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The Impact of Trade Liberalisation on Jobs and Growth

TECHNICAL NOTE

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Abstract

THE IMPACT OF TRADE LIBERALISATION ON JOBS AND GROWTH: TECHNICAL NOTE

by

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This report shows how more open markets in goods and services can contribute to creating jobs and increase incomes. Reducing tariffs and non-tariff barriers can help in the short run where the economic crisis has led to significant involuntary unemployment by reducing costs of imported products for consumers and by providing new market opportunities for exporters. Taking a longer term view of a more healthy global economy, lasting gains can be found from reallocation of resources across sector and from productivity growth. Reducing barriers to foreign direct investment in services is found to particularly increase demand for higher skilled labour, while the offshoring of services is not found to shift jobs abroad. The report presents in detail new results based on two large scale global computable general equilibrium models, one for goods and one for services, using novel approaches to assess the effects of reducing trade costs related to non-tariff measures, and to assess the effects of regulatory impediments to foreign direct investment in services. The analysis disentangles the effects of actions that the G20 economies could take from the potential effects of global tariff liberalisation efforts in which all countries would participate.

JEL Classification: F4, F12, F13, F16

Keywords: Trade liberalisation, non-tariff measures, global economy, general equilibrium models, services, foreign direct investment.

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Executive Summary

How can improved market access in goods and services bring about better labour market outcomes and reduce unemployment in major economies? As the rigour and sustainability of the post-crisis recovery will depend to no small degree on the answer to this question, it needs to be addressed carefully and methodically. This report attempts to do just that: it considers the economic implications of improving several border and behind-the-border measures that can be influenced by policymakers, including the reduction of trade costs in goods markets and the reduction of trade cost in foreign direct investment (FDI) in services. New results are presented that are based on multi-country models and from new econometric results that aim at quantifying the linkages between various trade costs and FDI in services. While the focus is on actions that G20 economies could take by themselves, the study also examines potential effects of global liberalisation efforts in which all countries would participate.

The results show that more open markets can continue to make positive contributions to income, employment and productivity growth. While more open trade in goods can help in the short run to reduce unemployment in those economies where the current economic crisis has led to significant involuntary unemployment, the long run benefits stemming from increased economic activity and productivity growth are even more substantial.

Beginning with analysis of trade in goods, this report examines the economic consequences in general, and the effects on workers via labour markets and earnings in particular, of more liberal tariff and non-tariff measure (NTM) regimes. The computable general equilibrium (CGE) model policy scenarios include reductions in not only current tariff barriers but also NTMs in a range of measures that increase the cost of trade. The current level of tariffs in many of the OECD Members of the G20 (at least on industrial goods) are already relatively low, but globally there remain significant tariff "spikes" and other barriers to international commerce.

The report examines these issues in two settings: the first in a recessionary environment, and the second over a longer-term horizon without high levels of involuntary unemployment. The analysis is based on a multi-regional CGE-model of the global economy and the latest version of the Global Trade Analysis Project (GTAP) database (Version 7.0). The calculations are also based on recent surveys and econometric estimates of the level of NTMs, based on recent studies of NTMs affecting European Union-Japan and European Union-United States trade.

Using these new estimates of the trade cost impact of NTMs, we find that NTMs are at least as — if not, more — important than prevailing tariff rates in obstructing trade. This is true even in the more sensitive, and hence protected, industrial goods sectors (like motor vehicles and processed foods). In addition, because NTMs tend to involve "deadweight" costs — and do not raise tariff revenues like tariffs — the welfare costs are much larger for an NTM than a comparable tariff. At the same time, the relative importance of NTMs compared to tariffs for individual G20 Members is shown to depend on national trade and policy structures. Hence, this report combines trade cost

estimates with a computational model of the world economy to estimate the potential economic implications of a more liberal tariff and NTM regime for economic growth, employment, and wages.

The estimates reveal consistent positive labour market impacts across the G20 under a recession setting. For one cohort of countries (Argentina, Brazil, United States, Japan) the employment impact in terms of jobs gained generally lies in a range of 0.3% to 0.7% for lower skilled workers, and higher for high skilled workers. In a second cohort of countries, including EU member states, Mexico, Korea, and South Africa, the estimated positive effects are expected to be even greater, ranging generally from between 1% and 3.4% for lower skilled workers in the long-run, and as high as 4 to 5% (i.e. Mexico under recession, Korea in the long-run). In short, in a recession context, liberalising trade in terms of lowering tariffs and reducing obstacles related to NTMs would imply a strengthening of labour markets and lower unemployment. In the longer run, lower trade cost would imply higher labour productivity and wages as well as greater active labour market participation.

Given their collective weight in the global economy, further trade liberalisation by G20 countries can make a substantial contribution to income growth. However, if all countries were to participate in lowering trade barriers, even if focussing just on tariffs, the effect on global income would be greater by a factor of 1.5. Most of the additional gains would be reaped by non-G20 countries, as their market opening would benefit their own economies by making imports available at lower prices.

Next, the report considers the (partial) removal of policies that discriminate against FDI in services. The results show generally positive effects on labour market outcomes, even if the first-round effect of that liberalisation is to generate productivity improvements in foreign-invested firms that would, in the first instance, reduce their unit labour requirements. While all G20 economies would see productivity improvements in foreign-invested firms, these are particularly pronounced in Brazil, China, Mexico and Russia.

In almost all cases, the long-run labour market implications of FDI liberalisation in G20 countries are positive. To the extent that there are adjustment costs, most of the reallocation is within sectors — from domestic to foreign-owned firms. This is likely to be far less costly for workers, especially for skilled labour, in terms of retraining and job search costs, than reallocation across sectors.

Overall, liberalisation of measures that discriminate against foreign services suppliers by the G20 is projected to provide higher economic well-being than would otherwise be the case, about ten years after the reforms. In view of the already low border barriers to FDI in G20 economies, the global real income gains are estimated to be positive but relatively modest. Labour market effects are projected to be positive, with real wage gains of up to 0.7% in the G20 group.

Finally, this report considers the impact of liberalising regulations affecting FDI and employment. The results demonstrate that reforms of behind–the-border regulation have a larger effect on FDI stocks and flows than FDI border liberalisation. Given the current level of regulation in most OECD and G20 countries, regulatory reforms related to recognition of equivalent foreign qualifications, standards, and harmonising and simplifying licensing systems would be most effective in attracting foreign investors as well as enhancing the competitiveness of local services suppliers and their customers.

FDI in services appears to have no significant impact on employment of medium-skilled workers, while unskilled workers are adversely affected and employment of highly skilled workers increases. FDI in services thus appears to dampen the squeeze of the medium skilled workers somewhat, but does contribute to a shift away from low-skilled workers and towards high-skilled workers. Services offshoring through FDI is found not to shift jobs abroad.

In sum, the report underscores that further market liberalisation can yield substantial benefits to the economies of the G-20 and their workers. The most significant results stem from lowering barriers to trade in goods and services via reform of non-tariff and behind–the-border impediments to trade and FDI, which tend to be the most difficult to reform. At the same time, reducing remaining tariff barriers globally would yield substantial gains, particularly for countries maintaining them. The results also show that further opening markets for goods and services would contribute to easing global imbalances, as exports of surplus countries would grow less than their imports, while exports of deficit countries would grow faster than their imports. Our results suggest that the attendant benefits to G-20 economies would be large and, hence, worth the effort.

THE IMPACT OF TRADE LIBERALISATION ON JOBS AND GROWTH: TECHNICAL NOTE

1. Introduction

As the world emerges from the global financial crisis, unemployment remains high, particularly in some of the major economies of Europe and North America. Accordingly, there is considerable interest in whether further trade liberalisation could contribute to job creation, both in these economies and in others that trade with them.

This report examines potential income and labour market implications of improving market access in goods and in services, focussing on actions that the G20 economies could take, but also looking into global liberalisation efforts. The current level of tariffs in many of the OECD Members of the G20 (at least on industrial goods) are already relatively low, and consequently reductions of trade barriers related to non-tariff measures (NTMs) are a key issue in defining scope for reducing barriers to international commerce. Likewise, trade in services is subject to many barriers that have their origin in behind–the-border measures related to domestic regulations. In addition, because NTMs tend to involve deadweight costs rather than tariff revenues the welfare costs are much larger for a comparable tariff barrier. Most NTMs are based on domestic regulations that address certain market failures, and they are put in place to ensure that imported products comply with the same standards and regulations as domestic products. Trade costs, and trade frictions, arise from differences in regulations and their implementation. Obviously, the total elimination of these NTMs is not a feasible option, and one has to acknowledge that a certain amount of trade costs related to those measures will always exist. This report takes this reality into account and estimates only the effects of reducing that part of the trade costs associated with NTMs that can be simplified.

Services account for about 65% of GDP of the G20 group, ranging from 32% in Saudi Arabia to 71% in United States in 2007. Services are even more important for employment with the employment share ranging from 40% in Indonesia to 78% in United States. Skills-biased technological change and globalisation have been seen as competing explanations for skills upgrading, growing income inequality and stagnant wages among unskilled and semi-skilled workers. However, the most recent evidence suggests that trade and technology are two sides of the same coin. Technology leads to skills upgrading, while trade and foreign direct investment (FDI) facilitate the diffusion of technology as well as providing incentives for investing in technology that improves productivity and competitiveness.

Foreign direct investment is the most important channel through which services are traded. Available estimates suggest that about 50% of services trade is through commercial presence. This report therefore concentrates on barriers to FDI in services.

This report uses economy-wide models that contain upstream and downstream linkages between sectors as well as trade and investment flows between countries. The two computable general equilibrium (CGE) models, one focussing on goods and the other focussing on foreign direct investment in services, used in this study are fuelled by new econometric estimates of trade barriers and investment. These estimates reveal that sometimes substantial barriers to trade remain that are

not related to tariffs, import quotas or similar traditional trade policy instruments. The subsequent model simulations show significant welfare gains from reducing restrictions that result from behind–the-border measures, both in goods trade and in FDI in services.

The expected outcomes for employment are overwhelmingly positive. In a recession context, liberalising trade in terms of lowering tariffs and making NTMs less trade restrictive would imply a strengthening of labour markets and lower unemployment. In the longer run, lower trade cost would imply higher labour productivity and wages as well as greater active labour market participation.

This report is structured as follows. The next chapter examines the labour market implications of improving markets access in goods by G20 countries. It does so in two settings: one is a recessionary environment and the other is set in a longer-term horizon without high levels of involuntary unemployment. The analysis is based on a multi-regional CGE-model of the global economy and the latest version of the Global Trade Analysis Project (GTAP) database. The calculations are also based on recent surveys and econometric estimates of the level of NTMs, based on recent studies of NTMs affecting European Union-Japan and European Union-United States trade.

Chapter 3 looks at the possible effects of liberalising barriers to FDI in a number of services sectors in both the short (with factor market rigidities) and long run (where all factors can adjust). It is assumed that the liberalisation is targeted just at foreign-invested firms, and leaves untouched regulatory restrictions that also affect domestically-owned services suppliers. It therefore concentrates on border measures that discriminate against foreign investors. A multi-regional CGE model of the global economy is used that has an explicit treatment of FDI. The FTAP model makes use of information on regulatory barriers to FDI that has been compiled by the OECD. It also makes use of econometric estimates of the extent to which FDI stocks can be expected to respond to changes in foreign investment barriers.

Chapter 4 examines the employment impacts of lowering behind–the-border restrictions on inward FDI as well as outward FDI It employs econometric techniques to estimate labour demand equations that distinguish between three skills categories (low-skill, medium skill and high-skill) in order to discern the impact of FDI, and lower barriers, on the skills composition as well as the overall level of labour demand. By specifically looking at outward FDI it sheds light on the domestic employment effects of offshoring services.

Finally, Chapter 5 provides concluding remarks.

2. Labour market impacts of reductions in non-tariff measures and tariffs on goods by the G20

In this chapter we examine labour market consequences of more liberal tariff and NTM regimes in the G20 member countries. This involves quantitative modelling (i.e. the use of a CGE model) of policy scenarios that include reductions in current tariff barriers as well as reductions of NTMs originating from a range of measures that increase the cost of trade. Given that the current level of tariffs (at least on industrial goods) in many of the OECD Members of the G20 are already relatively low, reductions of NTMs are a key issue in defining scope for reducing barriers to international commerce. We also look at the effects of global liberalisation, whereby all countries would reduce MFN tariffs.

This chapter puts some emphasis on the analysis of NTMs, an area that is more difficult conceptually, as well as in terms of achieving progress in reducing their trade hindering effects than tariffs. However, the analysis will reveal that tariff reductions remain an important source for income and employment gains, particularly if those efforts include all countries.

The next section will summarize the findings of previous studies on non-tariff barriers. This is followed by a descriptive analysis of both tariff and NTMs in G20 countries. The following sections will discuss the policy scenarios and the results, focusing on output, income, employment, wages, and trade effects under the different policy scenarios. The last section will conclude. More details about the model and the data used can be found in Annex 2.A and detailed results for all scenarios are found in Annex 2.B.

Previous studies on non-tariff measures

While there has been significant progress in lowering barriers to international trade linked to tariffs, the policy relevance of non-tariff measures (NTMs) has increased.[1] The reason for the greater attention to NTMs is three-fold. First, as the level of tariffs has decreased, the relative importance of NTMs has increased. In addition, during this time, significant progress has been made in terms of quantifying the effects of NTMs, leading to a better understanding of the costs these barriers impose on the cost of doing business. And finally, there is some evidence of NTMs being used as substitution for the tariffs that have been reduced.

The welfare effects of NTMs are less obvious than the economic costs associated with tariffs and quota. Most NTMs are based on domestic regulations that address certain market failures, such as information asymmetries about a product's quality or assuring product safety. NTMs are put in place to assure that imported products comply with the same standards and regulations as domestic products. By aiming at solving market failures they bring wider economic benefits to society, but also lead to trade costs for foreign suppliers. Those trade costs, and trade frictions, arise from differences in regulations and their implementation. The WTO recognizes the right to regulate to meet domestic policy objectives, but at the same time calls on its members to design regulations in such a way that they do not impose inappropriate barriers to trade. This chapter addresses this issue by isolating that part of the trade costs associated with NTMs that could feasibly be reduced, while acknowledging that a certain amount of trade costs related to those measures will always exist.

1. Following what is now standard practice, Non-Tariff Measures, NTMs are defined here as "all non-price and non-quantity restrictions on trade in goods, services and investment, at federal and state level. This includes border measures (customs procedures, etc.) as well as behind-the border measures flowing from domestic laws, regulations and practices." Some of these are deliberate barriers, while others follow from legitimate application and cross-country variations in regulations.

While much focus in the ongoing WTO Doha Round of trade negotiations is on tariff reductions, non-tariff measures are being discussed in various parts of the negotiations as well. Some initiatives are horizontal (such as transparency), while others are vertical and policy specific.

In the NAMA (non-agricultural market access) negotiations, besides reduction of tariffs, the talks are seeking to reduce the incidence of NTMs, in particular on products of interest to developing countries. The NTM component covers a mix of substantive and procedural measures which WTO members have raised, including import licensing, Technical Barriers to Trade and export taxes.

The Negotiating Group on Trade facilitation seeks to clarify and improve aspects of Articles V, VIII and X of GATT 1994. These articles take up Freedom of Transit, Fees and Formalities connected with importation and exportation, and Publication and Administration of Trade Regulations. This is an example of a horizontal effort with the goal to improve efficiency of trade by harmonising and streamlining customs procedures such as duplicative documentation requirements, customs processing delays, and non-transparent or unequally enforced import rules and requirements.

Another horizontal initiative takes place in the Rules Negotiating Group, where negotiations are reviewing the WTO antidumping and subsidy disciplines with the aim "to clarify and improve disciplines" under the *Agreements on Implementation of Article IV of GATT 1994* (AD) and on *Subsidies and Counterveiling Measures (ASCM)*. This involves mainly defining more concretely procedural aspects of governments' handling of their national antidumping and counterveiling duty investigations. A successful outcome of negotiations would close loopholes that make these remedies currently very easy to use. The mere existence of easily usable trade remedies, and the threat of use, can deter exporters from shipping their goods and can acts as NTM.

A sectoral approach is followed in the Committee on Trade and Environment which negotiates the reduction of tariffs as well as NTMs on environmental goods and services. And a sectoral approach is also taken in the negotiations on Agriculture, which include market access as well as domestics support policies that are considered to be trade distorting.

The effects of NTMs are relatively less researched than those of tariffs. Table 2.1 contains a summary of some previous studies on quantifying NTMs that are of interest and serve as background for this particular study. While the list of studies is not comprehensive, it's aimed to be representative. (For a survey on previous studies on NTMs in goods, see Anderson and van Wincoop 2004. For services, see Francois and Hoekman, 2010.) Basically, the literature can be categorized into two broad groups. The first study grouping contains overviews and assessments of available NTMs and surveys of existing literature. Amongst these studies are a number of OECD studies, i.e. OECD (2000) on technical standards and conformity, OECD (2001) on sanitary, phytosanitary and technical barriers to trade, OECD (2005) on Customs fees and charges on imports, OECD (2006) on the review of different methods for assessing NTMs and the OECD (2009) on assessments in agro-food trade.

We focus on recent EC studies that provide estimates of NTM levels – i.e. the ECORYS-led study on NTMs on European Union-United States Trade and Investment, and the Copenhagen Economics-led study on European Union—Japan trade. Both studies make use of a recent business survey originating in the Ecorys study (which is summarized below). The Copenhagen Economics-led study supplemented these with direct questions on cost impacts, similar to some of the OECD studies on cost impacts of regulatory differences.

Table 2.1. Overview of recent studies on NTM measures and estimating levels of NTMs

Study	Focus of the Study
An assessment of the costs for international trade in meeting regulatory requirements, OECD (2000)	To find out to what extent technical standards and conformity assessment procedures impede trade. Three product groups; Telecommunications Equipment, Dairy and Automotive Components for the United States, the United Kingdom, Germany and Japan. Also aims to quantify different sorts of costs for different sectors by surveying firms, such as costs of ascertaining standards to which products must comply in export markets, costs of testing.
Measurement of sanitary, phytosanitary and technical barriers to trade, OECD (2001)	Survey of available NTM proxies and methods.
Anderson and van Wincoop (2004)	Summarizes available measures of NTMs from the TRAINS data base, coverage ratios per country and industry. Gives the theoretical foundation for the gravity model. (Also gives estimates of tax equivalents based on annual averages of weekly Hong Kong MFA quota license prices for textiles and apparel exported to the United States.) *Summarizes that in total there is a 44% border related barrier for industrialized countries (8% policy, 7% language, 14% currency, 6% information costs and additional 3% security barrier for rich countries*).
Analysis of Non-Tariff measures: Customs fees and charges on Imports, OECD (2005)	Examines the nature and the extent to which use of customs fees and charges affect imports at borders. Incorporates data collected from WTO trade policy Review, NTM notification to NAMA as well as TRAINS.
Quantifying the Trade and Economic Effects of NTMs, OECD (2006)	Reviews the NTM literature and assesses different available methods.
EC-Canada Joint study on European Union-Canada trade	Sets out to examine the existing barriers, including NTMs, to the flow of goods, services and capital between the European Union and Canada. *Contains discussion on examples of measures that are perceived as NTMs, but no quantifications.*
Anderson, Bergstrand, Egger and Francois (2008)	Describes the theoretical foundations underlying a methodology pursued to analyse the economic impact or NTMs on international trade flows and to convert perceived NTMs into *ad valorem* trade cost equivalents for computing subsequent general equilibrium comparative statics.
EC study on NTM estimates: (2009)- carried out by Ecorys	Estimates European Union-United States, United States-European Union NTMs and the potential effects of removing them, using gravity equation approach- as presented in the Anderson et al (2008) study. NTMs were quantified using inputs from a business survey on both sides of the Atlantic. These indexes were then used as input in gravity estimates, yielding ad valorem equivalents of NTMs between countries at sectoral level.
EC study on European Union- Japan Trade (2009)- carried out by Copenhagen/IIDE	Aims to assess the current barriers to trade and investment between European Union and Japan. Incorporates inputs from the Ecorys NTM study, complemented with additional survey for EU firms operating in Japan, gravity estimates to calculate trade cost equivalents of NTMs at sectoral level for goods and services.
A cost-benefit framework for the assessment of non-tariff measures in agro-food trade: OECD (2009)	Sets up an analytical framework to assess the costs and benefits of NTM for stakeholders along the supply chain in agro-food sectors.
Francois and Hoekman (2010)	Surveys the literature on services trade, focusing on contributions that investigate the determinants of international trade and investment in services, the potential gains from greater trade, and efforts to cooperate to achieve such liberalisations thru trade agreements.

The second part of this literature is aimed more directly at providing estimates of the impact of barriers.

The EC NTM project led by ECORYS (2009) had the stated goal of trying to "shed light on the existence of nontariff measures (NTMs) and regulatory divergence at the sector level of European

Union-United States trade." Furthermore, the study aimed to estimate the magnitude of this divergence and to the calculate the potential economic impact of a reduction or harmonisation of these measures.

The basis for the estimation in the study comes from an extensive business survey incorporating firms originating in the European Union, United States and third countries, operating in the European Union and/or United States. (The survey is described further below.) The results from the survey were incorporated in a set of econometric models, using the Anderson et al methodology (outlined in the report) to estimate current levels of NTMs impacting United States-European Union trade The use of a gravity model allowed for calculation of *ad valorem* equivalents of NTMs. These were then used as basis for further analysis using a Computable General Equilibrium (CGE) model aiming to estimate potential effects of lowering current levels on NTMs,

The business survey was based on the following core question:

> "Consider exporting to the United States (EU), keeping in mind your domestic market. If 0 represents a completely 'free trade' environment, and 100 represents an entirely closed market due to NTMs, what value between 0 – 100 would you use to describe the overall level of restrictiveness of the United States (EU) market to you export product (service) in this sector."

Thus, the finished product of the business survey generated bilateral NTM index numbers (between 0 and 100) based on the answers from 5 500 companies, which then were cross-checked against other indicators.[2] These index number were transformed into "levels of trade restrictions", which in turn were used as inputs for gravity regressions. The coefficients emerging from the gravity equation estimates were then used to infer Trade cost equivalents (in ad valorem equivalent terms) resulting from current levels of NTMs (incorporating the Anderson, Bergstrand, Egger and Francois (2009) methodology). The results are summarized in Table 2.2.

As can be seen from the table, the estimated levels of NTM are quite significant. On trade going from European Union to the United States, they generally range from between 35 and 50%, and somewhat lower levels for trade going in to the United States.

In the NTM survey, the firms were also asked whether the NTMs had a discriminatory element, i.e. whether they were being treated differently in the market place than domestic, and other foreign firms operating in the third market. These survey answers were also scaled from 0-100, where 50 implied they considered themselves treated equally, 0 much better and 100 much worse than their international competitors. Using the same approach as above, *ad valorem* equivalents for third countries could be extracted as well.

The Copenhagen Economic study set out to estimate levels of European Union-Japanese NTMs which are then used to calculate trade cost equivalents, expressing the cost impact on cross-border trade of the identified NTMs. The corresponding process of calculating levels of NTMs in manufacturing entailed a very similar process to that described above- here in a three-stage process; one containing a complementing business survey aimed at European businesses operating in Japan, and two based on gravity models (one using a country specific dummy and the other the Ecorys NTM survey index)[3] according to the Anderson *et al*. (above) methodology.

2. More specifically, the OECD restrictiveness indicators and the Product Market Regulation (PMR) indexes (for goods) and the OECD (2007) FDI restrictiveness index (for services).

3. In the Ecorys NTM survey, firms were asked to indicate on a scale of 0 to 100 how restrictive they found exporting to be from their home country to the EU and their other export destinations (including Japan).

Table 2.2. *Ad Valorem* equivalents of overall levels of estimated NTMs on trade by sector in Ecorys NTM study

Sector	European Union—United States	United States—European Union
Travel	36	18
Transport	40	26
Financial Services	30	21
ICT	20	19
Insurance	29	39
Communication	45	27
Construction	45	37
Other business services	42	20
Personal, cultural and recreational services	36	35
Chemicals	46	53
Pharmaceuticals	34	45
Cosmetics	48	52
Biotechnology	46	50
Machinery	51	36
Electronics	31	40
Office, information and communication equipment	38	32
Medical, measuring and testing appliances	49	44
Automotive industry	35	32
Aerospace and Space industry	56	55
Food and Beverages	45	34
Iron, Steel and Metal products	35	24
Textiles, clothing and footwear	36	49
Wood and paper, paper products	30	47

Source: Ecorys (2009).

Tariffs and NTMs in the G20

In this section, we present an overview and comparison of current levels of NTMs and tariffs. For tariffs, we employ detailed product and partner level trade and tariff data that has been aggregated to broad industry aggregates by CEPII and the GTAP consortium. This data was based on tariff data as reported to the WTO which has been supplemented by CEPII data on preferential tariffs.

There are many references in the trade literature to empirical estimates of non-tariff barriers but there are no available specific and comparable estimates for the cost of NTMs across good categories for the full set of G20 countries. In this study, we therefore incorporate our own estimates of *ad valorem* equivalents of NTM estimates. These are based on the Anderson, Bergstrand, Egger and Francois (2009) estimates, combined with the underlying survey data responses for these countries (Ecorys 2009).4

As previously described Ecorys (2009) undertook a sector-specific survey of firms in order to obtain a quantitative measure of non-tariff barriers. The emphasis of the original study was on the bilateral European Union-United States relationship. However, the survey also includes responses on relative rankings of third countries. By using a less detailed aggregation than in the European Union-United States study, we have been able to compile a set of NTM indexes ranking G20 markets for six

4. We thank the EC-DG Trade for allowing use of these data.

broad sectors: processed foods, chemicals, metals, motor vehicles, machinery, and other manufactured goods. These indexes have then been converted to *ad valorem* trade cost equivalents. Specifically, this is accomplished as follows; from the survey data, we extracted NTM rankings for firms operating within the European Union (intra-EU transactions) as well as firms serving the European Union from third countries (extra-EU transactions). In addition, we employ estimates of the cost impact of full reduction of feasibly targeted (actionable) EU NTMs, originating from the ECORYS study, which from the methods used corresponds to a reduction of external barriers to the level faced internally.

The rationale behind this approach is two-fold. First, most NTMs are based on domestic regulations that address certain market failures. In essence this implies that NTMs are put in place to assure that imported products comply with the same standards and regulations as domestic products. Trade costs, and trade frictions, arise from differences in regulations and their implementation. Obviously, "reduction to zero" is not a feasible option for those NTMs. Thus, one has to acknowledge that a certain amount of trade costs related to those measures will always exist. This is the concept of "actionability" as used in this study, and it has no legal connotation. Secondly, the internal market of the European Union provides the most far reaching attempt to date to reduce trade costs by harmonization and mutual recognition of regulations across EU member states. This implies that European Union can be seen as a benchmark of what is achievable in terms of reduction in NTM-related trade costs.

Therefore, by comparing the gap between the extra-EU index levels and intra-EU index level with the gap between third countries and the same corresponding intra-EU index at sector level, we can extrapolate trade cost reductions for third countries based on their rankings relative to the European Union from the indexes. This is based on the trade cost reductions estimated for the European Union itself, as reported in above mentioned ECORYS study. Combined with NTM estimates for primary agriculture[5] (already included in the GTAP database) we have relatively comprehensive set of trade cost equivalents. For our experiments, we have modelled a 50% reduction in NTMs.

Table 2.3 below summarizes the responses of firms operating within the European Union and reporting on barriers encountered on intra-European Union transactions (column C). It also reports on average firm responses by firms from outside the European Union when selling inside the European Union. Finally, column A summarizes, for these aggregate sectors, the estimated cost savings that can be realized when moving from Column B to Column C levels. This is based on the values in Table 2.2, but also reflects an assessment at sector level of the feasibility to reduce barriers identified by firms (the concept of actionability.)

In order to take a closer look, Table 2.4 below presents estimates of the savings from NTM reduction (as a per cent of the value of trade) for selected countries, and compares this to baseline MFN protection from our database. These are reported for two sensitive sectors, processed foods and motor vehicles, where tariff barriers still remain high. Many of the tariffs would be reduced substantially for OECD members if the Doha Round was completed, but this is not reflected in the table. As can be seen from the table, it is clear that NTMs are often higher and thus more important, by our estimates, even in the more protected industrial goods sectors. In addition, because they tend to involve deadweight costs rather than tariff revenues (meaning the trade costs are not collected as government revenue in the case of NTMs) the welfare costs are much higher than for a comparable tariff.

5. N.b. The agricultural NTMs included in the database are 'classical' non-tariff trade instruments such as quota and TRQs. SPS- while TBT-related non-tariff measures are not covered. The database does, however, include estimates of domestic support to agriculture based on the OECD PSE/CSE database.

Table 2.3. NTM indexes in the European Union and the corresponding estimated cost savings

	Savings realized by moving from extra- to intra-EU levels, %*	Extra index	Intra index
	A	B	C
Chemicals (includes cosmetics and pharmaceuticals)	8.6	46.4	19.6
Machinery and equipment	8.7	39.6	17.9
Motor vehicles	17.1	38.3	13.2
Processed foods and beverages	30.1	35.4	15.7
Metals and fabricated metals	3.7	26.6	11.0
Other manufactured goods	1.6	32.9	27.2

* n.b. the notation savings also reflect the feasibility of changing non-tariff measures and so generally there are lower than the estimates shown in Table 2.2.

Table 2.4. Comparison of tariffs and NTM costs

	NTM related trade costs	Tariffs (MFN)
Motor vehicles		
Brazil	27.2	15.5
Canada	2.6	3.8
China	33.9	20.4
European Union	17.1	8.10
India	27.0	17.2
Korea	20.5	8.1
Russia	34.3	15.3
United States	14.9	2.3
Processed Foods		
Brazil	39.5	14.1
Canada	23.3	18.5
China	44.8	13.7
European Union	30.1	21.30
India	36.5	48.1
Korea	37.9	33.5
Russia	69.1	15.7
United States	49.5	6.4

Source: GTAP database for tariffs (based on MacMAPS and WTO data) and our own calculations for NTM rates.

Policy scenarios and results

The main policy scenario on which the analysis is based assumes that G20 member countries implement a 50% MFN tariff reduction as well as a reduction of non-tariff barriers by 50% on an MFN basis.[6] [7] In order to provide some understanding of the separate effects, some decomposition of the relative importance of tariff reductions *vs*. NTM reductions is also provided. A second policy scenario assumes 50% global MFN tariff reduction. All simulated tariff reductions refer to lowering of applied rates, thus neglecting the difficulties arising from the gap between bound rates, as agreed in the GATT/WTO, and actually applied rates. In other words, the tariff reduction scenarios assume that any reductions of bound rates would be sufficiently large to cut applied rates by half.

Furthermore, the analysis is based on two alternative sets of macroeconomic conditions (Annex 2.A7). The first reflects involuntary unemployment in the North American and EU member State economies, as well as South Africa. This is basically an assessment of how different employment conditions would be if the trade liberation considered here (tariffs and NTMs) had already been in place during recession. Under the first set of assumptions, which is a recession setting, we also take a short-run perspective, so that existing capital stock is country- and sector specific. The second set of assumptions reflects a longer term view of a more healthy global economy, with labour markets clearing and changes in employment linked to changes in labour productivity and wage rates.

All scenarios are assessed with a computational CGE model of the global economy (Annex 2.A). The analysis is based on the latest GTAP version, employing world-wide data for 2004, i.e. pre–crisis. The corresponding levels of GDP in 2004 for the OECD members are quite similar to those reported for 2007.

While the CGE modelling approach allows for a consistent numerical tracing of policy effects across markets, sectors and countries it should be acknowledged that the representation of labour markets remains a rough approximation of the complex interactions that exist in reality. In this study two extreme specifications have been chosen that together shed some light on the range of possible labour market outcomes following trade reforms. In the recession setting involuntarily unemployed labour would enter into employment at the given real wage rate as soon as an output expansion requires more labour to be hired. In the alternative setting labour markets always clear, there is no involuntary unemployment, and labour supply responds positively to rising wages.

6. It should be noted that since data for Saudi Arabia was not available, this country was not included in the analysis.

7. Since the European Union has a common external trade policy for all its 27 members the scenarios implement the same policy change for all EU member states, even if only few of them are part of the G20.

Table 2.5. Changes in real income (USD millions of 2004)

	arg*	**aus***	**bra***	**can***	**chn***	**EUZ***	**NEU***	**fra***	**ger***	**ind***	**idn***	**ita***	**jpn***
Recession	2 940	6 512	9 239	9 527	27 963	38 778	21 162	21 177	29 118	9 002	4 048	7 997	58 504
Long-run	10 315	41 963	39 047	50 240	139 710	114 374	74 465	12 6742	152 614	43 470	17 873	123 861	270 728
	mex*	**rus***	**zaf***	**kor***	**tur***	**gbr***	**usa***	**nld***	**nzl**	**nor**	**esp***	**che**	**bgd**
Recession	25 934	16 169	5 792	21 670	3 405	57 849	1 603	12 373	497	5 261	8 901	667	2 918
Long-run	-1 586	51 542	13 505	64 002	21 785	127 000	13 984	66 522	8 106	45 782	68 551	1 950	30 913
	usa	**nld**	**nzl**	**nor**	**Esp**	**Che**	**bgd**	**tha**	**Vnm**	**egy**	**Nig**	**LAS**	
Recession	85 423	14 671	1 672	2 850	19 579	2 871	-15	3 502	1 106	145	519	85	
Long-run	422 467	38 632	7 727	17 312	74 889	17 654	2 018	13 748	2 970	4 664	4 966	1 148	

arg=Argentina, aus=Australia, bra=Brazil, can=Canada, chn=China, EUZ=Eurozone, NEU=Non-Eurozone EU members, fra=France, ger=Germany, ind=India, idn=Indonesia, ita=Italy, jpn=Japan, mex=Mexico, rus=Russia, zaf=South Africa, kor=Republic of Korea, tur=Turkey, gbr=United Kingdom, usa=United States of America, nld=Netherlands, nzl=New Zealand, nor=Norway, esp=Spain, che=Switzerland, bgd=Bangladesh, tha=Thailand, vnm=Viet Nam, egy=Egypt, nig=Nigeria, LAS=Lldcs Asia, LAF=lldcs Africa, ASN=ASEAN plus, DAS=developing Asia, DLA=developing Latin America, DMN=developing N Africa middle east, DAF=developing S Africa, ROW=Rest of World.

* Denotes G20 member country and EU members (also includes European Union Members, as they have a common external trade policy.)

Source: Own calculations.

National income effects and GDP

Results for the G20 scenario (50% tariffs and NTM reductions by G20 countries on an MFN basis)

We first examine the real national income effects of reducing both non-tariff and tariff barriers on a MFN basis by 50% by G20 countries. Table 2.5 presents the impact of this scenario on real income. Lowering trade costs has a positive effect on national income on the short-run for all countries (with the exception of Bangladesh where a tiny decrease would take place). Furthermore, the combination of lower trade costs, higher investment, and higher productivity over the long run would result in even higher positive effects (with the exception of Mexico).

Changes in GDP are presented in Table 2.6 below in percentages. Similarly to the real income effects reported in Table 2.5, both on the short and the long run, positive income effects would take place with liberalisation. As investment effects kick in, together with increased productivity over the long-run setting, all countries are expected to have substantial gains in terms of increase in GDP (with the exception of Bangladesh and Mexico). These increases are estimated to be between 7 and 12%, with the highest levels shown to appear in Asia.

Table 2.6. Real income effects, % change in GDP

	arg*	**aus***	**bra***	**can***	**chn***	**EUZ***	**NEU***	**fra***	**ger***	**ind***	**idn***	**ita***	**jpn***
Recession	1.4	0.77	1.26	0.98	2.91	2.74	1.95	1.12	1.18	2.44	1.64	0.59	1.03
Long-run	7.32	6.88	7.48	5.6	12.13	8.93	7.35	6.92	6.75	9.5	8.03	8.63	7.62
	mex*	**rus***	**zaf***	**kor***	**tur***	**gbr***	**usa***	**nld***	**nzl**	**nor**	**esp***	**che**	**bgd**
Recession	4.61	2.04	2.82	3.15	1.13	2.83	0.89	2.49	0.8	0.25	1.78	0.34	-0.03
Long-run	-0.55	8.22	7.05	12.18	8.8	6.58	4.58	6.94	8.24	6.49	8.55	6.25	5.26
	tha	**vnm**	**Egy**	**nig**	**LAS**	**LAF**	**ASN**	**DAS**	**DLA**	**DMN**	**DAF**	**ROW**	
Recession	0.86	1.05	0.03	0.3	0.17	0.24	0.69	0.08	0.21	0.22	1.04	0.14	
Long-run	10.32	6.09	6.99	7.62	7.34	6.62	11.04	7.52	6.87	7.05	8.36	7.17	

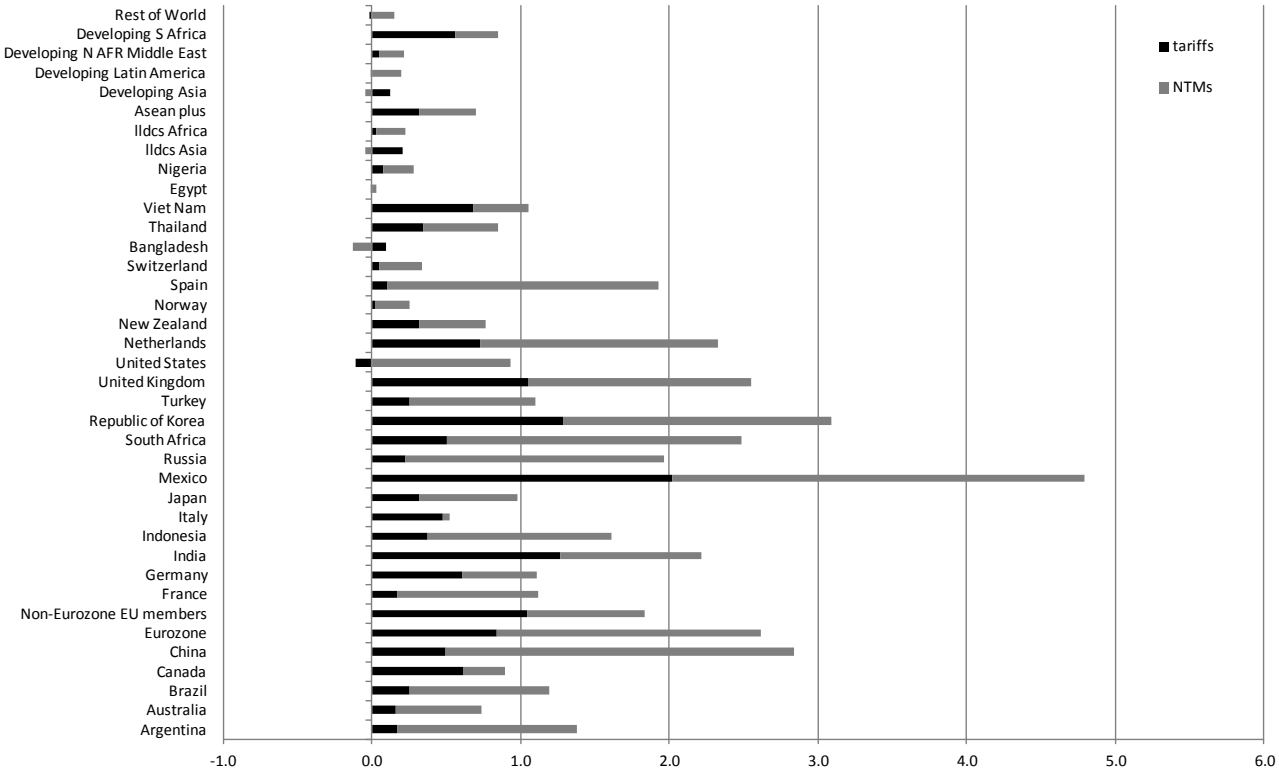
arg=Argentina, aus=Australia, bra=Brazil, can=Canada, chn=China, EUZ=Eurozone, NEU=Non-Eurozone EU members, fra=France, ger=Germany, ind=India, idn=Indonesia, ita=Italy, jpn=Japan, mex=Mexico, rus=Russia, zaf=South Africa, kor=Republic of Korea, tur=Turkey, gbr=United Kingdom, usa=United States of America, nld=Netherlands, nzl=New Zealand, nor=Norway, esp=Spain, che=Switzerland, bgd=Bangladesh, tha=Thailand, vnm=Viet Nam, egy=Egypt, nig=Nigeria, LAS=Lldcs Asia, LAF=lldcs Africa, ASN=ASEAN plus, DAS=developing Asia, DLA=developing Latin America, DMN=developing N Africa middle east, DAF=developing S Africa, RestofWorld=Rest of World.

* Denotes G20 member country and EU Members (also includes European Union Members, as they have a common external trade policy.)

Figure 2.1 depicts the contribution of reduction of tariffs and NTMs towards changes in GDP. For most of the countries the increase in GDP is more driven by NTM reduction than reduction in tariffs. In the case of the United States, for example, reduction of tariffs would not have a positive effect on GDP under the recession scenario, thus the increase in GDP would be solely due to reductions in NTMs. This reflects the relative importance NTMs compared to tariffs for G20 countries among which many countries already have rather low MFN tariff rates. Nevertheless, these results also indicate that there are some countries for which tariffs are also an important barrier to trade, and thus reduction of tariffs would have an important effect on their own economy as well as for exporters that now face tariff barriers.

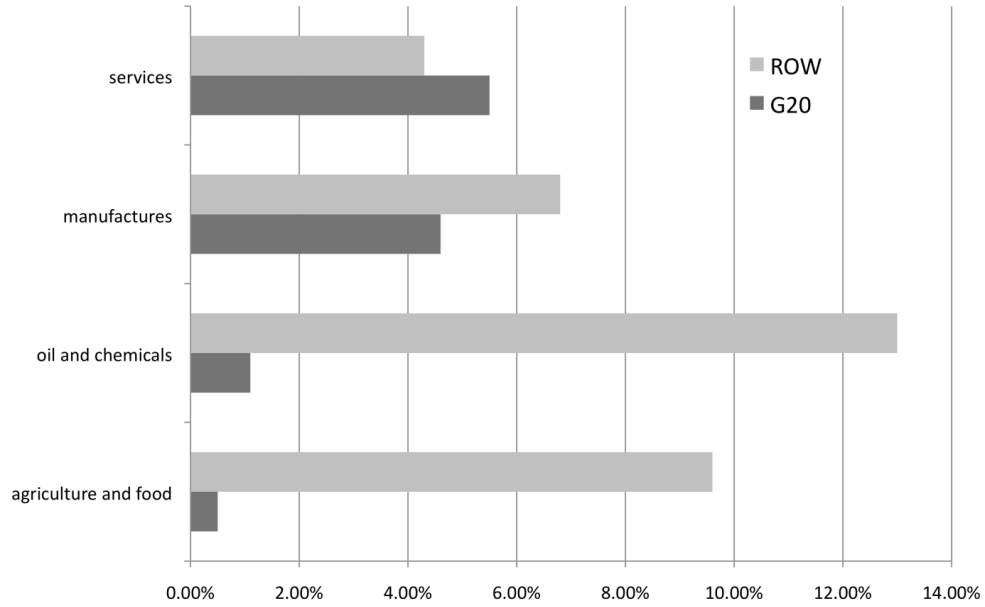
The income gains from reduced trade costs originate from two main sources. First, lower trade costs leads to consumers gaining access to cheaper goods, both from imports of consumer goods at reduced costs and from reduced costs of domestically produced goods, which in turn is an effect of access to cheaper imported inputs. This enables consumers to expand their consumption purchases, which then leads to second round income effects. Meanwhile, exporters will gain access to a larger set of buyers as trading on foreign markets becomes cheaper, and the consequent expansion of output will translate directly into increased incomes. Import-competing industries will experience increased competition from abroad, which will lead to adjustment pressures in those industries that are currently shielded behind trade barriers. However, our analysis shows that on balance the gains exceed the losses in those industries.

Figure 2.1. Breakdown of % change in real GDP in recession setting



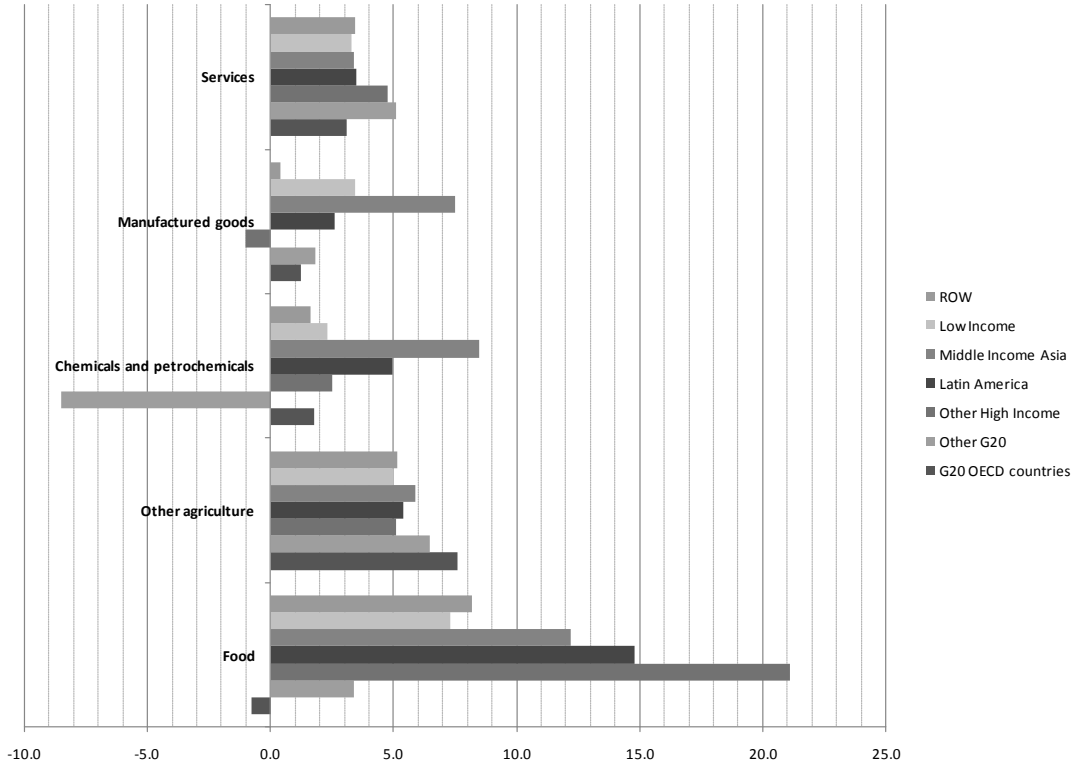
Some indication of the resulting structural changes implied by market opening as modelled here are given in Figure 2.2, which shows the long-run changes in output for broad groupings of sectors for both the economies of the G20 members and for the economies of the Rest of the world respectively. As can be seen from the figure, on aggregate positive output growth is expected in all sectors and in the G20 as well as in the group of all other countries combined. These results imply faster growth in services within the G20 relative to other countries. In other words, NTM reduction and tariff reduction reinforces the structural shift to services, where these economies collectively have a comparative advantage. In agriculture and food, oil and chemicals and manufacturing industries, on the other hand, non-G20 countries are expected to increase their share in global output. Of course, those aggregate figures hide some heterogeneity across individual sectors and across countries. The motor vehicle industry, for example, which is expected to grow relatively fast in Japan and Korea, is expected to register solid growth rates for European car manufacturers, but would lose some ground in the United States

Figure 2.2. Changes in output, long-run



More details on the sectoral distribution of output changes over the short run are shown in Figure 2.3. Reducing trade barriers will result in a slight decline in OECD G20 countries' output in the food sector, and an increase by about 3% in non-OECD G20 countries. On the other hand, all other regions would experience a significant increase in their food sector's output.

Figure 2.3. Changes in output by main sectors and regions, recession closure

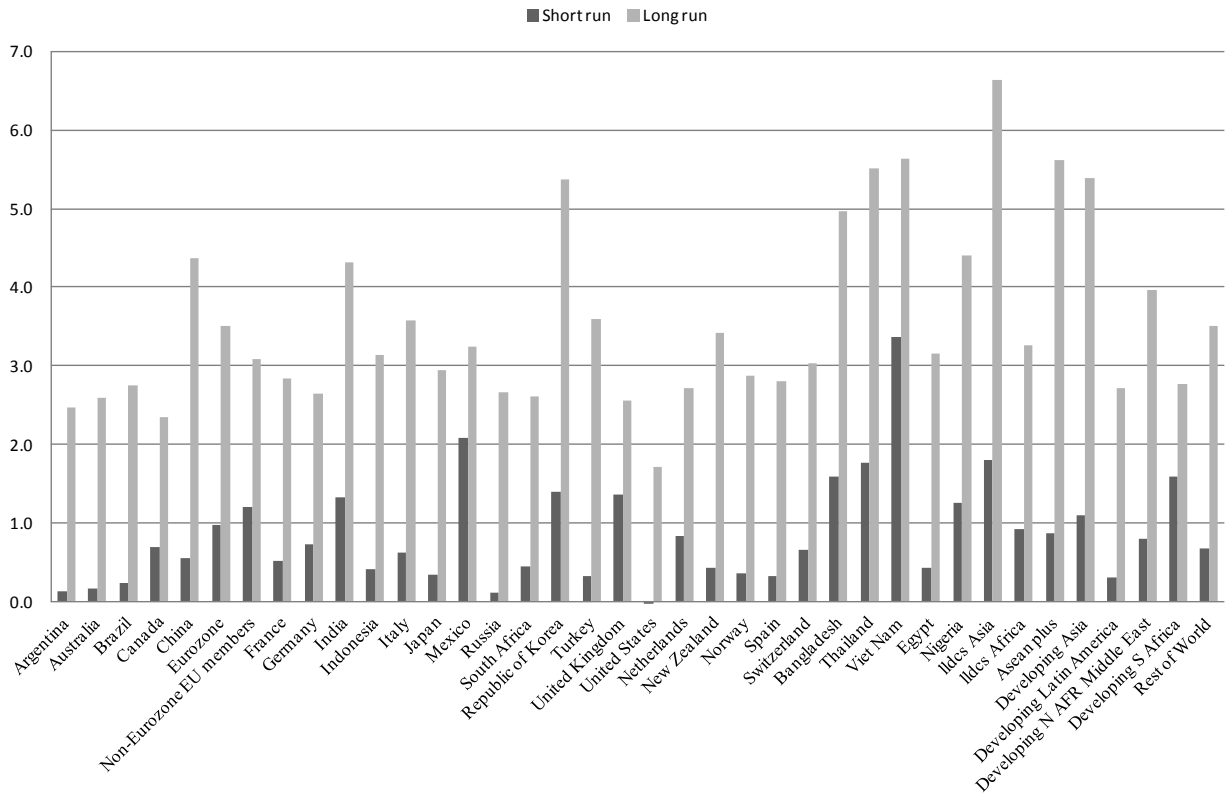


Output in agriculture products would increase in all regions, although for most regions with a lower magnitude than what would take place in the food sector. In manufactured goods and chemicals, the biggest impact would take place in middle-income Asia, with 7-8% increase in output in these sectors. On the other hand, output of chemicals and petrochemicals would drop by about 8% in non-OECD G20 countries. This indicates that the increased competition from non-G20 countries in chemicals and petrochemicals sector would push non-OECD G20 countries to undertake a structural shift towards sectors where they have a higher comparative advantage, such as services.

Results for the global scenario (global 50% tariff reduction)

The impact of our second policy scenario, a 50% reduction in tariffs by all countries, is presented in Figure 2.4 Both over the short run and the long run all countries will experience some increase in their GDP. The effects are considerably larger over the long-run, while on the short-run, only a smaller (less than 1%) increase would take place in most of the countries. However, over the long run, countries would be able to reap the benefits of increased productivity, resulting in rising GDP. The highest increase in GDP, amounting to almost 7%, would take place in least developed Asian countries. There would be several other Asian countries which would see their GDP increasing by more than 4% over the long run.

Figure 2.4. Changes in GDP (%), global liberalisation scenario



Given their collective weight in the global economy, further trade liberalisation by G20 countries can make a substantial contribution to income growth. However, if all countries would participate in lowering trade barriers, even if focussing just on tariffs, the effect on global income could be 50% greater. Most of the additional gains would be achieved in non-G20 countries, as

their market opening would benefit their own economies by making imports available at lower prices. More detail on the income effects by country and by scenario are provided in Annex 2.B.

Employment effects

Results for the G20 scenario (50% tariffs and NTM reductions by G20 countries on an MFN basis)

The impact of our main policy scenario, assuming a 50% reduction in tariffs and NTMs by G20 countries, on employment levels is summarized in Tables 2.7 and 2.8. As can be seen, the measures taken to lower costs of trade are estimated to yield consistently positive labour market impacts across the G20 for lower skilled workers. For one cohort of countries (Argentina, Brazil, United States, and Japan) this generally lies in a range of 0.3% to 0.7%. For a second cohort of countries, including for example EU member states, and also Mexico, Korea, and South Africa, the estimated effects are much more significant. Here, the resulting employment increase ranges between 1% and 3.5%. The impact is generally positive in developing countries, or else small and negative (Egypt, Bangladesh, low income Asia). In the longer-run, impacts are again shown to be consistently positive and even higher, here ranging from 1.2 to 3%. The magnified effect in the longer run emerges from the resulting higher productivity, linked to lower trade barriers, which pulls more workers into the active labour force as firms are able to pay higher wages given greater productivity in the absence of higher trade costs. We return to wage effects below.

Table 2.7. Changes in lower skilled worker employment, (%)

	arg*	**aus***	**bra***	**can***	**chn***	**EUZ***	**NEU***	**fra***	**ger***	**ind***	**idn***	**ita***	**jpn***
Recession	0.55	0.32	0.33	0.78	0.79	2.9	1.8	0.92	0.85	0.6	0.65	0.23	0.61
Long-run	2.31	2.25	1.97	1.74	2.73	2.58	2.36	2.27	2.04	2.12	1.88	2.71	2.32
	mex*	**rus***	**zaf***	**kor***	**tur***	**gbr***	**usa***	**nld***	**nzl**	**nor**	**esp***	**che**	**bgd**
Recession	3.36	0.42	2.56	1.77	0.47	2.7	0.53	2.56	0.56	0.34	2.12	0.2	-0.13
Long-run	0.92	1.85	2.06	3.94	2.6	1.86	1.28	2.53	2.63	2.33	2.67	1.74	0.72
	tha	**vnm**	**egy**	**nig**	**LAS**	**LAF**	**ASN**	**DAS**	**DLA**	**DMN**	**DAF**	**ROW**	
Recession	0.46	0.82	-0.06	0.21	-0.06	0.19	0.58	-0.14	0.14	0.23	1.02	-0.06	
Long-run	2.51	1.81	1.89	2.92	1.24	2.28	2.99	1.23	1.99	2.59	2.44	1.82	

arg=Argentina, aus=Australia, bra=Brazil, can=Canada, chn=China, EUZ=Eurozone, NEU=Non-Eurozone EU members, fra=France, ger=Germany, ind=India, idn=Indonesia, ita=Italy, jpn=Japan, mex=Mexico, rus=Russia, zaf=South Africa, kor=Republic of Korea, tur=Turkey, gbr=United Kingdom, usa=United States of America, nld=Netherlands, nzl=New Zealand, nor=Norway, esp=Spain, che=Switzerland, bgd=Bangladesh, tha=Thailand, vnm=Viet Nam, egy=Egypt, nig=Nigeria, LAS=Lldcs Asia, LAF=lldcs Africa, ASN=ASEAN plus, DAS=developing Asia, DLA=developing Latin America, DMN=developing N Africa middle east, DAF=developing S Africa, ROW=Rest of World.

* Denotes G20 member country and EU Members (also includes European Union Members, as they have a common external trade policy.)

The impact on high skilled workers is presented in Table 2.8. These effects are similar to those for less skilled employment. Across the G20, effects range from a modest 0.2-0.4% (Australia, Brazil, Indonesia, Italy) to a robust 2.3 to 4.9% (Netherlands, Mexico, United Kingdom, other Eurozone). Effects are more evenly spread out and positive in the long run outside a recession environment.

As can be seen from both tables, both Canada and the United States are expected to experience stronger effects outside recession, where a combination of lower trade costs, higher investment, and higher productivity drives both employment and wages higher relative to the recession scenario. Russia and Korea see particularly strong growth in employment in the long-run under this scenario as more workers are drawn into the active labour force.

Table 2.8 changes in skilled workers employment (%)

	arg*	aus*	bra*	can*	chn*	EUZ*	NEU*	fra*	ger*	ind*	idn*	ita*	jpn*
Recession	0.35	0.24	0.41	1.14	0.97	3.14	2.34	1.21	1.06	1.03	0.31	0.44	0.68
Long-run	2.18	2.07	2.18	1.81	2.96	2.6	2.56	2.31	2.06	3.74	1.42	2.72	2.47
	mex*	**rus***	**zaf***	**kor***	**tur***	**gbr***	**usa***	**nld***	**nzl**	**nor**	**esp***	**che**	**bgd**
Recession	4.92	1.11	3.75	1.76	0.53	3.15	0.83	3.01	0.16	0.33	1.95	0.24	-0.28
Long-run	0.14	3.01	2.39	4.01	2.67	2.27	1.28	2.59	2.02	2.32	2.32	1.87	0.6
	tha	**vnm**	**egy**	**nig**	**LAS**	**LAF**	**ASN**	**DAS**	**DLA**	**DMN**	**DAF**	**ROW**	
Recession	-0.19	0.2	-0.27	0.04	-0.4	-0.14	0.25	-0.4	-0.13	0.04	0.57	-0.13	
Long-run	2.05	1.11	1.48	2.07	0.6	1.55	2.07	0.99	1.89	2.59	1.84	1.82	

arg=Argentina, aus=Australia, bra=Brazil, can=Canada, chn=China, EUZ=Eurozone, NEU=Non-Eurozone EU members, fra=France, ger=Germany, ind=India, idn=Indonesia, ita=Italy, jpn=Japan, mex=Mexico, rus=Russia, zaf=South Africa, kor=Republic of Korea, tur=Turkey, gbr=United Kingdom, usa=United States of America, nld=Netherlands, nzl=New Zealand, nor=Norway, esp=Spain, che=Switzerland, bgd=Bangladesh, tha=Thailand, vnm=Viet Nam, egy=Egypt, nig=Nigeria, LAS=Lldcs Asia, LAF=lldcs Africa, ASN=ASEAN plus, DAS=developing Asia, DLA=developing Latin America, DMN=developing N Africa middle east, DAF=developing S Africa, ROW=Rest of World.

* Denotes G20 member country and EU Members (also includes European Union Members, as they have a common external trade policy.)

To illustrate the relative importance of NTMs and tariff reductions, Figure 2.5 breaks down the employment effects for lower skilled labour in the short term recession setting, while Figure 2.6 provides the breakdown for higher skilled labour. There are important differences between countries in terms of which type of liberalisation would result in higher changes in employment level. Even within the Eurozone, relative importance varies by country. In France, for example, most employment gains are linked to NTM reduction. In Germany however, tariff reductions are far more important to the pattern of overall jobs gains.

For Spain, NTMs are the primary source of gains, while for Italy tariff reductions are important, as is to the case for Germany. In Asia, tariffs and NTMs are equally important for Japan, while in India tariffs reductions are the primary source of gains. In North America, the gains for the United States are linked to NTMs, while for Canada they are linked more to tariff reductions.

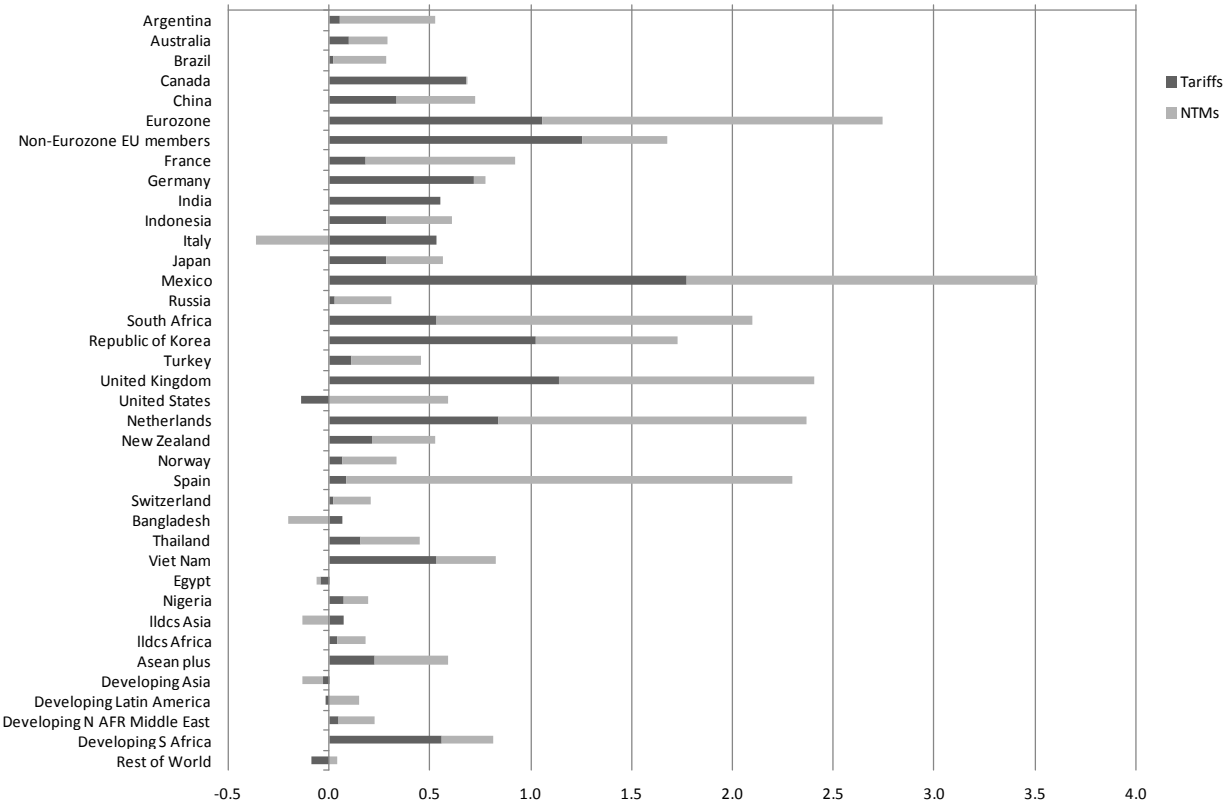
As can be seen from the results presented here, balanced trade liberalisation can create jobs in the short run without eliminating jobs in foreign countries, and it can generate income gains in the long run. To understand this process, it is useful distinguish among the four channels by which liberalisation affects the demand for labour. We examine these channels in the context of an economy that is operating under conditions of unemployment, as is now the case in many advanced countries. In such a setting, liberalisation reduces prices, improves productivity and generates savings to firms and households. These savings, in turn, increase demand and create jobs across the economy. Furthermore, liberalisation creates jobs in industries that export more due to reduced barriers abroad and/or lower costs at home. It also creates jobs in industries that supply investment goods and services to expanding firms. Moreover, it eliminates jobs in domestic industries that fail to compete with imports and/or benefit from declining intermediate goods prices.

Since the net result of these effects could be negative in any one country (although they are unlikely to be negative for the world as a whole), the challenge is to design policies that generate widely shared gains. The net results will be positive everywhere if the four employment effects reinforce each other, if price improvements are large, if substantial new investment is undertaken by expanding industries, and if the liberalisation of imports is at least approximately balanced by reciprocal liberalisation in a country's export markets.

The jobs created by liberalisation will be amplified by income multipliers under conditions of unemployment. The multipliers will be especially large if several major economies adopt concerted liberalisation policies.

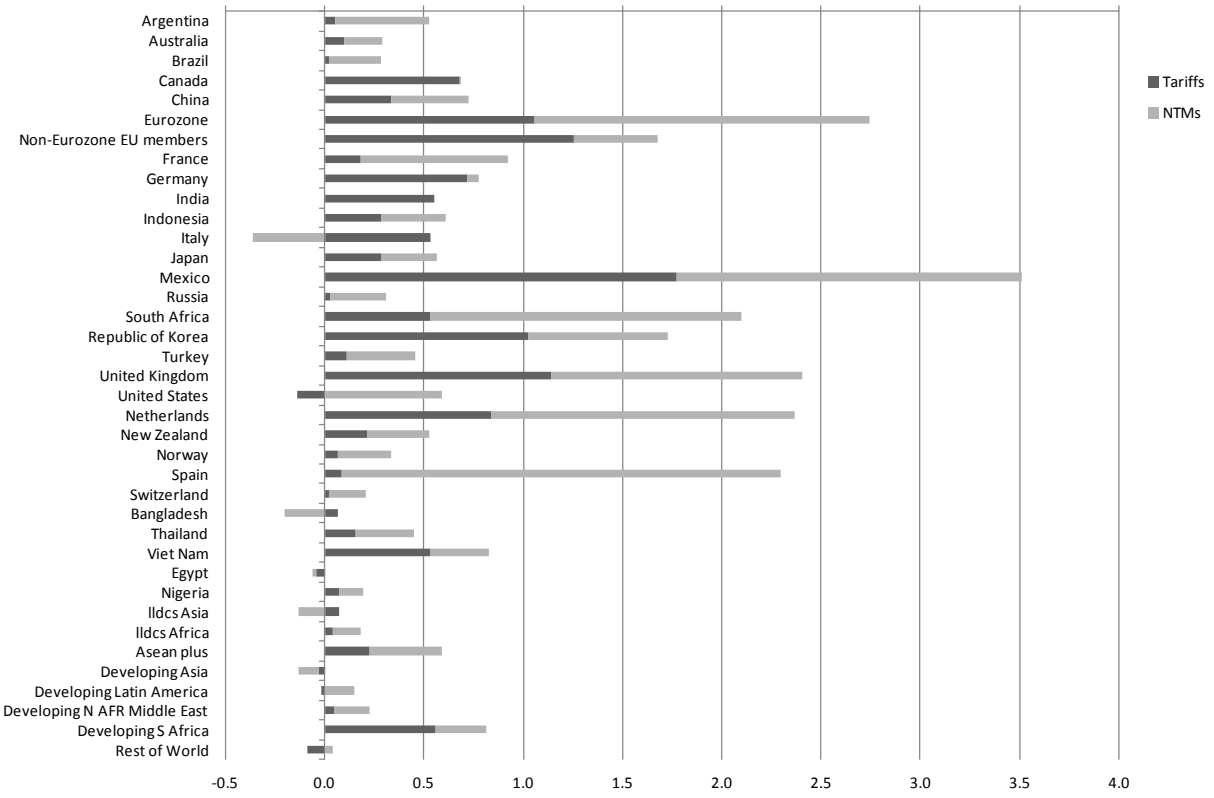
As the world economy approaches full employment, employment effects will become less relevant. But the benefits of liberalisation will not disappear; rather, they will be felt in the more usual form of rising real incomes and wages.

Figure 2.5. Breakdown of employment effects in recession scenario, % change employment of lower skilled workers



Source: Author's estimates from CGE model.

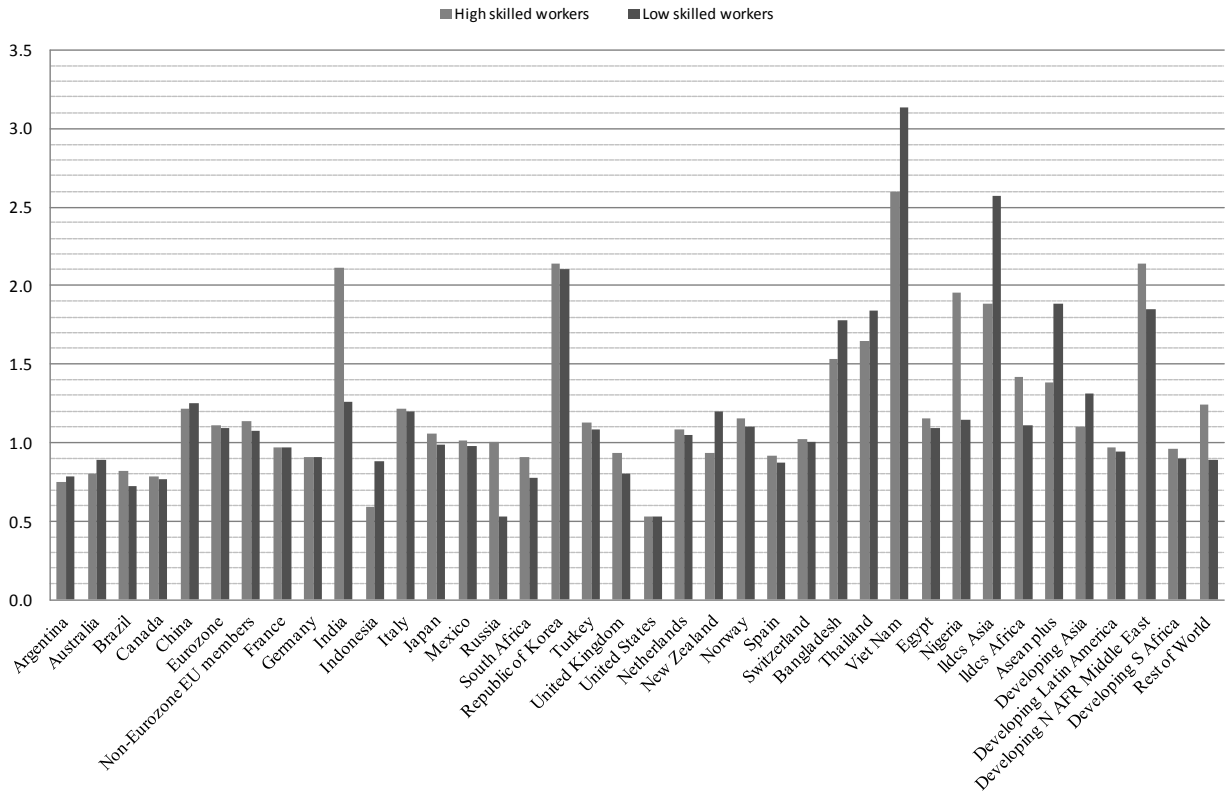
Figure 2.6. Breakdown of employment effects in recession scenario % change in employment of higher skilled workers



Results for the Global scenario (global 50% tariff reduction)

Figure 2.7 presents the long run effects of our second policy scenario, where we assume a 50% tariff cut by all countries. As can be seen from the figure, employment would increase under both short and long run, although the changes are rather small, for most countries being around 1%. Nevertheless, there are a few countries, where employment would increase somewhat more, the largest increases taking place in Viet Nam and least developed Asian countries. Most countries would experience a somewhat similar change for high and low skilled workers, although, there are a few exceptions. The employment level of Indian, Russian, and Nigerian high skilled workers would increase significantly more than those of low skilled workers. This is due to the shift in the economy towards sectors which require relatively more skilled workers increasing the demand for these workers and thus their wages.

Figure 2.7. Changes in high and low skilled employment over the long run, global tariff reduction scenario



Real wage effects

Results for the G20 scenario (50% tariffs and NTM reductions by G20 countries on an MFN basis)

Next we look at the impact of liberalisation on real wages which is presented in Tables 2.9 and 2.10 Under the recession setting, the impact of removal of non-tariff and tariff barriers are shown to have somewhat mixed impact on lower skilled workers' wages with an increase taking place in some of the countries, no impact in the markets with large scale involuntary unemployment (Europe, North America), and decrease in some others. On the other hand, over the long-run, all lower skilled workers would see their wages increase in real terms.

The estimated impact on wages of high skilled workers, presented in Table 2.10, is similar to that on lower skilled workers. There is again some heterogeneity between the different countries and regions, but all countries would experience an increase in high skilled wages over the long-run. This is due to higher investments and higher productivity over the long run which would result in higher wages. In most countries, the increase in unskilled wages is somewhat larger or similar in magnitude to skilled wage increases. Nevertheless there are some exceptions, for example India, where high skilled workers' wages would increase more than less skilled wages.

Table 2.9. Effects on unskilled workers' wages, %change

	arg*	aus*	bra*	can*	chn*	EUZ*	NEU*	fra*	ger*	ind*	idn*	ita*	jpn*
Recession	1.11	0.65	0.67	-	1.58	-	-	-	-	1.2	1.3	-	1.23
Long-run	4.67	4.54	3.97	3.51	5.53	5.22	4.79	4.58	4.12	4.29	3.8	5.49	4.7
	mex*	**rus***	**zaf***	**kor***	**tur***	**gbr***	**usa***	**nld***	**nzl**	**nor**	**esp***	**che**	**bgd**
Recession	-	0.84	-	3.57	0.94	-	-	-	1.12	0.69	-	0.4	-0.26
Long-run	1.85	3.73	4.17	8.04	5.26	3.75	2.58	5.12	5.33	4.72	5.41	3.51	1.46
	tha	**vnm**	**egy**	**nig**	**LAS**	**LAF**	**ASN**	**DAS**	**DLA**	**DMN**	**DAF**	**ROW**	
Recession	0.92	1.64	-0.12	0.42	-0.12	0.38	1.17	-0.28	0.29	0.47	2.04	-0.13	
Long-run	5.08	3.65	3.82	5.92	2.49	4.6	6.08	2.47	4.03	5.25	4.94	3.67	

arg=Argentina, aus=Australia, bra=Brazil, can=Canada, chn=China, EUZ=Eurozone, NEU=Non-Eurozone EU members, fra=France, ger=Germany, ind=India, idn=Indonesia, ita=Italy, jpn=Japan, mex=Mexico, rus=Russia, zaf=South Africa, kor=Republic of Korea, tur=Turkey, gbr=United Kingdom, usa=United States of America, nld=Netherlands, nzl=New Zealand, nor=Norway, esp=Spain, che=Switzerland, bgd=Bangladesh, tha=Thailand, vnm=Viet Nam, egy=Egypt, nig=Nigeria, LAS=Lldcs Asia, LAF=lldcs Africa, ASN=ASEAN plus, DAS=developing Asia, DLA=developing Latin America, DMN=developing N Africa middle east, DAF=developing S Africa, RestofWorld=Rest of World.

* Denotes G20 member country and EU Members (also includes European Union Members, as they have a common external trade policy.)

Table 2.10. Effects on skilled workers' wages, % change

	arg*	aus*	bra*	can*	chn*	EUZ*	NEU*	fra*	ger*	ind*	idn*	ita*	jpn*
Short-run	0.7	0.49	0.83	-	1.96	-	-	-	-	2.08	0.63	-	1.36
Long-run	4.41	4.18	4.42	3.65	6	5.26	5.19	4.68	4.16	7.61	2.85	5.52	5.01
	mex*	**rus***	**zaf***	**kor***	**tur***	**gbr***	**usa***	**nld***	**nzl**	**nor**	**esp***	**che**	**bgd**
Short-run	-	2.23	-	3.54	1.06	-	-	-	0.31	0.66	-	0.48	-0.55
Long-run	0.29	6.1	4.85	8.18	5.41	4.59	2.57	5.24	4.09	4.7	4.7	3.77	1.2
	tha	**vnm**	**egy**	**nig**	**LAS**	**LAF**	**ASN**	**DAS**	**DLA**	**DMN**	**DAF**		**ROW**
Short-run	-0.38	0.39	-0.54	0.09	-0.79	-0.28	0.49	-0.8	-0.27	0.08	1.15	-0.26	
Long-run	4.15	2.23	2.99	4.18	1.21	3.13	4.19	1.99	3.82	5.25	3.7	3.66	

arg=Argentina, aus=Australia, bra=Brazil, can=Canada, chn=China, EUZ=Eurozone, NEU=Non-Eurozone EU members, fra=France, ger=Germany, ind=India, idn=Indonesia, ita=Italy, jpn=Japan, mex=Mexico, rus=Russia, zaf=South Africa, kor=Republic of Korea, tur=Turkey, gbr=United Kingdom, usa=United States of America, nld=Netherlands, nzl=New Zealand, nor=Norway, esp=Spain, che=Switzerland, bgd=Bangladesh, tha=Thailand, vnm=Viet Nam, egy=Egypt, nig=Nigeria, LAS=Lldcs Asia, LAF=lldcs Africa, ASN=ASEAN plus, DAS=developing Asia, DLA=developing Latin America, DMN=developing N Africa middle east, DAF=developing S Africa, ROW=Rest of World.

* Denotes G20 member country and EU Members (also includes European Union Members, as they have a common external trade policy.)

Trade effects

Results for the G20 scenario (50% tariffs and NTM reductions by G20 countries on an MFN basis)

We now turn to analyzing the resulting effects on trade. Exports and imports of all countries are expected to increase both in the short- and the long-run (Table 2.11 and Table 2.12) as barriers to trade are removed by the G20 member countries. Similarly to previous results, in most countries a significantly more pronounced increase would take place under the long-run scenario than under the short-run. Nevertheless, even on the short-run, imports and exports of all countries would increase considerably.

In essence, the results show that opening markets helps addressing global imbalances. From Tables 2.11 and 12.12 we observe that exports of surplus countries (such as Germany and China) grow less than their imports, while exports of deficit countries (such as the United States) grow faster than their imports.

It is also of interest to look at what drives changes in exports. Figure 2.8 sheds some light on this by showing how much reductions in tariffs and reductions in NTMs contribute to estimated total increases in exports. Although there is some heterogeneity among the countries, for most countries the main driver behind increased exports is the reduction of NTMs. For developing Asian countries and for India tariff reductions are the main drivers. The reduction of tariffs would increase exports for India by 20% while reduction of NTMs would imply a smaller, 10% increase in exports. This is due to the specialisation of these countries in sectors where tariffs are more important (such as textiles and clothing). On the other hand, for many high-income countries, NTMs matter more, as they are specialized in sectors where tariff barriers are relatively low.

Table 2.11. Per cent changes in value of imports

	arg*	**aus***	**bra***	**can***	**chn***	**EUZ***	**NEU***	**fra***	**ger***	**ind***	**idn***	**ita***	**jpn***
Recession	17.28	14.98	31.13	3.3	30.59	5.1	6.04	6.12	7.96	28.36	18.63	6.91	24.23
Long-run	28.22	26.54	44.11	3.22	52.1	10.75	9.91	10.51	12.77	47.94	37.05	12.97	47.06
	mex*	**rus***	**zaf***	**kor***	**tur***	**gbr***	**usa***	**nld***	**nzl**	**nor**	**esp***	**che**	**bgd**
Recession	9.81	21.73	16.97	24.62	10.04	7.13	11.74	5.86	11.66	9.84	8.96	7.4	4.75
Long-run	28.11	36.58	25.6	36.04	19.56	13.24	20.09	7.76	23.33	15.89	25.08	16.32	8.77
	tha	**vnm**	**egy**	**nig**	**LAS**	**LAF**	**ASN**	**DAS**	**DLA**	**DMN**	**DAF**	**ROW**	
Recession	8.71	7.61	4.1	6.76	5.07	4.69	8.05	6.48	8.57	5.7	11.59	5.35	
Long-run	23.86	13.99	9.73	10.38	16.1	12.08	16.91	18.75	14.81	11.57	27.12	12.05	

arg=Argentina, aus=Australia, bra=Brazil, can=Canada, chn=China, EUZ=Eurozone, NEU=Non-Eurozone EU members, fra=France, ger=Germany, ind=India, idn=Indonesia, ita=Italy, jpn=Japan, mex=Mexico, rus=Russia, zaf=South Africa, kor=Republic of Korea, tur=Turkey, gbr=United Kingdom, usa=United States of America, nld=Netherlands, nzl=New Zealand, nor=Norway, esp=Spain, che=Switzerland, bgd=Bangladesh, tha=Thailand, vnm=Viet Nam, egy=Egypt, nig=Nigeria, LAS=Lldcs Asia, LAF=lldcs Africa, ASN=ASEAN plus, DAS=developing Asia, DLA=developing Latin America, DMN=developing N Africa middle east, DAF=developing S Africa, ROW=Rest of World.

* Denotes G20 member country and EU Members (also includes European Union Members, as they have a common external trade policy.)

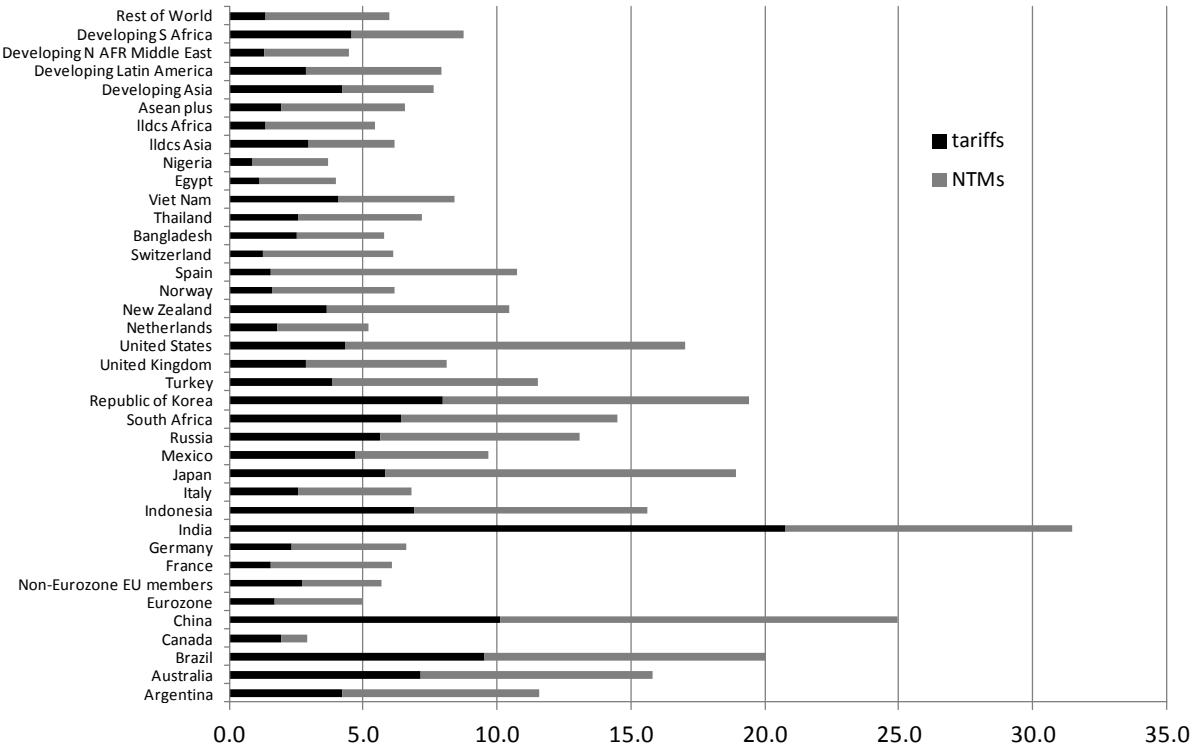
Table 2.12. Per cent changes in value of exports

	arg*	aus*	bra*	can*	chn*	EUZ*	NEU*	fra*	ger*	ind*	idn*	ita*	jpn*
Recession	11.79	16.92	22	3.15	26.49	5.16	6.01	6.29	6.98	34.62	16.38	7.23	19.94
Long-run	24.15	28.16	34.38	2.33	50.21	10.87	9.79	10.22	11.82	58.65	34.68	13.32	39.57
	mex*	**rus***	**zaf***	**kor***	**tur***	**gbr***	**usa***	**nld***	**nzl**	**nor**	**esp***	**che**	**bgd**
Recession	9.66	13.67	15.41	20.43	11.9	8.68	17.8	5.51	11.27	6.39	10.56	6.23	5.85
Long-run	18.13	27.44	24.25	34.06	21.75	14.2	23.67	7.49	23.56	13.95	27.59	14.61	8.68
	tha	**vnm**	**egy**	**nig**	**LAS**	**LAF**	**ASN**	**DAS**	**DLA**	**DMN**	**DAF**	**ROW**	
Recession	7.4	8.54	4.11	3.84	6.37	5.62	6.65	7.91	8.28	4.67	10.13	6.13	
Long-run	22.95	14.65	9.7	12.16	17.48	12.53	16.84	20.58	14.75	11.97	25.8	12.41	

arg=Argentina, aus=Australia, bra=Brazil, can=Canada, chn=China, EUZ=Eurozone, NEU=Non-Eurozone EU members, fra=France, ger=Germany, ind=India, idn=Indonesia, ita=Italy, jpn=Japan, mex=Mexico, rus=Russia, zaf=South Africa, kor=Republic of Korea, tur=Turkey, gbr=United Kingdom, usa=United States of America, nld=Netherlands, nzl=New Zealand, nor=Norway, esp=Spain, che=Switzerland, bgd=Bangladesh, tha=Thailand, vnm=Viet Nam, egy=Egypt, nig=Nigeria, LAS=Lldcs Asia, LAF=lldcs Africa, ASN=ASEAN plus, DAS=developing Asia, DLA=developing Latin America, DMN=developing N Africa middle east, DAF=developing S Africa, ROW=Rest of World.

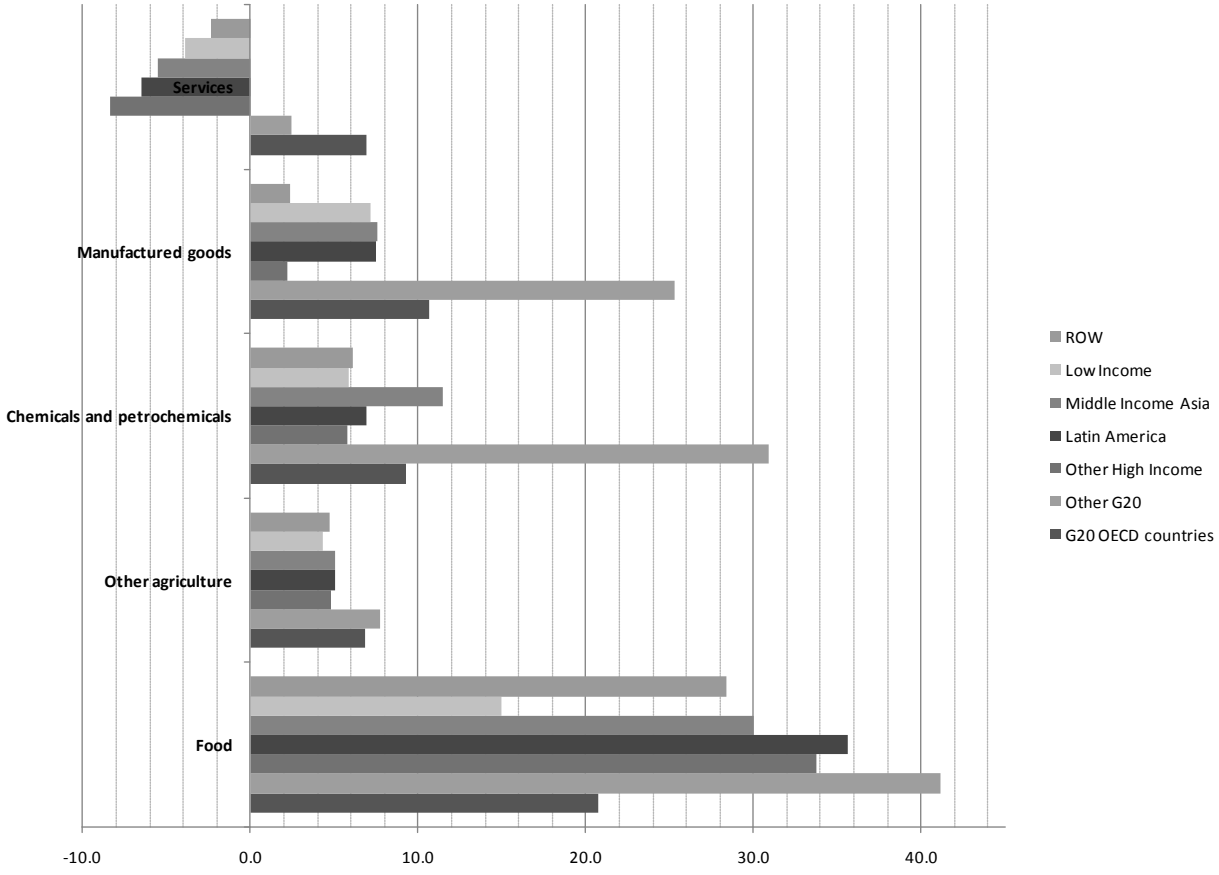
* Denotes G20 member country and EU Members (also includes European Union Members, as they have a common external trade policy).

Figure 2.8. Breakdown of changes in exports (%) in recession setting



Changes in exports by sectors for different regions are shown in Figure 2.9.[8] For all regions the most pronounced increase in exports would take place in the food sector. This is not surprising, as this remains the most heavily protected goods sector. For non-OECD G20 countries exports in the food sector are estimated to increase by more than 40%. Exports for non-OECD G20 countries would increase significantly relative to other regions also in manufactured goods and chemicals. On the other hand, for all regions with the exception of the G20 countries exports in services would decrease. This reflects the structural shift of G20 countries towards services, where they show a revealed comparative advantage.

Figure 2.9. Changes in exports (%), G20 tariffs and NTMs reduction, recession closure

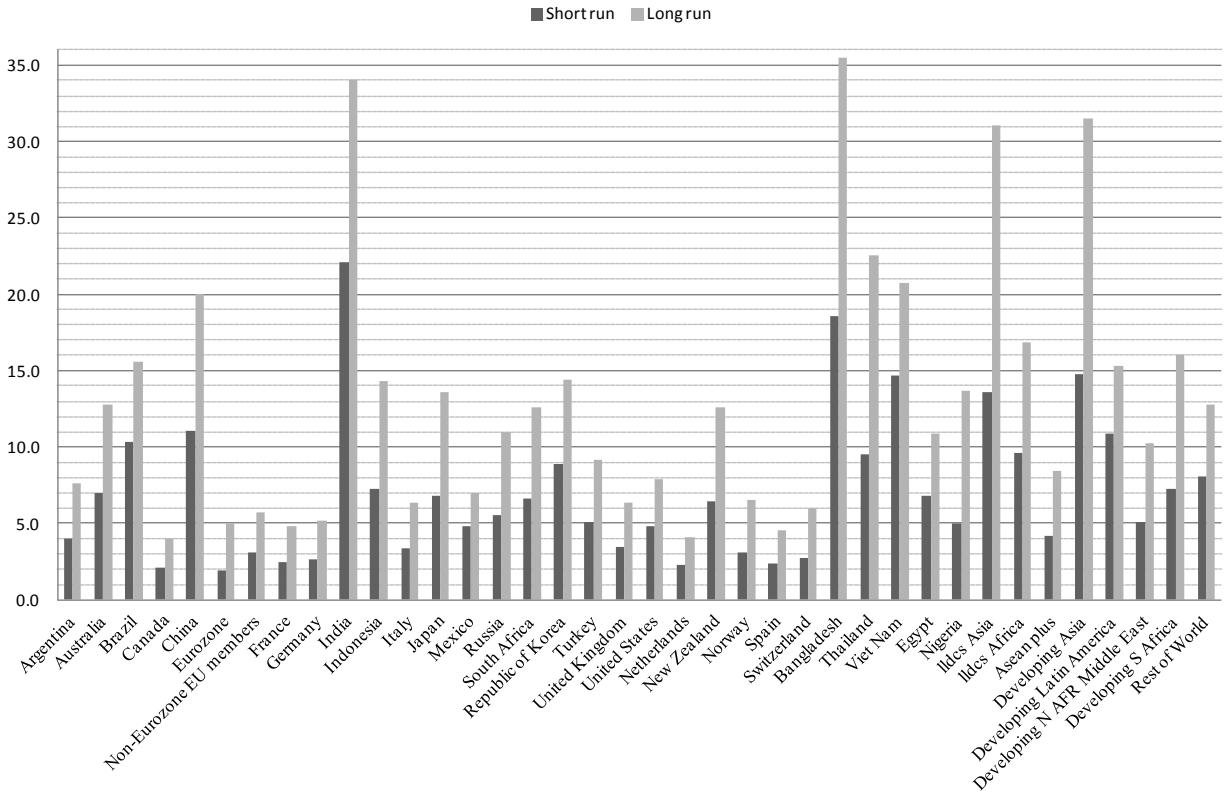


Results for the global scenario (global 50% tariff reduction)

The effects on exports of the global scenario, assuming a 50% reduction of applied tariffs by all countries, are presented in Figure 2.10. All countries would experience an increase in their exports under this scenario both on the short and the long run. For China, India, Bangladesh, Thailand, Viet Nam, least developed Asia, and developing Asian countries the exports would increase by more than 20% over the long-run. For all countries the long run effects dominate the short run effects as investment effects and increased productivity on the long run allow to further reap the benefits of trade liberalisation resulting in higher increases in exports.

8. The figure shows the results for the recession closure with the basic scenario assuming both tariff and NTMs reduction by G20 countries, further results for other scenarios are presented in Annex 2.B.

Figure 2.10. Changes in exports (%), global liberalisation scenario



Conclusions

The estimates reported here point to consistent positive labour market impacts across the G20 both under recession and also (especially) in the long run. The impact of the different scenarios highlight that balanced trade liberalisation can create jobs in the short run without eliminating jobs in foreign countries, and it can generate income gains in the long run. Since the net result of these effects could be negative in any one country (although they are unlikely to be negative for the world as a whole), the challenge is to design policies that generate widely shared gains. The net results will be positive everywhere if price improvements are large, if substantial new investment is undertaken by expanding industries, and if the liberalisation of imports is at least approximately balanced by reciprocal liberalisation in a country's export markets. The jobs created by liberalisation will be amplified by income multipliers under conditions of unemployment. The multipliers will be especially large if several major economies adopt concerted liberalisation policies.

In the short run, emerging from the crisis these results also indicate that coordinated trade policies can help to close the gap between actual and potential output. This would also generate follow-on benefits in the longer run, where lower trade cost would imply higher labour productivity and wages as well as greater active labour market participation. While NTMs make a particularly important contribution to overall effects, tariffs should not be neglected as they remain significant barriers in some industries and countries.

Annex 2.A. The Model Used

Our policy assessment uses a computable general equilibrium model (CGE) of global world trade. CGE models help answering *what if* questions by simulating the price, income and substitution effects in equilibrium on markets under different assumptions. Here, the economic outcomes of the "baseline" scenario with no policy effects is compared to the scenario with a tariff and quota free trade for developing countries are evaluated. The "baseline" for the model is the equilibrium before the policy change, and the "scenario" is the equilibrium after the policy change. The effect of the policy change can then be quantified as the difference between the two.

The remainder of this annex presents the computable general equilibrium model applied in the analysis.

A.1 The general equilibrium model

The CGE model employed is based on Francois, van Meijl, and van Tongeren (2005). The most important aspects of the model can be summarised as follows:

- it covers global world trade and production
- it allows for scale economies and imperfect competition
- it includes intermediate linkages between sectors
- it allows for trade to impact on capital stocks through investment effects

The inclusion of scale economies and imperfect competition implies agglomeration effects like those emphasized in the recent economic literature.

Box A.1. Key features of the model

Model simulations are based on a multi-region global CGE model. Sectors are linked through intermediate input coefficients (based on national social accounts data) as well as competition in primary factor markets. The model includes imperfect competition, short-run and long-run macroeconomic closure options, as well as the standard static, perfect competition, Armington-type of model as a subset. It also allows alternative labour market closures. On the policy side, it offers the option to implement tariff reductions, export tax and subsidy reduction, trade quota expansion, input subsidies, output subsidies, and reductions in trade costs. International trade costs include shipping and logistic services (the source of fob-cif margins) but can also be modelled as Samuelson-type deadweight costs. This can be used to capture higher costs when producing for export markets, due to regulatory barriers or NTMs that do not generate rents (or where the rents are dissipated through rent-seeking).

In the model there is a single representative composite household in each region, with expenditures allocated over personal consumption and savings. The composite household owns endowments of the factors of production and receives income by selling these factors to firms. It also receives income from tariff revenue and rents accruing from import/export quota licenses. Part of the income is distributed as subsidy payments to some sectors, primarily in agriculture.

Taxes are included at several levels. Production taxes are placed on intermediate or primary inputs, or on output. Tariffs are levied at the border. Additional internal taxes are placed on

domestic or imported intermediate inputs, and may be applied at differential rates that discriminate against imports. Where relevant, taxes are also placed on exports, and on primary factor income. Finally, where relevant (as indicated by social accounting data) taxes are placed on final consumption, and can be applied differentially to consumption of domestic and imported goods.

On the production side, in all sectors, firms employ domestic production factors (capital, labour and land) and intermediate inputs from domestic and foreign sources to produce outputs in the most cost-efficient way that technology allow. Perfect competition is assumed in the agricultural sectors (but the processed food products sector is characterised by increasing returns to scale). In these sectors, products from different regions are assumed to be imperfect substitutes.

Manufacturing sectors are modelled as involving imperfect or monopolistic competition. Monopolistic competition involves scale economies that are internal to each firm, depending on its own production level. An important property of the monopolistic competition model is that increased specialisation at intermediate stages of production yields returns due to specialisation, where the sector as a whole becomes more productive the broader the range of specialised inputs. These gains spill over through two-way trade in specialised intermediate goods. With these "spillovers," trade liberalisation can lead to global scale effects related to specialisation. Similar gains follow from consumer good specialisation.

While the model covers changes in gross trade flows, it does not model changes in net international capital flows. Rather the capital market closure involves fixed net capital inflows and outflows. This precludes the model from giving any indications of changes in international investment flows.

A.2 Data used for the baseline

The model runs on the GTAP database, version 7. It provides the data for the empirical implementation of the model. The database is the best and most up-to-date source of internally consistent data on production, consumption and international trade by country and sector.[9] The database for the model is benchmarked for 2004.

The GTAP data on protection incorporate the Macmaps data set, which includes a set of *ad valorem equivalents* (AVEs) of border protection across the world. The source information concerns various instruments, such as specific tariffs, mixed tariffs and quotas, which cannot be directly compared or summed. In order to be of use in a CGE model, these have been converted into an AVE per sector, per country and per trading partner.[10]

A.3. Sector aggregation

For the purpose of this study, we aggregate the GTAP database into 20 sectors. The sector structure is shown in Table 2.A.1.

9. For more information, please refer to Dimaran and McDougall (2006).

10. The MacMaps database is the result of a joint effort by the International Trade Center (governed by UNCTAD and WTO) and Cepii.

Table 2.A.1 Sectors in the Model

	Sectors		Sectors
1	Agriculture, forestry and fish	11	Construction
2	Processed foods	12	Trade
3	Oil coal petro chemicals	13	Transport and logistics nec
4	Chemicals	14	Sea transport
5	Metals and metal products	15	Air transport
6	Motor vehicles	16	Communications
7	Machinery	17	Financial services
8	Other manufactures	18	Insurance
9	Electricity	19	Business services
10	Gas and water	20	Other services

The GTAP agricultural and food processing sectors are classified according to the Central Product Classification (CPC). The other GTAP sectors are defined by reference to the International Standard Industry Classification (ISIC rev.3 as defined by United Nations Statistic Division). Services and utility classifications predate the GATS and are based on IMF balance of payments statistics (BOP) and UN definitions.

A.4. Market structure

From those sectors listed in Table 2.A.1, industrial sectors and most service sectors (except public services, utilities, and transport) are specified with monopolistic competition while all other sectors have perfect competition. Econometrically-based substitution elasticities for goods originate from Ecorys (2009) while elasticities for the services sectors were obtained from Dee (2010).

A.5. Country aggregation

The country aggregation used for the model is presented in Table 2.A.2.

Table 2.A.2. List of regions in the model

Region name	Short name	Region name	Short name
Argentina	Arg	United States	Usa
Australia	Aus	Netherlands	Nld
Brazil	Bra	New Zealand	Nzl
Canada	Can	Norway	Nor
China	Chn	Spain	Esp
Eurozone	EUZ	Switzerland	Che
Non-Eurozone EU members	NEU	Bangladesh	Bgd
France	Fra	Thailand	Tha
Germany	Ger	Viet Nam	Vnm
India	Ind	Egypt	Egy
Indonesia	Idn	Nigeria	Nig
Italy	Ita	Lldcs Asia	LAS
Japan	Jpn	lldcs Africa	LAF
Mexico	Mex	ASEAN plus	ASN
Russia	Rus	developing Asia	DAS
South Africa	Zaf	developing Latin America	DLA
Republic of Korea	Kor	developing N Africa middle east	DMN
Turkey	Tur	developing S Africa	DAF
United Kingdom	Gbr	Rest of World	Rest of World

A.6. Effects from non-tariff barriers compared to tariffs

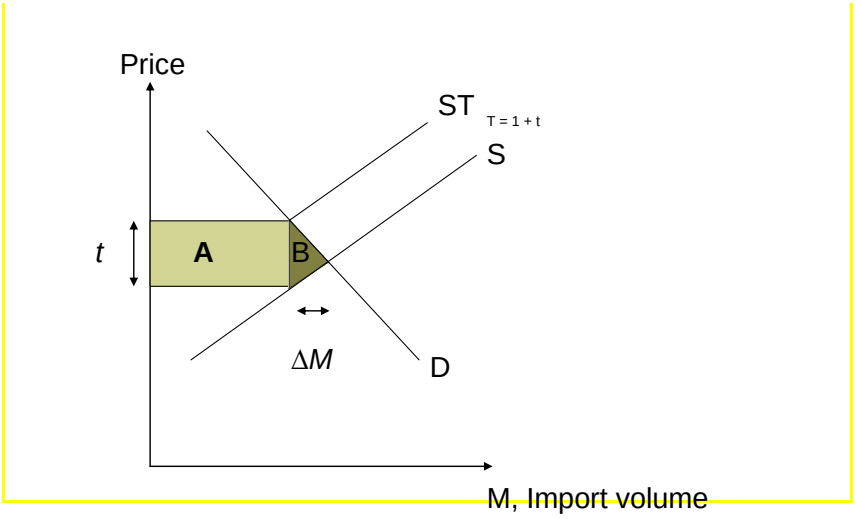
In the analysis of trade policy we focus both on removal of tariff and non-tariff barriers. The economics of the welfare effects of tariffs are relatively straightforward, while those for NTMs are less so. The basic points are illustrated below. Assume we can represent import demand and supply the curves below.

Import supply is represented by *S*, while a trade cost-distorted supply curve is represented by *ST*, where $T = (1+t)$ is our measure of an ad valorem trade cost at rate *t*. In the case of a tariff, the deadweight cost is area *B*. Area *A* represents tariff revenue. Its impact on welfare depends on relative supply and demand elasticities (and hence relative market power). For a small country, this area involves a loss in welfare offset by tariff revenues, without any terms of trade gains for the importer. Regardless of the allocation of terms of trade gains, global welfare effects are limited to the triangle *B*.

When NTMs involve quotas and quota rents with price impact t, national welfare effects again depend on the allocation of areas *A* and *B* between countries. Global welfare effects are again limited to area *B*. The impact of non-tariff barriers linked to efficiency have a different overall impact. Consider, for example, regulatory barriers that raise the cost of selling into the market by the cost factor *t*. Here, we now assume that *t* represents a real increase in the cost of producing and delivering to the market. Examples can include technical barriers that raise production costs, regulatory barriers that require inefficient delivery methods or increased production costs, or increased paperwork and procedures that cost manpower, time, and hence money. In all these cases, area *B* then represents real costs. These are not simply reallocated between countries, or between consumer and government. They are lost income globally. As a result, the global impact on welfare will be the combined areas *A* and *B*. See OECD (2009) for a cost-benefit framework to analyze NTMs.

In general, cost-raising trade barriers imply direct, and significant, gains from trade liberalisation relative to comparable tariffs (where comparable is defined in terms of price impacts.) Their allocation depends, like terms of trade effects, on relative supply and demand elasticities. Regardless of their national allocation, however, global welfare effects will be bigger. For the purpose of this study, we have focused on a partial reduction of NTMs (50%) and have modelled them as involving trade costs.

Figure 2.A.1. Effect of removal of non-tariff barriers



A.7. Macroeconomic aspects of the model

We examine two different macroeconomic structures or environments (also known as "closures") as implemented in the experiments.

- *Short-run with unemployment*: we take into account the effects of being in recession: Capital stocks are fixed by sector and region, and we assume unemployment (flat labour supply) in North America, the European Union, and South Africa. The rest of the world has upward sloping labour supply curves.
- *Long-run with investment and labour markets that clear*: we assume all regions have upward sloping labour supply curves. Capital is assumed to be mobile between sectors (and regions). Increased savings and investment yields higher capital stocks, and if wages go up labour supply also expands.

The long-run scenario examines changes along a steady-state growth path (level effects) following induced increases in the capital stock. The long-run effects are based on Francois *et al*. (1997). Here, we link capital stocks to long-run changes in investment in response to changes in incomes and returns to investment. The long-run closure provides an assessment of the impact of reductions of barriers to trade induced policy changes on the capital stock, thereby capturing the induced expansion (or contraction) of the economy over a longer time horizon following trade barrier reductions. In contrast, in the short-run we do not include the impact of investment on installed capital stocks. This means the long-run effects, which include those of the short-run, also incorporate further effects such as those resulting from capital accumulation. Thus the results of the long-run, dynamic scenarios involve a mix of induced investment, and also productivity effects. The productivity effects follow from an interaction of investment and variety/specialization gains. We do not preclude changes in gross international capital flows (indeed increased services trade implies FDI flows as well). However, we do not focus on changes in net capital flows, as these are driven in the long run by macroeconomic mechanisms outside the trade scenarios (and indeed trade policy is a second or third order determinant of long-run net capital flows).

Annex 2.B. Further Detailed Results

Table 2.B.1. Sectoral changes in exports by regions, %

	G20 OECD countries	Other G20	Other High Income	Latin America	Middle Income Asia	Low Income	ROW
G20 tariff reduction, short-run (recession closure)							
Food	7.9	16.4	11.5	15.5	10.7	4.3	11.1
Other agriculture	3.3	4.1	1.4	1.6	2.3	1.0	1.4
Chemicals and petrochemicals	3.2	13.3	-0.2	0.6	4.9	1.0	1.6
Manufactured goods	2.9	9.9	-1.9	1.5	2.2	4.3	-1.1
Services	1.9	3.5	-2.9	-2.0	-2.9	-2.3	-1.1
G20 tariff reduction, long-run							
Food	10.3	24.3	22.1	22.0	18.4	6.9	22.3
Other agriculture	6.4	6.5	2.8	3.5	-0.7	2.6	3.4
Chemicals and petrochemicals	4.5	11.5	-0.5	1.8	39.9	2.9	3.1
Manufactured goods	4.9	16.6	-4.2	2.4	-0.6	9.3	-2.6
Services	3.5	23.4	-0.4	-1.7	-13.2	-2.6	1.8
G20 NTMs reduction, short-run (recession closure)							
Food	10.7	20.4	20.1	17.3	17.7	10.3	14.2
Other agriculture	3.2	3.3	3.1	3.2	2.5	3.1	3.1
Chemicals and petrochemicals	5.7	15.3	6.4	6.5	6.4	5.0	4.9
Manufactured goods	7.5	14.1	4.7	6.3	5.5	2.8	3.9
Services	4.6	-1.1	-5.2	-4.4	-2.8	-1.7	-1.2
G20 NTMs reduction, long-run							
Food	16.3	26.3	38.2	27.3	30.9	13.9	24.6
Other agriculture	10.9	8.0	7.1	7.2	3.9	7.1	7.5
Chemicals and petrochemicals	9.1	22.7	16.2	22.7	26.9	20.6	8.6
Manufactured goods	10.6	26.5	2.5	8.5	24.1	5.4	10.0
Services	10.8	9.2	-1.2	-10.0	-22.0	-0.9	3.9

Table 2.B.1. Sectoral changes in exports by regions, % (*continued*)

	G20 OECD countries	Other G20	Other High Income	Latin America	Middle Income Asia	Low Income	ROW
G20 tariffs and NTMs reduction, short-run (recession closure)							
Food	20.8	41.1	33.8	35.6	30.0	15.0	28.4
Other agriculture	6.9	7.8	4.8	5.1	5.1	4.3	4.8
Chemicals and petrochemicals	9.3	30.9	5.8	7.0	11.5	5.9	6.1
Manufactured goods	10.7	25.3	2.2	7.5	7.6	7.1	2.3
Services	6.9	2.5	-8.3	-6.5	-5.6	-3.9	-2.3
G20 tariffs and NTMs reduction, long-run							
Food	30.7	59.3	66.5	59.3	55.7	21.6	56.8
Other agriculture	18.6	15.2	10.4	11.5	1.5	10.3	11.7
Chemicals and petrochemicals	14.9	32.2	13.9	23.4	89.7	25.5	10.3
Manufactured goods	17.2	51.5	-3.6	9.2	13.6	13.6	4.5
Services	14.7	40.0	-2.7	-11.4	-30.4	-3.9	5.0
Global 50% tariff reduction, short-run (recession closure)							
Food	10.3	18.4	17.9	26.6	25.4	14.4	24.1
Other agriculture	4.6	5.1	1.6	9.1	7.6	6.7	2.9
Chemicals and petrochemicals	3.7	14.1	1.2	4.2	9.6	16.8	10.8
Manufactured goods	3.3	10.4	-0.2	6.0	5.0	17.1	9.7
Services	1.7	3.3	-2.2	1.2	-2.3	5.7	2.2
Global 50% tariff reduction, long-run							
Food	15.3	29.6	28.9	36.2	35.5	16.4	34.8
Other agriculture	10.1	9.8	4.5	12.8	6.0	9.7	6.5
Chemicals and petrochemicals	6.3	13.4	3.9	11.5	43.8	49.6	16.2
Manufactured goods	6.2	19.6	-2.0	5.3	10.8	30.9	16.4
Services	4.9	21.3	3.1	3.8	-15.9	9.3	9.5

Table 2.B.2. Sectoral changes in output by regions,%

	G20 OECD countries	Other G20	Other high income	Latin America	Middle income Asia	Low income	ROW
G20 tariff reduction, short-run (recession closure)							
Other agriculture	2.4	1.8	1.5	1.5	2.0	1.2	1.6
Chemicals and petrochemicals	1.0	-3.9	-0.1	-0.3	3.7	0.2	-0.7
Manufactured goods	0.5	0.8	-1.4	0.2	2.5	2.1	-0.8
Services	0.7	1.0	1.3	0.8	0.9	0.9	0.8
G20 tariff reduction, long-run							
Food	0.4	3.2	12.1	8.4	9.6	4.8	5.6
Other agriculture	4.4	3.9	3.1	3.4	6.6	3.1	3.6
Chemicals and petrochemicals	1.9	-10.9	1.8	0.9	52.7	2.1	-4.3
Manufactured goods	1.9	3.8	-2.2	1.4	1.4	4.0	-0.2
Services	2.0	2.9	2.8	2.1	1.4	2.4	2.5
G20 NTMs reduction, short-run (recession closure)							
Food	0.2	2.9	12.6	7.2	6.9	4.8	4.8
Other agriculture	4.9	4.3	3.3	3.6	3.5	3.5	3.3
Chemicals and petrochemicals	0.7	-4.7	2.9	5.4	4.9	2.2	2.9
Manufactured goods	0.7	0.7	0.8	2.6	5.1	1.5	1.5
Services	2.3	3.9	3.3	2.6	2.4	2.3	2.5
G20 NTMs reduction, long-run							
Food	4.2	8.3	23.7	12.1	13.2	10.5	11.0
Other agriculture	11.3	11.8	7.9	9.2	9.6	9.2	8.5
Chemicals and petrochemicals	3.6	-6.0	7.1	28.1	35.3	7.5	10.1
Manufactured goods	3.5	8.2	3.4	5.4	20.0	6.4	7.9
Services	5.5	7.5	7.7	6.1	3.7	6.5	7.5
G20 tariffs and NTMs reduction, short-run (recession closure)							
Food	-0.8	3.4	21.1	14.8	12.2	7.3	8.2
Other agriculture	7.6	6.5	5.1	5.4	5.9	5.0	5.2
Chemicals and petrochemicals	1.8	-8.5	2.5	4.9	8.5	2.3	1.6
Manufactured goods	1.3	1.8	-1.0	2.6	7.5	3.5	0.4
Services	3.1	5.1	4.8	3.5	3.4	3.3	3.4
G20 tariffs and NTMs reduction, long-run							
Food	4.0	10.8	39.4	22.7	25.1	15.6	18.1
Other agriculture	16.7	16.0	11.7	13.2	18.6	13.0	12.9
Chemicals and petrochemicals	5.8	-26.5	7.8	28.8	123.4	9.3	2.5
Manufactured goods	5.5	14.1	-0.2	5.3	12.9	10.0	5.8
Services	7.4	10.8	10.4	8.2	5.9	8.6	9.7

Table 2.B.2. Sectoral changes in output by regions, % (*continued*)

	G20 OECD countries	Other G20	Other high income	Latin America	Middle income Asia	Low income	ROW
Global 50% tariff reduction, short-run (recession closure)							
Food	-0.5	0.7	3.3	5.0	1.7	-0.7	-1.9
Other agriculture	2.6	2.1	1.8	1.7	2.0	0.9	2.0
Chemicals and petrochemicals	1.2	-4.3	0.0	-0.4	5.1	0.4	-2.3
Manufactured goods	0.5	0.9	-1.4	-1.3	4.0	3.0	-1.3
Services	0.8	1.1	1.6	0.9	1.6	2.0	1.5
Global 50% tariff reduction, long-run							
Food	2.3	5.5	8.9	8.5	8.0	3.1	1.7
Other agriculture	6.6	6.4	5.0	6.0	7.2	4.5	5.7
Chemicals and petrochemicals	3.2	-10.4	2.8	4.0	58.6	0.9	-9.3
Manufactured goods	2.8	5.4	-1.0	0.5	7.9	12.1	3.0
Services	3.3	4.4	4.5	3.5	3.0	5.0	5.0

Table 2.B.3. Changes in real GDP by countries, %

	tariffs G20 50%		NTMs G20 50%		tariffs and NTMs G20 50%		tariffs GLOBAL 50%	
	short run (unemploy-ment closure)	long run	short run (unemploy-ment closure)	long run	short run (unemploy-ment closure)	long run	short run (unemploy-ment closure)	long run
Argentina	0.2	1.6	1.2	5.6	1.4	7.3	0.1	2.5
Australia	0.2	1.7	0.6	5.0	0.8	6.9	0.2	2.6
Brazil	0.3	1.8	0.9	5.5	1.3	7.5	0.2	2.7
Canada	0.6	1.5	0.3	4.2	1.0	5.6	0.7	2.3
China	0.5	2.9	2.3	9.4	2.9	12.1	0.6	4.4
Eurozone	0.8	2.3	1.8	6.6	2.7	8.9	1.0	3.5
Non-eurozone EU members	1.0	2.0	0.8	5.4	2.0	7.4	1.2	3.1
France	0.2	1.7	0.9	5.2	1.1	6.9	0.5	2.8
Germany	0.6	1.7	0.5	5.1	1.2	6.7	0.7	2.6
India	1.3	3.4	0.9	5.3	2.4	9.5	1.3	4.3
Indonesia	0.4	2.0	1.2	6.2	1.6	8.0	0.4	3.1
Italy	0.5	2.3	0.1	6.4	0.6	8.6	0.6	3.6
Japan	0.3	2.0	0.7	5.5	1.0	7.6	0.3	2.9
Mexico	2.0	0.8	2.8	1.3	4.6	-0.6	2.1	3.2
Russia	0.2	1.7	1.7	6.4	2.0	8.2	0.1	2.7
South Africa	0.5	1.3	2.0	5.5	2.8	7.1	0.4	2.6
Republic of Korea	1.3	4.0	1.8	7.3	3.1	12.2	1.4	5.4
Turkey	0.3	2.3	0.8	6.6	1.1	8.8	0.3	3.6
United Kingdom	1.1	1.6	1.5	4.8	2.8	6.6	1.4	2.6
United States of America	-0.1	1.1	0.9	3.5	0.9	4.6	0.0	1.7
Netherlands	0.7	1.8	1.6	5.2	2.5	6.9	0.8	2.7
New Zealand	0.3	2.3	0.5	6.0	0.8	8.2	0.4	3.4
Norway	0.0	1.6	0.2	5.1	0.3	6.5	0.4	2.9
Spain	0.1	1.7	1.8	7.0	1.8	8.6	0.3	2.8
Switzerland	0.1	1.5	0.3	4.7	0.3	6.3	0.7	3.0
Bangladesh	0.1	1.6	-0.1	3.9	0.0	5.3	1.6	5.0
Thailand	0.3	2.9	0.5	7.2	0.9	10.3	1.8	5.5
Viet Nam	0.7	2.2	0.4	3.9	1.1	6.1	3.4	5.6
Egypt	0.0	1.8	0.0	5.3	0.0	7.0	0.4	3.2
Nigeria	0.1	1.9	0.2	5.8	0.3	7.6	1.3	4.4
lldcs Asia	0.2	2.9	0.0	4.8	0.2	7.3	1.8	6.6
lldcs Africa	0.0	1.6	0.2	5.1	0.2	6.6	0.9	3.3
Asean plus	0.3	3.7	0.4	6.8	0.7	11.0	0.9	5.6
Developing Asia	0.1	2.7	0.0	4.9	0.1	7.5	1.1	5.4
Developing Latin America	0.0	1.6	0.2	5.3	0.2	6.9	0.3	2.7
Developing N Africa Mid East	0.1	1.7	0.2	5.5	0.2	7.0	0.8	4.0
Developing S Africa	0.6	1.0	0.3	7.1	1.0	8.4	1.6	2.8
Rest of World	0.0	1.8	0.2	5.4	0.1	7.2	0.7	3.5

Table 2.B.4. Change in employment of low skilled workers
%

	tariffs G20 50%		NTMs G20 50%		tariffs and NTMs G20 50%		tariffs GLOBAL 50%	
	short run (unemploy-ment closure)	long run	short run (unemploy-ment closure)	long run	short run (unemploy-ment closure)	long run	short run (unemploy-ment closure)	long run
Argentina	0.1	0.5	0.5	1.8	0.6	2.3	0.0	0.8
Australia	0.1	0.6	0.2	1.5	0.3	2.2	0.1	0.9
Brazil	0.0	0.5	0.3	1.5	0.3	2.0	0.0	0.7
Canada	0.7	0.5	0.0	1.2	0.8	1.7	0.8	0.8
China	0.3	0.9	0.4	2.0	0.8	2.7	0.4	1.3
Eurozone	1.1	0.7	1.7	1.9	2.9	2.6	1.2	1.1
Non-eurozone EU members	1.3	0.7	0.4	1.6	1.8	2.4	1.5	1.1
France	0.2	0.6	0.7	1.7	0.9	2.3	0.6	1.0
Germany	0.7	0.6	0.1	1.4	0.9	2.0	0.8	0.9
India	0.6	1.1	0.0	0.8	0.6	2.1	0.6	1.3
Indonesia	0.3	0.6	0.3	1.4	0.6	1.9	0.3	0.9
Italy	0.5	0.8	-0.4	2.0	0.2	2.7	0.7	1.2
Japan	0.3	0.7	0.3	1.6	0.6	2.3	0.3	1.0
Mexico	1.8	0.5	1.7	1.0	3.4	0.9	1.9	1.0
Russia	0.0	0.3	0.3	1.3	0.4	1.8	-0.1	0.5
South Africa	0.5	0.4	1.6	1.5	2.6	2.1	0.4	0.8
Republic of Korea	1.0	1.7	0.7	2.0	1.8	3.9	1.1	2.1
Turkey	0.1	0.7	0.3	2.0	0.5	2.6	0.1	1.1
United Kingdom	1.1	0.5	1.3	1.3	2.7	1.9	1.5	0.8
United States of America	-0.1	0.3	0.6	1.0	0.5	1.3	-0.1	0.5
Netherlands	0.8	0.7	1.5	1.9	2.6	2.5	1.0	1.0
New Zealand	0.2	0.8	0.3	1.9	0.6	2.6	0.3	1.2
Norway	0.1	0.5	0.3	1.9	0.3	2.3	0.3	1.1
Spain	0.1	0.5	2.2	2.2	2.1	2.7	0.3	0.9
Switzerland	0.0	0.5	0.2	1.2	0.2	1.7	0.3	1.0
Bangladesh	0.1	0.3	-0.2	0.5	-0.1	0.7	1.3	1.8
Thailand	0.2	0.9	0.3	1.6	0.5	2.5	1.3	1.8
Viet Nam	0.5	0.9	0.3	0.9	0.8	1.8	2.8	3.1
Egypt	0.0	0.5	0.0	1.5	-0.1	1.9	0.4	1.1
Nigeria	0.1	0.8	0.1	2.2	0.2	2.9	0.9	1.1
lldcs Asia	0.1	0.6	-0.1	0.8	-0.1	1.2	1.7	2.6
lldcs Africa	0.0	0.6	0.1	1.7	0.2	2.3	0.5	1.1
Asean plus	0.2	1.1	0.4	2.0	0.6	3.0	0.8	1.9
Developing Asia	0.0	0.4	-0.1	0.9	-0.1	1.2	0.9	1.3
Developing Latin America	0.0	0.5	0.2	1.6	0.1	2.0	0.3	0.9
Developing N Africa Mid East	0.1	0.7	0.2	2.0	0.2	2.6	0.8	1.9
Developing S Africa	0.6	0.1	0.3	2.3	1.0	2.4	1.1	0.9
Rest of World	-0.1	0.4	0.0	1.6	-0.1	1.8	0.3	0.9

Table 2.B.5. Change in employment of high skilled workers

%

	tariffs G20 50%		NTMs G20 50%		tariffs and NTMs G20 50%		tariffs GLOBAL 50%	
	short run (unemploy-ment closure)	long run	short run (unemploy-ment closure)	long run	short run (unemploy-ment closure)	long run	short run (unemploy-ment closure)	long run
Argentina	0.0	0.5	0.3	1.7	0.3	2.2	0.0	0.8
Australia	0.0	0.5	0.2	1.5	0.2	2.1	0.1	0.8
Brazil	0.0	0.6	0.3	1.6	0.4	2.2	0.0	0.8
Canada	0.8	0.5	0.2	1.3	1.1	1.8	0.9	0.8
China	0.3	0.8	0.7	2.3	1.0	3.0	0.3	1.2
Eurozone	1.1	0.7	1.8	1.9	3.1	2.6	1.3	1.1
Non-eurozone EU members	1.5	0.8	0.7	1.8	2.3	2.6	1.7	1.1
France	0.3	0.6	0.9	1.8	1.2	2.3	0.7	1.0
Germany	0.8	0.6	0.2	1.5	1.1	2.1	0.9	0.9
India	0.8	2.2	0.1	0.9	1.0	3.7	0.9	2.1
Indonesia	0.1	0.3	0.2	1.3	0.3	1.4	0.1	0.6
Italy	0.6	0.8	-0.3	2.0	0.4	2.7	0.8	1.2
Japan	0.3	0.8	0.3	1.6	0.7	2.5	0.3	1.1
Mexico	2.3	0.4	2.9	0.7	4.9	0.1	2.3	1.0
Russia	0.3	0.7	0.8	2.2	1.1	3.0	0.2	1.0
South Africa	0.9	0.5	2.4	1.8	3.8	2.4	0.9	0.9
Republic of Korea	1.0	1.7	0.7	2.1	1.8	4.0	1.1	2.1
Turkey	0.2	0.7	0.4	2.0	0.5	2.7	0.2	1.1
United Kingdom	1.3	0.6	1.5	1.6	3.2	2.3	1.7	0.9
United States of America	-0.1	0.3	0.8	1.0	0.8	1.3	0.0	0.5
Netherlands	1.0	0.7	1.8	1.9	3.0	2.6	1.2	1.1
New Zealand	0.0	0.5	0.1	1.6	0.2	2.0	0.2	0.9
Norway	0.1	0.6	0.2	1.8	0.3	2.3	0.4	1.2
Spain	0.2	0.6	1.9	1.8	1.9	2.3	0.5	0.9
Switzerland	0.0	0.5	0.2	1.4	0.2	1.9	0.3	1.0
Bangladesh	0.0	0.2	-0.3	0.5	-0.3	0.6	1.3	1.5
Thailand	-0.2	0.6	0.0	1.5	-0.2	2.1	1.0	1.6
Viet Nam	0.2	0.5	0.0	0.7	0.2	1.1	2.3	2.6
Egypt	-0.1	0.3	-0.1	1.3	-0.3	1.5	0.5	1.2
Nigeria	0.0	0.6	0.1	1.6	0.0	2.1	1.0	2.0
lldcs Asia	-0.1	0.1	-0.3	0.6	-0.4	0.6	1.6	1.9
lldcs Africa	-0.1	0.3	0.0	1.3	-0.1	1.6	0.8	1.4
Asean plus	0.1	0.6	0.2	1.4	0.2	2.1	0.6	1.4
Developing Asia	-0.2	0.1	-0.2	1.0	-0.4	1.0	0.8	1.1
Developing Latin America	-0.2	0.4	0.0	1.6	-0.1	1.9	0.2	1.0
Developing N Africa Mid East	0.0	0.7	0.1	2.0	0.0	2.6	1.0	2.1
Developing S Africa	0.3	0.0	0.1	2.1	0.6	1.8	0.9	1.0
Rest of World	-0.1	0.4	0.0	1.5	-0.1	1.8	0.5	1.2

Table 2.B.6. Change in total exports,

% change

	tariffs G20 50%		NTMs G20 50%		tariffs and NTMs G20 50%		tariffs GLOBAL 50%	
	short run (unemploy-ment closure)	long run	short run (unemploy-ment closure)	long run	short run (unemploy-ment closure)	long run	short run (unemploy-ment closure)	long run
Argentina	4.2	6.5	7.4	14.8	11.8	24.1	4.0	7.6
Australia	7.1	11.5	8.6	14.0	16.9	28.2	7.0	12.8
Brazil	9.5	13.0	10.5	16.9	22.0	34.4	10.3	15.6
Canada	1.9	3.5	1.0	0.9	3.2	2.3	2.1	4.0
China	10.1	16.5	14.9	26.3	26.5	50.2	11.1	20.0
Eurozone	1.7	3.5	3.2	7.1	5.2	10.9	1.9	4.9
Non-eurozone EU members	2.7	4.0	3.0	5.7	6.0	9.8	3.1	5.7
France	1.5	2.8	4.6	7.2	6.3	10.2	2.5	4.8
Germany	2.3	3.8	4.3	7.4	7.0	11.8	2.7	5.2
India	20.8	32.6	10.7	16.5	34.6	58.7	22.1	34.0
Indonesia	6.9	12.0	8.7	18.3	16.4	34.7	7.2	14.3
Italy	2.6	4.2	4.3	8.7	7.2	13.3	3.4	6.3
Japan	5.8	10.8	13.1	22.7	19.9	39.6	6.8	13.5
Mexico	4.7	2.0	5.0	2.4	9.7	18.1	4.8	7.0
Russia	5.6	9.4	7.5	16.8	13.7	27.4	5.5	10.9
South Africa	6.4	10.8	8.1	14.5	15.4	24.3	6.6	12.6
Republic of Korea	8.0	11.8	11.4	19.3	20.4	34.1	8.9	14.4
Turkey	3.9	6.3	7.7	14.6	11.9	21.7	5.1	9.1
United Kingdom	2.9	4.6	5.3	8.5	8.7	14.2	3.5	6.3
United States of America	4.3	6.0	12.7	15.1	17.8	23.7	4.8	7.9
Netherlands	1.8	2.7	3.4	4.6	5.5	7.5	2.3	4.1
New Zealand	3.6	7.7	6.8	13.8	11.3	23.6	6.4	12.6
Norway	1.6	3.6	4.6	9.9	6.4	14.0	3.0	6.5
Spain	1.6	2.8	9.2	25.8	10.6	27.6	2.4	4.6
Switzerland	1.2	2.8	4.9	11.4	6.2	14.6	2.8	6.0
Bangladesh	2.5	5.3	3.3	4.2	5.8	8.7	18.6	35.5
Thailand	2.5	4.4	4.6	19.2	7.4	22.9	9.5	22.5
Viet Nam	4.1	7.0	4.3	7.5	8.5	14.7	14.6	20.8
Egypt	1.1	2.8	2.8	6.8	4.1	9.7	6.8	10.9
Nigeria	0.9	2.9	2.8	8.9	3.8	12.2	5.0	13.7
lldcs Asia	3.0	10.9	3.2	6.9	6.4	17.5	13.6	31.1
lldcs Africa	1.3	3.2	4.1	9.0	5.6	12.5	9.6	16.8
Asean plus	1.9	3.5	4.6	14.2	6.6	16.8	4.2	8.5
Developing Asia	4.2	11.7	3.4	8.2	7.9	20.6	14.8	31.5
Developing Latin America	2.9	4.7	5.1	9.5	8.3	14.8	10.9	15.3
Developing N Africa Mid East	1.3	3.3	3.2	8.5	4.7	12.0	5.1	10.3
Developing S Africa	4.6	10.9	4.2	9.0	10.1	25.8	7.3	16.0
Rest of World	1.4	3.3	4.6	8.9	6.1	12.4	8.1	12.7
Global exports	3.8	6.2	6.9	12.4	11.2	20.3	5.1	9.4

Table 2.B.7. Real national income effects,

Billion dollars

	tariffs G20 50%		NTMs G20 50%		tariffs and NTMs G20 50%		tariffs GLOBAL 50%	
	short run (unemploy-ment closure)	long run	short run (unemploy-ment closure)	long run	short run (unemploy-ment closure)	long run	short run (unemploy-ment closure)	long run
Argentina	0.6	2.5	2.3	7.8	2.9	10.3	0.5	3.7
Australia	1.5	10.9	4.5	29.7	6.5	42.0	1.6	16.0
Brazil	1.8	9.8	6.8	28.3	9.2	39.0	1.8	14.4
Canada	6.0	13.3	2.6	37.0	9.5	50.2	6.9	20.6
China	1.7	31.5	26.2	115.0	28.0	139.7	4.0	52.2
Eurozone	12.3	30.6	25.0	86.5	38.8	114.4	14.9	47.0
non-eurozone EU members	11.5	21.0	8.4	54.8	21.2	74.5	13.8	32.7
France	3.3	32.2	18.0	97.0	21.2	126.7	11.0	53.1
Germany	16.6	40.4	10.8	114.2	29.1	152.6	20.3	62.9
India	4.5	15.9	3.5	24.5	9.0	43.5	5.1	20.1
Indonesia	1.0	4.7	3.0	13.5	4.0	17.9	1.2	7.2
Italy	7.8	34.0	-0.8	92.2	8.0	123.9	10.8	53.7
Japan	21.1	75.5	34.3	195.0	58.5	270.7	23.7	111.1
Mexico	11.6	4.8	15.8	10.6	25.9	-1.6	12.1	17.7
Russia	2.8	11.5	12.8	39.1	16.2	51.5	2.8	17.6
South Africa	0.8	2.2	4.4	10.7	5.8	13.5	0.7	4.7
Republic of Korea	9.3	23.0	12.3	38.4	21.7	64.0	10.7	30.6
Turkey	0.5	5.6	2.8	16.8	3.4	21.8	1.0	9.0
United Kingdom	22.0	33.1	30.7	92.0	57.8	127.0	29.2	51.2
United States of America	-16.5	102.3	94.5	323.1	85.4	422.5	-5.9	165.2
Netherlands	4.3	10.1	9.5	29.0	14.7	38.6	5.4	15.8
New Zealand	0.6	2.3	0.9	5.4	1.7	7.7	0.7	3.2
Norway	0.8	4.3	1.9	13.2	2.8	17.3	2.1	7.9
Spain	0.5	15.6	20.6	61.7	19.6	74.9	3.1	25.5
Switzerland	0.5	4.6	2.4	12.8	2.9	17.7	2.8	9.3
Bangladesh	0.1	0.7	-0.1	1.5	0.0	2.0	0.5	1.5
Thailand	1.4	4.6	2.0	9.0	3.5	13.7	2.8	6.5
Viet Nam	0.7	1.3	0.4	1.7	1.1	3.0	1.1	1.8
Egypt	0.0	1.2	0.1	3.5	0.1	4.7	0.2	2.0
Nigeria	0.1	1.3	0.3	3.7	0.5	5.0	0.9	3.1
lldcs Asia	0.1	0.5	0.0	0.8	0.1	1.1	0.3	0.8
lldcs Africa	0.4	3.6	1.1	10.7	1.6	14.0	1.3	5.9
Asean plus	4.2	22.3	8.2	43.2	12.4	66.5	8.3	33.2
Developing Asia	0.5	2.9	0.0	5.4	0.5	8.1	1.1	4.4
Developing Latin America	1.5	11.7	3.5	34.6	5.3	45.8	1.7	16.5
Developing N Africa Mid East	3.0	18.4	5.4	51.2	8.9	68.6	10.7	38.4
Developing S Africa	0.4	0.4	0.2	1.5	0.7	2.0	0.6	0.8
Rest of World	0.7	8.2	2.2	23.0	2.9	30.9	2.4	14.4
TOTAL	140.2	619.0	376.4	1,738.0	541.4	2,325.7	212.3	981.7

3. Employment implications of reducing border barriers to foreign direct investment in services

As the world emerges from the global financial crisis, unemployment remains high in some of the major economies of Europe and North America. Accordingly, there is considerable interest in whether further trade liberalisation could contribute to job creation, both in these economies, and in others that trade with them.

In the case of services trade, this proposition is by no means obvious. Services trade barriers occur behind–the-border , often in the form of restrictive regulations affecting the establishment and operations of domestic and foreign services suppliers. To the extent that the restrictive regulations induce services firms to use more inputs than otherwise, then trade liberalisation will have the effect of lowering costs by reducing input requirements — equivalent to a productivity improvement. And productivity improvements cost jobs rather than creating them, all other things being equal.

However, not all things will be equal, even in the short run. Productivity improvements lead to lower prices, which can encourage the demand for services. A key question is whether these "scale" effects of increased demand are likely to dominate the initial reductions in unit labour requirements in services. Another key question is whether any employment gains will be balanced across domestic and foreign suppliers, or whether the growth will occur in foreign suppliers at the expense of domestic ones. Thus the key empirical questions are about the scale of total employment effects in each economy, and the extent of the structural adjustments required.

The purpose of this chapter is to examine these two issues. It examines the possible effects of liberalising barriers to foreign direct investment (FDI) in a number of services sectors in both the short and long run. The main focus of the analysis is on restrictions that target foreign-invested firms, in other words, investment restrictions that are discriminatory. A supplementary, and indicative, analysis is provided on liberalisation of regulatory restrictions that also affected domestically-owned services suppliers.

The analysis is carried out with the FTAP model of the world economy, which was developed by Dee and Hanslow (2001), is documented fully in Hanslow, Phamduc and Verikios (1999).[11] The FTAP model is a computable general equilibrium model incorporating services delivered via FDI. The model is described in more detail in Annex 3.B.

This chapter examines the possible effects of liberalising barriers to foreign direct investment in both the short and long term. Over the longer term, wages in each economy can be expected to adjust in the face of services trade liberalisation to bring total employment levels into equilibrium, with any remaining unemployment being only the frictional unemployment associated with job search. Thus the longer-term effect of services trade liberalisation can be expected to be on the level of real wages rather than the level of aggregate employment. Liberalisation that has beneficial impacts on labour markets will generate real wages that are higher than otherwise. If liberalisation has adverse effects, real wages will be lower than otherwise.

In the current economic climate, however, trade liberalisation is being contemplated in economies that already have significant levels of structural unemployment. In the short term, therefore, the labour market effects of services trade liberalisation can be expected to be felt on aggregate levels of employment or unemployment, rather than on real wages. Furthermore, in the short run, the additional foreign direct investment spurred by liberalisation may not yet flow through into additional productive capacity. This provides a brake on the ability of services trade

11. The model code is available for download at *http://www.crawford.anu.edu.au/staff/pdee.php*.

liberalisation to generate scale effects that might boost jobs. The short-run treatment of services trade liberalisation in this paper takes both of these factors into account.

Finally, the paper examines the effects of investment liberalisation in services jointly by a number of FDI-sending and receiving countries. The chapter first examines the effects of liberalisation undertaken on a non-preferential or "most-favoured nation" basis by the G20 countries. It also looks at the effects of global liberalisation of investment in services.

To examine these issues, this paper uses a multi-regional computable general equilibrium (CGE) model of the global economy that has an explicit treatment of foreign direct investment. The exercise makes use of information on regulatory barriers to foreign direct investment that has been compiled by the OECD. It also makes use of econometric estimates made by the OECD of the extent to which FDI stocks can be expected to respond to changes in foreign investment barriers. The sizes of the FDI responses to liberalisation that are used in the general equilibrium model are therefore firmly based on historical patterns. The model then "traces back" the impacts on the level and distribution of employment, using a fully-articulated theory of supply and demand for both labour and capital, calibrated to estimates of the price-responsiveness of FDI that are also based on real-world data. In addition to generating projections for labour market impacts, the model can also generate projections for activity levels, macroeconomic aggregates, and measures of overall economic well-being.

Barriers to foreign direct investment in services

One of the earliest systematic compilations of barriers to foreign direct investment designed for use in subsequent empirical work was the study by Hardin and Holmes (1997). The OECD has subsequently undertaken similar exercises (Golub, 2003; Takeshi and Golub, 2006), the most recent one being by Kalinova, Palerm and Thomsen (2010).

The latter paper compiles information on four key dimensions of regulatory restrictions affecting foreign direct investment — foreign equity limits as they apply to both start-ups and acquisitions, screening and approval processes for both start-ups and acquisitions, restrictions on the movement of intra-corporate transferees, and 'other' restrictions, a catch-all category covering restrictions on legal form, on profit/capital repatriation, on access to finance and land, and the presence of reciprocity requirements. The presence of each restriction is given a score measuring its relative perceived importance (see the original paper for details), and the scores are added together to give an overall restrictiveness index value lying somewhere between zero (no restrictions apply) and one (all restrictions apply).[12]

12. However, if foreign equity limits are zero then the overall index is zero, irrespective of the other measures.

Table 3.1. OECD FDI restrictiveness index*

	ARG	AUS	BRA	CAN	CHN	REU	FRA	GER	IND	IDN	ITA	JPN	MEX	RUS	ZAF	KOR	TUR	GBR	US	ROW
Agric. etc	0.000	0.075	0.397	0.200	0.697	0.084	0.153	0.092	0.300	0.417	0.333	1.000	0.517	0.317	0.060	0.333	0.000	0.206	0.183	0.217
Proc. food	0.000	0.075	0.025	0.100	0.248	0.006	0.000	0.000	0.120	0.060	0.000	0.050	0.100	0.183	0.060	0.000	0.000	0.023	0.000	0.071
Other primary	0.000	0.088	0.025	0.150	0.390	0.018	0.009	0.000	0.525	0.085	0.020	1.000	0.100	0.943	0.060	0.000	0.050	0.023	0.100	0.191
Textiles etc	0.000	0.075	0.025	0.100	0.248	0.006	0.000	0.000	0.120	0.060	0.000	0.050	0.100	0.183	0.060	0.000	0.000	0.023	0.000	0.071
Wood etc	0.000	0.075	0.025	0.100	0.248	0.006	0.000	0.000	0.120	0.060	0.000	0.050	0.100	0.183	0.060	0.000	0.000	0.023	0.000	0.071
Chemicals	0.000	0.075	0.025	0.100	0.280	0.006	0.000	0.000	0.010	0.135	0.000	0.333	0.100	0.183	0.060	0.000	0.000	0.023	0.000	0.071
Metals	0.000	0.075	0.025	0.100	0.243	0.006	0.000	0.000	0.000	0.060	0.000	0.000	0.100	0.183	0.060	0.000	0.000	0.023	0.000	0.071
Vehicles	0.000	0.075	0.025	0.100	0.265	0.006	0.000	0.000	0.000	0.060	0.000	0.000	0.113	0.250	0.060	0.000	0.000	0.023	0.000	0.071
Elect. mach.	0.000	0.075	0.025	0.100	0.225	0.006	0.000	0.000	0.000	0.060	0.000	0.000	0.100	0.183	0.060	0.000	0.000	0.023	0.000	0.071
Other mach.	0.000	0.075	0.025	0.100	0.243	0.006	0.000	0.000	0.000	0.060	0.000	0.000	0.100	0.183	0.060	0.000	0.000	0.023	0.000	0.071
Electricity	0.000	0.075	0.025	0.100	0.608	0.060	0.000	0.000	0.000	0.110	0.000	0.000	0.100	0.250	0.060	0.417	0.000	0.023	0.222	0.282
Gas, water	0.000	0.075	0.025	0.100	0.608	0.060	0.000	0.000	0.000	0.110	0.000	0.000	0.100	0.250	0.060	0.417	0.000	0.023	0.222	0.282
Construction	0.000	0.075	0.025	0.100	0.265	0.006	0.000	0.000	0.000	0.310	0.000	0.000	0.100	0.183	0.060	0.000	0.000	0.023	0.000	0.132
Trade (**)	0.000	0.075	0.025	0.100	0.242	0.007	0.000	0.000	0.280	0.539	0.005	0.000	0.133	0.238	0.060	0.000	0.000	0.023	0.000	0.071
Other transp.	0.125	0.075	0.275	0.100	0.415	0.018	0.000	0.000	0.000	0.129	0.000	0.000	0.475	0.183	0.060	0.000	0.000	0.023	0.000	0.078
Water transp.	0.000	0.125	0.025	0.100	0.850	0.105	0.225	0.275	0.000	0.560	0.225	1.000	0.550	0.183	0.060	0.950	0.125	0.073	1.000	0.469
Air transp.	0.000	0.475	0.575	0.600	0.730	0.276	0.225	0.325	0.523	0.560	0.225	1.000	0.600	0.758	0.560	0.550	0.500	0.248	0.650	0.532
Communications	0.250	0.300	0.350	0.650	0.900	0.034	0.024	0.013	0.513	0.563	0.181	0.250	0.488	0.333	0.060	0.450	0.125	0.135	0.155	0.185
Other finance	0.000	0.138	0.025	0.100	0.515	0.016	0.047	0.008	0.160	0.135	0.027	0.000	0.150	0.471	0.085	0.030	0.000	0.025	0.063	0.127
Insurance	0.000	0.125	0.025	0.000	0.800	0.008	0.068	0.000	0.500	0.160	0.000	0.000	0.100	0.658	0.110	0.000	0.000	0.023	0.000	0.094
Other bus. serv.	0.000	0.103	0.025	0.100	0.138	0.064	0.003	0.000	0.500	0.560	0.000	0.000	0.103	0.308	0.385	0.000	0.125	0.023	0.000	0.141
Other services	0.000	0.400	0.000	0.000	0.275	0.304	0.000	0.000	0.000	1.000	0.000	0.100	0.167	0.733	0.010	0.000	1.000	0.000	0.000	0.311
OVERALL INDEX	0.025	0.127	0.116	0.164	0.457	0.045	0.038	0.023	0.223	0.331	0.073	0.257	0.225	0.350	0.085	0.131	0.074	0.061	0.084	0.152

ARG=Argentina, AUS=Australia, BRA=Brazil, CAN=Canada, REU=Rest of EU, FRA=France, GER=Germany, IND=India, IDN=Indonesia, ITA=Italy, JPN=Japan, MEX=Mexico, RUS=Russia, ZAF=South Africa, KOR=Republic of Korea, TUR=Turkey, GBR=Great Britain, United States=United States, ROW=Rest of world. * (0 = no restriction, 1 = full restriction); ** Wholesale and retail trade.
Source: Kalinova, Palerm and Thomsen (2010).

The resulting FDI restrictiveness indices, scaled between 0 (no restriction) and 1 (fully restricted), for G20 countries and the rest of the world are shown in Table 3.1.[13] The sectoral coverage has been adjusted to match that used in the CGE model.

Table 3.1 shows first that in many countries, FDI restrictions are either more prevalent or more severe in services than in other sectors of the economy. In part, this is because services sectors include key "backbone" services (transport, communications, finance) that have often been legislated government monopolies, and are still viewed as being strategically important for a variety of reasons. Nevertheless, there is ample evidence of the benefits of making these sectors more contestable (e.g. Findlay, 2008).

FDI restrictions are particularly severe in air and water transport. These are sectors where there are also significant barriers to services trade other than barriers to FDI. In maritime transport, cabotage restrictions can reserve coastal shipping services to vessels that are flagged, crewed and/or built locally. International air transport services are governed by a system of bilateral air services agreements that often incorporate both cabotage restrictions and restrictions on ownership, over and above the foreign equity limits written into general investment legislation.

FDI restrictions are also shown as being relatively high in communications. This is because the barriers are particularly high in broadcasting, where local ownership and local content requirements are both widespread. Foreign equity FDI restrictions are still surprisingly prevalent in telecommunications, even though a combination of technology and regulatory reforms has made telecommunications markets highly contestable in other respects (see also Dee, 2010).

FDI restrictions are also severe in some countries in "other business services," a category that includes the professions. Some countries have relatively restrictive requirements for entry of any new professionals, foreign or otherwise. Others are highly discriminatory against foreign suppliers, maintaining restrictions on foreign equity in, and the legal form of, professional firms, as well as restrictions on the movement of individual professionals.

Finally, Table 3.1 indicates that FDI restrictions are spread across both the developed and the developing world. They are particularly severe in developing countries such as China and Indonesia and in some emerging countries such as Russia. They also feature in at least some services sectors in developed countries such as Australia, Canada, Japan and the United States.

Thus FDI restrictions are relatively widespread through the G20 economies. A threshold question, however, is whether these are the only, or even the most important, restrictions affecting trade in services.

One way to answer this question is to look at the extent to which services are actually traded via FDI. Commercial presence is one of the means by which services are traded, and is recognised as such in the General Agreement on Trade in Services (GATS) under the World Trade Organisation (WTO). It involves the service provider moving to establish a permanent commercial presence in the consumers' country, and is an important mode of service delivery for services such as finance, telecommunications and land transport. Services can also be traded via the temporary movement of services suppliers. This is an important means by which many professional and other business services are traded. Services can be traded via the temporary movement of the consumer to the producer's country, as when students or medical patients travel overseas to be educated or treated. Finally, services can be traded while neither the producer nor consumer moves. This is the

13. As in chapter three, throughout this chapter , information on the G20 economies excludes information on Saudi Arabia, because it has not been possible to include a separate representation of Saudi Arabia in the CGE model used for this exercise.

main method of trade in air and maritime services, as well as for any services traded primarily over the internet.[14]

Estimates of the extent of services traded via FDI are hard to come by, because while many countries collect statistics on FDI itself, few collect statistics on the subsequent production and sales activities of foreign affiliates, and it is the latter that constitutes the traded service. Nevertheless, available estimates suggest that services traded via commercial presence account for about 50% of global services trade, while trade involving the temporary movement of suppliers accounts for 2%, the movement of consumers accounts for 14%, and 'pure' cross-border trade accounts for 28% (Karsenty, 2002; WTO, 2005).

Thus trade via FDI is the single most important mode of services trade. The FDI restrictiveness indices capture barriers to this trade, as well as some of the barriers affecting the movement of individual services suppliers (via restrictions on the movement of intra-corporate transferees). Furthermore, the evidence is that trade occurring cross-border and via the movement of consumers is relatively unimpeded in most countries currently (Mattoo and Wunsch-Vincent, 2004). Thus it would appear that barriers to commercial presence are probably the most important services trade barriers by mode.

A second question is whether barriers to FDI capture all of the important barriers to trade via commercial presence. In this respect, the WTO recognises two types of barriers. Restrictions on "national treatment" are restrictions that discriminate against foreign suppliers, *vis-à-vis* domestic ones, such as restrictions on the repatriation of profits. But the GATS also recognises restrictions on "market access". These are six specific types of regulatory restrictions, most of which are quantitative in nature (e.g. restrictions on the total number of services suppliers, or the total value of services transactions), and most of which do not necessarily discriminate against foreign suppliers — they could also affect potential domestic new entrants. Furthermore, the GATS recognises that WTO members have a right to regulate to meet domestic policy objectives, including imposing licensing and qualification requirements; however, those regulations must be administered in a reasonable, objective and impartial manner in order to avoid imposing inappropriate barriers to trade. Although the GATS currently imposes some general disciplines on such requirements, it also mandates negotiations aimed at developing a more detailed set of disciplines.

How important are these various types of trade restrictions in practice? A recent assessment of services regulation in East Asian economies showed that non-discriminatory trade restrictions in services not only occur, but are of considerable economic significance (Dee 2007). Their significance comes about because they tend to be the type that affects operations and creates pure waste by raising the real resources costs of services producers. This is in contrast to artificial barriers to entry that create artificial scarcity, and allow incumbent producers to raise prices above production costs. The latter kinds of barriers create large transfers from consumers to producers, but relatively small costs to the economy as a whole (relative to barriers that create pure waste). However, artificial barriers to entry are often used to discriminate against foreign suppliers, because they are often the most feasible way to impose discrimination.

14. About a quarter of cross-border services trade is intra-firm trade and thus driven by FDI, whereas about half of cross-border trade in services is transport and travel, probably driven by trade in goods and FDI in all sectors.

These reasons help to explain the finding that a preferential trade agreement among East Asian economies would generate gains that were less than a fifth of those available if those economies were to tackle the non-discriminatory regulations that affect both domestic and foreign new entrants equally. In a similar context, the gains from removing restrictions on market access could account for 75% of the total gains from liberalising services trade globally (Dee and Hanslow, 2001).

Thus barriers to FDI in services are not necessarily the most important barriers to commercial presence, in terms of impact on overall economic well-being. So the impacts on economic well-being projected in this paper are probably under-estimates of the total impact of liberalising commercial presence in services. Nevertheless, because FDI restrictions are discriminatory, their removal in isolation will give an upper estimate of the structural adjustments produced by liberalising commercial presence in services. Overall, therefore, the analysis may underestimate the gains and overestimate the costs from FDI liberalisation. Both these qualifications should be kept in mind in what follows.

In an alternative treatment, however, the liberalisation of barriers to FDI is combined with an indicative easing of regulatory restrictions that affect domestic and foreign services suppliers equally. This gives an indication of the extent to which the main welfare and labour market results of this study are underestimated.

Modelling the first-round effects of liberalising foreign direct investment in services

Modelling the liberalisation of barriers to services trade normally takes place as a two-step process (Dee, 2005). In the first step, econometric analysis is used to identify the 'first-round' impact of services trade barriers on various measures of sectoral economic performance, while controlling for all the other factors that might affect that performance. These first-round impacts are then fed into a CGE model to get a picture of the flow-on effects to other aspects of sectoral performance, to other sectors, and to the economy as a whole.

For this study an econometric analysis has been undertaken of the effects of FDI restrictions on FDI stocks – themselves the outcomes of FDI supply responses interacting with changes in the demand for FDI capital. The required 'market outcome' changes in FDI stocks are then fed into the CGE model as targets, and the supply curves of foreign-invested firms in the model can be shifted vertically by the (then model-determined) amounts required to guarantee the desired market outcomes.[15] The CGE model then yields insights into the effects along the supply chain and across sectors of increasing FDI stocks in services.

An alternative way, not followed in this study, involves structural econometric estimates. This requires estimating properly specified industry cost and profit functions. The key advantage of such an approach is that it can identify directly and empirically whether the first-round impact of the restrictions has been to create pure waste (which would show up in the cost function estimation) or has allowed inflated price-cost margins for incumbent producers (which would show up in the profit function estimation). As noted, this plays a major role in determining the subsequent projected impact of liberalisation on economic well-being. A recent example of econometric analysis along these lines applied to insurance is in Dee and Dinh (2008).

In contrast, the approach pursued in this study does not resolve the question of whether the FDI restrictions have operated by raising the price-cost margins of foreign-invested firms, or have created pure waste. In the base-case projections presented here, it is assumed that the FDI

15. Technically, this requires a closure switch so that the normally endogenous FDI stocks become a policy target and vertical supply curve shifters become endogenous 'enablers'.

restrictions create pure waste. This is a "conservative" treatment in the current context because it biases the model towards finding negative employment outcomes from the liberalisation of foreign direct investment.[16]

With FDI restrictions treated as being pure waste, the required FDI responses to liberalisation can be modelled as coming about through "enabling" improvements in the productivity of foreign-invested firms. These model-determined productivity changes correspond to the vertical shifts in the supply curves of foreign-invested firms required to elicit the required increases in FDI stocks from foreign investors.[17]

The econometric analysis that is used for this study to determine the first-round impact of FDI liberalisation on FDI stocks in services is described in Annex 3.A. It draws on a particular application of the "knowledge capital" model of FDI by Baltagi, Egger and Pfaffermayr (2007), although data limitations have precluded the full implementation of their approach.

The results suggest that across the sample of OECD countries a policy change from full restrictiveness to full liberalisation would increase inward FDI stocks by about 25%. As Table 3.1 shows, however, no country in the study is fully restricted currently. Nor would it be expected that, in response to the currently difficult employment climate, all countries would immediately move to full liberalisation. Instead, this paper examines the employment implications if countries were to remove half of their current FDI restrictions.

Using the econometric estimates from the Appendix, 50% liberalisation of FDI restrictions could be expected to increase inward FDI stocks by the amounts shown in Table 3.2. Because of the relative simplicity of the econometric specification, there is a direct proportional relationship between the sizes of the initial FDI restrictions in Table 3.1 and the liberalisation-induced increases in inward FDI stocks in Table 3.2.

Table 3.3 shows the model-generated estimates for the sizes of productivity improvements in foreign-invested firms required to induce the increases in FDI stocks shown in Table 3.2, in those sectors where FDI stocks are non-trivial to begin with (greater than USD 1 million in 2004 dollars). Table 3.3 shows that the required productivity improvements are non-trivial — for example, a 5.9% increase in FDI stocks in the communications sector in Mexico would require a 12.2% increase in the productivity of foreign-invested firms in that sector, while a 7.2% increase in FDI stocks in Mexico's air transport sector would require 27.8% increase in productivity of foreign-invested firms in that sector. These productivity improvements are the first round effects on foreign-invested firms. They bring about the necessary changes in FDI stocks. But they also have spillover effects to domestic firms in the same industry, to other industries, and to the economy as a whole. These spillover effects are discussed in a later section.

16. There is a second, more subtle reason for the current treatment. The model's database does not include a measure of inflated price-cost margins, if they exist. In order to get accurate welfare projections, the inflated price-cost margins would have to be injected into the model's database as tax equivalents first, before policy simulations could be undertaken. But with the intended closure switch, the size of the initial "tax" wedge would not be revealed until a policy simulation was undertaken.

17. In order to test for the sensitivity of the results to the treatment of rents, a series of simulations has been carried out that treat FDI restrictions as inflating the price-cost margins of foreign-invested firms, rather than creating pure waste. The results confirm that in this case liberalisation causes significant redistribution of income between FDI-sending countries (who have been receiving the economic rents) and FDI-receiving countries (who have been paying them), and net long-run gains from global liberalisation are considerably smaller.

Table 3.2. Econometric estimates of increases in FDI stocks from removing 50% of all FDI restrictions in services (%)

	ARG	AUS	BRA	CAN	CHN	REU	FRA	GER	IND	IDN	ITA	JPN	MEX	RUS	ZAF	KOR	TUR	GBR	USA	ROW
Construction	0.0	0.9	0.3	1.2	3.2	0.1	0.0	0.0	0.0	3.7	0.0	0.0	1.2	2.2	0.7	0.0	0.0	0.3	0.0	1.6
Trade (*)	0.0	0.9	0.3	1.2	2.9	0.1	0.0	0.0	3.4	6.5	0.1	0.0	1.6	2.9	0.7	0.0	0.0	0.3	0.0	0.9
Other transp.	1.5	0.9	3.3	1.2	5.0	0.2	0.0	0.0	0.0	1.6	0.0	0.0	5.7	2.2	0.7	0.0	0.0	0.3	0.0	0.9
Water transp.	0.0	1.5	0.3	1.2	10.2	1.3	2.7	3.3	0.0	6.7	2.7	12.0	6.6	2.2	0.7	11.4	1.5	0.9	12.0	5.6
Air transp.	0.0	5.7	6.9	7.2	8.8	3.3	2.7	3.9	6.3	6.7	2.7	12.0	7.2	9.1	6.7	6.6	6.0	3.0	7.8	6.4
Communications	3.0	3.6	4.2	7.8	10.8	0.4	0.3	0.2	6.2	6.8	2.2	3.0	5.9	4.0	0.7	5.4	1.5	1.6	1.9	2.2
Other finance	0.0	1.7	0.3	1.2	6.2	0.2	0.6	0.1	1.9	1.6	0.3	0.0	1.8	5.7	1.0	0.4	0.0	0.3	0.8	1.5
Insurance	0.0	1.5	0.3	0.0	9.6	0.1	0.8	0.0	6.0	1.9	0.0	0.0	1.2	7.9	1.3	0.0	0.0	0.3	0.0	1.1
Other bus. serv.	0.0	1.2	0.3	1.2	1.7	0.8	0.0	0.0	6.0	6.7	0.0	0.0	1.2	3.7	4.6	0.0	1.5	0.3	0.0	1.7

ARG=Argentina, AUS=Australia, BRA=Brazil, CAN=Canada, REU=Rest of EU, FRA=France, GER=Germany, IND=India, IDN=Indonesia, ITA=Italy, JPN=Japan, MEX=Mexico, RUS=Russia, ZAF=South Africa, KOR=Republic of Korea, TUR=Turkey, GBR=Great Britain, USA=United States, ROW=Rest of world. ; * Wholesale and retail trade.
Source: Author's calculations – see text.

Table 3.3. Projected productivity improvements in foreign-invested firms required to increase FDI stocks by estimated amounts in long term (%)

	ARG	**AUS**	**BRA**	**CAN**	**CHN**	**REU**	**FRA**	**GER**	**IND**	**IDN**	**ITA**	**JPN**	**MEX**	**RUS**	**ZAF**	**KOR**	**TUR**	**GBR**	**USA**	**ROW**
Construction	0.1	1.3	1.1	0	0	0.4	0.1	0	0	0	0	0	8.6	4.4	0.8	0	0.1	0.6	0.1	2.5
Trade (*)	0.3	1.7	0.5	3.1	8.6	0.6	0.1	0.2	9.8	9.7	0.1	0.2	14.6	11.7	1.9	0.3	0.4	1.0	0.1	2.7
Other transport	3.8	0	0	0	14.9	0.9	0.1	0.1	0	0	0	0	3.4	5.2	2.0	0.3	0.3	0.9	0.1	2.8
Water transport	0	5.9	0	4.2	0	4.9	0	0	0	0	0	28.3	15.3	7.4	3.2	23.3	8.1	0	23.8	13.9
Air transport	0	12.0	0	9.3	0	6.0	0	6.8	0	0	0	17.0	27.8	0	0	0	0	0	13	13
Communications	7.6	0	12.9	0	33.5	1.6	0.7	0.8	0	0	0	0	12.2	6.4	2.4	0	8.8	4.3	4.3	6.7
Other finance	0.4	6.0	0.5	0	23.3	1.1	1.2	0.4	7.8	6.2	1.1	0	3.5	8.8	3.9	1.7	0.5	0.7	1.0	4.6
Insurance	0	3.9	0.5	0.6	0	0.4	1.0	0	0	0	0.1	0.1	2.0	19.3	3.5	0.2	0.4	0.3	0.1	2.3
Other business services	0.4	2.2	1.1	2.6	3.6	2.8	0.5	0.5	7.9	9.4	0.5	0	6.6	11.6	10.9	0	0	1.3	0.1	5.3

* Wholesale and retail trade.
Source: FTAP model projections. ;

The projected increases in productivity required to bring about the econometrically estimated increases in FDI stocks are a function of three things — the model's assumed price responsiveness of demand for FDI capital, its assumed price responsiveness of the supply of FDI capital, and the estimated sizes of FDI stocks to begin with. Some of the largest changes in Tables 3.2 and 3.3 are associated with sectors in which FDI stocks are small to begin with. The foreign ownership shares that are implicit in the model's database are derived from data on FDI stocks, and are presented in the next section. The model's assumed price responsiveness of FDI capital supply and demand have also been roughly calibrated to real world responses, in a way that is explained further in the next section.

The economy-wide effects of liberalising foreign direct investment in services in the G20 in the long run

The projected long-run effects of liberalising FDI in the G20 provide a benchmark for understanding the flow-on effects to labour markets, even though the short-run scenario may be of more immediate policy interest.

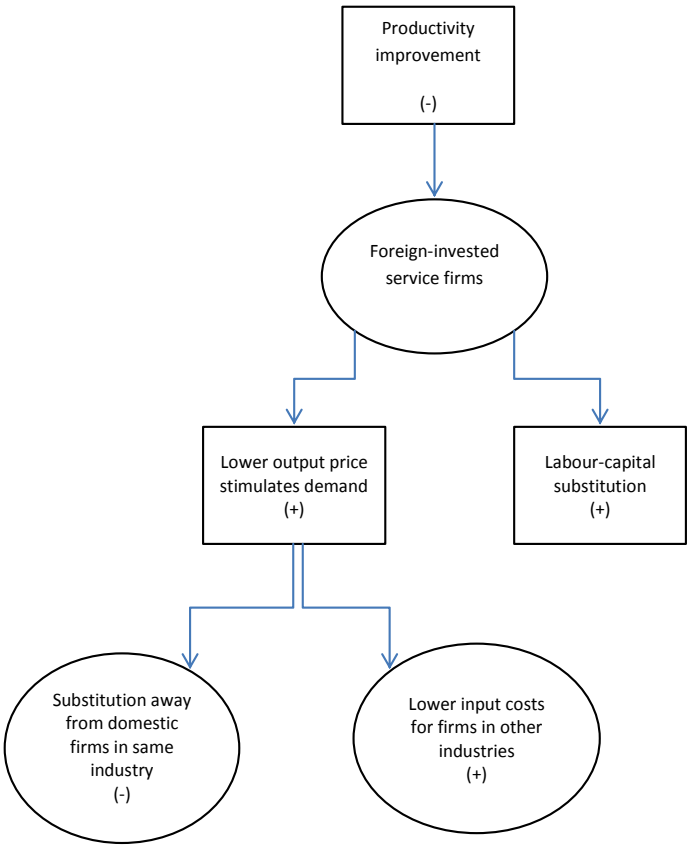
The long-run effects of FDI liberalisation on labour markets begin with the effects on foreign-invested firms, as illustrated in Figure 3.1. One of the immediate results of relaxing restrictions on FDI can be productivity improvements in foreign-invested firms. All other things being equal, this would imply that fewer inputs were required per unit of output. With monopolistic competition, however, the productivity improvements should flow through to lower prices, and this in turn can stimulate demand for the services of foreign-invested firms.

The first-round impact of the productivity improvements on unit input requirements would imply reduced demand for both capital and labour.[18] This would imply both lower employment and lower stocks of FDI capital. However, the econometric estimation in Annex 3.A suggests that the net effect is a rise in FDI stocks in response to liberalisation. This implies that the scale effects of the increased demand outweigh the resource-saving effects of the productivity changes. This is also consistent with the relatively high demand elasticities in services.

If FDI liberalisation implies an increase in FDI stocks, as the econometrics suggests, and if there is no substitution between capital and labour as output expands, then the demand for labour should also increase proportionately in foreign-invested firms. However, there is also likely to be some substitution (in relative terms) away from capital and towards labour in foreign-invested firms. This is because the supply of labour to foreign-invested firms is likely to be reasonably price-responsive. Labour is assumed to be perfectly mobile between sectors, and foreign-invested firms are a relatively small proportion of the economy in most countries, so foreign-invested firms should find it reasonably easy to attract labour away from domestically-owned firms in their own sector, and away from firms in other sectors. By contrast, the supply of FDI capital is likely to be less price-responsive, because having already made their preferred portfolio allocation choices, foreign investors are likely to require non-trivial increases in (sector- and ownership-specific) returns before they are willing to provide the additional FDI capital. As a consequence, there is likely to be an increase in the returns to that FDI capital, relative to wages, and further substitution towards labour in foreign-invested firms.

18. FDI liberalisation implies fewer regulatory restrictions on the operations of foreign-invested firms. This is likely to affect all inputs, so the productivity improvements are modelled as being output-augmenting (Hicks-neutral), rather than as being biased towards saving labour, capital or material inputs.

Figure 3.1. Labour market effects of FDI liberalisation



This analysis is shown numerically in Tables 3.4 and 3.5, taking the United States as an example. The results for all other G20 countries are similar. Table 3.4 shows significant projected increases in the output of the foreign-invested firms undergoing the productivity improvements, particularly in those sectors (such as air and water transport) that have the highest demand elasticities. Table 3.5 shows even greater expansions in the employment of less skilled labour in those firms, despite the productivity improvements (the results for skilled labour are very similar). This is consistent with significant substitution towards labour, and indeed the results reveal that FDI capital stocks grow less than proportionately with output in foreign-invested firms.

The overall story thus far is that although productivity gains in foreign-invested firms might imply job shedding, all other things being equal, there are also significant scale effects that serve to increase the demand for the services of these firms. There are also substitution effects that serve to increase their employment even more than their output.

The next key question is whether this is at the expense of employment in domestically-owned firms. Tables 3.6 and 3.7 show that in many cases, it is. In many cases, the change in overall employment, across both foreign-invested and domestic firms, is negative in the sectors undergoing the FDI liberalisation. In other sectors, outside of services, the employment changes are often positive. This shows that the spillover effects of FDI liberalisation can be mixed. Firms that compete directly with the foreign-invested firms, especially domestic firms in the same sector, suffer from lower priced competition (because of substitution in demand). But sectors that use the services of foreign-invested firms as inputs benefit from lower-priced inputs.

Table 3.4. Long-run changes in output of domestic and foreign-owned firms in the United States, by ownership category, after 50% liberalisation of investment in services by all G20 countries (percentage deviation from control)

	ARG	AUS	BRA	CAN	CHN	REU	FRA	GER	IND	IDN	ITA	JPN	MEX	RUS	ZAF	KOR	TUR	GBR	USA	ROW
Agric. etc	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Proc. food	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other primary	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Textiles etc	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wood etc	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chemicals	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Metals	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vehicles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Elect. mach.	0	0.1	0	0.1	0	0.1	0	0	0	0	0	0	0.1	0	0.1	0	0	0	0	0
Other mach.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Electricity	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gas, water	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Construction	0	-0.1	0	0	0	0.2	0.3	0.3	0	0	0	0	0	0	0	0.1	0.1	0.3	0	0.3
Trade (*)	0.2	-0.1	0.2	-0.1	0.1	0.2	0.6	0.4	0.3	0	0.3	0.2	-0.4	0.2	0.1	0.2	0.1	0.3	0	0.4
Other transp.	0	0	0	0	0	0.2	0.4	0.4	0	0	0	0.2	0.1	0	0	0.2	0	0.3	0	0.4
Water transp.	-2.3	0	-2.4	0	-2.3	123.0	121.8	0	-2.3	0	0	0	-2.3	-2.3	-2.3	126.5	-2.3	0	-2.3	122.8
Air transp.	-0.3	0	-0.3	0	-0.3	72.2	-0.4	72.5	-0.3	0	0	0	-0.3	-0.3	-0.3	-0.3	-0.3	0	-0.3	73.5
Communications	13.1	12.8	12.9	0	-0.3	12.8	13.3	13.4	-0.4	0	0	0	12.9	12.8	12.6	13.1	13	12.9	-0.3	13.3
Other finance	6.7	6.1	6.7	0	6.5	6.6	6.8	6.8	6.6	0	0	6.8	6.1	6.2	6.3	0	0	6.8	-0.3	6.9
Insurance	0	-0.1	0	0.1	0	0.2	0.4	0.4	0	0	0.3	0.2	-0.1	0	0	0.2	0	0.4	0	0.4
Other bus. serv.	0.3	0	0.3	0	0.2	0.1	0.5	0.4	0.2	0	0	0.3	0.3	0.2	0	0	0	0.5	-0.1	0.4
Other serv.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

ARG=Argentina, AUS=Australia, BRA=Brazil, CAN=Canada, REU=Rest of EU, FRA=France, GER=Germany, IND=India, IDN=Indonesia, ITA=Italy, JPN=Japan, MEX=Mexico, RUS=Russia, ZAF=South Africa, KOR=Republic of Korea, TUR=Turkey, GBR=Great Britain, USA=United States, ROW=Rest of world. *Source*: FTAP model projections. * Wholesale and retail trade.

Table 3.5. Long-run changes in employment of less skilled labour in domestic and foreign-owned firms in the United States, by ownership category, after 50% liberalisation of investment in services by all G20 countries (percentage deviation from control)

	ARG	AUS	BRA	CAN	CHN	REU	FRA	GER	IND	IDN	ITA	JPN	MEX	RUS	ZAF	KOR	TUR	GBR	USA	ROW
Agric. etc	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Proc. food	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other primary	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Textiles etc	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wood etc	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chemicals	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Metals	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vehicles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Elect. mach.	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0	0.1	0.1	0.1	0.1	0.1	0.1	0	0	0.1	0.1
Other mach.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Electricity	0	0.1	0	0	0	0.1	0	0	0	0	0	0	0.1	0	0.1	0	0	0	0	0
Gas, water	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Construction	0	-0.1	0	0	0	0.2	0.3	0.3	0	0	0	0	0	0	0	0.1	0.1	0.3	0	0.3
Trade (*)	0.2	-0.1	0.2	-0.1	0.1	0.2	0.6	0.4	0.3	0	0.3	0.2	-0.4	0.1	0.1	0.2	0.1	0.3	0	0.3
Other transp.	0	0	0	0	0	0.2	0.4	0.4	0	0	0	0.2	0	0	0	0.2	0	0.3	0	0.4
Water transp.	-3.3	0	-3.3	0	-3.3	122.7	121.4	0	-3.3	0	0	0	-3.3	-3.3	-3.3	126.2	-3.3	0	-3.3	122.5
Air transport	-0.4	0	-0.4	0	-0.4	76.2	-0.5	76.5	-0.4	0	0	0	-0.4	-0.4	-0.4	-0.4	-0.4	0	-0.4	77.6
Communications	14.2	13.9	14	0	-0.6	13.9	14.6	14.6	-0.6	0	0	0	14.1	13.9	13.6	14.3	14.1	14.1	-0.6	14.5
Other finance	5.8	5.3	5.7	0	5.6	5.7	5.9	5.8	5.7	0	0	5.9	5.2	5.3	5.4	0	0	5.8	-0.4	5.9
Insurance	0	-0.1	0	0.1	0	0.2	0.3	0.4	0	0	0.2	0.2	-0.1	0	0	0.2	0	0.3	0	0.3
Other bus. serv.	0.2	0	0.2	0	0.2	0	0.4	0.3	0.1	0	0	0.2	0.3	0.1	0	0	0	0.4	-0.1	0.3
Other services	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

ARG=Argentina, AUS=Australia, BRA=Brazil, CAN=Canada, REU=Rest of EU, FRA=France, GER=Germany, IND=India, IDN=Indonesia, ITA=Italy, JPN=Japan, MEX=Mexico, RUS=Russia, ZAF=South Africa, KOR=Republic of Korea, TUR=Turkey, GBR=Great Britain, USA=United States, ROW=Rest of world. * Wholesale and retail trade. *Source*: FTAP model projections.

Table 3.6. Long-run changes in sectoral employment of less skilled labour in each G20 country after 50% liberalisation of investment in services by all G20 countries (percentage deviation from control)

	ARG	AUS	BRA	CAN	CHN	REU	FRA	GER	IND	IDN	ITA	JPN	MEX	RUS	ZAF	KOR	TUR	GBR	USA	ROW
Agric. etc	0.1	0.1	0	0.1	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0
Proc. food	0	0.2	0	0.1	0	0	0.1	0.1	0	0.1	0	0	0	0	0.1	0	0	0.1	0	0
Other primary	0	0	0	0	0	0	0	0	0	0	0	0	0.3	0	0	0	0	0	0	0
Textiles etc	0	0.4	0	0.2	0.1	-0.1	0	0	0.1	0.1	0	0	-0.2	0	0.3	0.1	0.1	0	0	0.1
Wood etc	0	0.1	0.1	0.2	0.1	0	0	0	0	0.2	0.1	0	-0.3	0.1	0.2	0	0	0	0	0.1
Chemicals	0	0.1	0	0.2	0	0	0	0	0	0.1	0	0	0	0.1	0.3	0.1	0.1	0	0	0.1
Metals	0.1	0.1	0.1	0.2	0	-0.1	-0.1	0	0.1	0.1	0	0	-0.3	0.2	0.1	0	0.1	-0.1	0	0.1
Vehicles	0.1	0.2	0.1	0.2	0	0	0	0.1	0	0	0.1	0	-0.3	0.9	0.3	0	0.1	0	0	0.1
Elect. mach.	0.1	0	0	0.3	0.1	0.1	-0.1	0	0.1	0.9	0	0	-0.4	0.4	0.7	0	0	-0.1	0.1	0.1
Other mach.	0	0.1	0	0.2	0	-0.1	0	0	0.1	0.1	0	0	0	0.1	0.3	0	0.1	0	0	0.2
Electricity	0	0.1	0	0	0	0	0	0.1	0	0.1	0	0	0.1	0.1	0	0	0	0	0	0.1
Gas, water	0	0.1	0	0.1	0	0	0.1	0	0	0	0	0	0.1	0	0	0	0	0.1	0	0.1
Construction	0	0	0	0	0	0	0	0	0	0.1	0	0	-0.4	0.1	0	0	0.1	0	0	0
Trade (*)	0	0	0	-0.2	-0.1	0.1	0.1	0	0	-0.2	0	0	-1.6	-0.3	0.1	0	0	0	0	-0.1
Other transp.	0	0.1	0	0.1	0	0.1	0	0	0	0.1	0	0	0.3	0	0	0	0	0	0	0
Water transp.	-1.5	-0.2	-1.5	3.4	-0.4	-0.6	2.2	0.8	-0.4	-0.4	-0.4	-0.3	2.4	-1	-1.2	1.8	-0.4	-0.7	0	-1.1
Air transp.	-0.7	0	-0.5	0.8	-0.7	2.2	-0.9	-0.9	-0.1	-0.5	-0.6	0.7	-0.4	-0.5	-0.7	-0.6	-0.4	-0.5	-0.4	-0.7
Communications	-0.2	-0.3	-0.2	-0.2	-0.2	-0.3	-0.2	-0.3	-0.3	-0.5	-0.2	0	-0.2	-0.3	-0.3	-0.4	-0.2	0.1	-0.2	-0.4
Other finance	-0.1	-0.7	-0.1	-0.1	-0.2	0	-0.2	-0.2	-0.2	-0.2	-0.1	-0.1	0.4	-0.5	-0.3	-0.2	-0.2	0.3	-0.1	-0.3
Insurance	0	0.1	0	0.4	-0.1	0.1	0.1	0	-0.1	-0.1	0	0	0.3	0.9	-0.1	0	-0.1	0.3	0	-0.1
Other bus. serv.	-0.1	-0.2	-0.1	-0.1	-0.1	0	-0.1	-0.1	-0.3	-0.1	-0.1	0	7.6	0.2	-0.6	-0.1	-0.1	-0.1	-0.1	-0.2
Other serv.	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0.1	0	0.1

ARG=Argentina, AUS=Australia, BRA=Brazil, CAN=Canada, REU=Rest of EU, FRA=France, GER=Germany, IND=India, IDN=Indonesia, ITA=Italy, JPN=Japan, MEX=Mexico, RUS=Russia, ZAF=South Africa, KOR=Republic of Korea, TUR=Turkey, GBR=Great Britain, USA=United States, ROW=Rest of world. * Wholesale and retail trade.

Source: FTAP model projections.

Table 3.7. Long-run changes in sectoral employment of higher skilled labour in each G20 country after 50% liberalisation of investment in services by all G20 countries (percentage deviation from control)

	ARG	AUS	BRA	CAN	CHN	REU	FRA	GER	IND	IDN	ITA	JPN	MEX	RUS	ZAF	KOR	TUR	GBR	USA	ROW
Agric. etc	0.1	0.1	0.1	0.1	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0
Proc. food	0	0.2	0	0.1	0	0	0.1	0.1	0	0	0	0	0	0.1	0.2	0	0	0.1	0	0
Other primary	0	0	0	0	0	0	0	0	0	0	0	0	0.2	0	0	0	0	0	0	0
Textiles etc	0	0.4	0.1	0.2	0.1	-0.1	0	0	0.1	0.1	0	0	-0.2	0	0.3	0.1	0.1	-0.1	0	0.1
Wood, etc	0	0.1	0.1	0.2	0.1	0	0	0	0	0.1	0.1	0	-0.4	0.1	0.2	0	0	0	0	0.1
Chemicals	0	0.2	0	0.2	0	0	0	0.1	0	0.1	0	0	-0.1	0.2	0.4	0.1	0.1	0	0	0.1
Metals	0.1	0.1	0.1	0.2	0.1	-0.1	-0.1	0	0.1	0.1	0.1	0	-0.4	0.2	0.2	0	0.1	-0.1	0	0.1
Vehicles	0.1	0.2	0.1	0.2	0	0	0	0.1	0.1	0	0.1	0	-0.3	1	0.3	0	0.1	0	0	0.1
Elect. mach.	0.1	0	0	0.2	0.1	0.1	-0.1	0	0.1	0.9	0	0	-0.5	0.4	0.7	0	0	-0.1	0.1	0.1
Other mach.	0	0.2	0.1	0.2	0.1	0	-0.1	0	0.1	0.1	0.1	0	-0.1	0.1	0.4	0	0.1	-0.1	0	0.2
Electricity	0	0.1	0.1	0	0	0	0	0.1	0	0	0	0	0	0.1	0.1	0	0	0	0.1	0.1
Gas, water	0.1	0.1	0	0.1	0	0	0.1	0.1	0	0	0	0	0	0	0.1	0	0	0	0	0.1
Construction	0	0	0.1	0	0	0	0	0	0	0.1	0	0	-0.5	0.1	0.1	0	0.1	0	0	0
Trade (*)	0	0.1	0	-0.2	-0.1	0.1	0.1	0	0	-0.2	0	0	-1.7	-0.3	0.1	0	0	0	0	-0.1
Other transp.	0	0.1	0	0.1	0	0.1	0	0	0	0	0	0	0.2	0	0.1	0	0	0	0	0
Water transp.	-1.5	-0.1	-1.5	3.4	-0.4	-0.6	2.2	0.8	-0.4	-0.5	-0.3	-0.3	2.3	-1	-1.1	1.8	-0.4	-0.7	0	-1.1
Air transp.	-0.7	0.1	-0.5	0.8	-0.7	2.2	-0.9	-0.9	-0.1	-0.5	-0.6	0.7	-0.5	-0.5	-0.6	-0.6	-0.4	-0.5	-0.4	-0.7
Communications	-0.2	-0.3	-0.2	-0.2	-0.2	-0.3	-0.2	-0.2	-0.3	-0.5	-0.2	0	-0.3	-0.3	-0.3	-0.4	-0.2	0.1	-0.2	-0.4
Other finance	-0.1	-0.7	0	-0.1	-0.2	0	-0.2	-0.1	-0.1	-0.2	-0.1	-0.1	0.3	-0.5	-0.2	-0.2	-0.2	0.3	-0.1	-0.2
Insurance	0	0.2	0	0.4	-0.1	0.2	0.1	0	0	-0.1	0	0	0.3	0.9	0	0	-0.1	0.3	0	-0.1
Other bus. serv.	-0.1	-0.1	-0.1	-0.1	-0.1	0	-0.1	-0.1	-0.3	-0.1	-0.1	0	7.5	0.2	-0.6	-0.1	-0.1	-0.1	-0.1	-0.2
Other serv.	0	0	0	0	0	0	0.1	0	0	0	0	0	-0.1	0	0	0	0	0.1	0	0.1

ARG=Argentina, AUS=Australia, BRA=Brazil, CAN=Canada, REU=Rest of EU, FRA=France, GER=Germany, IND=India, IDN=Indonesia, ITA=Italy, JPN=Japan, MEX=Mexico, RUS=Russia, ZAF=South Africa, KOR=Republic of Korea, TUR=Turkey, GBR=Great Britain, USA=United States, ROW=Rest of world. * Wholesale and retail trade.

Source: FTAP model projections.

Thus in almost all cases, the long-run labour market implications of FDI liberalisation in G20 countries are positive. To the extent that there are adjustment costs in the form of labour reallocation across sectors, the results show that most of the reallocation is within sectors — from domestic to foreign-owned firms. This is likely to be far less costly for workers, in terms of retraining and job search costs, than reallocation across sectors.[19]

Tables 3.8 and 3.9 show the relative effects on sectoral output of a country's own FDI liberalisation, relative to the effects of FDI liberalisation in all G20 countries. The comparison gives an indication of the strength of spillover effects between countries. Sectors outside of services tend to gain from a country's own FDI liberalisation. Those same sectors tend to gain more, or lose by less, when the liberalisation occurs across the G20 as a group. This indicates that the spill-over effects of lower services prices are positive both within and between countries. If the price reductions across G20 countries were unbalanced, there could be some substitution in demand towards the goods and services from countries with lower prices. But with liberalisation being relatively widespread, this substitution is kept to a minimum.

Finally, Table 3.10 shows the projected impacts of FDI liberalisation on macroeconomic aggregates and overall economic well-being. The effects on overall levels of economic activity (as measured by real GDP) are positive, and tend to be larger in those economies that undergo more extensive reforms, or where foreign-ownership shares are larger to begin with higher real wages for both less skilled and higher skilled labour in liberalising G20 economies contribute to higher levels of GDP.

Real income changes need not match changes in real GDP, however, in part because the increases in FDI stocks have to be financed, and this in turn implies higher debt service payments or profit repatriation in the long run. The bottom part of Table 3.10 shows the overall sizes and sources of gains in economic well-being in each economy. Some of the countries that are important sources of FDI (France, Germany, Japan, Great Britain and the United States) enjoy gains in the form of repatriated profits from the higher FDI stocks elsewhere in the world. But some of the biggest sources of FDI are also some of the biggest destinations for FDI, so others (Canada, the rest of the European Union) lose because of higher outward profit payments. Countries that are predominantly FDI recipients (e.g. Indonesia, Mexico, Russia, South Africa, Korea) also lose on this score.

Other important sources of real income gains are the productivity improvements themselves. Those measured in Table 3.10 include those generated by the FDI liberalisation itself, as well as the endogenous gains from greater variety in monopolistically competitive industries. A further source of gain is via improvements in allocative efficiency. In the current context, this is a second-best welfare result, but it is almost invariably positive. Finally, note that terms of trade effects are minor — FDI liberalisation is behind-the-border liberalisation.

19. To the extent that foreign-firms are less labour-intensive than domestic firms in the same sector to start with, this reallocation of labour towards foreign-invested firms could also imply a negative influence on overall labour demand through compositional effects. The theoretical literature stresses that foreign-invested firms are likely to be more *skilled*-labour intensive, but the implication for overall labour intensity is unclear. And as noted, FATS data are insufficiently detailed to shed empirical light on the issue.

Table 3.8. Long-run changes in sectoral output in each G20 country after 50% liberalisation of investment in services by all G20 countries (percentage deviation from control)

	ARG	AUS	BRA	CAN	CHN	REU	FRA	GER	IND	IDN	ITA	JPN	MEX	RUS	ZAF	KOR	TUR	GBR	USA	ROW
Agric. etc	0	0.1	0	0.1	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0
Proc. food	0	0.2	0	0.1	0	0	0	0.1	0	0.1	0	0	0.1	0	0.1	0	0	0.1	0	0
Other primary	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0
Textiles, etc	0	0.4	0	0.1	0	0	0	0	0.1	0.1	0	0	0	0	0.3	0.1	0	0	0	0.1
Wood, etc.	0	0.1	0.1	0.1	0	0	0	0	0	0.1	0	0	-0.1	0.1	0.2	0	0	0	0	0.1
Chemicals	0	0.1	0	0.1	0	0	0	0	0	0.1	0	0	0	0.1	0.2	0	0	0	0	0.1
Metals	0.1	0.1	0.1	0.2	0	-0.1	0	0	0	0.1	0	0	-0.1	0.1	0.1	0	0	-0.1	0	0.1
Vehicles	0.1	0.2	0	0.2	0	0	0	0.1	0	0	0	0	0	0.7	0.2	0	0	0	0	0
Elect. mach.	0.1	0	0	0.2	0	0	-0.1	0	0	0.4	0	0	-0.1	0.3	0.5	0	0	-0.1	0	0.1
Other mach.	0	0.1	0	0.2	0	0	0	0	0	0.1	0	0	0	0.1	0.2	0	0	0	0	0.1
Electricity	0	0.1	0	0	0	0	0	0	0	0	0	0	0.1	0.1	0	0	0	0	0	0
Gas, water	0	0.1	0	0.1	0	0	0.1	0	0	0	0	0	0.1	0	0.1	0	0	0	0	0
Construction	0	0.1	0	0.1	0	0	0	0	0	0.1	0	0	0.5	0.1	0	0	0	0	0	0
Trade (*)	0	0.3	0	0.7	0	0.2	0	0	0	0.2	0	0	3.4	0.1	0.1	0	0	0.2	0	0
Other transp.	0	0.1	0	0.2	0	0.1	0	0	0	0	0	0	0.2	0	0	0	0	0.1	0	0
Water transport	-0.9	0.4	-1.3	3.9	-0.1	0	2.0	1.1	-0.3	-0.2	0	-0.1	2.7	-0.5	-0.5	1.5	-0.1	-0.5	0.6	-0.6
Air transport	-0.4	0.2	-0.4	1	-0.2	2.2	-0.8	-0.5	-0.1	-0.2	-0.4	0.8	0.1	-0.3	-0.3	-0.3	-0.1	-0.3	-0.3	-0.4
Communications	-0.1	0.1	0	0.3	0	0	-0.1	-0.1	-0.1	-0.2	0	0	0.4	-0.1	-0.1	0.3	0.2	1.2	0.1	-0.2
Other finance	0	1.3	0	0.1	0	0.3	0	-0.1	-0.1	-0.1	0	0	1.6	0.8	0.7	0	-0.1	0.4	0	-0.2
Insurance	0	0.5	0	0.5	-0.1	0.2	0.1	0	0	0	0	0	0.8	1.3	0	0	0	0.3	0	-0.1
Other bus. serv.	0	0.2	0	0	0	0.3	0	0	-0.2	0	0	0	15.1	0.8	0.3	0	0.1	0	-0.1	-0.1
Other services	0	0.1	0	0.1	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0

ARG=Argentina, AUS=Australia, BRA=Brazil, CAN=Canada, REU=Rest of EU, FRA=France, GER=Germany, IND=India, IDN=Indonesia, ITA=Italy, JPN=Japan, MEX=Mexico, RUS=Russia, ZAF=South Africa, KOR=Republic of Korea, TUR=Turkey, GBR=Great Britain, USA=United States, ROW=Rest of world. * Wholesale and retail trade.

Source: FTAP model projections.

Table 3.9. Long-run changes in sectoral output in each G20 country after *own* 50% liberalisation of investment in services (percentage deviation from control)

	ARG	AUS	BRA	CAN	CHN	REU	FRA	GER	IND	IDN	ITA	JPN	MEX	RUS	ZAF	KOR	TUR	GBR	USA	ROW
Agric. etc	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	na
Proc. food	0	0.1	0	0.1	0	0	0	0	0	0	0	0	0.1	0	0.1	0	0	0	0	na
Other primary	0	0	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	na
Textiles etc	0	0.3	0	0.1	0	-0.1	0	0	0	0.1	0	0	0	-0.1	0.2	0	0	-0.1	0	na
Wood etc	0	0.1	0	0.1	0	0	0	0	0	0	0	0	-0.1	0	0.1	0	0	0	0	na
Chemicals	0	0.1	0	0.1	0	0	0	0	0	0	0	0	0	0.1	0.2	0	0	-0.1	0	na
Metals	0	0.1	0	0.1	0	-0.1	0	0	0	0.1	0	0	-0.1	0.1	0.1	0	0	-0.1	0	na
Vehicles	0	0.1	0	0.1	0	0	0	0	0	0	0	0	0	0.7	0.2	0	0	-0.1	0	na
Elect. mach.	0	0	0	0.1	0	0	0	0	0	0.3	0	0	-0.1	0.2	0.4	0	0	-0.1	0.1	na
Other mach.	0	0.1	0	0.1	0	-0.1	0	0	0	0.1	0	0	0	0	0.2	0	0	-0.1	0	na
Electricity	0	0.1	0	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	na
Gas, water	0	0.1	0	0.1	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	na
Construction	0	0.1	0	0	0	0	0	0	0	0	0	0	0.5	0	0	0	0	0	0	na
Trade (*)	0	0.3	0	0.7	0	0.2	0	0	0	0.2	0	0	3.3	0.1	0.1	0	0	0.2	0	na
Other transp.	0	0.1	0	0.2	0	0.1	0	0	0	0.1	0	0	0.2	0	0.1	0	0	0.1	0	na
Water transp.	0	0.6	0	4.2	0	0.5	2.7	1.3	0	0.1	0.9	0.2	3.4	0.1	0.1	1.8	0	0.1	0.8	na
Air transp.	0	0.5	0	1.4	0	2.3	0.1	0	0	0.1	0.3	1.1	0.2	0	0.1	0	0	0.3	0	na
Communications	0	0.2	0	0.5	0	0.1	0	0	0	0	0.1	0	0.5	0.2	0	0.3	0.3	1.2	0.1	na
Other finance	0	1.3	0	0.1	0	0.3	0.1	0	0	0	0	0	1.6	0.9	0.8	0.1	0	0.7	0	na
Insurance	0	0.5	0	0.4	0	0.2	0.1	0	0	0	0.1	0	1.1	1.4	0	0	0	0.3	0	na
Other business services	0	0.2	0	0.1	0	0.3	0	0	0	0.1	0	0	14.6	0.8	0.3	0	0.1	0	0	na
Other services	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	na

na = not applicable.

ARG=Argentina, AUS=Australia, BRA=Brazil, CAN=Canada, REU=Rest of EU, FRA=France, GER=Germany, IND=India, IDN=Indonesia, ITA=Italy, JPN=Japan, MEX=Mexico, RUS=Russia, ZAF=South Africa, KOR=Republic of Korea, TUR=Turkey, GBR=Great Britain, USA=United States, ROW=Rest of world. * Wholesale and retail trade.

Source: FTAP model projections.

Table 3.10. Long-run changes in macroeconomic aggregates after 50% liberalisation of investment in services by all G20 countries (percentage deviation from control)

		ARG	AUS	BRA	CAN	CHN	REU	FRA	GER	IND	IDN	ITA	JPN	MEX	RUS	ZAF	KOR	TUR	GBR	USA	ROW
Real GDP	%	0.00	0.33	0.01	0.28	0.01	0.16	0.03	0.02	0.01	0.10	0.02	0.01	0.37	0.17	0.20	0.06	0.02	0.13	0.02	0.00
Real national income	%	0.00	0.21	0.01	0.19	0.02	0.10	0.11	0.07	0.01	0.07	0.04	0.02	0.29	0.07	0.10	0.02	0.01	0.15	0.04	0.03
Real GNE	%	0.01	0.19	0.01	0.17	0.02	0.09	0.09	0.06	0.01	0.07	0.04	0.02	0.25	0.08	0.09	0.03	0.02	0.13	0.03	0.03
Trade balance	USD m	-3	820	-2	996	-11	2639	-1188	-991	-11	99	-299	-485	752	529	211	121	17	-185	-1928	-1083
Welfare gains	USD m	3	1227	41	1631	182	3636	1984	1578	79	134	571	640	1754	281	172	120	42	3008	4452	1121
Sources of gain:																					
Allocative efficiency	USD m	-3	135	8	196	54	546	189	124	13	16	48	73	1053	39	26	22	6	249	112	84
Endowments	USD m	-3	86	-4	80	4	261	-36	-44	-2	15	-21	9	41	44	23	6	1	20	-57	-80
Productivity	USD m	6	1805	48	2405	159	5859	441	521	31	217	259	182	1395	876	361	345	51	2510	1743	114
Terms of trade	USD m	7	-48	20	-123	64	-339	64	-67	38	11	39	17	-63	-42	-13	-85	16	-24	475	52
Int. interest and profit	USD m	-4	-751	-31	-927	-99	-2691	1327	1043	-1	-125	246	359	-672	-637	-225	-167	-32	253	2179	951

ARG=Argentina, AUS=Australia, BRA=Brazil, CAN=Canada, REU=Rest of EU, FRA=France, GER=Germany, IND=India, IDN=Indonesia, ITA=Italy, JPN=Japan, MEX=Mexico, RUS=Russia, ZAF=South Africa, KOR=Republic of Korea, TUR=Turkey, GBR=Great Britain, USA=United States, ROW=Rest of world.

Source: FTAP model projections.

Overall, FDI liberalisation by the G20 is projected to provide higher economic well-being than would otherwise be the case, about ten years after the reforms. Globally, the real income gains are about USD 23 billion a year (in 2004 USD). The labour market effects are also projected to be positive, with real wage gains of up to 0.7% in the G20 group.

Recall from the introduction that both these results are "conservative." Gains in economic well-being are likely to be very much higher if the liberalisation were to include all the barriers to commercial presence in services, not just the FDI barriers that discriminate against foreign providers. And the adjustment costs would also be lower, because local firms in the same industry would also gain from the liberalisation (although training and job search costs associated with the current reallocation of labour from domestic to foreign-invested firms are in any event likely to be relatively low). Further, the labour market outcomes here are biased downwards by the assumption that all of the gains from FDI liberalisation accrue as productivity improvements rather than as reductions in the price-cost margins of foreign-invested firms.

The short run

The way in which foreign-invested firms respond to FDI liberalisation in the short run is qualitatively similar to their response in the long run, although the magnitudes differ. Lower prices for their services encourages more demand, although the size of these scale effects is smaller than in the long run because FDI capital stocks cannot respond. There is also substitution towards labour in the short run. In surplus-labour economies, FDI firms can get all the additional labour they want without bidding up wages. Without yet being able to increase their FDI capital stocks, they will expand entirely by hiring more labour. On both counts, the substitution effect toward labour in all economies is likely to be stronger than in the long run. With a smaller scale effect but a larger substitution effect, it is hard to know *a priori* whether the overall short-run effect on labour markets is likely to be larger or smaller than the long run effect. However, it is still likely to be positive.

Taking again the United States, a surplus labour economy, as an example, Tables 3.11 and 3.12 confirm that the scale effect is slightly smaller in the short run than in the long run. Despite stronger substitution effects, the overall increases in employment in foreign-invested firms are smaller than in the long run, but only slightly.

There are now some noticeable differences in the overall outcomes between surplus-labour and other economies. Table 3.13 shows that in some of the economies projected to gain in the long term, such as Russia, there are now predominantly negative impacts on industry output throughout the economy. This reflects negative spill-over effects from economies characterized by surplus-labour to the other economies. The surplus labour economies can expand without bidding up wages, and so gain a competitive advantage on others. But this result needs to be kept in perspective. At current levels of underlying growth, both types of economies will probably continue to experience positive growth *over time*. It is just that the surplus-labour economies will be able to catch up to their full-employment neighbours.

These negative spillovers are also reflected in the overall results for real wages (in full employment economies) or aggregate employment levels (in surplus-labour economies), shown in Table 3.14. They are also evident in the results for macroeconomic aggregates and measures of overall economic well-being (Table 3.15). The global gains in real income are larger in the short run than in the long run, at USD 68 billion per year (in 2004 USD). This is because the short-run results incorporate the surplus-labour economies catching up to their current economic potential (helped by the FDI liberalisation), as well as all economies expanding their potential, as in the long run.

Table 3.11. Short-run changes in output of domestic and foreign-owned firms in the United States, by ownership category, after 50% liberalisation of investment in services by all G20 countries (percentage deviation from control)

	ARG	AUS	BRA	CAN	CHN	REU	FRA	GER	IND	IDN	ITA	JPN	MEX	RUS	ZAF	KOR	TUR	GBR	USA	ROW
Agric. etc	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Proc. food	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other primary	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Textiles etc	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Wood etc	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chemicals	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Metals	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Vehicles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Elect. mach.	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0	0.1	0.1	0.1	0.1	0.1	0.1	0	0	0.1	0.1
Other mach.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Electricity	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gas, water	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Construction	0	-0.1	0	0	0	0.2	0.4	0.3	0	0	0	0	0	0	0	0.2	0.1	0.4	0	0.3
Trade (*)	0.2	-0.1	0.2	-0.1	0.2	0.2	0.7	0.4	0.4	0	0.4	0.3	-0.4	0.2	0.1	0.2	0.2	0.3	0	0.4
Other transport	0	0	0	0	0	0.2	0.4	0.4	0	0	0	0.2	0.1	0	0	0.2	0	0.3	0	0.4
Water transport	-2.1	0	-2.1	0	-2.1	112.6	111.4	0	-2.1	0	0	0	-2.1	-2.1	-2.1	116	-2.1	0	-2.1	112.4
Air transport	-0.3	0	-0.3	0	-0.3	67.2	-0.3	67.5	-0.3	0	0	0	-0.3	-0.3	-0.3	-0.3	-0.3	0	-0.3	68.5
Communications	11.0	10.7	10.9	0	-0.2	10.7	11.3	11.3	-0.2	0	0	0	10.9	10.8	10.5	11.0	10.9	10.9	-0.2	11.2
Other finance	6.3	5.7	6.2	0	6.1	6.1	6.4	6.3	6.2	0	0	6.4	5.6	5.7	5.8	0	0	6.3	-0.3	6.4
Insurance	0	-0.1	0	0.1	0	0.3	0.4	0.4	0	0	0.3	0.2	-0.1	0	0	0.2	0	0.4	0	0.4
Other bus. serv.	0.3	0	0.3	0	0.3	0.1	0.5	0.4	0.2	0	0	0.3	0.3	0.2	0	0	0	0.5	0	0.4
Other serv.	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1

ARG=Argentina, AUS=Australia, BRA=Brazil, CAN=Canada, REU=Rest of EU, FRA=France, GER=Germany, IND=India, IDN=Indonesia, ITA=Italy, JPN=Japan, MEX=Mexico, RUS=Russia, ZAF=South Africa, KOR=Republic of Korea, TUR=Turkey, GBR=Great Britain, USA=United States, ROW=Rest of world. * Wholesale and retail trade.

Source: FTAP model projections.

Table 3.12. Short-run changes in employment of unskilled labour in domestic and foreign-owned firms in the United States, by ownership category, after 50% liberalisation of investment in services by all G20 countries (percentage deviation from control)

	ARG	AUS	BRA	CAN	CHN	REU	FRA	GER	IND	IDN	ITA	JPN	MEX	RUS	ZAF	KOR	TUR	GBR	USA	ROW
Agric. etc	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Proc. food	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0.1	0	0	0
Other primary	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0	0.2	0.2	0.2	0.2	0.2	0.2	0	0.2	0.2	0.2
Textiles etc	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0
Wood etc	0	0	0	0	0	0	0	0	0	0.1	0.1	0.1	0	0	0	0	0.1	0	0	0
Chemicals	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0
Metals	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0
Vehicles	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0.1	0	0	0
Elect. machinery	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.2	0.2
Other mach.	0	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0
Electricity	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Gas, water	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Construction	0	-0.1	0	0.1	0	0.2	0.3	0.3	0	0.1	0.1	0.1	0	0	0	0.2	0.1	0.3	0	0.3
Trade (*)	0.2	-0.1	0.2	-0.1	0.2	0.2	0.6	0.4	0.3	0.1	0.3	0.3	-0.4	0.2	0.1	0.2	0.2	0.3	0	0.4
Other transport	0	0	0	0.1	0	0.2	0.4	0.4	0	0.1	0.1	0.3	0.1	0	0	0.2	0	0.3	0	0.4
Water transport	-3.1	0.1	-3.1	0.1	-3.1	117.5	116.2	0.1	-3.1	0.1	0.1	0.1	-3.1	-3.1	-3.1	121	-3.1	0.1	-3.1	117.3
Air transport	-0.5	0.1	-0.5	0.1	-0.5	73.9	-0.5	74.2	-0.5	0.1	0.1	0.1	-0.5	-0.5	-0.5	-0.5	-0.5	0.1	-0.5	75.3
Communications	12.7	12.4	12.5	0.1	-0.5	12.3	13	13	-0.5	0.1	0.1	0.1	12.5	12.4	12.1	12.7	12.6	12.5	-0.5	12.9
Other finance	5.5	4.9	5.4	0.1	5.3	5.3	5.5	5.5	5.4	0.1	0.1	5.5	4.9	5	5.1	0.1	0.1	5.5	-0.3	5.6
Insurance	0	-0.1	0	0.1	0	0.2	0.3	0.4	0	0.1	0.3	0.2	0	0	0	0.2	0.1	0.4	0	0.3
Other bus. serv.	0.2	0	0.3	0.1	0.2	0.1	0.5	0.4	0.2	0.1	0.1	0.2	0.3	0.2	0	0.1	0.1	0.4	0	0.4
Other services	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1

ARG=Argentina, AUS=Australia, BRA=Brazil, CAN=Canada, REU=Rest of EU, FRA=France, GER=Germany, IND=India, IDN=Indonesia, ITA=Italy, JPN=Japan, MEX=Mexico, RUS=Russia, ZAF=South Africa, KOR=Republic of Korea, TUR=Turkey, GBR=Great Britain, USA=United States, ROW=Rest of world. * Wholesale and retail trade.

Source: FTAP model projections.

Table 3.13. Short-run changes in sectoral output in each G20 country after 50% liberalisation of investment in services by all G20 countries (percentage deviation from control)

	ARG	AUS	BRA	CAN	CHN	REU	FRA	GER	IND	IDN	ITA	JPN	MEX	RUS	ZAF	KOR	TUR	GBR	USA	ROW
Agric. etc	0	0.1	0	0.2	0	0.1	0.1	0.1	0	0	0.1	0	0.2	0	0.1	0	0	0.2	0	0
Proc. food	-0.1	0.1	0	0.9	0	0.3	0.1	0.1	0	0	0	0	0.5	0	0.4	0	0	0.7	0	0
Other primary	0.1	0	0.1	0.1	0	0.1	0.1	0.1	0	0	0.1	0.1	0.1	0	0.1	0	0	0	0	0
Textiles etc	0	0.3	0	1.8	0	0.5	0.1	0.1	0	0.1	0	0	0.4	-0.1	0.9	0	0	1.1	0	0
Wood etc	0	0	0.1	1	0	0.3	0	0	0	0.1	0	0	0.3	-0.1	0.6	0	0	0.7	0	0
Chemicals	-0.1	0.1	0	1	0	0.3	0.1	0.1	0	0	0.1	0	0.4	-0.2	0.6	0	0	0.8	0	0
Metals	0	0	0	1.2	0	0.3	0	0.1	0	-0.1	0	0	0.3	-0.1	0.2	0	0	0.9	0	-0.1
Vehicles	0	0.1	0	1	0	0.3	0	0.1	0	0	0	-0.1	0.2	0.5	0.7	0	0	1.5	0	0
Elect. machinery	-0.1	0	0	2.5	0	0.3	0	0.1	0	0.2	0	0	0.2	-0.1	0.9	0	0	0.6	0.1	0
Other mach.	0	0	0	1.5	0	0.4	0	0	0	0	0	0	0.6	-0.1	0.5	0	0	0.8	0	0
Electricity	0	0	0	0.4	0	0.2	0.1	0.1	0	0	0	0	0.4	0	0.2	0	0	0.5	0	0
Gas, water	0	0	0	0.5	0	0.3	0.2	0.1	0	0	0.1	0	0.4	0	0.4	0	0	0.4	0	0
Construction	0	0.1	0.1	0.3	0	0.2	0.1	0.1	0	0.1	0.1	0.1	0.6	0.1	0.2	0	0.1	0.2	0	0.1
Trade (*)	0	0.3	0	1.6	0	0.5	0.1	0.1	0	0.2	0	0	3.5	0.1	0.4	0	0	0.9	0	0
Other transport	0	0.1	-0.1	0.9	0	0.3	0.1	0	0	0	0	0	0.5	0	0.3	0	0	0.6	0	0
Water transport	-0.9	0.3	-1.5	4.5	-0.1	0.2	1.8	1	-0.3	-0.2	0	-0.1	2.9	-0.4	-0.3	1.3	0	-0.2	0.6	-0.6
Air transport	-0.4	0.2	-0.6	2.1	-0.2	2.4	-0.7	-0.4	-0.1	-0.3	-0.4	0.9	0.4	-0.3	-0.1	-0.3	-0.1	0.1	-0.3	-0.3
Communications	0	0.1	0	1.1	0	0.2	0	0	-0.1	-0.1	0	0	1.3	-0.1	0.2	0.3	0.3	1.7	0.1	-0.2
Other finance	0	1.3	0	1	0	0.5	0.1	-0.1	0	-0.1	0	0	2.1	0.7	1	0	-0.1	0.9	0	-0.2
Insurance	**0**	**0.4**	**0**	**1.3**	**-0.1**	**0.4**	**0.2**	**0**	**0**	**-0.1**	**0**	**0**	**6.4**	**1.1**	**0.3**	**0**	**0**	**0.9**	**0**	**-0.1**
Other bus. serv.	**0**	**0.2**	**0**	**0.9**	**0**	**0.5**	**0.1**	**0**	**-0.1**	**0**	**0**	**0**	**18.2**	**0.7**	**0.6**	**0**	**0.1**	**0.4**	**0**	**0**
Other services	**0**	**0**	**0**	**0.9**	**0**	**0.4**	**0.2**	**0.1**	**0**	**0**	**0**	**0**	**0.8**	**0**	**0.5**	**0**	**0**	**0.7**	**0.1**	**0.1**

ARG=Argentina, AUS=Australia, BRA=Brazil, CAN=Canada, REU=Rest of EU, FRA=France, GER=Germany, IND=India, IDN=Indonesia, ITA=Italy, JPN=Japan, MEX=Mexico, RUS=Russia, ZAF=South Africa, KOR=Republic of Korea, TUR=Turkey, GBR=Great Britain, USA=United States, ROW=Rest of world. * Wholesale and retail trade.

Source: FTAP model projections.

Table 3.14. Short-run changes in aggregate employment and real wages in each G20 country after 50% liberalisation of investment in services by all G20 countries (percentage deviation from control)

	ARG	AUS	BRA	CAN	CHN	REU	FRA	GER	IND	IDN	ITA	JPN	MEX	RUS	ZAF	KOR	TUR	GBR	USA	ROW
Employment																				
Unskilled labour	0	0	0	1.2	0	0.47	0.12	0.07	0	0	0.05	0	1.04	0	0.64	0	0	0.83	0.04	0
Skilled labour	0	0	0	1.34	0	0.49	0.15	0.08	0	0	0.04	0	1.36	0	0.63	0	0	0.84	0.04	0
Overall	0	0	0	1.25	0	0.48	0.13	0.07	0	0	0.04	0	1.16	0	0.64	0	0	0.83	0.04	0
Real wages																				
Unskilled labour	-0.01	0.33	-0.03	0	0	0	0	0	-0.05	0.06	0	-0.01	0	0.15	0	0.03	0	0	0	-0.03
Skilled labour	-0.02	0.31	-0.04	0	-0.02	0	0	0	-0.06	0.07	0	-0.01	0	0.17	0	0.02	-0.02	0	0	-0.02
Overall	-0.02	0.33	-0.03	0	0	0	0	0	-0.05	0.06	0	-0.01	0	0.16	0	0.03	0	0	0	-0.03

ARG=Argentina, AUS=Australia, BRA=Brazil, CAN=Canada, REU=Rest of EU, FRA=France, GER=Germany, IND=India, IDN=Indonesia, ITA=Italy, JPN=Japan, MEX=Mexico, RUS=Russia, ZAF=South Africa, KOR=Republic of Korea, TUR=Turkey, GBR=Great Britain, USA=United States, ROW=Rest of world.

Source: FTAP model projections.

Table 3.15. Short-run changes in macroeconomic aggregates after 50% liberalisation of investment in services by all G20 countries (percentage deviation from control)

		ARG	AUS	BRA	CAN	CHN	REU	FRA	GER	IND	IDN	ITA	JPN	MEX	RUS	ZAF	KOR	TUR	GBR	USA	ROW
Real GDP	%	0	0.29	0.01	1.16	0.01	0.46	0.12	0.07	0	0.09	0.04	0	0.93	0.15	0.55	0.05	0.01	0.75	0.05	0
Real national income	%	-0.01	0.17	-0.01	1.1	0	0.4	0.22	0.13	0	0.03	0.06	0.02	0.88	0.1	0.5	0	0	0.78	0.08	0.08
Real GNE	%	0	0.16	0.01	0.91	0.02	0.34	0.19	0.12	0.01	0.06	0.07	0.03	0.74	0.13	0.45	0.02	0.02	0.68	0.07	0.08
Trade balance	USD m	23	863	14	2213	-280	3999	-1370	-1291	-80	110	-481	-1455	1205	531	237	7	-23	501	-3128	-1595
Welfare gains	USD m	-13	977	-33	9462	4	14687	4037	3101	0	66	906	820	5362	457	902	-13	4	15557	8920	2742
Sources of gain																					
Allocative efficiency	USD m	-5	89	-1	3532	50	6360	1141	732	-2	13	240	28	2958	63	233	9	-5	5144	1248	188
Endowments	USD m	5	-41	11	4009	33	5218	651	569	7	-4	144	8	1590	-15	433	6	1	6328	2047	49
Productivity	USD m	1	1762	37	3585	96	7796	689	684	18	206	306	73	1714	807	486	315	47	4291	2040	-66
Terms of trade	USD m	32	27	43	-371	-66	-896	42	-164	-29	28	-13	-192	-122	286	-6	-182	4	-305	503	1379
Int. interest and profit	USD m	-46	-860	-123	-1293	-109	-3791	1514	1280	6	-177	229	903	-778	-684	-244	-161	-43	99	3082	1192

ARG=Argentina, AUS=Australia, BRA=Brazil, CAN=Canada, REU=Rest of EU, FRA=France, GER=Germany, IND=India, IDN=Indonesia, ITA=Italy, JPN=Japan, MEX=Mexico, RUS=Russia, ZAF=South Africa, KOR=Republic of Korea, TUR=Turkey, GBR=Great Britain, USA=United States, ROW=Rest of world.

Source: FTAP model projections.

Global liberalisation

There is very little to say about the effects when FDI liberalisation is extended to the world as a whole, other than the global gains are bigger (Tables 3.16 and 3.17). In the short run, they are USD 89 billion per year (in 2004 USD), while in the long run they are USD 37 billion a year (in 2004 USD). As before, the short-run gains include "catch-up" in surplus-labour economies, an effect that is absent in the long-run results. The labour market outcomes for G20 economies when liberalisation is global are quite similar to those when only the G20 liberalise. As noted earlier, the more widespread the reforms, the less likely it is that any particular sector or economy will suffer adversely from substitution effects. Particularly when liberalisation yields productivity improvements, there are distinct dangers that laggards will lose out.

Extending liberalisation to domestic service providers

Another key aspect of the above analysis is that it focuses on liberalising barriers to FDI — it does not also consider the effects of easing of non-discriminatory regulatory barriers that affect domestic and foreign services providers equally. Dee and Findlay (2008) review the evidence available at that time on whether services trade barriers discriminate against foreign providers, or also affect domestic players. One generalisation is that "when there are significant barriers to foreign supply, there are typically also non-trivial barriers to domestic supply. It is very rare to have a significant barrier to foreign entry and/or operations with no barrier affecting domestic new entrants" (p. 54).

In an alternative treatment, it is assumed that in addition to the productivity improvements in foreign-invested firms that accrue from liberalising barriers to FDI, there are comparable productivity improvements available in both domestic and foreign-invested firms from easing non-discriminatory regulatory barriers. Thus the total productivity improvements in foreign-invested firms are twice those shown in Table 3.3, while productivity improvements in domestic firms are the same as those in Table 3.3.

Clearly, this treatment is indicative in several respects. While the evidence surveyed in Dee and Findlay (2008) indicates that non-discriminatory regulatory barriers often tended to roughly double the total (discriminatory plus non-discriminatory) burden, there were notable variations across both sectors and countries. For example, in developed economies the relative importance of discriminatory barriers was higher in legal than in accounting services. In developing countries, the relative importance of discriminatory barriers was often, but not always, higher in banking than in telecommunications. Furthermore, the estimated productivity gains came from empirical evidence on the extent to which FDI barriers affect FDI levels. There is no guarantee that non-discriminatory barriers would affect either domestic or foreign firms to the same extent. And ideally, the first-round impact on domestic firms should be estimated using direct measures of the performance of those domestic firms.

Nevertheless, Table 3.19 confirms that when the liberalisation extends to measures that also affect domestic services providers, the long-run gains from global liberalisation can be an order of magnitude larger than before, at around USD 620 billion per year (in 2004 dollars). Table 3.20 shows that the overall labour market benefits are also significantly greater. The detailed employment results (not shown) show that when the liberalisation extends to domestic services providers, there is less relative movement of labour between domestic and foreign-invested firms within sectors.[20]

20. The projections suggest some significant negative spillover effects across countries, particularly in air and water transport, but this result is misleading. The productivity gains in Table 3.3 are sometimes zero in these sectors not because there are no FDI barriers, but because there are no significant FDI stocks in the database to start with. In reality, there are likely to be significant non-discriminatory restrictions in these sectors, the easing of which would generate productivity gains for domestic firms and allow them to match the more intense cross-border competition. The current indicative treatment does not pick this up, but it would alleviate at least some of the apparent negative cross-border spillovers.

Table 3.16. Projected long-run changes in macroeconomic aggregates after 50% liberalisation of investment in services globally (percentage deviation from control)

		ARG	AUS	BRA	CAN	CHN	REU	FRA	GER	IND	IDN	ITA	JPN	MEX	RUS	ZAF	KOR	TUR	GBR	USA	ROW
Real GDP	%	0	0.33	0.01	0.29	0.02	0.17	0.03	0.03	0.01	0.1	0.02	0.01	0.38	0.18	0.2	0.06	0.02	0.14	0.01	0.29
Real national income	%	0.02	0.26	0.02	0.21	0.03	0.16	0.15	0.09	0.02	0.09	0.06	0.03	0.3	0.08	0.11	0.04	0.02	0.21	0.07	0.14
Real GNE	%	0.02	0.22	0.03	0.19	0.03	0.14	0.12	0.08	0.02	0.09	0.06	0.03	0.26	0.1	0.11	0.04	0.03	0.18	0.06	0.14
Trade balance	USD m	-17	681	-49	887	-79	1049	-1725	-1289	-30	73	-535	-809	738	474	203	95	-3	-1063	-4654	6052
Welfare gains	USD m	28	1482	111	1821	342	6110	2722	2058	136	182	872	981	1844	326	192	179	82	4116	7881	5133
Sources of gain																					
Allocative efficiency	USD m	-4	139	17	194	87	727	210	160	19	21	57	91	1088	58	27	26	8	299	140	823
Endowments	USD m	-4	81	-6	76	0	173	-62	-76	-4	15	-33	9	39	43	23	5	1	-28	-159	657
Productivity	USD m	9	1867	59	2492	205	6443	561	818	38	222	316	265	1436	893	373	385	59	2631	1720	10872
Terms of trade	USD m	17	-16	44	-125	138	-288	118	-111	73	33	84	60	-55	-55	-6	-76	34	33	997	-897
Int. interest and profit	USD m	10	-589	-3	-816	-88	-945	1895	1267	10	-109	448	556	-664	-613	-225	-161	-20	1181	5183	-6322

ARG=Argentina, AUS=Australia, BRA=Brazil, CAN=Canada, REU=Rest of EU, FRA=France, GER=Germany, IND=India, IDN=Indonesia, ITA=Italy, JPN=Japan, MEX=Mexico, RUS=Russia, ZAF=South Africa, KOR=Republic of Korea, TUR=Turkey, GBR=Great Britain, USA=United States, ROW=Rest of world.

Source: FTAP model projections.

Table 3.17. Projected short-run changes in macroeconomic aggregates after 50% liberalisation of investment in services globally (percentage deviation from control)

		ARG	AUS	BRA	CAN	CHN	REU	FRA	GER	IND	IDN	ITA	JPN	MEX	RUS	ZAF	KOR	TUR	GBR	USA	ROW
Real GDP	%	0	0.3	0.01	1.18	0.01	0.55	0.18	0.17	0	0.09	0.08	0	0.96	0.16	0.57	0.05	0.02	0.85	0.03	0.26
Real national income	%	0.01	0.21	0	1.14	0.02	0.54	0.32	0.25	0	0.05	0.12	0.03	0.92	0.12	0.52	0.01	0.01	0.94	0.1	0.15
Real GNE	%	0.02	0.19	0.02	0.94	0.04	0.46	0.27	0.22	0.02	0.08	0.12	0.04	0.77	0.15	0.48	0.03	0.04	0.81	0.09	0.16
Trade balance	USD m	17	742	-19	2141	-378	2753	-1856	-1322	-106	92	-704	-1963	1216	486	226	-36	-44	-318	-6261	5332
Welfare gains	USD m	6	1232	17	9813	136	19888	5888	5852	48	99	1763	1238	5609	540	947	24	38	18652	11485	5346
Sources of gain																					
Allocative efficiency	USD m	-6	96	7	3603	85	7856	1720	1843	2	17	571	42	3080	88	240	11	-5	5931	888	707
Endowments	USD m	6	-37	14	4098	40	6410	1013	1486	8	-4	308	11	1657	-14	444	7	1	7268	1384	-304
Productivity	USD m	3	1824	46	3695	123	8815	965	1385	23	210	466	122	1768	816	500	348	53	4672	1826	10393
Terms of trade	USD m	46	68	70	-372	-11	-925	78	-363	-4	51	14	-184	-112	324	5	-190	24	-270	1041	708
Int. interest and profit	USD m	-43	-719	-120	-1211	-101	-2268	2112	1501	19	-175	404	1247	-784	-674	-242	-152	-35	1051	6346	-6158

ARG=Argentina, AUS=Australia, BRA=Brazil, CAN=Canada, REU=Rest of EU, FRA=France, GER=Germany, IND=India, IDN=Indonesia, ITA=Italy, JPN=Japan, MEX=Mexico, RUS=Russia, ZAF=South Africa, KOR=Republic of Korea, TUR=Turkey, GBR=Great Britain, USA=United States, ROW=Rest of world.

Source: FTAP model projections.

Table 3.18. Projected long- and short-run changes in aggregate employment and real wages in each country after 50% liberalisation of investment in services globally (percentage deviation from control)

	ARG	AUS	BRA	CAN	CHN	REU	FRA	GER	IND	IDN	ITA	JPN	MEX	RUS	ZAF	KOR	TUR	GBR	USA	ROW
Long run																				
Real wages																				
Unskilled labour	0.03	0.39	0.02	0.35	0.06	0.24	0.07	0.09	0	0.12	0.08	0.01	0.62	0.25	0.29	0.09	0.04	0.2	0.02	0.34
Skilled labour	0.02	0.38	-0.01	0.37	0.05	0.22	0.07	0.07	-0.03	0.15	0.06	0.01	0.69	0.24	0.24	0.08	0.03	0.2	0.01	0.33
Overall	0.03	0.38	0.01	0.36	0.05	0.23	0.07	0.08	0	0.13	0.07	0.01	0.65	0.25	0.27	0.09	0.04	0.2	0.02	0.34
Short run																				
Employment																				
Unskilled labour	0	0	0	1.22	0	0.57	0.2	0.2	0	0	0.11	0	1.09	0	0.66	0	0	0.95	0.03	0
Skilled labour	0	0	0	1.37	0	0.6	0.22	0.19	0	0	0.09	0	1.42	0	0.65	0	0	0.96	0.02	0
Overall	0	0	0	1.28	0	0.58	0.21	0.20	0	0	0.10	0	1.21	0	0.66	0	0	0.95	0.02	0
Real wages																				
Unskilled labour	0	0.34	-0.03	0	0.02	0	0	0	-0.06	0.06	0	0	0	0.14	0	0.04	0.01	0	0	0.27
Skilled labour	-0.02	0.33	-0.05	0	0	0	0	0	-0.08	0.08	0	-0.01	0	0.17	0	0.03	-0.02	0	0	0.27
Overall	-0.01	0.34	-0.04	0	0.01	0	0	0	-0.06	0.06	0	0	0	0.15	0	0.03	0	0	0	0.27

ARG=Argentina, AUS=Australia, BRA=Brazil, CAN=Canada, REU=Rest of EU, FRA=France, GER=Germany, IND=India, IDN=Indonesia, ITA=Italy, JPN=Japan, MEX=Mexico, RUS=Russia, ZAF=South Africa, KOR=Republic of Korea, TUR=Turkey, GBR=Great Britain, USA=United States, ROW=Rest of world.

Source: FTAP model projections.

Table 3.19. Projected long-run changes in macroeconomic aggregates after 50% liberalisation of investment in services and indicative liberalisation of domestic regulation globally (deviation from control)

		ARG	AUS	BRA	CAN	CHN	REU	FRA	GER	IND	IDN	ITA	JPN	MEX	RUS	ZAF	KOR	TUR	GBR	USA	ROW
Real GDP	%	-0.05	3.29	0.91	3.1	5.49	1.84	0.41	0.44	0.13	0.42	0.42	0.74	2.22	6.71	3.64	1.47	0.67	1.43	0.64	3.73
Real national income	%	1.17	4	1.73	3.51	6.81	2.32	0.6	0.43	0.49	1.35	0.81	0.52	2.53	8.22	4.19	1.44	1.06	1.37	0.74	3.85
Real GNE	%	1.09	3.32	1.57	2.99	4.99	2.05	0.65	0.55	0.58	1.39	0.88	0.61	2.2	7.33	3.8	1.32	1.22	1.31	0.74	3.27
Trade balance	USD m	-970	90	-2008	1200	14612	-10755	-3961	-5310	-1015	-1405	-5674	366	253	315	176	34	-1004	1255	-3420	17220
Welfare gains	USD m	1444	22566	8845	30276	90723	87868	10968	8597	3068	2744	11969	19260	15473	36690	7565	7955	3080	27956	87091	136300
Allocative efficiency	USD m	6	1682	1196	2842	2731	8524	354	1022	497	276	675	2913	5700	2845	652	725	192	2171	4126	14285
Endow-ments	USD m	0	686	370	954	5732	2311	-185	-353	79	101	-14	915	179	1154	268	55	116	422	1626	7680
Produc-tivity	USD m	-73	18221	3857	25993	80947	67144	8288	11473	232	640	6358	29957	9177	33670	6746	9163	1656	27528	67811	136119
Terms of trade	USD m	598	760	1466	-291	1519	-938	1104	-2971	2015	922	2244	-6435	79	-1776	292	-1697	791	45	13198	-10936
Int. interest and profit	USD m	913	1217	1956	778	-206	10827	1407	-574	245	805	2706	-8090	338	797	-393	-291	325	-2210	330	-10848

ARG=Argentina, AUS=Australia, BRA=Brazil, CAN=Canada, REU=Rest of EU, FRA=France, GER=Germany, IND=India, IDN=Indonesia, ITA=Italy, JPN=Japan, MEX=Mexico, RUS=Russia, ZAF=South Africa, KOR=Republic of Korea, TUR=Turkey, GBR=Great Britain, USA=United States, ROW=Rest of world.

Source: FTAP model projections.

Table 3.20. Projected long-run changes in real wages in each country after 50% liberalisation of investment in services and indicative liberalisation of domestic regulation globally (percentage deviation from control)

	ARG	AUS	BRA	CAN	CHN	REU	FRA	GER	IND	IDN	ITA	JPN	MEX	RUS	ZAF	KOR	TUR	GBR	USA	ROW
Unskilled labour	0.52	3.69	1.29	3.71	7.35	2.47	0.99	1.23	0.2	0.76	1.43	0.87	3.21	10.1	5.18	2.11	1.41	2.06	0.8	3.98
Skilled labour	0.47	3.86	1.23	4.35	8.69	2.5	0.73	0.94	-0.21	1.05	1.04	0.84	3.78	11.87	5.42	2.08	1.35	1.94	0.64	4.25
Overall	0.51	3.76	1.27	3.95	7.68	2.48	0.87	1.11	0.1	0.81	1.27	0.86	3.43	10.66	5.27	2.1	1.4	2.01	0.73	4.07

ARG=Argentina, AUS=Australia, BRA=Brazil, CAN=Canada, REU=Rest of EU, FRA=France, GER=Germany, IND=India, IDN=Indonesia, ITA=Italy, JPN=Japan, MEX=Mexico, RUS=Russia, ZAF=South Africa, KOR=Republic of Korea, TUR=Turkey, GBR=Great Britain, USA=United States, ROW=Rest of world.

Source: FTAP model projections.

Conclusion

This chapter has addressed the empirical question of whether liberalisation of FDI in services can produce beneficial labour market outcomes. The answer is in the affirmative under a wide variety of circumstances — even if the first-round effect of that liberalisation is to generate productivity improvements in foreign-invested firms that would, in the first instance, reduce their unit labour requirements.

There are two key mechanisms leading to the positive labour market outcomes. The first is that a loosening of investment restrictions will lower the costs of foreign-invested firms, competition will ensure this is passed on in the form of lower prices, and those lower prices will encourage greater quantity demanded by consumers and using industries, both locally and overseas. Econometric evidence suggests that this scale effect is likely to be substantial, because demands for services appear to be reasonably price responsive.

A second mechanism is that as foreign-invested firms expand, their labour intensity is likely to increase. This reflects their ability to attract additional labour, relative to additional FDI capital. Labour tends to be fairly mobile within and between sectors, and foreign-invested firms account for a relatively small proportion of total employment in most economies. Foreign-invested firms should have little trouble attracting labour away from domestic firms in their own sector, and from other sectors in the local economy. By contrast, FDI capital is subject to the portfolio allocation choices of international investors, and FDI capital is far less mobile than debt and other financial instruments. Econometric evidence suggests that, having made their preferred choices, investors would require non-trivial increases in returns in order to be persuaded to invest more FDI capital in overseas locations. As a result, FDI liberalisation is likely to require an increase in capital returns relative to wages, and this will encourage an increase in labour intensity in foreign-invested firms.

Nevertheless, overall labour market outcomes depend on the spill-over effects to other firms and industries. The results suggest that these spillover effects of FDI liberalisation can be mixed. Firms that compete directly with the foreign-invested firms, especially domestic firms in the same sector, suffer from lower priced competition. But sectors that use the services of foreign-invested firms as inputs benefit from lower-priced inputs. So long as the liberalisation is reasonably widespread across economies, the positive spillovers dominate, both within and between economies. There could well be some significant structural adjustments as labour shifts from domestic to foreign-invested firms within each economy. But the adjustment costs from this type of reallocation, in terms of retraining and job search, are likely to be relatively small (compared with other types of structural adjustments). Furthermore, the structural adjustments projected here are probably overstated. The paper considers only the liberalisation of measures that discriminate against foreign services suppliers. In practice, there are also significant barriers in most economies to market entry by any new supplier, domestic or foreign. Were liberalisation to extend to such measures, the structural adjustment costs would be smaller, and the overall economic gains would be considerably bigger. And sensitivity analysis confirms that the overall economic and labour market gains would be an order of magnitude larger.

The positive labour markets outcomes do not just accrue in the long term, but also in the short run. Foreign-invested firms may have less time to put additional FDI capital in place in the short run, so the scale effects may be smaller. But particularly in surplus-labour economies, additional labour can be hired with no upward pressure on wages, so the substitution towards labour in foreign-invested firms should be greater. The net short-run effect on labour market outcomes is remarkably similar to the long-run effect.

Nor are the positive labour-market effects dependent on the assumption that the benefits of FDI liberalisation accrue as productivity gains to foreign-invested firms, rather than as reductions in their price-cost margins. Both mechanisms lead to lower prices that can be passed on to consumers and using industries. Although the global gains in overall economic well-being are very much smaller when price-cost margins are squeezed than when productivity gains accrue, the labour market outcomes are again similar.

Overall, therefore, the liberalisation of services trade can contribute not only to overall economic well-being, particularly if it extends beyond the removal of discrimination against foreign suppliers, but also significantly and positively to labour market outcomes, in terms of employment gains in the short term, and real wages gains in the long term.

Annex 3.A. The effects of FDI restrictions on bilateral FDI

The empirical analysis is based on Baltagi, Egger and Pfaffermayr (2007), hereafter BEP. They propose a "knowledge capital" type model of FDI extended by third country effects. The knowledge capital model features three factors of production; physical capital and skilled and unskilled labour. Horizontal as well as vertical investment is possible depending on relative factor endowments and market sizes. Further, national and multinational companies may coexist. Finally, the extension to include third country effects captures the fact that bilateral stocks and flows of FDI depend not only on market conditions in the home and host country of the multinational company, but also on market conditions and transaction costs in third countries, which obviously are alternative sources/hosts of FDI for any country pair considered.

This model is particularly useful for estimating the parameters for the FTAP general equilibrium model featuring bilateral investment stocks and flows. The regression equation for BEP model 1 is without spatial effects and reads (sector subscripts are omitted):

$$F_{ijt} = \beta_0 + \beta_1 G_{ijt} + \beta_2 S_{ijt} + \beta_3 k_{ijt} + \beta_4 h_{ijt} + \beta_5 l_{ijt} + \beta_6 \Gamma_{ijt} + \beta_7 \Theta_{ijt} + \beta_8 FDIri_{ijt} \quad (1)$$

The variables are defined as follows (all variables are sector-specific):

G_{ijt} : the log of combined output of country i and j

S_{ijt} : index of country pair similarity in output value $S_{ijt} = 1 - s_i^2 - s_j^2$ where lower case s is the share of country i in country pair output;

k_{ijt} : the log of the relative capital stock invested in the sector in question

h_{ijt} : the relative share of hours worked performed by workers with tertiary education

l_{ijt} : the relative share of hours worked performed by unskilled workers

Γ_{ijt} : interaction term between G_{ijt} and k_{ijt}

Θ_{ijt} : interaction term between the log of distance and (k_{ijt} - l_{ijt})

$FDIri_{ijt}$: is the OECD FDI restrictiveness index

Behind the border regulation is an important factor when investors consider possible investment projects. Relevant regulations are for instance licenses, qualification requirements and related procedures in regulated professional services, zoning regulation, opening hours and regulation of size of retail outlets in the retail sector, access and interconnection regulation (or lack thereof) for telecommunications and entry barriers in the transport sectors, to mention but a few. Such regulation is captured in the OECD Product Market Regulation Indices. They are calculated for the overall economy as well as the following services sectors: Transport (air, road and rail);

telecommunications, postal services, retail services, professional services (accounting, architecture, engineering services and legal services), electricity and gas. Domestic regulation as measured by these indices has been found to have a significant impact on FDI stocks and flows (OECD, 2008). The model simulations should therefore aim at capturing the impact on FDI of regulatory reforms. This is done here first by replacing the FDI restrictiveness indices with the sector-specific PMR indices in the regressions, and second including both indices in the same regression. Before doing so, measures included in both indices were removed from the PMR in order to avoid double counting.[21]

Data

Bilateral FDI data are available OECD databases for 22 countries for the period 1995-2005.[22] Data on output by sector and capital endowments are from OECD Stan, hours worked are from EUKLEMS, the FDI restrictiveness indices and the PMR indices are from OECD (OECD 2003; 2006; 2010).[23] Table 3.A.1 below describes the FDI restrictiveness index and the PMR by sector for the year 2005.

Table 3.A.1. Summary statistics for the FDI restrictiveness index and the adjusted PMR, 2005

	Mean	Standard deviation	Minimum	Maximum
FDI ri				
Construction	0.068	0.059	0.011	0.2
Trade and repairs	0.068	0.059	0.011	0.2
Hotels and restaurants	0.098	0.154	0.011	0.75
Transport	0.331	0.113	0.165	0.498
Telecommunications	0.200	0.171	0.011	0.625
Finance	0.135	0.072	0.027	0.277
Business services	0.139	0.119	0.011	0.432
PMR				
Retail	2.312	0.952	0.504	4.528
Transport	2.468	1.135	0.289	5.875
Post and telecoms	2.196	0.426	1.402	4.375
Business services	3.337	1.261	1.139	5.500

The FDI restrictiveness index takes values between 0 and 1, the PMR index takes values between 0 and 6.

Source: OECD

21. The PMR for air transport includes information on open skies agreements and the PMR for professional services includes information on screening and economic needs tests, which are removed from the indices before using them in the regressions. The PMR indices are calculated by taking the simple average of the scores of the measure included, so the adjusted indices are calculated as the simple average of the remaining measures after the border measures are taken out.

22. Total bilateral stocks and flows of FDI and stocks and flows by country and sector are available from OECD.Stat. Based on this information, bilateral FDI stocks and flows have been estimated by OECD staff using an optimization technique.

23. The PMR is available for all the OECD countries and the 2008 version also includes Chile, Estonia, Israel, Russia, Slovenia, Brazil and China.

Regression results

The regression was first run as specified above in equation 1. Due to gaps in the data and the fact that the FDI restrictiveness index is only available for two years during the period 1995-2005, the number of observations are limited and the regression was run for pooled data (and sector dummies) for the seven major services sectors included in OECD FDI statistics and the FDI restrictiveness index (business services, telecommunications, construction, distribution, finance, hotels and restaurants, transport). The regressions including sector-specific PMRs include business services, telecommunications, distribution and transport only. The results are reported in Table 3.A.2.

Table 3.A.2 Regression results, equation (1)

Lhs variable: ln inward FDI stock

	(a)		(b)		(c)	
	coeff	**s.d.**	**coeff**	**s.d.**	**coeff**	**s.d.**
Ln combined output	1.564	0.213***	1.520	0.206***	2.462	0.544***
Similarity output index	3.133	0.874***	1.993	0.737***	2.507	1.691
Ln distance	-0.559	0.257**	-1.403	0.288***	-1.051	0.572
Ln relative capital stock	-1.379	1.329	-0.321	1.196	-1.961	2.899
Interaction output relative capital	0.033	0.107	-0.105	0.090	-0.086	0.228
Relative skilled labour share of employment	-0.023	0.066	0.120	0.059**	-0.098	0.125
Relative unskilled labour share of employment	0.233	0.138	0.439	0.745	0.968	1.332
Interaction ln distance and the difference between relative capital and unskilled labour	0.026	0.019	0.085	0.104	0.143	0.184
FDI restrictiveness (not logged)	0.269	1.234			-2.667	2.921
Product market regulation (PMR)			-0.553	0.101***	-0.397	0.258
N		640		784		188
adj. R^2		0.477		0.398		0.397
Sector fixed effects		yes		yes		yes
Host country fixed effects		no		no		no
Source country fixed effects		yes		yes		yes

It is noted that with FDI indices observations for two periods, seven sectors and 22 countries there are 6 776 possible observations, but information on all the variables included in regression equation (1) is available for only 640 of these. The PMR indices are available every year for transport and telecoms, but only for two years for the others. Selection bias and other problems related to a limited sample is therefore a concern. Moreover, when including both indices in the same regressions too many observations are lost to make precise estimates. Nevertheless, the coefficients on combined output and output similarity have the same sign but are much smaller in magnitude than in BEP (who estimated the regression on outward US FDI and FATS). The host country's relative unskilled labour share of employment appears to have a positive effect on inward

investment. Although we consider this model as the ideal approach to estimate parameter values for the FTAP simulations of FDI liberalisation in services, further data gathering is necessary before reliable estimates can be made using this approach.

We therefore turn to a simpler, gravity-based regression introducing bilateral distance and an interaction term between distance and FDI restrictiveness. The rationale for the interaction term is that FDI liberalisation is likely to trigger more inward flows from source countries closer to home at the margin.

$$F_{ijt} = \beta_0 + \beta_1 G_{ijt} + \beta_2 S_{ijt} + \beta_3 dist_{ij} + \beta_4 FDIri_{ijt} + \beta_5 dist * FDIri_{ijt} + \varepsilon_{ijt} \quad (2)$$

Table 3.A.3. Regression result, equation (2)

Lhs variable: Ln inward FDI stock

	(a)		(b)		(c)		(d)	
	coeff	**s.d**	**coeff**	**s.d**	**coeff**	**s.d**	**coeff**	**s.d**
Ln combined output	0.467	0.029***	0.259	0.016***	0.239	0.045***	0.250	0.045***
Similarity index	0.002	0.272	-1.138	0.153***	-1.665	0.394***	-1.563	0.395***
Ln distance	-0.609	0.06***	-0.491	0.041***	-0.617	0.072***	-0.730	0.115***
FDI restrictiveness	-1.004	0.488**			-1.013	0.484**	-2.062	0.622***
FDI restrictiveness*distance	0.00013	0.000***					0.000	0.0002***
PMR			-0.361	0.025***	-0.485	0.055***	-0.406	0.073***
PMR*distance			0.000	0.000			0.000	0.000
N	5162		9790		1926		1926	
adj. R^2	0.309		0.353		0.329		0.331	
Sector fixed effects	yes		yes		yes		yes	
Host country fixed effects[1]	no		no		no		no	
Source country fixed effects	yes		yes		yes		yes	

1. Host country fixed effects are not used because of collinearity with the FDI restrictiveness index and two of the PMR indices The FDI restrictiveness index and the PMR index are not logged.

***, **, and * indicate statistical significance at a 1, 5 and 10% level respectively.

Clearly, with this simpler specification the number of observations increases to an acceptable sample. The fact that the variable of interest, FDI restrictiveness, is only available for two years makes the total possible number of observations 6 776 when including the FDI restrictiveness index. The PMR is available for two periods for business services and retail and for ten periods for post and telecoms and transport, which makes the possible number of observations 11 616.

Note that the indices are not logged, and since the FDI restrictiveness index takes values between 0 and 1, with 0 totally open and 1 totally closed, one would expect that the parameter on

the FDI restrictiveness index be close to minus one.[24] Between these extremes, the results suggest that the marginal effect of FDI liberalisation in a host country declines with the distance to the source country, as expected. However, the marginal effect of domestic regulation on inward investment appears to be independent of distance as shown in regressions (b) and (d).

Starting with regression (a), the impact of FDI restrictiveness on the FDI stock is -1.004 +0.00013*distance. Evaluated at the mean distance this would be: -1.004+5639.5*0.00013=-0.27. This is very similar to the elasticity of FDI with respect to the FDI restrictiveness index ($\varepsilon = 0.265$) reported in equation (c) where the interaction term with distance is excluded but the PMR index is included.

Although the interaction term between the PMR and distance is not statistically significant in regressions (b) or (d), the inclusion of the interaction term tends to distort the estimated direct effect of the FDI restrictiveness index, whereas the inclusion of the PMR did not affect the parameter. It is therefore suggested that the elasticities used for the FTAP simulations are the ones estimated in regression (c).

Finally, one should bear in mind that the gravity regression determines bilateral FDI flows as a function of bilateral trade costs. Therefore, the marginal effect refers to the impact on FDI flows to one particular country of a change in its trade barriers *relative to all others.*

24. I.e. when moving from a totally open to a totally closed FDI policy regime, one would expect FDI stocks to move towards zero.

Annex 3.B. A Model for Examining the Economy-Wide Effects of Liberalising Foreign Direct Investment in Services

As noted in the introduction, modelling the liberalisation of FDI requires a model in which FDI is represented explicitly. The effects have been projected here using the FTAP model of the world economy, which was developed by Dee and Hanslow (2001), is documented fully in Hanslow, Phamduc and Verikios (1999), and is available for download *at* *http://www.crawford.anu.edu.au/staff/pdee.php*. The FTAP model is a computable general equilibrium model incorporating services delivered via FDI. It differs in turn from GTAP (Hertel 1997), the 'plain vanilla' model from which it was derived, in three important respects.

First, because many services are delivered primarily via commercial presence, the modelling framework includes foreign direct investment as a mode of services trade delivery, and covers separately the production and trading activity of foreign multinationals (in all sectors, not just in services). In other words, GTAP, the conventional multi-country model, is split out by ownership as well as location.

It is not advisable to impute foreign ownership shares simply by comparing sectoral estimates of FDI stocks with sectoral estimates of total capital stocks. This is because foreign-invested firms are likely to use a range of financing methods to finance their investments. In addition to using FDI capital from their parent company, they may also borrow, and accept equity injections from other minority stakeholders. As noted, however, few countries collect systematic Foreign Affiliates Statistics (FATS) on the activities of foreign affiliates. One that does is the United States.

The default way of deriving foreign ownership shares in the FTAP model is to make use of several ratios derived from United States FATS statistics. Ratios of FDI capital to total assets, and total assets to total sales, were extracted by sector and by host country by researchers at the United States International Trade Commission. The ratios show less variation across host countries than across sectors. So sector-specific ratios of FDI capital to total sales are used to "gross up" sectoral and bilateral estimates of FDI stocks in order to generate sectoral and bilateral estimates of the output of foreign-invested firms. In the current version of the model, the sectoral and bilateral estimates of FDI stocks were provided by CEPII (Boumellassa, Gouel and Laborde, 2007), and are derived from UNCTAD, Eurostat, and other sources.

The resulting estimates of the output of foreign-invested firms are compared with the data on total sectoral output from the GTAP model's database (version 7.1 is used for the current exercise), and the resulting implicit foreign ownership shares are used to derive full costs and sales structures for foreign-invested firms on a strictly pro rata basis. The pro rata treatment is not ideal, especially since the theoretical literature highlights that the cost and sales structures of foreign-invested firms are likely to feature significant amounts of intra-firm trade. Nevertheless, even where FATS data are collected, they rarely extend to a full treatment of costs and sales structures, so the current treatment is perhaps not much less sophisticated than would be feasible, even if FATS data were more widely available.

In any given application of the FTAP model, the default foreign ownership shares are typically overwritten with any application-specific information that might be available. The current

application is no exception. FATS statistics for OECD countries are being compiled, where they exist, under the OECD's globalisation project. This data provides estimates of the value added of foreign-invested firms, which can be compared with sectoral value added from national accounts sources, to provide alternative estimates of foreign ownership shares, albeit not broken down by host country. These scanty data have been used to very roughly calibrate the overall size of foreign ownership shares, although the sectoral and host country breakdown still comes from the default treatment. Interestingly, the calibration resulted in a downward adjustment to the overall size of foreign ownership shares.

The resulting foreign ownership shares used in the current application are shown in Table 3.B.1. They show many of the same problems as the underlying FDI stock data. Apart from the inevitable idiosyncrasies, a few more general qualifications that are pertinent to the current application are as follows. Firstly, foreign ownership shares in 'other finance' are probably overstated, because this sector is very often an intermediary, rather than the ultimate destination of the FDI. Secondly, foreign ownership shares are likely underestimated, and probably severely so, in countries such as China and Indonesia.[25] This is because OECD countries dominate the reporting of FDI data. Nevertheless, other aspects of the data are probably accurate. In particular, foreign ownership shares are likely very low in maritime and air transport, because of the raft of regulations preventing foreign penetration, over and above the restrictions written into investment legislation. These shares are likely to remain low, even after FDI liberalisation, for this very reason.

A second way in which FTAP differs from GTAP is that it recognises, by virtue of foreign ownership, that at least some of the profits of foreign-invested firms will be repatriated back to the home countries. Thus the profit streams in the conventional multi-country model have to be reallocated from the host to the home country, after provision is made for them to be taxed in either the home or host country. This reallocation leads to a distinction between GDP — the income *generated* in a region — and GNP — the income *received by residents* of a region. The latter forms the basis of the welfare measure in FTAP. The information on profit repatriation comes from the Balance of Payments Statistics of the International Monetary Fund (IMF).

Thirdly, not all profits of foreign multinationals need be repatriated to the home country. Some may be reinvested in the host country. To account for this phenomenon, and to allow for the effect that regulatory reform may have on both domestic and foreign direct investment more generally, the model makes provision for savings and capital accumulation. This is particularly important, since some regulatory barriers are aimed directly at limiting foreign equity participation. It is therefore important to capture how regulatory reform will affect not just foreign ownership *shares*, but also the *total amount* of productive capacity available to an economy. National savings rates are derived from the macroeconomic data in the International Financial Statistics and Balance of Payments Statistics of the IMF. Government savings rates are derived from the Government Finance Statistics of the IMF. Household savings rates are calculated as a residual.

The FTAP model also differs from GTAP in its assumptions about industry organisation. In particular, it allows for firm-level product differentiation, economies of scale and large-group monopolistic competition. This is also important, since services tend to be highly specialized, being tailored to the needs of individual customers.

In practice, large-group monopolistic competition can be modelled using much the same theory as is used to specify the default Armington treatment in the GTAP model (e.g. Francois, McDonald and Nordstrom 1996). The main difference is in the parameterisation. Where

25. Many of the foreign ownership shares in these economies appear to be zero, but this is because of rounding.

competition is monopolistic, and economies of scale are global, then the double-nested Armington treatment collapses to a single nest,[26] and the single demand parameter reflects the extent of product differentiation — in turn a function of the extent of economies of scale. Consumers and users globally also benefit from greater variety when industry output expands, a feature that is captured by having an endogenous productivity improvement tied to expansions in industry output. The size of this productivity boost from greater variety is also a function of the extent of product differentiation (see also Neary, 2001).

In the current version, the parameterisation is adapted from Berden *et al*. (2009), and shown in Table 3.B.2. The parameters used Berden *et al.* (2009) were obtained by estimating a gravity equation explaining bilateral trade, which included an index of barriers to trade. If the elasticity of prices with respect to the index of trade barriers can be assumed to be unity, then the estimated coefficients on the index in the gravity equation can also be taken as estimates of demand elasticities. This was the approach taken in Berden *et al*. (2009) to parameterise export demands all sectors. It is used in this application to parameterise agriculture and manufacturing.

For services, however, direct estimates are available for the elasticities of prices or costs with respect to indexes of trade barriers. Sourdin (2010) looks at how indexes of barriers to trade in air and maritime services have affected the cif/fob margins on goods shipped by air or sea, respectively. While Sourdin estimated semi-elasticities, the corresponding elasticities of these measures of air and maritime shipping costs with respect to the corresponding trade indexes, evaluated at the APEC average values of trade restrictions, are 0.14 for air transport and 0.30 for sea transport. These estimates can be used to adjust the demand parameters for services from Berden *et al*. (2009). The resulting adjusted trade parameters range from 7 to 14 but centred on 10 if Sourdin's maritime estimate is used. They range from 14 to 30 but centred on 22 if her air estimate is used. In Table 3.5, a representative value of 10 has been chosen.

A final feature of Table 3.B.2 is whether monopolistic competition is assumed to be global or regional. As argued in Dee (2003), many services are sold into markets that have very region-specific languages, cultures and regulatory structures (for example, local legal and accounting standards). This means that the services sold into those markets will tend to be tailored to meet the particular regulatory and market needs of those markets, and therefore will not be appropriate for delivery elsewhere. Accordingly, any economies of scale will be local rather than global. This explains the choices made on this score in Table 3.B.2. With regional economies of scale, the elasticity of substitution between domestic and imported services is less than the elasticity of substitution between different sources of imports, instead of being the same. However, some services, such as air and maritime transport, are recognised as being relatively homogeneous (in the sense of having generic rather than regional product differentiation) across different markets.

Finally, the FTAP model not only has a treatment of savings and capital accumulation, it also has an explicit treatment of how savings is used to finance investment — by building the investment portfolios of investors around the world. The model therefore includes an explanation of the portfolio allocation choices of investors in each country. They prefer to hold a mixed portfolio of debt and equity, and a mix of equities across different industries and host countries, albeit with some home country bias to the equity portfolio choice. Because they do not treat equities from different sectors and host countries as perfect substitutes (although they do treat debt as perfectly mobile), they therefore require non-trivial changes in the relative returns to equity from different countries in order to be induced to hold more in their overall portfolio. This is relevant to

[26]. This is achieved by having the same values for the elasticities of substitution in both nests — the one between domestic and imported goods, and the one between different sources of imports.

the current application, because FDI stocks can only be built up if investors are willing to hold them.

As noted earlier, however, the capital supply elasticities in the model can also be roughly calibrated to various pieces of econometric evidence. The evidence of Sourdin (2010) for maritime is that the semi-elasticity of services prices (or costs) with respect to an index of trade barriers (scaled between zero and one) is -0.487. The evidence in Annex A is that the semi-elasticity of FDI stocks supplied by investors with respect to an index of trade and investment barriers (also scaled between zero and one) is -0.27. These together imply that the elasticity of FDI stocks with respect to costs is 0.27/0.487 = 0.55. This is the same order of magnitude as the relationship between the changes in FDI stocks in Table 3.2 and the changes in productivity required to generate them in Table 3.3. These were produced using the default capital supply elasticities in the FTAP model (Hanslow, Phamduc and Verikios 1999).

In the long-run treatment, the model provides a snapshot of how different each economy would look about ten years after the introduction of the investment liberalisation, compared to the situation at that same point in time if the reforms had not taken place. During the ten-year adjustment period, many other changes would affect each economy, but they are not taken into account in the current analysis. For this reason, the results should not be interpreted as indicating the likely changes that would occur *over time* in each economy — this would require all changes, not just those in regulatory trade barriers, to be taken into account. Instead, they should be interpreted as deviations from some future "business-as-usual" control.

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

In the long-run treatment, each economy is assumed to be able to adjust in various ways. Both the total sizes of capital stocks and their allocation across sectors and countries are assumed to adjust to the FDI liberalisation. Employment of skilled and unskilled labour is also assumed to be able to move between sectors, but not between countries. Crucially, however, the sizes of the skilled and unskilled labour forces are assumed to be the same in the long run, whether or not the FDI liberalisation takes place. In this long-run, equilibrium view of labour markets, FDI liberalisation will not create jobs because it will not create new members of the labour force. To the extent that FDI liberalisation increases the demand for labour, however, this will drive wages to be higher than otherwise. To the extent that it reduces the demand for labour, it will drive wages lower than otherwise. Thus, in the long run, labour markets clear.

In the short-run treatment, by contrast, the productivity improvements that follow from FDI liberalisation flow through to higher returns to investors, but there is insufficient time for capital stocks to adjust to the changes in returns. Accordingly, capital stocks are assumed to be the same (by sector, host country and ownership category) with the reforms as without them. To capture the idea of FDI liberalisation being undertaken in a situation of excess unemployment in some countries, the total levels of employment of skilled and unskilled labour in those economies are assumed to adjust to the liberalisation, while real wages are kept fixed. This treatment is applied to North America (Canada, Mexico, United States), Europe (France, Germany, Italy, Great Britain, the rest of the European Union) and South Africa.

Table 3.B.1. Foreign ownership shares (%)

	ARG	AUS	BRA	CAN	CHN	REU	FRA	GER	IND	IDN	ITA	JPN	MEX	RUS	ZAF	KOR	TUR	GBR	USAs	ROW	TOTAL
Agric. etc.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Proc. food	1	19	4	33	0	26	9	3	7	0	11	1	3	5	2	8	4	17	8	10	1
Other primary	1	17	2	29	0	20	8	5	0	0	4	5	2	0	1	1	5	41	9	3	1
Textiles etc	1	10	2	8	0	10	13	10	1	0	5	2	1	2	1	7	1	31	5	3	1
Wood etc	1	9	1	16	0	14	9	4	0	0	7	1	2	2	1	7	4	38	3	11	1
Chemicals	3	37	7	45	0	36	33	14	2	0	10	4	5	4	3	11	7	46	24	16	3
Metals	0	4	1	14	0	6	7	3	0	0	3	1	1	0	0	1	1	12	4	5	0
Vehicles	2	31	8	15	0	27	16	12	5	0	31	10	2	4	1	8	4	32	22	51	2
Elect. mach.	7	80	1	100	0	20	34	15	1	0	24	2	2	16	9	2	8	43	13	6	7
Other mach.	4	39	2	57	0	31	16	13	1	0	7	3	4	3	2	18	7	39	23	16	4
Electricity	0	9	0	3	0	6	5	1	0	0	2	0	2	0	0	1	1	22	4	2	0
Gas, water	0	9	1	3	0	6	4	1	0	0	1	0	2	0	0	1	1	21	4	1	0
Construction	0	7	0	4	0	3	2	1	0	0	0	1	5	0	1	1	1	5	2	2	0
Trade	2	16	2	26	0	27	19	14	0	3	9	1	22	1	3	11	5	20	8	10	2
Other transp.	0	2	0	2	0	4	3	1	0	0	2	0	1	0	0	2	0	9	2	2	0
Water transp.	1	8	1	35	0	7	13	6	0	0	5	0	13	0	1	3	1	1	2	6	1
Air transp.	0	1	0	3	0	10	1	0	0	0	2	2	1	0	0	0	0	1	0	6	0
Communications	1	2	1	2	0	8	5	8	0	0	4	0	4	2	1	3	3	23	3	4	1
Other finance	11	26	3	5	0	28	12	2	0	0	5	0	37	11	20	6	5	29	5	18	11
Insurance	2	7	0	34	0	11	2	1	0	0	10	1	29	4	0	2	11	8	4	7	2
Other bus. serv.	7	11	2	2	0	8	9	9	0	1	1	0	100	5	5	1	3	2	8	11	7
Other services	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

ARG=Argentina, AUS=Australia, BRA=Brazil, CAN=Canada, REU=Rest of EU, FRA=France, GER=Germany, IND=India, IDN=Indonesia, ITA=Italy, JPN=Japan, MEX=Mexico, RUS=Russia, ZAF=South Africa, KOR=Republic of Korea, TUR=Turkey, GBR=Great Britain, USA=United States, ROW=Rest of world.

Source: FTAP model database.

Table 3.B.2. Demand parameters

	Treatment of competition	Treatment of economies of scale	Elasticity of substitution between domestic and foreign goods (ESUBD)	Elasticity of substitution between foreign goods from different sources (ESUBD)	Productivity parameter determining gains from variety
Agric. etc	Armington		4.8	4.8	0
Proc. food	Monopolistic competition	Global	5.00	5	0.2
Other primary	Armington		9.8	9.8	0
Textiles etc	MC	Global	7.20	7.2	0.14
Wood etc	MC	Global	7.90	7.9	0.13
Chemicals	MC	Global	5.10	5.1	0.20
Metals	MC	Global	13.00	13	0.08
Vehicles	MC	Global	7.10	7.1	0.14
Elect. mach.	MC	Global	12.20	12.2	0.08
Other mach.	MC	Global	7.10	7.1	0.14
Electricity	Armington		10	10	0
Gas, water	Armington		10	10	0
Construction	Monopolistic competition	Regional	5	10	0.1
Trade	Monopolistic competition	Regional	5	10	0.1
Other transp.	Armington		10	10	0
Water transp.	Armington		10	10	0
Air transp.	Armington		10	10	0
Communications	Monopolistic competition	Regional	5	10	0.1
Other finance	Monopolistic competition	Regional	5	10	0.1
Insurance	Monopolistic competition	Regional	5	10	0.1
Other bus. serv.	Monopolistic competition	Regional	5	10	0.1
Other serv.	**Armington**		**10**	**10**	**0**

Given the way that productivity shifts are modelled in FTAP, the productivity parameter is just the inverse of ESUBM.

Source: FTAP model database.

4. Services offshoring and the skills composition of employment

This chapter complements the general equilibrium modelling analysis by looking in more detail at the relationship between trade in services and labour demand by skills category. It builds on and updates previous OECD work in this area (OECD, 2007), using the same methodology and new data. A rising skills premium and stagnating median incomes in some countries, notably the United States, have raised concerns and globalisation has been partly blamed in the popular press. In particular, offshoring of services and the slicing up of value chains within international production networks is widely perceived as "sending jobs abroad". The academic literature on the other hand, tended to focus on skills-biased technical change as the major explanation for polarisation of the labour market, arguing that labour market developments did not conform to the predictions of trade theory.[27] More recently, however, the trade explanation has gained more prominence also in the academic literature (e.g. Blinder,2009; Grossman and Rossi-Hansberg, 2006; 2008)

Although offshoring of services has featured high on the agenda in the policy debate, empirical research on the relation between trade and labour markets has largely focussed on trade in goods. This is understandable due to vastly better quality and coverage of trade statistics for goods. Nevertheless, services trade and FDI data for the OECD countries have improved in recent years, which allows us to undertake empirical analysis with reasonable confidence in the robustness of the results.

Long established international specialisation based on comparative advantage in final goods is widely accepted as a source of mutually gainful division of labour, but deepening specialization affecting new sectors and exposing additional occupations and skills categories to international competition raise some anxiety. Over the past few years, the policy debate has focussed on an apparent shift in employment from medium skilled clerical and blue collar jobs towards low-skilled manual tasks in services on the one hand and high-skilled services jobs on the other in major OECD economies. A rising skills premium has coincided with this polarisation of the labour market, suggesting that demand for skills has outpaced supply in spite of a steady increase in educational attainment in the G20 countries. During the great recession this pattern was reinforced, at least in the United States, where employment of professionals and technicians on the high-skills end and personal care services on the low-skill end increased during the period 2007-2009, while employment in all other categories declined (Autor, 2010).

Medium skilled workers and medium skilled jobs have traditionally constituted the largest share of employment and the major livelihood for middle class bread winners. Any developments to the detriment of this group raise concerns. To what extent services trade liberalisation accelerates or dampens polarisation of the labour market is therefore an important question that is left largely unanswered. One reason for the surprising absence of empirical analysis of the relation between services trade and recent labour market developments is lack of data. Fortunately, a recently developed database (EU KLEMS) contains comparable information on employment and wages of three skill levels for the EU member countries, Australia, Canada, Japan, Korea and the United States.[28] This information is used first, for a description of recent trends in services trade

27. See for instance Keller (2004) for a recent review.

28. Data for the empirical analysis in this chapter come from the following sources: data on FDI in services are from OECD.stat; employment and wages by skills category is from EUKLEMS, the policy indicators are the Product Market Regulation index from the OECD/ECO and the Foreign Direct Investment Restrictiveness Index from OECD/DAF; data on output and prices are OECD.Stan supplemented by EUKLEMS.

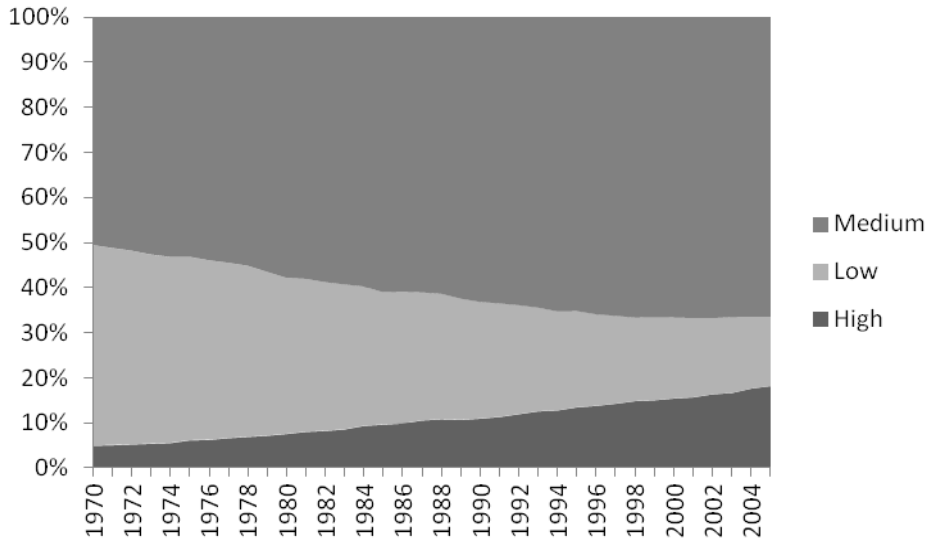
and investment as well as labour market developments. Second, the relation between services trade and investment and employment by skills category is explored.

Labour market developments and services trade

During the past four decades there has been a steady shift in employment from low-skilled to medium and high skilled labour categories as indicated in Figure 4.1.

Figure 4.1. Employment by skills level, share of total

Shares, pooled data, 14 countries



Source: Calculated from EU KLEMS as the average of Australia, Austria, Belgium, Denmark, Finland, France, Ireland, Italy, Korea, the Netherlands, Sweden the United Kingdom and United States. These are the countries for which long time series data are available.

Clearly, the share of low-skilled workers has been squeezed from both an increase in the share of medium and high-skilled workers. Since the late 1990s, however, the share of medium skilled workers has stagnated, and in some countries the rising trend of this category has been reversed whereas the share of unskilled labour has stabilized or slightly increased (Autor, 2010). Structural changes in the labour market to some extent follow naturally from improvements in educational attainment. According to the World Bank Development indicators the enrolment rate in tertiary education increased from 5% to 6% in low-income countries, from 13 to 24% in middle income countries and from 39 to 67% in high-income countries from 1985 to 2008.[29] Structural changes in the labour market should therefore provide an increasingly skilled workforce with jobs that match their skill levels.

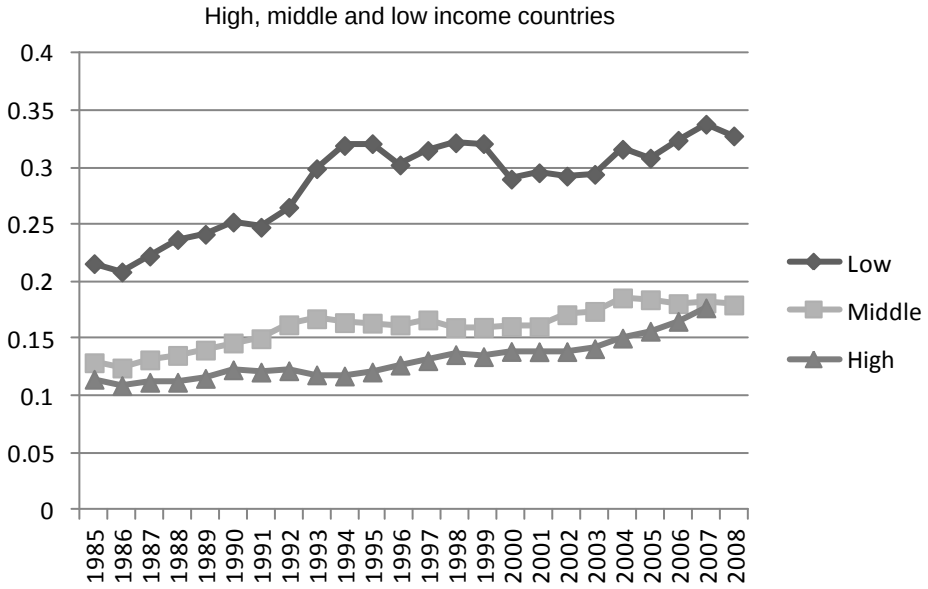
If this was the whole story, relative wages of the three skills categories should be expected to remain fairly stable. However, in most countries for which data are available, the relative wages of skilled workers have been rising, suggesting that demand for highly skilled workers has increased even faster than supply or that productivity of high-skilled labour has increased faster than average, for instance due to skills-biased technical development, or both. It is well known that trade affects relative factor demand, and this will be explored in the next section focussing on services.

29. Data for earlier years than 1985 is only available for middle-income countries where the tertiary enrolment rate was only 3% in 1970.

Structural changes in the skills composition of employment has gone hand in hand with structural changes in employment by sector, with a rising share of employment in services. In high-income countries for instance, the share of services (excluding construction) in total employment has increased from 63.5% in 1991 to 72.2% in 2007.[30] A snapshot of the role of services in employment and production in the G20 shows that services account for about 65% of GDP of the G20 group, ranging from 32% in Saudi Arabia to 71% in United States in 2007.[31] Services are even more important for employment with the employment share ranging from 40% in Indonesia to 78% in the United States. Furthermore, as noted, services employment held up much better during the crisis than employment in other sectors.

The exposure of services industries to international competition has increased over the past few decades, but it is still way behind goods producing sectors. Perhaps surprisingly, trade in services account for a much larger share of services value added in developing countries than in developed countries as Figure 4.2 illustrates. The corresponding ratios for trade in goods relative to goods value added range between 1.17 in middle income countries to 1.82 for high-income countries in 2007.[32] The shift of employment towards services, which are much less exposed to trade than manufacturing, it can be argued a declining proportion of the labour force is directly exposed to cross-border trade.[33]

Figure 4.2. Trade in services as share of services value added



Source: World Bank, World Development indicators.

30. *Source*: World Bank Development Indicators. Employment shares are only available for high-income countries as a group in this database.

31. The exceptionally low share in Saudi Arabia stems from the high share of petroleum in GDP. Employment in services was about 75% of the total in 2007, according to World Bank figures. Note also that in Wold Bank data construction is not included in the services sector.

32. These ratios are calculated from the World Development indicators, dividing trade/GDP by sector/GDP, which should give trade/sector value added.

33. In competitive labour markets the wage rate is, however, determined by the value of the marginal product of workers, regardless of whether or not the output produced is directly exposed to international competition.

Foreign direct investment is the most important channel through which services are traded, as available data suggest that about half of services trade is through commercial presence (WTO, 2005). In addition in the countries for which information is available, about a quarter of cross-border trade in services is intra-firm (OECD, 2010). About half of services trade is transport and travel, suggesting complementarity between trade in goods and services. Furthermore, when analysed at firm level, manufacturing and perhaps surprisingly, mining and oil companies are among the sectors with the highest services exports relative to total sales.[34]

The figures presented in this section suggest that services are essential parts of national economies as well as global production networks. In fact, technological developments in services, particularly communication, have made the recent wave of globalisation possible. Furthermore, the diffusion of ICT technology and its adoption in sectors that support trade such as transport, finance and distribution has been facilitated by comprehensive trade and FDI liberalisation, particularly in telecommunications and finance.

There is ample evidence that exposure to international trade and investment improves productivity. For instance, recent research has found that exposure to imports from China in the European Union has boosted the adoption of ICT in import-competing industries raising productivity and competitiveness substantially.[35] Skills upgrading has gone hand in hand with the introduction of ICT. About 75% of traded services are intermediate inputs (OECD 2009). Therefore, services trade and investment contribute to productivity gains not only in the services sectors but also in downstream industries. Furthermore, services trade contributes to the competitiveness of manufacturing industries and not least to enhancing value added in natural resource extracting sectors, creating upstream and downstream jobs related to natural resources.

Barriers to trade and investment in services

Few services can be traded across borders without complementary movement of either the services provider to the premises of the customer or the other way around. Even the services that can be transmitted over electronic networks more often than not need support from a local office or frequent business travel to support the customer. Thus, Infosys one of India's most prominent services exporters, has offices and development centres in China, Australia, the Czech Republic, Poland, United Kingdom, Canada and Japan.[36]

The need for direct interaction between services providers and customers led policy makers as well as modellers to consider services as non-tradable in the past, and as a consequence, there are few explicit policy-induced barriers to cross-border trade in services. However, as the Infosys example illustrates, whereas cross-border trade in services may be relatively frictionless, there is a host of policy induced barriers to the movement of services providers across borders. Table 4.1 depicts OECD indicators of barriers to foreign investment in services for the G20 countries.

From this table it is noted that barriers to investment are significantly higher in services than in manufacturing for almost all countries. It is also noted that on average OECD countries have lower barriers than non-OECD G20 countries. The lowest overall index among the G20 countries is found in Germany, while the highest is observed in China. The most restricted sectors are transport, media and communications, but also distribution services and business services (accounting, architecture, engineering and legal services) have high barriers, particularly in non-OECD G20 countries. Transport and communications provide services that are essential to a well-functioning

34. The cited firm level analysis is from the United Kingdom (see Breinlich and Criscuolo, 2010).

35. See Bloom *et al.* (2009) for further discussion.

36. See Infosys webpage: *http://www.infosys.com/about/what-we-do/pages/index.aspx*.

economy. In contrast, uncompetitive transport and communications services raise transaction costs for all business, whether directly exposed to international markets or not. While protection of these services may conserve jobs in the sector in question, it may impose a cost on all other sectors and thereby dampen job creation.

The FDI restrictiveness index is broken down on equity restrictions, screening and approval of foreign investments; and restrictions on nationality or residency of managers and board members. Whereas non-OECD G20 countries score higher (are more restrictive) on equity restrictions and restrictions on key personnel, they score lower on screening. Screening has a much lower weight in the index than equity restrictions, which is reasonable. However, screening and equity restrictions have to be considered simultaneously as the restrictiveness of screening depends on the level of equity restrictions. In addition implementation of screening, in particular to what extent there are clear criteria for approval and a fair and effective procedure is crucial. The presence of considerable uncertainty related to the timing and outcome of the screening process is by itself is a serious barrier to foreign entry.

Foreign equity restrictions, screening and nationality requirements for key personnel and the board of directors are the major entry barriers facing foreign services providers. However, there is a host of behind–the-border regulations that also affect the ease at which services can be provided to foreign customers. The professional services are a case in point. A licence is typically required in order to provide, e.g. legal services, accounting, medical services, engineering and architecture. The criteria for obtaining a license are typically education requirements, practice and an exam or test, often administered by the professional association. Many of these criteria were introduced during a period when the markets for professional services were mainly national, and as a result, transparent procedures for assessing the qualifications of foreign suppliers may be lacking in some countries, leading to elevated market entry costs.

The potential for licensing procedures, qualification requirements and standards to be misused in a manner which creates a trade restriction is recognised in the General Agreement of Trade in Services (GATS) Article VI, which mandates negotiations on disciplines on such domestic regulation. These are not included in the FDI restrictiveness indicators reported above, but are captured in the OECD Product Market Regulation Index. It is interesting to compare the two indices for accounting services as depicted in Figure 4.3.[37]

The example of accounting services illustrates nicely the difference between the two indicators. While more than half of the countries in this sample have no direct restrictions on FDI in accounting; licensing, lack of recognition of equivalent foreign qualifications and lengthy procedures (captured by the PMR) are prominent. Ireland is the most liberal country as measured by both indices, but otherwise there appears to be little correlation between the two indices in this sample.[38] It should be underscored that licensing and education requirements per se are not necessarily a barrier to trade and investment. However, if countries have similar levels of qualification requirements, but do not recognise each other's qualifications, entry is more difficult for a foreign services provider if he or she is required to incur additional costs, e.g. through taking additional exams for each country in which he or she wishes to provide services.

The annex to Chapter 3 presents an estimate of the impact of FDI liberalisation as well as behind–the-border reforms for inward FDI. It is shown that in the sample of countries and sectors

37. The PMR indices for business services include information on licensing, education requirement and quotas and economic needs tests.

38. The correlation coefficient is only 0.15. Although there are two years between the data for the two indices, the time lag between them is unlikely to explain much of the difference.

included in the study, where most countries have relatively low barriers to FDI, behind–the-border regulatory reforms would have a larger impact on inward FDI than further FDI liberalisation. This would in turn have a larger impact on employment as shown in the model simulations, and perhaps more so in low-income countries that are not included in our sample.[39] This of course does not imply that FDI liberalisation is not important. It merely reflects the fact that the OECD countries as well as some of the major emerging economies are already fairly open to FDI in services as measured by the FDI restrictiveness index reported in Table 4.1.

Table 4.1. OECD FDI restrictiveness indices for G20 economies, 2010 0 denotes fully open; 1 fully closed

FDI RR INDEX 2010	AVE-RAGE ALL*	OECD	NON-OECD **	AUS	CAN	FRA	DEU	ITA	JPN	KOR	MEX
Manufacturing	0.041	0.029	0.063	0.075	0.100	0.000	0.000	0.000	0.077	0.000	0.103
Electricity	0.123	0.118	0.133	0.075	0.100	0.000	0.000	0.000	0.000	0.417	0.100
Construction	0.055	0.027	0.111	0.075	0.100	0.000	0.000	0.000	0.000	0.000	0.100
Distribution	0.062	0.029	0.128	0.075	0.100	0.000	0.000	0.000	0.000	0.000	0.150
Transport	0.252	0.228	0.300	0.225	0.267	0.150	0.200	0.150	0.667	0.500	0.542
Hotels & restaurants	0.047	0.030	0.082	0.075	0.100	0.000	0.000	0.015	0.000	0.000	0.100
Media	0.221	0.168	0.328	0.200	0.700	0.048	0.025	0.363	0.000	0.400	0.625
Communications	0.134	0.107	0.188	0.400	0.600	0.000	0.000	0.000	0.500	0.500	0.350
Financial services	0.078	0.046	0.142	0.133	0.067	0.054	0.005	0.018	0.000	0.020	0.133
Business services	0.109	0.075	0.178	0.103	0.100	0.003	0.000	0.000	0.000	0.000	0.103
FDI INDEX TOTAL	0.114	0.091	0.159	0.127	0.164	0.038	0.023	0.073	0.257	0.131	0.225

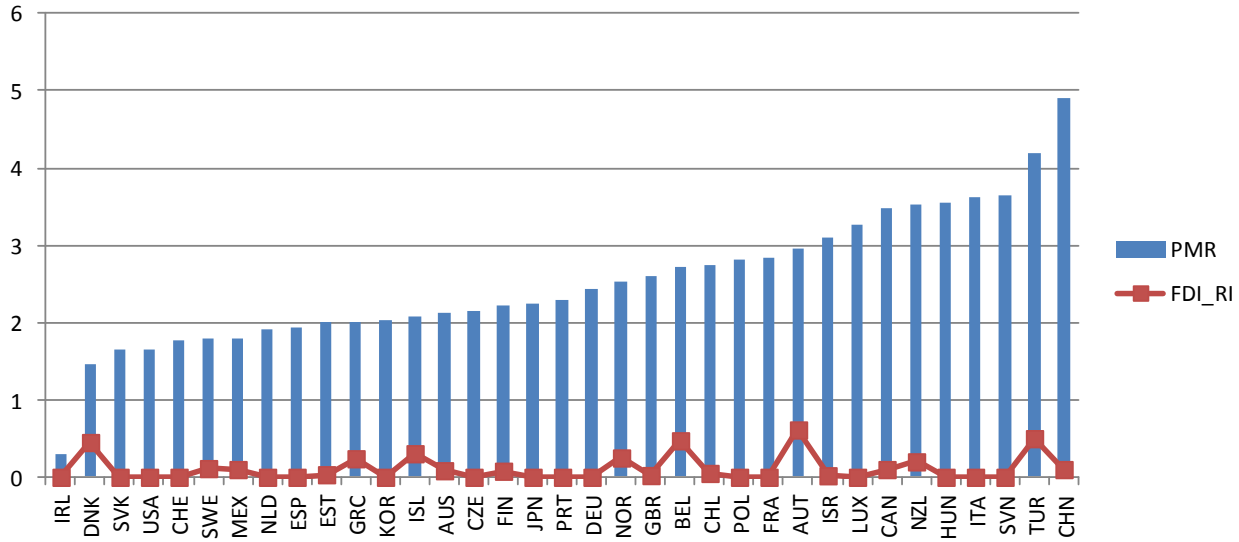
FDI RR INDEX 2010	TUR	GBR	USA	ARG	BRA	CHN	IND	IDN	RUS	SAU	ZAF
Manufacturing	0.000	0.023	0.000	0.000	0.025	0.252	0.026	0.075	0.197	0.180	0.060
Electricity	0.000	0.023	0.222	0.000	0.025	0.608	0.000	0.110	0.250	0.180	0.060
Construction	0.000	0.023	0.000	0.000	0.025	0.265	0.000	0.310	0.183	0.180	0.060
Distribution	0.000	0.023	0.000	0.000	0.025	0.238	0.420	0.685	0.183	0.243	0.060
Transport	0.208	0.114	0.550	0.042	0.292	0.665	0.174	0.416	0.375	0.430	0.227
Hotels & restaurants	0.000	0.023	0.000	0.000	0.025	0.250	0.000	0.248	0.348	0.180	0.060
Media	0.250	0.248	0.300	0.500	0.675	1.000	0.600	0.716	0.383	0.590	0.060
Communications	0.000	0.023	0.010	0.000	0.025	0.800	0.425	0.410	0.283	0.305	0.060
Financial services	0.000	0.024	0.042	0.000	0.025	0.610	0.273	0.143	0.533	0.263	0.093
Business services	0.125	0.023	0.000	0.000	0.025	0.138	0.500	0.560	0.308	0.305	0.385
FDI INDEX TOTAL	0.074	0.061	0.084	0.025	0.116	0.457	0.223	0.331	0.350	0.350	0.085

* Average calculated over all 49 countries included in the database.
** Average calculated over all non-OECD countries amongst the 49 countries included in the database.

39. See Francois and Hoekman (2010) who report a negative correlation between GDP per capita and restrictiveness to services trade.

Figure 4.3. PMR 2008, FDI restrictiveness index 2010, Accounting services

The PMR ranks between 0 and 6; the FDI restrictiveness between 0 and 1



The impact of services liberalisation on productivity and labour demand

As noted, trade is an important factor determining industrial structure and employment patterns. In order to assess the relationship between services trade liberalisation and employment, standard labour demand functions are estimated empirically for all services sectors. The literature in this field distinguishes between conditional and unconditional labour demand. The former controls for the level of output and can therefore be interpreted as labour demand per unit of output, which is also a measure of labour productivity. The latter does not control for output and therefore represents total labour demand. Both demand functions are derived from the cost function for the sector in question, where labour demand is a function of factor prices, output prices; and variables that affect labour productivity, such as R&D expenditure, or competitive pressure, e.g. from foreign services suppliers, and regulation or lack thereof, depending on the sector.[40] The variables that are expected to affect productivity are introduced as shift parameters in the labour demand function.

To the extent that foreign market entry through trade or FDI increases competition or contributes to technology transfer to the host economy, one would expect that the impact on unit labour demand is negative. If so, it would help creating good jobs which support higher wages and the standard of living that people have become accustomed to. It also has a positive effect on employment if higher wages stimulate demand such that expansion of output more than compensates for the gain in productivity as far as labour demand is concerned.

The measures of openness to trade in services included in the labour demand functions are import penetration in the sector in question, inward FDI stocks and outward FDI stocks. These measures are outcomes of a number of factors such as market size, level of development, geography, cultural factors as well as the policy stance. In order to explore the impact of policy more directly, the OECD FDI restrictiveness index and the PMR are also introduced as shift parameters in the labour demand regressions. The results are reported in Table 4.2.

40. Market regulation has a positive impact on the competitiveness in sectors where there are significant entry barriers (e.g. telecommunications), but a negative impact in sectors that are inherently competitive.

Table 4.2. Conditional labour demand in services, various shift parameters related to trade in services

Panel A. Total hours worked

Shift variable	Import penetration		Inward FDI stock		Outward FDI stock		FDI restrictions index		Sector specific PMR	
	Coeff.	Std.	Coef.	Std.	Coeff.	Std.	Coef.	Std.	Coef.	Std.
ln wage	-0.396	0.089***	-0.563	0.033***	-0.533	0.033***	-0.516	0.034***	-0.524	0.028***
ln net capital stock	0.089	0.058	0.137	0.021***	0.132	0.021***	0.122	0.022***	0.032	0.026
ln output price	1.438	0.194***	0.601	0.112***	0.609	0.115***	0.345	0.136***	-0.133	0.048***
ln output	0.284	0.058***	0.486	0.026***	0.485	0.026***	0.543	0.023***	0.264	0.021***
R&D intensity	0.062	0.021***	0.000	0.000	0.000	0.000	-0.014	0.015		
shift variable	-0.014	0.009*	-0.007	0.005	-0.006	0.004	-0.142	0.096	0.037	0.007***
N	309		1036		997		587		951	
R squared	0.9797		0.989		0.989		0.990		0.986	
Panel B. Low skilled hours worked										
ln wage	-0.530	0.146***	-0.425	0.113***	-0.272	0.114**	-0.127	0.119	-0.26	0.07***
ln net capital stock	0.977	0.304***	0.328	0.091***	0.376	0.091***	0.195	0.108	-0.30	0.08***
ln output price	0.650	0.292**	0.516	0.406	0.353	0.420	0.552	0.552	-0.04	0.11
ln output	-1.266	0.135***	0.286	0.094***	0.265	0.097***	0.638	0.107***	0.19	0.06***
R&D intensity	0.201	0.077***	-0.185	0.078**	-0.130	0.075*	-0.104	0.121		
shift variable	-0.011	0.014	-0.057	0.023***	-0.086	0.019***	0.531	0.871	0.19	0.02***
N	187		706		669		435		730	
R squared	0.978		0.925		0.932		0.920		0.910	

Table 4.2. Conditional labour demand in services, various shift parameters related to trade in services (*continued*)

Panel C. Medium skilled hours worked

Shift variable	Import penetration		Inward FDI stock		Outward FDI stock		FDI restr. index		Sector specific PMR	
	Coef.	Std.	Coef.	Std.	Coef.	Std.	Coef.	Std.	Coef.	Std.
ln wage	-0.250	0.080***	-0.540	0.088***	-0.439	0.091***	-0.305	0.084***	-0.518	0.028***
ln net capital stock	-0.078	0.172	0.081	0.047*	0.059	0.046	0.043	0.045	0.074	0.035*
ln output price	0.365	0.149**	0.578	0.261**	0.610	0.257**	-0.790	0.309***	-0.119	0.051***
ln output	-0.074	0.111	0.479	0.046***	0.501	0.044***	0.531	0.054***	0.332	0.031***
R&D intensity	0.135	0.031***	-0.014	0.030	-0.008	0.032	0.034	0.038		
shift variable	-0.010	0.006	0.000	0.008	-0.004	0.007	-0.157	0.223	0.006	0.009***
N	187		706		669		435		730	
R squared	0.9917		0.9736		0.9741		0.969		0.9889	

Panel D. High skilled hours worked

	Coef.	Std.	Coef.	Std.	Coef.	Std.	Coef.	Std.	Coef.	Std.
ln wage	-0.116	0.093	-0.499	0.075***	-0.462	0.076***	-0.503	0.101***	-0.417	0.055***
ln net capital stock	0.502	0.183***	0.282	0.056***	0.236	0.054***	0.263	0.067***	0.077	0.047*
ln output price	0.737	0.196***	0.251	0.220	0.486	0.208**	-0.187	0.295	-0.681	0.191***
ln output	0.416	0.104***	0.385	0.056***	0.433	0.053***	0.374	0.067***	0.516	0.053***
R&D intensity	0.169	0.040***	0.330	0.043***	0.233	0.045***	0.533	0.088***		
shift variable	0.024	0.011**	0.045	0.013***	0.052	0.010***	-0.670	0.467	-0.095	0.019***
N	187		706		669		435		730	
R squared	0.984		0.966		0.967		0.960		0.957	

Total employment is available for more countries and sectors than employment by skills category, which explains why there are more observations in the total employment columns. Reported standard errors are robust standard errors; *, ** and *** signify 10, 5 and 1% levels of significance respectively. Sector and country fixed effects are included. The shift variable for each regression is denoted in the first column headings. The policy indices and import penetration are not logged and the coefficient thus represents the change in unit labour input following a one index unit change in the variable. FDI stocks are logged, and the parameters represent elasticities. R&D intensity is skipped from the last columns because it is not very significant, and there are only 116 observations for which data are available if R&D intensity and sectoral PMRs are included at the same time. This could lead to a problem with selection bias.

It is first noted that inward and outward FDI in services appears to have no discernible impact on overall unit labour demand as indicated in Panel A. Import penetration in the sector in question, however, has a significant effect on unit labour demand; a one percentage point increase in import penetration (as measured by imports over total domestic expenditure on the service) reduces unit labour demand by 1.4%. Behind the border regulation has a positive impact on unit labour demand, thus reducing labour productivity. A one index point reduction in the PMR sector-specific index improves labour productivity by 3.7% on average.[41] Turning to the three skills categories, a higher level of regulation is associated with more inputs per unit of unskilled and medium skilled workers, but lower unit labour requirements for skilled workers.

While FDI appears to have little, if any, effect on average unit labour demand, it does affect the skills composition. Both inward and outward FDI reduce unit labour demand for unskilled and increase unit labour demand for skilled labour, resulting in a more skills intensive production. A possible interpretation which conforms to existing literature is that outward services FDI is related to offshoring of low-skilled tasks, leaving home production more skills intensive. By the same token, inward FDI introduces more skills-intensive technologies to the host country. Medium skilled workers are, perhaps surprisingly, unaffected by FDI as far as unit labour demand is concerned.

While labour productivity (as measured by unit labour demand) is important for longer-term welfare considerations, the direct relationship between trade in services and the composition of employment by skills categories is more interesting for trade related labour market adjustments in the short run. That relationship is explored by estimating unconditional labour demand as reported in Table 4.3.

It is first observed that import penetration in the services sectors has no effect on total labour demand, but contributes to a shift in employment from low-skilled to medium and high-skilled workers with the largest effect on high-skilled. The impact is quite significant with a one percentage point increase in import penetration being associated with a 6% lower employment of unskilled workers, 1.3% higher employment of medium skilled workers and 4.3% higher employment of high-skilled workers.

Turning to FDI, inward stocks contribute to overall job creation, and the impact is highest for high-skilled labour. The scale of the changes is, however, relatively modest. A 10% increase in the stock of FDI is associated by an overall increase in employment by 0.45% for medium skilled workers; and 0.8% for high-skilled. Foreign capital thus appears to complement high skills.

Outward FDI on the other hand, does not seem to affect overall employment. In other words, outward FDI in services does not imply "moving jobs abroad", although a shift in employment from low-skilled to high-skilled workers is observed. Medium skilled workers appear to be largely unaffected, but it is likely that some of the lost low-skilled jobs are replaced by medium-skilled jobs, while some medium skills jobs are replaced by high-skilled jobs, leaving total medium skilled jobs fairly constant.

A high level of behind–the-border regulation is arguably associated with the worst labour market outcome reported above. First, as discussed in Chapter 3 above, a high level of behind–the-border regulation has a strong negative effect on FDI inflows. Second, although regulation is associated with higher unit labour demand (and lower labour productivity) it still contributes to reduce overall labour demand. Furthermore, a high level of regulation appears to protect low-skilled workers while contributing to lower demand for medium and high-skilled workers. Finally, it is noted that while FDI restrictions appear to affect the labour market mainly through the FDI channel, behind–the-border regulations affect the labour market both through FDI and a direct effect, as the PMR is highly significant in most labour market regressions while the FDI restrictiveness index is not.[42]

41. Recall that the index ranks from 0 to 6 such that one index point represent quite significant reforms.

42. When both FDI stocks and the policy indices are included in the same regressions (not reported), the PMR index is still significant, while the FDI restrictiveness index is not.

Table 4.3. Unconditional labour demand

Panel A. Total hours demanded

Shift variable	Import penetration		Inward FDI stocks		Outward FDI stocks		FDI restrictiveness index		PMR index	
	Coef.	Std.	Coef.	Std.	Coef.	Std.	Coef.	Std.	Coef.	Std.
ln wage	-0.131	0.068**	-0.522	0.038***	-0.465	0.039***	-0.537	0.049***	-0.168	0.073**
ln capital stock	0.238	0.050***	0.372	0.022***	0.364	0.023***	0.380	0.024***	0.352	0.032***
ln price	1.170	0.174***	0.655	0.169***	0.632	0.168***	0.659	0.176***	0.407	0.173**
R&D intensity	0.016	0.019	-0.002	0.001***	-0.002	0.001***	-0.015	0.020	-0.143	0.028***
Shift variable	-0.005	0.008	0.032	0.007***	0.007	0.006	-0.317	0.159**	-0.045	0.012***
N	309		1036		997		587		201	
R square	0.977		0.984		0.983				0.997	

Panel B. Low skilled hours demanded

Shift variable	Import penetration		Inward FDI stocks		Outward FDI stocks		FDI restrictiveness index		PMR index	
	Coef.	Std.	Coef.	Std.	Coef.	Std.	Coef.	Std.	Coef.	Std.
ln wage	-0.852	0.176***	-0.471	0.115***	-0.313	0.113***	-0.261	0.124**	-0.149	0066**
ln capital stock	-0.437	0.356	0.462	0.079***	0.508	0.074***	0.513	0.088***	-0.157	0.056***
ln price	2.253	0.268***	0.686	0.412*	0.507	0.420	1.016	0.543*	-0.248	0.112**
R&D intensity	0.389	0.076***	-0.185	0.083**	-0.141	0.081*	-0.075	0.125		
Shift variable	-0.064	0.018***	-0.029	0.022	-0.076	0.019***	0.353	0.986	0.161	0.017***
N	187		706		669		435		730	
R square	0.964		0.924		0.931		0.915		0.908	

Table 4.3. Unconditional labour demand (*continued*)

Panel C. Medium skilled hours demanded

Shift variable	Import penetration		Inward FDI stocks		Outward FDI stocks		FDI restrictiveness index		PMR index	
	Coef.	Std.	Coef.	Std.	Coef.	Std.	Coef.	Std.	Coef.	Std.
ln wage	-0.273	0.085***	-0.565	0.091***	-0.461	0.093***	-0.337	0.087***	-0.329	0.029***
ln capital stock	-0.155	0.162	0.304	0.044***	0.308	0.046***	0.291	0.040***	0.340	0.030***
ln price	0.458	0.128***	0.814	0.236***	0.842	0.232***	-0.391	0.296	0.463	0.045***
R&D intensity	0.147	0.024***	-0.026	0.036	-0.039	0.043	0.043	0.040		
Shift variable	-0.013	0.005***	0.045	0.010***	0.014	0.009	-0.250	0.280	-0.041	0.009***
N	187		706		669		435		730	
R square	0.992		0.969		0.969		0.961		0.985	

Panel D. High-skilled hours demanded

	Coef.	Std.	Coef.	Std.	Coef.	Std.	Coef.	Std.	Coef.	Std.
ln wage	-0.009	0.088	-0.483	0.077***	-0.442	0.077***	-0.507	0.098***	-0.206	0.152***
ln capital stock	0.964	0.193***	0.463	0.045***	0.453	0.043***	0.436	0.057***	0.536	0.148***
ln price	0.218	0.153	0.412	0.215*	0.655	0.207***	0.078	0.303	-1.144	0.347**
R&D intensity	0.107	0.033***	0.316	0.041***	0.203	0.048***	0.537	0.082***		
Shift variable	0.043	0.011***	0.081	0.012***	0.067	0.010***	-0.735	0.390	-0.178	0.017***
N	187		706		669		435		730	
R square	0.981		0.964		0.964		0.958		0.950	

Total employment is available for more countries and sectors than employment by skills category, which explains why there are more observations in the total employment columns. Reported standard errors are robust standard errors; *, ** and *** signify 10, 5 and 1% levels of significance respectively. Sector and country fixed effects are included. The shift variable for each regression is denoted in the first column headings. The policy indices are not logged and the coefficient thus represents the change in unit labour input following a one index unit change in the index.

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During the economic crisis, discouraging outward FDI or relocation was one of the protectionist measures reported in the recent OECD study on *Trade and Economic Effects of Responses to the Economic Crisis (*OECD, 2010). The rationale for this policy is to make sure that the stimulus preserves local jobs to the largest extent possible. The results reported in Tables 3 and 4 suggest that relocation of services does not reduce employment at home, but contributes somewhat to the shift towards more skills-intensive production and higher productivity.

Conclusion

This section has explored the relation between services offshoring through FDI or cross-border trade and the skills composition of labour demand, focussing in particular on its possible contribution to polarization of the labour market. It was found that outward investment does not shift jobs abroad. Linking stimulus packages to local production are therefore unlikely to protect local jobs. Furthermore, keeping the local market open to trade and investment would contribute to net job creation. Moreover, further investment liberalisation would enhance job creation, also during the crisis. It is found that services trade does contribute to structural changes in employment, in particular a shift from low-skilled to high-skilled employment. However, contrary to what has been feared, services offshoring does not seem to hurt medium-skilled workers. Finally, reducing behind–the-border regulatory barriers is the most effective policy measure that would stimulate FDI, and employment while improving labour productivity, although also this measure reduces demand for low-skilled labour.

5. Concluding remarks

This report has used two large scale global economic models, one for goods and one for services, to assess the potential implications of trade liberalisation for job creation and growth. Additional econometric analysis has focussed on the skill composition of labour demand in relation to increases in FDI in services.

In the area of trade in goods the analysis examines the economic consequences in general and the labour market consequence in particular of more liberal tariff and NTM regimes in G20 member countries. It also examines the potential effects of global tariff reductions in which all countries would participate. The estimates reported here point to consistent positive labour market impacts across the G20 both under recession and also (especially) in the long run. The impact of the different scenarios highlight that balanced trade liberalisation can create jobs in the short run without eliminating jobs in foreign countries, and it can generate income gains in the long run. Since the net result of these effects could be negative in any one country (although they are unlikely to be negative for the world as a whole), the challenge is to design policies that generate widely shared gains. The net results will be positive everywhere if price improvements are large, provided that substantial new investment is undertaken by expanding industries and liberalisation of imports is approximately balanced by reciprocal liberalisation in a country's export markets. The jobs created by liberalisation will be amplified by income multipliers under conditions of unemployment. The multipliers will be especially large if several major economies adopt concerted liberalisation policies.

In the short run, as economies emerge from the crisis, these results also indicate that coordinated trade policies can help to close the gap between actual and potential output. This would also generate follow-on benefits in the longer run, where lower trade cost would imply higher labour productivity and wages as well as greater active labour market participation. While NTMs make a particularly important contribution to overall effects, tariffs should not be neglected as they

remain significant barriers in some industries and countries. This re-iterates the importance of a swift conclusion of the current Doha Round of trade negotiations.

Considering liberalisation in services, this report focuses on the question of whether liberalisation of FDI in services can produce beneficial labour market outcomes. The answer is in the affirmative under a wide variety of circumstances — even if the first-round effect of that liberalisation is to generate productivity improvements in foreign-invested firms that would, in the first instance, reduce their unit labour requirements.

Overall labour market outcomes depend on the spill-over effects to other firms and industries. The results suggest that these spillover effects of FDI liberalisation can be mixed. Firms that compete directly with the foreign-invested firms, especially domestic firms in the same sector, suffer from lower priced competition. But sectors that use the services of foreign-invested firms as inputs benefit from lower-priced inputs. So long as the liberalisation is widespread across economies, the positive spillovers dominate, both within and between economies. There could well be some significant structural adjustments as labour shifts from domestic to foreign-invested firms within each economy. But the adjustment costs from this type of reallocation, in terms of retraining and job search, are likely to be relatively small (compared with other types of structural adjustments). Furthermore, the adjustment costs would be reduced, and the overall gains increased, if the liberalisation would not only pertain to measures that discriminate against foreign services suppliers but extend to domestic barriers to market entry by any new supplier, domestic or foreign.

The positive labour markets outcomes do not just accrue in the long term but also the short run. Foreign-invested firms may have less time to put additional FDI capital in place in the short run, so the scale effects may be smaller. But particularly in surplus-labour economies, additional labour can be hired with no upward pressure on wages, so the substitution towards labour in foreign-invested firms should be greater.

Looking at the relation between services offshoring through FDI or cross-border trade and the skills composition of labour demand, and focussing in particular on its possible contribution to polarisation of the labour market, we find that outward investment does not shift jobs abroad. Linking stimulus packages to local production is therefore unlikely to protect local jobs. Furthermore, keeping the local market open to trade and investment would contribute to net job creation. Moreover, further investment liberalisation would also increase employment during the crisis. Our results suggest that services trade does contribute to structural changes in employment, in particular a shift from low-skilled to high-skilled employment. However, contrary to what has been feared, services offshoring does not seem to hurt medium-skilled workers. Finally, reducing behind the border regulatory barriers is the most effective policy measure to stimulate FDI and employment while improving labour productivity, although this measure also reduces demand for low-skilled labour.

Overall, therefore, the liberalisation of services trade can not only make a valuable contribution to overall economic well-being, particularly if it extends beyond the removal of discrimination against foreign suppliers, but also contribute significantly and positively to labour market outcomes, in terms of employment gains in the short term, and real wages gains in the long term.

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