The Benefits of Liberalising Product Markets and Reducing Barriers to International Trade and Investment in the OECD

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THE BENEFITS OF LIBERALISING PRODUCT MARKETS AND REDUCING BARRIERS TO INTERNATIONAL TRADE AND INVESTMENT IN THE OECD

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ABSTRACT/RÉSUMÉ

The Benefits of Liberalising Product Markets and Reducing Barriers to International Trade and Investment in the OECD

This paper provides an assessment of the impact of a package of structural reforms in all OECD countries on their long-run trade and output gains. The package includes reforms that reduce competition-restraining regulations, cut tariff barriers and ease restrictions on foreign direct investment to "best practice" levels in the OECD area. The analysis, which is based on earlier OECD studies, indicates that such reforms could lead to gains in GDP per capita in OECD countries of up to 4 to 5 per cent. As the analysis is confined to a relatively narrow set of policies and abstracts from potential dynamic effects from reform-induced increases in innovation, the overall gains from broad reforms could be significantly higher than reported in the paper.

JEL : F13, F21, K2, O4

Key Words : international trade, foreign direct investment, regulation, growth and productivity

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Les bénéfices de la libéralisation des marchés de produits et de la réduction des barrières aux échanges et aux investissements internationaux dans les pays de l'OCDE

Ce document offre une évaluation des réformes globales structurelles dans tous les pays de l'OCDE sur les échanges et la croissance de long terme. Ces réformes incluent l'ensemble des mesures politiques visant la réduction de la réglementation anti-compétitive, la baisse des barrières tarifaires et des restrictions sur les investissements directs étrangers vers les «meilleures pratiques» observées au sein des pays de l'OCDE. L'analyse, qui s'appuie sur de précédents travaux de l'OCDE, montre que de telles réformes peuvent conduire à une augmentation du PIB par habitant entre 4 et 5 pour cent dans les pays de l'OCDE. Étant donné que l'analyse ne couvre qu'un nombre de mesures spécifiques et exclut les effets dynamiques potentiels de l'innovation, les bénéfices tirés d'un ensemble de réformes beaucoup plus large pourraient bien être plus élevés que ceux reportés dans ce document.

*JEL:*F13, F21, K2, O4

Mots clés: commerce international, investissement direct étranger, réglementation, croissance et productivité

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EDITORIAL

This study quantifies the macroeconomic benefits that would arise from significant reductions of the barriers that still inhibit product market entry, foreign direct investment and trade in all OECD countries. It follows upon a study released last June that examined the gains for the OECD countries of reforms limited to the United States and members of the European Union.

Paradoxically, this work is very topical. At a time when some OECD member countries may be losing momentum in their drive to open product and services markets, the study shows that the economic rationale for such liberalisation remains very strong. Room for progress is indeed still large in the area of product market reforms in many countries, especially in Europe, and so are the rewards to be reaped in terms of higher living standards. As past OECD research strongly suggests, more open product markets translate ultimately into higher productivity growth. Such a boost would be welcome in a context where over the past fifteen years economic performance has been relatively poor in some European countries, as well as in a few other member countries.

Moving from these sorts of general analytical conclusions to a more concrete, policy-focused exercise was an interesting challenge for the OECD Economics and Trade departments. Here we tried precisely to quantify the gains that could be achieved by deepening liberalisation efforts throughout the OECD area, incorporating the positive spillovers that would accrue for trading-partner countries.

The approach is to identify across the OECD the countries which have, in one sector or another, the regulatory framework most supportive of good economic performance and evaluate what economic benefits would materialise if other countries aligned their own framework on "best practice".

The barriers that are relaxed comprise:

- Competition-restraining product market regulation, including barriers associated with state control of companies and state involvement in business operations in the form of *e.g.* administrative barriers to start-ups, administrative opacity and barriers to competition.

- Obstacles to foreign direct investment, including restrictions on foreign ownership, and notification and licensing requirements for non-residents.

- Tariffs, including for agriculture.

In all these areas, over the past few years, the OECD has constructed a large number of structural policy indicators that are comparable across countries. These structural indicators have been used in empirical analysis to determine the effects of barriers and related policies on employment and growth. We were thus able to draw on this empirical evidence to quantify the effects of eliminating those barriers in all OECD countries.

It should be noted, however, that the scope of liberalisation illustrated in this exercise focused only on barriers that inhibited economic performance but not those like environmental or safety regulations aimed at non-economic objectives. The study also left aside most non-tariff interventions in agriculture, all the

labour market and financial market regulations, and the distortions induced by welfare systems. It thus quantifies the consequences of a set of regulatory reforms that is deep but not very broad in scope.

The benefits to be expected from such a liberalisation exercise are nonetheless substantial. On average, reducing barriers to trade, investment and competition could increase the level of GDP per head over the medium term by some 3 per cent in each of the main OECD regions. For the OECD as a whole, GDP per capita would increase by 2 to 5 per cent.

An important lesson of this work is that product market deregulation rather than tariff lowering would provide the main source of economic gains, especially for Europe. This finding should not come as a surprise, however, knowing that tariff barriers are now rather small while domestic product market regulations often remain substantial, especially so in the services sector.

The estimated output gains are substantial but they may seem too modest to some observers. In fact, our estimates of the gains of liberalisation are very prudent. In this exercise, we have only assessed the "one-shot" or "static" gains stemming from greater international trade specialisation and better allocation of resources. But many would argue that liberalisation produces "dynamic" gains, that is more open product markets stimulate research, innovation and technical progress on a sustained basis. Empirical research indeed suggests that these gains could be quite large although their estimated magnitude is still surrounded by substantial margins of uncertainty.

I would conclude by noting that it may look surprising to model the outcome of a joint liberalisation in all OECD countries, knowing that in any case unilateral liberalisation is already beneficial. There are nonetheless good reasons to consider such a joint approach. In a world where mercantilistic attitudes are still important, reciprocity matters: the gains from liberalisation are easier to visualise when exports are increasing than when purchasing power at home is rising. And there will be spillovers. The more countries participate in liberalisation, the higher the collective gains.

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THE BENEFITS OF LIBERALISING PRODUCT MARKETS AND REDUCING BARRIERS TO INTERNATIONAL TRADE AND INVESTMENT IN THE OECD

1. Introduction and summary of key results

1. Improving the functioning of product markets could play a key role in raising living standards in the OECD area. This paper provides an assessment of the potential long-run trade and output gains accruing to OECD countries from a package of structural reforms in all member countries that enhances product market competition, reduces broad tariff barriers, and eases restrictions on foreign direct investment (FDI). It follows upon an earlier paper that analysed the impact of such reforms in the United States and member countries of the European Union (OECD, 2005).

2. The specific features of the reform package considered in the paper are inferred from OECD estimates of the gaps in the first half of this decade between structural policy settings in individual OECD member countries and measures of what are considered to be "best-practice" policies across all OECD countries. The analysis of the impact of reforms on trade and output is based on earlier regression results obtained by the OECD in its work on the determinants of economic growth and on the drivers of trade and FDI, supplemented by general equilibrium analysis using the Global Trade Analysis Project (GTAP). Throughout the analysis reported in the paper, it is assumed that the reductions in the external barriers to trade and investment in the OECD area apply globally. Hence, the estimated benefits of reform are spread through the rest of the world. The analysis excludes any policy changes in the non-OECD area: the gains from reforms for OECD and non-OECD countries alike would be amplified if both areas were to implement reforms, *e.g.* in the context of the current WTO trade round.

3. At the level of the OECD area as a whole, the study estimates that GDP-per-capita levels could increase by around 2 to 5%, depending on the analytical approach used to estimate the gains. This increase in GDP per capita is equivalent to the expansion that would be expected over one to two years when OECD economies are growing at around their potential growth paths. These gains may seem modest, but it should be noted that they are permanent. Once adjustments to the reforms are complete, individuals would be able to reap the gains each year thereafter. For example, over an average 40-year working life of an individual, the cumulated addition to earnings would be between one to two full-year's earnings. The key results with respect to broad reform areas are:

- Product market reforms that stimulate competition would provide the largest part of the overall gains in GDP per capita in all OECD countries. Countries would benefit from relaxing competition-restraining regulations at home and from similar reforms in trading-partner countries. Aligning the stance of domestic regulations on that in the least restraining country could lead to an increase in GDP per capita of 1¾ to 3 per cent in the OECD area, with the biggest gains in countries with the highest regulatory barriers to competition.

- The lowering of barriers to foreign direct investment to best practice levels could raise GDP per capita by 3/4 per cent in the OECD area.

- Cuts in tariff rates would give a boost to output, even if tariff rates are already relatively low in most OECD countries, increasing GDP per capita in the OECD area by ¼ to one per cent. Such

measures would tend to be more effective in countries outside Europe, given that intra-European trade is already exempted from tariffs due to the customs union.

4.   The size of these gains should be seen in the context of the scope of the policy reforms considered and the techniques used to assess the benefits. The reforms are quite deep with respect to competition-restraining regulations in product markets, FDI restrictions and external tariff barriers. Indeed, movement to "best practice" in individual policy areas implies a more liberal overall policy stance than seen in any OECD country at present. However, such liberalisation efforts are not unprecedented in the OECD, and should be seen as a continuation of past trends rather than a radical shift. For example, for the United States and some members of the European Union, the reform intensities implied are only moderately larger than those seen over the 1998-2003 period. Moreover, the reform package is relatively narrow as it excludes reforms to labour markets, financial markets, certain forms of non-tariff barriers, agricultural support and taxation, all of which could strengthen economic integration and performance.[1] And reforms are likely to set in motion dynamic growth effects, for example through increased innovative efforts, which have not been considered in calculating the benefits.

5.   It is important to note that the reforms considered in the analysis concern reform of competition-restraining regulations only. Regulations that may serve important and legitimate social objectives, such as those governing health and safety standards and the environment, are not included in the measures of the regulatory stances, nor envisaged as areas in need of reform. It is also important to keep in mind that the policy settings that serve as a basis for the analysis refer to the situation as it was a few years ago and therefore have been overtaken by policy action since then in some countries. In these cases, the scope for additional reforms is smaller than assumed in this paper and hence the gains are correspondingly lower.

6.   The remainder of the paper is structured as follows. Section 2 briefly documents the current extent of economic integration in OECD countries. In Section 3, structural policy settings in OECD countries are discussed. The distance between these settings and best-practice policy settings in the OECD are used to calibrate country-specific reform packages in Section 4. The potential impact of such reforms on output and trade in OECD economies is analysed in Section 5. In Section 6, conclusions are offered, while an annex provides more detailed results of the impact of the reform packages.

2.   Economic integration in the OECD

7.   The salient features of the extent of economic integration of OECD countries in general are as follows:

- International trade has risen (relative to GDP) across the OECD over the past two decades (Figure 2.1). However, the composition of trade has remained strongly imbalanced and tilted towards goods. Trade in services comprises only around a third of total trade flows, despite services accounting for around two-thirds or more of GDP in the OECD area.[2] Relative to value

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1.   For example, within Europe, some studies suggest that business compliance costs could be significantly reduced if tax and accounting systems were better co-ordinated (European Commission 2001 and 2004). More generally, tax systems may have significant impacts on innovation activities, but their overall impact appears comparatively small relative to the stance of anti-competitive product market regulation (Jaumotte and Pain 2005).

2.   In part, the lower trade intensity of services reflects that data on services do not cover all traded service activities. In particular, the exchanges 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) are excluded from balance-of-payments statistics. These omissions, however, are small relative to the gap between goods and services trade intensities (Nicoletti *et al.* 2003). More importantly, trade in services may be lower than for goods because of higher transport costs. For example, many personal services are

added in the respective sectors (Figure 2.2), trade in services is less than one-tenth of that of goods.

- International investment (relative to GDP) has also markedly increased over the past two decades (Figure 2.1). In practice, most of the increasing FDI activity appears to have been largely driven by ownership changes in existing enterprises (for example, via mergers and acquisitions and privatisations), rather than so-called "green-field" investment (OECD, 2002). In contrast to the sectoral pattern of trade flows, FDI is more extensive in the service sector than in the goods-producing sector (Figure 2.3).

- The activity of foreign affiliates in host countries has risen as the counterpart of FDI trends. Nonetheless, the presence of foreign affiliates in employment in the manufacturing and service sectors in OECD countries is generally quite limited (Figure 2.4).

8.   The broad increase in trade, FDI and foreign-affiliated activity in OECD economies over the past two decades points to stronger economic interdependence. This process has no doubt been assisted by successive multilateral trade and investment accords that have reduced many formal barriers to trade and FDI. However, national borders still remain barriers to enhanced integration.[3] These barriers may reflect both explicit border barriers and domestic structural policy settings that curb competition and indirectly reduce or distort the scope of international trade and investment (Box 1).

Box 1. Barriers to economic integration

    Traditional tariff and non-tariff barriers, and regulations that restrict foreign ownership of domestic assets and grant complete or near monopoly status to state-owned enterprises, can be expected directly to reduce economic integration across countries. In addition, domestic regulations that do not in principle discriminate between local and foreign firms may still distort cross-border integration by affecting the relative prices of different products, or the relative rates of return expected from investing in different locations. For example, differences in domestic regulation may affect relative production costs and the competitiveness of exporters in foreign markets. Moreover, a jointly negative influence on bilateral trade might be expected from 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 exporting and importing 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. Evidence of a negative correlation between anti-competitive service regulation and the intensity of service trade is provided in Golub (2003). In short, a quantification of both domestic and outward-focused regulation across countries is required to assess potential barriers to economic integration.

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not traded between regions within a country, let alone national borders. However, some of the most dynamic service sectors over the past two decades, such as communications, financial intermediation and business services, have lower transportation costs. Moreover, these costs are falling as information and communication technologies (ICT) spread and open up the possibility of trade in services that were traditionally non-tradeable, such as retail distribution (see, for instance, the articles in OECD, 2001).

3.   For example, see McCallum (1995) and Anderson and van Wincoop (2001).

Figure 2.1. **Development in trade and FDI relative to GDP in the OECD** [1]
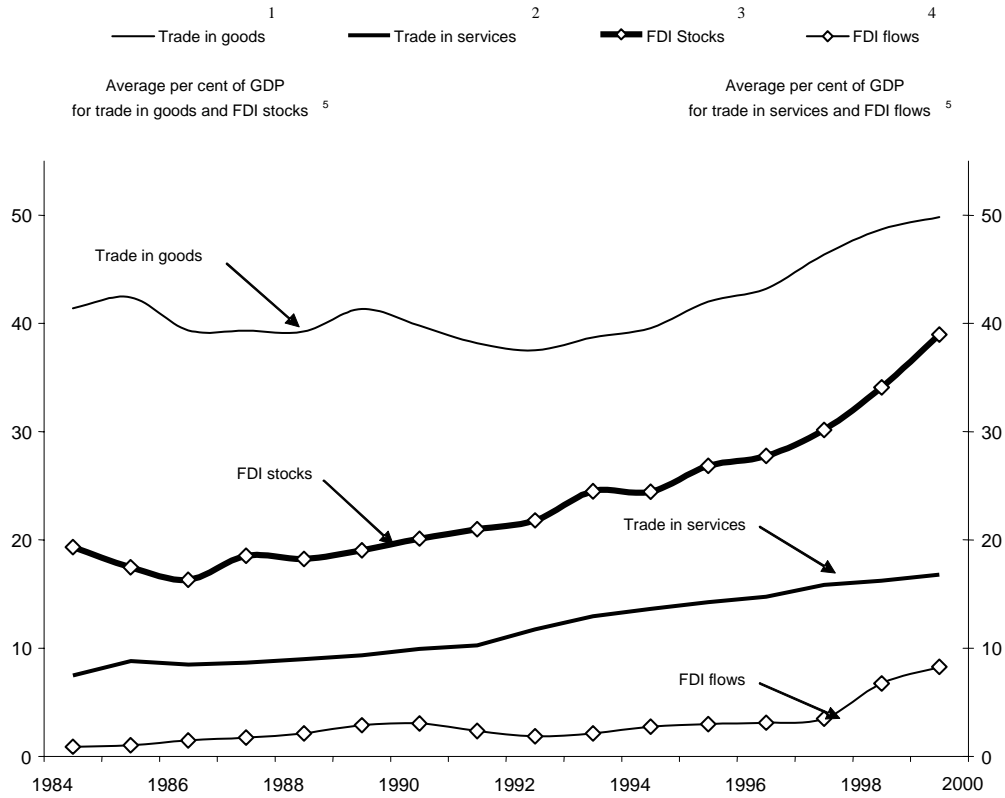
1. Trade in goods is defined as the sum of exports and imports of goods realised between a reporting country and the OECD area.
2. Trade in services is defined as the sum of exports and imports of services realised between a reporting country and the world (due to the lack of OECD-specific data, services 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.

Figure 2.2. Trade in goods and services 2001

% of respective value added
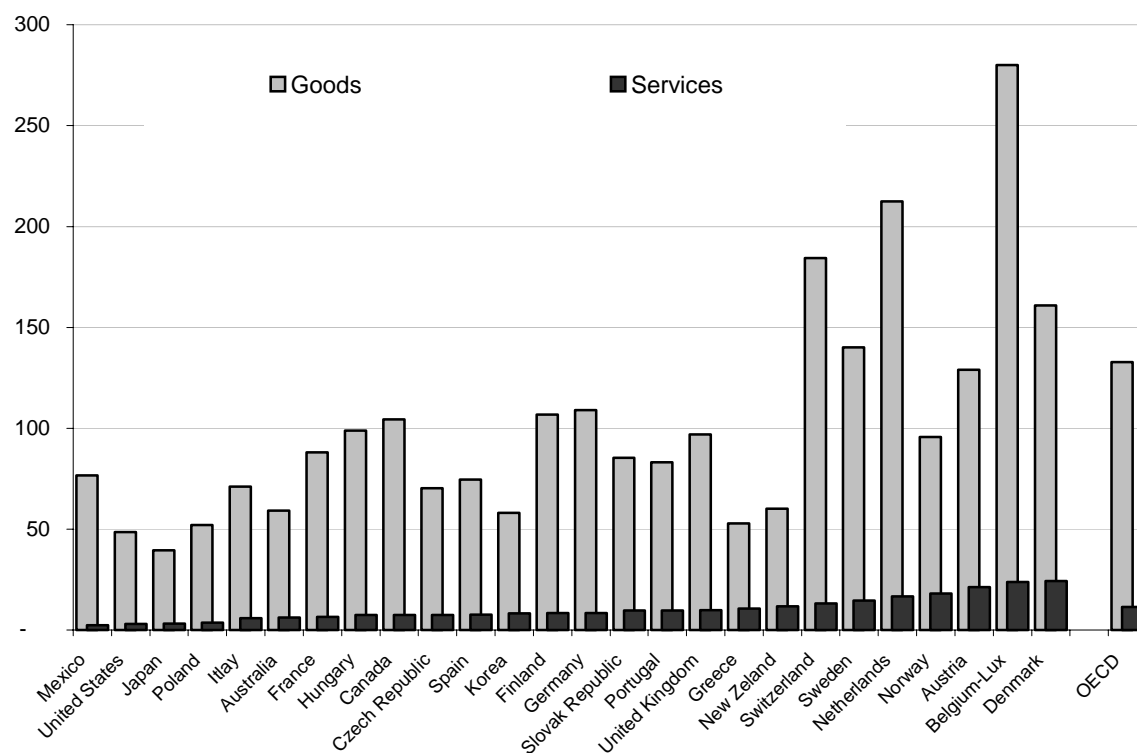
Average of exports and imports of goods and services as percent of value added in respective sectors.

Source : IMF, Balance of Payments - Trade, December 2004. OECD, STAN Database, December 2004.

Figure 2.3. FDI stocks by sectors 2001

% of GDP
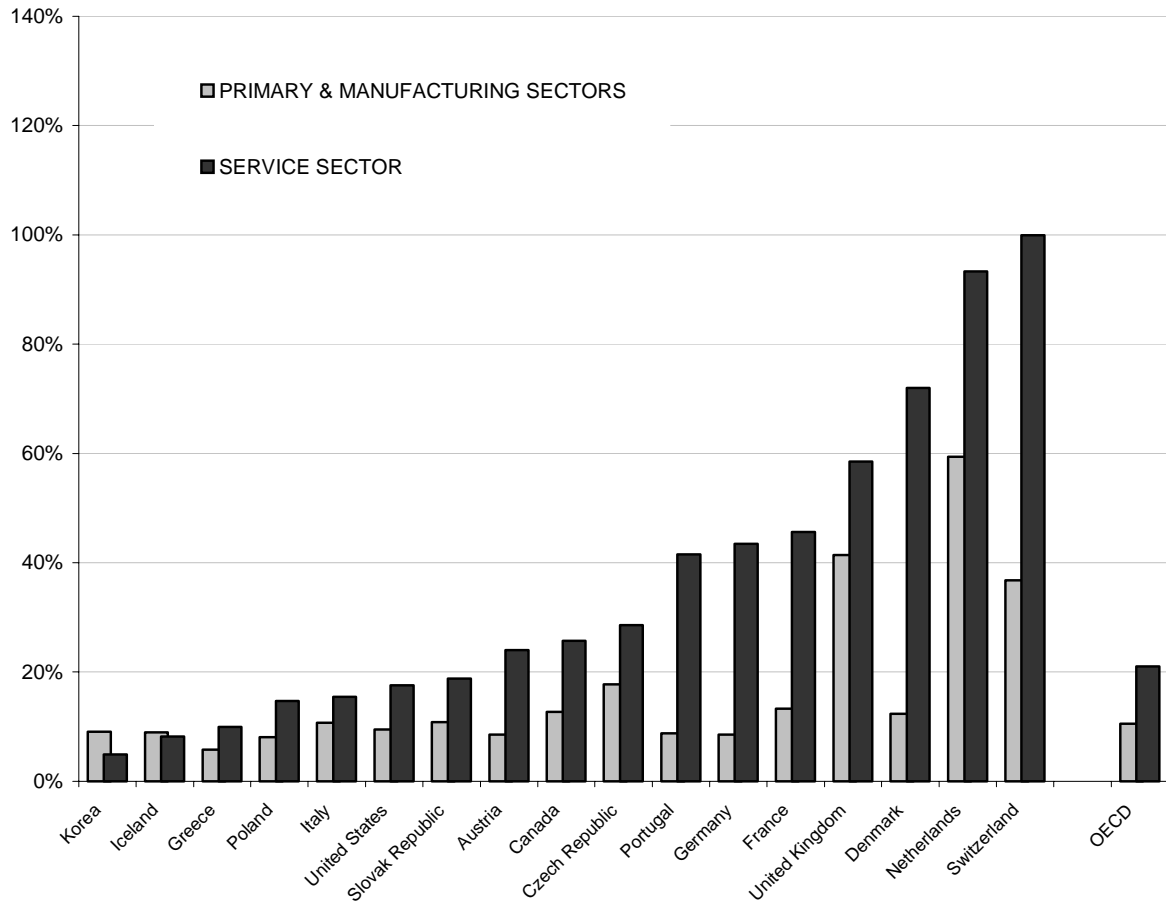
1. FDI stocks is the sum of inward and outward positions as per cent of GDP.

Source: OECD, FDI database (2005).

Figure 2.4. Employment in foreign affiliates in selected OECD countries

per cent of business sector employment[1], 1990s
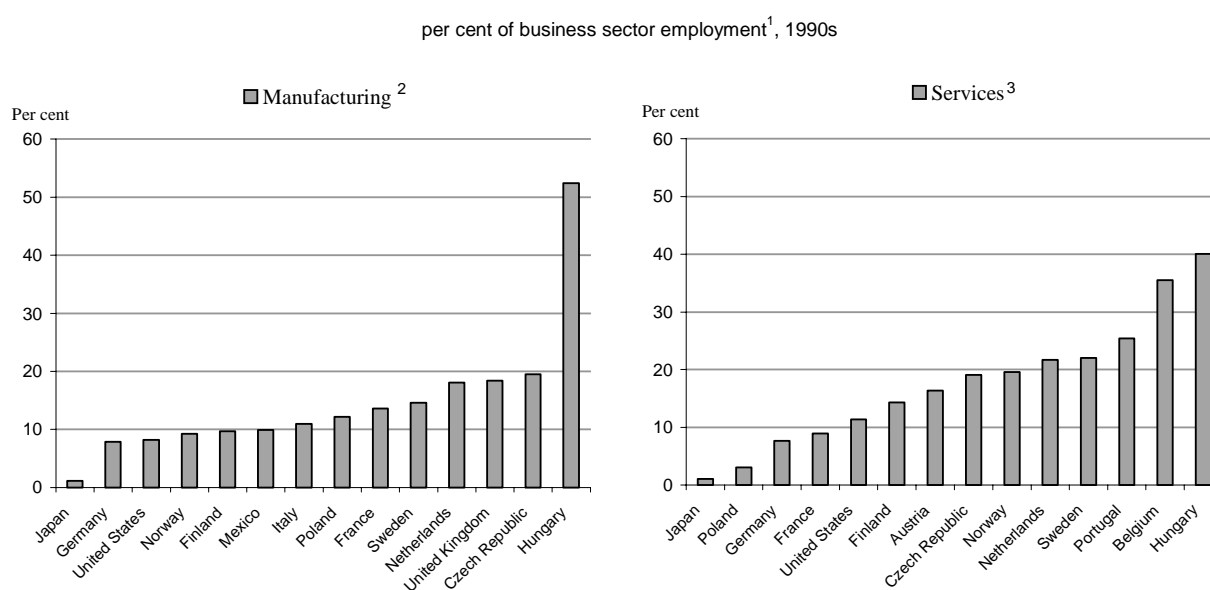
1. Activities of foreign affiliates are classified into industries according to the principal activity of the affiliate. Data are means over available years.
   The country coverage in manufacturing and services is different.
2. Employment of foreign affiliates in manufacturing is an aggregate corresponding to Total Manufacturing (ISIC rev.3).
3. Employment of foreign affiliates in services is an aggregate corresponding to Total Services (ISIC rev.3).

Source: OECD.

3.   Structural policies in the OECD

9.   This section presents indicators of product market regulations, and barriers to foreign trade and investment, across all OECD countries in order to gauge the relative levels of regulation between individual countries.

3.1   *Overall and domestic product market restrictions*

10.   Recent work in the OECD has codified a comprehensive range of regulatory barriers to competition into indicators of the overall stance of product market regulation (PMR) as at the end of 2003, updating a comparable set of indicators of regulation in 1998. [4] The overall indicators of PMR for OECD countries in 2003 are shown in Figure 3.1, along with indicators of the regulatory burdens imposed by inward-oriented policies only. High PMR scores indicate that a country has a relatively restrictive set of product market regulations, while low PMR scores suggest that the regulatory environment is more conducive to competition. Importantly, low scores do not necessarily indicate that there is less regulation in the economy overall. For example, regulations that serve important and legitimate social objectives, such as those covering health and safety standards and the environment, are not included in the measures.

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4.   The PMR indicators are based on a broad survey of economy-wide and industry-specific structural policy settings. The standard methodology developed for all countries to summarise the broad information set involved in constructing the PMR indicators was first described in Nicoletti *et al.* (1999). The update of the indicators to take into account regulation at the end of 2003 is discussed in Conway *et al.* (2005) and is comparable to indicators of regulation in 1998. In general, the cross-country outcomes of the PMR indicators are largely in line with more 'subjective' surveys of regulation and the business environment (Nicoletti and Pryor, 2005).

11.   Based on the overall and inward-oriented regulation indicators for 2003, three groups of countries can be identified:

- Relatively low regulatory barriers to competition are found in most English-speaking countries and some Nordic countries.

- Relatively high barriers characterise lower-income member countries (Mexico, Turkey), Central and Eastern European countries (Poland, Hungary, Czech Republic) and Southern European countries.[5]

- Intermediate regulatory constraints are recorded in other European countries and in Asian member countries.

12.   A decomposition of inward-oriented regulations into those arising from restraints to competition due to state control and those from barriers to entrepreneurship is shown in Figure 3.2. Restraints due to state control are noticeably higher in most heavily regulated countries and are driven by higher levels of public ownership (*i.e.* state or local government is represented in a broader range of market activities and own a larger fraction of the business sector) and greater state involvement in business operations (*i.e.* greater use of command and control regulations, such as regulations of shop opening hours, and universal service requirements on air and rail networks).[6] Cross-country differences in barriers to entrepreneurship are less marked.

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5.   Reforms since 2003 have lowered competition barriers in some of these countries.

6.   Note that higher levels of state ownership in certain sectors of the economy might in itself constitute a barrier to foreign investment flows to the extent the State has effective equity controlling stakes. This is an issue, for example, in the electricity and telecommunications sectors in several European countries.

Figure 3.1. Product market regulation indicators in the OECD, 2003[1]
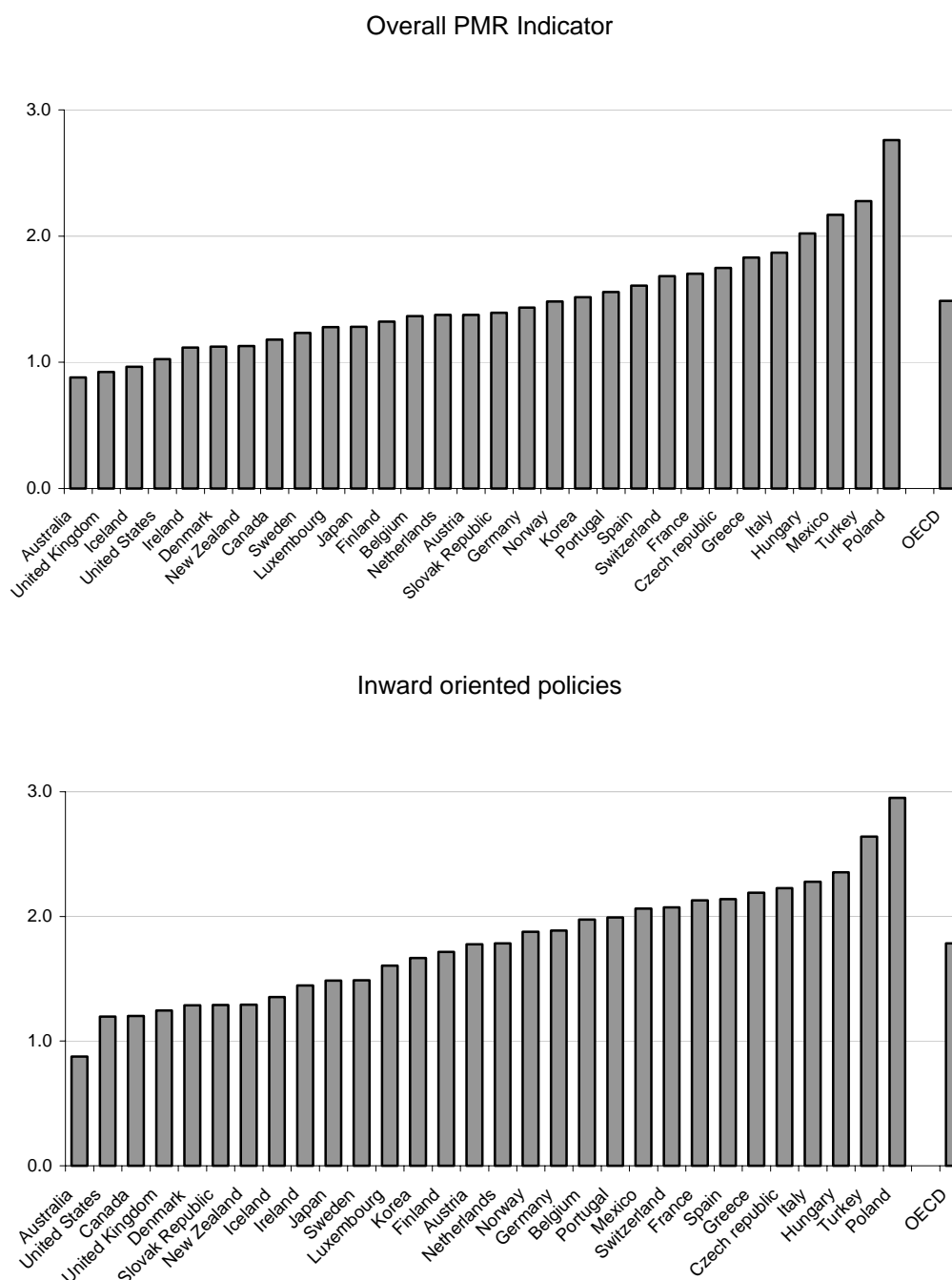
Overall PMR Indicator

Inward oriented policies

1. The indicators range from 0 (least restrictive) to 6 (most restrictive).
Note: OECD (simple average).
Source : OECD, Conway *et al.* (2005).

Figure 3.2. Indicators of state control and barriers to entrepreneurship in the OECD, 2003[1]
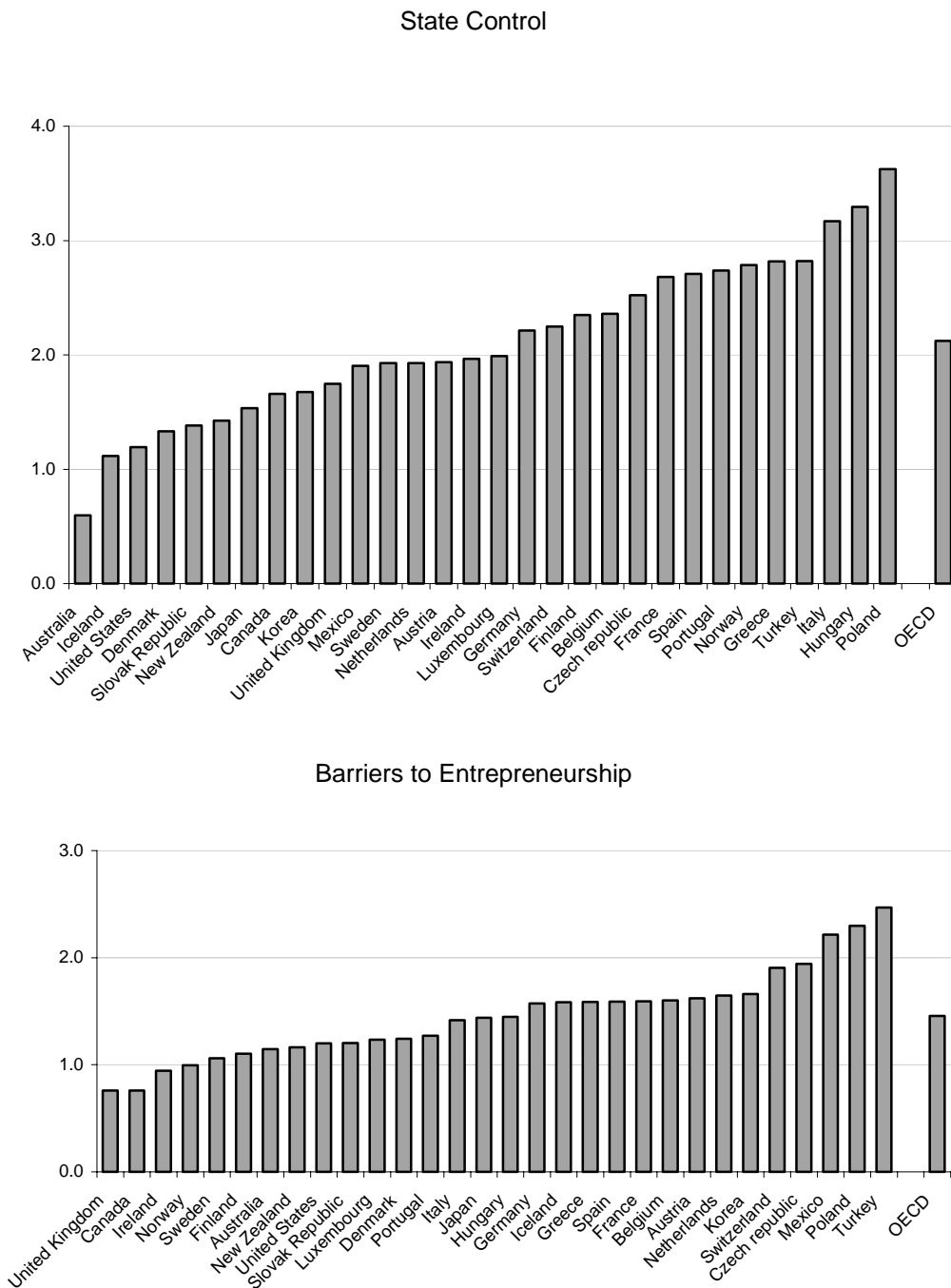
State Control

Barriers to Entrepreneurship

1. The indicators range from 0 (least restrictive) to 6 (most restrictive).
Note: OECD (simple average).
Source : OECD, Conway *et al.* (2005).

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3.2   Overall FDI restrictions

13.   Barriers to FDI can arise in several guises. The most obvious are foreign ownership barriers, which typically take the form of limiting controlling equity stakes by non-residents in domestic companies. Examples of these barriers include airlines in some member countries of the European Union and in North America, telecommunications in Japan and shipping in the United States. Obligatory screening and approval procedures may also constrain FDI to the extent that they raise entry costs, although the impact of such procedures on FDI flows may be quite limited in practice. Other formal constraints on FDI include restrictions on the ability of foreign nationals to work in affiliates and regulations that nationals or residents must form a majority of the board of directors (for example, in insurance companies of some EU-member countries, in financial services in Canada and in transportation industries in Japan). In addition, FDI flows may be hampered by informal barriers such as opaque application of regulatory procedures.

14.   Indicators of FDI restrictions that take into account these barriers suggest that, at the aggregate level, FDI barriers tended to be relatively low in most European countries and the United States at the turn of the century (Figure 3.3). The low restrictions recorded for the European Union members, however, reflected largely the absence of barriers to intra-EU FDI and, only to a lesser extent, openness *vis-à-vis* non-EU countries. The United Kingdom had the lowest FDI barriers in the European Union and in the OECD area, owing to a particularly permissive regime on foreign ownership of domestic asset. Outside the European Union, FDI restrictions were noticeably higher in Japan, Korea and Australia than the OECD average, while the highest restrictions were recorded in Iceland, Turkey, Canada and Mexico.[7]

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7.   Reforms in some of these countries, *e.g.* Turkey, have reduced overall FDI restrictions since the turn of the century.

Figure 3.3. OECD indicators of FDI restrictions, 2001
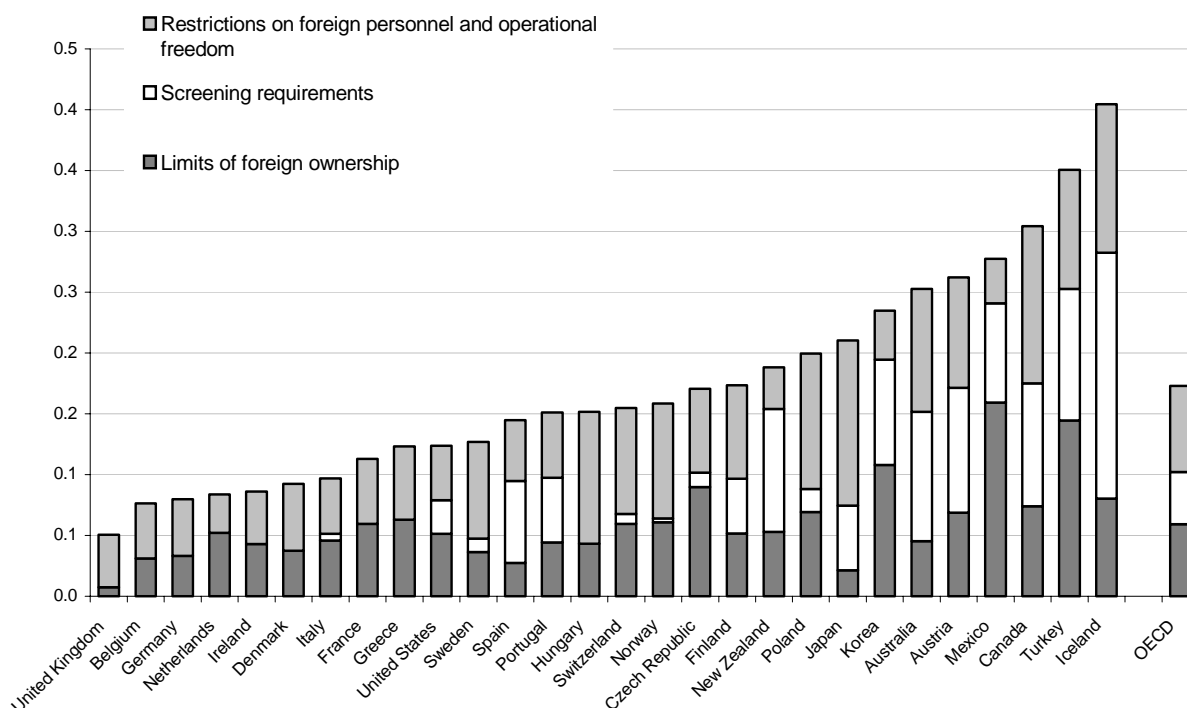
1. The indicators range from 0 (least restrictive) to 1 (most restrictive).
Note: OECD (simple average).
Source : OECD, Golub (2003).

3.3   *Overall tariff and non-tariff barriers*

15.   Figure 3.4 provides a snapshot of recent overall tariff levels in OECD countries based on a simple average of most-favoured-nation (MFN) tariff rates in 2003.[8] It shows that average tariff barriers in the OECD are relatively low, mostly reflecting the decline of tariff rates driven by past successive rounds of multilateral trade liberalisation and regional free trade agreements. However, a few OECD countries (Mexico, Poland, Korea, Turkey and Hungary) still had relatively high tariff protection in 2003.

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8.   The simulation analysis reported below is based on bilateral applied tariff rates and not on MFN tariff rates.

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Figure 3.4. Average most-favoured-nation tariff levels in the EU, US and other OECD countries, 2003

per cent
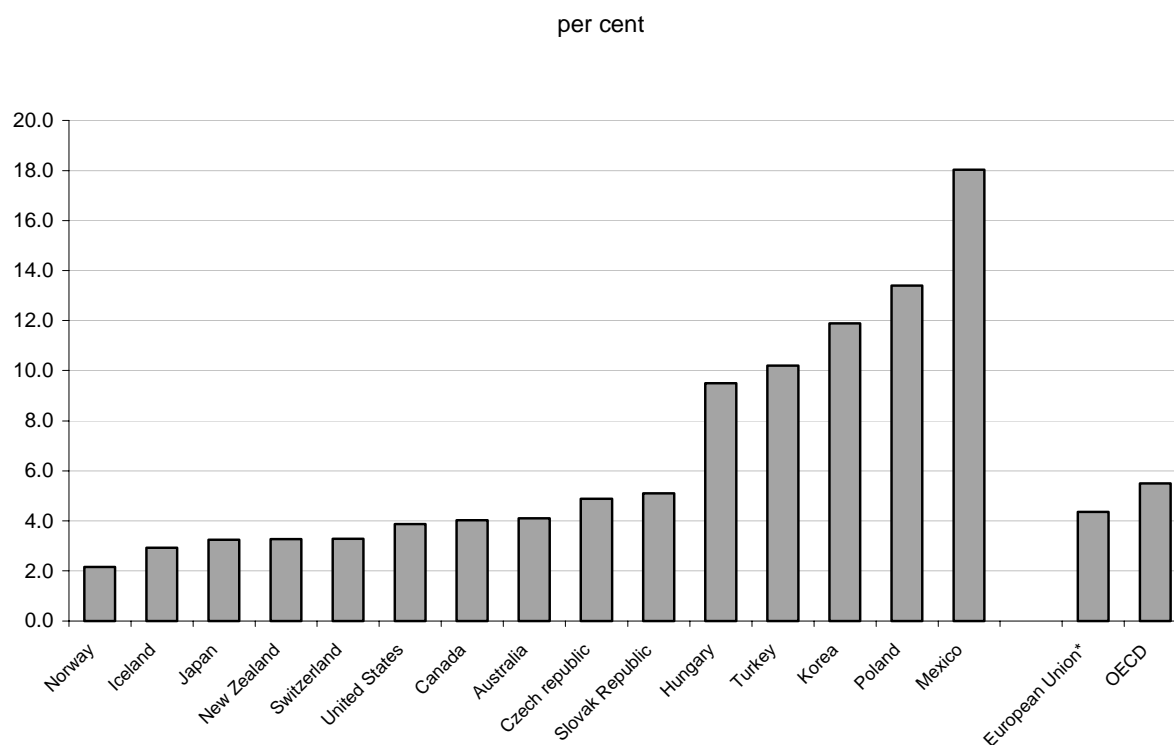
Note: EU I5.
Source: OECD.

16.   In a similar vein to FDI restrictions, non-tariff trade measures (NTMs) come in many guises. "Traditional" non-tariff border measures, including quantitative and price control measures, have been largely eliminated in successive rounds of multilateral trade negotiations. Non-tariff behind-the-border measures are domestically imposed regulations applied to achieve certain policy objectives. Some of these measures are increasingly recognised as relatively more trade restricting than remaining traditional non-tariff measures (see Box 2 for further discussion). For methodological and data availability reasons, accurate quantifications of both border and behind-the-border NTMs are still unreliable today, and are excluded from the analysis. However, to a significant extent, behind-the-border NTMs are captured by indicators of anti-competitive product market regulations, as discussed above.

Box 2. Barriers to trade from non-tariff measures

Traditionally, non-tariff measures (NTMs) were associated with a restricted number of barriers enforced at the border. Recent years have seen significant changes in the landscape of NTMs, encompassing both border and behind-the-border measures.

Non-tariff *border* measures

NTMs in the form of quantitative controls (*e.g.* quotas and voluntary export restraints) were mostly abolished at the time of the implementation of the Uruguay Round trade agreement. Within the OECD area, price control NTMs mainly consist of trade remedies. Although these trade remedies are meant to be distortion-correcting rather than distortion-creating, at times NTMs may instead divert trade and protect local producers. Other remaining border NTMs are generally applied to protect morals, public health and security. In addition, in some cases customs procedures and rules of origin applied by some OECD member countries are perceived as unnecessarily trade restrictive.

Non-tariff *behind-the-border* measures

Frequent objections concerning behind-the-border measures encompass heterogeneity in broad regulatory measures, government procurement procedures, subsidies and other aids for production, domestic tax measures, competition policy, intellectual property rights, investment-related measures, and, to a lesser extent, state trading entities. Regulatory measures include national environmental, safety, health and administrative regulations, standards and technical regulations for industrial products as well as sanitary and phytosanitary measures (SPS).

While many of the measures (*e.g.* technical barriers to trade, SPS) are *de facto* applied at the border and thus perceived as border NTMs, they are directly linked with the domestic policies applicable to both domestic and imported goods. Countries have the legitimate right to adopt measures they deem appropriate as long as they do not discriminate between domestic and foreign producers and conform to WTO rules. Concerns in this area comprise non-transparency; burdensome and costly testing, certification and inspections procedures; packaging and labelling requirements; and adoption of measures exceeding international recommendations.

For many of these NTMs, it is difficult to determine their degree of trade restrictiveness. However, policy makers can help prevent non-tariff trade measures from becoming non-tariff trade barriers by ensuring that NTMs are non-discriminatory, transparent, and applied with efficient administrative procedures.

3.4   *Regulations and border barriers at the sectoral level*

17.   The barriers to international integration discussed above tend to be relatively concentrated in certain sectors of the economy. In particular, barriers in the manufacturing sector tend to be relatively low across the OECD, while barriers in the services and agricultural sectors are relatively high. This would suggest that the aggregate gains from liberalisation discussed in Section 5 would to a significant extent flow from increased exposure to competition in certain services sectors.

18.   Table 3.1 reports indicators of regulations in seven non-manufacturing sectors (*e.g.* electricity, gas, telecommunications, postal services, airlines, rails and road transportations) measuring levels in public ownership (*e.g.* share of equity owned by central government) and entry barriers (*e.g.* legal limitations on the number of operating companies). Regulations appear most extensive in rail transportation, gas supply and postal services, with the highest levels of regulations in these sectors being observed in the countries characterised by the strictest overall regulatory stance (except Ireland and Finland). While road freight and telecom sectors are subject to relatively light regulation in the OECD area as a whole, this is not the case in all countries: road transportation is heavily regulated in Greece, Italy and the Czech Republic, and telecommunications are heavily controlled in Iceland and Turkey. Differences in regulatory stances in

airlines and electricity mainly reflect differences in the stage the deregulation process especially among EU countries.

Table 3.1. Product market regulations in services in OECD countries, 2003

Country, 2003	All sectors	Electricity	Gas	Telecom	Post	Airlines	Rail	Road
Australia	1.5	1.0	1.9	1.9	2.9	0.9	1.9	0.0
Austria	2.4	1.5	2.7	1.6	2.9	1.2	5.3	1.7
Belgium	2.1	1.3	2.6	2.1	2.9	0.0	4.3	1.7
Canada	1.9	3.7	0.5	0.8	3.7	1.0	3.0	0.5
Czech Republic	3.3	..	3.6	..	3.2	4.4	2.3	3.0
Denmark	1.6	1.0	3.2	0.7	2.9	0.4	2.6	0.5
Finland	2.4	1.5	4.5	0.9	2.2	1.7	5.3	0.5
France	3.0	3.6	3.5	2.1	2.9	1.7	5.3	1.7
Germany	1.6	1.8	1.5	1.6	2.2	0.0	3.0	1.3
Greece	4.1	3.3	5.2	1.7	2.9	4.3	5.6	6.0
Hungary	3.7	..	3.4	..	3.5	5.6	3.8	2.5
Iceland	2.0	..	..	3.3	2.9	0.0	..	1.7
Ireland	3.2	3.3	4.1	1.5	2.9	4.3	5.6	0.5
Italy	2.6	1.1	2.4	1.0	3.5	1.9	2.6	5.5
Japan	2.2	2.1	2.8	1.7	2.9	1.7	3.8	0.5
Korea	3.2	..	4.8	1.1	..	1.7	6.0	2.5
Luxembourg	3.0	..	3.4	..	2.7	..	..	..
Mexico	2.9	..	4.6	1.2	3.7	3.5	3.0	1.3
Netherlands	1.6	0.6	2.9	1.1	2.2	0.4	2.6	1.3
New Zealand	2.1	1.3	2.6	1.1	2.2	2.5	4.1	0.5
Norway	2.3	2.0	3.5	2.3	2.9	0.4	4.3	1.0
Poland	2.9	..	4.8	..	2.9	3.5	1.7	1.7
Portugal	2.6	2.3	4.1	1.5	2.9	3.0	3.8	0.5
Slovak Republic	2.9	..	3.7	..	3.4	4.2	1.9	1.5
Spain	2.0	0.5	2.5	1.2	2.9	1.0	4.9	1.3
Sweden	1.9	1.0	2.7	1.8	2.2	0.6	3.8	1.0
Switzerland	2.8	5.0	3.9	2.5	2.9	1.0	4.1	0.5
Turkey	3.7	..	4.1	4.8	3.9	4.1	..	1.7
United Kingdom	1.0	0.0	1.7	0.5	2.9	1.4	0.4	0.5
United States	1.4	2.3	0.4	0.2	3.7	0.0	3.0	0.5
OECD	2.5	1.9	3.1	1.6	3.0	1.9	3.6	1.5

Note: The indicator ranges from 0 (least regulated) to 6 (most regulated).

Source: OECD.

19.   FDI controls in manufacturing appear quite low in most OECD countries, with restrictions mainly confined to the service sectors (Table 3.2). Among the sectors covered, barriers to FDI appear highest in electricity, telecoms and transport services. In these sectors, regulations largely reflect overt discriminations against foreign investments. Restrictions on foreign investment in natural-resource-based sectors are also common in some countries (*e.g.* Iceland and Canada).

Table 3.2. Sectoral barriers to FDI in OECD countries, 2001

Country, 2001	Total	Business	Telecom	Construction	Distribution	Finance	Tourism	Transport	Electricity	Manufacturing
Australia	0.3	0.2	0.4	0.2	0.2	0.3	0.2	0.4	0.7	0.2
Austria	0.3	0.3	0.3	0.2	0.3	0.2	0.2	0.4	0.6	0.2
Belgium	0.1	0.0	0.3	0.0	0.1	0.1	0.0	0.2	0.3	0.0
Canada	0.3	0.2	0.5	0.2	0.2	0.5	0.2	0.6	0.7	0.2
Czech Republic	0.2	0.2	0.6	0.1	0.1	0.2	0.1	0.2	1.0	0.1
Denmark	0.1	0.1	0.1	0.0	0.1	0.1	0.0	0.2	0.8	0.0
Finland	0.2	0.1	0.2	0.1	0.2	0.2	0.1	0.3	0.9	0.1
France	0.1	0.0	0.3	0.0	0.1	0.1	0.0	0.3	1.0	0.0
Germany	0.1	0.0	0.2	0.0	0.1	0.1	0.0	0.2	0.5	0.0
Greece	0.1	0.0	0.4	0.0	0.1	0.1	0.0	0.3	1.0	0.0
Hungary	0.2	0.1	0.3	0.1	0.1	0.1	0.1	0.4	0.6	0.1
Iceland	0.4	0.3	0.8	0.3	0.4	0.4	0.3	0.4	1.0	0.3
Ireland	0.1	0.0	0.1	0.0	0.1	0.1	0.0	0.1	1.0	0.0
Italy	0.1	0.0	0.1	0.0	0.1	0.2	0.0	0.2	1.0	0.0
Japan	0.2	0.3	0.6	0.2	0.2	0.2	0.2	0.4	0.2	0.2
Korea	0.2	0.1	0.5	0.1	0.3	0.5	0.1	0.4	1.0	0.1
Mexico	0.3	0.3	0.4	0.3	0.2	0.3	0.4	0.5	1.0	0.0
Netherlands	0.1	0.0	0.1	0.0	0.0	0.1	0.0	0.2	1.0	0.0
New Zealand	0.2	0.1	0.4	0.1	0.1	0.1	0.1	0.3	1.0	0.1
Norway	0.2	0.1	0.4	0.1	0.1	0.1	0.1	0.5	0.8	0.1
Poland	0.2	0.1	0.7	0.1	0.2	0.3	0.1	0.3	1.0	0.1
Portugal	0.2	0.1	0.4	0.1	0.1	0.2	0.1	0.3	0.8	0.1
Spain	0.1	0.1	0.3	0.1	0.1	0.2	0.1	0.4	0.6	0.1
Sweden	0.1	0.1	0.4	0.1	0.1	0.1	0.1	0.3	0.6	0.1
Switzerland	0.2	0.1	0.3	0.1	0.1	0.1	0.1	0.4	1.0	0.1
Turkey	0.3	0.4	0.9	0.3	0.4	0.3	0.2	0.5	1.0	0.2
United Kingdom	0.1	0.0	0.0	0.0	0.1	0.1	0.0	0.2	0.0	0.0
United States	0.1	0.1	0.4	0.1	0.1	0.2	0.1	0.5	0.5	0.1
OECD	0.2	0.1	0.4	0.1	0.1	0.2	0.1	0.3	0.8	0.1

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

Source: OECD, Golub (2003).

20. Average tariff levels in most of the OECD are higher in the agricultural sector than in manufacturing, with particularly high rates of protection in a few product lines such as rice, sugar and dairy products. The agricultural sector in many OECD countries is heavily subsidised (Figure 3.5). These distort world markets (OECD, 2004) but a specific quantification of these distortions is outside the scope of this paper.

Figure 3.5. Estimates of producer support on agriculture in the OECD, 2003
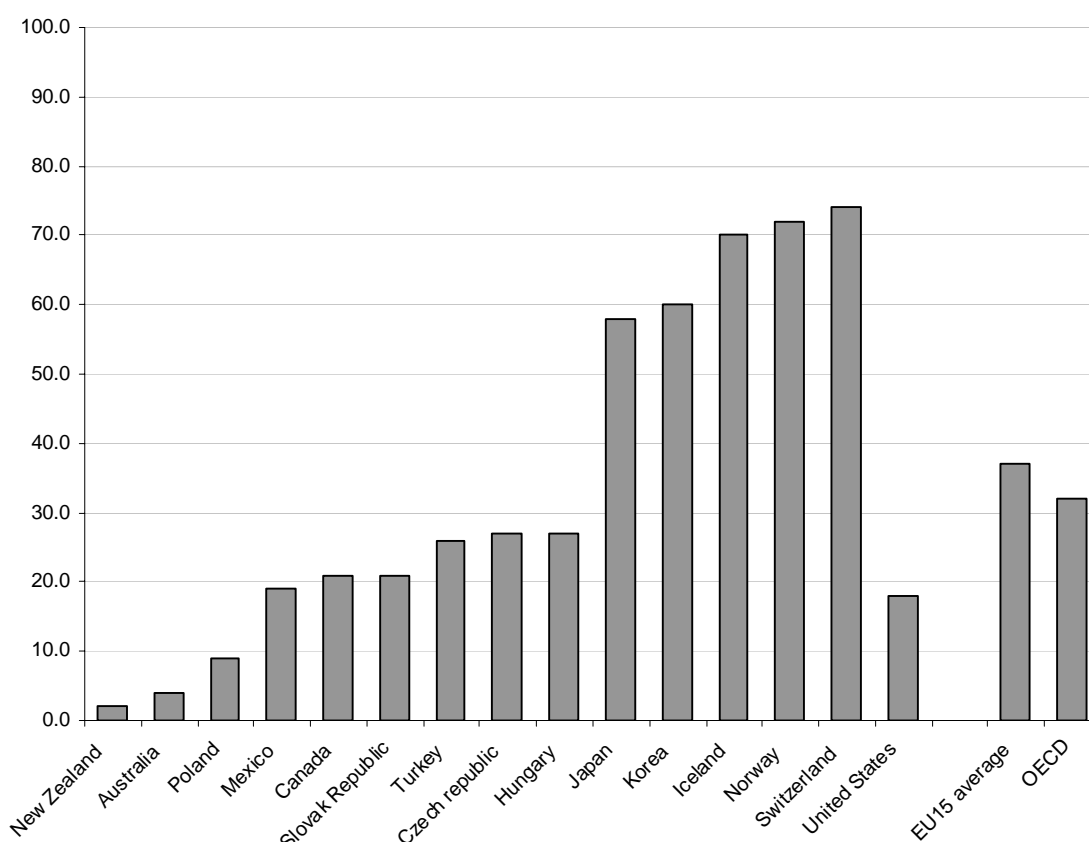
Source: OECD, Producer and consumer support estimates database.

4.   The potential for reform

21.   This section presents structural reform packages for all OECD countries based on the identification of gaps with best-practice in the OECD area. The approach followed is to simply adjust the levels of the relevant policy settings, as measured by the indicators discussed above, to those of the least restrictive OECD countries. The adjustments are applied to indicators of policy stances in particular areas that are then aggregated at the national level.[9] As a consequence, the reform package considered is quite ambitious -- it would involve an easing of domestic product market regulation and reductions in barriers to external trade and investment to levels that are less restrictive than present policy settings in any OECD member country. However, significant progress has generally been made in reducing competition-restraining regulation in the OECD since 1998[10] (Conway *et al.* 2005*)*, FDI restrictions have come down

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9.   The overall PMR indicator is constructed from aggregating a hierarchy of lower-level indicators. The lower the level of an indicator is within the hierarchy, the more narrowly-focused is the area of anti-competitive regulation measured.

10.   In the EU15, on average, the indicator of the overall stance of PMR is estimated to have declined from around 2.1 to 1.4 over the period from 1998 to 2003, a cut of 0.7 points, while in the US the decline is from around 1.3 to 1.1. In this study the implied level of "best practice" overall PMR is around 0.7. For the European Union, movement to best practice would therefore imply a similar sized reform as that seen over the 1998-2003 period. In the United States, although the size of the overall reforms is almost twice that estimated to have occurred since 1998, it is nonetheless visibly smaller than that in the EU15.

since 1990[11] (Golub, 2003) and formal border barriers have been eased in successive trade rounds (Nicoletti *et al.* 2003). In light of this, the overall reform package considered in this paper might better be thought of as a continuation of the trend to liberalise product markets and enhance international integration, as opposed to a radical shift in policy stances.

22.   The benchmarking of best-practice inward-oriented product market regulation[12] is based on policies promoting domestic competition for the two key sub-components of this indicator:

- *State control*. The size and scope of the public enterprise sector were both estimated to be the least restrictive in Australia, which is therefore taken to be best practice in these areas. State control over business operations is also estimated to be the lowest in Australia.

- *Barriers to Entrepreneurship*. No OECD country ranks as having best policy practices in all of the areas covered under this aspect of regulation so the benchmark refers to different countries and situations. Administrative burdens on the start-up of a new business are found to be least restrictive in Denmark and Ireland. The indicator for regulatory and administrative opacity is estimated to be the lowest in Canada. And finally, lowest levels of barriers to competition are found in Ireland and the United Kingdom.

As noted above, movements to overall best-practice level of inward-oriented regulation could involve significant reforms in all OECD countries. However, the required reform effort would be particularly strong in the most heavily-regulated OECD countries, *i.e.* the low-income and/or Southern European countries. By contrast, the reform effort would be comparatively light in most English-speaking countries, especially in Australia.

23.   The required sectoral focus of reforms would also differ across countries (Table 4.1). Countries marked by stringent competition-restraining regulations would have to implement reforms across most, if not all, non-manufacturing sectors. For countries with intermediate levels of regulations in general, policy changes would also have to be introduced in a broad range of sectors, though some sectors could be excluded as they are already close to best practice. In the remaining group of countries, reforms would only be required in one or a few sectors. For example, the United States and Canada would only have to concentrate reform efforts in electricity generation and rail transportation, the Netherlands and Denmark would have to focus on gas and rail transportation, and Iceland on telecommunications and road transportation.

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11.   Restrictions on FDI have been significantly reduced since the 1990s (Golub, 2003). On average, across the OECD countries for which FDI restrictions are measured, the reduction in the level of the indicator of restrictions is around 40% over the period from 1990 to 2000. In this study, easing FDI restrictions to best-practice levels implies that levels are approximately halved in the United States and the European Union.

12.   As noted in the annex, a more narrow indicator of product market regulations has been used in some parts of the analysis. The "best practice" for this indicator has been determined in a similar way as for the broad indicator. Please note that this indicator has been revised since the release of OECD (2005).

Table 4.1. **Required intensity of reforms by sectors to attain OECD best practices, 2003**

Country	Electricty	Gas	Telecom	Post	Airline	Rail	Road
Australia		X	X			X	
Austria	X	X				XX	X
Belgium		X	X			XX	X
Canada	XX					X	
Czech Republic	..	XX	..		XX	X	XX
Denmark		X				X	
Finland	X	XX			XX	XX	
France	XX	XX	X		XX	XX	X
Germany	X					XX	
Greece	XX	XX			XX	XX	XX
Hungary	..	XX	..		XX	XX	X
Iceland	..	..	XX			..	X
Ireland	XX	XX			XX	XX	
Italy		X			XX	X	XX
Japan	X	X			XX	XX	
Korea	..	XX		..	XX	XX	X
Luxembourg	..	XX	..		..	..	..
Mexico	..	XX			XX	X	
Netherlands		X				X	
New Zealand		X			XX	XX	
Norway	X	XX	X			XX	
Poland	..	XX	..		XX		X
Portugal	X	XX			XX	XX	
Slovak Republic	..	XX	..		XX	X	
Spain		X				XX	
Sweden		X	X			XX	
Switzerland	XX	XX	X			XX	
Turkey	..	XX	XX	X	XX	..	X
United Kingdom							
United States	X					X	
OECD	X	X			X	XX	X

Note: A blank space means that regulation is close to OECD best practices. X and XX indicate the extent of the required efforts to move from current levels of regulation toward best practice levels according to OECD indicators, ranging respectively from 1.5 to 3 and 3 and above.

Source: OECD.

24. The reform package implemented to move to best-practice levels in outward-orientated regulation covers two areas:

- *Restrictions on FDI*. Overall best practice in this area is derived from best practices in each of the sectors included in the OECD FDI restriction indicator. Best practices in each of the sectors differ from one country to the other, as discussed above in the context of Table 3.2.

- *Tariff levels*. Tariff levels are set at, or close to zero reflecting best practice in the OECD area.

Efforts to reduce outward-oriented barriers to best practice levels would be considerable in many countries. For countries with the strongest overall barriers to FDI (such as Canada, Iceland and Mexico), reforms would have to be broad-based and incorporate most sectors. However, in countries that are relatively open to foreign investment, the required reforms would be more concentrated on particular areas. For example, in the United States and France, reforms could be confined to the transportation sectors and the electricity sector, respectively. As for tariff reforms, the sectoral focus would vary across countries, given their different tariff structures. For example, reductions in tariff levels in the European Union to best practice would be concentrated on agricultural products, while in the United States tariff reductions to best-practice levels would imply relatively more adjustment to rates of protection on textiles, apparel and other manufacturing goods.

5.   Potential benefits of reform

25.   The estimated benefits of the reform package outlined above are presented in this section. The discussion begins with an overview of the broad linkages between structural policy settings, growth and trade, and how a package of reforms would be expected to lift performance. It then turns to an empirical assessment of the impact of reforms.[13]

5.1   *The impact of closer economic co-operation on economic performance: the key linkages*

5.1.1   *Gains from regulatory reform of domestic product markets*

26.   Reform of domestic product markets in the OECD to best-practice levels would stimulate competitive pressures. Increased competition is associated with both one-off and on-going gains in output via an improvement in multi-factor productivity (MFP), *i.e.* the combined productivity of labour and capital. One-off efficiency improvements, otherwise known as static gains, arise from both better allocation of existing resources and from a take-up of slack in the usage of resources, given the enhanced pressures on businesses to perform. On-going or dynamic gains from domestic product market reform may arise from both greater efforts to innovate and optimise production, and from more rapid diffusion of new technologies. In practice, the distinction between static and dynamic efficiency gains is blurred because static gains do not occur instantaneously – it may take some time, for example, to re-allocate resources to where they can be more efficiently employed. As such, reform of domestic product market regulation might be associated with improved growth performance over many years, even if all the gains that arise can be best characterised as static.[14]

5.1.2   *Gains from trade and investment liberalisation*

27.   Gains from international trade and investment potentially accrue through a number of channels. The most familiar channel is that trade increases the efficiency with which resources are deployed across countries through exploitation of comparative advantages. Given relatively similar factor endowments,

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13.   Recent literature on the gains from reducing border barriers to trade can be seen in Vandenbussche *et al.* (2004) and London Economics (2002). In Bayoumi *et al.* (2004), estimates of reducing rigidities in labour and product markets in the European Union to those of US-levels are presented.

14.   Reform of anti-competition product market regulation and a reduction of external barriers to trade and investment may also, of course, be associated with short-run regional or even national losses in output and employment to the extent that the resources released from sheltered industries are not quickly re-deployed. To mitigate these concerns, reform of product markets might preferably be complemented by structural policy reform in other spheres. For example, short-run employment costs could be mitigated by reform to labour markets that improve their flexibility, while financing requirements to replace inefficient capital could be assisted by reforms in financial markets.

technologies and consumer preferences across most OECD countries, the potential gains, on average, from further exploiting comparative advantages, *a priori,* are likely to be relatively modest, although consumers' welfare will be boosted by the availability of a greater variety of products. Trade and FDI liberalisation may also afford exploitation of increasing returns to scale as firms are able to expand production or service delivery for larger markets. The increased industry concentration that would result from such consolidations runs the risk of abuse of market power. However, offsetting the potential risks from concentration in local markets is the greater global competition that such firms would be exposed to. In practice, given that manufacturing production has already been substantively liberalised, gains from increasing returns to scale are likely to be most important in certain service sectors, where markets are perhaps more fragmented.

28.   Shifting resources to take into account comparative advantages and increasing returns to scale in theory has a long-run impact only on the level of output, although as with domestic product market reform it could take several years for the new long-run levels to be reached. In addition to these effects, liberalising trade and FDI flows would increase a country's exposure to international competition, and as such may have a more profound impact on a nation's longer-term output growth path for similar reasons as those discussed with reference to domestic product market reform.

5.2   *Estimating the benefits of reform*

29.   The benefits of reforms are estimated using three different approaches (for further details see Box 3):

- The estimation of the impact of the reforms on overall trade exposures, and the associated derived effect on GDP per capita, using previous OECD econometric panel-data studies on the determinants of trade and economic growth.

- The estimation of the impact of reforms on output explicitly via productivity increases, using alternative econometric studies developed by the OECD on the link between product market regulations and productivity.

- Simulations of the GTAP general equilibrium model with two scenarios. Firstly, the static impact of tariff reductions on trade and GDP. Secondly, the additional effects when this scenario is supplemented by the productivity increases derived from the econometric approach mentioned above.

The impact of reforms on GDP per capita via induced stronger innovation activity is not taken into account in these approaches. OECD and other research indicates that stronger competition in product markets stimulates R&D spending which might have powerful effects on lifting the level of GDP per capita and even the growth rate (Box 4). However, the strength of these effects is subject to considerable uncertainty, and they have therefore been excluded in this study.

Box 3. Methodological approaches to estimating the benefits of structural reform

The main tools that researchers have used to quantify the benefits of structural reforms can be classified into two distinct frameworks: general equilibrium (GE) model-based studies and single-equation econometric studies. In broad terms, the chief advantage of GE model studies is that the complex interactions between policy settings and economic outcomes are guided by economic theory and described within a well-defined framework designed to capture both the direct impact of any policy changes and the indirect "feedback effects" of such changes on economic activity and trade patterns.

In general, econometric studies are less able to capture the impact of any indirect changes in policy settings, such as trade diversion effects, changes in relative prices, and the feedback of changes in one countries growth potential onto growth in the rest of the world. Furthermore, given their "reduced form" nature they are also generally unable to disentangle what the transmission mechanisms behind change in policy settings and economic outcomes are. Despite these limitations, econometric approaches may better quantify the impacts of policy changes on economic outcomes given that the models are determined more by the historical data experience than any particular economic theory.[1] For example, much of the static gains from structural policy reform may derive from the take-up of slack in production (or x-inefficiencies) and these are generally not captured within traditional GE frameworks.

In this study, the two frameworks outlined are seen as complementary. Recent OECD econometric panel data studies and the well-known trade general equilibrium model GTAP are used to estimate the impact of structural policy changes in all OECD countries.

Under the econometric approach, two alternative panel-data study frameworks are utilised. The first framework considers the impact of structural policy settings on output via their influence on trade openness. In this framework, trade exposure impacts are estimated using the equations developed in Nicoletti *et al.* (2003). Inputs into these equations include the reductions in tariff levels, FDI restrictions and domestically-focused product market regulations needed to move policy settings in all OECD countries to best practice levels. The resulting changes in trade exposures are then fed into equations described in Bassanini *et al.* (2001) and Bessanini and Scarpetta (2002) to estimate the impact on output levels. The second panel-data study framework considers how domestically-focused product market regulations directly affect multi-factor productivity (MFP) levels (Nicoletti and Scarpetta, 2003). The impact of this on output depends upon the extent to which shifts in MFP are accompanied by changes in capital and labour employment. The GTAP model is utilised to provide an independent estimate of the impact of changes in tariff levels on OECD trade and output, and to provide an assessment of these policy changes on non-OECD countries.[2] In addition, the impact on MFP from a reduction in domestic product market regulation estimated using Nicoletti and Scarpetta (2003) is applied in GTAP to provide a more comprehensive estimate.

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1.   A common criticism of using models based on the historical data experience to quantify the impact of any future reform is that the estimated coefficients of the models themselves may change under reform, implying estimates of the benefits may be unreliable (Lucas, 1975). The OECD panel data studies used in this paper mitigate this concern. As the coefficients are estimated for an OECD country sample that incorporates a broad range of historical policy-settings, they are likely to be more robust to changes in policy regimes. That said, the returns to policy reform from reduced x-inefficiencies may well be declining in the OECD area, hence the coefficients may exaggerate the effectiveness of additional reform.

2.   See Hertel (1997) for a complete description on the GTAP model. Recent analysis conducted using this model is seen in OECD (2003) and references therein.

Box 4. The link between reforms, innovations and growth

For many industries in countries that can be considered to be near the technological frontier, dynamic gains through greater innovative efforts may well be the most important long-term effects of any reductions in anti-competitive regulation. A key factor determining the rate at which the frontier is expanded is the intensity of research and development (R&D) and other innovative activities. Empirical evidence suggests that strict product market regulations can have a significantly detrimental impact on R&D in both the public and private sectors. [15] Based on recent OECD empirical evidence,[16] the average decline in the stringency of product market regulation considered in this study could permanently boost R&D expenditures (relative to GDP) by around 11%, and the total level of patents by around 5%, on average across the OECD.

In theory, raising R&D intensities would be expected to lift long-term growth as productivity enhancing technologies are developed (Ahn, 2002). If the estimation results of the *Growth Study* are interpreted as imparting such permanent growth effects, the impact of GDP growth would be implausibly large at around 0.2 to 0.4 percentage points (Bassanini *et al.* 2001). On the other hand, the estimation results can be interpreted as permanently raising GDP per capita levels. Under such a "conservative" interpretation of the estimation results, the increase in R&D intensity of 11% suggested above implies an increase in the level of GDP per capita of 2 per cent, indicating very strong multiplier effects. Given that there must be doubts about whether the linkages between R&D intensities on the one hand and GDP per capita levels or growth on the other are as strong as suggested by the estimation results in the *Growth Study*, the analysis in this paper abstracts from any reform-derived innovation effects on GDP per capita.

5.3. *Estimated benefits of reform*

5.3.1 The estimated impact on GDP per capita via increased trade exposure

30.   The estimated impact of structural policy reforms on OECD trade in goods and services using models developed in Nicoletti *et al.* (2003) is reported in Figure 5.1. Detailed results are reported in the annex. The overall impact of the reforms is to significantly boost trade levels by close to 40% for the OECD area. All OECD countries are estimated to gain from these policy reforms.

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15.   For evidence on the linkages between regulation and innovation also see Nicoletti *et al* (2001) and Bassanini and Ernst (2002).

16.   Jaumotte and Pain (2005).

Figure 5.1. Impact of reforms on total exports in OECD countries

% change
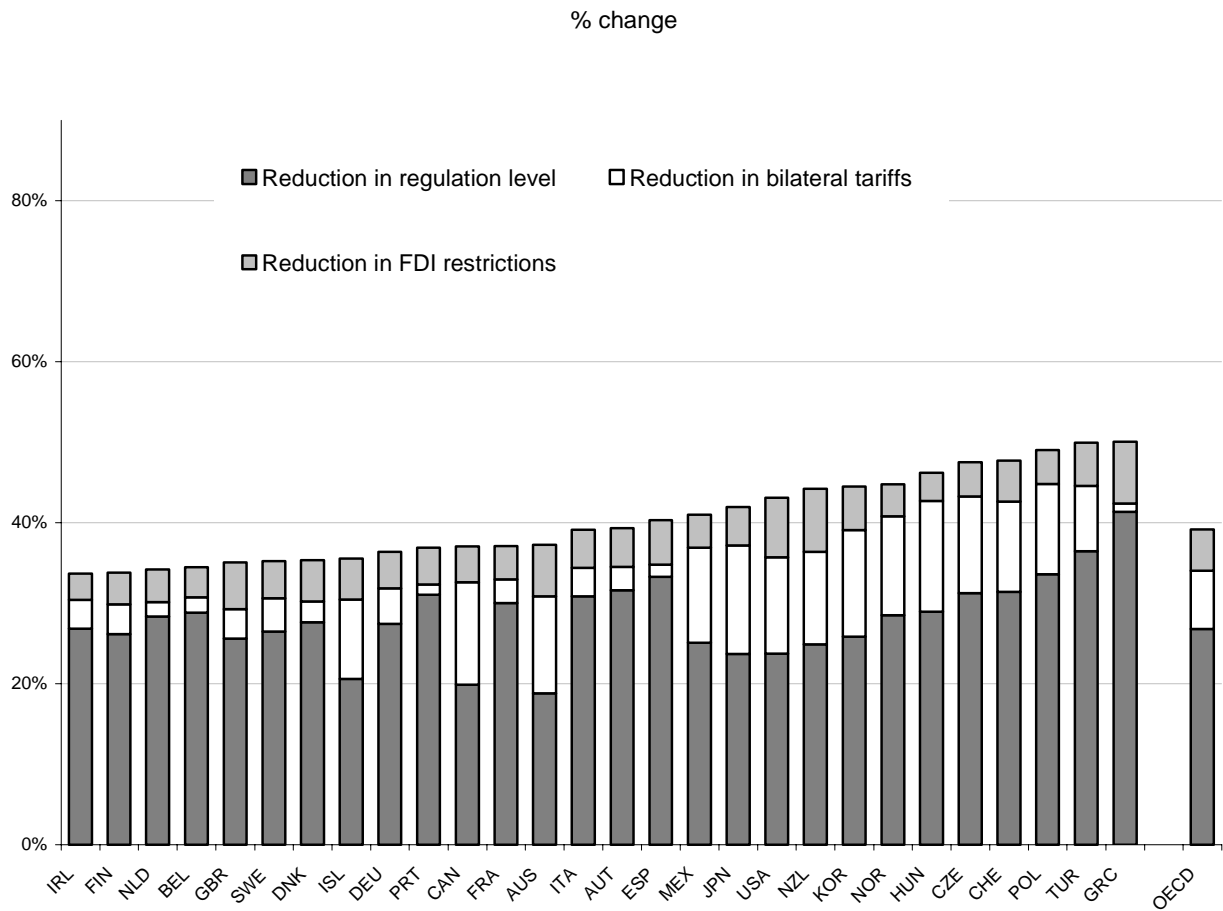
Source : OECD.

31.   The largest driver by far of the increase in exports is the reduction in inward-oriented product market regulations, raising total OECD exports by close to 30% and accounting for more than two-thirds of total trade gains in the OECD area. This large policy impact reflects both reforms in home and partner countries which affect trade by improving the competitiveness of exporting firms on the one side and easing market access to partner countries on the other side. However, as can be seen from Figure 5.2, the bulk of the gains is driven by policies fostering competition in home countries. As a result, the biggest boost to exports is found in countries with the most competition-restraining regulatory framework. On the other hand, countries with relatively weak regulatory constraints on competition gain more (Australia, Iceland) or almost as much from reforms abroad as from domestic reforms.

Figure 5.2. The effect of regulatory reforms in home and partner countries on total exports

% changes
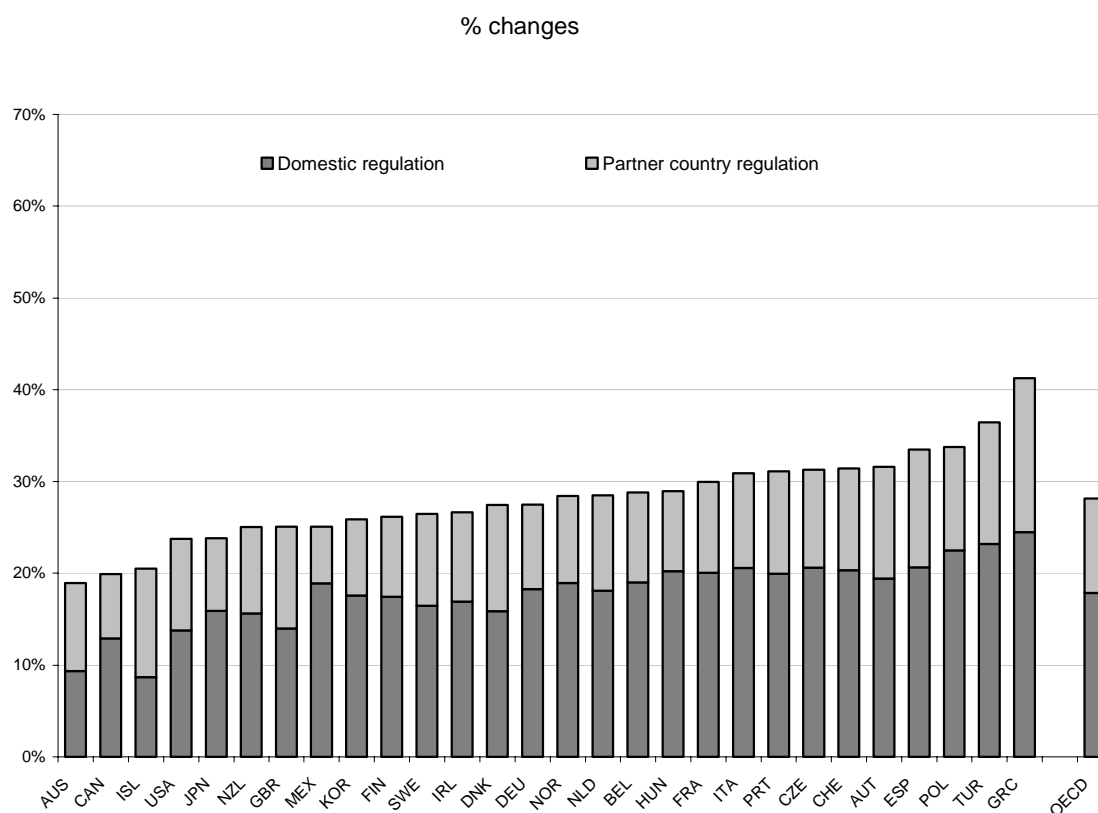
Source: OECD.

32.   The estimated trade gains from lowering both tariff barriers and restrictions on FDI are relatively small, raising OECD exports by around 12%.[17] This mostly reflects the benefits from practically abolishing remaining tariffs. Mirroring in large part the comparatively high tariffs in trading partner countries, the tariff cuts are estimated to have the strongest impact on exports from Canada, Iceland, Japan, Mexico, Norway, Poland and the United States. Nonetheless, even in these countries, tariff cuts in trading partner countries are found to have a lower impact on raising trade than regulatory reforms at home, suggesting the central role that domestic regulatory reforms can play in fostering economic integration in the OECD area.

33.   The impact of the increase in trade openness on GDP per capita levels in OECD countries, estimated using the models developed in Bassanini *et al.* (2001), is presented in Table 5.1.[18] The table shows that the boost to living standards could be significant in all major OECD areas, exceeding 4% in the United States, the European Union and Japan. Reflecting the results for the increase in exports, the contribution of the different policy reforms would differ across these areas. In the United States and Japan,

17.   Part of these gains comes about through higher FDI and the associated increase in trade. Indeed, cuts in tariffs and the easing of FDI restrictions are estimated to increase FDI in-stocks in the OECD area by 40%, with the strongest gains in Korea, Turkey, Poland, Mexico and New Zealand.

18.   According to the equations employed, the impact of a given increase in trade exposure on GDP per capita diminishes as the initial level of trade exposure rises. Hence, countries with high export and import intensities tend to gain less from reforms than other countries.

the comparatively high GDP gains largely reflect that tariff cuts abroad would provide a comparatively strong boost to exports, whereas the impact of regulatory reforms at home and abroad is below the OECD average. By contrast, tariff cuts in trading partner countries have only relatively modest effects in the EU15 countries, while regulatory reforms play a greater role in boosting output. Mirroring the comparatively low barriers to competition in Australia and New Zealand, the gains in output in these countries would be more related to tariff cuts and lower FDI barriers.

Table 5.1. Indirect impacts of reforms on GDP per capita *via* trade exposure

(% increase in GDP per capita levels)

	Bilateral tariffs reduction	FDI reduction	Regulatory reforms	All policies
Australia	1.1	0.8	1.9	3.8
Austria	0.3	0.7	3.1	4.1
Belgium	0.1	0.2	0.6	0.8
Canada	1.4	0.7	2.1	4.1
Switzerland	1.2	0.7	3.0	5.0
Czech Republic	0.8	0.3	1.8	2.9
Germany	0.5	0.5	3.2	4.2
Denmark	0.3	0.6	3.0	3.9
Spain	0.2	0.7	3.7	4.7
Finland	0.4	0.6	2.8	3.8
France	0.4	0.6	3.7	4.7
United Kingdom	0.5	0.5	3.1	4.1
Greece	0.2	0.8	3.9	4.9
Hungary	0.6	0.2	1.1	1.9
Ireland	0.0	0.0	0.6	0.7
Iceland	1.3	0.8	2.3	4.3
Italy	0.4	0.5	3.4	4.3
Japan	1.3	0.7	2.4	4.4
Korea	1.0	0.5	1.8	3.2
Mexico	1.5	0.7	2.8	5.0
Netherlands	0.2	0.3	1.7	2.2
Norway	1.4	0.6	3.1	5.0
New Zealand	1.1	0.8	2.3	4.3
Poland	1.3	0.6	3.1	5.0
Portugal	0.2	0.7	3.5	4.4
Sweden	0.4	0.6	2.8	3.8
Turkey	1.0	0.7	3.1	4.8
United States	1.3	0.7	2.6	4.7
OECD	0.9	0.7	3.1	4.7
EU 15	0.4	0.5	3.2	4.2

Source: OECD.

5.3.2   *The estimated impact on GDP per capita via increased productivity*

34.   As discussed in section 5.2, an alternative version of the econometric approach can be based on the estimated link between product market regulations and multi-factor productivity levels (Nicoletti and Scarpetta, 2003). This provides an additional sensitivity test of the direct impact of the reform package on output in OECD countries, although it is more limited in scope given that reductions in external barriers to

trade and investment are excluded from the analysis. The overall impact of domestic regulatory reforms (Table 5.2) is to lift MFP by around 2% in the OECD area with the largest gains in Poland, Hungary and Turkey, followed then by the most regulated EU countries (Italy, Greece, France, Spain and Portugal). The MFP gains mainly reflect large cuts in state control of the business sector, while reducing entry barriers only has relatively modest effects.

Table 5.2. Impact of inward oriented product market reforms on MFP levels and GDP per capita

% changes

Country	Effect of reducing public onwership [1]	Effects of easing entry barriers [2]	Combined impact on MFP levels [1]+[2]	Impact on output[1]
Australia	0.4	0.3	0.6	0.9
Austria	1.4	0.4	1.8	2.6
Belgium	1.8	0.4	2.2	3.1
Canada	1.2	0.2	1.4	2.0
Czech Republic	1.9	0.5	2.4	3.4
Denmark	1.0	0.3	1.2	1.8
Finland	1.8	0.2	2.0	2.9
France	2.0	0.4	2.4	3.4
Germany	1.7	0.4	2.0	2.9
Greece	2.1	0.4	2.5	3.6
Hungary	2.5	0.3	2.9	4.1
Iceland	0.8	0.4	1.2	1.7
Ireland	1.5	0.2	1.7	2.4
Italy	2.4	0.3	2.8	3.9
Japan	1.1	0.3	1.5	2.1
Korea	1.2	0.4	1.6	2.3
Mexico	1.4	0.5	2.0	2.8
Netherlands	1.4	0.4	1.8	2.6
New Zealand	1.0	0.3	1.3	1.8
Norway	2.1	0.2	2.3	3.3
Poland	2.8	0.6	3.4	4.8
Portugal	2.1	0.3	2.4	3.4
Slovak Republic	1.0	0.3	1.3	1.8
Spain	2.1	0.4	2.4	3.5
Sweden	1.4	0.2	1.7	2.4
Switzerland	1.7	0.5	2.1	3.1
Turkey	2.1	0.6	2.8	3.9
United Kingdom	1.3	0.2	1.4	2.1
United States	0.8	0.3	1.1	1.6
OECD	1.5	0.3	1.9	2.7
EU15	1.7	0.3	2.0	2.9

1. The impact on output is a calculated from an assumed Cobb-Douglas production function. Labour's income share is set at 0.7 and capital increases such that the efficiency-augmented capital-to-labour ratio does not change.

Source: OECD.

35.   The translation of the impact on MFP levels to output depends upon the extent to which productivity improvements are accompanied by increases in the use of capital and labour. The most conservative assumption is that there is no additional use of these factors of production, in which case the impact on GDP is equivalent to the impact on MFP. However, perhaps a more realistic assumption is that the change in MFP will be accompanied by higher capital input as returns to investment improve. Under

standard assumptions,[19] the MFP gains could result in increases in output shown in the last column of Table 5.2.

36.   The gains in output from domestic regulatory reform using the MFP equation are significantly lower for many OECD countries than those derived from trade-exposure approach reported above.[20] In evaluating these estimates, it should be borne in mind that easing of FDI and trade restrictions are not included. Furthermore, two additional factors are worth considering. Firstly, evidence suggests that reforms may speed-up the rate at which productivity levels in under-performing countries converge to the productivity levels of the best-performing OECD economies (Bassanini *et al.* 2001 and Scarpetta and Tressel, 2002). To the extent this is the case, there would be an additional, albeit temporary, boost to output in countries where productivity levels are relatively low. Secondly, there are good reasons to expect that increased product market competition would also have positive spill-over effects on labour market outcomes, for example, through reducing rent-seeking behaviour and enhancing job-search efforts. Empirical support for this is provided in Nicoletti *et al.* (2001), where reducing PMR from relatively high to relatively low levels is estimated to boost employment rates by around 2%. Overall, the benefits of reforms to product markets may be greater than the estimates provided in this paper.

5.3.3   Estimates using the GTAP model

37.   To provide a partial crosscheck on the results reported in Section 5.3.1, the impact of a broadly similar cut in tariff levels using the GTAP model is provided in Table 5.3. The results from the GTAP model suggest that tariff cuts would have a much smaller effect on output than derived from the OECD panel study. Indeed, the GTAP model indicates that there would be no, or close to no, gains in the majority of the countries listed in Table 5.3.

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19.   More specifically, it is assumed that capital is increased such that the ratio of capital to efficiency-augmented labour does not change. The estimated impact on GDP further assumes that aggregate output can be described by a Cobb-Douglas production function with labour's income share set at 0.7 and capital's income share at 0.3. Evidence that anti-competitive product market regulations may curb investment spending in OECD countries is reported in Alesina *et al.* (2003).

20.   Of course, the similarity of the results is highly dependent on the assumed production function and increase in capital inputs.

**Table 5.3. Impact of tariff cuts on exports and GDP per capita in selected OECD countries
using the GTAP model**

per cent

Country	Export volumes	Real GDP
Australia	4.9	0.1
Austria	0.5	0.1
Belgium	0.9	0.1
Canada	2.8	0.2
Czech Republic	4.4	0.0
Denmark	-0.3	-0.5
Finland	1.2	0.1
France	1.6	0.1
Germany	1.6	0.0
Greece	5.1	0.7
Hungary	2.4	0.4
Ireland	1.1	0.5
Italy	2.4	0.2
Japan	4.8	0.7
Korea	4.6	2.1
Mexico	7.6	0.4
Netherlands	1.5	0.2
New Zealand	0.6	0.2
Norway and Iceland	2.2	0.7
Poland	7.2	0.7
Portugal	2.1	0.2
Slovak Republic	3.9	-0.1
Spain	2.4	0.1
Sweden	0.9	0.2
Switzerland	3.5	1.7
Turkey	3.4	0.4
United Kingdom	3.1	0.2
United States	5.7	0.0
OECD[1]	4.1	0.2
EU15[1]	2.0	0.1

1. Weighted average.
Source: Simulations based on GTAP (version 6.0).

38.   At a broad level, one reason for the smaller impact of tariff cuts on output under the GTAP model is that the gains purely derive from static improvements in allocative efficiencies. Given fairly low average starting tariff levels in most of the OECD, the potential gains of tariff cuts from this channel are not large. In contrast, the models developed in Bassanini *et al.* (2001) implicitly embody not only these static allocative efficiency gains but also the impact of reform on the take-up of existing slack in the employment of inputs into production (or productive efficiency gains). The literature suggests these latter gains are a more important channel through which reductions in barriers to trade improve competition, and ultimately, productivity and output (Nicodeme and Sauner-Leroy, 2004).

39.   The lack of productive efficiency gains in GTAP does not, however, explain why trade increases do not always linearly translate into GDP gains. For example, the United States experiences a larger gain in trade than the EU15 countries, yet the corresponding impact on GDP is somewhat smaller. This result

occurs because the model estimates that the potential allocative efficiency gains in the European Union are larger than those available in the United States.[21] In other terms, the GTAP results suggest that the extent of misallocation of resources associated with tariffs is larger in the United States. Hence, a reduction in tariff barriers has a larger impact on EU output, despite the smaller percentage increase in trade creation.

40.   As a final cross-check on the benefits of reducing domestic product market barriers, the increase in MFP levels estimated in Section 5.3.2 above were plugged into the GTAP model and the de-tariffication scenario presented in Table 5.3 above was re-run. The results of this simulation suggest that output in the OECD would expand by around the same amount as the productivity increase (Table 5.4).[22]

Table 5.4. Impact of tariff cuts and productivity boost on exports and GDP per capita using the GTAP model
Per cent

Country	Export volumes	Real GDP
Australia	7.0	0.7
Austria	1.6	2.0
Belgium	2.4	2.3
Canada	4.0	1.6
Czech Republic	6.2	2.4
Denmark	0.8	0.7
Finland	2.1	2.2
France	2.5	2.6
Germany	2.3	2.1
Greece	4.8	3.3
Hungary	4.3	3.4
Ireland	2.9	2.2
Italy	2.0	3.0
Japan	3.0	2.2
Korea	6.1	3.7
Mexico	9.0	2.4
Netherlands	2.5	2.0
New Zealand	1.9	1.5
Norway and Iceland	3.0	3.1
Poland	7.4	4.2
Portugal	2.2	2.7
Slovak Republic	5.4	1.2
Spain	3.6	2.5
Sweden	1.6	1.9
Switzerland	4.4	3.8
Turkey	4.4	3.3
United Kingdom	3.9	1.6
United States	8.2	1.1
OECD[1]	5.3	1.9
EU15[1]	2.7	2.3

1. Weighted average.
Source: Simulations based on GTAP (version 6.0).

41.   According to the GTAP simulations, the non-OECD area would benefit from reforms confined to OECD countries. Such reforms would increase the exports of countries outside the OECD, with the gains exceeding 2½ per cent in China, India and Latin America. However, the associated increase in GDP in

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21.   The results of the de-tariffication scenario are broadly consistent with a comparable GTAP simulation of tariff reform presented in Fernandez de Cordoba *et al.* (2005).

22.   Simulation of the regulatory reforms is implemented through productivity increases that reduce the cost of production in OECD countries, with no spillover effects to other countries and regions. Under this assumption, the rest of the world cannot make use of the productivity improvements that occur in the countries that implement regulatory reforms, hence there are no positive feedback effects to the OECD.

these countries would be relatively small. For the non-OECD countries to benefit significantly from reforms, they would themselves have to implement tariff cuts, reduce restrictions on FDI and relax competition-restraining product market regulations. Such reforms would also have a positive spill-over for OECD countries.

6.   Concluding remarks

42.   This study has sought to quantify the impact of a broad reduction in domestic and external product market regulations in all OECD countries. Results suggest that ambitious reform packages, such as that applied in this study, could significantly boost both bilateral trade between individual member countries. In addition, the results suggest that such reforms are likely to be accompanied by substantive increases in output in OECD.

43.   Three approaches were used in estimating the benefits of reform: two based on previous OECD econometric panel-data studies and one using the general equilibrium model GTAP. The results of all approaches are subject to considerable uncertainty. The econometric results, for example, may over-estimate the impact of liberalisation, given that they are based on historical experiences and that future reforms may start facing declining returns. Furthermore, the assumed reform package may be too large given that it is based on deviation from best practice a few years ago and thus does not incorporate recent reforms in certain member countries. On the other hand, results from the GTAP model on the effects of tariff cuts may under-estimate impacts given that productive efficiency is not built into the model. In addition, the estimated gains reported in the paper do not directly consider potentially powerful dynamic efficiency gains arising from a faster pace of innovation. Finally, the estimated benefits of reform to product markets presented in the paper could be enhanced by structural reform efforts in other areas, such as labour and financial markets.

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ANNEX

SUPPORTING MATERIAL

44.   This Annex presents detailed results of the policy simualtions presented in Section 5 of the main text, along with more discussion of the empirical approaches. The Annex is organised into three sections corresponding to the approaches used to examine the benefits of reducing external and internal barriers to trade and investment. The first section presents detailed results using the panel-data studies that examine the impact of reforms from the perspective of their impact on trade openness. Section 2 discusses in more detail the emprical approach employed to estimate the impact of reform *via* its effect on multi-factor productivity. Finally, in Section A3 more detailed results from simulation of the GTAP model are presented.

A1   Impact of policy reforms on output *via* increased trade exposures

45.   The empirical approach used to to examine the impacts of the policy reforms *via* trade openness relies on bilateral trade equations reported in Nicoletti *et al.* (2003). To the extent possible, this empirical work aims to isolate the impact of policy variables from non-policy and country-specific factors. The *general* model considered is:

$$(1) \qquad Y_{ijt} = \sum_x \beta_x X_{ijt} + \sum_c \beta_c C_{it} + \sum_p \beta_p P_{jt} + \alpha_i + \alpha_j + \alpha_t + \alpha_{it} + \alpha_{ij} + \alpha_{jt} + u_{ijt}$$

where Y_{ijt} is the logarithm of bilateral export of goods or export of services from country i to partner j at time t (with $i=1,2,…,I$; $j=1,2,…,J$; and $t=1,2,…,T$).[23] X_{ij} are variables that are specific to a given country-partner pair. They incorporate both non-policy-related factors (*e.g.*, geographic distance, transport costs and factor similarities) and specific policy measures (*e.g.* bilateral tariff levels and FDI restrictions); C_i are country-specific variables and P_j are partner-specific variables, which in general comprise the inward-oriented regulatory policy indicators. The α-type variables stand for specific effects and control for all combinations of unobserved factors.

46.   As discussed in Nicoletti *et al.* (2003), estimation of the relevant policy and non-policy impacts (*i.e.*, the β_X, β_C and β_P parameters) in the form above is a non-trivial exercise and hence a "transformed least squares" (TLS) approach is employed to simplify the estimation. A summary of the estimated policy impacts as applied in this paper is provided in Table A1. below. These estimates show, for example, that a ten percentage point reduction in domestic regulation levels would boost goods and services exports by 2.5%, while a similar sized easing of FDI restrictions could lift services exports by 1.3% and goods exports by 0.4%.[24] Reductions in trading partner regulations are also important, and along with reductions in bi-lateral tariff levels and FDI restrictions explain why countries that do not undertake any reforms in this exercise still have a significant boost in their trade levels.

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

24.   Regulation in the exports of services equation is captured by an indicator of barriers in certain services sectors, as described in Nicoletti *et al.* (2003). In the original estimation of the exports of goods equation a time series indicator called "REGREF" was used to capture inward-oriented regulations. This indicator is also aggregated at the sectoral level and is based on various areas of regulation including public ownership, barriers to entry, price controls, vertical integration and market structures.

47.   As discussed in the main text, non-tariff border measures are not considered formally in the analysis given data issues and the reduction in formal non-tariff barriers over the past five years in OECD, although Nicoletti *et al.* (2003) estimates that historically these have been an important impediment to goods trade (italicised row, table A1). Moreover, to some extent, the product market regulation indicators already encapsulate behind-the-border non-tariff measures that exist today (Conway *et al*. 2005). For example, the lower-level indicator called "regulatory procedures" quantifies the extent to which countries' domestic regulatory procedures have engaged in mutual recognition agreements (MRAs) with other nations; whether specific provisions exist which require domestic regulators to consider the equivalence of regulatory measures or the results of conformity assessment performed in other countries; whether specific provision exist which require regulators to use internationally harmonised standards and procedures where available and appropriate; and whether there are specific procedures that require or encourage domestic regulatory procedures to avoid unnecessary trade restrictiveness.

Table A1. Summary impact of the policy variables on exports

Elasticity of exports with respect to a decrease in the policy indicators[1]

	Exports of Goods	Exports of Services
Decrease in domestic regulation	0.25	0.25
Decrease in trading partner regulation	0.11	0.24
Decrease in bi-lateral tariff levels	0.15	..
Decrease in FDI restrictions	0.04	0.13
Decrease in non-tariff barriers	*0.08*	..

1) A reduction in the indicators of 1 percentage point would increase exports by the factors shown in the table

48.   To examine the impact of policy reforms on exports from any country *i* to partner *j*, the changes in the relevant indicator variables are multiplied by the estimated coefficients of the bilateral export equation as summarised above. This is recorded as an increase in exports in country *i* and an increase in imports in county *j*. The total impact on exports for country *i* will be the summation of the increase in exports across all its trading partners. Similarly, the total impact on imports for any country will be the sum of the exports to that country. Given that an almost complete OECD country panel was utilised in the Nicoletti *et al.* (2003) study, a fairly comprehensive picture can be built up of how changes in the regulatory variables may influence trade flows *within* the OECD. However, a major limitation of this analysis is that the impact of reform on trade *vis-à-vis* non-OECD countries cannot be estimated. As such, the reforms may underestimate the trade gains, especially for OECD countries whose existing trade flows are relatively concentrated in the non-OECD area.

49.   The estimated increases in exports and imports, according to the equations in Nicoletti *et al.* (2003), are used to calculate an increase in "trade openness" of each country, which is then fed into the output-growth equations estimated in Bassanini *et al.* (2001) to infer the impact of reform on GDP levels.[25] In brief, the generic specification of the growth equations are consistent with a standard

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25.   Trade openness is calculated as: X + (1-X)*Mp, where X is the export to GDP ratio and Mp is the ratio of imports to apparent consumption (domestic production minus exports plus imports). Relative to the simple gross-trade to GDP ratio, this measure of trade openness effectively reduces the impact of re-exporting activities, perhaps providing a better indicator of economic openness for countries engaged in re-exporting in the OECD area.

neoclassical growth model, but the estimated forms are extended to involve human capital, research and development expenditures and a set of policy and institutional factors potentially affecting economic efficiency, including trade openness. In the econometric results, trade openness is found to be highly significant and robust to alternative model specifications, indicating its importance for the general growth process (see Table 5, Bassanini *et al.* (2001)). In this paper, the estimated elasticity of output with respect to trade openness is set at 0.2 (*i.e.* an increase in the level of trade openness by 10% will cause GDP per capita to rise by 2% all else equal) to reflect the most common impact estimated in the Bassanini *et al.* study.

A2   Impact of policy reforms on output *via* increased productivity

50.   The main text of the paper provides the complete set of results obtained from simulating the impact of the policy reforms on multi-factor productivity and output. This section provides more detail on the estimation approach.

51.   The empirical approach is based on the MFP equations estimated in Nicoletti and Scarpetta (2003). In this paper, the effect of policies on both the level of MFP, and the speed of its convergence to the technological frontier (*i.e.* the highest observed MFP levels at the sectoral levels considered) is estimated as follows:

$$(2) \qquad \Delta \ln MFP_{ijt} = \beta_{2j} \Delta \ln MFP_{Ljt} - \left(1 - \beta_{1j}\right) RMFP_{ijt-1} + \omega_{ijt}$$

where MFP_{ij} is the level of MFP in country i and industry j; MFP_{Lj} is the highest level of MFP seen in the OECD country sample for industry j; $RMFP_{ij}$ is the gap between these two variables, and ω_{ijt} is an error term modelled as:

$$(3) \qquad \omega_{ijt} = \sum_{k} \gamma_k V_{kijt-1} + f_i + g_j + d_t + \eta_{ijt}$$

where V_{ijt} is a vector of covariates comprising structural features (*e.g.* human capital) and regulatory policies potentially affecting the level of MFP; unobserved country and industry effects are represented by f_i, and g_j, respectively; global macroeconomic shocks are given by d_t and η_{ijt} is a serially uncorrelated error term. In the estimations, the coefficient on MFP growth in the country leader (β_{2j}) and that on the speed of convergence ($1-\beta_{1j}$) are constrained to vary only between the manufacturing and services sectors.

52.   The specification of equation (2) implies that the regulatory variables as well as the country and industry fixed effects translate only into differences in MFP levels, and not into permanent differences in growth rates of MFP. However, policies may speed up the rate at which the frontier is reached. In this paper, the speed-up effects estimated in Nicoletti and Scarpetta (2003) were ignored given they do not, in principle, change the level of MFP a country achieves in the long-run. Instead, the impact of reforms is based on the estimated coefficients on two regulatory indicators that serve as a reasonable proxy for inward-oriented regulation: scope of the public enterprise sector and barriers to entry in the services sector.[26]

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26.   Data for the scope of the public enterprise sector are preliminary estimates from the 2003 PMR indicator project, in this version of the paper, barriers to entry in the services sector is an estimate derived from the change in the indicator of "legal barriers" between 1998 and 2003 in the PMR indicator database. Revised versions of the paper will incorporate an updated 2003 measuresof both of these indicators.

A3   Impact of policy reforms using the GTAP model

A3.1   Overview of the model and data

53.   The analysis presented at the end of Section 5 of the main paper is conducted using a static, perfect competition, global general equilibrium model developed at the Global Trade Analysis Project (GTAP)[27] centre and the most recent version of the GTAP database (version 6). The GTAP model and database incorporate detailed information on economic structures and economic policy instruments of all major world economies. The model allows for substitution between different sources of imports, between imports and domestic supplies and between different goods in production and demand. Primary factors of production (labour, land and capital) are given in fixed amounts and are assumed to be fully employed. Labour and capital move across all sectors of production and land moves across agricultural sectors.

54.   In addition to whether perfect competition is assumed or not, results from all applied partial and general equilibrium models used for trade policy analysis depend crucially on trade elasticities McDaniel and Balistreri, (2002). Reflecting difficulties with their econometric estimation, the elasticities used in applied trade analysis are typically assumed to vary by sector but not across countries. The set of elasticities employed in GTAP also reflects this assumption. Hence, the country specificity in terms of responsiveness of trade volumes to trade prices is captured solely by countries' composition of imports (*e.g.* a given country's imports being concentrated in high or low import demand elasticity products).

55.   The dataset used for the simulations is version 6.0 of the GTAP database, comprising data with a base year of 2001 and covering 57 broad economic sectors and 87 countries. The distinct advantage of data in GTAP 6.0 is that it fully integrates the information on bilateral *ad valorem* tariffs (both MFN and preferential), *ad valorem* equivalents of specific tariffs (MFN and preferential), as well as tariff rate quotas from CEPII/ITC Market Access Maps (MAcMap) database.[28]   The resulting *ad valorem* equivalent measure of applied protection is thus a comprehensive measure of protection that is consistent across all bilateral trade flows. Border protection is specified bilaterally. Due to the level of data aggregation, each bilateral *ad valorem* equivalent measure of applied protection included in the database may combine the information on MFN and any preferential market access as well as the actual composition of trade within this product category. Thus, bilateral protection rates for a given product category vary from one country pair to another. These equivalent measures of applied protection are used in the tariff reduction simulations presented in the paper.

A3.2   Detailed results

56.   Detailed results of the overall tariff liberalisation and productivity boost simulation discussed in the main text are provided in Tables A2 and A3. In Table A2 the impact of the reforms on the volume of exports, the price of exports, and the terms of trade are seen. This shows that reforms boost export levels in all areas, although terms of trade effects can be negative. In Table A3 the impact of the reforms on welfare, per-capita welfare, and GDP are seen. The measure of change in welfare reported is the equivalent variation in income measured in millions of US 2001 dollars.[29]

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27.   The model is documented in Hertel (1997).

28.   The dataset is documented in detail in Bouët *et al.* (2004).

29.   Equivalent variation in income is the money metric equivalent of the utility change brought about by the price change.

Table A2. Impact of tariff cuts and a boost in productivity on trade using the GTAP model

	Change in the volume of exports			Change in price index of exports			Change in terms of trade		
	Total	MFP component	Tariff component	Total	MFP component	Tariff component	Total	MFP component	Tariff component
Australia	6.96	2.09	4.86	-1.05	-1.38	0.33	-0.01	-0.25	0.25
New Zealand	1.93	1.35	0.57	2.36	-1.30	3.66	3.76	-0.10	3.86
Japan	3.03	-1.77	4.80	-0.34	-0.78	0.44	0.86	0.41	0.45
Korea	6.14	1.56	4.58	-0.95	-1.29	0.35	-0.02	-0.18	0.17
Rest of World	1.69	1.45	0.24	-0.66	-1.22	0.56	0.60	-0.08	0.68
China	3.20	1.11	2.09	0.38	-1.19	1.57	1.25	-0.07	1.32
North East Asia	1.17	0.76	0.40	-0.10	-1.14	1.04	0.72	-0.01	0.74
South East Asia	0.55	0.65	-0.10	-0.22	-1.13	0.91	0.66	0.00	0.66
India	2.87	2.56	0.31	-0.83	-1.45	0.62	0.23	-0.31	0.54
Canada	4.02	1.27	2.76	-2.23	-1.25	-0.98	-0.59	0.02	-0.61
US	8.21	2.52	5.69	-2.03	-1.39	-0.64	-0.79	-0.26	-0.53
Mexico	8.98	1.44	7.55	-3.27	-1.28	-1.99	-1.78	-0.03	-1.75
Latin America	2.57	2.24	0.34	0.36	-1.47	1.84	1.55	-0.25	1.80
Austria	1.60	1.15	0.45	-1.72	-1.04	-0.68	-0.21	0.04	-0.25
Belgium	2.35	1.43	0.93	-1.99	-1.10	-0.88	-0.52	0.00	-0.52
Denmark	0.81	1.14	-0.33	-0.98	-1.08	0.10	0.54	0.01	0.52
Finland	2.07	0.87	1.20	-1.68	-1.05	-0.62	-0.39	0.03	-0.42
France	2.45	0.83	1.62	-1.91	-1.03	-0.88	-0.42	0.06	-0.48
Germany	2.26	0.69	1.57	-1.67	-1.00	-0.68	-0.24	0.11	-0.35
Great Britain	3.91	0.85	3.06	-1.94	-1.04	-0.90	-0.52	0.09	-0.62
Greece	4.84	-0.27	5.12	-2.28	-0.81	-1.46	-0.96	0.28	-1.24
Ireland	2.93	1.82	1.11	-1.86	-1.19	-0.67	-0.34	-0.08	-0.25
Italy	2.02	-0.36	2.39	-1.61	-0.85	-0.75	-0.21	0.26	-0.47
Luxembourg	1.52	1.48	0.04	-1.78	-1.07	-0.72	-0.08	0.02	-0.10
Netherlands	2.52	1.01	1.52	-2.20	-1.02	-1.17	-0.91	0.10	-1.01
Portugal	2.22	0.09	2.13	-2.09	-0.87	-1.22	-0.52	0.21	-0.73
Spain	3.58	1.20	2.38	-1.91	-1.07	-0.84	-0.48	0.01	-0.49
Sweden	1.57	0.72	0.86	-1.41	-1.01	-0.40	0.06	0.08	-0.02
Switzerland	4.44	0.90	3.54	-1.47	-1.04	-0.43	0.09	0.07	0.02
Rest of EFTA	2.96	0.74	2.22	-1.14	-0.95	-0.18	0.31	0.14	0.16
Rest of Europe	2.07	1.80	0.28	-1.29	-1.19	-0.10	0.16	-0.13	0.29
Rest of EU	0.20	0.68	-0.48	-0.77	-1.01	0.24	0.64	0.06	0.58
Turkey	4.36	0.99	3.37	-0.83	-1.10	0.26	0.45	0.01	0.44
MENA	1.01	1.20	-0.19	-1.27	-1.20	-0.07	0.02	-0.06	0.08
Sub-Saharan Africa	1.36	1.26	0.10	-0.90	-1.21	0.31	0.34	-0.06	0.40
Czech Republic	6.15	1.80	4.36	-1.90	-1.11	-0.79	-0.41	-0.06	-0.35
Poland	7.40	0.18	7.22	-1.54	-0.88	-0.66	-0.12	0.20	-0.32
Hungary	4.33	1.92	2.41	-1.26	-1.17	-0.08	0.11	-0.11	0.22
Slovakia	5.40	1.47	3.93	-1.54	-1.02	-0.52	-0.06	0.04	-0.11

Source: Simulation of the standard GTAP model based on GTAB 6.0 database..

Table A3. Impact of tariff cuts and a boost in production on welfare using the GTAP model

	Welfare (equivalent variation, US$ million)			Per capita welfare (% change)			Real GDP (% change)		
	Total	MFP component	Tariff component	Total	MFP component	Tariff component	Total	MFP component	Tariff component
Australia	2,685	1,301	1,384	0.84	0.41	0.43	0.70	0.57	0.13
New Zealand	1,850	642	1,208	4.08	1.42	2.66	1.49	1.30	0.20
Japan	102,262	67,373	34,889	2.86	1.88	0.98	2.21	1.50	0.71
Korea	16,392	6,467	9,925	4.34	1.71	2.63	3.67	1.58	2.09
Rest of World	1,155	-838	1,993	0.31	-0.22	0.53	0.09	-0.03	0.12
China	6,298	-156	6,454	0.60	-0.01	0.61	0.14	0.00	0.14
North East Asia	2,262	-636	2,897	0.53	-0.15	0.67	0.05	0.00	0.06
South East Asia	3,627	-539	4,166	0.53	-0.08	0.61	0.04	0.00	0.05
India	442	-480	922	0.10	-0.11	0.21	0.07	-0.02	0.09
Canada	9,040	10,261	-1,221	1.41	1.60	-0.19	1.60	1.41	0.19
US	85,701	102,471	-16,770	0.93	1.12	-0.18	1.10	1.10	0.00
Mexico	12,047	12,518	-471	2.20	2.29	-0.09	2.41	2.00	0.40
Latin America	4,888	-2,300	7,188	0.40	-0.19	0.58	0.02	-0.04	0.06
Austria	3,599	3,694	-95	2.19	2.24	-0.06	1.96	1.83	0.13
Belgium	4,487	5,407	-920	2.21	2.66	-0.45	2.32	2.20	0.12
Denmark	1,708	1,989	-281	1.20	1.39	-0.20	0.68	1.21	-0.52
Finland	2,598	2,626	-28	2.45	2.48	-0.03	2.20	2.06	0.14
France	32,996	34,225	-1,229	2.81	2.92	-0.10	2.55	2.46	0.09
Germany	38,020	40,253	-2,233	2.35	2.49	-0.14	2.06	2.04	0.03
Great Britain	20,125	21,236	-1,111	1.56	1.65	-0.09	1.61	1.41	0.20
Greece	3,359	3,265	94	3.28	3.18	0.09	3.25	2.56	0.69
Ireland	2,015	1,750	266	2.15	1.87	0.28	2.19	1.70	0.48
Italy	34,480	35,051	-571	3.59	3.65	-0.06	2.99	2.85	0.15
Luxembourg	442	465	-22	2.57	2.70	-0.13	2.27	2.21	0.06
Netherlands	6,135	7,439	-1,304	1.82	2.20	-0.39	2.03	1.80	0.23
Portugal	2,811	2,975	-164	2.87	3.03	-0.17	2.71	2.47	0.24
Spain	13,886	14,818	-932	2.68	2.86	-0.18	2.45	2.41	0.05
Sweden	4,516	4,208	307	2.32	2.16	0.16	1.91	1.75	0.16
Switzerland	10,435	5,705	4,731	4.85	2.65	2.20	3.82	2.16	1.66
Rest of EFTA	6,153	4,695	1,457	3.94	3.01	0.93	3.07	2.38	0.69
Rest of Europe	-61	-212	151	-0.07	-0.26	0.18	0.00	-0.03	0.03
Rest of EU	242	-18	260	0.48	-0.04	0.51	0.02	-0.01	0.03
Turkey	5,470	4,427	1,043	4.17	3.37	0.79	3.26	2.82	0.44
MENA	-1,392	-1,604	212	-0.18	-0.20	0.03	-0.01	-0.03	0.02
Sub-Saharan Africa	-82	-637	556	-0.03	-0.22	0.19	-0.05	-0.04	-0.01
Czech Republic	1,351	1,391	-40	2.79	2.87	-0.08	2.42	2.40	0.01
Poland	7,573	6,570	1,004	4.86	4.21	0.64	4.15	3.50	0.65
Hungary	2,008	1,575	433	4.45	3.49	0.96	3.37	2.95	0.42
Slovakia	262	278	-15	1.49	1.57	-0.09	1.20	1.30	-0.10

Source: Simulation of the standard GTAP model based on GTAP 6.0 database.

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