FDI from the United States than Greece, the Czech Republic, Portugal, Iceland and Austria. On the

8. See the Annex for details on number of partners and geographical specialisation (based on the degree of kurtosis of the distribution of bilateral FDI).

whole, the dispersion of specialisation patterns suggests that geographical factors are important, but they cannot explain the entire variability in the data.⁹

Figure 5. **Patterns of geographical specialisation in inward and outward FDI¹**



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. * Data for FDI from Japan are for 1991-1994. Source: OECD.

9. 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.

2.2. *Patterns in activities of foreign affiliates: employment and output*

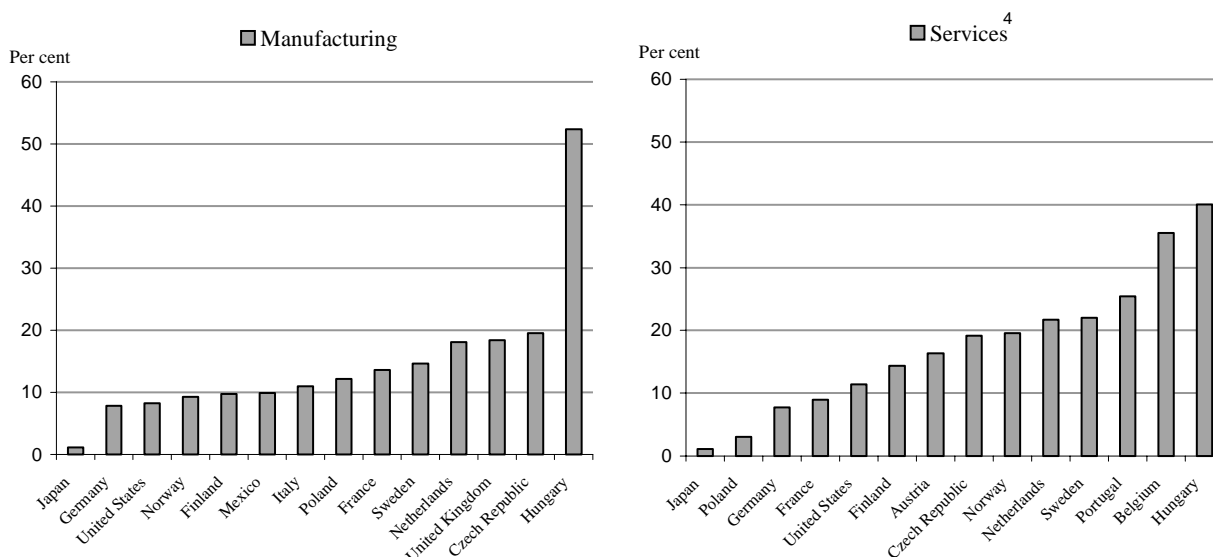
19. The counterpart of FDI is the activity of foreign affiliates in host countries. Foreign affiliates can be aimed at replicating the production of some of the same goods and services in both the home and host countries (so-called “horizontal” FDI) or at fragmenting the production of a good or service into stages located in different countries (so-called “vertical” FDI). As noted above, FDI flows can finance the acquisition of a local firm by a parent located abroad, expand the activity of an existing foreign affiliate or create a new foreign-owned firm in the local market. However, the market targeted by the parent company is not necessarily located in the country (and industry) that reports the FDI transaction. For instance, FDI can be directed at affiliates of the parent company that act merely as financial intermediaries in redirecting the funds to a third country (or industry).¹⁰ Therefore, the share of economic activity accounted for by foreign affiliates in the local market (and in each industry) is ultimately the best indicator of the actual degree of internationalisation of production in OECD countries.

20. Despite the limitations of available data in this area (Box 2), the information concerning total output of foreign affiliates in host countries suggests that the surge in FDI flows observed during the 1990s was indeed mirrored by a significant increase in the activity of foreign affiliates in the OECD area (OECD, 2002f).¹¹ This increase was particularly noticeable in the United States and the United Kingdom, in which both the value of foreign-affiliate production and its share in total OECD foreign affiliate production rose, more significantly so in the former country.

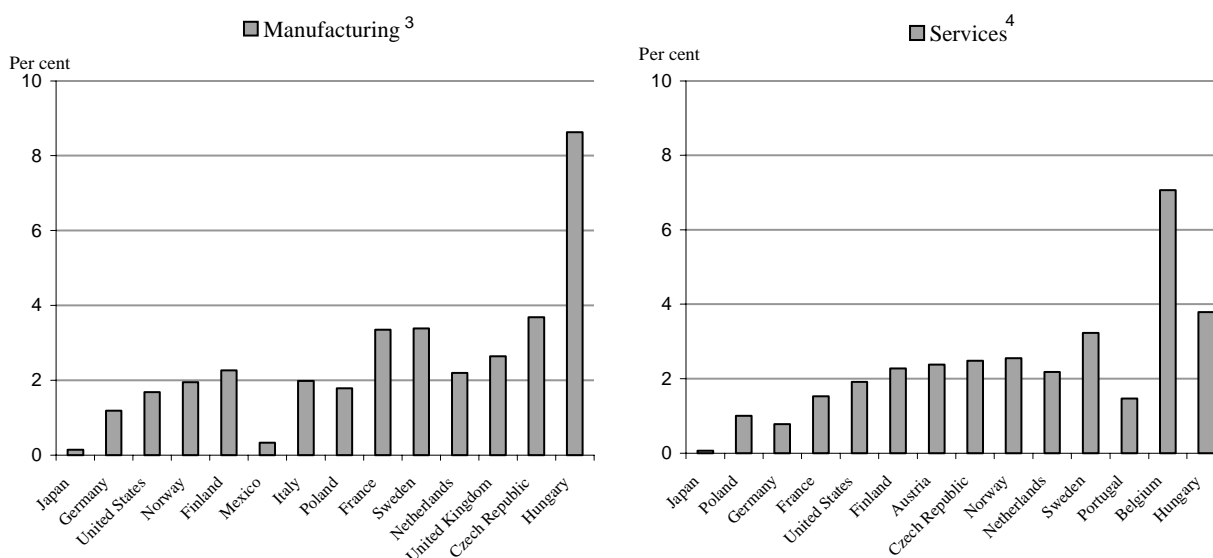
21. To illustrate cross-country patterns in the activity of foreign affiliates, Figure 6 shows the shares of total foreign-affiliate turnover and employment in the manufacturing and service sectors of OECD countries for which the data are available. The statistics report the situation in the late 1990s, and the shares are computed relative to total business value added and employment to control for possible inconsistencies in the way foreign affiliate and domestic firms are classified in the two broad aggregates (see Box 2). The activity of foreign affiliates differs significantly across countries, with employment generally accounting for from 1 to 4 per cent of total employment and turnover being equivalent to 10 to 25 per cent of total value added. Exceptions are Hungary, which has much higher shares of foreign affiliates in both manufacturing and services; Belgium, which has a much higher share in services (manufacturing is not covered in this country); and, at the other extreme, Japan, which has a particularly low presence of foreign affiliates in both manufacturing and services. The data suggest that in most countries the presence of foreign affiliates in services is either equivalent or higher than in manufacturing. This is not the case, however, in France, Poland and Hungary.

10. Consistent with international guidelines, statistics on FDI outstocks and outflows reflect the countries (and industries) with which the parent company has direct positions and transactions, rather than according to the countries (and industries) of the affiliates whose operations the parent ultimately owns or controls. Borgia and Mataloni (2001) argue that the bias in U.S. statistics of the geographical (and industry) distribution of FDI outflows and outstocks implied by this reporting convention is rising over time, due to the increasing role played by such financial holdings located in strategic partner countries.

11. Cross-country and time-series analysis of the activity of foreign affiliates is hampered by several limitations of the available data. For most countries, only a limited number of periods during the 1990s are covered. Moreover, differences in reporting conventions make cross-country comparisons difficult. Finally, the industry classification of foreign affiliates is often inconsistent with the reporting conventions of industrial statistics. Therefore, it is generally not possible to relate foreign-affiliate production or employment to total production or employment in a given industry.

Figure 6. Activity of foreign affiliates in selected OECD countries,¹ 1990sPanel A: Turnover as a per cent of business sector value added²

Panel B: Employment as a per cent of business sector employment



1. Activities of foreign affiliates are classified into industries according to the principal activity of the affiliate. Data are means over available years.

The country coverage in manufacturing and services is different.

2. Value added is total value added (gross domestic product) in the reporting country.

3. Turnover and employment of foreign affiliates in manufacturing is an aggregate corresponding to Total Manufacturing (ISIC rev.3).

4. Turnover and employment of foreign affiliates in services is an aggregate corresponding to Total Services (ISIC rev.3).

Source: OECD.

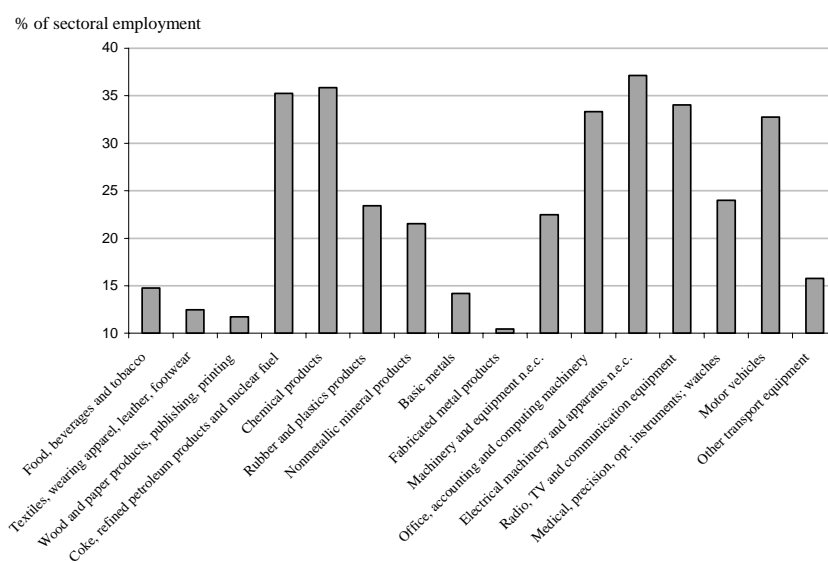
22. A closer look at the industry distribution of foreign affiliates within the manufacturing and non-manufacturing industries of the countries for which data are available suggests that internationalisation tends to be concentrated in a few activities (Figure 7). In manufacturing industries, their presence is

particularly significant in ICT industries, petroleum products, chemicals and motor vehicles, while it is lower in food, textile and wood products and, not surprisingly, in industries traditionally sheltered from foreign influence by national governments (basic metals, heavy transport equipment). In the service industries, on average, foreign affiliates' presence (measured by the employment share) is strongest in distribution, followed at a distance by business services and hotels and restaurants (*i.e.* tourism). In other industries -- such as utilities, construction, telecoms and, especially, transport -- the degree of internationalisation is generally low.

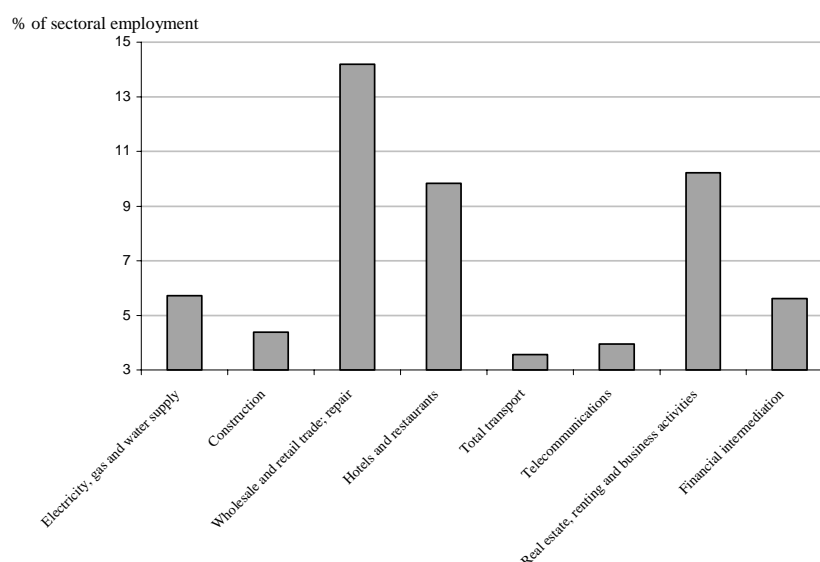
Figure 7. Percentage share of employment in foreign affiliates in selected industries

OECD average,¹ 1990s

Panel A. Manufacturing²



Panel B. Non-manufacturing²



1. Simple average. The data cover 19 OECD countries. Available years and sector coverage differ across countries.

2. Activities of foreign affiliates are classified into industries according to the principal activity of the affiliate. Sectoral employment is consistent with this classification.

Source: Directorate for Science, Technology and Industry, OECD.

2.3. Trade developments: goods and services

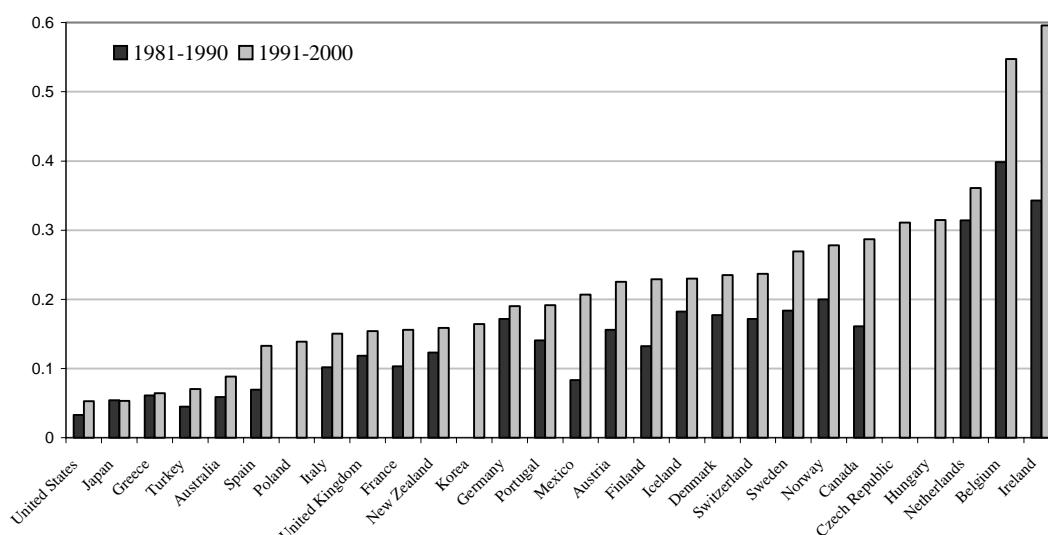
23. As pointed out in Figure 1, both goods and service trade flows rose faster than GDP over the past decade in the OECD area. At the same time, the intensity of trade in services remained much lower than in goods. Underlying these OECD-wide stylised facts are wide cross-country differences in export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

2.3.1. Goods trade

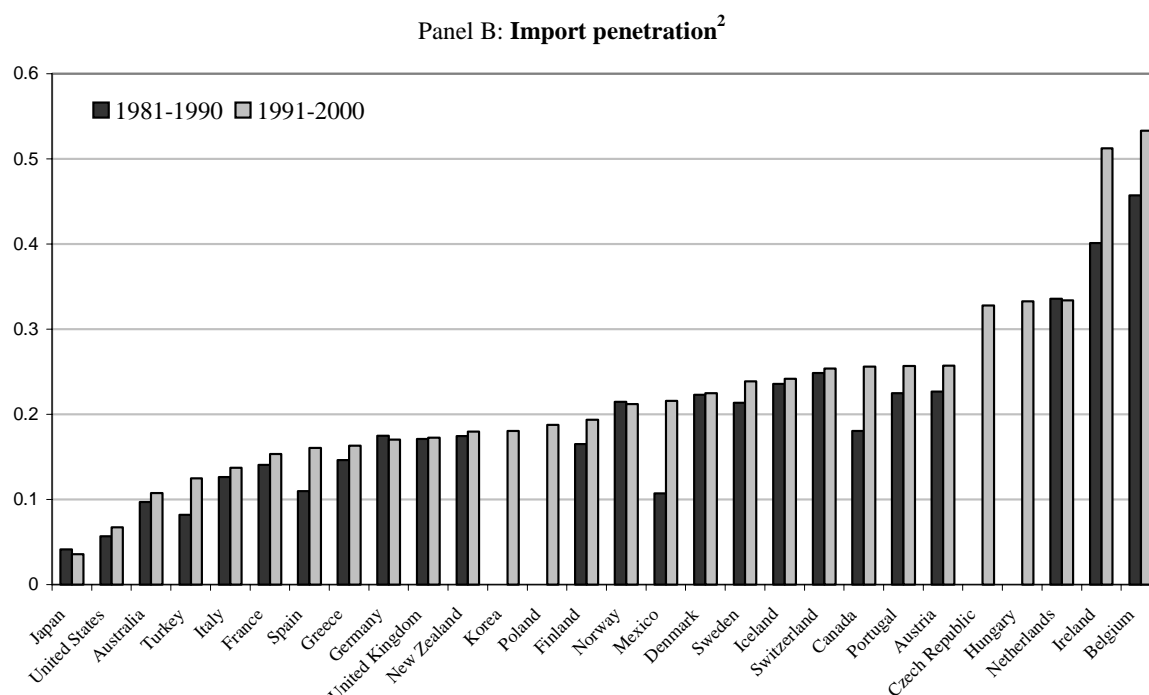
24. Figure 8 shows average intensities of goods trade within the OECD area for individual member countries over the 1980s and the 1990s. The intensity of exports to OECD countries (defined as the share of exports in GDP) increased in all countries except Japan,¹² partly reflecting a stronger propensity 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. Developments 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. A cursory view at the figure also suggests that both the location and the size of the countries are important factors determining the propensity to export. 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 a relatively low export intensity, reflecting either a wide internal market or high transport costs. By contrast, economies that are small and well-connected to large neighbouring countries, such as Belgium and the Netherlands, have high export 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 high intensities, such as New Zealand and Korea.

Figure 8. Intensity of goods trade within the OECD area, 1980s and 1990s

Panel A: Export intensity¹



12. Data for the 1980-1990 period is incomplete or missing for transition countries and Korea.



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.

25. As with export intensities, part of the cross-country variation in import penetration rates (defined as the ratio of imports to domestic absorption) appears to be related to location and size, with small and well-connected countries tending to have higher penetration than large or remote countries (Figure 8, panel B). Again, Australia, the United States and Japan stand at the tail of the distribution, with their imports accounting for no more than around 10 per cent of domestic absorption, while some European countries and Canada show the highest penetration to foreign goods.

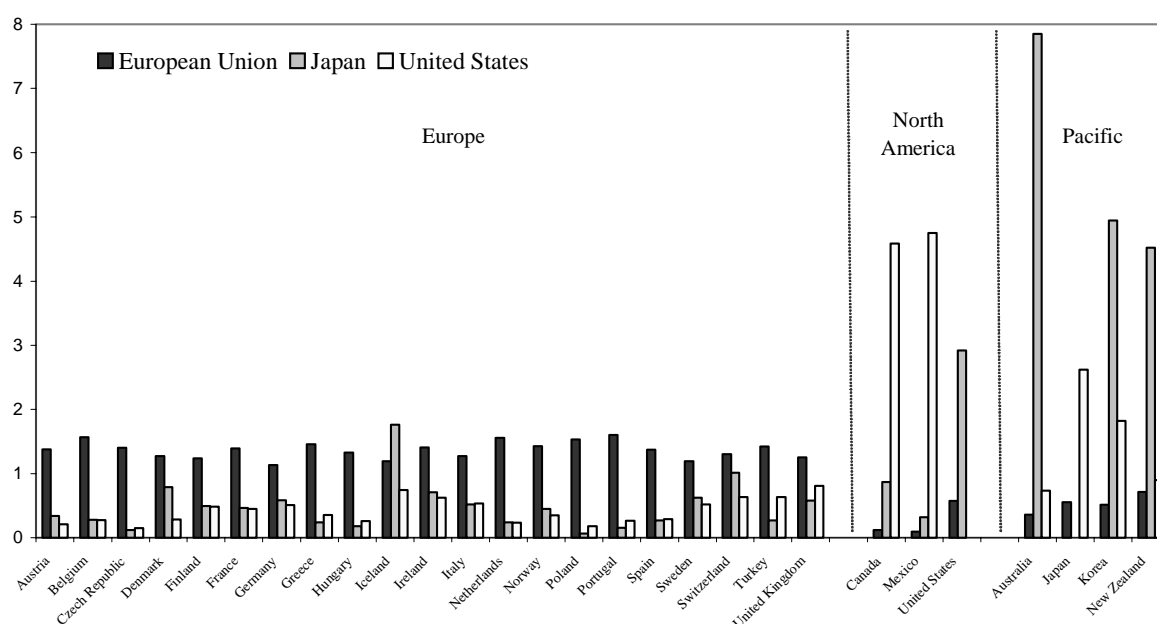
26. The increase in trade intensities over the past two decades has probably been matched by rising intra-firm trade related to the widening role played by MNEs in the OECD area (OECD, 2002d). Indirect evidence of this is provided by the rising share of intra-industry trade, especially in transition 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.

27. As with FDI, looking at the geographical distribution of bilateral trade flows within the OECD can provide clues on some of the factors determining the attractiveness of a country to its trading partners. Using the same indicator as for FDI, Figure 9 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).

Figure 9. **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. For computational details, see Annex.

Source: OECD.

2.3.2. Trade in services

28. Figure 10 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 2).¹³ 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 services (12 per cent) and financial services (6 per cent). The composition of services trade is similar at the individual country level.¹⁴ 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 trade intensity is much lower than for goods, with both goods exports and imports several times higher than the corresponding flows in services in all OECD countries for which data are available.¹⁵ 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.

29. 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.¹⁶ 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 11). 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.

13. 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).

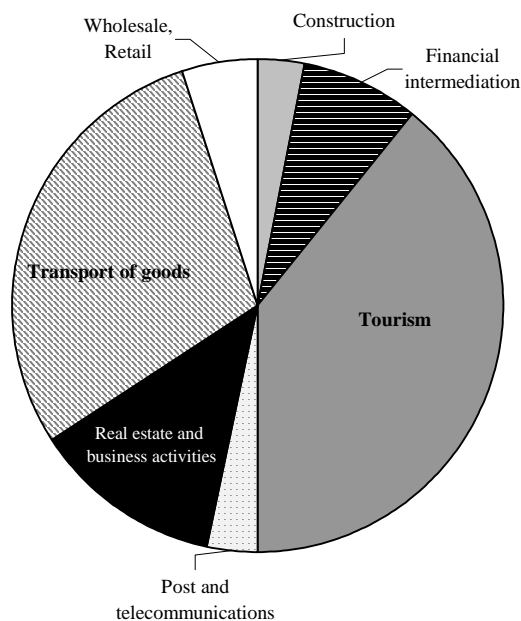
14. Unfortunately, no industry breakdown is available for bilateral service trade.

15. The ratio of manufacturing to services trade flows generally ranged from 3 to 6 in most countries, but in some extreme cases, like Mexico, trade in manufacturing was even 10 times higher. See the Annex for more details.

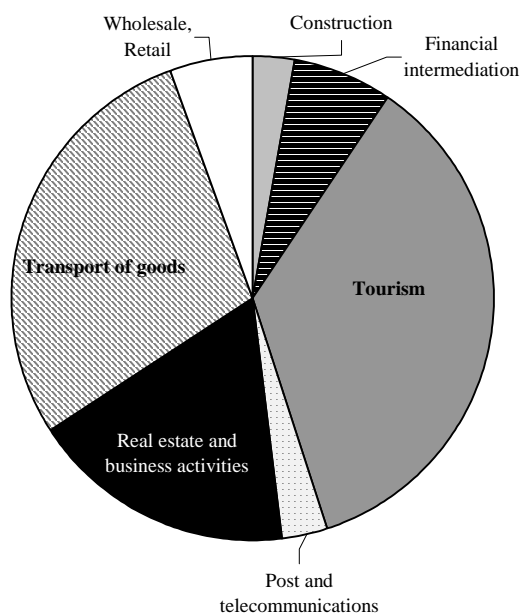
16. For instance, services provided by a barber are hardly tradeable between cities or regions within a country, not to mention across borders. However, the provision of many other services, including some of the most dynamic ones over the past two decades (such as communication, financial intermediation 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 tradeable, such as retail distribution (see, for instance, OECD 2001b).

Figure 10. **Composition of services trade in the OECD area,¹ 1999**
OECD average²

Panel A: **Exports³**



Panel B: **Imports³**

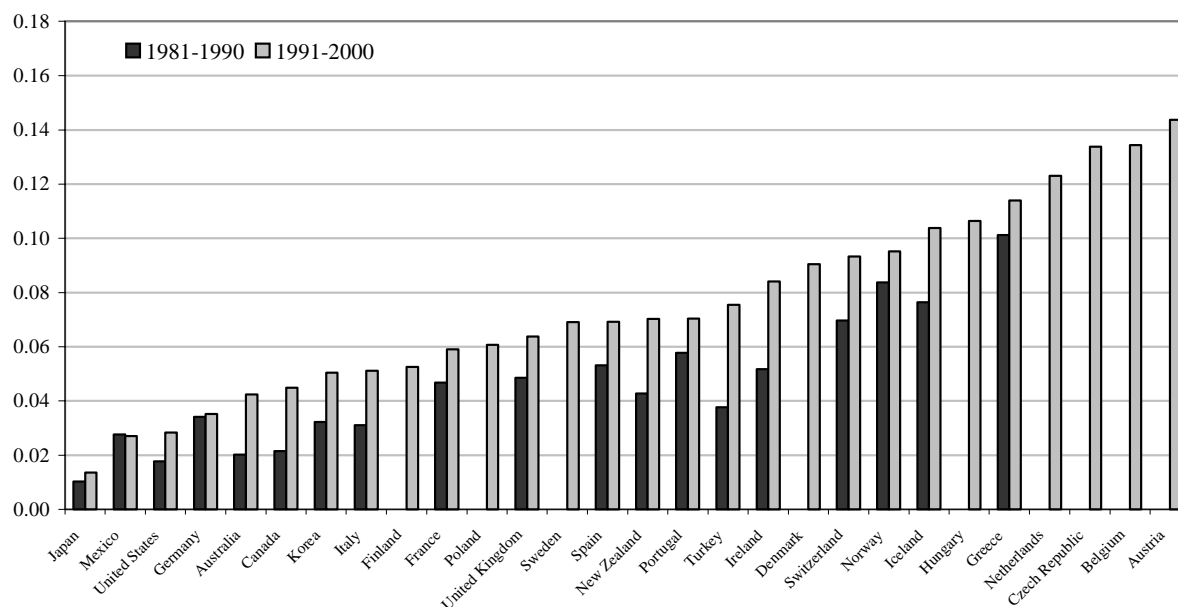
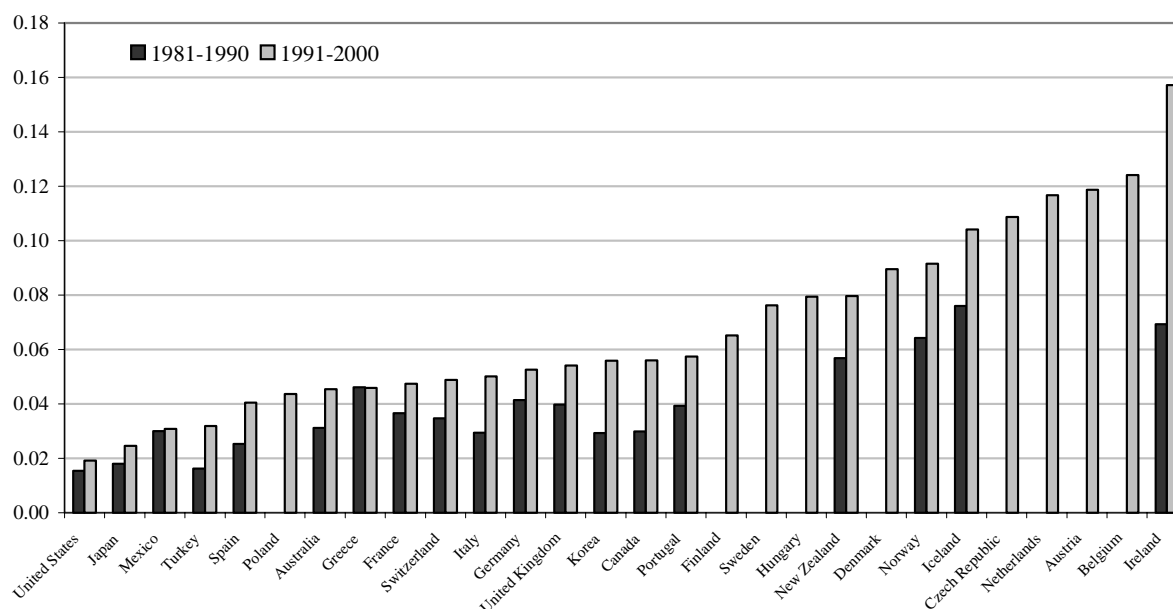


1. Service trade reported by balance of payments statistics includes only cross-border supply and consumption abroad. Service supplied through commercial presence or movement of individuals are excluded.

2. Simple average.

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

Source: OECD.

Figure 11. **Intensity of global trade in services, 1980s and 1990s****Panel A: Export intensity¹****Panel B: Import penetration²**

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.

2.4. Twin developments in FDI and trade

30. 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.

Table 1. **Bivariate correlations between bilateral trade and FDI^a**

Bilateral FDI measures	<i>Outward position</i>	<i>Inward position</i>	<i>Outward investment</i>	<i>Inward investment</i>	<i>Outward position</i> (% of GDP)	<i>Outward investment</i> (% of GDP)
Bilateral trade measures						
<u>A. All available years</u>						
<i>Manufacturing exports</i>	0.64 (5998)	0.57 (5963)	0.39 (7930)	0.34 (7610)		
<i>Manufacturing imports</i>	0.59 (5997)	0.63 (5961)	0.34 (7930)	0.37 (7610)		
<i>Services exports^b</i>	0.81 (344)	0.83 (347)	0.50 (559)	0.58 (498)		
<i>Services imports^b</i>	0.77 (344)	0.67 (347)	0.45 (559)	0.53 (498)		
<i>Total exports</i> (manufacturing plus services)	0.64 (344)	0.58 (347)	0.36 (559)	0.40 (498)		
<i>Total imports</i> (manufacturing plus services)	0.61 (344)	0.63 (347)	0.35 (559)	0.41 (498)		
<u>B. Average 1990-2000</u>						
<i>Manufacturing exports (% of GDP)</i>					0.73 (298)	0.71 (321)
<u>C. Average 1998-2000</u>						
<i>Total exports (% of GDP)</i>					0.61 (67)	0.57 (76)

a) Number of observations in parenthesis

All correlations are significant at 5 per cent levels

b) Balance of payments definition.

Source: OECD.

31. 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 relationship 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, service trade and FDI can be expected *a priori* to be complementary, because establishing commercial presence abroad generally brings stronger service 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 accounts for an increasing share of total FDI flows (up to 65 per cent at the end of the 1990s).¹⁷ 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.

2.5. *Summing up*

32. The review of trends and cross-country patterns in FDI and trade in this section has provided some facts and, at the same time, opened up questions to be explored in the empirical analysis of the next sections. Trade and FDI are closely related and appear to be driven by largely the same set of geographical, structural and economic factors (such as size, income and location). However, neither the increase in the intensity and variance of trade and FDI intensities over time nor their patterns of geographical specialisation are fully explained by these factors. Differences observed in goods and service trade intensities, as well as cross-country patterns of services trade, can hardly be explained by transport costs and other structural and economic factors alone, which seem to have at least partially similar effects on both kinds of trade. Policies may, therefore, play an important role both directly and indirectly (*e.g.* through the effect of free-trade agreements on market size and trade and investment costs).

3. **Policy and other determinants of trade and international investment**

33. 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 3). Moreover, their influence may also differ in some cases across trade in goods and trade in services.

34. 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. 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.¹⁸ This section shows by means of newly-developed indicators that approaches

17. See OECD (2002f).

18. 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.

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.

Box 3. 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.¹ 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 (2002g) for a discussion of the relationship between trade and FDI.

-
1. 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).

3.1. Openness

35. 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.

3.1.1. Tariff and non-tariff barriers

36. Figure 12 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.¹⁹ The conclusion of global and regional trade agreements (Box 4) during this period was reflected in a decline of both non-tariff and, to a lesser extent, tariff barriers within the OECD area.

-
19. 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.

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 13 shows that in 2001 the dispersion of average (unweighted) applied tariff 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.²⁰

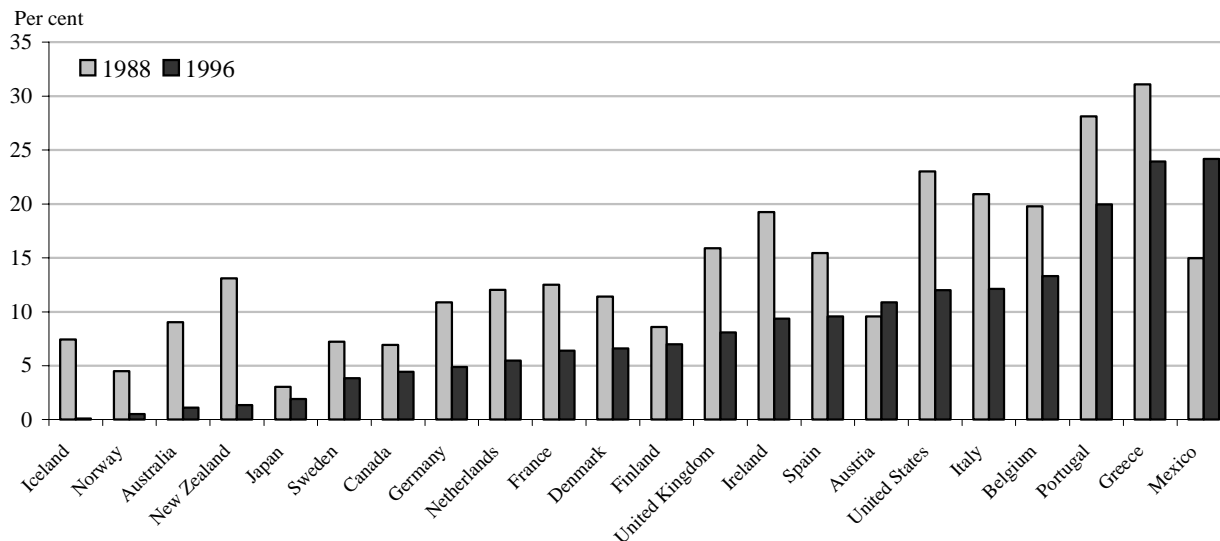
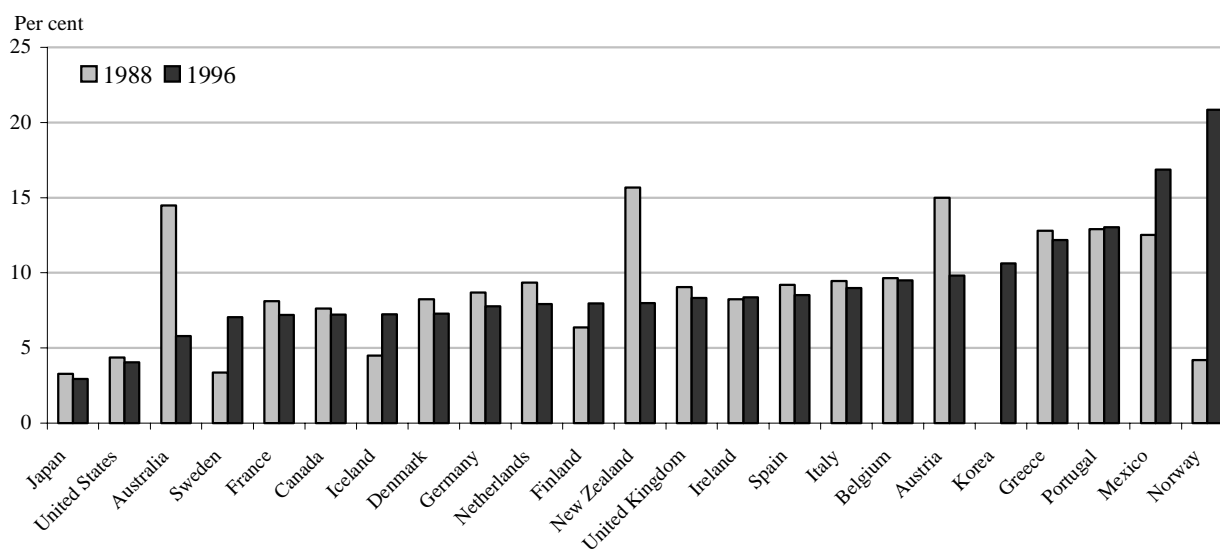
Box 4. Trade agreements

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 2002h), Panagariya (1999) and Hoekman and Schiff (2002)

20. *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. See Annex 1 for details.

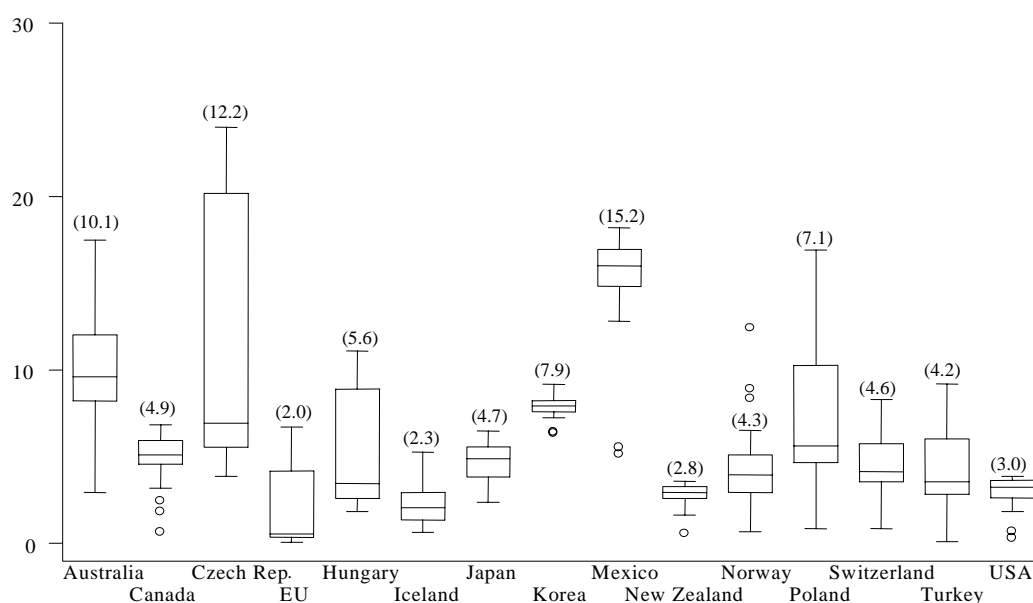
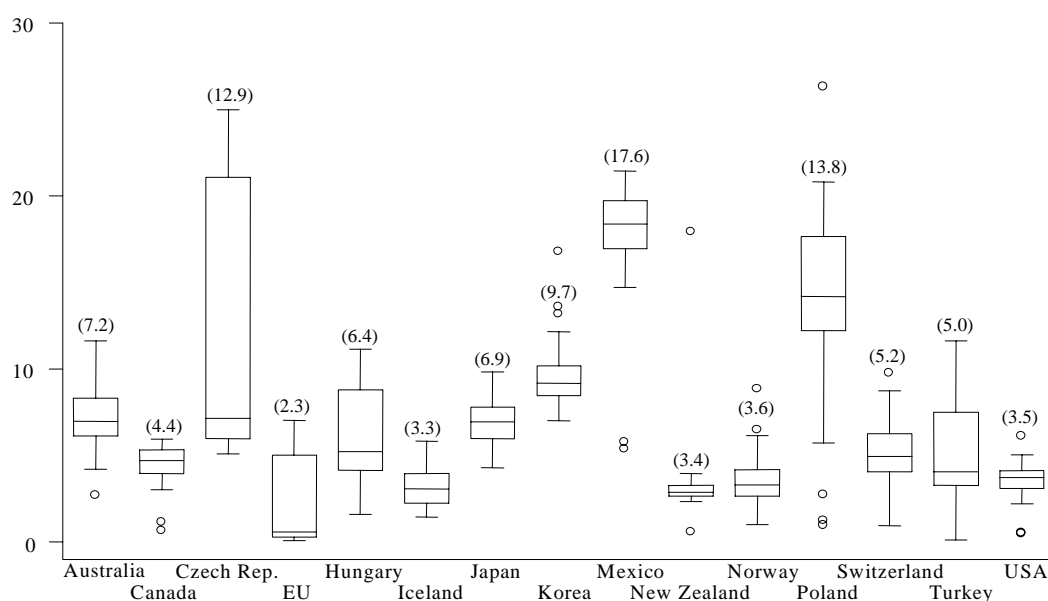
Figure 12. **Manufacturing trade liberalisation in the OECD area, 1988-1996****Panel A. Import coverage of non-tariff barriers¹****Panel B. Import weighted MFN tariff rates¹**

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.

Figure 13. **Median and dispersion of bilateral applied tariffs by importing countries in 2001¹**

(Average values in parentheses)

Panel A. Dispersion reflecting the compound effect of regional preferences and OECD import product mix²**Panel B. Dispersion reflecting only regional preferences³**

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.

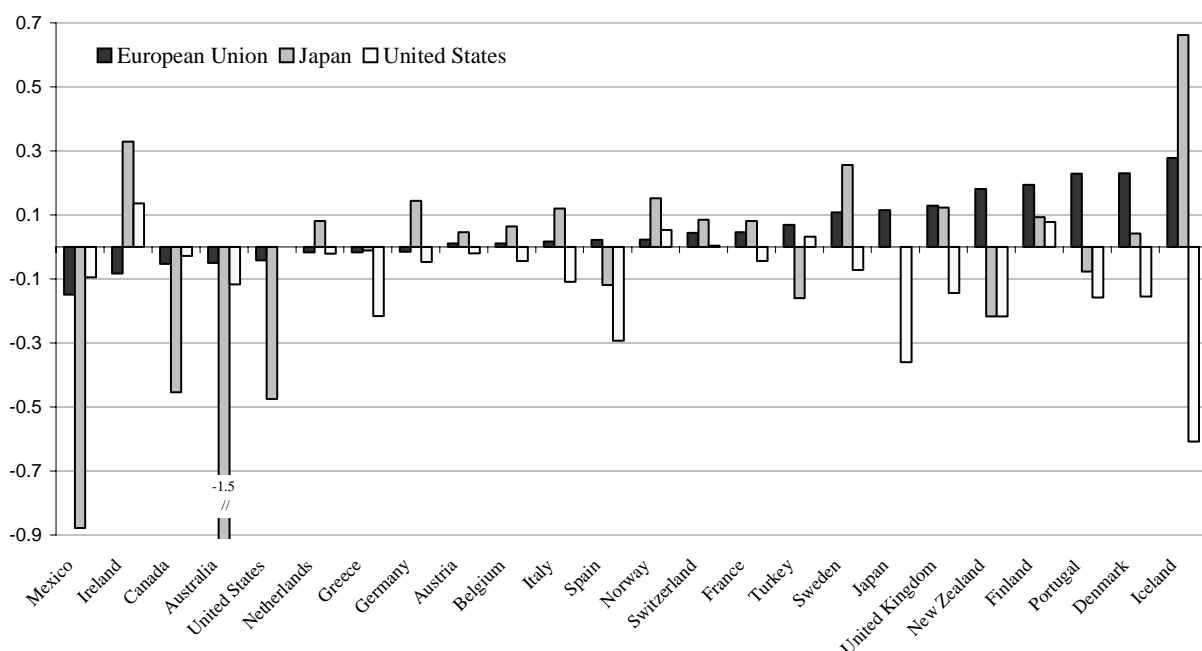
2. ISIC rev.3 two-digit industry-level tariffs were aggregated to national level using the weights of the OECD import product mix.

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

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

37. Trade agreements tend to match and accentuate the gravity forces (see below) that affect bilateral trade among signatory countries.²¹ 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 14, 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.

Figure 14. 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.

38. 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 exporting to third-party countries

21. 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.

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.

39. The effect of free-trade agreements on bilateral FDI transactions is more complex.²² 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.²³ 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.²⁴ 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.

3.1.2. FDI restrictions

40. 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.²⁵

41. According to these indicators (Figure 15), liberalisation of FDI flows has been substantial over the past two decades in all OECD countries except the United States and to a lesser extent Japan, both of

22. See Markusen (2002) for an extensive discussion of the conflicting forces acting on bilateral FDI flows as trade liberalisation is implemented.

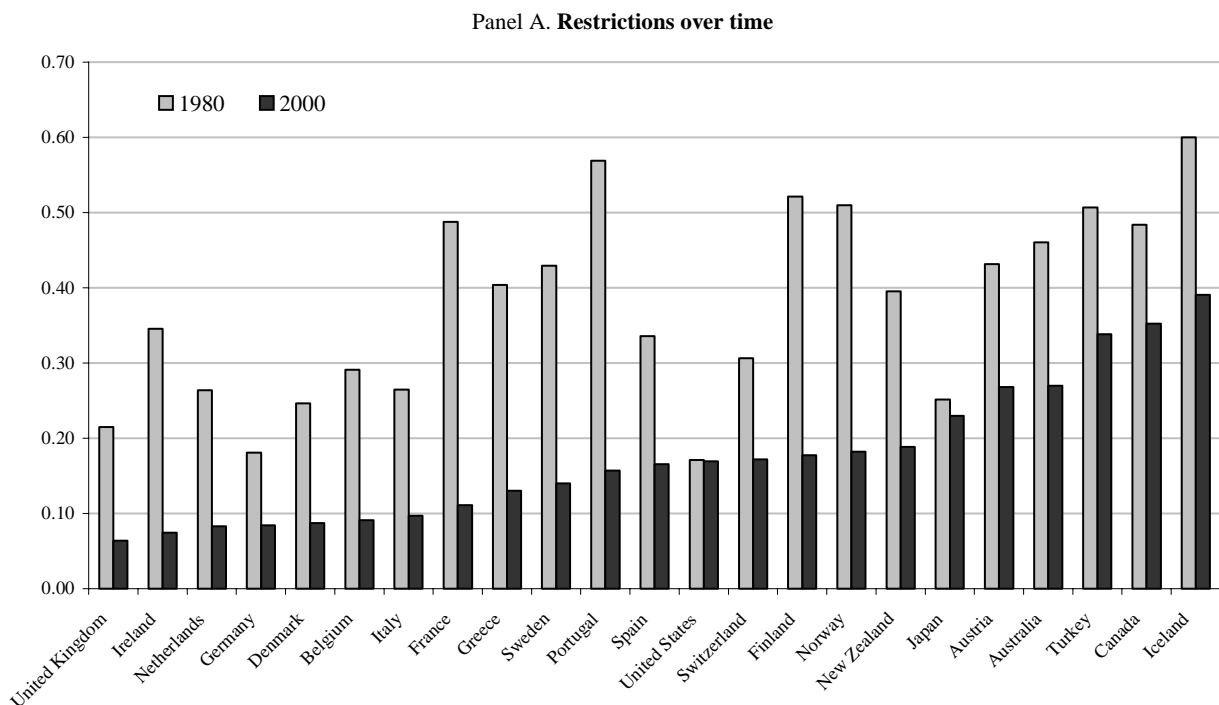
23. This could partly explain the wave of within EU mergers and acquisitions that followed the Single Market Programme.

24. 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.

25. 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 represented by full state ownership of business enterprises and hidden institutional or behavioural barriers documented in official reports.

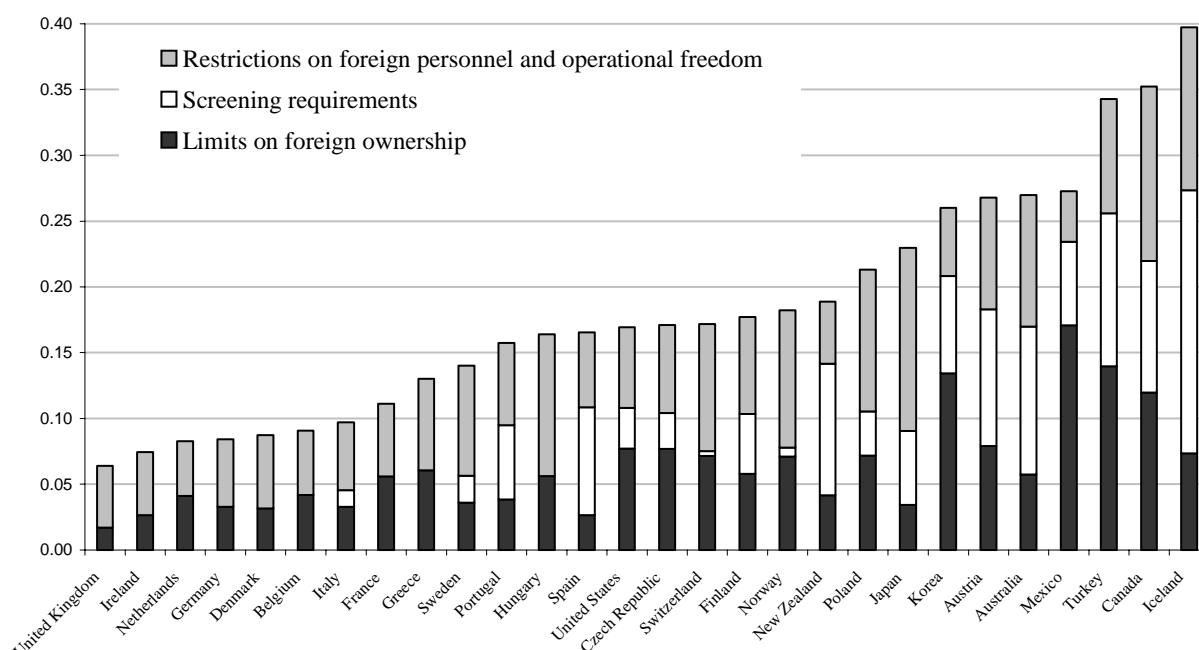
which had relatively low statutory restrictions to begin with.²⁶ Despite the easing of restrictions and their generally much lower level at the end of the 1990s, cross-country differences remain significant, with most EU countries showing greater openness than the United States and Japan, and a few OECD 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).²⁷ On average, the bulk of restrictions are found in non-manufacturing industries.²⁸ 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.

Figure 15. FDI restrictions in OECD countries,¹ 1980-2000



-
26. 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.
27. 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.
28. A simple count of restrictions affecting different industries shows that 67 per cent of all restrictions concern the services sector (Sauvé and Steinfatt, 2003).

Panel B. Breakdown by type of restriction, 1998-2000



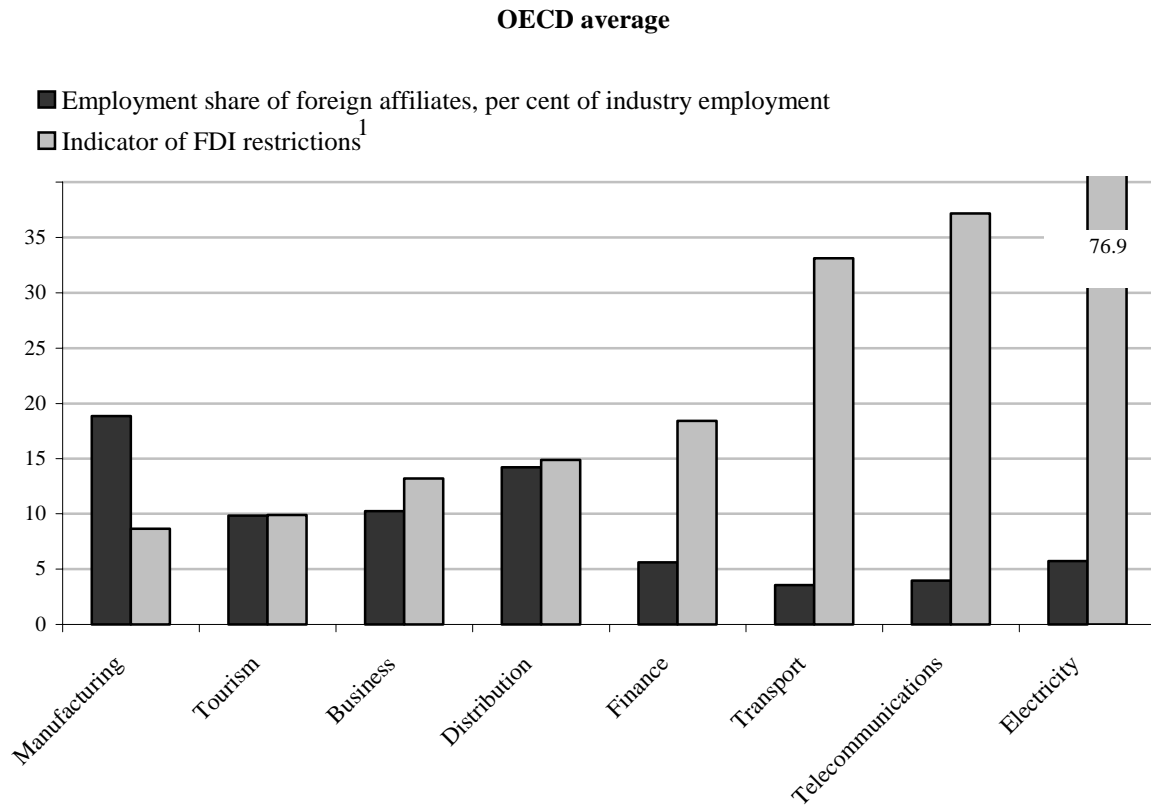
1. The indicator ranges from 0 (least restrictive) to 1 (most restrictive). The most recent year for which data are available varies across countries between 1998 and 2000.

Source: Golub (2003).

42. 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 16, which suggests that in very broad terms 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.²⁹

29. 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.

Figure 16. Foreign affiliates and FDI restrictions in selected industries



1. For this figure, the indicator ranges from 0 (least restrictive) to 100 (most restrictive).

Source: Golub (2003) and OECD

43. 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.

3.1.3. Currency unions

44. 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,

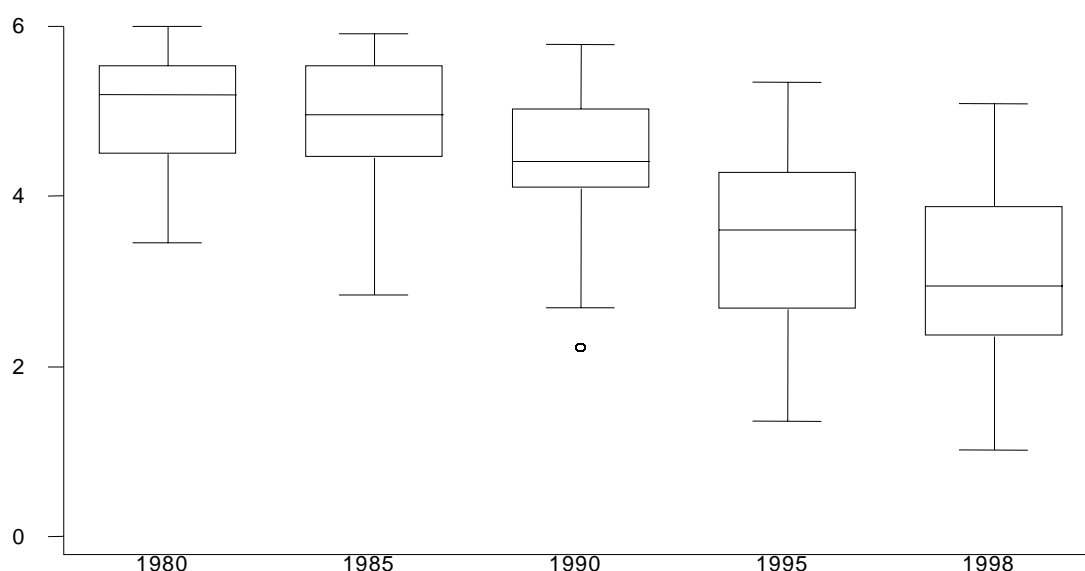
uses the host country or foreign inputs and finances its capital at home or abroad.³⁰ Therefore, the effect of exchange-rate variability on FDI is ultimately an empirical issue.

3.3. Product market regulation

45. Using a summary indicator of regulatory reform that ranks regulations in seven non-manufacturing industries from least to most restrictive of competition, Figure 17 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 (Nicoletti and Scarpetta, 2003).³¹

Figure 17. 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).

30. 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.

31. 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).

46. 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) 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.³² 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.* tradeable *versus* non-tradeable or home *versus* foreign) or the relative rates of return expected from investing in different locations.

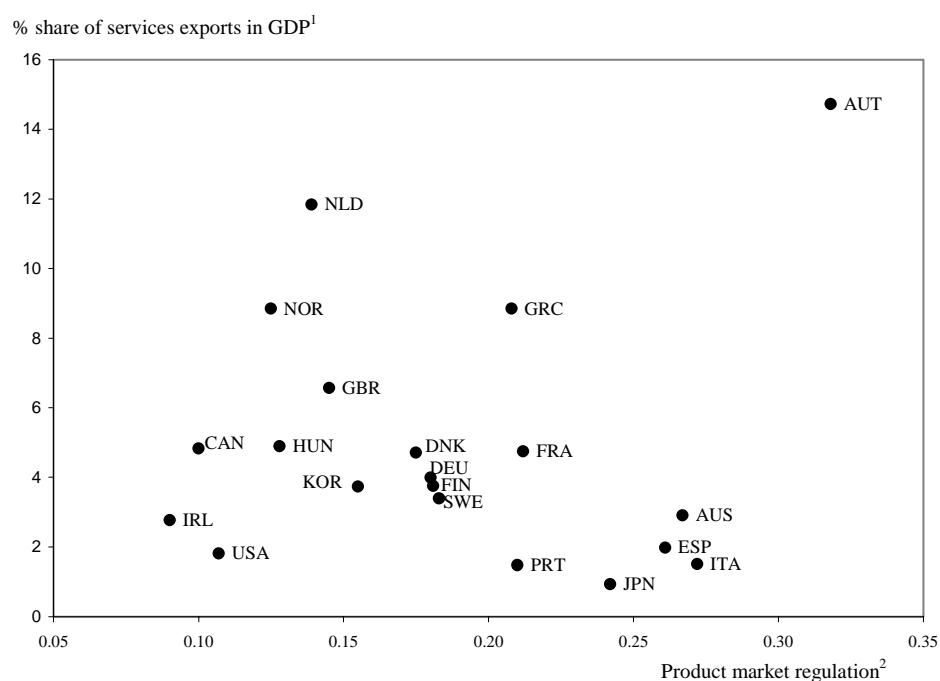
47. A way in which relative prices can be affected is when the introduction of anti-competitive regulation in one country increases its production costs, for instance by discouraging efficiency enhancements and productivity growth. In the short run, this tends to make the products exported by this country 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.

48. 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. Suggestive evidence of a negative correlation between anti-competitive service regulation and the intensity of service trade is provided in Figure 18, which plots the service export and import intensities of OECD countries against a summary indicator of regulation in non-manufacturing (which is increasing in restrictions to competition).³³

32. 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).

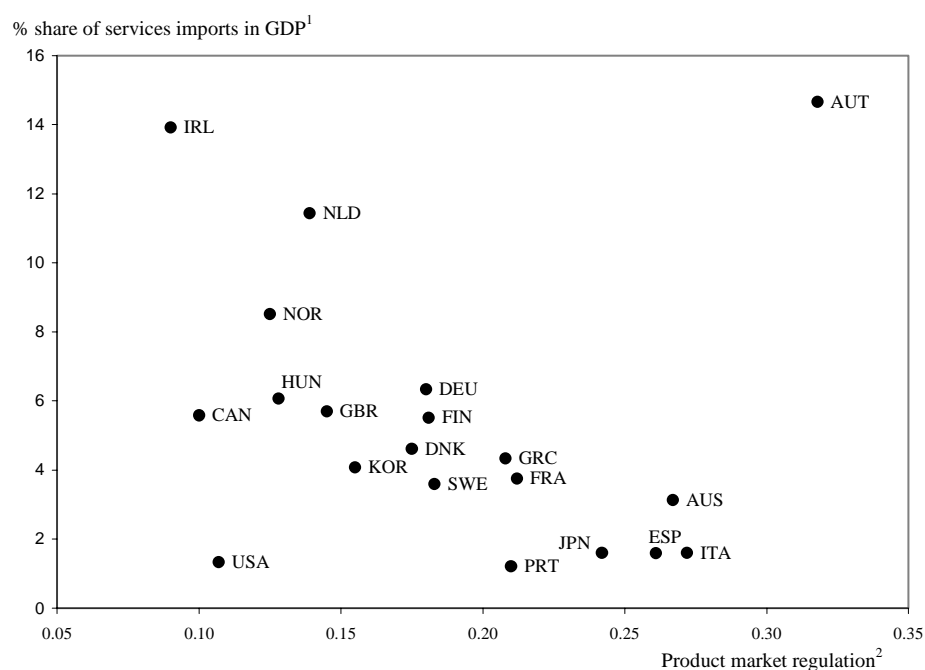
33. The summary indicator is the GDP-weighted average of the indicators of regulation in twelve non-manufacturing industries.

Figure 18. Non-manufacturing regulation and trade in services, 1998



Correlation coefficient: -0.37 (excluding Austria)

t-statistic: -1.66



Correlation coefficient: -0.64 (excluding Austria)

t-statistic: -3.45

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.

49. 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.³⁴
- 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.

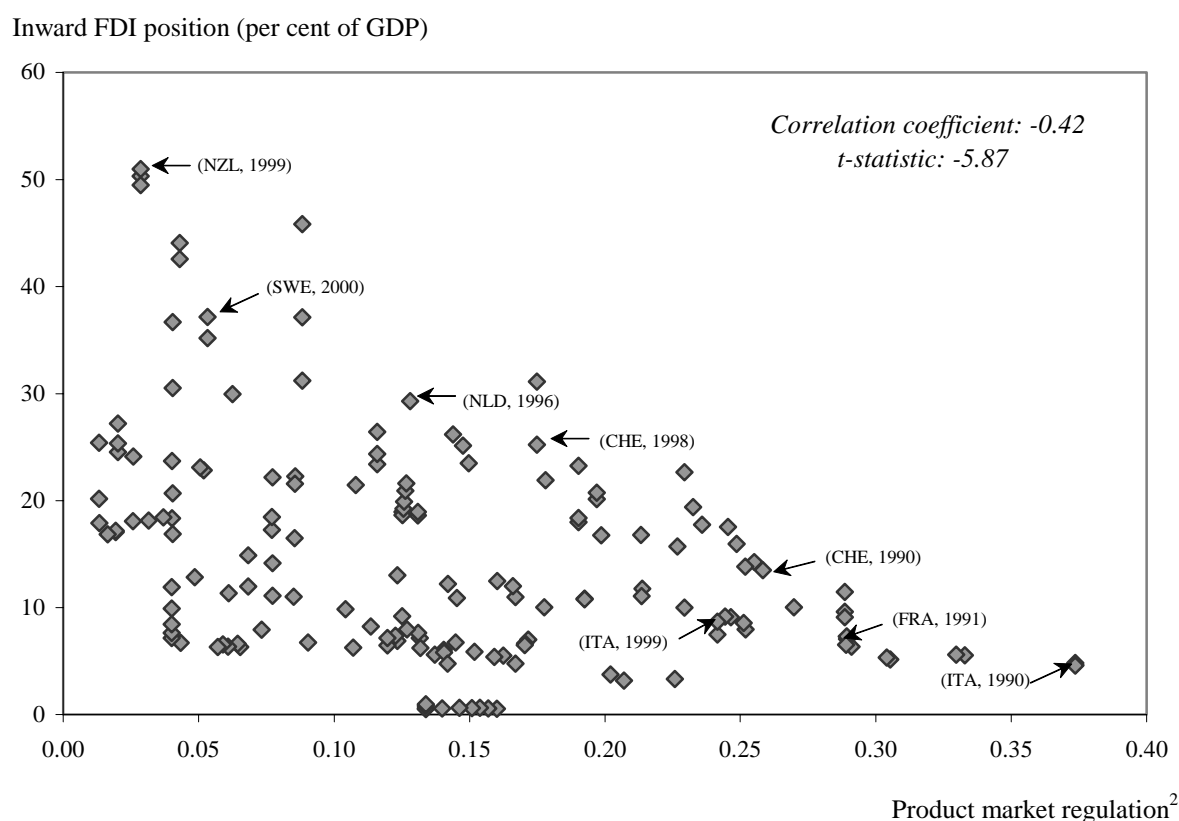
50. Despite the potentially conflicting linkages between regulation and FDI, *prima facie* evidence suggests that, on the whole, barriers to entry and cost-increasing regulations in the host country, as summarised by the product of the 1998 indicator of economy-wide regulation with the summary 1980-1998 indicator of barriers to entry in seven non-manufacturing industries, are inversely related with the intensity of inward FDI in OECD countries (Figure 19).

3.4. *Labour market arrangements*

51. A wide set of policies and institutions affects the functioning of the labour markets that impinges 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.³⁵ The OECD (1997c, 1999) has extensively documented cross-country differences in labour market policies and institutions (see the Annex for details). 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.

34. 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.

35. 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.

Figure 19. **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.

52. 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.³⁶ 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

36. 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.

high wedges.³⁷ 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).³⁸ 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.

53. 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 tradeable vs. non-tradeable 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.³⁹ 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.

3.5. *Infrastructure*

54. Trade and FDI may also be affected by factors that are, or have been, closely-related to government policies regarding transportation, communications and energy supply. Indeed, due to their public good and natural monopoly characteristics, some fixed network infrastructures are financed through public investment.⁴⁰ Figure 20 uses a new set of indicators especially developed for this project 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,

37. 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.

38. 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.

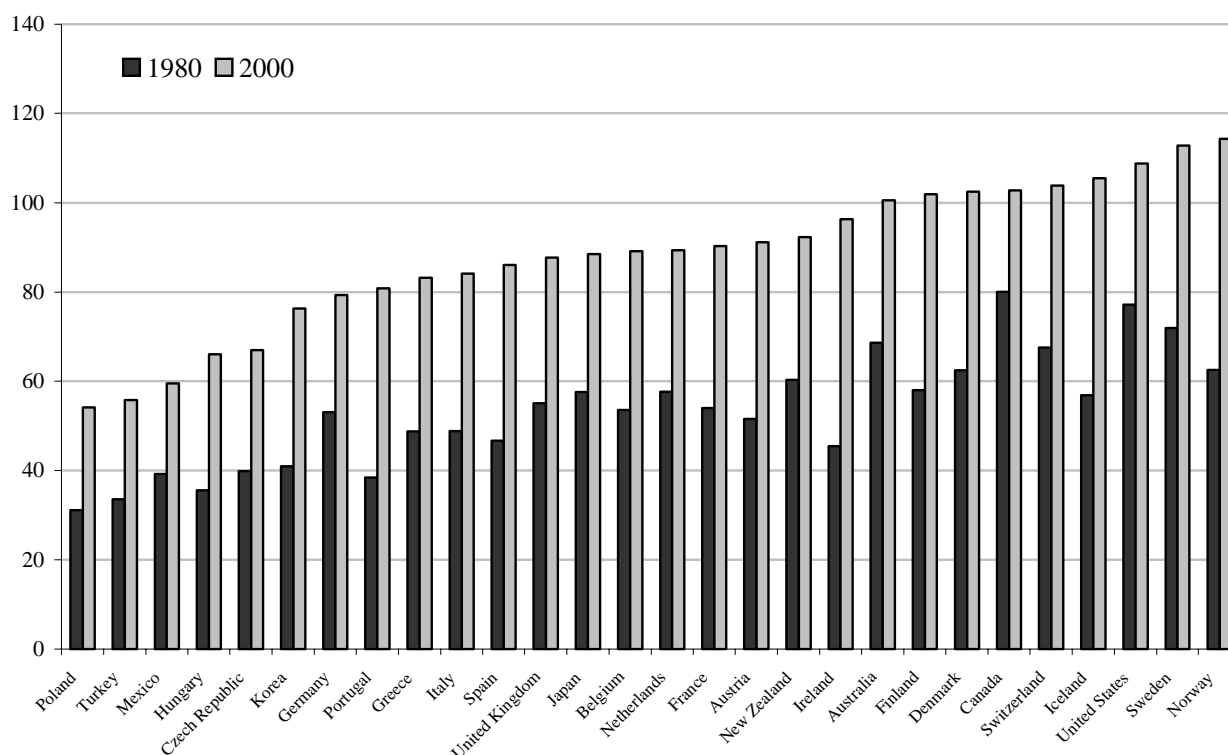
39. It is also possible that foreign investors may find the implications of restrictive EPL provisions more difficult to ascertain than domestic investors (due to an asymmetry of information) and hence have to face higher costs.

40. 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 Gonenç *et al.* (2000) and OECD (2001b) for a detailed discussion of these issues.

communication and energy supply infrastructure (Box 5). 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 countries, 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.

Figure 20. **Infrastructure endowments**¹

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 (see Annex).

Box 5. 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. Details on sources, methodologies and results are in the Annex.

55. 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 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 service 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).⁴¹ 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.

3.6. *Geographical and economic factors*

56. 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.⁴² 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 3). 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.⁴³ In general, geographical and economic factors are expected to affect trade and FDI in the following ways:

-
- 41. Yeaple and Golub (2002) attempt to test these hypotheses and provide some support for the effects of infrastructure on comparative and absolute advantage.
 - 42. Deardorff (1995) shows that this relationship emerges from virtually all models of trade.
 - 43. 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

- 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.⁴⁴
- 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.

3.7. *Summing up*

57. This section has discussed the main channels through which four sets of policies affect trade and FDI and has in some cases provided *prima facie* evidence of their importance. Table 2 provides a summary of the likely impacts of specific policies on outward FDI and on exports of goods and services. Several of the policy indicators constructed for this study suggest that the variability of border and non-border barriers to trade and FDI over time and across OECD countries is large enough to potentially explain part of the observed dispersion in trade and FDI intensities. Although simple correlations suggest that these policy variables may have a role in determining trade and FDI, their full importance can be gauged only with multivariate statistical analysis, which is carried out in the next section.

4. Empirical evidence

58. 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 -- detailed regression estimates can be found in the Annex. 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 (Box 1). 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

Keller, 2002). Their role in determining vertical FDI is emphasised in Helpman (1984) and Helpman and Krugman (1985).

44. 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.

Table 2. Policy and other influences on trade and FDI

<i>Expected impact on:</i>	Outward FDI	Exports	
		<i>Goods</i>	<i>Services</i>
<i>Factors:</i>			
Market size	+	+	+
	Gravity and economies of scale effects	Gravity effect	Gravity effect
Size similarity	?/+	?/+	?/+
	Positive for hor. MNE (economies of scale) No effect on ver. MNE	Positive for intraindustry trade No effect on interindustry trade	Positive for intraindustry trade No effect on interindustry trade
Distance	?/--	--	--
	Transaction cost	Transaction cost	Transaction cost
Transport costs	?/--	--	--
	Negative for ver. MNE No effect on hor. MNE	Transaction cost	Transaction cost
Dissimilarity in factor endowments	?	+	?
	Negative for hor. MNE (cost similarity needed) Positive for ver. MNE (comparative advantage exploited)	Comparative advantage	Positive for some services due to comparative advantage Negative for services that need inputs at both ends
Product differentiation (R&D intensity)	+	+	+/?
	Positive for hor. MNE (firm-level scale economies)	Positive for intraindustry trade	Positive for intraindustry trade
Exchange rate (host vs home)	?	--	--
	Positive asset effect on flows Negative valuation effect on stocks	Curbs competitiveness	Curbs competitiveness
General comments	If hor. MNE dominate, then size similarity and factor dissimilarity should have opposite effects	If intraindustry trade dominates size similarity should have positive effects	If intraindustry trade dominates size similarity should have positive effects

Source: OECD.

Table 2. Policy and other influences on trade and FDI (cont.)

<i>Expected impact on:</i>	Outward FDI	Exports	
<i>Policies:</i>		<i>Goods</i>	<i>Services</i>
Tariff barriers	+/? Positive for hor. MNE (tariff-jumping) Negative for ver. MNE	-- Trade cost/barrier	na
Non-tariff barriers	+/? Positive for hor. MNE (tariff-jumping) Negative for ver. MNE	-- Trade cost/barrier	na
Free trade area (same for home and host)	+/? Ambiguous for hor. MNE Positive for ver. MNE	+ Gravity and market size effects	+/? Gravity and market size effects Non-border barriers more relevant
Free trade area (only host)	+ Non-members access larger market	+/? Gravity and market size effects	+/? Gravity and market size effects Non-border barriers more relevant
FDI restrictions	-- Investment cost/barrier	+/? Positive for hor. MNE (FDI-jumping) Negative for ver. MNE	? FDI-jumping for hor. MNE FDI and trade complementary modes of supply
Product market regulation (at home)	? Incentive to delocalise Handicaps ability to internationalise	-- Curbs competitiveness (short run) Distorts relative prices Curbs intraindustry trade	-- Hinders trade at both ends of transaction
Product market regulation (in host)	? Negative for ver. MNE and "greenfield" FDI Ambiguous for hor. MNE and M&A FDI	? Raises competitiveness of home country exports (short run) Creates barriers to foreign goods	-- Hinders trade at both ends of transaction
Lack of IPR (in host)	-- Reduces incentives to FDI due to risk of imitation	na	na
EPL and tax wedge on labour (at home)	? Incentive to delocalise Handicaps ability to internationalise Effect depends on bargaining regime at home	--/? Curbs competitiveness (short run) Distorts relative prices Effect depends on bargaining regime at home	--/? Trade cost Effect depends on bargaining regime at home
EPL and tax wedge on labour (in host)	--/? Investment cost Investors may choose locations with lower risk-return ratio	+/? Raises competitiveness of home country exports (short run) Effect depends on bargaining regime in host	--/? Trade cost Effect depends on bargaining regime in host
Currency unions (same for home and host)	+/? May reduce risk in some cases	+/? May reduce transaction costs and risk in some cases	+/? May reduce transaction costs and risk in some cases
Infrastructure (at home)	na	na	+ Facilitates trade at both ends of transaction
Infrastructure (in host)	+/? Reduces investment cost Discourages FDI in infrastructure	na	+ Facilitates trade at both ends of transaction
General comments	Relative stringency of regulations and labour market arrangements in home and host countries most relevant for outward FDI	Labour market arrangements may have different effects in home and host countries depending on bargaining systems	Regulatory environment and infrastructure conditions at both ends of the transactions jointly affect service exports Labour market arrangements may have different effects in home and host countries depending on bargaining systems

Source: OECD.

for a smaller set of OECD countries. Bilateral exports of services cover 20 reporting countries and 27 partners over the 1999-2000 period.⁴⁵ All trade and FDI variables are expressed in dollars at 1996 purchasing power parity values.

4.1. Approach

59. 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.⁴⁶ 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; results for bilateral outflows are broadly the same and are reported in the Annex.⁴⁷

60. 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).⁴⁸
- *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-

45. As mentioned above, these “financial” FDI data suffer from several drawbacks (*e.g.* they do not distinguish between mergers and acquisitions and greenfield 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.

46. 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.

47. 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.

48. The year-on-year difference of transportation costs was smoothed out to eliminate excessive volatility in the data.

weighted) nominal exchange rates in total instock equations); and exchange rate variability (defined as the standard error of the monthly exchange rates).⁴⁹

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 quantity and quality of infrastructure in transport, telecommunications and electricity supply.

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 the Annex.

61. 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 home country-partner 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).⁵⁰ The econometric approach takes into account these factors either explicitly (by estimating the relevant

49. 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.

50. 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.

parameters) or implicitly (by transforming the data prior to estimation).⁵¹ 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.⁵² Estimation methods are summarised in Box 6, more details can be found in the Annex.

Box 6. 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.¹ 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.^g

51. 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.

52. 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.

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 overidentifying restrictions were performed to ensure that the regression specifications reported in the main text were supported by the data.

-
1. 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 (see the Annex.)

62. 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. The results of “thematic” regressions, focusing on specific policy areas (such as openness or product market regulation) are shown in the Annex. 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.⁵³

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

63. Table 3 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.⁵⁴
- 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 service 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

53. Due to data limitations, the total instock regressions covered only 10 to 19 OECD countries, depending on the policy variables included.

54. 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. 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.

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 (see Table 2). Finally, factor dissimilarities have no statistically significant impact on service 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).

- 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).⁵⁵

64. 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 Annex). At the multilateral level (as captured by the dynamic total instock regressions), the asset effect seems to prevail, perhaps due to composition effects.⁵⁶ The effects of exchange rate variability are discussed below.

4.3. *The direct and indirect influence of policies*

65. Table 4 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). 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.

55. Relatedly, persistence could be also driven by the large share of reinvested earnings in FDI flows.

56. 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.

Table 3. Non-policy-related structural factors impinging on trade and FDI

Dependent variable (ln)	Export of				FDI		
	Goods		Services		Outstock		Total instock
	bilateral TLS ^a		bilateral TLS ^a		bilateral TLS ^a		multilateral dynamic IV ^b
Specification	country	partner	country	partner	country	partner	
Total GDP ^c	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 ^d					-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]
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 ^e	7780	7768	540	534	4521	4517	174
R-squared ^f	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 ^g							224 (340)
Autocorrelation in first-differenced residuals							
First-order ^h							-3.940
Second-order ^h							-2.160

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

a) 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.

b) The dynamic panel specification was estimated using the Arellano and Bond (1991) generalized method of moments estimator.

c) Defined as domestic absorption in the total instock regressions.

d) Coefficients multiplied by 100.

e) Samples are adjusted for outliers based on the Welsch distance cut-off (Chatterjee and Hadi, 1988).

f) The R-squared is reported only in fixed effects regressions.

g) 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.

h) 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.

Table 4a. The influence of policies on foreign trade and investment

Dependent variable (ln)	FDI				
	Outstock		Total instock		
	bilateral TLS ^a		multilateral dynamic IV ^b		
Specification	country	partner			
Total GDP ^c	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 ^d	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 ⁱ	-0.032 [2.62]**	-0.053 [5.37]**		-0.007 [2.91]**	-0.007 [2.46]**
Labour tax wedge ratio ⁱ	-0.925 [9.20]**	-2.297 [11.65]**		-0.005 [1.10]	-0.008 [1.75]
Regulation ratio ⁱ	-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]
Notes:	28 countries and partners		16 countries	14 countries	10 countries
Period	1980-2000		1980-2000		
Observations ^e	3792	3601	169	163	134
R-squared ^f	0.71	0.72	n.a.	n.a.	n.a.
Sargan test ^g			223 (340)	205 (693)	151 (338)
Autocorrelation in first-differenced residuals					
First-order ^h			-3.45	-3.30	-3.30
Second-order ^h			-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. See Annex for the definitions of variables.

Country, partner, bilateral and time effects as in Table 3.

Notes: a)-h) see Table 3

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

Source: OECD.

Table 4b. The influence of policies on foreign trade and investment

Dependent variable (ln)	Export of					
	Goods		Services			
Specification	bilateral TLS ^a		bilateral TLS ^a		bilateral TLS ^a	
	country	partner	country	partner	country	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]**
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]**
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]
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]
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]**
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]**				
FDI restrictions		-0.039 [0.84]				
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]**		
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]				
<i>Combined country/partner policy variables</i>						
Regulation ^g			-0.258 [2.57]*	-0.241 [2.26]*	-0.236 [2.18]*	-0.258 [2.18]*
Transport infrastructure ^g			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 ^c	6107	6119	480	477	435	432
R-squared ^d	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.

See Annex for the definitions of variables.

Country, partner, bilateral and time effects as in Table 3.

Notes: a)-f) see Table 3

g) Product of indicators in home and host countries.

Source: OECD.

4.3.1. *Openness*

66. FDI restrictions by the partner are estimated to have a significant negative impact on bilateral FDI outstocks (Table 4, 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 5).⁵⁷ 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.

Table 5. **FDI positions: the hypothetical effect of removing FDI restrictions^a**
Average across countries

	<i>Per cent change in inward FDI position</i>
Removal of foreign equity ceilings	77.9
Removal of approval and national interest tests	21.2
Easing of nationality requirements on management ^b	10.1

a) The simulations are based on the coefficients estimated in regression B of Table A17 in the Annex.

The regressions cover bilateral FDI relationships between 28 OECD countries over the 1980-2000 period.

b) From majority of domestic managers to only one or more domestic managers.

Source: OECD.

67. Similarly, border barriers directly affect trade in goods (Table 4, panel B). Applied bilateral tariff rates have a significant negative effect on exports, with the estimated elasticities implying around one per cent increase in exports as tariffs decline by one percentage point. Moreover, the estimates suggest that a decrease by one 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 one 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.⁵⁸

57. 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 the Annex.

58. 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

68. Table 4 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.

69. 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; *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 4);
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 6);
3. FTA membership does not enhance exports of services. In particular, close integration under the Single Market Programme does not appear to have boosted services trade among EU countries (Table 6).

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. 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.⁵⁹

tariffs are robust to the adjustment of standard errors for repeated observations over the time dimension (see the Annex).

59. 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).

Table 6. The influence of free-trade agreements

Dependent variable (ln)	FDI		Exports of			
	Outstock		Goods		Services	
Specification	bilateral TLS ^a		bilateral TLS ^a		bilateral TLS ^a	
	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 ^d	-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]**		
<i>Partner in:</i>						
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]
Notes:	28 countries and partners		28 countries and partners		17 countries and 26 partners	
Period	1980-2000		1980-2000		1999-2000	
Observations ^e	4521	4517	6958	6945	525	519
R-squared ^f	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.

See Annex for the definitions of variables.

Country, partner, bilateral and time effects as in Table 3.

Notes: a)-f) see Table 3

Source: OECD.

70. 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 Table 4 and 6, it is significant in other bilateral and multilateral specifications of the FDI outstock and outflow equations (see the Annex). 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.

4.3.2. *Product market regulation*

71. Product market regulations that curb competition are estimated to have a negative and significant effect on both trade and FDI (Table 4). 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.⁶⁰ 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.⁶¹ Hence, this variable was omitted from the preferred specifications reported in Table 4.

72. 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.

73. 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.

60. In the total instock equation regulation can be interpreted as being expressed relative to the OECD average.

61. Results for IPR are not robust to the adjustment of standard errors for repeated observations over the time dimension (see the Annex). The relationship between IPR protection and FDI is discussed in OECD (2002k).

4.3.3. *Labour market arrangements*

74. 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, 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.⁶²

75. 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 4) 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.

4.3.4. *Infrastructure*

76. Table 4 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.⁶³ 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 (see Annex). Therefore, this variable was omitted from the “preferred” specifications reported in Table 4. 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.⁶⁴ Moreover, transport infrastructure is estimated to have a sizeable and significant positive effect on trade in services. Here,

62. 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.

63. 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.

64. Excluding the low infrastructure countries yields insignificant (though correctly signed) estimates, probably due to the lack of sufficient cross-country variability in the data.

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.⁶⁵ 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.

4.4. *Summing up*

77. 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.

65. The restriction that the coefficients of (the log of) infrastructure in the country and partner are the same is supported by statistical tests.

5. How do policies shape trade and FDI patterns?

78. 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.⁶⁶ 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.

5.1. Accounting for cross-country patterns of trade and FDI

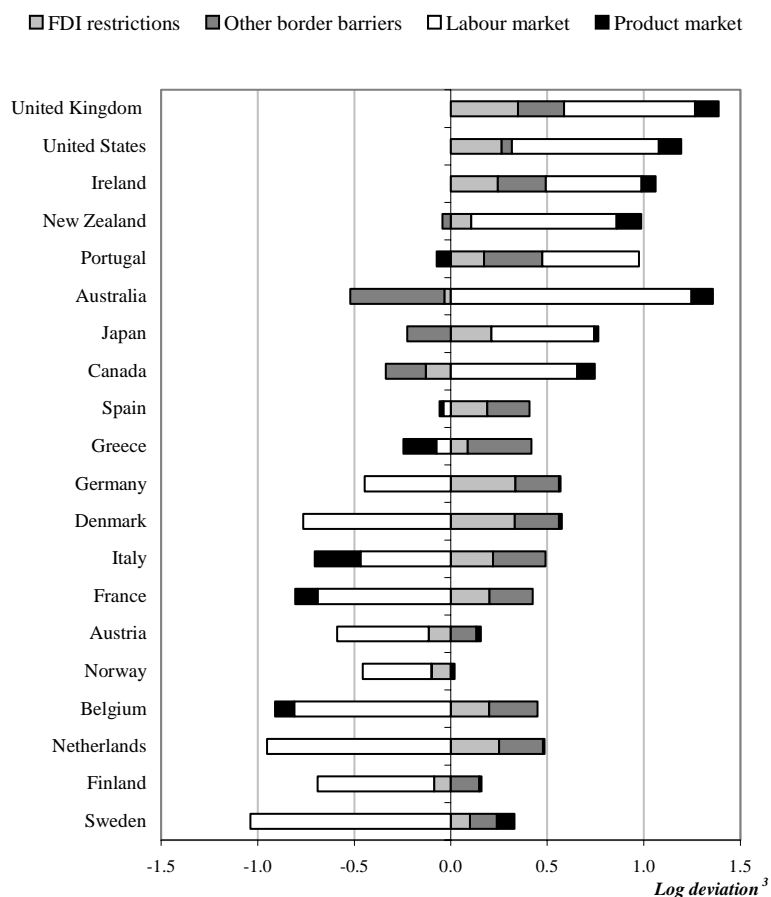
79. Figures 21-23 show the contributions of policies to the deviation (in logarithms) of total FDI instocks, services exports and goods exports in each country from the OECD average over the 1990s. The figures also show how much of these deviations are explained on average by non-policy-related factors -- 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.⁶⁷ 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.

80. Policies influence bilateral FDI positions across Member countries almost as much as all other (“non-policy”) factors taken together (Figure 21).⁶⁸ 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

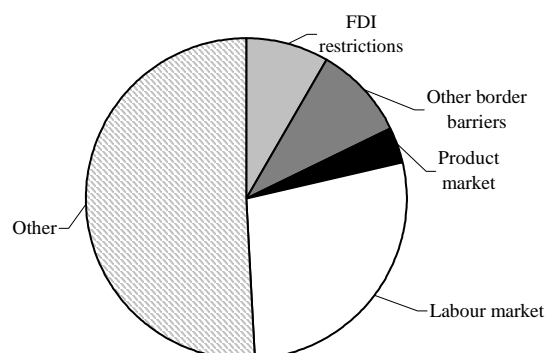
66. In particular, this kind of simulations assumes that policy changes do not change the estimated average relationships (*i.e.* the estimated regression coefficients) between trade, FDI and policies and are thus subject to the Lucas critique (Lucas, 1976). Moreover, it is assumed that these average cross-country relationships are representative of relationships in each country.

67. 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.

68. The unexplained residual is generally very small in the FDI equations.

Figure 21. Policies and inward FDI positions¹Contributions to explaining the deviations from OECD average, 1980-2000²

Average contributions (absolute values)



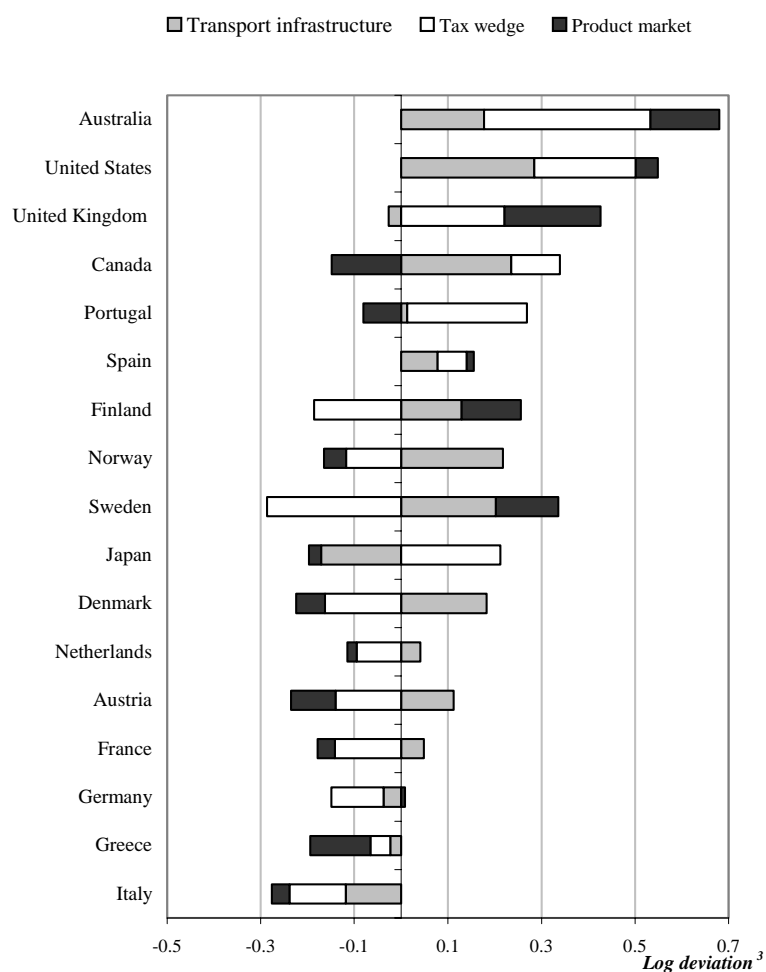
1. *Other border barriers* contains the contribution of tariff and non-tariff barriers of membership in a free-trade area.
Labour market contains the contributions of the relative indicator of the tax wedge on labour income and of the relative indicator of employment protection legislation.
Product market contains the contribution of the relative level of barriers to entry.
Other include the contribution of the structural variables and dummy variables.
 2. Contributions are computed using the results of regression B in Table A17 in the Annex.
Details on the methodology used to compute the contributions are in the Annex.
 3. Average is computed on countries included in the sample.
- Source: OECD.

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.

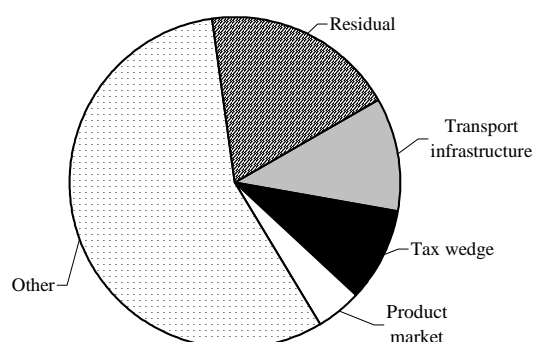
81. Policies also play an important (though smaller) role in explaining why services exports are above or below the OECD average (Figure 22). In this case, the contribution of other factors is inflated by unexplained regression residuals, which are larger than for FDI. The contribution of policies to 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.

82. Policies can explain only a relatively small part of the cross-country variance in goods exports (Figure 23). 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.

Figure 22. Policies and services exports¹
 Contributions to explaining the deviations from OECD average, 1999-2000²

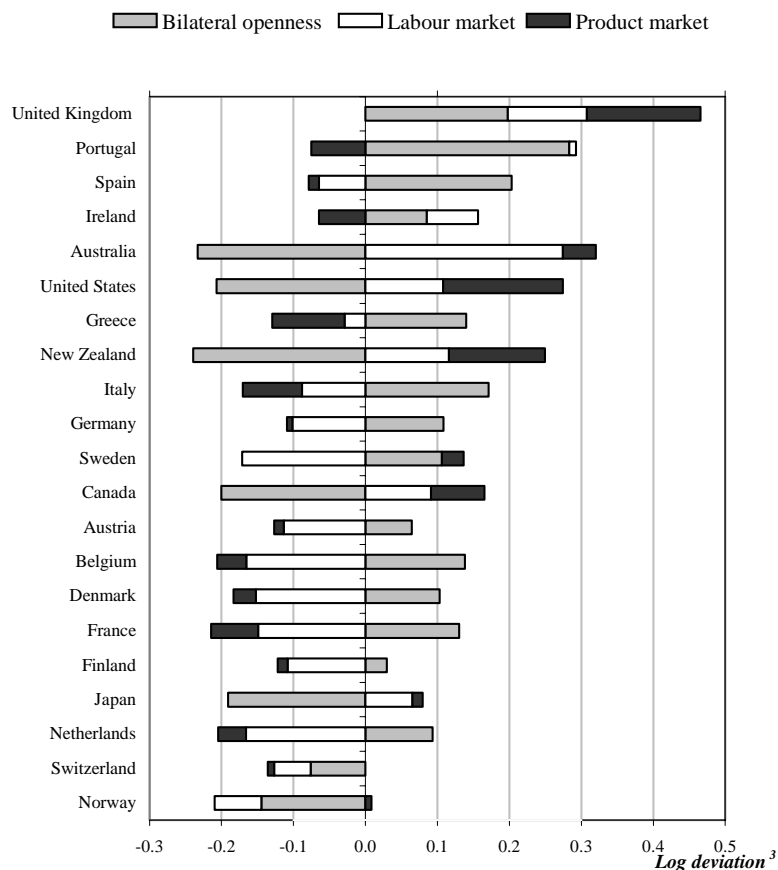


Average contributions (absolute values)

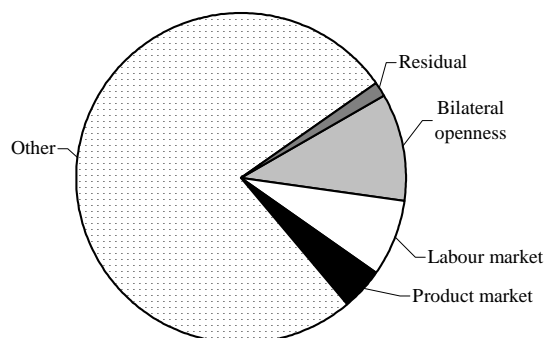


1. *Product market* contains the contribution of the level of barriers to entry.
Other include the contribution of the structural variables and dummy variables.
Residual contains the unexplained part of the variation.
 2. Contributions are computed using the results of regression D in Table A23 in the Annex.
 Details on the methodology used to compute the contributions are in the Annex.
 3. Average is computed on countries included in the sample.
- Source: OECD.

Figure 23. 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 include the contribution of the structural variables and dummy variables.
Residual contains the unexplained part of the variation.
 2. Contributions are computed using the results of regression D in Table A20 in the Annex.
 Details on the methodology used to compute the contributions are in the Annex.
 3. Average is computed on countries included in the sample.
- Source: OECD.

5.2. *The impact of removing impediments to trade and FDI*

83. 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.

5.2.1. *Policies and FDI*

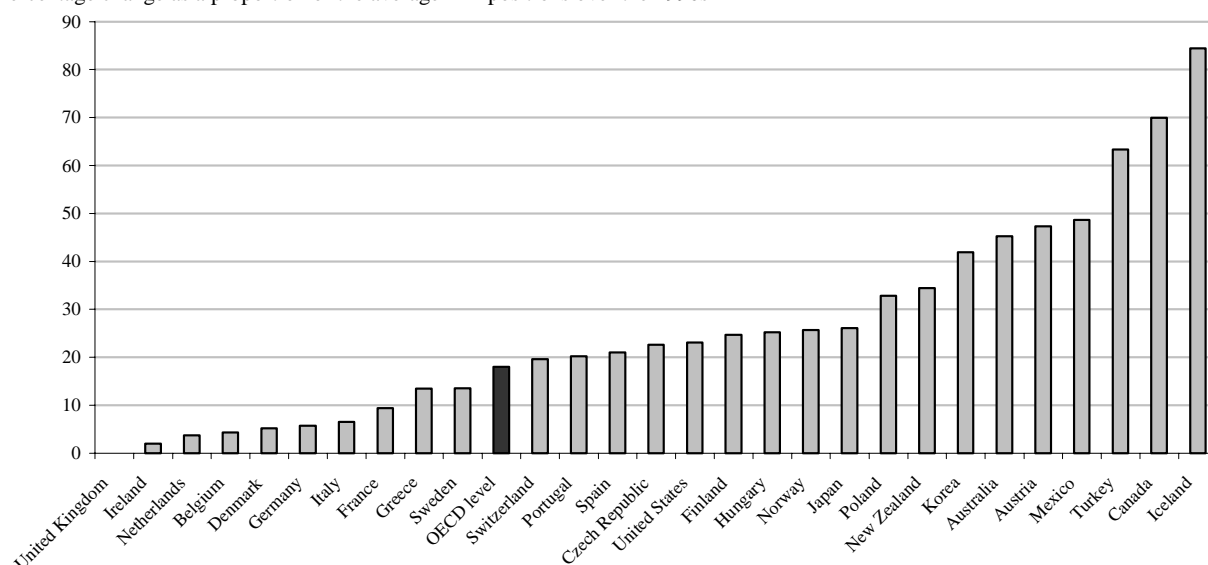
84. Figure 24 shows the effect of bringing FDI restrictions in all OECD countries down to the level of restrictions in the United Kingdom, the least restrictive country according to the indicator described in Golub (2003). This move would require country-specific reforms that differ in content and scope 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.⁶⁹ Overall, such policy reforms could increase OECD-wide instocks by almost 20 per cent.

85. Reducing anti-competitive product market regulations is also likely to increase significantly FDI instocks (Figure 25). 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).

69. In the simulations, the initial stock is defined as the inward FDI position in 1998.

Figure 24. **Policies and inward FDI positions: the scope for further integration¹**
Lifting FDI restrictions

Percentage change as a proportion of the average FDI positions over the 1990s



1. The simulation is based on the coefficient estimated in regression B of Table A17 in the Annex. It shows the effect of a decrease in regulation in all countries to the level of the least restrictive country (i.e. the United Kingdom).

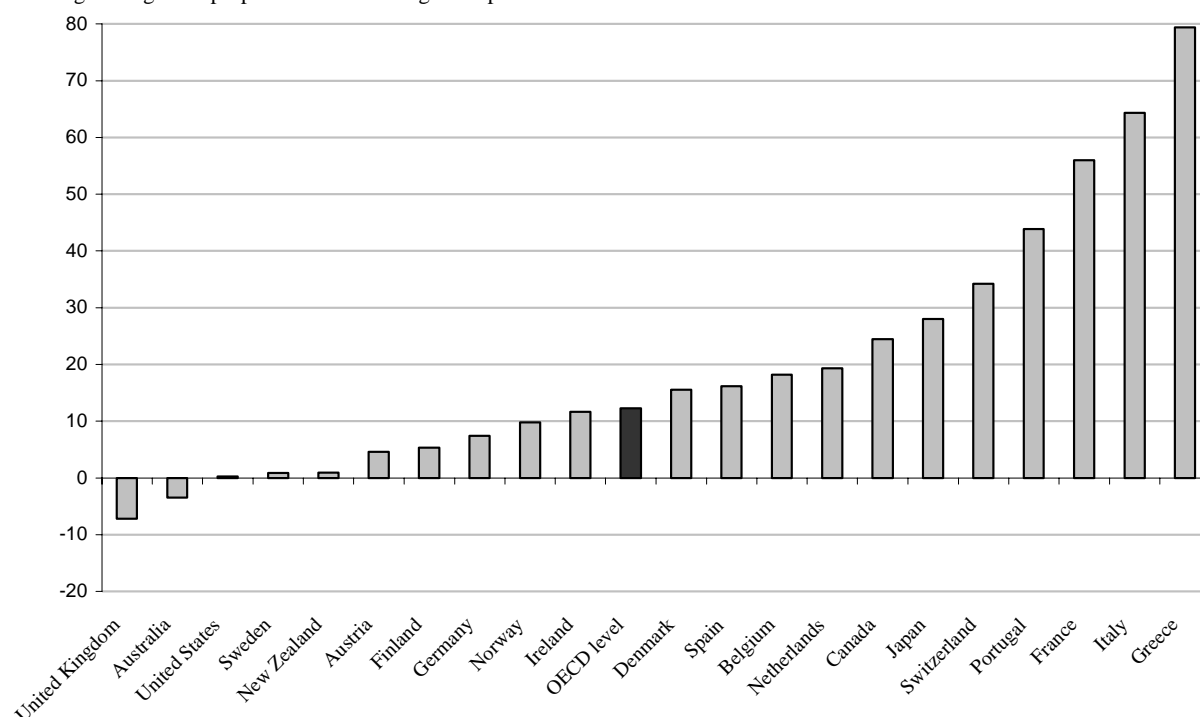
The regressions cover bilateral FDI relationships between 28 OECD countries over the 1980-2000 period.

Details on simulation methodologies are in the Annex.

Source: OECD.

Figure 25. **Policies and inward FDI positions: the scope for further integration¹**
Easing product market regulations

Percentage change as a proportion of the average FDI positions over the 1990s



1. The simulation is based on the coefficient estimated in regression B of Table A17 in the Annex. It shows the effect of a decrease in regulation in all countries to the level of the least restrictive country (i.e. the United Kingdom).

The regressions cover bilateral FDI relationships between 28 OECD countries over the 1980-2000 period.

Details on simulation methodologies are in the Annex.

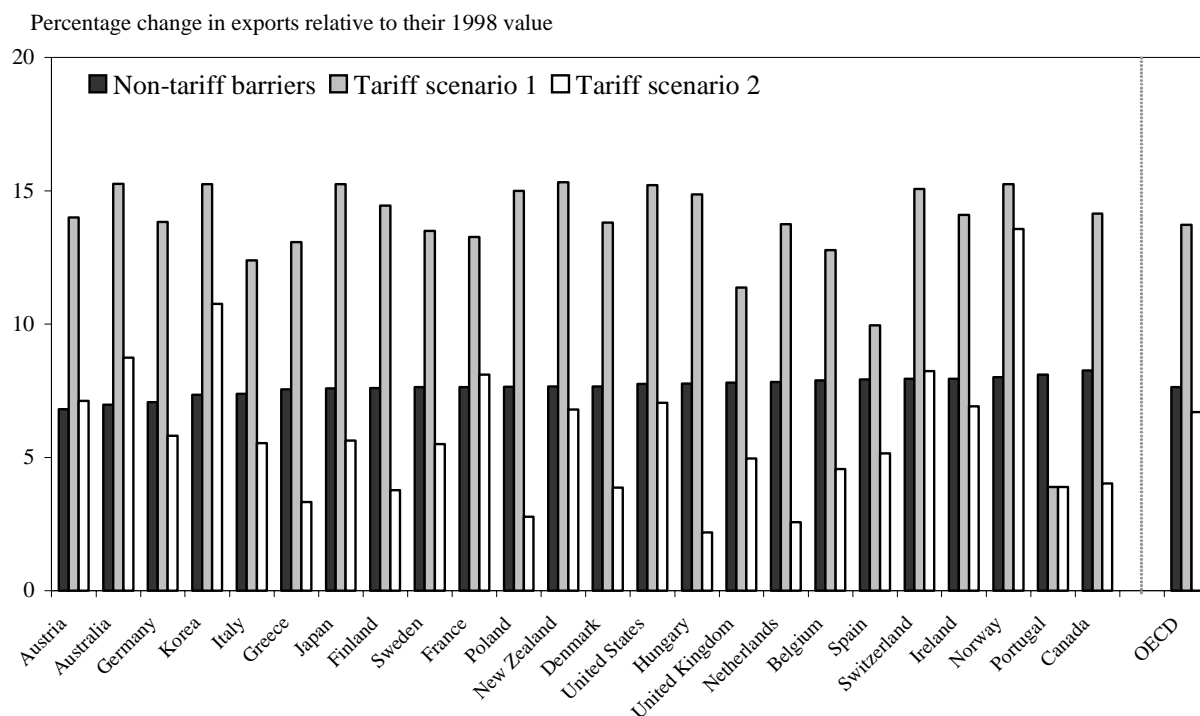
Source: OECD.

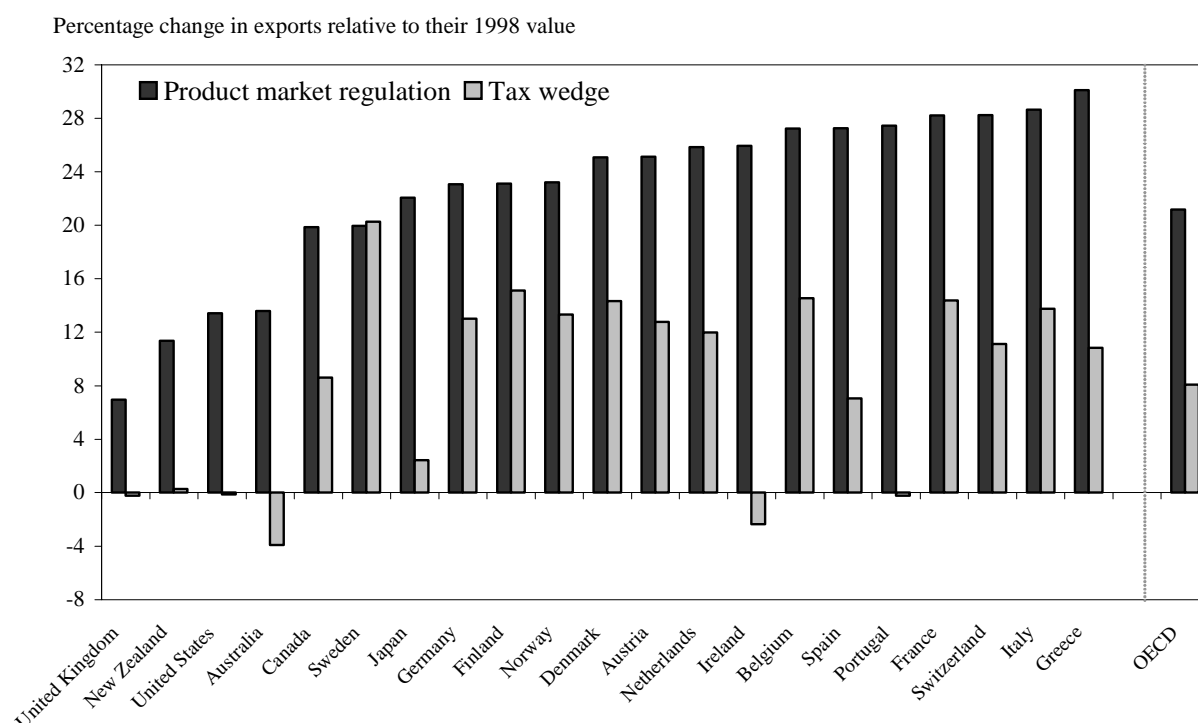
5.2.2. Policies and trade

86. Figure 26 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 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.

Figure 26. **Change in goods exports from reducing tariff and non-tariff barriers, product market regulation and the tax wedge on labour income¹**

Panel A. **Effect of reducing tariff and non-tariff barriers²**



Panel B. Effect of easing product market regulation and reducing tax wedges³

1. The simulation is based on the coefficients estimated in regressions D and E of Table A20 in the Annex.
Details on simulation methodologies are in the annex.
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, simulation cannot be presented as this country is present in the sample only as a partner.
3. The simulation shows the effects of a easing regulation 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.

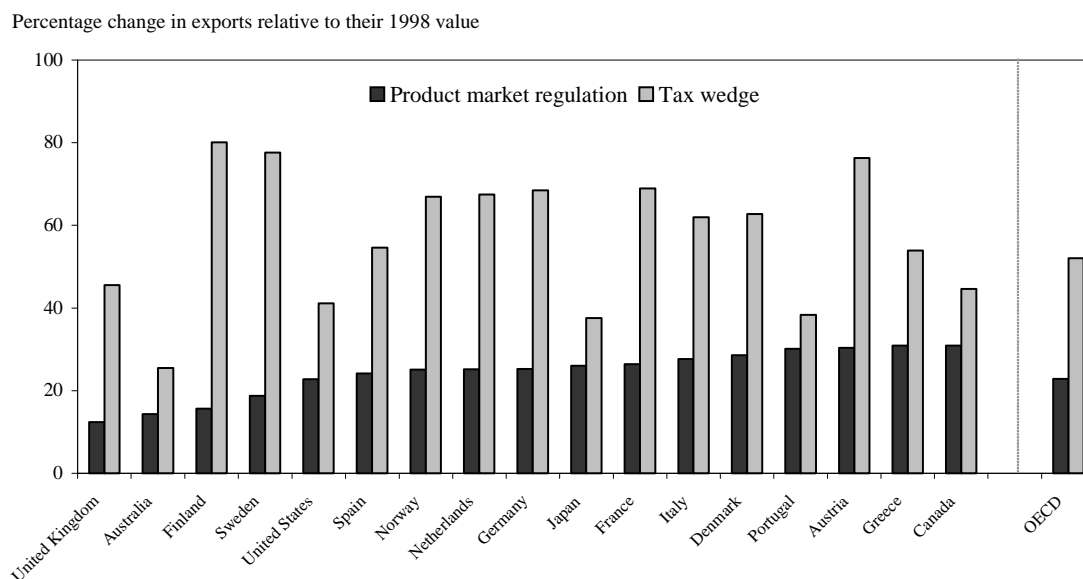
87. The increase in the level of total exports within the OECD area ranges from 6 to 20 per cent, depending on the policy package implemented. Unsurprisingly, the largest and most widespread gains are obtained by setting all bilateral tariffs to their minimum OECD level (close to zero), but significant 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.

88. Large OECD-wide gains are also obtained by aligning regulatory restrictions on those of the least regulated OECD country in 1998 (the United Kingdom, according to the indicator used in the empirical

analysis). 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).

89. Figure 27 reports the results of a similar simulation for exports of services.⁷⁰ 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 27. **Change in services exports from easing product market regulation and reducing the tax wedge on labour income^{1,2}**



1. The simulation is based on the coefficients estimated in regressions D and E of Table A23 in the Annex.

Details on simulation methodologies are in the annex.

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.

70. Here regulation is specific to non-manufacturing and the most liberal country in 1998 is again estimated to be the United Kingdom.

5.2.3. EU accession, FDI and trade

90. 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 7 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 the 1990s in most countries. However, these simulation results are likely to overestimate the actual post-accession gains to the extent that trade and FDI stocks have already been affected by the expectation of EU membership.

Table 7. The effects of European Union accession on trade and FDI ^{a,b}

	<i>Percent increase in exports ^c</i>	<i>Percent increase in imports ^c</i>	<i>Percent increase in the FDI outstock ^d</i>	<i>Percent increase in the FDI instock ^d</i>
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)

a) The simulation is based on the coefficient estimated in regression B of Table A13 in the Annex.

b) Initial levels relative to GDP are in parentheses.

c) Relative to 1998 values.

d) Relative to the average level over the 1990s.

Source: OECD.

Annex 1. FDI and other miscellaneous data: sources and methodologies

A1.1 Dependent variables

91. The four main activities studied in the paper are foreign direct investment, trade in goods, trade in services, and the activities of foreign affiliates. Table A1 presents the basic information about the data sets used. The study primarily focuses on the period 1980-2000 and 28 countries, where data for Belgium and Luxembourg are combined and Slovakia is not included because of insufficient availability of data and indicators. The coverage of FDI and trade in goods is broadly the same over the cross-country as well as the time-series dimension. Services trade data are only available for the 1999-2000 period, while the data on foreign affiliates have a more patchy time-series coverage.

Table A1. Basic data used in the analysis

	FDI flows and stocks ^{a)}	Activities of foreign affiliates	Trade in goods ^{a)}	Trade in services
Number of reporting countries	28	19	28	17
Countries excluded	Slovakia	Australia, Canada, Switzerland, Denmark, Spain, Greece, Iceland, Korea, Mexico, New Zealand, Slovakia	Slovakia	Belgium+Luxembourg, Switzerland, Czech Rep., Hungary, Iceland, Ireland, Korea, Mexico, New Zealand, Poland, Slovakia, Turkey
Number of partners	28	29	28	27
Partners excluded	Slovakia	Slovakia	Slovakia	Belgium+Luxembourg, Slovakia
Time span	1980-2000	1990-1999	1980-2000	1999-2000

a) Data are combined for Belgium and Luxembourg.

Source: OECD.

92. Table A2 provides basic statistics on the trade and FDI data used in the empirical analysis.⁷¹ Statistics refer to both bilateral data, reflecting the stocks/flows between two countries, and multilateral data, reflecting the overall inward or outward positions of the reporting countries. As highlighted in the main text, there are large cross-country differences in bilateral and multilateral trade and investment intensities.

71. In the analysis, the variables are expressed in US dollars at 1996 purchasing power, and logarithms are taken of these values.

Table A2. **Characteristics of the dependent variables**

Variable ^{a)}	Bilateral values			Multilateral values		
	Number of observations	Mean	Maximum	Number of observations	Mean	Maximum
Outflows ratio	8032	0.0009	0.130	492	0.015	0.336
Inflows ratio	7862	0.0010	0.196	490	0.015	0.340
Outstock ratio	6161	0.0058	0.394	394	0.091	0.649
Instock ratio	6136	0.0084	0.442	395	0.131	0.834
Manufacturing export ratio	13843	0.0077	0.337	525	0.186	0.798
Manufacturing import ratio	13851	0.0081	0.271	525	0.194	0.673
Services export ratio	659	0.0026	0.070	380	0.068	0.155
Services import ratio	659	0.0029	0.123	380	0.061	0.275

a) Ratios are expressed as a share of reporting country's GDP.

Source: OECD.

A1.1.1 Foreign direct investment

93. 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). "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. Direct investment involves both the initial transaction between the two entities and all subsequent capital transactions between them and among affiliated enterprises, both incorporated and unincorporated. According to classification applied in balance-of-payments accounts, a foreign direct investment enterprise is an incorporated enterprise in which a foreign investor owns 10 per cent or more of the ordinary shares or voting power or an unincorporated enterprise in which a foreign investor has equivalent ownership.

94. The present study takes advantage of the existence of two qualitatively different sets of data on foreign direct investment, and can thus look at the international investment activity from two perspectives: from the viewpoint of ("financial") investment flows and stocks, and from the viewpoint of "real" activities of foreign affiliates in the OECD countries. The two data sets differ mainly due to their different coverage: while FDI flows and stocks relate to ownership of 10 per cent or more of the shares or voting power, the data on the activities of foreign affiliates include only enterprises with foreign ownership of 50 per cent or more. Because of the better coverage, this study focuses on the analysis of the financial data; the information on real activities of foreign affiliates is used as a complementary descriptive tool.

Investment stocks and flows

95. 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).

96. 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.⁷²

97. Using the bilateral dimension, data limitations can be sometimes remedied by using data on the mirror activity in the country-partner pair to substitute for missing observations. Thus, for instance, if country X does not report data on its outward stock, the data reported by all other countries on their inward stocks from country X can be used. While potential differences in reporting methodologies (see below) make it inadvisable to use this approach to replace single missing observations, the procedure can be adopted for those series that are entirely missing for a given country-pair. Around 19 per cent of the sample (the share varies depending on the variable) has been restored by applying this procedure (Table A3).

Table A3. **FDI observations gained by using mirror information**

Variable	Number of observations in	
	Original data	Enlarged data
Outward stock	5086	6193
Outflows	7093	8059
Inward stock	4985	6148
Inflows	7348	7897

Source: OECD.

98. Substantial progress has been made towards 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. However, to the extent that they do not vary over time, most of these cross-country idiosyncrasies are potentially handled by the fixed country- and partner-specific effects used in the empirical analysis.

99. Table A4 provides details on the geographical distribution of bilateral FDI. It describes the concentration (kurtosis) of the distribution and the number of partners for each country.

72. 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.

Table A4. Statistics on the geographical distribution of bilateral FDI

Country	Kurtosis ^{a)}				Number of partners ^{b)}			
	Outflows	Inflows	Outstock	Instock	Outflows	Inflows	Outstock	Instock
Australia	6.78	17.68	6.17	9.05	19	21	16	21
Austria	5.17	8.79	5.11	15.78	26	22	25	23
Belgium	3.81	9.14	8.77	2.66	27	27	23	21
Canada	12.02	17.41	20.37	21.16	21	20	24	24
Czech Republic	1.00	3.69	9.54	8.59	2	17	21	26
Denmark	7.53	11.29	17.79	8.77	22	14	27	21
Finland	22.74	14.89	10.90	12.87	26	17	25	18
France	5.45	8.38	7.39	3.62	27	27	26	26
Germany	23.01	9.12	13.48	8.37	27	27	27	26
Greece	5.73	1.00	10.47	4.80	12	2	13	17
Hungary	n.a.	n.a.	3.29	8.25	n.a.	n.a.	8	25
Ireland	6.60	1.50	9.06	5.72	19	3	17	17
Iceland	5.56	5.85	3.61	12.99	16	15	17	15
Italy	3.95	3.39	2.45	1.58	25	19	11	11
Japan	7.21	15.25	11.86	13.12	19	18	15	16
Korea	10.75	4.98	18.87	n.a.	20	17	22	n.a.
Mexico	5.15	18.32	9.07	19.16	7	22	11	24
Netherlands	7.89	5.88	9.32	7.74	27	24	27	27
Norway	3.45	3.76	3.11	3.91	15	10	19	16
New Zealand	3.42	9.67	7.39	5.21	13	17	12	16
Poland	5.73	10.17	5.20	8.71	9	26	18	26
Portugal	8.13	5.01	11.86	3.16	26	24	26	27
Spain	2.57	6.59	3.16	2.77	23	26	18	18
Sweden	18.08	15.80	5.99	3.56	23	18	25	19
Switzerland	7.52	10.59	10.48	5.32	25	20	25	21
Turkey	1.50	6.08	6.29	1.44	3	15	10	11
United Kingdom	20.68	6.25	16.22	15.01	25	16	25	19
United States	8.30	9.11	9.40	3.98	26	24	27	27

a) Kurtosis of bilateral values in 1998. The kurtosis statistics measures (on an increasing scale) the extent to which the distribution of bilateral FDI is concentrated around a few investors/hosts.

b) Number of partners with non-zero and non-missing values.

Source: OECD.

Activity of foreign affiliates

100. The complementary approach to measure foreign direct investment is to use “real” data. The data used in the descriptive part of this study are drawn from a database developed by the OECD Directorate for Science, Technology and Industry and published in *Measuring Globalization: The Role of Multinationals in OECD Economies* that stores information on the activities of foreign affiliates. These data are based on surveys of foreign-owned enterprises and are disaggregated by investing country and by industry.⁷³ The reported information includes turnover, employment and value added. Research and development expenditures and intra-firm exports and imports are also reported, but their coverage is very limited.

101. The cross-sectional coverage of this database is limited to 21 reporting countries, 19 of which can be used for multilateral and 12 for bilateral analysis. Each of these countries reports transactions with all its partners; 29 OECD partners are used in the analysis. In general, data pertain to the 1990-1999 period. For most countries, however, data are available for only a few years or even just a single year.

102. The statistics on foreign affiliates in services and manufacturing are provided by different national sources: central banks usually provide data on the activities of foreign affiliates in the service sector, while finance ministries, trade ministries, or business registries are the sources of data on the activities of foreign affiliates in manufacturing. Therefore, the two sets of data are not necessarily consistent. The same industries may appear in both databases and values of the activities in these industries for some countries may not be the same.

103. Foreign affiliates are included in the database if foreign investors have majority shareholdings in their capital.⁷⁴ Hence, the activities covered represent a subset of all activities originated by “financial” foreign direct investment. Also, the information on real activities is collected at the level of the company and is classified accordingly (*i.e.* all activities of the affiliate are classified according to its main activity), while industrial statistics are usually based on establishment-level surveys. Therefore, direct comparability of employment, turnover and value-added in foreign affiliates to the corresponding sectoral or national account aggregates is impossible. Selected basic ratios relating these foreign affiliates’ statistics to industrial statistics are used for descriptive purposes only in this study.

A1.1.2 Foreign trade

104. The information on trade in goods and trade in services has been collected from three sources within the OECD.

105. Data on trade in goods come from the OECD publication *International Trade by Commodity Statistics*. This database provides time-series disaggregated according to trading partners. The primary sources of these data are customs records. For the purposes of the study, the same coverage as for financial FDI data was used, *i.e.* 28 countries and 28 partners over the 1980-2000 period.

106. The newly-developed OECD database on bilateral trade in services (*Statistics on International Trade in Services 1999-2000*) was the source of the information on trade in services with partner disaggregation. These statistics cover 17 countries and 27 partners over the two years period. The primary source of the data is national balance of payments statistics, which measures only imperfectly the actual

73. Industries are coded according to ISIC rev.3.

74. Some countries collect information also on enterprises where the share of the foreign investor is below 50 per cent (the surveys in Hungary, Portugal and the United States include enterprises where the foreign share is at least 10 per cent).

amount of services trade, e.g. by failing to distinguish the various modes of supply and omitting certain items.⁷⁵

107. While no industry detail is available for the bilateral service trade data, sectoral details exist for multilateral trade in services over the 1990-1999 period. In this study, the sectoral data have been used for descriptive purposes only.

A1.2. Non-policy-related structural variables

108. The basic structural specification of trade and investment equations employs the gravity and factor proportion approaches in a panel data setting.⁷⁶ Indexing the home country by i and the partner country by j , the gravity factors used in the present study include:

$$- \text{Total GDP}_{ijt} = \ln(GDP_{it} + GDP_{jt}),$$

measuring joint market size and the implied economies of scale.

$$- \text{Size similarity}_{ijt} = \ln \left[1 - \left(\frac{GDP_{it}}{GDP_{it} + GDP_{jt}} \right)^2 - \left(\frac{GDP_{jt}}{GDP_{it} + GDP_{jt}} \right)^2 \right],$$

capturing the relative size of the two countries that influences bilateral intra-industry trade and horizontal investment. The exponent of this indicator varies between 0 (absolute size divergence) and 0.5 (countries are equal in size).

- $Distance_{ij}$ is measured as the geographic distance between the capitals of the two countries and proxies for transport and transaction cost.

$$- \text{Transport cost}_{ijt} = \frac{\sum_{\tau=t-1}^{t+1} [IMPORT(CIF)_{ji\tau} - EXPORT(FOB)_{ij\tau}]}{3}$$

measuring the difference between the value of goods declared in the importing country (c.i.f.) and the value of goods declared in the exporting country (f.o.b.). Transport costs hence explicitly address the cost of trading goods. In order to smooth out the volatility of the data, a three-year moving average was computed.

109. Factor proportions are expressed by:

$$- \text{Factor dissimilarity}_{ijt} = \left| \ln \frac{K_{jt}}{N_{jt}} - \ln \frac{K_{it}}{N_{it}} \right|$$

75. For a discussion of the limitations of balance of payments statistics on services, see Maurer and Chauvet (2002).

76. Markusen and Maskus (2001) discuss a “unified approach” to international trade and investment and Egger (2000) discusses a correct specification of a panel gravity model.

This measures the difference between the relative factor endowments of the two countries. Relative factor endowments are defined as the capital-labour ratio (K stands for capital stock in the business sector, N for total employment in the business sector). The indicator is equal to zero when the relative factor endowments in both countries are identical, and increases with their difference. This variable captures comparative advantage considerations for bilateral trade, while for international investment it is supposed to determine whether cost advantages or cost similarities are more sought by MNEs. Data on capital stock and employment come from the OECD. Although some information is in general available for all countries, the availability of data on capital stock represents a significant problem in constructing this indicator, and therefore a proxy variable is defined below and used in the study.

$$- \text{Factor dissimilarity (alternative definition)}_{ijt} = \left| \ln \frac{GDP_{jt}}{POP_{jt}} - \ln \frac{GDP_{it}}{POP_{it}} \right|$$

The alternative definition of factor dissimilarity is expressed as the dissimilarity of national per capita incomes (POP stands for the population of a country; the source for these data is the OECD). The rationale for using this proxy is the long run positive relationship between high capital intensity of an economy and its income. Empirical results are robust to the use of the two alternative definitions of factor dissimilarity.

$$- \text{Human capital dissimilarity}_{ijt} = \left| \ln HC_{jt} - \ln HC_{it} \right|$$

Human capital dissimilarity is defined in a similar way, and captures the difference between the two countries in terms of skilled labour. Human capital (HC) is measured as the average years of education of the working age population achieved in the country. Average years of education are a weighted average of years of education spent in different education levels, with weights equal to the share of working age population in each level. These data were drawn from Bassanini and Scarpetta (2001) and extended.

110. Other economic factors:

- *The bilateral exchange rate*⁷⁷ is defined as units of partner currency per one unit of domestic currency. In the multilateral specification, the nominal *effective exchange rate* was used, which is a trade-weighted average of nominal bilateral exchange rates. Bilateral exchange rates and effective exchange rates come from the OECD

77. The level of bilateral exchange rate has important implications for international trade as it directly influences the competitiveness of the exports via price. The implications for foreign investment are more complicated. Here various effects are at work.

- A simple accounting (or measurement) effect: as foreign investment is measured in dollars, changes in the exchange rate result in a revaluation of the stocks and flows. Depreciation thus should decrease the dollar value of a given investment.
- An asset effect: host country depreciation should make assets in that country cheap, and *ceteris paribus* increase both horizontal and vertical investment.
- A macroeconomic effect: depreciation in the host country may be a sign of instability, leading to a decrease in foreign investment.

- *Exchange rate variability* is defined as the yearly variability of the monthly exchange rate. It captures the foreign currency risk and is an indicator of the transaction costs incurred by traders and investors.
- *R&D intensity* is defined as a country's business expenditure on R&D as a percentage of its GDP. The data are drawn from the OECD *Main Science and Technology Indicators*, and are available for all countries.

A1.3 Miscellaneous policy indicators

111. The study analyses five main groups of policy variables: openness, infrastructure, taxation, and product and labour market regulation. Data on some policy variables were drawn from secondary sources (*e.g.* bilateral tariffs and intellectual property rights protection), but most of the policy indicators were created in the context of previous OECD studies, and new indicators of infrastructure, bilateral taxation and FDI restrictions were constructed for this study. These newly constructed indicators and indicators of product market regulation are described in separate Annexes. Here the focus is on those policy indicators that are either from secondary sources or are not described elsewhere.

112. For the econometric analysis, all indicator variables were rescaled to range from 0 to 100. They are generally increasing in the level of regulation (Regulatory reform, Barriers to entry, Liberalisation, Employment protection regulation, FDI restrictions), quality of infrastructure or in the other dimensions covered (Indexes of co-ordination, centralisation and corporatism). The indicator of intellectual property rights (see Annex 5), however, decreases in the level of protection.

113. Not all indicators are available for all countries (*e.g.* indicators for new Member countries are often missing). Therefore, the analysis of the influence of the full set of policies was limited to a subset of 21 home countries and 20 host countries.⁷⁸ Moreover, not all indicators cover the time-series dimension. Time invariant policy variables, generally referring to 1998, were used in the analysis where necessary (see Table A2.6 for availability and means of policy variables).

A1.3.1 Openness variables

114. Multilateral *tariff barriers* are expressed as the *ad valorem* tariff per cent rates; *non-tariff barriers* are expressed in their (per cent) import coverage. Multilateral tariff and non-tariff barriers were obtained by aggregation of the sectoral values available from the UNCTAD/OECD Indicators of Tariff and Non-tariff Barriers (UNCTAD, 2000). The tariff barriers were aggregated from 6-digit level of the Harmonised System to 2-digit level using import weights, and to national levels using sectoral value-added weights. The periods covered are 1988, 1993 and 1996. The data were interpolated in the missing years and the beginning and end values were extended backward and forward to cover the 1980-2000 period. The UNCTAD's Trade Analysis and Information System (TRAINS) has been the source of the most comprehensive available set of data on government trade measures; however, it is incomplete across countries and products and fails to capture all complexities of the NTBs. The data on tariff and non-tariff barriers are not available for Switzerland, the Czech Republic, Hungary, Poland and Turkey. Therefore, all estimates that include multilateral tariff and/or non-tariff barriers exclude these countries.

78. Home countries: Australia, Austria, Belgium+Luxembourg, Canada, Denmark, Finland, France, Germany, United Kingdom, Greece, Ireland, Italy, Japan, Netherlands, Norway, New Zealand, Portugal, Spain, Sweden, Switzerland, United States. Host countries: Australia, Austria, Belgium+Luxembourg, Canada, Denmark, Finland, France, Germany, United Kingdom, Greece, Ireland, Italy, Japan, Netherlands, Norway, New Zealand, Portugal, Spain, Sweden, United States.

115. Bilateral tariffs are based on the new MacMaps database assembled by the International Trade Centre in Geneva and CEPII in Paris. They cover MFN duties, other *ad-valorem* duties, specific duties, preferential margins, prohibitions, tariff quotas and anti-dumping (specific and *ad-valorem*) duties. The data are drawn from international (UNCTAD, WTO, AMAD) and national (official journals, etc.) sources as well as country notifications to the WTO regarding antidumping regimes. The data refer to 2001. The tariff line data are aggregated with average import weights within economically homogeneous groups of countries up to two digits ISIC Rev. 3. OECD-average import weights are used to obtain figures at the national level. For more details see Bouët *et al.* (2001 and 2002).

116. The effects of regional free trade agreements were analysed using several types of dummy variables:

- *Free trade area* captures the effect of trade liberalisation within a free trade area. This variable is equal to 1 if both countries are members of the same free trade area, 0 otherwise.
- *European Union* analyses the effects of the EU economic integration. It is equal to 1 if both countries are members of the EU, 0 otherwise.
- *Partner in the European Union* captures the effect on bilateral trade and investment of accessing the EU market by third countries. This variable is equal to 1 if the host/importer country is a member of the EU while the investor/exporter is not, and 0 otherwise.
- *NAFTA* captures the effects of the North-American economic integration. It is equal to 1 if both countries are members of NAFTA, 0 otherwise.
- *Partner in NAFTA* captures the effect on bilateral trade and investment of accessing the NAFTA market by third countries. This variable is equal to 1 if the host/importer country is a member of NAFTA while the investor/exporter is not, and 0 otherwise.
- *EFTA* captures the effects of the European Free Trade Association. It is equal to 1 if both countries are members of EFTA, 0 otherwise.
- *Partner in EFTA* captures the effect on bilateral trade and investment of accessing the EFTA market by third countries. This variable is equal to 1 if the host/importer country is a member of EFTA while the investor/exporter is not, and 0 otherwise.⁷⁹

A1.3.2 Intellectual property rights

117. Intellectual property rights (IPR) confer on the owner the right to prohibit others from making, using, selling or importing the protected idea or invention for a defined period. They also impose on the owner certain obligations, for instance concerning disclosure. IPR are covered by international agreements, but are granted and enforced nationally. There is a wide variation across countries in subject matters covered by IPR, their administration and the way they are legally enforced, leading to international differences in their value. The index used in the empirical analysis is a composite of five indicators: the

79. All these variables are time-variant. In 2000, the members of the European Union were Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain, Sweden, and United Kingdom; the members of the European Free Trade Association were Iceland, Liechtenstein, Norway and Switzerland; and the members of the North American Free Trade Agreement were Canada, Mexico and the United States.

extent of coverage, the membership in international patent agreements, provisions for loss of protection, enforcement mechanisms and duration of protection (see Ginarte and Park, 1997, for details).

A1.3.3 Labour market arrangements

118. Table A5 provides definitions and sources for the indicators of labour market arrangements:

Table A5. **Labour market policies and institutions: definitions and sources**

Indicator	Definition	Source
EPL	Index of strictness of employment protection legislation	Nicoletti, Scarpetta and Boylaud (1999)
Tax wedge	Employees' and employers' social security contributions and personal income tax less transfer payments as percentage of gross labour costs.	OECD database on the tax/benefits position of employees
Corporatism	Index of corporatism	Elmeskov, Martin and Scarpetta (1998) and OECD Economic Surveys (various years)
Co-ordination	Index of bargaining co-ordination	Elmeskov, Martin and Scarpetta (1998) and OECD Economic Surveys (various years)
Centralisation	Index of bargaining centralisation	Elmeskov, Martin and Scarpetta (1998) and OECD Economic Surveys (various years)

Source: OECD.

119. The *employment protection legislation* indicator is taken from Nicoletti *et al.* (1999) and is defined as a simple average of the level of employment protection legislation for regular and temporary workers constructed for 1989 and 1998. Turning points match actual dates of reforms as identified in the OECD Jobs Study. The variable is available for 22 countries for the main period; data for the Czech Republic, Hungary, Korea and Poland are available only for 1998, no values are available for Iceland and Mexico.

120. The *tax wedge* on labour income expresses the employees' and employers' social security contributions and personal income tax net of transfer payments as percentage of gross labour costs. This variable was drawn from the OECD database on the tax/benefits position of employees and is, in general, available for all countries.

Table A6. **Summary statistics of policy variables**

	Number of observations ^{a)}	Mean	Period
Import weighted tariffs (per cent)	467	8.86	1980-1998
Non-tariff barriers (per cent)	467	11.7	1980-1998
Index of FDI restrictions (time series)	588	33.8	1980-2000
Index of FDI restrictions (cross-section)	588	17.02	1998-2000
Product market regulation ^{b)}	441	69.3	1980-1998
Barriers to entry ^{b)}	441	68.52	1980-1998
Economy-wide regulation	567	28.9	1998
Tax wedge (per cent)	476	32.4	1980-2000
Employment protection regulation	546	42.81	1989-1998
Index of bargaining co-ordination	547	60.5	1980-1996
Index of bargaining centralisation	539	42.37	1980-1996
Index of corporatism	547	53.06	1980-1996
Index of infrastructure (total)	588	68.54	1980-2000
Index of infrastructure (transport)	588	45.05	1980-2000
Lack of intellectual property rights protection	525	40.11	1995

a) Numbers of observations refer to the availability within the 28 (countries) times 21 (years) panel.

b) Summary indicator of regulation of seven non-manufacturing industries.

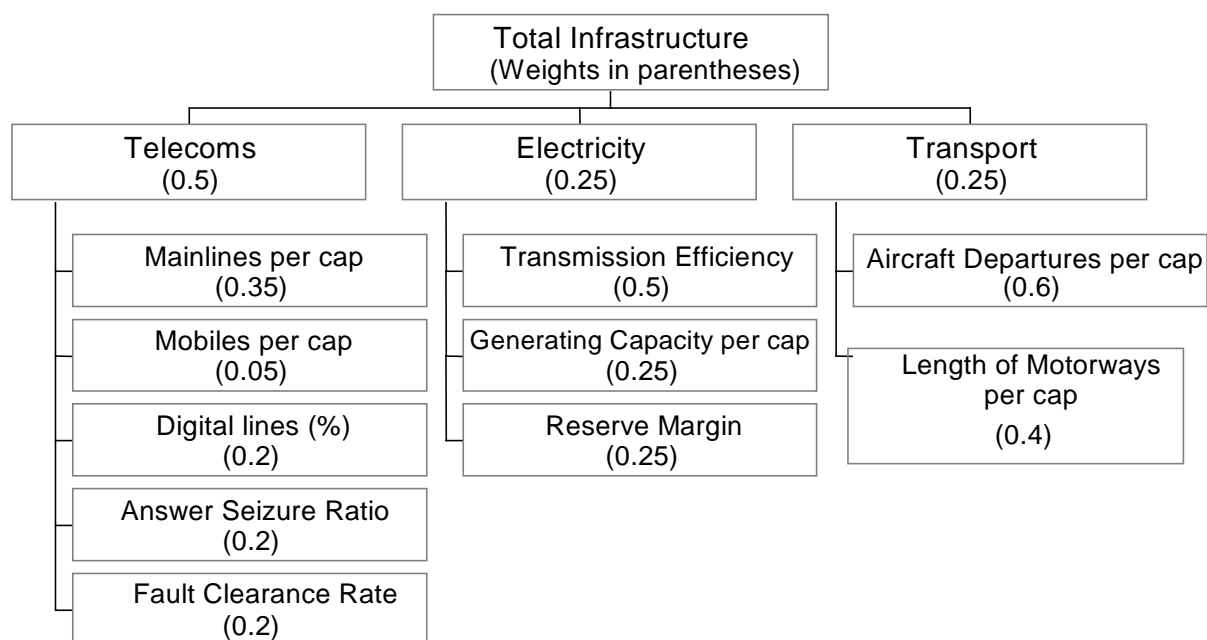
Source: OECD.

A1.3.4 Infrastructure

121. The indicator on infrastructure is based on measures of quality and quantity of telecommunications, transport, and electricity infrastructure. It is available for 28 OECD countries over the 1980-2000 period.⁸⁰ For the purpose of this project, only physical infrastructure is covered, and the indicators exclude measures of social infrastructure on governance, judicial system, education, etc.

122. For each of the three types of physical infrastructure, a weighted-average index based on several components was calculated. The structure of the index is shown in Figure A1. Each series is indexed to a standard base US 1995 = 100. The weights were based on judgements about the importance of the components as well as the quality of the data. For both of these reasons, a large weight was placed on telecommunications (0.5) with transport and electricity each given the weight of 0.25.

80. Missing values were interpolated in some cases as noted below.

Figure A1. **Construction of infrastructure index**

Source: OECD.

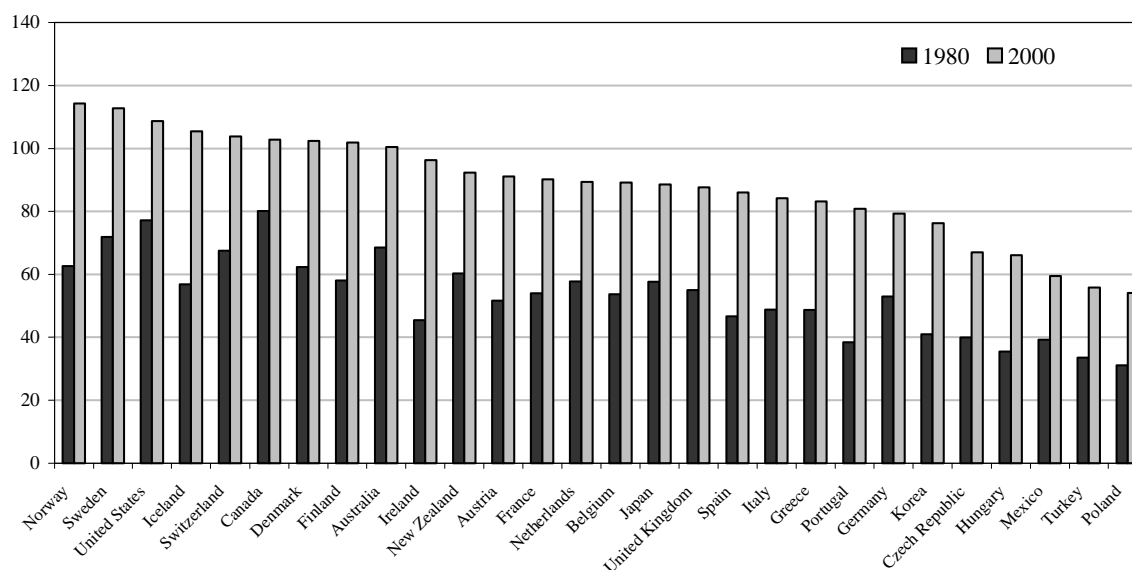
123. Table A7 and Figure A2 present the findings for *aggregate infrastructure*. There have been substantial increases in infrastructure capital over the twenty years covered in the sample. The less developed and transition countries such as Mexico, Turkey, Poland and, to a lesser extent, Hungary, the Czech Republic and Korea have low levels of infrastructure. Most of these countries, however, show large gains in the 1990s. The Nordic countries, the United States, Canada, Switzerland, and Australia had among the highest levels of infrastructure in 2000.

Table A7. **Composite indices of total infrastructure**

United States 1995 = 100

	1980	1990	2000
Australia	69	74	100
Austria	52	59	91
Belgium	54	65	89
Canada	80	91	103
Czech Republic	40	41	67
Denmark	62	74	102
Finland	58	72	102
France	54	72	90
Germany	53	62	79
Greece	49	55	83
Hungary	36	38	66
Iceland	57	70	105
Ireland	45	65	96
Italy	49	60	84
Japan	58	67	89
Korea	41	55	76
Mexico	39	44	60
Netherlands	58	67	89
New Zealand	60	74	92
Norway	63	81	114
Poland	31	33	54
Portugal	38	48	81
Spain	47	58	86
Sweden	72	88	113
Switzerland	67	80	104
Turkey	34	41	56
United Kingdom	55	67	88
United States	77	90	109

Source: OECD.

Figure A2. **Aggregate infrastructure, 1980 and 2000**

Source: OECD.

Telecommunications infrastructure

124. The five constituent series underlying the indicator of telecommunications infrastructure are the number of mainlines per capita, the number of mobile phones per capita, the share of digital lines as a per cent of total lines, answer seizure ratios, and fault clearance rates.⁸¹ All data are from OECD sources. The first four are from the OECD Telecommunications file, and the last is from the OECD Regulations database. The first two of these measures are indicators of the quantity of infrastructure while the others are indicators of quality. Mobiles were given a low weight for two reasons. First, the explosion in the number of mobile phones in the 1990s is so large that it swamps movements in other variables if given a large weight. Second, the use of mobiles is sometimes a response to the poor quality of the mainline services.

125. There have been large increases in telecommunications infrastructure over the 1990s for most countries (Table A8). The ordering of countries is similar to that for aggregate infrastructure. In addition to the countries noted above, others with particularly strong telecommunications infrastructure in 2000 include Japan.

Table A8. **Composite indices of telecommunications infrastructure**

United States 1995 = 100

	1980	1990	2000
Australia	58	69	116
Austria	55	66	114
Belgium	54	72	104
Canada	65	90	116
Czech Republic	36	39	88
Denmark	68	84	126
Finland	59	79	128
France	59	88	115
Germany	58	71	100
Greece	40	51	103
Hungary	27	31	84
Iceland	57	78	123
Ireland	47	67	111
Italy	50	68	113
Japan	63	79	119
Korea	40	66	105
Mexico	35	45	76
Netherlands	63	78	115
New Zealand	53	75	98
Norway	57	82	133
Poland	24	27	70
Portugal	34	50	104
Spain	47	62	105
Sweden	79	98	140
Switzerland	66	82	111
Turkey	26	44	71
United Kingdom	59	79	116
United States	69	89	116

Source: OECD.

81. The fault clearance rate is the percentage of faults repaired in 24 hours. Fault clearance rates were only available for 1990-97. The answer seizure ratio is the proportion of international calls that successfully seize an international circuit and are answered in the terminating country. Answer seizure ratios are only available for the 1990s. Digital access and mobiles only came into widespread use in the 1990s, although there is some information for the 1980s.

Electricity infrastructure

126. This indicator includes measures of transmission loss (gap between production and consumption), generating capacity per capita, and the reserve margin (deviation from the “optimal” gap between peak use and generating capacity).⁸² An attempt to control for the effect of climate differences on generating capacity was made by regressing the latter on the average temperature in the capital city of each country.

127. Electricity infrastructure indices display much less cross-country variation as well as lesser changes over time than telecommunications (Table A9). In some countries, there are small decreases in the indexes. The countries with the highest levels of electricity infrastructure in 2000 are Norway, the United States, Iceland and Australia. The lower-income countries generally again have the lowest levels of infrastructure, but the differences between them and others are often not great.

Table A9. **Composite indexes of electricity infrastructure**

	United States 1995 = 100		
	1980	1990	2000
Australia	90	97	100
Austria	67	70	75
Belgium	80	83	84
Canada	88	96	93
Czech Republic	76	76	78
Denmark	74	79	79
Finland	78	85	89
France	76	82	84
Germany	80	81	81
Greece	86	84	90
Hungary	76	76	75
Iceland	87	91	101
Ireland	70	76	81
Italy	76	83	83
Japan	87	93	94
Korea	81	81	83
Mexico	79	79	77
Netherlands	76	78	83
New Zealand	89	92	92
Norway	97	105	107
Poland	73	76	73
Portugal	77	79	74
Spain	74	80	82
Sweden	87	93	94
Switzerland	78	83	83
Turkey	77	73	75
United Kingdom	79	81	81
United States	93	98	101

Source: OECD.

Transport infrastructure

128. The indicator of transport infrastructure covers the length of motorways per capita and aircraft departures per capita. Aircraft departures are from World Bank's World Development Indicators (WDI).

82. The optimal deviation is assumed to be 15 per cent. For more details see Steiner (2000).

Motorways are from the transportation database of the European Council of Ministers of Transportation (ECMT), as well as WDI. The number of aircraft departures is an imperfect measure of air transport infrastructure, as it reflects the volume of air travel but not necessarily the capacity of a country's airports but no data directly measuring the latter are available, nor is it even clear how to measure it. Alternative measures of road adequacy were considered by scaling by land area and number of vehicles (to allow for congestion effects) rather than population, but were not used in empirical analysis. Missing data for motorways were filled in by assuming that the ratio of motorways to paved roads in missing countries varied in the same way as the OECD average. The most complete motorways series are from the World Bank, but they begin only in 1990. In order to obtain 1980-89 data, the OECD average for those countries that have available data in the 1980s (Belgium, Denmark, France, Germany, Ireland, Italy, Netherlands, Spain, United Kingdom) was computed. For those countries with no data in the 1980s, it was assumed that the growth rate in the road network was equal to the average of the countries for which data are available.

129. There are a few countries with very low levels of transport infrastructure (Table A10). These include Turkey, Mexico, Korea and the transition countries. Japan and Italy also have strikingly low levels of transport infrastructure. By contrast, Switzerland has the highest level of transport infrastructure followed by the United States and the Nordic countries.

Table A10. **Composite indices of transport infrastructure**

United States 1995 = 100

	1980	1990	2000
Australia	68	60	70
Austria	29	34	62
Belgium	25	34	66
Canada	101	89	86
Czech Republic	12	9	14
Denmark	40	51	79
Finland	36	45	62
France	21	31	47
Germany	17	25	36
Greece	29	34	37
Hungary	11	13	21
Iceland	26	33	74
Ireland	18	48	83
Italy	19	21	27
Japan	18	19	22
Korea	4	7	12
Mexico	7	6	8
Netherlands	29	33	46
New Zealand	45	57	82
Norway	40	53	84
Poland	3	2	3
Portugal	9	13	41
Spain	18	28	53
Sweden	42	63	78
Switzerland	60	74	110
Turkey	4	4	7
United Kingdom	23	31	37
United States	77	87	102

Source: OECD.

Annex 2. Detailed empirical results

130. This Annex describes in detail the statistical and computational methods used in the main paper. It also provides the complete set of econometric results along with sensitivity analysis aimed at checking their robustness. Finally, the procedure followed to simulate the impacts of various policy changes is spelled out.

A2.1 Empirical approach

131. The aim of the empirical analysis is twofold: to analyse the impact of policies on bilateral investment and trade activity among the OECD countries, as well as their impact on the overall ability of individual OECD countries to attract foreign direct investment from their partners. For this purpose, two types of cross-section time-series data are employed: data where cross-section groups are identified by country-partner pairs and data where the groups are identified by countries (see Annex 1). Correspondingly, two different models are estimated. The bilateral model describes how policies and other factors influence the incentives of home country investors (henceforth country) to invest/export in a partner country (henceforth partner). The multilateral model describes how policy and non-policy-related factors influence the overall attractiveness of a host country for foreign investors.

132. Regression results were obtained from single-equation estimation of reduced forms for bilateral outward FDI stocks and flows, goods exports and services exports as well as for total inward FDI stocks. To appropriately account for both the cross-section and time-series dimensions of the data, panel data estimation methods were used. Bilateral models were estimated primarily using the method of transformed least squares, with a log-linear specification in FDI equations and a log-log specification in trade equations. Total inward FDI equations were estimated using dynamic panel methods.

A2.1.1 Transformed least squares

133. 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. Thus, the *general* model to consider is:

$$Y_{ijt} = \sum_x \beta_x X_{ijt} + \sum_c \beta_c C_{it} + \sum_p \beta_p P_{jt} + \alpha_i + \alpha_j + \alpha_t + \alpha_{it} + \alpha_{ij} + \alpha_{jt} + u_{ijt} \quad (\text{General})$$

where Y_{ijt} stands for the logarithm of bilateral FDI outward stocks or flows, export of goods or export of services from country i to partner j at time t (with $i=1,2,\dots,I$; $j=1,2,\dots,J$; and $t=1,2,\dots,T$); X_{ijt} are variables that are specific to a given country-partner pair; C_{it} are country-specific variables; and P_{jt} are partner-specific variables.⁸³ The α -type variables stand for specific effects and control for all combinations of unobserved factors.

83. In the bilateral specifications for goods and services exports variables X , C and P are also expressed in logarithms.

134. The OLS and fixed-effect (FE) models are special cases of this “General” model. Indeed, if all the unobserved factors are equal to a constant $\bar{\alpha}$ then the model reduces to a form that can be estimated using OLS:⁸⁴

$$Y_{ijt} = \sum_x \beta_x X_{ijt} + \sum_c \beta_c C_{it} + \sum_p \beta_p P_{jt} + \bar{\alpha} + u_{ijt} \quad (\text{OLS})$$

135. Alternatively, if $\alpha_{it} + \alpha_{ij} + \alpha_{jt} = 0$, the fixed-effect model is obtained:⁸⁵

$$Y_{ijt} = \sum_x \beta_x X_{ijt} + \sum_c \beta_c C_{it} + \sum_p \beta_p P_{jt} + \alpha_i + \alpha_j + \alpha_t + u_{ijt} \quad (\text{FE})$$

136. Bilateral data are best represented by the “General” model. However, estimating such a model is not trivial: the inclusion of the full set of specific effects results in an excessive loss of degrees of freedom and high multicollinearity. Therefore, a “transformed least squares” (TLS) approach (Erkel-Rousse and Mirza, 2002) was employed, which simplifies the equation to be estimated, preserving at the same time the desirable properties of the relevant coefficient estimates. In this approach, the variables of the “General” equation are expressed as deviations from the means across either countries or partners. Specifically, defining for any variable Z_{ijt} and any t the operators Δ_i and Δ_j such that:

$$\Delta_i Z_{ijt} = Z_{ijt} - \frac{1}{I} \sum_i Z_{ijt}$$

$$\Delta_j Z_{ijt} = Z_{ijt} - \frac{1}{J} \sum_j Z_{ijt}$$

the following two alternative specifications are obtained:

$$\Delta_i Y_{ijt} = \sum_x \beta_x \Delta_i X_{ijt} + \sum_c \beta_c \Delta_i C_{it} + \lambda_i + \lambda_{it} + v_{ijt} \quad (\text{TLS country})$$

and

$$\Delta_j Y_{ijt} = \sum_x \beta_x \Delta_j X_{ijt} + \sum_p \beta_p \Delta_j P_{jt} + \lambda_j + \lambda_{ij} + v'_{ijt} \quad (\text{TLS partner})$$

where $\lambda_i = \Delta_i \alpha_i$ and $\lambda_j = \Delta_j \alpha_j$ are deviations from the mean fixed effects; and $\lambda_{it} = \Delta_i \alpha_{it}$, $\lambda_{jt} = \Delta_j \alpha_{jt}$ are country- (resp. partner-) specific deviations that vary over time. The latter have been proxied in empirical analysis by a trend variable specific to each country (resp. partner).

137. It should be stressed that the residuals are defined to include both the random errors *and* the deviations of bilateral fixed effects from their means:

$$v_{ijt} = \Delta_i u_{ijt} + \Delta_i \alpha_{ij}$$

84. The OLS equation has been used as a benchmark in the cross-section study of bilateral services exports.

85. The FE equation has been used as a benchmark in the panel study of bilateral goods exports and bilateral FDI.

$$v'_{ijt} = \Delta_j u_{ijt} + \Delta_j \alpha_{ij}$$

The implicit assumption is that the deviations of bilateral fixed effects from their means are i.i.d. random errors. This assumption will be made explicit in some model specifications in which the $\Delta_i \alpha_{ij}$ and $\Delta_j \alpha_{ij}$ will be modelled as random effects. The important property of the “TLS country” and “TLS partner” equations is that the relevant parameters to be estimated ($\beta_x, \beta_p, \beta_c$) are the same as in the “General” specification.

138. Thus, the TLS approach expresses all variables as deviations from the mean country or, alternatively, the mean partner. Consequently, two equations for bilateral outward FDI and bilateral exports are obtained: a “country” equation; and a “partner” equation. 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 partner-specific variables can be included in the country equations and, symmetrically, no 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.

139. For outward FDI stock and flows and goods exports, the “FE” model estimates are presented for comparison with the TLS results. For trade in services, the “OLS” estimates are shown, since data for services trade are available for a couple of years only, which does not provide enough inter-temporal variation for the “FE” model to be estimated. The variation in the services data is mostly driven by the cross-sectional dimension making the “FE” method inconsistent, as its estimator captures only inter-temporal variation.

A2.1.2 *Dynamic panel methods*

140. In contrast to the approach taken in the bilateral analysis, which is static, the analysis of the determinants of the total inward FDI positions uses a “partial adjustment” framework (Cheng and Kwan, 2000) to capture the lack of instantaneous adjustment of the inward FDI position to its equilibrium level. The model assumes that the equilibrium stock of foreign direct investment in country i and year t , Y_{it}^* is determined by both policy and non-policy-related factors as discussed in Section 3 of the main paper:

$$\ln Y_{it}^* = \sum_x \beta_x X_{it} + \sum_z \beta_z Z_{it} + v_i + \varepsilon_{it} \quad (1)$$

where the X_{it} are non-policy related variables, the Z_{it} are policy variables, β_x and β_z are parameters to be estimated, v_i are unobserved country-specific time-invariant effects and ε_{it} is a random disturbance that is assumed to be i.i.d. The gap between the actual inward position, Y_{it} , and the equilibrium stock induces foreign direct investment flows that tend to eliminate it:

$$d \ln Y_{it} / dt = \alpha (\ln Y_{it}^* - \ln Y_{it}) \quad (2)$$

However, the adjustment to the equilibrium level is not instantaneous. The parameter α captures the speed of this adjustment: the slower the adjustment (the closer α is to zero) the higher is persistence, reflecting the presence of adjustment costs. In turn, these costs may reflect the role played by “agglomeration effects”, *i.e.* the positive externalities caused by the previous accumulation of foreign direct investment in the country.

141. The discrete version of equation (2) can be rearranged as follows:

$$\ln Y_{it} = (1 - \alpha) \ln Y_{it-1} + \alpha \ln Y_{it}^* \quad (3)$$

where the current total inward FDI position of country i is a weighted average of its lagged FDI position and of the equilibrium FDI position, with $0 < \alpha < 1$ needed for long-run convergence to the equilibrium stock.

142. Substituting (1) into (3) gives the estimated dynamic panel specification:

$$\ln Y_{it} = \gamma \ln Y_{it-1} + \sum_x \delta_x X_{it} + \sum_z \lambda_z Z_{it} + \nu_i + \varepsilon_{it} \quad (\text{Dynamic})$$

where $\gamma = (1 - \alpha)$, $\delta_x = \alpha \beta_x$, and $\lambda_z = \alpha \beta_z$.

143. In the presence of the lagged dependent variable and possibly other endogenous variables on the right-hand side of the equation, the least-squares dummy-variables (FE) estimator yields inconsistent (downward biased) coefficient estimates, as these variables are asymptotically correlated with the error term (Nickell, 1981).⁸⁶ The usual way to solve the problems stemming from endogeneity is to use an instrumental variables estimation method. While first differencing and the use of (appropriate) instrumental variables eliminates the inconsistency (Anderson and Hsiao, 1981), it does not yield asymptotically efficient estimates (Arellano, 1988).

144. The “Dynamic” model was, therefore, estimated by means of the Generalized Method of Moments (GMM) (Arellano and Bond, 1991). As in the Anderson-Hsiao approach, this estimator eliminates the country-specific effects by first-differencing the equation and estimates the first-differenced model by means of instrumental variables. Under the assumption of no autocorrelation in ε_{it} , twice lagged levels of the dependent variable and of the predetermined variables can be used as instruments in the differenced equation together with the differences of the strictly exogenous variables (if any). The GMM estimator is more efficient than the Anderson-Hsiao estimator because it imposes orthogonality restrictions between lagged values of endogenous variables and errors and exploits the key identifying assumption that there is serial correlation in the first-differenced residuals. The validity of the orthogonality restrictions can be checked using the Sargan test of over-identifying restrictions, while the assumption about the lack of serial correlation can be checked by testing for second-order serial correlation in the first-differenced residuals. With serially uncorrelated errors, these first differences should follow an MA(1) process implying non-zero first-order correlation but no correlation of higher order.⁸⁷

86. As long as the number of time periods is relatively small. However, Judson and Owen (1999) show that the bias can be significant even for $T=30$. Moreover, the bias increases with the persistence parameter γ .

87. Bond (2002) provides a simple discussion and some illustrations of these empirical techniques.

A2.2 Detailed results

145. This section presents detailed regression results for bilateral outward FDI positions and flows, total inward FDI positions, and bilateral exports of goods and services. For each bilateral specification, three sets of results are reported: transformed least squares regressions with country-specific variables (TLS country), transformed least squares regressions with partner-specific variables (TLS partner), and fixed-effects regressions (OLS regressions for services trade).

A2.2.1 *Bilateral analysis: basic specifications*

146. The results for the “basic” specification in which dependent variables are regressed only on non-policy-related variables, are reported in Table A11.⁸⁸ This table also provides details on the specific effects included in each specification. Since these remain the same throughout the analysis, the information about specific effects is not repeated in the following tables. It should be noted that the FE and OLS specifications omit some of these specific effects. Therefore, the corresponding regression estimates may be biased. The potential bias stemming from the use of fixed effects or OLS type regressions instead of TLS-type specifications is well illustrated by the estimated coefficients of the exchange rate and of the human capital dissimilarity in the goods exports equation. These coefficients change sign when switching from the FE to TLS methods. Unlike the FE estimates, TLS estimates of the human capital effect appear to be in line with theory.⁸⁹ Despite these shortcomings, the FE and OLS estimates serve as benchmarks for assessing the TLS estimates, which by construction can only include either country-specific or partner-specific variables (see above). Estimation results are generally homogenous across “TLS country” and “TLS partner” specifications, with the exception of exchange-rate effects which are not robust to changes in TLS specifications in the outward FDI model.

88. These results refer to the full sample of countries and partners in the years 1980-2000 as described in Annex 1 (Table A1).

89. Similarly, the coefficient estimates of factor and human capital dissimilarities obtained from OLS in the services-trade equation are inconsistent with theory, but they appear to be positive, although insignificant, when turning to TLS methods.

Table A11. Basic bilateral specifications^a

	Outward FDI stock 1980-2000				Outward FDI flow 1980-2000				Exports of goods 1980-2000				Exports of services 1998-1999			
	TLS		FE		TLS		FE		TLS		FE		TLS		OLS	
	Country	Partner	Country	Partner	Country	Partner	Country	Partner	Country	Partner	Country	Partner	Country	Partner	Country	Partner
	A	B	C		D	E	F		G	H	I		J	K	L	
Total GDP	1.928 [4.89]**	1.903 [5.37]**	1.133 [8.12]**		1.665 [4.06]**	1.735 [4.38]**	1.781 [12.18]**		1.284 [14.95]**	0.78 [9.19]**	0.894 [21.84]**	1.926 [11.49]**	1.677 [13.66]**	1.8 [48.77]**		
Size similarity	1.436 [7.50]**	1.247 [7.22]**	0.819 [11.08]**		1.314 [6.59]**	1.292 [6.73]**	1.214 [15.34]**		0.627 [11.89]**	0.38 [7.47]**	0.483 [21.48]**	0.948 [9.70]**	0.694 [9.22]**	0.816 [17.68]**		
Factor dissimilarity	-0.199 [3.18]**	-0.43 [7.05]**	-0.283 [4.18]**		-0.093 [1.34]	-0.336 [4.61]**	-0.254 [3.11]**		0.084 [2.64]**	0.046 [1.50]	0.027 [1.40]	0.386 [1.41]	0.032 [0.30]	-0.405 [6.21]**		
Human capital dissimilarity	-2.122 [9.43]**	-2.153 [10.28]**	-1.838 [9.08]**		-1.909 [8.65]**	-1.735 [8.27]**	-2.002 [9.35]**		0.415 [2.63]**	0.338 [2.51]**	-0.399 [7.07]**	-0.177 [0.29]	0.66 [1.19]	-1.191 [4.01]**		
Transport costs	-0.722 [5.95]**	-0.506 [3.86]**	-0.977 [8.82]**		-1.297 [9.87]**	-1.425 [10.98]**	-1.577 [11.78]**		-0.813 [18.02]**	-0.792 [18.64]**	-0.995 [29.12]**					
Bilateral exchange rate	0.637 [3.78]**	-0.701 [4.34]**	-0.217 [2.55]**		0.296 [1.76]	-0.816 [4.73]**	-0.024 [0.26]		-0.583 [11.14]**	-0.237 [4.40]**	0.059 [2.70]**					
Exchange rate variability ^b	-0.003 [1.94]	-0.002 [1.65]	0.0002 [0.19]		-0.003 [2.16]**	-0.002 [1.66]	-0.0003 [0.21]									
Distance									-1.106 [27.74]**	-1.126 [30.63]**	-1.069 [102.95]**	-0.843 [10.47]**	-0.762 [10.34]**	-0.75 [23.24]**		
R&D intensity									0.107 [3.79]**		0.125 [2.08]**					
Constant	-2.13 [4.31]**	-1.06 [2.76]**	-10.51 [2.84]**		-0.44 [0.92]	-1.61 [3.84]**	-28.97 [7.46]**		1.92 [9.58]**	0.96 [5.92]**	6.75 [6.15]**	-0.60 [4.94]**	-0.10 [0.98]	-22.76 [23.01]**		
Observations	4521	4517	4480		4984	5014	4991		7780	7768	7787	540	534	533		
R-squared	0.72	0.65	0.84		0.57	0.5	0.71		n.a.	n.a.	0.94	n.a.	n.a.	0.85		
Country effects	Yes	Implicit	Yes		Yes	Implicit	Yes		Yes	Implicit	Yes	Yes	Implicit	No	Yes	Implicit
Partner effects	Implicit	Yes	Yes		Implicit	Yes	Yes		Implicit	Yes	Yes	Implicit	Yes	No	Yes	Yes
Time effect	Implicit	Implicit	Yes		Implicit	Implicit	Yes		Implicit	Implicit	Yes	Implicit	Implicit	No	Implicit	Implicit
Trend*country	Yes	Implicit	No		Yes	Implicit	No		Yes	Implicit	No	n.a.	n.a.	n.a.	n.a.	n.a.
Trend*partner	Implicit	Yes	No		Implicit	Yes	No		Implicit	Yes	No	n.a.	n.a.	n.a.	n.a.	n.a.
Bilateral effect	Fixed	Fixed	No		Fixed	Fixed	No		Random	Random	No	Random	Random	No	Random	Random

a) Absolute value of t-statistics in brackets.

* significant at 5% level; ** significant at 1% level; n.a. = not applicable.

b) Coefficients multiplied by 100.

A2.2.2 *The influence of policies*

147. Because of the limited coverage of some of the policy indicators, in regressions using the full set of indicators several countries are dropped from the sample. To maximise country coverage, this section adopts a “thematic” approach, focusing first on the influence of each group of policies and then on their combined influence on trade and FDI.

Bilateral outward FDI positions and flows

148. The influence of openness indicators (participation in free trade areas, tariff and non-tariff barriers and FDI restrictions) is summarised in Table A12. The estimated effect of these indicators is generally stable across model specifications and, to a lesser extent, across stock and flows regressions. Table A13. looks more specifically at the free trade area effects. The variables European Union, NAFTA and EFTA take a unit value if both the country and its partner participate in one of these agreements, while the variables “Partner in...” are unity if the partner only participates in the agreement.⁹⁰ The reference case is when the partner is not a member of any of these free-trade agreements. The estimated effects of these variables are not robust across TLS and FE estimators, suggesting that the latter may suffer from omitted variables bias. Moreover, while the effects on FDI among the free-trade agreement members are unambiguously positive, the effects on FDI from third-party countries is less clear. Stock estimates suggest a positive effect only in the EU, while flow estimates suggest an effect only in NAFTA.

90. The free trade area variables vary over time as new countries join the agreements. In 2000, the members of the European Union were Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain, Sweden, and the United Kingdom; the members of the European Free Trade Association were Iceland, Liechtenstein, Norway and Switzerland; and the members of the North American Free Trade Agreement were Canada, Mexico and the United States.

Table A12. **Bilateral foreign direct investment: Openness^a**

	Outward FDI stock 1980-2000			Outward FDI flow 1980-2000		
	TLS		FE ^c	TLS		FE ^c
	Country ^b	Partner ^c		Country ^b	Partner ^c	
	A	B	C	D	E	F
Total GDP	2.043 [5.33]**	1.76 [4.93]**	1.219 [8.91]**	1.939 [4.84]**	1.485 [3.64]**	1.889 [12.63]**
Size similarity	1.495 [8.07]**	1.172 [6.73]**	0.864 [12.05]**	1.453 [7.48]**	1.184 [6.04]**	1.264 [15.61]**
Factor dissimilarity	-0.205 [3.25]**	-0.519 [5.90]**	-0.235 [2.25]*	-0.107 [1.53]	-0.485 [4.89]**	-0.229 [2.28]*
Human capital dissimilarity	-1.73 [7.70]**	-1.831 [7.97]**	-1.565 [7.04]**	-1.555 [7.16]**	-1.334 [5.87]**	-1.986 [8.69]**
Transport costs	-0.562 [4.80]**	-0.629 [5.51]**	-0.956 [9.66]**	-1.068 [8.20]**	-1.357 [9.99]**	-1.645 [11.75]**
Bilateral exchange rate	0.704 [4.23]**	-0.953 [5.70]**	-0.493 [4.63]**	0.324 [1.96]*	-0.95 [5.25]**	-0.237 [2.00]*
Exchange rate variability ^d	-0.003 [1.55]	-0.004 [0.95]	-0.362 [1.85]	-0.002 [1.49]	-0.004 [0.69]	0.394 [1.57]
Free trade area	0.47 [7.59]**	0.579 [6.80]**	0.565 [6.43]**	0.483 [8.04]**	0.351 [3.73]**	0.455 [4.60]**
Bilateral tariff barriers	-0.09 [7.62]**	-0.125 [9.85]**	-0.148 [11.98]**	-0.098 [8.08]**	-0.127 [8.60]**	-0.134 [8.91]**
FDI restrictions		-0.011 [1.70]	-0.013 [2.66]**		-0.015 [2.17]*	-0.003 [0.53]
Non-tariff barriers		0.017 [2.95]**	0.016 [3.05]**		-0.008 [1.14]	0.008 [1.20]
Constant	-2.12 [4.48]**	-1.11 [2.88]**	-10.65 [2.94]**	-0.38 [0.82]	-1.21 [2.77]**	-30.05 [7.57]**
Observations	4521	3987	3964	4984	4493	4464
R-squared	0.73	0.68	0.85	0.59	0.54	0.73

a) Absolute value of t-statistics in brackets.

* significant at 5% level; ** significant at 1% level.

b) All 28 home and host countries included.

c) All 28 home countries and 23 hosts included (excluded: Czech Republic, Hungary, Poland, Switzerland and Turkey).

d) Coefficients multiplied by 100.

Table A13. **Bilateral foreign direct investment: Free trade agreements^a**

	Outward FDI stock 1980-2000 ^b			Outward FDI flow 1980-2000 ^b		
	TLS		FE	TLS		FE
	Country	Partner		Country	Partner	
	A	B	C	D	E	F
Total GDP	1.89 [4.86]**	1.918 [5.42]**	1.128 [8.04]**	1.728 [4.28]**	1.57 [3.99]**	1.751 [11.78]**
Size similarity	1.414 [7.51]**	1.255 [7.25]**	0.788 [10.54]**	1.342 [6.86]**	1.21 [6.34]**	1.174 [14.62]**
Factor dissimilarity	-0.176 [2.79]**	-0.395 [6.41]**	-0.253 [3.76]**	-0.053 [0.77]	-0.323 [4.40]**	-0.214 [2.63]**
Human capital dissimilarity	-1.906 [8.56]**	-1.934 [9.34]**	-1.622 [7.99]**	-1.743 [8.14]**	-1.57 [7.66]**	-1.904 [9.00]**
Transport costs	-0.693 [5.75]**	-0.479 [3.74]**	-0.879 [8.08]**	-1.221 [9.26]**	-1.346 [10.39]**	-1.46 [11.09]**
Bilateral exchange rate	0.711 [4.26]**	-0.718 [4.47]**	-0.234 [2.78]**	0.361 [2.18]*	-0.85 [4.94]**	-0.04 [0.44]
Exchange rate variability ^c	-0.003 [1.50]	-0.002 [1.26]	0.0006 [0.57]	-0.002 [1.43]	-0.002 [1.22]	0 [0.07]
European Union	0.529 [7.73]**	0.808 [3.89]**	-0.082 [0.58]	0.615 [8.84]**	0.643 [2.22]*	0.009 [0.05]
NAFTA	1.578 [7.37]**	1.754 [7.69]**	1.32 [7.75]**	1.519 [6.58]**	2.119 [6.30]**	1.515 [6.48]**
EFTA	0.466 [2.53]*	0.5 [1.49]	-0.229 [0.93]	0.519 [3.17]**	0.731 [1.95]	0.449 [1.84]
<i>Partner in:</i>						
European Union		0.376 [1.79]	-0.488 [3.51]**		0.147 [0.49]	-0.415 [2.31]*
NAFTA		-0.048 [0.27]	-0.334 [3.88]**		0.744 [3.76]**	-0.179 [1.63]
EFTA		0.264 [0.98]	-0.801 [4.88]**		0.223 [0.65]	-0.408 [1.93]
Constant	-2.21 [4.53]**	-0.85 [2.05]*	-10.42 [2.81]**	-0.52 [1.09]	-1.51 [3.26]**	-28.16 [7.15]**
Observations	4521	4517	4480	4984	5014	4991
R-squared	0.73	0.66	0.84	0.58	0.52	0.71

a) Absolute value of t-statistics in brackets.

* significant at 5% level; ** significant at 1% level.

b) All 28 home and host countries included.

c) Coefficients multiplied by 100.

149. Table A14 summarises the effects of infrastructure on bilateral foreign direct investment. A significant and positive effect of infrastructure on FDI was found only in the FE specifications, with a stronger impact in transition countries. However, as mentioned above, these estimates are not reliable because they may suffer from omitted variables bias.

Table A14. **Bilateral foreign direct investment: Infrastructure^a**

	Outward FDI stock 1980-2000 ^b				Outward FDI flow 1980-2000 ^b			
	TLS Partner		FE		TLS Partner		FE	
	A	B	C	D	E	F	G	H
Total GDP	1.886 [5.34]**	1.928 [5.42]**	1.272 [8.65]**	1.291 [8.79]**	1.725 [4.36]**	1.719 [4.35]**	1.802 [11.98]**	1.845 [12.27]**
Size similarity	1.239 [7.19]**	1.258 [7.25]**	0.874 [11.41]**	0.887 [11.59]**	1.286 [6.71]**	1.283 [6.69]**	1.223 [15.12]**	1.246 [15.39]**
Factor dissimilarity	-0.433 [7.04]**	-0.429 [7.01]**	-0.276 [4.09]**	-0.264 [4.01]**	-0.332 [4.55]**	-0.331 [4.51]**	-0.252 [3.05]**	-0.23 [2.76]**
Human capital dissimilarity	-2.127 [10.17]**	-2.131 [10.19]**	-1.831 [9.10]**	-1.861 [9.23]**	-1.729 [8.24]**	-1.729 [8.23]**	-2.003 [9.31]**	-2.028 [9.41]**
Transport costs	-0.502 [3.84]**	-0.501 [3.84]**	-0.952 [8.62]**	-0.999 [8.92]**	-1.42 [10.94]**	-1.421 [10.92]**	-1.573 [11.76]**	-1.646 [12.07]**
Bilateral exchange rate	-0.687 [4.19]**	-0.643 [3.84]**	-0.179 [2.68]**	-0.285 [4.01]**	-0.794 [4.58]**	-0.797 [4.59]**	-0.033 [0.45]	-0.155 [1.96]
Infrastructure ^c	0.014 [1.24]	0.014 [1.25]	0.024 [3.42]**	0.019 [2.65]**	0.011 [0.90]	0.011 [0.84]	0.004 [0.55]	-0.002 [0.22]
Infrastructure ^d (transition countries)		-0.033 [1.19]		0.054 [3.97]**		0.014 [0.43]		0.073 [4.58]**
Constant	-1.21 [3.09]**	-1.32 [3.26]**	-15.55 [3.84]**	-15.73 [3.89]**	-1.71 [3.92]**	-1.62 [3.34]**	-29.77 [7.23]**	-30.52 [7.42]**
Observations	4517	4517	4480	4480	5014	5014	4991	4991
R-squared	0.65	0.65	0.84	0.84	0.5	0.5	0.71	0.71

a) Absolute value of t-statistics in brackets.

* significant at 5% level; ** significant at 1% level.

b) All 28 home and host countries included.

c) Increases with the level and quantity of infrastructure.

d) Increases with the level and quantity of infrastructure for Czech Republic, Hungary, Korea, Mexico, Poland and Turkey but is zero for all the other partners.

150. The negative and significant effects of product market regulation and labour market arrangements indicators are remarkably stable across model specifications in both the FDI stocks and flows equations (Tables A15 and A16.).

Table A15. **Bilateral foreign direct investment: Product market regulation^a**

	Outward FDI stock 1980-2000 ^b			Outward FDI flow 1980-2000 ^b		
	TLS		FE	TLS		FE
	Country	Partner		Country	Partner	
	<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>	<i>E</i>	<i>F</i>
Total GDP	2.089 [5.11]**	1.811 [5.05]**	1.178 [8.60]**	1.982 [4.52]**	1.631 [3.99]**	1.879 [12.69]**
Size similarity	1.554 [7.87]**	1.21 [6.92]**	0.858 [11.99]**	1.486 [7.00]**	1.263 [6.41]**	1.29 [16.01]**
Factor dissimilarity	-0.214 [2.26]*	-0.69 [6.24]**	-0.585 [5.44]**	0.044 [0.44]	-0.39 [3.60]**	-0.243 [2.24]*
Human capital dissimilarity	-1.404 [5.93]**	-1.689 [7.61]**	-1.557 [7.25]**	-2.121 [8.51]**	-1.687 [6.96]**	-2.078 [8.84]**
Transport costs	-0.887 [7.10]**	-0.772 [6.31]**	-1.156 [10.69]**	-1.427 [10.04]**	-1.581 [10.58]**	-1.902 [12.43]**
Bilateral exchange rate	0.441 [2.41]*	-0.863 [5.02]**	-0.317 [2.92]**	0.11 [0.60]	-0.888 [4.81]**	-0.138 [1.18]
Regulation ratio ^c	-0.154 [8.64]**	-0.16 [8.62]**	-0.152 [9.39]**	-0.095 [5.05]**	-0.107 [5.42]**	-0.108 [5.58]**
Constant	-1.92 [3.65]**	-1.49 [3.76]**	-11.80 [3.24]**	-0.29 [0.57]	-1.84 [4.22]**	-31.55 [8.01]**
Observations	3792	3784	3752	4440	4435	4418
R-squared	0.68	0.67	0.84	0.56	0.51	0.71

a) Absolute value of t-statistics in brackets.

* significant at 5% level; ** significant at 1% level.

b) 21 home and host countries included (excluded: Czech Republic, Hungary, Iceland, Korea, Mexico, Poland and Turkey).

c) Ratio of indicators of lack of liberalisation in the host and home countries. The ratio increases as product market regulation in the host country becomes relatively more restrictive.

Table A16. **Bilateral foreign direct investment: Labour market regulation^a**

	Outward FDI stock 1980-2000 ^b			Outward FDI flow 1980-2000 ^b		
	TLS		FE	TLS		FE
	Country	Partner		Country	Partner	
	<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>	<i>E</i>	<i>F</i>
Total GDP	3.227 [7.90]**	1.614 [4.64]**	0.931 [7.08]**	2.528 [5.83]**	1.14 [2.82]**	1.66 [11.52]**
Size similarity	2.099 [10.65]**	1.087 [6.39]**	0.683 [9.83]**	1.754 [8.35]**	1.028 [5.25]**	1.18 [15.05]**
Factor dissimilarity	-0.078 [1.05]	-0.465 [5.86]**	-0.257 [2.88]**	0.048 [0.58]	-0.371 [4.00]**	-0.133 [1.34]
Human capital dissimilarity	-1.46 [6.20]**	-1.717 [7.93]**	-1.261 [6.12]**	-2.012 [8.39]**	-1.724 [7.36]**	-2.082 [9.06]**
Transport costs	-0.996 [7.93]**	-0.786 [6.86]**	-1.206 [11.57]**	-1.333 [9.59]**	-1.412 [10.31]**	-1.655 [11.30]**
Bilateral exchange rate	0.133 [0.75]	-0.683 [4.12]**	-0.05 [0.45]	-0.156 [0.87]	-0.763 [4.29]**	0.03 [0.27]
EPL ratio ^c	-0.098 [8.54]**	-0.09 [10.42]**	-0.103 [11.55]**	-0.094 [6.56]**	-0.076 [5.83]**	-0.088 [6.44]**
Wedge ratio ^c	-1.181 [12.40]**	-2.255 [13.93]**	-1.837 [15.68]**	-0.788 [8.50]**	-1.834 [9.47]**	-1.726 [11.60]**
Constant	-0.15 [0.29]	-2.93 [7.77]**	-1.49 [0.42]	1.15 [2.26]*	-2.83 [6.57]**	-22.28 [5.78]**
Observations	4148	4134	4105	4726	4727	4711
R-squared	0.72	0.68	0.85	0.57	0.51	0.71

a) Absolute value of t-statistics in brackets.

* significant at 5% level; ** significant at 1% level.

b) 26 home and host countries included (excluded: Iceland and Mexico).

c) Ratio of the EPL and labour wedge indicators in the host and home countries. The ratios increase as EPL or the labour tax wedge in the host country becomes relatively more restrictive.

151. The estimation of the model including all policy indicators is presented in Tables A17. The coefficient estimates of equation B from Table A17 were used to compute the contributions of policies to the deviation of outward FDI positions from OECD average (Figures 21 and 22 in the main text), as well as the policy simulations related to FDI restrictions (Table 5 and Figure 24 in the main text).

152. The time invariance of some variables of interest (namely, the bilateral customs tariffs and the lack of intellectual property rights protection) might artificially shrink the standard errors of the corresponding estimates. To check for this potential source of error, Table A17 (columns D-E and I-J) includes adjusted estimates, based on both clustering and random-effects procedures. Clustering involves relaxing the assumption that the observations within specified groups (clusters) are independent. This procedure affects the estimated standard errors and variance-covariance matrix of the estimators, but not the estimated coefficients. The other option is to use an estimator which is asymptotically equivalent to a random-effects estimator.⁹¹ These estimators make it possible to estimate valid standard errors given the true nature of within-group correlation. The results suggest that the significance of IPR protection in the equation for outward FDI positions is not robust to these adjustments, while the significance of bilateral tariff barriers remains unchanged. Therefore, intellectual property rights (IPR) protection was omitted from the preferred equations. At the same time, both IPR protection and bilateral tariffs remain significant across different estimators in the equations for outward FDI flows.

91. The generalized linear model (Liang and Zeger, 1986), where the dependent variable is normally distributed and the link function is identity, allows to adjust for heteroscedasticity (using the Huber/White/sandwich estimator of variance). The procedure used by this estimator is different from the one used by the random effects estimator and thus may lead to different results in unbalanced panels.

Table A17. **Bilateral foreign direct investment: Full specification - years 1980-2000**^{a7}

	Outward FDI stock 1980-2000					Outward FDI flow 1980-2000				
	TLS		FE ^c	Clustering ^c	Random effects ^c	TLS		FE ^c	Clustering ^c	Random effects ^c
	Country ^b	Partner ^c				Country ^b	Partner ^c			
	A	B	C	D	E	F	G	H	I	J
Total GDP	3.342 [8.39]**	1.328 [3.78]**	1.011 [7.71]**	0.866 [1.53]	1.669 [3.46]**	2.764 [6.34]**	1.344 [3.24]**	1.785 [12.03]**	0.782 [1.22]	1.147 [2.26]*
Size similarity	2.187 [11.43]**	0.968 [5.64]**	0.751 [10.99]**	0.729 [2.58]*	1.033 [4.35]**	1.883 [8.92]**	1.127 [5.64]**	1.227 [15.20]**	0.818 [2.64]**	0.923 [3.69]**
Factor dissimilarity	-0.059 [0.63]	-0.794 [6.90]**	-0.623 [5.40]**	-0.763 [3.43]**	-0.417 [2.45]*	0.07 [0.71]	-0.464 [4.16]**	-0.296 [2.67]**	-0.402 [2.12]*	0.101 [0.60]
Human capital dissimilarity	-0.844 [3.57]**	-1.383 [6.08]**	-1.152 [5.08]**	-1.378 [2.82]**	-1.552 [2.43]*	-1.608 [6.36]**	-1.173 [4.78]**	-1.757 [7.24]**	-1.282 [2.34]*	-1.239 [2.12]*
Transport costs	-0.662 [5.39]**	-0.743 [6.14]**	-1.136 [11.08]**	-0.744 [3.13]**	-0.42 [1.82]	-1.192 [8.42]**	-1.477 [10.37]**	-1.836 [12.45]**	-1.462 [6.27]**	-0.795 [3.82]**
Bilateral exchange rate	0.283 [1.61]	-0.97 [5.70]**	-0.095 [0.84]	-1.094 [3.08]**	-0.049 [0.19]	-0.033 [0.18]	-0.945 [5.08]**	-0.021 [0.18]	-1.065 [3.27]**	-0.691 [2.62]**
Exchange rate variability ^d	0.024 [5.45]**	-0.0001 [1.23]	0.038 [2.09]*	-0.006 [0.91]	-0.001 [0.15]	0.003 [0.57]	0.00002 [0.34]	0.012 [0.57]	0.002 [0.23]	0.005 [0.78]
Free trade area	0.366 [5.22]**	0.482 [5.84]**	0.421 [4.99]**	0.489 [3.18]**	0.243 [1.93]	0.392 [5.83]**	0.254 [2.71]**	0.353 [3.57]**	0.303 [1.60]	0.104 [0.74]
FDI restrictions		-0.019 [3.06]**	-0.015 [3.08]**	-0.019 [2.23]*	-0.012 [1.82]		-0.02 [2.76]**	-0.005 [1.02]	-0.018 [2.22]*	-0.017 [2.36]*
Bilateral tariff barriers	-0.1 [6.08]**	-0.059 [4.07]**	-0.111 [8.03]**	-0.06 [1.84]	-0.159 [4.04]**	-0.107 [6.14]**	-0.077 [4.52]**	-0.094 [5.40]**	-0.076 [2.05]*	-0.162 [4.13]**
Non-tariff barriers		0.011 [1.89]	0.011 [2.09]*	0.01 [0.95]	0.016 [1.66]		-0.013 [1.95]	0.003 [0.40]	-0.013 [1.12]	-0.006 [0.67]
EPL ratio ^e	-0.032 [2.62]**	-0.053 [5.37]**	-0.048 [4.83]**	-0.046 [1.78]	-0.027 [1.21]	-0.042 [2.56]*	-0.043 [2.77]**	-0.043 [2.66]**	-0.032 [0.85]	-0.051 [1.47]
Wedge ratio ^e	-0.925 [9.20]**	-2.297 [11.65]**	-1.657 [11.49]**	-2.328 [5.84]**	-0.783 [2.26]*	-0.546 [5.51]**	-1.653 [6.54]**	-1.54 [8.72]**	-1.685 [3.60]**	-0.43 [1.14]
Regulation ratio ^f	-0.142 [8.25]**	-0.1 [6.11]**	-0.118 [7.88]**	-0.102 [2.94]**	-0.035 [1.10]	-0.077 [4.17]**	-0.064 [3.46]**	-0.08 [4.09]**	-0.067 [1.72]	-0.026 [0.87]
IPR				-0.239 [1.76]	-0.217 [1.36]				-0.398 [2.95]**	-0.545 [4.23]**
Constant	-0.87 [1.75]	-3.29 [7.97]**	-2.12 [0.60]	-4.56 [4.18]**	-0.92 [0.89]	0.58 [1.16]	-2.69 [5.54]**	-24.43 [6.16]**	-4.67 [4.25]**	-3.41 [3.59]**
Observations	3792	3601	3576	3601	3601	4440	4235	4223	4235	4235
R-squared	0.71	0.72	0.86	0.72		0.58	0.55	0.73	0.55	

a) Absolute value of t-statistics in brackets.

* significant at 5% level; ** significant at 1% level.

b) 21 home and host countries included (excluded: Czech Republic, Hungary, Iceland, Korea, Mexico, Poland and Turkey).

c) 21 home countries (excluded: Czech Republic, Hungary, Iceland, Korea, Mexico, Poland and Turkey), 20 host countries (excluded: the same countries plus Switzerland).

d) Coefficients multiplied by 100.

e) Ratio of the EPL and labour wedge indicators in the host and home countries. The ratios increase as EPL or the labour tax wedge in the host country becomes relatively more restrictive.

f) Ratio of indicators of lack of liberalisation in the host and home countries. The ratio increases as product market regulation in the host country becomes relatively more restrictive.

Total inward FDI stock

153. Table A18 presents the results obtained for total inward positions using the GMM estimation approach. The “basic” specification is adapted to the multilateral nature of the data. The non-policy variables include domestic absorption, human capital, and business expenditures on research and development. The number of countries covered is lower due to limitations of data on inward positions. First differencing, instrumenting and introducing policy variables further restricts the number of countries covered to 10 in the full specification. The number of countries included in the analysis can be increased by making assumptions about missing values for some variables (primarily, the R&D variable, which is for some countries available only biannually). Results in columns A-F of Table A18 are based on this modified data set. Column G presents the results without making these assumptions, which are reported in the main text. The analyses of the samples with 14 countries (column F) and 10 countries (column G) yield similar results with the exception of the estimated effects of human capital and regulation, which gain significance in the latter specification. FDI restrictions are significant in the largest sample, when neither regulation variables nor tariff barriers are included (columns D and E).

Bilateral trade in goods

154. In Tables A19 and A20, indicators of openness, product market regulation and labour market arrangements are progressively added to the basic specification for bilateral goods exports. Some variables are either partner-specific (*e.g.*, FDI restrictions, non-tariff barriers) or country-specific (*e.g.*, R&D). Thus, they only appear in one of the TLS specifications. Equations D and E in Table A20 contain all the variables of interest. The coefficients of equation D were used to compute the contributions of policies to the deviation of goods exports from the OECD average (Figure 23 in the main text), and coefficients from equations D and E were used to compute the simulations related to goods exports (Figure 26 in the main text).

155. Save for FDI restrictions, whose significance vanishes as new policy variables are included, the significance and coefficients of both non-policy-related and policy variables are robust to changes in model specification.⁹² However, the effects of certain policy variables (such as non-tariff barriers, regulation in the partner and labour tax wedges) are not robust across TLS and FE estimation procedures, suggesting an omitted variable bias in the latter procedure. Equations F-H in Table A19 replace the single free-trade area variable by the indicators of membership in the European Union, NAFTA and EFTA. The “TLS partner” and “FE” specifications (columns G and H) also include indicators that take a unit value only when the partner belongs to one of these free-trade areas. While the three agreements appear to increase internal trade, only the European Union has a significant effect on exports from third-party countries.

92. A few coefficients are significant only at the 10 per cent level (*e.g.*, tariff barriers in the TLS country specification in Table A19).

Table A18. **Foreign direct investment: Total inward FDI stock**

	Dynamic instrumental variable, GMM estimation ^a						
	A	B	C	D	E	F	G
Domestic absorption	0.305 [5.45]**	0.135 [2.02]*	0.185 [2.68]**	0.283 [3.76]**	0.265 [3.42]**	0.389 [5.01]**	0.363 [4.56]**
Human capital endowment	1.382 [3.32]**	1.873 [4.38]**	1.629 [3.80]**	1.248 [2.83]**	1.631 [3.49]**	0.658 [1.42]	1.219 [2.67]**
R&D intensity	0.218 [3.67]**	0.360 [5.42]**	0.311 [4.63]**	0.323 [4.93]**	0.3919 [5.33]**	0.403 [5.71]**	0.485 [6.66]**
Effective exchange rate		0.005 [4.70]**	0.005 [5.07]**	0.004 [4.15]**	0.004 [4.03]**	0.003 [3.33]**	0.004 [3.70]**
Exchange rate variability			-0.006 [0.97]	-0.008 [1.33]	-0.012 [1.99]*	-0.008 [1.47]	-0.011 [1.80]
FDI restrictions			-0.006 [2.64]**	-0.007 [2.62]**	-0.003 [0.91]	-0.002 [0.50]	0.006 [1.58]
Non-tariff barriers				0.112 [3.55]**	0.107 [3.32]**	0.143 [4.44]**	0.166 [4.89]**
Tariff barriers					0.013 [3.38]**		
Infrastructure				0.008 [2.12]*	0.005 [1.15]	0.013 [2.92]**	0.006 [1.35]
Regulation						-0.006 [1.53]	-0.010 [2.53]*
Employment protection						-0.007 [2.91]**	-0.007 [2.46]*
Labour tax wedge						-0.005 [1.10]	-0.008 [1.75]
Lagged dependent variable	0.704 [17.50]**	0.688 [17.11]**	0.675 [17.06]**	0.626 [15.19]**	0.627 [15.16]**	0.558 [12.42]**	0.519 [10.98]**
Constant	0.006 [1.32]	0.002 [0.34]	-0.004 [0.79]	-0.008 [1.07]	0.001 [0.13]	-0.007 [0.88]	0.009 [1.04]
Observations	174	174	174	169	169	163	134
Countries	19 ^b	19 ^b	19 ^b	16 ^c	16 ^c	14 ^d	10 ^e
Sargan test ^f	244 (340)	224 (340)	227 (509)	223 (340)	210 (509)	205 (693)	151 (338)
Autocorrelation in first-differenced residuals							
First-order ^g	-3.98	-3.94	-3.87	-3.45	-3.68	-3.30	-3.30
Second-order ^g	-1.97	-2.16	-1.96	-1.93	-1.91	-1.94	-1.73

a) Absolute value of Z-statistics in brackets.

* significant at 5% level; ** significant at 1% level.

b) Australia, Canada, Czech Republic, Finland, France, Germany, Hungary, Iceland, Italy, Japan, Mexico, Netherlands, Norway, New Zealand, Poland, Portugal, Sweden, United Kingdom, United States.

c) Australia, Canada, Finland, France, Germany, Iceland, Italy, Japan, Mexico, Netherlands, Norway, New Zealand, Portugal, Sweden, United Kingdom, United States.

d) Same countries as in note c), except Iceland and Mexico.

e) Australia, Canada, Finland, France, Germany, Italy, Japan, Netherlands, United Kingdom, United States.

f) The Sargan test tests the null hypothesis that all moment conditions are satisfied. The test statistics has χ^2 distribution, number of degrees of freedom that apply is provided in parentheses.

g) 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.

Table A19. **Bilateral goods exports: Openness^a**

	Trade openness			FDI restrictions		Free trade area		
	TLS		FE ^c	TLS Partner ^c	FE ^c	TLS		FE ^c
	Country ^b	Partner ^c				Country ^b	Partner ^c	
	A	B	C	D	E	F	G	H
Total GDP	1.326 [15.23]**	0.69 [8.06]**	0.889 [21.05]**	0.653 [7.92]**	0.89 [20.87]**	1.33 [14.59]**	0.662 [7.74]**	0.852 [19.54]**
Size similarity	0.675 [12.78]**	0.364 [7.02]**	0.496 [21.47]**	0.345 [6.84]**	0.496 [21.35]**	0.702 [12.94]**	0.369 [6.98]**	0.467 [19.76]**
Factor dissimilarity	0.175 [4.89]**	0.098 [2.80]**	0.139 [5.61]**	0.099 [2.83]**	0.139 [5.62]**	0.164 [4.36]**	0.12 [3.27]**	0.142 [5.85]**
Human capital dissimilarity	0.335 [1.87]	0.25 [1.64]	-0.508 [7.97]**	0.249 [1.63]	-0.508 [7.98]**	0.216 [1.26]	0.093 [0.62]	-0.47 [7.44]**
Distance	-1.024 [20.85]**	-1.022 [22.67]**	-0.995 [75.65]**	-1.022 [22.75]**	-0.995 [75.48]**	-1.042 [20.97]**	-1.058 [22.14]**	-0.997 [75.81]**
R&D intensity	0.121 [4.15]**		0.095 [1.51]		0.096 [1.51]	0.119 [4.12]**		0.141 [2.21]*
Transport costs	-0.755 [13.84]**	-0.732 [14.13]**	-1.013 [24.05]**	-0.732 [14.15]**	-1.013 [23.97]**	-0.749 [13.74]**	-0.72 [14.16]**	-0.964 [23.58]**
Bilateral exchange rate	-0.621 [11.07]**	-0.279 [4.98]**	-0.055 [1.76]	-0.324 [6.07]**	-0.055 [1.75]	-0.58 [10.20]**	-0.346 [6.39]**	-0.075 [2.35]*
Free trade area	0.097 [4.28]**	0.113 [4.23]**	0.083 [4.66]**	0.106 [3.96]**	0.083 [4.59]**			
Bilateral tariff barriers	-0.066 [1.80]	-0.093 [2.90]**	-0.082 [7.58]**	-0.095 [2.97]**	-0.083 [7.59]**	-0.097 [2.31]*	-0.105 [2.69]**	-0.137 [12.16]**
Non-tariff barriers		-0.065 [3.11]**	0.103 [5.43]**	-0.056 [2.72]**	0.103 [5.41]**		-0.074 [3.78]**	0.085 [4.30]**
FDI restrictions				-0.106 [2.31]*	-0.003 [0.09]		-0.107 [2.33]*	-0.041 [1.01]
European Union						0.058 [1.85]	0.163 [3.34]**	0.405 [8.86]**
EFTA						0.183 [3.12]**	0.239 [3.12]**	0.794 [13.45]**
NAFTA						0.485 [2.43]*	0.495 [3.58]**	0.038 [0.45]
Partner in:								
European Union							0.144 [3.16]**	0.585 [12.65]**
EFTA							0.027 [0.46]	0.365 [7.10]**
NAFTA							0.033 [0.64]	-0.011 [0.27]
Constant	2.03 [9.28]**	0.89 [5.30]**	6.21 [5.50]**	0.80 [4.90]**	6.21 [5.51]**	2.08 [9.94]**	0.82 [4.76]**	7.63 [6.71]**
Observations	6943	6929	6950	6929	6950	6958	6945	6950
R-squared	n.a.	n.a.	0.95	n.a.	0.95	n.a.	n.a.	0.95

a) Absolute value of t-statistics in brackets.

* significant at 5% level; ** significant at 1% level; n.a. = not applicable.

b) All 28 home and host countries included.

c) All 28 home countries and 23 hosts included (excluded: Czech Republic, Hungary, Poland, Switzerland and Turkey).

Table A20. Bilateral goods exports: All policies^a

	Product market regulation			Labour market regulation		
	TLS		FE ^d	TLS		FE ^d
	Country ^b	Partner ^c		Country ^b	Partner ^c	
	A	B	C	D	E	F
Total GDP	1.297 [14.86]**	0.626 [7.41]**	0.857 [19.53]**	1.006 [11.15]**	0.747 [8.77]**	0.867 [17.57]**
Size similarity	0.695 [12.58]**	0.378 [7.21]**	0.497 [20.80]**	0.539 [9.52]**	0.44 [8.19]**	0.502 [18.95]**
Factor dissimilarity	0.168 [4.25]**	0.102 [2.51]*	0.126 [4.63]**	0.153 [3.87]**	0.112 [2.72]**	0.128 [4.72]**
Human capital dissimilarity	0.571 [2.89]**	0.465 [2.74]**	-0.434 [6.67]**	0.54 [2.80]**	0.46 [2.69]**	-0.443 [6.82]**
Distance	-0.976 [18.03]**	-0.991 [20.82]**	-0.977 [73.24]**	-0.972 [18.18]**	-0.991 [20.63]**	-0.976 [73.14]**
R&D intensity	0.161 [5.47]**		0.157 [2.36]*	0.208 [7.89]**		0.144 [2.06]*
Transport costs	-0.703 [11.31]**	-0.682 [11.55]**	-1.012 [25.58]**	-0.71 [11.37]**	-0.683 [11.75]**	-1.015 [25.43]**
Bilateral exchange rate	-0.611 [10.37]**	-0.327 [6.27]**	-0.029 [0.88]	-0.489 [8.33]**	-0.285 [5.53]**	-0.041 [1.20]
Free trade area	0.101 [4.45]**	0.128 [4.80]**	0.116 [6.38]**	0.109 [4.77]**	0.134 [4.96]**	0.12 [6.60]**
Bilateral tariff barriers	-0.137 [3.67]**	-0.146 [4.12]**	-0.1 [9.04]**	-0.137 [3.69]**	-0.145 [4.08]**	-0.1 [8.99]**
Non-tariff barriers		-0.074 [3.93]**	0.026 [1.15]		-0.08 [4.23]**	0.026 [1.13]
FDI restrictions		-0.071 [1.59]	0.09 [2.41]*		-0.039 [0.84]	0.049 [1.17]
<i>Country-specific variables</i>						
Regulation	-0.212 [3.27]**		-0.191 [2.07]*	-0.253 [3.85]**		-0.23 [2.25]*
Labour tax wedge				-0.399 [5.54]**		0.061 [0.48]
Employment protection						
With high-level corporatism				0.002 [1.85]		0.006 [2.47]*
With mid-level corporatism				-0.003 [2.52]*		0.002 [0.57]
With low-level corporatism				0.001 [0.60]		0.006 [2.77]**
<i>Partner-specific variables</i>						
Regulation		-0.11 [1.90]	0.161 [3.02]**		-0.118 [2.06]*	0.172 [3.16]**
Labour tax wedge					0.194 [2.94]**	-0.031 [0.39]
Employment protection						
With high-level corporatism				0.001 [0.92]		0.005 [2.95]**
With mid-level corporatism				-0.002 [1.43]		0.003 [1.86]
With low-level corporatism				-0.001 [0.80]		0.005 [3.44]**
Constant	2.07 [9.62]**	1.01 [6.33]**	7.07 [6.15]**	1.50 [6.20]**	1.21 [6.98]**	7.07 [4.77]**
Observations	6107	6107	6195	6107	6119	6195
R-squared	n.a.	n.a.	0.95	n.a.	n.a.	0.95

a) Absolute value of t-statistics in brackets.

* significant at 5% level; ** significant at 1% level; n.a. = not applicable.

b) 21 home countries (excluded: Czech Republic, Hungary, Iceland, Korea, Mexico, Poland and Turkey), all 28 host countries.

c) All 28 home countries and 20 hosts included (excluded: Czech Republic, Hungary, Iceland, Korea, Mexico, Poland, Switzerland and Turkey),

d) 21 home countries (excluded: Czech Republic, Hungary, Iceland, Korea, Mexico, Poland and Turkey), 20 host countries (excluded: the same countries plus Switzerland).

156. Table A21 presents variants of equations D-F in Table A20 to check for the robustness of the results. For simplicity, however, only the ‘basic’ variables are presented along with the variables of interest for the robustness check.⁹³ In columns A and C, product market regulation is defined in the same way as in the FDI equations (*i.e.*, the product of economy-wide regulation and the summary indicator of regulatory reform in 7 non-manufacturing industries). The related coefficients appear with the same sign but the effect of regulation in the partner country appears to be less significant than in Table A20, where regulation is defined as in the main text. All other coefficients remain robust to this change. Column D looks at the effect of exchange-rate variability which turns out to be insignificant. Finally, column E omits the bilateral distance variable. To the extent that distance captures transport costs, its presence along with the transport cost proxy could be redundant. However, the results show that excluding distance would result in a fall in the R-squared suggesting that distance might provide additional information on differences in cultures or networks among trade partners.

Bilateral trade in services

157. Tables A22 and A23 show detailed regression results for bilateral services exports. Estimates in column D of Table A23 were used to compute the contributions of policies to explaining deviation of services exports from the OECD average (Figure 22 in main text). Estimates in columns D and E of Table A23 were used in the simulations reported in Figure 27 of the main text. Progressively extending the basic specification for services with policy variables generally does not change the values and the significance of the estimated coefficients. However, some policy variables show a high degree of multicollinearity in the data underlying this set of regressions and, therefore, only subsets of them can be included simultaneously in the estimated equations. Multicollinearity is particularly strong between FDI restrictions and infrastructure (see Table A22) as well as between labour tax wedges and employment protection legislation (see Table A23).⁹⁴ Table A22 shows that free trade agreements have no significant effect on services trade. Thus, this variable has been removed from the equations shown in Table A23.

93. Complete results are available upon request.

94. Columns J-L of Table A23 illustrate why it is preferable not to introduce simultaneously tax wedges and employment protection. Although the R-squared appears to be similar or even somewhat higher when comparing the equations J-L to their counterparts D-F and G-I, respectively, the estimated coefficient for the labour tax wedge and barriers to entry are insignificant. This outcome is typical for multicollinearity, where the whole set of variables explains a large share of the variance while a subset of variables becomes insignificant, though it is significant in alternative specifications.

Table A21. **Bilateral goods exports: Variants^a**

	TLS Country ^b		TLS Partner ^c		FE ^d
	A	B	C	D	E
Total GDP	1.026 [11.30]**	0.989 [10.97]**	0.785 [9.44]**	0.773 [9.23]**	0.833 [11.63]**
Size similarity	0.548 [9.58]**	0.533 [9.41]**	0.455 [8.59]**	0.451 [8.51]**	0.452 [11.83]**
Factor dissimilarity	0.163 [3.89]**	0.162 [3.89]**	0.119 [2.89]**	0.118 [2.87]**	-0.051 [1.24]
Human capital dissimilarity	0.538 [2.80]**	0.532 [2.76]**	0.46 [2.70]**	0.453 [2.66]**	-0.804 [7.53]**
Distance	-0.971 [18.02]**	-0.972 [18.11]**	-0.992 [20.81]**	-0.992 [20.82]**	
R&D intensity	0.206 [7.80]**	0.207 [7.81]**			0.063 [0.59]
Transport costs	-0.71 [11.38]**	-0.713 [11.48]**	-0.69 [11.77]**	-0.691 [11.84]**	-1.538 [25.63]**
Bilateral exchange rate	-0.494 [8.46]**	-0.489 [8.36]**	-0.262 [5.13]**	-0.269 [5.22]**	-0.04 [0.88]
Bilateral tariff barriers	-0.138 [3.70]**		-0.144 [4.08]**		-0.472 [24.97]**
<i>Country-specific variable</i>					
Regulation	-0.077 [2.01]*				
<i>Partner-specific variable</i>					
Regulation			-0.056 [1.67]		
Exchange rate variability ^e		0.006 [1.59]		0.003 [0.93]	
Constant	1.485 [6.16]**	1.526 [6.33]**	1.243 [7.23]**	1.253 [7.25]**	-2.586 [1.21]
Observations	6112	6109	6099	6096	6195
R-squared	n.a.	n.a.	n.a.	n.a.	0.89

a) Absolute value of t-statistics in brackets.

* significant at 5% level; ** significant at 1% level; n.a. = not applicable.

b) 21 home countries (excluded: Czech Republic, Hungary, Iceland, Korea, Mexico, Poland and Turkey), all 28 host countries.

c) All 28 home countries and 20 hosts included (excluded: Czech Republic, Hungary, Iceland, Korea, Mexico, Poland, Switzerland and Turkey),

d) 21 home countries (excluded: Czech Republic, Hungary, Iceland, Korea, Mexico, Poland and Turkey), 20 host countries (excluded: the same countries plus Switzerland).

e) Coefficients multiplied by 100.

Table A22. Bilateral services exports: Openness and infrastructure^a

	Trade openness ^b										Infrastructure ^b		
	TLS		OLS	TLS Partner	OLS	TLS		OLS	TLS		OLS		
	Country	Partner				Country	Partner		Country	Partner			
	A	B	C	D	E	F	G	H	I	J	K		
Total GDP	1.924 [11.40]**	1.677 [13.74]**	1.803 [46.71]**	1.623 [11.31]**	1.800 [46.17]**	1.999 [14.57]**	1.692 [18.21]**	1.88 [51.46]**	1.977 [15.08]**	1.691 [24.31]**	1.875 [50.16]**		
Size similarity	0.947 [9.57]**	0.694 [9.21]**	0.819 [17.78]**	0.659 [7.80]**	0.808 [17.35]**	0.981 [12.20]**	0.71 [9.57]**	0.909 [19.44]**	0.962 [12.64]**	0.704 [9.32]**	0.906 [19.84]**		
Factor dissimilarity	0.381 [1.34]	0.033 [0.30]	-0.381 [4.62]**	0.099 [0.92]	-0.363 [4.18]**	0.444 [1.60]	0.259 [2.78]**	0.19 [1.58]	0.385 [1.39]	0.196 [1.79]	0.129 [1.16]		
Human capital dissimilarity	-0.162 [0.27]	0.66 [1.15]	-1.237 [3.84]**	0.729 [1.25]	-1.218 [3.74]**	-0.152 [0.23]	0.571 [0.98]	-1.248 [4.13]**	-0.096 [0.15]	0.482 [0.87]	-1.182 [3.93]**		
Distance	-0.854 [7.13]**	-0.762 [7.48]**	-0.734 [15.49]**	-0.751 [7.43]**	-0.727 [14.58]**	-0.844 [7.44]**	-0.73 [6.84]**	-0.755 [17.67]**	-0.854 [7.26]**	-0.755 [8.06]**	-0.761 [16.75]**		
Free trade area	-0.044 [0.20]	0.001 [0.00]	0.06 [0.49]	-0.02 [0.07]	0.055 [0.45]				-0.034 [0.16]	-0.11 [0.41]	0.063 [0.59]		
FDI restrictions				-0.399 [3.03]**	-0.063 [0.90]		-0.139 [1.00]	-0.067 [0.96]		-0.209 [1.86]	-0.089 [1.30]		
Transport infrastructure ^c						0.355 [1.59]	0.381 [3.19]**	0.391 [7.78]**	0.314 [1.37]	0.399 [3.28]**	0.364 [7.56]**		
European Union						0.194 [0.83]	0.26 [0.74]	0.168 [1.53]					
NAFTA						-0.367 [1.21]	-0.508 [1.54]	-0.2 [0.65]					
Constant	-0.60 [4.92]**	-0.10 [0.99]	-23.00 [19.24]**	-0.11 [1.06]	-23.11 [18.92]**	-0.70 [4.65]**	-0.09 [1.31]	-28.27 [25.08]**	-0.69 [4.65]**	-0.11 [1.58]	-27.89 [23.33]**		
Observations	540	534	533	519	518	525	519	518	525	519	518		
R-squared	n.a.	n.a.	0.85	n.a.	0.85	n.a.	n.a.	0.87	n.a.	n.a.	0.87		

a) Absolute value of t-statistics in brackets.

* significant at 5% level; ** significant at 1% level; n.a. = not applicable.

b) All 20 exporter countries and all 27 importer countries.

c) Sum of the infrastructure indicators in country and partner. The indicators increase with the quality and quantity of infrastructure.

Table A23. **Bilateral services exports: All policies^{a,b}**

	Product market ^c			Wedge ^c			Employment protection legislation (EPL)			Tax wedge and EPL together ^d		
	TLS		OLS	TLS		OLS	TLS		OLS ^d	TLS		OLS
	Country	Partner		Country	Partner		Country ^c	Partner ^d		Country	Partner	
	A	B	C	D	E	F	G	H	I	J	K	L
Total GDP	1.914 [33.46]**	1.671 [35.60]**	1.857 [46.92]**	1.759 [29.53]**	1.614 [31.88]**	1.755 [41.58]**	1.569 [27.51]**	1.464 [27.22]**	1.594 [36.01]**	1.571 [27.54]**	1.467 [26.41]**	1.577 [35.02]**
Size similarity	0.977 [15.14]**	0.708 [13.13]**	0.912 [16.60]**	0.897 [13.31]**	0.676 [11.94]**	0.87 [15.71]**	0.803 [13.41]**	0.571 [9.97]**	0.772 [14.92]**	0.787 [13.08]**	0.569 [9.65]**	0.752 [14.10]**
Factor dissimilarity	0.372 [2.99]**	0.315 [2.76]**	0.145 [1.25]	0.26 [1.93]	0.193 [1.67]	0.05 [0.44]	0.137 [0.97]	0.198 [1.36]	0.31 [2.36]*	0.076 [0.52]	0.251 [1.41]	0.188 [1.19]
Human capital dissimilarity	-0.331 [1.03]	-0.725 [2.43]*	-1.056 [3.78]**	-0.788 [2.24]*	-0.852 [2.21]*	-1.471 [5.05]**	-0.415 [1.08]	0.31 [0.70]	-0.967 [2.86]**	-0.42 [1.07]	0.31 [0.69]	-1.038 [2.97]**
Distance	-0.874 [21.75]**	-0.654 [16.17]**	-0.793 [22.64]**	-0.928 [19.44]**	-0.806 [18.81]**	-0.958 [22.90]**	-0.895 [23.42]**	-0.795 [19.36]**	-0.916 [24.38]**	-0.912 [20.28]**	-0.794 [16.88]**	-0.947 [21.40]**
FDI restrictions		-0.132 [1.79]	-0.075 [1.09]									
Transport infrastructure ^e	0.262 [3.23]**	0.43 [7.16]**	0.343 [6.89]**	0.212 [2.39]*	0.365 [5.70]**	0.324 [6.21]**						
Regulation ^f	-0.359 [3.82]**	-0.184 [2.03]*	-0.292 [3.91]**	-0.258 [2.57]*	-0.241 [2.26]*	-0.244 [2.97]**	-0.236 [2.18]*	-0.258 [2.18]*	-0.235 [2.66]**	-0.181 [1.57]	-0.248 [2.08]*	-0.22 [2.46]*
<i>Country-specific variables</i>												
Labour tax wedge				-0.608 [3.83]**		-0.761 [5.09]**				-0.208 [0.93]		-0.22 [1.00]
Employment protection							-0.011 [4.85]**		-0.013 [5.88]**	-0.01 [3.16]**		-0.012 [3.62]**
With high-level corporatism							0.034 [4.34]**		0.028 [3.18]**	0.031 [3.61]**		0.027 [2.92]**
With mid-level corporatism							-0.011 [1.47]		-0.002 [0.22]	-0.013 [1.55]		-0.004 [0.50]
<i>Partner-specific variables</i>												
Labour tax wedge					-0.726 [4.70]**	-0.904 [6.05]**					0.041 [0.21]	-0.274 [1.46]
Employment protection								-0.022 [8.10]**	-0.018 [7.47]**		-0.022 [7.36]**	-0.016 [5.98]**
With high-level corporatism								0.01 [1.86]	0.003 [0.58]		0.006 [1.03]	0.006 [1.01]
With mid-level corporatism								-0.003 [0.32]	0.002 [0.20]		-0.004 [0.36]	-0.001 [0.10]
Constant	-0.66 [11.85]**	-0.08 [2.14]*	-28.10 [23.60]**	-0.63 [10.39]**	-0.06 [1.57]	-17.48 [10.18]**	-0.53 [11.02]**	0.09 [1.88]	-15.74 [12.09]**	-0.52 [10.87]**	0.11 [2.15]*	-13.28 [6.74]**
Observations	512	508	505	480	477	460	435	432	416	420	417	416
R-squared	0.79	0.77	0.87	0.79	0.76	0.88	0.79	0.76	0.88	0.8	0.77	0.88

a) Absolute value of t-statistics in brackets.

* significant at 5% level; ** significant at 1% level.

b) The random effects specification is rejected in these regressions.

c) All 20 exporter countries and 26 importer countries (excluded: Iceland).

d) All 20 exporter countries and 25 importer countries (excluded: Iceland and Mexico).

e) Sum of the infrastructure indicators in country and partner. The indicators increase with the quality and quantity of infrastructure.

f) Regulation is the sum of the logs of country and partner-specific indicators. The indicators summarise regulatory barriers to entry in 12 non-manufacturing industries and are increasing with the intensity of restrictions.

A2.3 Other computations

A2.3.1 Contributions

158. The empirical estimates were used to compute the “contributions” of the policy and non-policy-related variables to the overall variation in the dependent variables.

Foreign direct investment

159. The “TLS partner” specification was used to evaluate the contributions of all variables of interest to the deviation of bilateral inward FDI positions from the OECD average (Figure 21 in the main text). The transformed data set⁹⁵ was further collapsed in order to obtain average values for every variable and partner. For variables with bilateral dimension, these values are simple averages over investors and years,

$$\overline{\Delta_j Y_{ijt}} = \frac{1}{I} \sum_i \frac{1}{T} \sum_t \Delta_j Y_{ijt} \quad \text{and} \quad \overline{\Delta_j X_{ijt}} = \frac{1}{I} \sum_i \frac{1}{T} \sum_t \Delta_j X_{ijt}, \text{ for partner-specific variables (and dummies)}$$

these values are simple period averages, $\overline{\Delta_j P_{jt}} = \frac{1}{T} \sum_t \Delta_j P_{jt}$. Policy contributions are then computed as

the product of the value of the transformed variable and the corresponding estimated coefficients (\hat{b}_x, \hat{b}_p), to yield the following equivalence:

$$\overline{\Delta_j Y_{ijt}} = \sum_x \hat{b}_x \overline{\Delta_j X_{ijt}} + \sum_p \hat{b}_p \overline{\Delta_j P_{jt}} + l_j + l_{jt} + \overline{\Delta_j \hat{e}_{ijt}},$$

where l are the estimated partner-specific and partner-time-specific effects and $\overline{\Delta_j \hat{e}_{ijt}}$ are regression residuals.

Trade in goods and trade in services

160. The TLS country specification was used to compute the contributions of policy and non-policy-related variables to the deviation of countries’ bilateral goods and services exports from the OECD average (Figures 22 and 23 in the main text). The transformed data set⁹⁶ was further collapsed in order to obtain average values for every variable and country. For variables with bilateral dimension, these values are

$$\text{simple averages over importers and years, } \overline{\Delta_i Y_{ijt}} = \frac{1}{J} \sum_j \frac{1}{T} \sum_t \Delta_i Y_{ijt} \quad \text{and} \quad \overline{\Delta_i X_{ijt}} = \frac{1}{J} \sum_j \frac{1}{T} \sum_t \Delta_i X_{ijt},$$

for country-specific variables (and dummies) these values are simple period averages, $\overline{\Delta_i P_{it}} = \frac{1}{T} \sum_t \Delta_i P_{it}$.

95. The transformed variables are expressed as the deviations of their bilateral values from the averages taken over all host countries: $\Delta_j Z_{ijt} = Z_{ijt} - \frac{1}{J} \sum_j Z_{ijt}$ (see section 2.1, TLS partner).

96. The transformed variables are expressed as the deviations of their bilateral values from the averages taken over all exporters: $\Delta_i Z_{ijt} = Z_{ijt} - \frac{1}{I} \sum_i Z_{ijt}$ (see section 2.1, TLS country).

Policy contributions are then computed as the product of the value of the transformed variable and the corresponding estimated coefficients (\hat{b}_x, \hat{b}_p), to yield the following equivalence:

$$\overline{\Delta_i Y_{ijt}} = \sum_x \hat{b}_x \overline{\Delta_i X_{ijt}} + \sum_p \hat{b}_p \overline{\Delta_i P_{it}} + l_i + l_{it} + \overline{\Delta_i \hat{e}_{ijt}},$$

where l are the estimated country-specific and country-time-specific effects and $\overline{\Delta_i \hat{e}_{ijt}}$ are regression residuals.

A2.3.2 Simulations

161. The purpose of the simulation exercise is to assess the change in bilateral FDI or exports prompted by changes in policies, using the estimated regression coefficients of the relevant policy indicators.

Foreign direct investment

162. Bilateral outward FDI positions and flows are expressed in the following log-linear specification:

$$\begin{aligned} \ln Y_{ijt} = & \sum_x \beta_x X_{ijt} + \sum_c \beta_c C_{it} + \sum_p \beta_p P_{jt} \\ & + \alpha_i + \alpha_j + \alpha_t + \alpha_{it} + \alpha_{ij} + \alpha_{jt} + u_{ijt} \end{aligned}$$

where symbols should be interpreted as in the “General” equation above.

163. Discrete changes of Y_{ij} from its baseline level Y_{ij0} can be expressed as:

$$\Delta Y_{ij} = \exp\left(\ln \frac{Y_{ij1}}{Y_{ij0}}\right) * Y_{ij0} - Y_{ij0} \quad (4)$$

and, *ceteris paribus*, changes in any policy indicator Z ($Z \in X, C$ or P) imply $\Delta \ln Y_{ij} = \beta_z * \Delta Z$. Therefore:

$$\Delta Y_{ij} = \exp(\beta_z * \Delta Z) * Y_{ij0} - Y_{ij0} \quad (5)$$

The change in total inward FDI of country j implied by this policy change is then computed as the sum over all investors i of bilateral changes in FDI.

Trade in goods and services

164. Bilateral exports of goods and services are expressed in the following log-log specification:

$$\begin{aligned} \ln Y_{ijt} = & \sum_x \beta_x \ln X_{ijt} + \sum_c \beta_c \ln C_{it} + \sum_p \beta_p \ln P_{jt} \\ & + \alpha_i + \alpha_j + \alpha_t + \alpha_{it} + \alpha_{ij} + \alpha_{jt} + u_{ijt} \end{aligned}$$

Ceteris paribus, the growth in exports implied by the (percentage) change in policy Z is:

$$\Delta \ln Y_{ijt} = \beta_z * \Delta \ln Z \quad (6)$$

The percentage change in policy Z from its baseline level Z_0 can be approximated as follows:

$$\Delta \ln Z \approx \frac{\Delta Z}{Z_0} = \frac{Z_1 - Z_0}{Z_0} \quad (7)$$

Substituting (7) into (6) and the resulting expression into (4) yields the following change in trade expected from change in the policy Z :

$$\Delta Y_{ij} = \exp\left(\beta_c \frac{\Delta Z}{Z_0}\right) Y_{ij0} - Y_{ij0} \quad (8)$$

The change in total exports in country i implied by this change in policy is then the sum of bilateral export changes over all importers j .

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