

Regional Impacts of Russia's Accession to the World Trade Organization

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Abstract: In this paper we develop a computable general equilibrium model of the regions of Russia to assess the impact of accession to the World Trade Organization (WTO) on the regions of Russia. We estimate that the average gain in welfare as a percentage of consumption for the whole country is 7.8 percent (or 4.3 percent of consumption); we estimate that three regions will gain considerably more: Northwest (11.2 percent), St. Petersburg (10.6 percent) and Far East (9.7 percent). We estimate that the Urals will gain only 6.2% of consumption, considerably less than the national average. The principal explanation in our central analysis for the differences across regions is the ability of the different regions to benefit from a reduction in barriers against foreign direct investment. The three regions with the largest welfare gains are clearly the regions with the estimated largest shares of multinational investment. But the Urals has attracted relatively little FDI in the service sectors. An additional reason for differences across regions is quantified in our sensitivity analysis: regions may gain more from WTO accession if they can succeed in creating a good investment climate.

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Regional Impacts of Russia's Accession to the WTO

by

Thomas Rutherford and David Tarr

I. Introduction

Russia is the largest economy in the world that is not a member of the World Trade Organization. Russia applied for membership in the General Agreement on Tariffs and Trade (GATT) in June 1993 and the GATT Working Party was transformed into the World Trade Organization (WTO) Working Party in 1995. President Vladimir Putin has made WTO accession a priority for Russia, and after languishing for several years, the Russian accession negotiations began to see real progress under his administration.

In response to numerous calls for a quantitative assessment of the impact of WTO accession on Russia, Jensen, Rutherford and Tarr (forthcoming) have estimated the economy-wide and sector impacts of Russian WTO accession. While this paper has been helpful in identifying the sectors likely to expand and contract and the reasons for the gains to Russia from WTO accession, geographically Russia is the largest country in the world. There are parts of European Russia close to markets of Western Europe and parts of Far Eastern Russia that are close to the markets of China and Japan, while large portions of Siberia are relatively isolated. We can expect the impacts across the regions to be very diverse, even for the same industry. Consequently, there is a need for a model of Russia that distinguishes its regions.

In this paper we develop a ten region model of Russia for the purpose of assessing the impacts across these ten regions. The structure of the model for each region follows the general structure of the national model of Jensen, Rutherford and Tarr. In particular, we allow foreign direct investment in the business services sectors in each region. We also allow for imperfect competition where the sectors that use goods or services produced under imperfect competition obtain endogenous productivity effects from additional varieties of goods or services (the Dixit-Stiglitz framework).

We present results and explain the economic intuition for these results from a computable general equilibrium model that we believe is appropriate to evaluate the regional impacts of Russian accession to the WTO. We argue that the gains to Russia from WTO accession will derive from three principal effects, which are, in order of importance:

(1) Liberalization of barriers to foreign direct investment in services. A growing body of evidence and economic theory suggest that the close availability of a diverse set of business services is important

for economic growth.¹ The key idea in the literature is that a diverse set (or higher quality set) of business services allows users to purchase a quality adjusted unit of business services at lower cost. Russian commitments to multinational service providers will encourage them to increase foreign direct investment to supply the Russian market. Russian businesses will then have improved access to the services of multinational service providers in areas like telecommunication, banking, insurance, transportation and other business services. This should lower the cost of doing business in Russia, increase productivity of Russian firms using these services and generally improve the competitiveness of the Russian economy. However, the regions of Russia vary widely in their capacity to attract foreign direct investment. Differences in results across regions depend to a significant extent on their attractiveness as a location for FDI.

(2) Russian tariff reduction. Tariff reduction will lead to improved domestic resource allocation since tariff reduction induces the country to shift production to sectors where production is valued more highly based on world market prices. This impact, known as the “gains from trade” is a fundamental effect from trade liberalization and is often stressed by international trade economists in the literature. In addition, Russian businesses will be able to more easily import modern technologies or a greater variety of technologies and this will increase Russian productivity. As we show, this second impact is more important.²

(3) Improved access to the markets of non-CIS countries in selected products. Russia has already negotiated most-favored nation (MFN) status on a bilateral basis with most of its important trading partners, so Russia’s exporters will not see an immediate reduction in the tariffs they face and this effect may not be expected to be large. But Russia will have improved rights under antidumping and

¹ As early as the 1960s, the urban and regional economics literature (e.g., Jacobs, 1969; Chinitz 1961; Vernon 1960; Stanback, 1979) recognized the importance of non-tradable intermediate goods (primarily producer services produced under conditions of increasing returns to scale) as an important source of agglomeration externalities which account for the formation of cities and industrial complexes, and explanations of the difference in economic performance across regions. The more recent economic geography literature (e.g., Fujita, Krugman and Venables, 1999) has also focused on the fact that related economic activity is economically concentrated due to agglomeration externalities (e.g., computer businesses in Silicon Valley, ceramic tiles in Sassuolo, Italy). Evidence comes from a variety of sources. Ciccone and Hall (1996) show that firms operating in economically dense areas are more productive than firms operating in relative isolation. Caballero and Lyons (1992) show that productivity increases in industries when output of its input supplying industries increases. Hummels (1995) shows that most of the richest countries in the world are clustered in relatively small regions of Europe, North America and East Asia, while the poor countries are spread around the rest of the world. He argues this is partly explained by transportation costs for inputs since it is more expensive to buy specialized inputs in countries that are far away for the countries where a large variety of such inputs are located.

² Romer (1994) has emphasized that the impact of trade liberalization on new or higher quality products is much more important quantitatively than improved resource allocation.

countervailing duty investigations in its export markets, which is the source of the improved access we model.³

Our aggregate results for each region are summarized in table 13a. Our central estimates are that the overall gains to Russia from WTO accession are 7.8 percent of Russian consumption (or 4.3 percent of GDP). While the average gain in welfare as a percent of GDP for the whole country is 4.3 percent, we estimate that three regions will gain considerably more: Northwest (6.2 percent), St. Petersburg (5.7 percent) and Far East (5.2 percent). The principal explanation for the differences across regions is the ability of the different regions to benefit from a reduction in barriers against foreign direct investment. The four regions with the largest welfare gains are clearly the regions with the estimated largest shares of multinational investment. All have estimated multinational shares of the service sector that are twice the national average in maritime services, rail services, truck services, air transportation services, telecommunications, science and financial services. On the other hand, we estimate that the Urals will gain only 3.3% of GDP, considerably less than the national average. But the Urals has relatively little FDI in the services sectors.

We observe that the reduction in barriers to FDI alone results in an improvement in Russian welfare on average across regions of 6.7 percent of consumption (or 3.7 percent of GDP). Improved market access and tariff reduction contribute an improvement in Russian welfare by 0.3 percent and 0.7 percent of consumption, respectively, or a combined one percent. Thus, by far the most important effect derives from the reduction in barriers to FDI in services. We also simulate a reduction in the barriers to FDI in business services of only fifty percent of the cuts we assume in our WTO scenario. The gains in Russian welfare are substantially reduced to 4.2 percent of consumption, which again shows the importance of reducing barriers to FDI in order to increase Russian productivity, competitiveness and welfare. Thus, the estimated gains from FDI liberalization are almost three-quarters of the total gains from Russian WTO accession. Thus, while improving its offer to foreign services providers within the context of the GATS has been one of the most difficult aspects of Russia's negotiation for WTO accession, our estimates suggest that the most important component of WTO accession for Russia in terms of the welfare gains is liberalization of its barriers against FDI in services sectors.

In the sensitivity analysis, we also incorporate data on the investment potential of regions based on the investment potential rankings of Expert RA. The principal result is that the estimated gains for Moscow, St. Petersburg and Tumen increase and the estimated gains for Siberia, Northwest, North,

³ WTO accession will grant an "injury determination" to Russia in antidumping cases in WTO members countries. Combined with the decision by the US and the EU to treat Russia as a market economy this will imply Russian exporters may have considerably improved rights in these cases in the US. But market economy status may be denied in particular cases, so it will be necessary to see how this is implemented in practice.

Central and the Far East decline. Despite smaller estimated gains in this scenario, Far East and Northwest are still estimated to receive above average gains. The results suggest that the gains for a region could vary considerably depending on whether it succeeds in creating an atmosphere conducive to investment.

Our estimates show that many of our Russian goods sectors should expand and employment in many services sectors expands. This occurs despite the reduction in all tariffs by 50 percent and a reduction in barriers against foreign direct investment in business services. Whether a sector expands or contracts depends on what happens to the incentives of one sector versus another. Economy-wide, Russia will see an increase in exports equal to the increase in imports. The expansion in exports occurs because Russia will have to pay for additional imports through hard currency, which increases the demand for hard currency and causes a real depreciation of the ruble. A depreciated ruble makes exporting more profitable and decreases the demand for imports until the additional exports are equal to the additional imports. The export intensive sectors tend to gain the most from ruble depreciation.

In goods sectors, we estimate that the ferrous metals, non-ferrous metals and chemicals sectors are the goods sectors that expand the most. These are the sectors that export the most intensively. They also experience a terms of trade gain from improved treatment in antidumping cases. We estimate that food, machinery and equipment and construction materials will decline as these sectors export relatively less and are relatively highly protected.

In business services, employment effects vary across sectors, with some expanding (multinationals will demand Russian labor when they locate in Russia and the demand for business services increases) and some contracting demand for labor (since multinationals use Russian labor less intensively than Russian companies). But users of business services will become more internationally competitive as they obtain an increase in the quality and diversity of available competitively priced business services.

This paper quantifies and supports the views expressed by the some in the government that when all changes are taken into account, many goods sectors would expand, despite a reduction in their tariff.

The paper is organized as follows. In section II, we describe the model and the most important data. In section III, we describe and interpret the policy scenarios and quantitatively assess the sensitivity of the results to parameter assumptions. Many of the scenarios we describe are decomposition scenarios that allow us to assess the relative importance of the various aspects that we consider important to Russian WTO accession. We provide sensitivity analysis in section IV and briefly conclude in section V.

II. Overview of the Model and Key Data

Production and Geographic Structure

There are 30 sectors in the model that are listed in table 1. There are three types of sectors: perfectly competitive goods and services, imperfectly competitive goods sectors and imperfectly competitive business services sectors.

The geographic decomposition of our model of Russia is shown in table 2. In the first instance, we obtain data from the publication the *Regions of Russia* by Rosstat on 88 regions of Russia. The 88 regions have several names in Russian; the most common legal jurisdiction is referred to in Russian as an “oblast.” Oblasts are analogous to states in the United States or provinces in Canada. But there are also jurisdictions known as territories, federal cities, autonomous districts and an autonomous region. Since we want to use the term “region” for another purpose in the model, we use the Russian term “oblast” for all of these 88 geographic areas,⁴ with the understanding that they are not all oblasts in the Russian sense of the term.

We group several contiguous oblasts into what we call Regional Markets (RMs). The mapping of oblasts into regional markets is also shown at the top of table 2. In this paper, we shall analyze effects at the level of the Regional Market. Value-added, exports and imports by sector for our ten regions of Russia are presented in tables 3-11.

We assume that firms and sectors operate at the Regional Market level, primary factors of production are not able to move between Regional Markets (unless otherwise notes). We assume a nested CES structure of demand. Since this implies that the structure of demand is both a homothetic and weakly separable, consumers and firms in a representative Regional Market r employ multiple stage budgeting for all goods.

Price determination for competitive goods and services sectors

Firms in each Regional Market have three choices for sales: sell in their own Regional Market; sell to other parts of Russia; or export to the rest of the world. This is depicted in figure 1. Firms maximize revenue for any given output level based on their transformation possibilities between the three types of goods which is defined by a constant elasticity of transformation production function. For all firms within the same Regional Market, the product they export to other parts of Russia (including other oblasts within their own regional market) is homogeneous. It follows from our assumptions of

⁴ Several of the territories are part of oblasts, so it was necessary to adjust the data to avoid double counting of the territories.

homogeneous demand and production outside of the own Regional Market, that for each competitive good, say good g , there will be only three prices for good g of Regional Market r : the price of good g in Regional Market r ; the price of good g from Regional Market r in other parts of Russia; and the price of good g from Regional Market r in the rest of the world.

The structure of demand for goods or services from competitive sectors is shown in figure 2. Consumers and firms in a representative Regional Market r first optimize their choice of expenditures on foreign goods versus goods from Russia. Subsequently they optimally allocate their expenditures between goods from other Russian Regional Markets and their own Regional Market. Finally, they optimally allocate their expenditures between goods from the other Russian Regional Markets. This structure assumes that consumers differentiate the products of producers from different regional markets; but, they regard as homogeneous the products of producers from different oblasts within the same regional market.

Goods produced subject to increasing returns to scale

The structure of demand for goods produced under increasing returns to scale is shown in figure 3. Consumers (and firms) in RM r , optimally allocate expenditures on good g among the goods available from the different regional markets of Russia and the rest of the world producers. Having decided how much to spend on the products from each regional market, consumers then allocate expenditures among the producers within each regional market. Since we assume identical elasticity of substitution at all levels, this is equivalent to firm level product differentiation of demand. That is, the structure is equivalent to a single stage in which consumers decide how much to spend on the output of each firm in the first stage of optimal allocation of expenditure.

We assume that imperfectly competitive manufactured goods may be produced in each region or imported. Both Russian and foreign firms in these industries set prices such that marginal cost (which is constant) equals marginal revenue in each regional market. There is a fixed cost of operating in each region and there is free entry, which drives profits to zero for each firm on its sales in each regional market in which it sells. Quasi-rents just cover fixed costs in each region in the zero profit equilibrium. We assume that all firms that produce from the same regional market have the same cost structure—the standard symmetry assumption.

Foreigners produce the goods abroad at constant marginal cost but incur a fixed cost of operating in each RM in Russia. The cif import price of foreign goods is simply defined by the import price; by the zero profits assumption, in equilibrium the import price (less tariffs) must cover fixed and marginal costs that foreign firms incur in each regional market.

Similar to foreign firms, Russian firms also produce their goods in their home regions; they incur a fixed cost of operation if each RM in which they operate. By the zero profit constraint, if they operate in a RM, the price of their product must just cover both fixed and marginal costs of operation in that RM.

In figure 4, we depict the structure of production for imperfectly competitive Russian firms. Regional firms use intermediate inputs (which can be foreign inputs, inputs from other regions of Russia or from its own region) and primary factors of production to produce output. We emphasize that business services are not part of the “other services” nest; rather business services substitute for primary factors of production in a CES nest.⁵ We show that the elasticity of substitution between business services and primary factors of production significantly impacts the results.

We assume that Russian firms do not have any market power on world markets and thus act as price takers on their exports to world markets. On the exports to the rest of the world then, price equals marginal costs. On sales to Russia, firms must use a specific factor in addition to the other factors of production. The existence of the specific factor implies that additional output or firms can only come at increasing marginal costs. Imperfectly competitive Russian goods producers sell in all of Russia; but services firms do not sell in other Russian regional markets.

We employ the standard Chamberlinian large group monopolistic competition assumption within a Dixit-Stiglitz framework, which results in constant markups over marginal cost. For simplicity we assume that the composition of fixed and marginal cost is identical in all firms producing under increasing returns to scale (in both goods and services). This assumption in a Dixit-Stiglitz based Chamberlinian large-group model assures that output per firm for all firm types remains constant, i.e., the model does not produce rationalization gains or losses.

An increase in the number of varieties increases the productivity of the use of imperfectly competitive goods based on the standard Dixit-Stiglitz formulation. Dual to the Dixit-Stiglitz quantity aggregator is the Dixit-Stiglitz cost function which shows the productivity adjusted cost of using the available varieties in the regional market when varieties are purchased at minimum cost for a given output level. This cost function for users of goods produced subject to increasing returns to scale declines in the total number of firms in the industry. The lower the elasticity of substitution, the more valuable is an additional variety.

We have assumed that imperfectly competitive firms within a regional market have symmetric cost structures and face symmetric demand for their outputs. It follows from these assumptions that all

⁵ For example, firms can employ an accountant or a lawyer, or contract for accounting or legal services. They can employ a driver and buy a truck, or contract for delivery services. These examples make it evident that it is more appropriate to allow substitution between business services and primary factors of production than to assume a Leontief structure.

imperfectly competitive firms from a regional market will obtain the same price in any regional market of Russia in which they operate, although the price will differ across regional markets since the fixed costs associated with entering any regional market varies across the regional markets.

Services sectors that are produced in Russia under increasing returns to scale and imperfect competition

These sectors include telecommunications, financial services, most business services and transportation services. In services sectors, we observe that some services are provided by foreign service providers on a cross border basis analogous to goods providers from abroad. But a large share of business services are provided by service providers with a domestic presence, both multinational and Russian.⁶ As shown in figure 5, our model allows for both types of foreign service provision in these sectors. There are cross border services allowed in this sector and they are provided from the firms outside of Russia at constant costs—this is analogous to competitive provision of goods from abroad. Cross border services from the rest of the world, however, are not good substitutes for service providers who have a presence within the regional market of Russia where consumers of these services reside.⁷

Russian firms providing imperfectly competitive business services operate at the regional level and organize production in a manner fully analogous to imperfectly competitive Russian firms producing goods. Thus, figure 4 applies to both Russian imperfectly competitive goods and services firms. Other assumptions we made for imperfectly competitive goods producers, such as entry conditions, pricing and symmetry are also apply to imperfectly competitive services providers. The only difference is that we assume that regional services providers sell only in their own regional market. It follows from these assumptions that there is a unique price for all Russian providers of imperfectly competitive business services in a regional market.

There are also multinational service firm providers that choose to establish a presence in a RM of Russia in order to compete with regional Russian firms directly in the Russian Regional Market. The decision to locate in a regional market by a multinational must take into account the existence of a fixed cost of operating in a regional market. As with imperfectly competitive goods producers, quasi-rents must cover the fixed plus marginal costs of producing in a regional market and we have a zero profit equilibrium.

⁶ One estimate puts the world-wide cross-border share of trade in services at 41% and the share of trade in services provided by multinational affiliates at 38%. Travel expenditures 20% and compensation to employees working abroad 1% make up the difference. See Brown and Stern (2001, table 1).

⁷ Daniels (1985) found that service providers charge higher prices when the service is provided at a distance.

When multinational service providers decide to establish a domestic presence in a regional market of Russia, they will import some of their technology or management expertise. That is, foreign direct investment generally entails importing specialized foreign inputs. Thus, the cost structure of multinationals differs from Russian service providers. Multinationals incur costs related to both imported primary inputs and Russian primary factors, in addition to intermediate factor inputs. Foreign provision of services differs from foreign provision of goods, since the service providers use Russian primary inputs. This is shown in figure 6, where we show multinationals combining imported primary inputs with inputs of the service good from the oblasts within the regional market. Domestic service providers do not import the specialized primary factors available to the multinationals. Figure 4 for Russian business service providers is analogous to figure 6 for multinational service providers except for the nest for imported primary inputs. Foreign service providers also must use a specific factor to produce the output and this implies that additional output can only be obtained at increasing marginal costs. Since the structure of costs for all multinational firms that provide a service s in a given region m is identical and demand is symmetric, there is a unique price for all multinationals providers of service s in regional market m .

For multinational firms, the barriers to foreign direct investment affect their profitability and entry. Reduction in the constraints on foreign direct investment in a region will induce foreign entry that will typically lead to productivity gains because when more varieties of service providers are available, buyers can obtain varieties that more closely fit their demands and needs (the Dixit-Stiglitz variety effect).

Factors of Production

Primary factors include skilled and unskilled labor and three types of capital; (i) mobile capital (within regions); (ii) sector-specific capital in the energy sectors reflecting the exhaustible resource; and (iii) sector specific capital in imperfectly competitive sectors. We also have primary inputs imported by multinational service providers, reflecting specialized management expertise or technology of the firm. The existence of sector specific capital in several sectors implies that there are decreasing returns to scale in the use of the mobile factors and supply curves in these sectors slope up.

The above list of primary factors exist in all regions. In the case of skilled and unskilled labor it is natural to assume that the representative agent in the region obtains the returns from these factors of production. Consistent with standard trade models, in our central model we assume that capital and labor are immobile between regions. However, this model is a regional disaggregation of a national model of Russia; consequently, it does not seem reasonable to assume that all capital in a region is *owned* by the agents in that region. Thus, we make the assumption that a fraction of the capital in any region is held by agents outside of the region, but the capital is held by residents in the country. We take the fraction of the

capital held by agents in the region to be 50 percent, but this percentage is not crucial to the solution of the model.

Regarding the capital of each region that is held outside of the region, it is convenient to think of a national mutual fund that holds the remaining capital in each region. For all three capital types ((i) mobile; (ii) specific capital in the energy sectors; and (iii) specific capital in the IRTS sectors) fifty percent of the capital used in the region is owned by this mutual fund and the balance is owned by the representative agent in the region. The national mutual fund invests in all regions and obtains an overall return. The representative agent in the region also holds shares in the national mutual fund.⁸

For each region we report returns to capital as returns to the three types of regional capital held by the region's representative agent. Plus the region's representative agent obtains a share of the returns from the national mutual fund. The return to national capital is the region's share of the return of the national mutual fund reported as a percentage of initial consumption of the region.

Key Data

Ad Valorem Equivalence of Barriers to Foreign Direct Investment in Services Sectors

Among the key restrictions against multinational service providers that have existed or exist in Russia are: the Rostelecom monopoly on long distance fixed-line telephone services (scheduled to be removed), affiliate branches of foreign banks are prohibited, and there is a quota on the multinational share of the insurance market.⁹ Estimates of the ad valorem equivalence of these and other barriers to FDI in services are key to the results. Consequently, we commissioned 20 page surveys from Russian research institutes that specialize in these sectors and econometric estimates of these barriers based on these surveys.

⁸ Define $M(r)$ as the representative agent's share of the returns to the national mutual fund. We calculate $M(r)$ as follows. For each region r , the initial consumption income $C(r)$ equals its endowment income $E(r)$ minus the share of the trade surplus $B(r)$ attributed to the region: $C(r) = E(r) - B(r)$. Define $B(r) = [C(r)/C] * B$ where C is aggregate consumption for Russia and B is the aggregate trade surplus. That is, the region's share of the trade surplus is proportional to its share of aggregate consumption.

$E(r)$ is defined above, but is also defined as: $E(r) = L(r) + K(r) + M(r)$. That is, endowment income for each region is labor income $L(r)$; plus capital income on regional capital held by the representative agent in the region $K(r)$; plus the representative agent's share of the returns to the national mutual fund $M(r)$. $E(r)$, $L(r)$ and $K(r)$ are all known. We calculate $M(r)$ residually for each region r as:

$$E(r) - L(r) - K(r) = C(r) - B(r) - L(r) - K(r) = M(r).$$

⁹ The protocol on Russian accession signed between the European Union and Russia on May 21, 2004 calls for the termination of the Rostelekom monopoly by 2007 and allows for an increase in the upper limit on the multinational share of the Russian insurance market.

These questionnaires provided us with data, descriptions and assessments of the regulatory environment in these sectors.¹⁰ Using this information and interviews with specialist staff in Russia, as well as supplementary information, Kimura, Ando and Fujii (2004a, 2004b, 2004c) then estimated the ad valorem equivalence of barriers to foreign direct investment in several Russian sectors, namely in telecommunications; banking, insurance and securities; and maritime and air transportation services. The process involved converting the answers and data of the questionnaires into an index of restrictiveness in each industry. Kimura et al. then applied methodology explained in the volume by C. Findlay and T. Warren (2000), notably papers by Warren (2000), McGuire and Schulele (2000) and Kang (2000). For each of these service sectors, authors in the Findlay and Warren volume evaluated the regulatory environment across many countries. The price of services is then regressed against the regulatory barriers to determine the impact of any of the regulatory barriers on the price of services. Kimura et al. then assumed that the international regression applies to Russia. Applying that regression and their assessments of the regulatory environment in Russia from the questionnaires and other information sources, they estimated the ad valorem impact of a reduction in barriers to foreign direct investment in these services sectors.¹¹ The results of the estimates are listed in table 2.¹² In the case of maritime and air transportation services, we assume that the barrier will only be cut by 15 percentage points, since pressure from the Working Party in these sectors is not strong.

Share of Expatriate Labor Employed by Multinational Service providers. The impact of liberalization of barriers to foreign direct investment in business services sectors on the demand for labor in these sectors will depend importantly on the share of expatriate labor used by multinational firms. We explain in the results section that despite the fact that multinationals use Russian labor less intensively than their Russian competitors, if multinationals use mostly Russian labor their expansion is likely to increase the demand for Russian labor in these sectors.¹³ We obtained estimates of the share of expatriate labor or specialized technology that is used by multinational service providers in Russia, but which is not

¹⁰ This information was provided by the following Russian companies or research institutes: Central Science Institute of Telecommunications Research (ZNIIS) in the case of telecommunications, Expert RA for banking, insurance and securities; Central Marine Research and Design Institute (CNIIMF) for maritime transportation services and Infomost for air transportation services. We thank Vladimir Klimushin of ZNIIS; Dmitri Grishankov and Irina Shuvalova of ExpertRA; Boris Rybak and Dmitry Manakov of InfoMost; and Tamara Novikova, Juri Ivanov and Vladimir Vasiliev of CNIIMF. The questionnaires are available at www.worldbank.org/trade/russia-wto. The same sources provided the data on share of expatriate labor discussed below.

¹¹ Warren estimated quantity impacts and then using elasticity estimates was able to obtain price impacts. The estimates by Kimura et al. that we employ are for “discriminatory” barriers against foreign direct investment. Kimura et al. also estimate the impact of barriers on investment in services that are the sum of discriminatory and non-discriminatory barriers.

¹² See Jensen, Rutherford and Tarr (2006) for an explanation of the estimate in telecommunications.

¹³ See Markusen, Rutherford and Tarr (2005) for a detailed explanation on why FDI may be a partial equilibrium substitute for domestic labor but a general equilibrium complement.

available to Russian firms, from the Russian research institutes that specialize in these sectors. In general, we found that multinational service providers use mostly Russian primary factor inputs and only small amounts of expatriate labor or specialized technology. In particular, the estimated share of foreign inputs used by multinationals in Russia is: telecommunications, 10% plus or minus 2%; financial services, 3%, plus or minus 2%; maritime transportation, 3%, plus or minus 2%; and air transportation, 12.5%, plus or minus 2.5%.

Tariff and Export Tax data

Tariff rates by sector are taken from the paper by Tarr, Shepotylo and Koudoyarov (2006). Tarr, Shepotylo and Koudoyarov estimate the tariff rates by sector in our model based on the following data and methodology. For the purpose of calculating the tariff rates, we obtained data on the quantity and value of imports for 2001, 2002 and 2003 from the electronic database of the commercial company Academy-Service.¹⁴ This dataset provides information on the Russian tariff structure at the tariff line level, i.e., the 10-digit level. The source of information on tariff rates is the Decree of the Government of Russian Federation on import duties #830.¹⁵ The decree is available, for example, at www.consultant.ru.

The average MFN tariff in Russia has increased between 2001 and 2003. On an un-weighted simple average basis it increased from 11.6% to 12.9%; on a weighted average basis it increased from 11.4% to 14.5%. This average is calculated based on MFN tariffs.

Collected tariffs are less than MFN tariffs because of a several exemptions in the Russian tariff structure. Most notably, CIS imports usually enter tariff free (although there are exceptions to this rule), and personal and private imports also enter tariff free for sufficiently small values of imported shipments. We also provide estimates of the tariff rates where we adjust for zero tariff collections on CIS imports. That is, in our formulas for calculating the tariff on a tariff line, we set ad valorem and specific rates on imports from the CIS countries equal to zero to take into account the special trade regime within the CIS. *We call these calculations our estimated collected tariff rates.* We find that overall estimated collected tariff rates are lower than the MFN rates by about one percent.

Our overall estimated collected tariff rate was equal to 10.4% in 2001, 10.9% in 2002, and 11.5% in 2003. On the other hand, based on Ministry of Finance and Customs Committee data, the actual

¹⁴ <http://www.ftinform.com>

¹⁵ We looked at three editions of the decree: first, dated by 11.30.2001 for 2001; the second, dated by 02.06.2003 for 2002 rates, and the third, dated by December 2003 for 2003 rates.

collected rate was 9.5% in 2001, 9.7% in 2002, and 9.8% in 2003. The difference can be attributed to the fact that we did not take into account any exemptions other than the CIS free trade zone exemption.¹⁶

We believe collected tariff rates more closely approximate the protection a sector receives and the incentives it faces. Using our estimated collected tariff rates, and based on a Rosstat mapping from the tariff line data of the Customs Committee to the sectors in our input output table, we calculated a weighted average tariff rate for the sectors of our model. The results of this procedure for each sector of our model are reported in table 12a.

Export tax rates are calculated from the 2001 input-output table of Rosstat and are reported in table 12a. Since we do not change export taxes in the counterfactual simulations, these parameters are less important to the results than the tariff rates.

Input-output tables

The core input-output model is the 2001 table produced by Rosstat. The official table contained only 22 sectors, and importantly has little service sector disaggregation. In order to disaggregate the table, we used costs and use shares from our 35 sector Russian input-output table for 1995 prepared by expert S. P. Baranov. (For details see www.worldbank.org/trade/russia-wto.) When we broke up a sector such as oil and gas into oil, gas and oil processing, we assumed that the cost shares and use shares of the sector were the same in 2001 as they were in the 1995 table. For example, steel is an input to the oil and gas sector. Suppose in 1995, that oil purchased 55 percent of the steel used in oil and gas. Then we assume that in 2001, oil purchased 55 percent of the steel used in oil and gas.

Regional IO tables

We generated input-output tables for the regions based on output data from the regions and the national input-output table. For each industrial sector we took national output from the national input-output table for 2001, and we used the data in Regions of Russia to allocate the shares of that output across regions. That is, from the Regions of Russia 2001, we have, by region; industry shares of output for the year 2000 (table 13.3); thousands of tons of oil recovery, including gas condensate, for the year 2000 (table 13.13); extraction of natural gas (in millions of cubic meters for the year 2000, table 13.14); thousands of tons of mined coal for the year 2000 (table 13.15). We also have external exports and imports by region, as well as the commodity structure of exports and imports by region for the year 2001

¹⁶ To calculate actual collected rate, we used the Ministry of Finance data on collected import duties as a numerator. As a denominator, we used the overall import volume less import from Belarus as reported by the Russian Customs Committee. The exclusion of the imports from Belarus is determined by the fact that the electronic dataset which we used in the calculations reported import volume without imports from Belarus.

(tables 23.1 and 23.2). We also have unpublished data supplied by Rosstat on exports and imports by sector and by region of Russia.

We assume that the technology of production is common across regions, so that the same input output coefficients apply across all regions. We create an input output table for each region of Russia, where the shares of output and energy for each region are taken from the Regions of Russia and we have common technology across all regions. We infer regional demand (and supply) of services, assuming that intermediate and final demand for services have the same intensity of demand in all regions as in the national model.

We have to adjust the resulting regional import and export intensities so that regional exports in aggregate are consistent with national import and export values. We do not need to make any other adjustments, as the production technologies are assumed consistent across the regions.

FDI Shares

We explain the methodology further in the appendix, but briefly, we first employed the NOBUS survey to obtain the shares of workers working in multinationals service sectors in each sector in each region. We used this as a proxy for the share of output in each service sector in each region. We also obtained information from (1) our estimates from Russian service sector institutes of the share by sector of multinational ownership in the key services sectors;¹⁷ (2) *Regions of Russia (2003)* by Rosstat; and (3) the “BEEPS survey. Only the NOBUS survey provides data that allows us to estimate shares of multinational ownership by both region and sector. We thus start with our calculations based on the NOBUS information.

When found, however, that when we aggregate the NOBUS shares across regions or sectors, the other three sources of information show considerably higher foreign ownership shares than the NOBUS survey. We believe that the NOBUS survey estimates are too small, and adjust them. We adjusted our estimates from the NOBUS to be consistent with the estimates of the service sectors institutes. The service sector institute estimates are lower than those from the BEEPS or *Regions of Russia*, and thus involve less adjustment of the NOBUS data. We employed least squares adjustment of the NOBUS data so that the weighted average over all of Russia in each sector is consistent with the national estimates we received from the specialist service sector research institutes in Russia. This process will give as a *structure* of ownership based on the NOBUS survey, with the economy-wide average by sector determined by the national data. Results are presented in table 12b.

¹⁷ We thank the service sectors institutes in Russia mentioned above for these estimates.

III. Policy Results

For each of our ten regional markets, we first discuss our central scenario (results are in table 13). In our central scenario, we assume that tariffs on goods are cut by fifty percent, that barriers to foreign direct investment are eliminated or reduced (depending on the sector) and that seven industrial sectors receive an improvement in their market access between 0.5% and 1.5%. See table 12a for details by sector. We present the overall welfare effects, the impact on wages and returns to capital, the changes in exports and the real exchange rate and factor adjustment costs. The gains come from a combination of effects, so we also estimate the comparative static impacts of the various components to WTO accession in order to assess their relative importance. We also decompose the results in the components of the gains to provide a transparent explanation of the results. Next we discuss the estimates of the impact at the level of productive sectors of the economy. In order to obtain an assessment of the adjustment costs, we estimate the percentage of mobile labor and capital that must change industries. We also conduct sensitivity analysis with respect to some key parameters and present these results. A key aspect of the sensitivity analysis is how the results differ when we assess the ability of different regions to attract FDI based on the ranking of their investment potential. The sensitivity analysis helps to provide insights into how the gains may differ across regions.

Welfare Effects of WTO Accession

In table 13a, we show that the weighted average of the welfare gains across all regions is 4.3 percent of GDP or 7.8 percent of consumption. By region, the welfare gains as a percent of GDP range from 3.1 percent in Tumen to 6.2 percent in the Northwest region. Except for Tumen, the gains as a percent of consumption range from 6.2 percent in the Urals regional market to 11.2 percent in the Northwest regional market. The gains to Tumen as a percent of consumption are much higher because a larger share of the GDP of Tumen is invested, so consumption is a smaller share of GDP.

In order to assess what is causing these results we have undertaken several additional simulations in which we allow only one of the components of our WTO scenario to change, while holding others constant. That is we evaluate separately the impact of complete removal of barriers to foreign direct investment in business services, but no other changes; the impact of an increase in market access alone; and a cut tariff barriers only.

Explaining Differences across Regions. While the average gain in welfare as a percent of GDP for the whole country is 4.3 percent, we estimate that three regions will gain considerably more: Northwest (6.2 percent), St. Petersburg (5.7 percent) and Far East (5.2 percent). The principal explanation for the differences across regions is the ability of the different regions to benefit from a reduction in

barriers against foreign direct investment. Some regions may attract FDI much more easily than others. A key parameter in our model is the initial share of multinational investment in each sector in each region. Multinational firms have widely different shares of the business services sectors in the different regions. A ten percent expansion of multinational firms will be a much larger absolute amount in a region that has substantial FDI initially. Thus, larger initial shares of FDI in a region will lead to larger absolute increases in FDI in the region when the barriers against FDI are reduced.

In table 12b, we display our estimates of the shares of the industry captured by multinational firms. The three regions with the largest welfare gains are clearly the regions with the estimated largest shares of multinational investment (along with a fourth region, the North region, which also gains substantially). All have estimated multinational shares of the service sector that are twice the national average in maritime services, rail services, truck services, air transportation services, telecommunications, science and financial services. On the other hand, we estimate that the Urals will gain only 3.3% of GDP, considerably less than the national average. But we see from table 12b that the Urals has relatively little FDI in the services sectors, as the Urals share of FDI ranges from about 50 to 70 percent of the national average depending on the sector.

Impact of Foreign Direct Investment Liberalization in Business Services. In this scenario, presented in table 13b, we reduce barriers against FDI in the services sectors according to the cuts in table 12, but there is no reduction in tariffs or improved market access. Russian commitments to reduce barriers against multinational service providers will allow multinationals to obtain greater after tax returns on their investments in Russia. This will encourage them to increase foreign direct investment to supply the Russian market. Although we expect some decline in the number of purely Russian owned businesses serving the services markets, on balance there will be additional service providers. Russian users of businesses services will then have improved access to the providers of services in areas like telecommunication, banking , insurance, transportation and other business services. We have referenced several empirical papers in the introduction which show that availability of a diverse set of service suppliers is crucial to the growth of countries as this should lower the cost of doing business and increase productivity of Russian firms using these services. We estimate that the gains to Russia from liberalization of barriers to FDI in services are about 6.7 percent of the value of Russian consumption or 3.7 percent of the value of GDP.

Impact of Improved Market Access. In table 13d, we present the results of a scenario in which we allow for improved market access (according to the terms of trade improvements of table 12), but we do not lower tariffs or barriers to FDI in services sectors. We estimate that the impact of improved market access at 0.3 percent of consumption (0.2% of GDP). The gains come from both improved prices for exports. But also a higher value for exports allows Russia to buy more imports and more varieties of imports increase productivity. The gains are quite small compared with the gains from liberalization of barriers against FDI in services. In part this is because the ad valorem equivalent of the barriers against FDI are much higher than the percentage improvement in market access, while Russia already has most-favored-nation (MFN) status or better on a bilateral or plurilateral basis with virtually all its trading partners.

Improved market access has a small but positive effect on all regions except Tumen. The reason the impact is negative for Tumen is that Tumen exports mainly oil and gas, products that do not gain from the improved market access. The improved market access results in greater exports for the economy, which has the effect of appreciating the real exchange rate, and thereby reducing the value of the principal exports of Tumen. This is analogous to the Dutch disease problem, except it is non-oil and gas exports that are hurting the oil and gas exports in this scenario.

Impact of Tariff Reduction. The results for this scenario are presented in table 13e. We lower tariffs by fifty percent, but there is no liberalization of the barriers to FDI or improved market access. The estimated welfare gains to the economy are 0.7 percent of consumption or 0.4 percent of GDP.

The gains to the economy from tariff reduction alone come about for two reasons. Tariff reduction in Russia will lead to improved domestic resource allocation since tariff reduction will induce Russia to shift production to sectors where production is valued more highly based on world market prices. This impact, known as the “gains from trade” is the fundamental effect from trade liberalization and is often stressed by international trade economists. In addition, Russian businesses will be able to more easily import a variety of modern technologies and this will increase Russian productivity.

Summary of Overall Welfare Effects. We observe that the reduction in barriers to FDI results in an improvement in Russian welfare on average across regions of 6.7 percent of consumption. Improved market access and tariff reduction contribute an improvement in Russian welfare by 0.3 percent and 0.7 percent, respectively, or a combined one percent. Thus, by far the most important effect derives from the reduction in barriers to FDI. We also simulate a reduction in the barriers to FDI in business

services of only fifty percent of the cuts we assume in our WTO scenario (shown in table 13c). The gains in Russian welfare are substantially reduced which again shows the importance of reducing barriers to FDI in order to increase Russian productivity and welfare.

Impact on the Productive Sectors

It is useful to discuss principles of sector analysis before discussing the results. Businessmen in Russia sometimes complain that the tariff or FDI barriers in their sector will decline and forecast that WTO accession could adversely impact on their sector. The initial effect of the tariff reduction is to induce an increase in the demand for imports, and this is the immediate impact that businessmen fear. But the rest of the world will not provide Russia with a “free lunch,” i.e., the increased imports have to be paid for by increased exports. The increased demand for imports raises the prices of foreign exchange (more technically, depreciates the real exchange rate) that in turn induces an increase in exports and a decrease in the quantity of imports. The real exchange rate depreciates until the value of the increase in exports equals the value of increased imports. The percentage change in the overall value of increased international exports is presented in the table 13a and equals 9.4 percent in our central scenario.¹⁸ The expansion of exports varies across regions ranging from a low of 2.8 percent from Tumen to a high of 23 percent from the Central region.¹⁹

Thus, not all sectors can decline since Russia has to pay for its imports with hard currency. It is not the absolute level of the tariff that is important for the impact of WTO accession on the sector; rather it is the impact of changes in protection on relative prices. The tariff reduction induces output expansion in many sectors because, first, tariff reduction reduces the costs of imported intermediate inputs, so the price of intermediate inputs may decline in many sectors. Second, and crucially, tariff reduction induces a depreciation in the real exchange rate.

Similarly, all regions within Russia must pay for their imports, from abroad or from other regions. Analogous to our national model, we assume that each region has a balance of trade constraint such that

¹⁸ The change in the value of international exports must equal the change in the value of international imports. Since international exports exceed international imports in the benchmark equilibrium, the percentage change in exports is smaller than the percentage change in imports.

¹⁹ Since the initial value of exports exceeds the initial value of imports in our data set, a smaller percentage increase in exports is equal in absolute dollar value to a larger percentage increase in imports.

any increase or decrease in imports is exactly matched by an increase or decrease in exports. Moreover, total employment in the region is unchanged by the trade or FDI policy changes. Thus, an expansion of employment in one sector must be offset by a decline in employment in another sector.

In tables 15-18, we present the estimated results in particular sectors and region. We present the results for the WTO overall scenario. Our WTO accession scenario involves a proportional reduction in all tariffs to one-half of their original level, improved market access and complete removal of barriers to FDI in services. Results are presented for output, exports, imports and employment of skilled and unskilled labor by sector. We discuss manufacturing and services sectors separately.

Expanding Manufacturing Sectors. Results for the manufacturing sectors that expand or contract depend on several industry characteristics. Sectors which are likely to expand are those that either: export a relatively large share of their output; obtain an exogenous increase in export prices as a result of WTO accession; are relatively unprotected initially compared to other sectors of the economy; or experience a significant reduction in the cost of their intermediate inputs, typically because they have a large share of intermediate inputs that come from sectors that produce additional varieties due to trade or FDI liberalization.

The manufacturing sectors that we estimate are likely to expand their output the most are ferrous metals, chemicals and non-ferrous metals.²⁰ These sectors are among the sectors that we assume will gain an exogenous increase in the price of its exports upon WTO accession. They are also among those that export the highest share of their output—they all export over thirty percent of the value of their output on

²⁰ In the Saint Petersburg, Northwest, Far East and North regions, we estimate a more substantial expansion of the business services sectors than in other regions, since, as explained above, these regions already experience more foreign direct investment relative to the other regions of the economy. The expansion of business services in these regions attracts labor and capital away from other sectors of the region, which explains why output of non-ferrous metals declines in the Northwest region (and slightly in the Saint Petersburg region). But non-ferrous metals is a rather small sector in those regions so it does not significantly detract from the economy-wide overall expansion of non-ferrous metals—which is equal to 61 billion rubles in 2001 rubles.

The estimated decline in the value of non-ferrous metals output in the Northwest and Saint Petersburg regions is 100 million rubles for the sum of the decline from the two regions. Since value-added is 308 billion rubles in Saint Petersburg and 152 billion in the Northwest region in 2001 rubles, this is only about two-tenths of one percent of the value added of the regions. Economy-wide, value-added of non-ferrous metals is 195 billion rubles in 2001, so these declines are only about one-half of one percent of the value-added of non-ferrous metals.

a national basis. Export intensity is important because a reduction in tariffs generally depreciates the real exchange rate (see Table 13 for estimates). Since the real exchange rate depreciates, sectors that export intensively will gain an increase in the value of their exports in terms of rubles.²¹

Declining Manufacturing Sectors. The sectors that contract the most are the sectors that are the most protected prior to tariff reduction and which have a relatively small share of exports. Most notably this includes food, machinery and equipment and construction materials. All of these sectors do little exporting and are among the sectors with tariff rates above ten percent. Textiles and apparel, with the highest tariff in the economy, also declines, but less significantly. But the export and import intensities vary across regions, so results differ across regions.

Business Services Sectors. Russian business and labor interests in these sectors are not the same, and we discuss the impact on labor in these sectors first. Our central estimates, shown in tables 16 and 17, are that skilled and unskilled employment will expand in several business services sectors, most notably telecommunications, truck transportation and railway transportation services. The reason is that as a result of a reduction in the barriers to foreign direct investment in these sectors, we estimate that there will be an expansion in the number of multinational firms who locate in Russia to provide business services from within Russia, and a contraction in the number of purely Russian firms. But multinationals also demand Russian labor, even though they use Russian labor slightly less intensively than Russian firms.²² But as more service firms enter the market, the quality adjusted price of services falls, and

²¹ Formally, there is no money in the model, so the value of exports increases in terms of the numeraire. The real exchange depreciates because the increased demand for imports accompanying the decline in tariffs induces an increase in the price of foreign exchange. In addition, the reduction in barriers to multinational investment in the services sector depreciates the real exchange rate. This is because multinationals use more foreign skilled labor, and they must pay in foreign exchange for the foreign skilled labor from domestic sales. The depreciation of the real exchange rate encourages exports and mutes the import expansion. The depreciated real exchange rate results in the export sectors having an increased incentive to export even if the tariffs in the export markets are unchanged. This is one of the primary reasons that international trade economists say that an import tariff is equivalent to a tax on exports. Given our view that Russia will neither give nor receive a free lunch from the rest of the world in the long run, we assume that there must be an increase in the value of exports to match the increase in the value of imports accompanying tariff reduction. The real exchange rate is the principal variable that induces the equilibrium between the change in imports and exports.

²² As discussed above, we have employed estimates of the share of expatriate labor used by multinationals provided by Russian research institutes in the services sectors. In general the share is small, from about 3 to 15 percent, depending on the sector. We perform sensitivity analysis, using the high and low estimates provided by the research institutes.

industries that use services expand their quantity demanded for business services. For telecommunications, truck transportation and railway transportation services, on balance, the increase in labor demand from the increase in the demand for business services exceeds the decline in labor demand from the substitution of multinational supply for Russian supply in the Russian market. Thus, we estimate that labor in these business services sectors will gain from an expansion in foreign direct investment and multinational provision of services in Russia.

These results are not uniform, however, as in maritime and financial services sectors we estimate a decline in employment. In these sectors the fact that multinationals use Russian labor less intensively dominates the impact of the greater use of business services.

Regarding capital, as a result of the removal of restrictions, we estimate there would be significant increase in foreign direct investment and an increase in multinational firms operating in Russia. Regarding Russian firms, we must be careful in interpreting what this means. As discussed above, we define joint ventures between Russian firms and multinationals as a multinational firm. An estimated decline in Russian firms does not mean their capital moved to other sectors or disappears. In many cases, it means the Russian firms have become joint venture partners with a multinational firm in the same sector. Multinationals will often look for Russian joint venture partners when they want to invest in Russia. Many Russian companies providing business services are likely to see this as a profitable opportunity and form joint ventures with multinationals. These Russian companies will become part of the expanding multinational share of the business services market. The Russian firms that become part of joint ventures with foreign investors will likely preserve or increase the value of their investments. Russian capital owners in business services who remain wholly independent of multinational firms, either because they avoid joint ventures or are not desired as joint venture partners, will likely see the value of their investments decline.

This suggests that domestic lobbying interests within a service sector are very diverse regarding FDI liberalization. We estimate that labor should find it in their interest to support FDI liberalization even if capital owners in the sector oppose it. But capital owners themselves may have diverse interests depending on their prospects for acquisition by multinationals.

IV. Sensitivity Analysis

Sensitivity to Investment Potential of the Regions

In our central scenario, results differ across regions due to a significant extent to the inherited FDI of the regions—the more existing FDI, the more the regions are capable of attracting new FDI for the same elasticities. In this scenario we augment the assessment of how regions may adapt and attract FDI based on the ranking of their investment potential. For investment potential ranking we use the rankings of Expert RA, which we explain in Appendix B. We use the investment potential rankings to adjust a parameter in our model (ϵ_{taf}) that reflects the responsiveness (elasticity) of foreign investment supply to an increase in the price of their product in the region. We assign higher values of ϵ_{taf} to regions with above average investment potential rankings and conversely for low investment potential rankings. We present these results in the first row of new results in table 19, where we also indicate how the elasticity ϵ_{taf} varies across regions based on the investment rankings.

The principal result is that the estimated gains for Moscow, St. Petersburg and Tumen increase and the estimated gains for Siberia, Northwest, North, Central and the Far East decline. Despite smaller estimated gains in this scenario, Far East and Northwest are still estimated to receive above average gains. The results suggest that the gains for a region could vary considerably depending on whether it succeeds in creating an atmosphere conducive to investment.

Sensitivity to Results to a 50% Cut in the Barriers to Foreign Direct Investment

We perform sensitivity analysis with respect to the extent of liberalization of barriers to foreign direct investment. In this scenario, we cut in the ad valorem tax equivalence of the barriers to FDI in the services sectors by 50 percent of the cut we executed in our central scenario. In this scenario, we allow for improved market access and a fifty percent cut in tariff barriers. We find that the gains to the economy are reduced to about 4.2 percent of consumption or 2.4 percent of GDP. St. Petersburg and the Northwest regions still are the regions that gain the most, but the ranking of gains among other regions changes slightly—reflecting different relative gains from FDI, versus tariff reduction or improved market access.

Piecemeal Sensitivity Analysis

In table 19, we present the impact on welfare of varying the value of key parameters. In these scenarios, we retain the central value of all parameters except the parameter in question. In general, the gains to the economy (welfare gains) increase with an increase in elasticities, since higher elasticities imply that the economy is able to more easily shift to sectors or products that are cheaper after trade and FDI liberalization.²³ There are two parameters in the table that have a strong impact on the results: the elasticity of substitution between value-added and business services (esubs) and the elasticity of multinational firm supply (etaf). A liberalization of the barriers to FDI will result in a reduction in the cost of business services, both from the direct effect of lowering the costs of doing business for multinational service providers and from the indirect effect that additional varieties of business services allow users to purchase a quality adjusted unit of services at less cost. When the elasticity of substitution between value-added and business services is high (esubs = 2 in table 19), users have the greater potential to substitute the cheaper business services and this increases productivity. The elasticity of multinational and Russian firm supply (etaf, etad) is primarily dependent on the sector specific factor for each firm type (foreign or domestic). When etaf is high, a reduction in the barriers to foreign direct investment results in a larger expansion in the number of multinational firms supplying the Russian market, and hence more gains from additional varieties of business services. In addition, the share of the services market captured by multinationals has a strong effect, since a liberalization results in a larger number of new varieties introduced.

V. Conclusions

These results are consistent with the themes of empirical work on multilateral trade liberalization that suggest that a country will generally gain more from its own liberalization than it gains from improved access to the markets of its trading partners. Improved market access is a gain to Russia but is quantitatively less important than its own tariff and FDI liberalization in terms of increases in Russian

²³ An increase in the elasticity of substitution between varieties reduces the welfare gain. This is because when varieties are good substitutes, additional varieties are worth less to firms and consumers.

welfare from WTO accession. In addition, we find that in the Russian context, liberalization of barriers to FDI are quantitatively more important than tariff liberalization. In part, this reflects the starting point of the analysis, in which we assess that Russia has done more to lower its tariffs on goods than it has to liberalize its barriers to FDI in services sectors. But it is also explained by the economic geography literature that suggests that access to a diverse set of service providers is crucial for growth.

Regional results in our central scenario differ mainly due to inherited FDI, where more existing FDI allows a region to more easily attract new FDI when barriers against FDI are relaxed. In our sensitivity analysis, we show that a better investment potential of a region will also lead to larger gains for a region. So creating a good investment climate can help a region gain more from WTO accession.

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Table 1. List of Sectors

1. Sectors where foreign direct investment from new multinational services providers is possible

RLW	Railway transportation
TRK	Truck transportation
PIP	Pipelines transportation
MAR	Maritime transportation
AIR	Air transportation
TRO	Other transportation
TMS	Telecommunications
SCI	Science & science servicing
FIN	Financial services

2. Sectors where new foreign firms may provide new goods from abroad

FME	Ferrous metallurgy
NFM	Non-ferrous metallurgy
CHM	Chemical & oil-chemical industry
MWO	Mechanical engineering & metal-working
TPP	Timber & woodworking & pulp & paper industry
CNM	Construction materials industry
FOO	Food industry
OTI	Other industries

3. Competitive sectors subject to constant returns to scale

HEA	Public services, culture and arts
AGR	Agriculture & forestry
COL	Coalmining
HOU	Housing and communal services
CON	Construction
ELE	Electric industry
GAS	Gas
CRU	Crude oil extraction
OIL	Oil refining and processing
OTH	Other goods-producing sectors
PST	Post
TRD	Wholesale and retail trade
CLI	Textiles and apparel

Table 2. List of Russian Regional Markets and Oblasts

Russian regional "markets" (markets are aggregates of oblasts defined below)

msc	Moscow	(msk,mos)
stp	Saint-Petersburg	(len,spb)
tmn	Tumenskaya	(tum,kha,yam)
vgd	Northwest	(vol,klg,nov,psk)
nor	North	(kpa,nen,krl,kom,arh,mur)
cen	Central	(bel,bry,vla,vor,iva,kal,kos,krs,lip,orl,rya,smo,tam,tve,tul,yar)
sou	South	(sar,ady,dag,ing,kab,klr,kar,sev,kdk,sta,ast,vlg,ros)
url	Urals	(mar,mor,tat,udm,chv,kir,niz,pen,ulo,ore,sam,bas,per,krk,sve,chl)
sib	Siberia	(alr,bur,tyv,hak,alt,irk,kem,nvs,tom,oms,eve,tai,ust,kra,sah,kam,mag,kor,chu)
far	Far East	(agi,chi,hab,amu,sao,pri,eao)

Oblasts (plus Republics, Territories, Federal Cities, Autonomous Regions, Autonomous Districts)

1. ady	Adygeya, The Republic of	46. mar	Mari El, The Republic of
2. agi	Aginsky Buryatsky Autonomous District	47. mor	Mordovia, The Republic of
3. alt	Altaisky krai	48. msk	Moscow city
4. alr	Altay Republic	49. mos	Moskovskaya
5. amu	Amurskaya	50. mur	Murmanskaya
6. arh	Arkhangelskaya	51. nen	Nenetsky Autonomous District
7. ast	Astrakhanskaya	52. niz	Nizhegorodskaya
8. bas	Bashkortostan, The Republic of	53. sev	North Osetia, The Republic of
9. bel	Belgorodskaya	54. nov	Novgorodskaya
10. bry	Bryanskaya	55. nvs	Novosibirskaya
11. bur	Buryatia, The Republic of	56. oms	Omskaya
12. chr	Chechnya (sou), The Republic of ^{*/}	57. ore	Orenburgskaya
13. chl	Chelyabinskaya	58. orl	Orlovskaya
14. chi	Chitinskaya	59. pen	Penzenskaya
15. chu	Chukotsky Autonomous District	60. per	Permskaya
16. chv	Chuvashia, The Republic of	61. pri	Primorsky krai
17. dag	Dagestan, The Republic of	62. psk	Pskovskaya
18. eve	Evenkiysky Autonomous District	63. ros	Rostovskaya
19. ing	Ingushetia, The Republic of	64. rya	Ryazanskaya
20. irk	Irkutskaya	65. spb	Saint Petersburg City
21. iva	Ivanovskaya	66. sah	Sakha, The Republic of
22. eao	Jewish Autonomous Region	67. sao	Sakhalinskaya
23. kab	Kabardino Balkaria, The Republic of	68. sam	Samarskaya
24. klg	Kaliningradskaya	69. sar	Saratovskaya
25. kal	Kaluzhskaya	70. smo	Smolenskaya
26. klr	Kalmykia, The Republic of	71. sta	Stavropolsky krai
27. kam	Kamchatskaya	72. sve	Sverdlovskaya
28. kar	Karachaevo Cherkessia, The Republic of	73. tai	Taimyrsky (Dolgano-Nenetsky) Autonomous District
29. krl	Karelia, The Republic of	74. tam	Tambovskaya
30. kem	Kemerovskaya	75. tat	Tatarstan, The Republic of
31. hab	Khabarovsk krai	76. tom	Tomskaya
32. hak	Khakasia, The Republic of	77. tul	Tulskaya
33. kha	Khanty-Mansiysky Autonomous District	78. tum	Tumenskaya
34. kir	Kirovskaya	79. tve	Tverskaya
35. kom	Komi, The Republic of	80. tyv	Tyva, The Republic of
36. kpa	Komi-Permyatsky Autonomous District	81. udm	Udmurtia, The Republic of
37. kor	Koryaksky Autonomous District	82. ulo	Ulyanovskaya
38. kos	Kostromskaya	83. ust	Ust-ordynsky Buryatsky Autonomous District
39. kdk	Krasnodarsky krai	84. vla	Vladimirskaya
40. kra	Krasnoyarsky krai	85. vlg	Volgogradskaya
41. krg	Kurganskaya	86. vol	Vologodskaya
42. krs	Kurskaya	87. vor	Voronezhskaya
43. len	Leningradskaya	88. yam	Yamalo-Nenetsky Autonomous District
44. lip	Lipetskaya	89. yar	Yaroslavskaya
45. mag	Maganskaya		

^{*/} No data.

Table 3. Value Added in 2000 by Russian Regional Market and by Sector(in billions of 2001 rubles) ^{a/}

Sector ^{b/}	Central	Far East	North	Siberia	South	Urals	Moscow	St. Petersb.	Tumen	North- west	Sector total
MAR	4.7	1.3	1.4	7.2	4.1	14.7	4.0	1.7	6.9	1.0	47.1
AGR	110.2	17.5	7.4	84.8	125.2	155.3	15.2	11.8	8.2	15.1	550.7
AIR	3.6	1.3	1.0	5.3	4.5	10.0	14.9	1.6	2.5	0.6	45.2
CHM	13.9	0.3	1.6	10.6	9.3	35.6	7.7	2.0	0.1	4.2	85.4
CNM	10.3	1.1	0.7	4.6	6.7	12.2	8.8	2.4	0.8	0.7	48.2
COL	0.1	5.2	3.2	32.6	1.7	1.2					43.9
CON	76.4	7.1	6.1	54.7	105.2	151.6	138.6	29.7	24.1	11.4	605.0
CRU		4.5	16.9	9.9	37.7	97.5			282.9	1.0	450.3
ELE	26.7	7.8	7.1	34.7	22.9	62.9	42.9	10.5	19.1	5.8	240.4
FIN	43.5	16.4	14.3	60.7	44.0	106.8	115.7	20.8	47.0	9.0	478.0
FME	19.0	0.5	1.6	9.0	3.9	33.8	2.3	1.1		11.3	82.5
FOO	24.9	9.2	3.7	17.4	24.0	28.1	33.9	17.7	0.5	4.7	164.2
GAS		0.2	0.4	0.5	1.5	2.8			52.2	0.0	57.5
HEA	42.3	17.5	14.6	58.8	45.0	100.6	126.3	21.8	40.6	8.9	476.4
HOU	22.1	8.8	6.7	29.1	24.8	50.9	68.0	11.2	13.7	4.6	239.8
MWO	38.7	11.2	2.6	19.4	18.0	101.8	45.4	18.9	3.0	3.6	262.7
NFM	2.5	8.1	9.3	113.2	4.8	46.0	7.1	4.4		0.2	195.5
OIL	12.2	4.7	1.5	17.4	10.1	39.2	4.4	7.2	3.9		100.6
OTH	7.7	2.0	2.2	8.8	4.9	18.4	6.3	3.3	7.4	1.9	62.8
OTI	13.6	0.6	0.7	2.5	4.0	9.2	9.9	2.6	0.1	0.9	44.0
PIP	1.5	0.5	0.5	2.0	1.7	5.4	1.2	0.7	5.2	0.2	18.7
PST	2.7	1.0	0.8	3.5	2.9	6.3	6.8	1.3	2.8	0.6	28.7
RLW	23.5	6.9	6.3	30.2	20.5	53.8	34.5	9.4	16.1	6.2	207.3
SCI	8.8	3.2	2.4	10.4	7.8	22.6	16.5	4.1	9.8	1.5	87.0
TMS	7.6	2.8	2.2	10.1	8.3	18.7	21.1	3.6	7.4	1.5	83.3
TPP	6.8	4.4	15.1	13.1	2.6	13.0	6.8	7.3	0.6	4.2	73.9
TRD	205.4	78.2	67.0	300.6	223.3	535.3	456.6	101.6	386.8	48.2	2,402.9
TRK	10.2	3.5	3.1	13.6	11.3	24.6	23.0	4.7	12.9	2.2	109.2
TRO	4.5	1.5	1.3	5.7	5.1	11.2	10.7	2.0	5.7	0.9	48.7
CLI	3.8	1.6	1.2	5.0	4.4	8.6	12.9	2.0	1.9	0.8	42.3
Market total	747.2	228.8	202.7	975.2	790.0	1,778.0	1,241.5	305.6	962.3	151.1	7,382.4

^{a/} Value added defined here does not include taxes.^{b/} Sector codes are in Table 1, oblasts in the markets are listed in Table 2.

Source: Regions of Russia, Roskomstat, and authors' calculations.

Table 4. Value-Added by Sector as a percent of the Value-Added of the Regional Market

Sector	Central	Far East	North	Siberia	South	Urals	Moscow	St. Petersburg	Tumen	North-west
MAR	0.6	0.6	0.7	0.7	0.5	0.8	0.3	0.6	0.7	0.6
AGR	14.8	7.6	3.7	8.7	15.8	8.7	1.2	3.9	0.9	10.0
AIR	0.5	0.6	0.5	0.5	0.6	0.6	1.2	0.5	0.3	0.4
CHM	1.9	0.1	0.8	1.1	1.2	2.0	0.6	0.7	0.0	2.8
CNM	1.4	0.5	0.4	0.5	0.8	0.7	0.7	0.8	0.1	0.4
COL	0.0	2.3	1.6	3.3	0.2	0.1				
CON	10.2	3.1	3.0	5.6	13.3	8.5	11.2	9.7	2.5	7.6
CRU		1.9	8.3	1.0	4.8	5.5			29.4	0.7
ELE	3.6	3.4	3.5	3.6	2.9	3.5	3.5	3.5	2.0	3.9
FIN	5.8	7.2	7.0	6.2	5.6	6.0	9.3	6.8	4.9	5.9
FME	2.5	0.2	0.8	0.9	0.5	1.9	0.2	0.4		7.5
FOO	3.3	4.0	1.8	1.8	3.0	1.6	2.7	5.8	0.1	3.1
GAS		0.1	0.2	0.0	0.2	0.2			5.4	0.0
HEA	5.7	7.6	7.2	6.0	5.7	5.7	10.2	7.1	4.2	5.9
HOU	3.0	3.8	3.3	3.0	3.1	2.9	5.5	3.7	1.4	3.0
MWO	5.2	4.9	1.3	2.0	2.3	5.7	3.7	6.2	0.3	2.4
NFM	0.3	3.5	4.6	11.6	0.6	2.6	0.6	1.4		0.1
OIL	1.6	2.1	0.8	1.8	1.3	2.2	0.4	2.4	0.4	
OTH	1.0	0.9	1.1	0.9	0.6	1.0	0.5	1.1	0.8	1.2
OTI	1.8	0.2	0.3	0.3	0.5	0.5	0.8	0.8	0.0	0.6
PIP	0.2	0.2	0.2	0.2	0.2	0.3	0.1	0.2	0.5	0.1
PST	0.4	0.4	0.4	0.4	0.4	0.4	0.6	0.4	0.3	0.4
RLW	3.1	3.0	3.1	3.1	2.6	3.0	2.8	3.1	1.7	4.1
SCI	1.2	1.4	1.2	1.1	1.0	1.3	1.3	1.4	1.0	1.0
TMS	1.0	1.2	1.1	1.0	1.0	1.1	1.7	1.2	0.8	1.0
TPP	0.9	1.9	7.5	1.3	0.3	0.7	0.5	2.4	0.1	2.8
TRD	27.5	34.2	33.0	30.8	28.3	30.1	36.8	33.3	40.2	31.9
TRK	1.4	1.5	1.5	1.4	1.4	1.4	1.9	1.5	1.3	1.5
TRO	0.6	0.7	0.7	0.6	0.6	0.6	0.9	0.7	0.6	0.6
CLI	0.5	0.7	0.6	0.5	0.6	0.5	1.0	0.7	0.2	0.5
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

See Table 1 for sector codes.

Source: Regions of Russia, Roskomstat.

Table 5. Share of Sector Value-Added by Regional Market of Russia

(in percent)

Good	Central	Far East	North	Siberia	South	Urals	Moscow	St. Petersb.	Tumen	North- west	Sector Total
MAR	10.0	2.8	2.9	15.2	8.8	31.3	8.5	3.7	14.7	2.0	100.0
AGR	20.0	3.2	1.3	15.4	22.7	28.2	2.8	2.1	1.5	2.7	100.0
AIR	7.9	2.8	2.1	11.6	10.0	22.1	32.9	3.6	5.5	1.4	100.0
CHM	16.3	0.4	1.8	12.4	10.9	41.6	9.1	2.4	0.1	4.9	100.0
CNM	21.3	2.3	1.5	9.6	13.9	25.2	18.2	4.9	1.6	1.4	100.0
COL	0.3	11.8	7.3	74.2	3.8	2.7					100.0
CON	12.6	1.2	1.0	9.0	17.4	25.1	22.9	4.9	4.0	1.9	100.0
CRU		1.0	3.7	2.2	8.4	21.7			62.8	0.2	100.0
ELE	11.1	3.2	2.9	14.4	9.5	26.2	17.9	4.4	7.9	2.4	100.0
FIN	9.1	3.4	3.0	12.7	9.2	22.3	24.2	4.4	9.8	1.9	100.0
FME	23.0	0.6	1.9	10.9	4.8	40.9	2.8	1.4		13.7	100.0
FOO	15.2	5.6	2.2	10.6	14.6	17.1	20.6	10.8	0.3	2.8	100.0
GAS		0.3	0.7	0.8	2.5	4.8			90.8	0.0	100.0
HEA	8.9	3.7	3.1	12.3	9.4	21.1	26.5	4.6	8.5	1.9	100.0
HOU	9.2	3.7	2.8	12.1	10.3	21.2	28.4	4.7	5.7	1.9	100.0
MWO	14.7	4.3	1.0	7.4	6.8	38.8	17.3	7.2	1.1	1.4	100.0
NFM	1.3	4.1	4.7	57.9	2.5	23.6	3.6	2.2		0.1	100.0
OIL	12.1	4.7	1.5	17.3	10.0	38.9	4.4	7.2	3.9		100.0
OTH	12.3	3.2	3.6	14.0	7.8	29.3	10.0	5.2	11.7	3.0	100.0
OTI	30.8	1.3	1.6	5.7	9.1	20.9	22.5	5.8	0.2	2.1	100.0
PIP	7.8	2.7	2.5	10.5	8.9	28.9	6.4	3.6	27.7	1.0	100.0
PST	9.3	3.5	2.8	12.2	10.1	22.0	23.9	4.5	9.9	1.9	100.0
RLW	11.3	3.3	3.0	14.6	9.9	25.9	16.6	4.5	7.8	3.0	100.0
SCI	10.1	3.6	2.8	11.9	8.9	26.0	18.9	4.7	11.3	1.7	100.0
TMS	9.1	3.3	2.7	12.1	9.9	22.4	25.3	4.3	8.9	1.8	100.0
TPP	9.3	5.9	20.5	17.8	3.5	17.6	9.2	9.8	0.8	5.7	100.0
TRD	8.5	3.3	2.8	12.5	9.3	22.3	19.0	4.2	16.1	2.0	100.0
TRK	9.3	3.2	2.8	12.5	10.4	22.6	21.1	4.3	11.8	2.0	100.0
TRO	9.2	3.1	2.7	11.7	10.5	23.0	21.9	4.2	11.8	1.9	100.0
CLI	9.0	3.7	2.8	11.7	10.5	20.4	30.6	4.7	4.6	1.9	100.0
Total	329.2	99.4	96.2	453.3	284.4	734.1	465.5	128.4	340.9	68.7	3000.0

Source: Regions of Russia and authors calculations.

Table 6: Exports by Product and by Regional Market (in billions of 2001 rubles)

Good	Central	Far East	North	Siberia	South	Urals	Moscow	St. Petersb.	Tumen	North- west
MAR	4.9	1.7	1.7	7.1	4.5	13.7	4.3	2.2	6.9	1.2
AGR	3.1	0.5	0.2	2.4	3.5	4.4	0.4	0.3	0.2	0.4
AIR	5.6	2.4	1.8	7.6	6.8	13.2	18.9	3.0	4.4	1.2
CHM	27.5	0.5	2.0	33.2	18.2	92.0	13.7	5.0	0.3	15.2
CNM	1.8	0.2	0.1	1.7	1.2	3.4	1.6	0.6	0.2	0.2
COL	0.1	4.2	2.6	26.4	1.3	0.9				
CON	4.0	0.4	0.3	2.9	5.6	8.0	7.3	1.6	1.3	0.6
CRU		7.1	27.0	15.8	60.3	156.1			452.8	1.6
ELE	1.1	0.3	0.3	1.4	1.0	2.6	1.8	0.4	0.8	0.2
FIN	0.7	0.3	0.2	0.9	0.7	1.6	1.8	0.3	0.7	0.1
FME	50.5	1.1	3.7	22.4	11.1	83.8	7.1	4.8		28.3
FOO	8.7	9.7	2.5	12.6	23.1	10.1	27.0	9.2	0.1	3.6
GAS		1.4	3.1	3.6	11.5	21.8			410.7	0.0
HEA	0.3	0.1	0.1	0.4	0.3	0.6	0.8	0.1	0.2	0.1
HOU	0.3	0.1	0.1	0.4	0.3	0.6	0.8	0.1	0.2	0.1
MWO	22.8	14.2	1.9	43.0	23.3	97.0	95.5	30.4	1.9	5.0
NFM	4.6	15.1	18.4	203.1	11.1	101.6	17.2	11.3		0.6
OIL	35.5	13.7	4.5	50.9	29.5	114.4	12.8	21.1	11.5	
OTH	1.7	0.4	0.5	1.9	1.1	4.0	1.4	0.7	1.6	0.4
OTI	7.2	0.3	0.4	1.3	2.1	4.9	5.3	1.4	0.0	0.5
PST	0.3	0.1	0.1	0.5	0.4	0.8	0.9	0.2	0.4	0.1
RLW	0.9	0.3	0.2	1.1	0.8	2.0	1.3	0.3	0.6	0.2
SCI	0.6	0.2	0.2	0.7	0.5	1.6	1.1	0.3	0.7	0.1
TMS	0.9	0.3	0.3	1.2	1.0	2.1	2.4	0.4	0.9	0.2
TPP	3.1	17.1	29.2	35.1	1.7	13.3	2.1	12.7	0.4	8.1
TRD	2.0	0.8	0.7	3.0	2.2	5.3	4.5	1.0	3.9	0.5
TRK	0.4	0.1	0.1	0.5	0.4	0.9	0.9	0.2	0.5	0.1
TRO	0.5	0.2	0.2	0.7	0.6	1.3	1.2	0.2	0.7	0.1
CLI	2.6	1.1	0.8	3.4	3.1	6.0	9.0	1.4	1.3	0.5

See Tables 1 and 2 for sector and region definitions.

Source: Roskomstat unpublished surveys and authors' calculations.

Table 7. Sector Exports as a Percent of Total Exports of the Regional Market

Good	Central	Far East	North	Siberia	South	Urals	Moscow	St. Petersburg	Tumen	North-west
MAR	3	2	2	1	2	2	2	2	1	2
AGR	2	1	0	0	2	1	0	0	0	1
AIR	3	3	2	2	3	2	8	3	0	2
CHM	14	1	2	7	8	12	6	5	0	22
CNM	1	0	0	0	1	0	1	1	0	0
COL	0	4	3	5	1	0				
CON	2	0	0	1	2	1	3	1	0	1
CRU		8	26	3	27	20			50	2
ELE	1	0	0	0	0	0	1	0	0	0
FIN	0	0	0	0	0	0	1	0	0	0
FME	26	1	4	5	5	11	3	4		41
FOO	5	10	2	3	10	1	11	8	0	5
GAS		2	3	1	5	3			45	0
HEA	0	0	0	0	0	0	0	0	0	0
HOU	0	0	0	0	0	0	0	0	0	0
MWO	12	15	2	9	10	13	40	28	0	7
NFM	2	16	18	42	5	13	7	10		1
OIL	19	15	4	10	13	15	5	19	1	
OTH	1	0	0	0	0	1	1	1	0	1
OTI	4	0	0	0	1	1	2	1	0	1
PST	0	0	0	0	0	0	0	0	0	0
RLW	0	0	0	0	0	0	1	0	0	0
SCI	0	0	0	0	0	0	0	0	0	0
TMS	0	0	0	0	0	0	1	0	0	0
TPP	2	18	28	7	1	2	1	12	0	12
TRD	1	1	1	1	1	1	2	1	0	1
TRK	0	0	0	0	0	0	0	0	0	0
TRO	0	0	0	0	0	0	1	0	0	0
CLI	1	1	1	1	1	1	4	1	0	1
Total	100	100	100	100	100	100	100	100	100	100

See Tables 1 and 2 for sector and region definitions.

Source: Roskomstat unpublished surveys and authors' calculations.

Table 8. Sector Export Intensities by Regional Market: Exports of the Sector as a Percent of Production of the Sector (in percent)

Good	Central	Far East	North	Siberia	South	Urals	Moscow	St. Petersb.	Tumen	North- west
MAR	53	57	57	51	53	50	54	57	51	57
AGR	1	1	1	1	1	1	1	1	1	1
AIR	46	48	48	44	45	43	43	48	47	48
CHM	27	21	17	48	27	37	24	35	40	57
CNM	3	3	3	6	3	5	3	4	4	7
COL	23	23	23	23	23	23				
CON	3	3	3	3	3	3	3	3	3	3
CRU		56	56	56	56	56			56	56
ELE	2	2	2	2	2	2	2	2	2	2
FIN	1	1	1	1	1	1	1	1	1	1
FME	40	35	34	37	43	37	48	75		37
FOO	4	12	8	8	11	4	9	6	3	9
GAS		27	27	27	27	27			27	27
HEA	0	0	0	0	0	0	0	0	0	0
HOU	1	1	1	1	1	1	1	1	1	1
MWO	11	25	14	48	25	18	45	32	12	27
NFM	44	45	48	43	58	55	62	67		79
OIL	32	32	32	32	32	32	32	32	32	
OTH	12	12	12	12	12	12	12	12	12	12
OTI	15	15	15	15	15	15	15	15	15	15
PST	9	9	9	9	9	9	9	9	9	9
RLW	2	2	2	2	2	2	2	2	2	2
SCI	3	3	3	3	3	3	3	3	3	3
TMS	7	7	7	7	7	7	7	7	7	7
TPP	7	77	33	48	11	17	5	30	12	33
TRD	1	1	1	1	1	1	1	1	1	1
TRK	2	2	2	2	2	2	2	2	2	2
TRO	5	5	5	5	5	5	5	5	5	5
CLI	11	11	11	11	11	11	11	11	11	11
Total	364	534	474	545	488	477	397	459	357	510

See Tables 1 and 2 for sector and region definitions.

Source: Roskomstat unpublished surveys and authors' calculations.

Table 9: Imports by Product and by Regional Market (in x 2001 rubles)

Good	Central	Far East	North	Siberia	South	Urals	Moscow	St. Petersb.	Tumen	North- west
AGR	4.6	1.4	0.8	4.3	5.0	7.6	7.9	2.0	1.3	0.8
AIR	0.3	0.1	0.1	0.4	0.3	0.6	0.9	0.1	0.2	0.1
CHM	12.5	4.0	2.8	18.8	9.7	25.5	47.9	8.9	4.9	3.6
CNM	2.7	0.5	0.4	3.3	2.8	4.6	11.6	2.2	0.8	0.7
COL	0.6	0.2	0.2	1.3	0.4	1.2	0.6	0.2	0.2	0.2
CON	8.0	4.0	3.4	10.2	10.0	20.4	15.3	4.7	16.4	1.7
CRU	1.5	0.6	0.2	2.2	1.4	5.1	0.6	0.9	1.1	0.0
ELE	0.3	0.1	0.1	0.4	0.3	0.8	0.5	0.1	0.2	0.1
FIN	1.6	0.6	0.5	2.2	1.6	3.7	4.2	0.8	1.7	0.3
FME	9.5	1.2	0.8	3.1	7.8	11.7	13.4	4.3	2.9	2.8
FOO	19.1	7.2	3.0	14.4	17.9	25.3	79.1	36.2	4.2	7.7
GAS	0.1	0.0	0.0	0.1	0.1	0.3	0.2	0.0	0.2	0.0
HEA	0.9	0.4	0.3	1.3	1.0	2.3	2.8	0.5	0.9	0.2
HOU	3.5	1.4	1.1	4.6	3.9	8.0	10.7	1.8	2.2	0.7
MWO	35.8	14.3	8.2	18.0	31.1	60.3	198.5	49.6	20.1	10.9
NFM	3.9	2.1	1.5	13.2	4.7	10.9	9.2	3.5	2.2	1.2
OIL	4.1	1.1	1.0	4.5	4.0	9.0	6.4	1.6	3.3	0.8
OTH	1.7	0.6	0.5	2.2	1.7	4.1	3.7	0.8	2.0	0.4
OTI	1.2	0.3	0.2	1.1	1.1	2.1	1.5	0.4	0.6	0.2
PST	0.1	0.0	0.0	0.1	0.1	0.2	0.2	0.0	0.1	0.0
RLW	0.1	0.0	0.0	0.2	0.1	0.3	0.3	0.1	0.2	0.0
SCI	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0
TMS	0.8	0.3	0.2	1.0	0.8	1.8	2.0	0.4	0.7	0.2
TPP	2.7	0.6	1.1	0.7	3.6	2.0	22.1	7.3	0.1	2.8
TRD	1.0	0.4	0.3	1.5	1.1	2.6	2.4	0.5	1.5	0.2
TRK	0.4	0.1	0.1	0.5	0.4	0.9	0.9	0.2	0.5	0.1
TRO	0.1	0.0	0.0	0.2	0.2	0.3	0.3	0.1	0.2	0.0
CLI	25	10	8	32	29	56	84	13	13	5
Total	142	52	35	142	140	268	528	140	81	41

See Tables 1 and 2 for sector and region definitions.

Source: Roskomstat unpublished surveys and authors' calculations.

Table 10. Sector Imports as a Percent of Total Imports of the Regional Market

Good	Central	Far East	North	Siberia	South	Urals	Moscow	St. Petersburg	Tumen	North-west
AGR	3	3	2	3	4	3	1	1	2	2
AIR	0	0	0	0	0	0	0	0	0	0
CHM	9	8	8	13	7	10	9	6	6	9
CNM	2	1	1	2	2	2	2	2	1	2
COL	0	0	1	1	0	0	0	0	0	1
CON	6	8	10	7	7	8	3	3	20	4
CRU	1	1	1	2	1	2	0	1	1	0
ELE	0	0	0	0	0	0	0	0	0	0
FIN	1	1	2	2	1	1	1	1	2	1
FME	7	2	2	2	6	4	3	3	4	7
FOO	13	14	9	10	13	9	15	26	5	19
GAS	0	0	0	0	0	0	0	0	0	0
HEA	1	1	1	1	1	1	1	0	1	0
HOU	2	3	3	3	3	3	2	1	3	2
MWO	25	28	23	13	22	23	38	35	25	27
NFM	3	4	4	9	3	4	2	2	3	3
OIL	3	2	3	3	3	3	1	1	4	2
OTH	1	1	1	2	1	2	1	1	2	1
OTI	1	1	1	1	1	1	0	0	1	0
PST	0	0	0	0	0	0	0	0	0	0
RLW	0	0	0	0	0	0	0	0	0	0
SCI	0	0	0	0	0	0	0	0	0	0
TMS	1	1	1	1	1	1	0	0	1	0
TPP	2	1	3	1	3	1	4	5	0	7
TRD	1	1	1	1	1	1	0	0	2	1
TRK	0	0	0	0	0	0	0	0	1	0
TRO	0	0	0	0	0	0	0	0	0	0
CLI	17	20	22	23	21	21	16	9	15	13
Total	142	52	35	142	140	268	528	140	81	41

See Tables 1 and 2 for sector and region definitions.

Source: Roskomstat unpublished surveys and authors' calculations.

Table 11. Sector Import Intensities by Regional Market: Regional Imports of the Sector as a Percent of Regional Consumption of the Product

Good	Central	Far East	North	Siberia	South	Urals	Moscow	St. Petersburg	Tumen	North-west
AGR	4	4	4	4	4	4	4	4	4	4
AIR	3	3	3	3	3	3	3	3	3	3
CHM	35	36	30	47	29	33	74	58	19	57
CNM	13	16	13	18	10	11	29	25	8	20
COL	7	7	7	7	7	7	7	7	7	7
CON	8	8	8	8	8	8	8	8	8	8
CRU	5	5	5	5	5	5	5	5	5	5
ELE	1	1	1	1	1	1	1	1	1	1
FIN	1	1	1	1	1	1	1	1	1	1
FME	32	17	19	14	36	17	38	37	25	75
FOO	25	23	13	15	20	15	31	94	10	50
GAS	2	2	2	2	2	2	2	2	2	2
HEA	1	1	1	1	1	1	1	1	1	1
HOU	8	8	8	8	8	8	8	8	8	8
MWO	36	37	24	15	27	26	98	100	16	53
NFM	16	40	41	96	35	23	39	41	23	25
OIL	8	8	8	8	8	8	8	8	8	8
OTH	19	19	19	19	19	19	19	19	19	19
OTI	7	6	6	6	6	6	7	7	6	6
PST	2	2	2	2	2	2	2	2	2	2
RLW	0	0	0	0	0	0	0	0	1	0
SCI	0	0	0	0	0	0	0	0	0	0
TMS	6	6	6	6	6	6	6	6	6	6
TPP	13	11	28	4	19	5	60	83	1	78
TRD	0	0	0	0	0	0	0	0	0	0
TRK	2	2	2	2	2	2	2	2	2	2
TRO	1	1	1	1	1	1	1	1	1	1
CLI	73	73	73	73	73	73	73	73	73	73
Total	142	52	35	142	140	268	528	140	81	41

See Tables 1 and 2 for sector and region definitions.

Source: Roskomstat unpublished surveys and authors' calculations.

Table 12a. Tariff Rates, Export Tax Rates, Estimated Ad Valorem Equivalence of Barriers to FDI in Services Sectors and Estimated Improved Market Access
(ad-valorem in %) -- by sector

	Tariff rates	Export tax rates	Estimated change in world market price	Equivalent % barriers to FDI	
				Post-WTO Base Year	Accession
Electric industry	2.6	0.0	0.0		
Oil extraction	0.0	7.9	0.0		
Oil processing	4.5	4.6	0.0		
Gas	5.0	18.8	0.0		
Coalmining	2.2	0.0	0.0		
Other fuel industries	5.0	2.6	0.0		
Ferrous metallurgy	5.9	0.4	1.5		
Non-ferrous metallurgy	8.5	5.3	1.5		
Chemical & oil-chemical industry	7.5	1.6	1.5		
Mechanical engineering & metal-working	10.7	0.0	0.0		
Timber & woodworking & pulp & paper industry	13.5	6.9	0.0		
Construction materials industry	12.0	1.6	0.0		
Textiles and Apparel	16.8	4.1	0.5		
Food industry	14.1	3.1	0.5		
Other industries	12.4	0.0	0.5		
Agriculture & forestry	8.4	0.6	0.0		
Other goods-producing sectors	14.6	0.0	0.5		
Telecommunications				33.0	0.0
Science & science servicing (market)				33.0	0.0
Financial services				36.0	0.0
Railway transportation				33.0	0.0
Truck transportation				33.0	0.0
Pipelines transportation				33.0	0.0
Maritime transportation				95.0	80.0
Air transportation				90.0	75.0
Other transportation				33.0	0.0

Source: Tarr, Shepotylo and Koudoyarov (2005) for tariff rates; Kimura et al. (2004a,b,c) for barriers to FDI; Roskomstat for export tax rates; authors' estimates for change in world market prices.

Table 12b. Shares of Business Services Sectors in the Regions of Russia Captured by Multinational Firms (ad-valorem in %) -- by sector

	Maritime	Rail	Truck	Pipeline	Air	Other Transp.	Telecom	Science	Financial
Moscow	0.47	0.02	0.03	0.06	0.11	0.02	0.08	0.07	0.13
St. Petersburg	0.70	0.06	0.10	0.06	0.50	0.08	0.30	0.20	0.18
Tumen	0.29	0.04	0.05	0.01	0.46	0.04	0.20	0.12	0.08
Northwest	0.70	0.06	0.10	0.06	0.50	0.08	0.30	0.20	0.20
North	0.70	0.06	0.10	0.06	0.50	0.08	0.30	0.20	0.20
Central	0.41	0.03	0.07	0.05	0.35	0.05	0.20	0.09	0.09
South	0.46	0.04	0.06	0.05	0.30	0.05	0.19	0.10	0.09
Urals	0.15	0.02	0.03	0.02	0.16	0.03	0.09	0.07	0.04
Siberia	0.28	0.02	0.05	0.03	0.26	0.04	0.15	0.09	0.07
Far East	0.70	0.06	0.10	0.06	0.50	0.08	0.30	0.20	0.20
National average	0.35	0.03	0.05	0.03	0.25	0.04	0.15	0.10	0.10

Table 13a. Impact of WTO Accession on Regional Markets (% change from base year)

	Overall average	Moscow	St. Peters.	Tumen	North- west	North	Central	South	Urals	Siberia	Far East
Aggregate welfare											
Welfare (EV as % of consumption)	7.8	7.0	10.6	13.8	11.2	9.8	7.6	8.3	6.2	7.6	9.7
Welfare (EV as % of GDP)	4.3	4.7	5.7	3.1	6.2	4.7	4.2	4.7	3.3	4.2	5.2
Aggregate trade											
Regional terms of trade (% change)	3.3	4.9	6.4	4.4	6.1	5.2	4.8	4.4	3.7	3.6	5.4
Regional exports (% change)	1.9	2.6	2.1	1.8	2.1	2.2	2.2	1.7	1.6	1.6	2.4
Real exchange rate (% change)	2.5	2.6	3.4	2.7	2.9	2.7	2.8	2.8	1.9	1.9	3.0
International exports (% change)	9.4	13.3	19.1	2.8	17.3	7.7	23.0	10.9	10.8	8.0	11.1
Return to primary factors (% change)											
Unskilled labor	4.1	4.7	6.6	4.2	6.1	5.5	3.8	4.9	2.5	4.1	6.2
Skilled labor	4.2	3.5	7.4	3.8	7.2	5.7	5.3	5.1	2.9	4.4	6.9
National capital	4.0	4.2	4.9	4.2	4.4	4.2	4.4	4.3	3.4	3.4	4.6
Regional mobile capital	6.5	6.6	10.2	5.4	10.2	7.6	6.9	6.5	5.5	6.1	8.0
Crude oil resources	4.9			5.6	4.1	5.3		5.4	2.9	2.8	5.9
Natural gas resources	1.8			2.9	-17.2	-9.1		-5.0	-9.9	-12.3	-9.1
Coal resources	10.8					14.1	13.7	13.6	10.6	9.8	14.2
Specific capital in domestic firms	-24.7	-32.3	-26.4	-47.5	-23.7	-27.4	-19.7	-26.3	-18.6	-21.0	-30.4
Specific capital in multinational firms	101.4	60.4	45.6	228.1	79.2	148.3	116.6	130.6	144.1	165.2	118.0
Factor adjustments											
Unskilled labor (% changing sectors)	2.3	2.1	3.2	1.5	4.2	2.1	2.6	1.7	2.3	2.1	2.8
Skilled labor (% changing sector)	2.5	2.6	3.9	1.9	4.1	2.5	2.9	2.0	2.4	2.4	3.2

Source: Authors' calculations.

Table 13b. Impact of Full Foreign Direct Investment Liberalization in Services on Regional Markets: Welfare, Trade and Factor Market Effects

(% change from base year)

	Average	Moscow	St. Peters.	Tumen	North-west	North	Central	South	Urals	Siberia	Far East
Aggregate welfare											
Welfare (EV as % of consumption)	6.7	5.5	8.4	11.5	9.0	8.9	7.3	7.2	5.9	6.8	8.4
Welfare (EV as % of GDP)	3.7	3.8	4.5	2.6	5.0	4.3	4.1	4.1	3.2	3.8	4.5
Aggregate trade											
Regional terms of trade (% change)	1.7	2.1	2.9	3.1	3.1	3.1	2.1	2.0	1.7	1.9	2.9
Regional exports (% change)	1.8	2.1	1.8	2.0	1.6	2.2	1.4	1.5	1.5	1.9	2.0
Real exchange rate (% change)	1.1	1.0	1.6	1.6	1.4	1.6	1.2	1.2	0.8	1.2	1.5
International exports (% change)	2.9	5.1	5.5	2.5	5.6	3.1	5.2	2.6	1.8	2.3	4.1
Return to primary factors (% change)											
Unskilled labor	3.3	2.6	5.1	3.0	4.5	5.0	3.5	3.7	2.5	3.5	5.3
Skilled labor	2.1	0.9	3.9	2.5	4.2	4.3	2.6	2.6	1.2	2.5	4.3
National capital	2.1	1.9	2.6	2.5	2.4	2.6	2.1	2.1	1.8	2.1	2.4
Regional mobile capital	3.8	3.4	5.6	3.9	5.8	5.2	4.3	4.2	2.9	3.5	5.3
Crude oil resources	4.0			4.4	3.9	4.9		3.8	2.6	3.8	4.5
Natural gas resources	1.7			2.2	-8.8	-3.9		-4.2	-3.6	-2.1	-6.2
Coal resources	7.9					9.9	7.3	8.2	6.4	7.6	9.1
Specific capital in domestic firms	-20.4	-27.4	-19.1	-47.7	-18.2	-23.8	-14.2	-22.2	-14.0	-18.7	-25.1
Specific capital in multinational firms	86.3	53.2	44.2	198.9	68.4	126.9	96.6	106.1	118.6	137.5	100.1
Factor adjustments											
Unskilled labor (% changing sectors)	1.4	1.4	1.7	1.4	1.7	1.7	1.1	1.1	1.2	1.6	1.8
Skilled labor (% changing sector)	1.8	2.0	2.3	1.8	2.2	2.4	1.6	1.4	1.6	2.0	2.5

See Table 2 for definition of regional markets

Source: Authors' estimates

Table 13c. Impact of Partial Foreign Direct Investment Liberalization in Services on Regional Markets: Welfare, Trade and Factor Market Effects
(% change from base year)

	Average	Moscow	St. Peters.	Tumen	North- west	North	Central	South	Urals	Siberia	Far East
Aggregate welfare											
Welfare (EV as % of consumption)	4.2	4.3	6.0	6.4	6.1	4.8	3.7	4.5	3.2	4.0	5.1
Welfare (EV as % of GDP)	2.4	2.9	3.2	1.5	3.4	2.3	2.0	2.6	1.7	2.2	2.7
Aggregate trade											
Regional terms of trade (% change)	2.1	3.5	4.6	2.5	4.2	3.3	3.4	3.0	2.6	2.2	3.6
Regional exports (% change)	1.0	1.6	1.3	0.6	1.4	1.1	1.6	1.0	0.7	0.4	1.4
Real exchange rate (% change)	1.8	2.0	2.5	1.7	2.0	1.7	2.1	2.0	1.3	1.0	2.1
International exports (% change)	7.3	9.3	14.6	1.6	14.3	6.7	18.5	8.8	9.1	6.2	9.4
Return to primary factors (% change)											
Unskilled labor	1.6	2.5	3.1	1.5	2.7	1.7	1.2	2.1	0.4	1.4	2.3
Skilled labor	2.1	2.0	3.8	1.3	3.5	2.0	2.7	2.6	1.6	2.0	3.0
National capital	2.5	2.8	3.3	2.4	2.8	2.5	2.9	2.8	2.1	1.8	2.9
Regional mobile capital	3.9	4.4	6.3	2.8	6.3	4.3	4.0	3.7	3.4	3.7	4.6
Crude oil resources	2.2			2.5	1.7	2.1		2.8	1.0	0.1	2.9
Natural gas resources	0.0			0.7	-14.7	-8.0		-3.0	-8.7	-12.3	-6.6
Coal resources	4.3					6.6	7.8	6.8	4.8	3.5	7.3
Specific capital in domestic firms	-11.5	-15.5	-14.4	-17.0	-13.0	-14.1	-10.3	-12.0	-8.5	-8.2	-16.1
Specific capital in multinational firms	42.0	25.3	18.2	90.4	35.8	70.0	49.9	57.6	54.1	67.1	56.2
Factor adjustments											
Unskilled labor (% changing sectors)	2.0	1.7	2.4	1.0	3.3	2.0	2.2	1.5	2.3	2.1	2.4
Skilled labor (% changing sector)	1.9	1.8	2.6	1.0	2.9	2.1	2.3	1.5	1.9	2.0	2.4

See Table 2 for definition of regional markets

Source: Authors' estimates

Table 13d. Impact of Improved External Market Access on Regional Markets: Welfare, Trade and Factor Market Effects

(% change from base year)

	Average	Moscow	St. Peters.	Tumen	North- west	North	Central	South	Urals	Siberia	Far East
Aggregate welfare											
Welfare (EV as % of consumption)	0.3	0.5	0.5	-2.2	0.7	0.1	0.4	0.4	0.3	0.2	0.3
Welfare (EV as % of GDP)	0.2	0.3	0.3	-0.5	0.4	0.1	0.2	0.2	0.1	0.1	0.2
Aggregate trade											
Regional terms of trade (% change)	0.1	-0.4	-0.4	-0.6	-0.4	-0.6	-0.5	-0.5	-0.6	-0.7	-0.3
Regional exports (% change)	0.0	0.2	0.1	-0.3	0.2	-0.2	0.1	0.1	-0.1	-0.2	0.1
Real exchange rate (% change)	-0.6	-0.5	-0.5	-0.4	-0.7	-0.6	-0.6	-0.6	-0.8	-0.9	-0.4
International exports (% change)	0.6	-1.0	1.2	0.3	3.2	-0.1	2.6	0.0	1.4	0.5	-1.8
Return to primary factors (% change)											
Unskilled labor	-0.3	-0.1	-0.2	-0.3	-0.2	-0.4	-0.2	0.0	-0.3	-0.6	-0.4
Skilled labor	0.0	0.2	0.3	-0.4	0.2	-0.2	0.2	0.1	0.1	-0.3	-0.2
National capital	0.2	0.3	0.3	0.4	0.0	0.2	0.1	0.2	0.0	-0.1	0.4
Regional mobile capital	0.4	0.4	0.7	-0.4	0.9	0.3	0.5	0.3	0.5	0.5	0.2
Crude oil resources	-1.4			-0.9	-2.5	-1.9		-1.8	-2.3	-2.7	-1.1
Natural gas resources	-2.5			-1.6	-13.9	-9.3		-9.3	-11.8	-12.9	-6.3
Coal resources	-1.7					-0.8	-1.0	-0.8	-1.2	-2.1	-0.1
Specific capital in domestic firms	-0.4	-0.5	-0.8	-0.1	-1.2	-0.1	-0.7	-0.3	-0.6	0.1	0.3
Specific capital in multinational firms	2.0	0.4	-0.3	4.5	1.6	2.9	3.2	3.7	3.9	5.0	2.1
Factor adjustments											
Unskilled labor (% changing sectors)	0.7	0.5	0.8	0.3	1.2	0.8	0.5	0.3	0.8	1.1	0.8
Skilled labor (% changing sector)	0.7	0.4	0.8	0.3	1.1	0.9	0.5	0.3	0.8	1.1	1.0

See Table 2 for definition of regional markets

Source: Authors' estimates

Table 13e. Impact of Tariff Reductions on Regional Markets of Russia: Welfare, Trade and Factor Market Effects
(% change from base year)

	Average	Moscow	St. Peters.	Tumen	North- west	North	Central	South	Urals	Siberia	Far East
Aggregate welfare											
Welfare (EV as % of consumption)	0.7	0.9	1.6	4.6	1.4	0.7	-0.2	0.7	-0.1	0.6	0.9
Welfare (EV as % of GDP)	0.4	0.6	0.9	1.0	0.8	0.3	-0.1	0.4	0.0	0.3	0.5
Aggregate trade											
Regional terms of trade (% change)	1.4	3.1	3.9	1.9	3.5	2.6	3.2	2.8	2.6	2.3	2.7
Regional exports (% change)	0.2	0.2	0.2	0.1	0.3	0.1	0.7	0.2	0.2	-0.3	0.2
Real exchange rate (% change)	2.0	2.1	2.5	1.4	2.3	1.6	2.4	2.1	1.8	1.5	1.7
International exports (% change)	5.5	9.3	9.0	0.1	8.2	4.8	13.1	7.7	7.3	5.1	9.6
Return to primary factors (% change)											
Unskilled labor	1.2	2.2	2.2	1.4	1.8	0.9	0.6	1.2	0.3	1.3	1.3
Skilled labor	2.0	2.2	2.8	1.6	2.7	1.6	2.3	2.2	1.6	1.9	2.6
National capital	1.7	1.8	2.2	1.2	2.0	1.3	2.1	1.8	1.5	1.2	1.5
Regional mobile capital	2.2	2.7	3.3	1.9	3.1	2.1	1.9	1.9	2.0	1.9	2.5
Crude oil resources	2.3			1.9	3.0	2.2		3.6	2.8	1.7	2.0
Natural gas resources	1.2			0.7	1.6	2.5		9.9	6.1	1.2	0.2
Coal resources	3.2					3.6	6.5	5.0	4.4	3.0	3.3
Specific capital in domestic firms	-3.4	-3.7	-4.6	0.7	-3.5	-3.3	-4.2	-3.2	-3.7	-2.0	-5.4
Specific capital in multinational firms	10.9	5.8	1.0	21.0	6.6	15.5	13.5	17.4	18.6	19.3	13.7
Factor adjustments											
Unskilled labor (% changing sectors)	1.3	1.0	1.2	0.6	1.6	1.0	1.5	1.1	1.5	1.1	2.4
Skilled labor (% changing sector)	0.9	0.8	1.0	0.4	1.0	0.8	1.4	0.8	1.0	0.8	2.0

See Table 2 for definition of regional markets

Source: Authors' estimates

Table 14. Decomposition of Welfare Impacts for the Regional Markets – WTO Scenario

Component effects on welfare (EV) as a percent of consumption

	Average	Moscow	St. Peters.	Tumen	North- west	North	Central	South	Urals	Siberia	Far East
Wages											
Skilled wages	0.7	0.3	1.2	1.9	1.5	1.1	1.1	0.9	0.6	0.9	1.0
Unskilled wages	1.6	1.0	2.5	3.7	2.9	2.1	2.0	2.0	1.2	1.8	2.1
Capital Earnings											
National capital	2.7	4.1	3.9	-0.2	1.7	3.5	1.5	2.9	1.3	1.5	4.3
Regional mobile capital	3.2	1.7	4.6	7.9	6.2	3.7	4.3	3.2	3.3	3.6	3.3
Regional energy rents	0.2			4.2	0.0	0.4	0.0	0.2	0.1	0.2	0.2
Specific capital in domestic firms	-1.9	-1.3	-2.4	-5.2	-2.7	-2.4	-2.5	-1.8	-2.0	-1.9	-2.1
Specific capital in multinational firms	1.0	0.7	1.1	2.9	1.4	1.3	1.2	1.0	1.0	1.1	1.1
Tax and Terms of Trade Effects											
Regional investment	-0.4	-0.1	-0.7	-2.7	-0.5	-0.7	-0.5	-0.5	-0.2	-0.3	-0.7
Value of stock changes	0.4	0.4	0.5	1.1	0.6	0.6	0.4	0.3	0.3	0.4	0.5
Value of capital flows (terms of trade)	-0.9	-1.0	-1.3	-1.0	-1.1	-1.0	-1.1	-1.0	-0.7	-0.7	-1.1
Change in lumpsum taxes	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Total Welfare Change (% Consump)	7.8	7.0	10.6	13.8	11.2	9.8	7.6	8.3	6.2	7.6	9.7

See Table 2 for definition of regional markets

Source: Authors' estimates

Table 15. Impact of WTO Accession on Output by Sector and Regional Market
(percentage change)

Good	Central	Siberia	South	North	Urals	Far East	Moscow	St. Peters.	Tumen	North- west
FME	33.1	13.1	44.8	23.7	15.2	19.7	43.6	352.3		10.5
CHM	8.3	21.5	10.4	-1.9	12.7	0.1	2.9	4.9	45.3	28.6
NFM	10.9	4.5	33.8	10.2	22.7	6.1	35.4	-0.1		-11.6
TMS	9.2	5.0	9.0	16.6	-2.3	16.7	-4.3	15.8	11.3	16.8
TRK	7.7	5.3	6.9	9.6	3.1	11.2	2.9	10.8	7.0	11.9
COL	5.6	3.7	5.5	5.7	4.8	5.2				
TRD	6.0	4.1	4.4	4.2	3.9	5.3	4.3	6.5	2.7	8.0
ELE	1.9	1.6	1.8	1.0	1.4	0.7	0.4	1.9	0.3	4.0
SCI	-0.6	1.3	-0.1	2.9	-1.2	3.7	-0.1	4.8	-0.5	4.5
HOU	0.9	1.2	1.9	1.8	0.4	1.9	1.4	1.3	2.2	1.6
PST	1.5	1.0	2.0	1.6	0.5	2.1	1.0	1.1	1.7	1.6
HEA	1.2	1.2	1.6	1.4	1.0	1.6	1.4	1.6	1.2	1.7
CRU		0.9	1.4	1.7	0.9	1.6			1.6	1.3
RLW	3.2	-0.1	0.9	0.4	0.8	0.8	-1.1	4.6	0.7	2.6
OIL	4.0	-2.5	3.6	2.2	-1.7	3.0	-0.7	-2.8	6.2	
GAS		-1.4	-0.2	-0.5	-1.0	-0.6			1.1	-1.9
CON	0.5	-1.6	0.6	-1.4	-0.1	-1.4	1.6	-2.7	2.2	-4.7
TPP	-7.0	-4.6	-10.1	-0.6	-2.3	29.9	-13.2	-8.9	15.3	-10.6
AIR	-1.4	-5.1	-1.4	1.1	-3.4	0.6	-2.5	-2.6	4.8	-2.7
CLI	-1.8	-4.5	-2.1	-3.1	-3.2	-2.9	-3.8	-6.1	1.3	-7.1
PIP	-2.4	-4.6	-3.1	-4.6	-2.8	-4.6	-5.9	-6.0	-0.2	-1.3
MWO	-9.4	0.4	-1.7	-6.1	-9.0	-4.0	8.7	-2.4	-1.7	-11.2
OTI	-3.8	-6.2	-2.6	-4.5	-4.3	-5.9	-0.3	-3.6	-1.5	-6.0
AGR	-3.2	-4.0	-2.2	-4.6	-1.8	-5.4	-3.7	-9.7	2.8	-11.4
FIN	-6.2	-6.7	-6.1	-6.6	-6.7	-6.3	-6.6	-6.0	-7.1	-5.3
MAR	-4.3	-11.7	-6.8	-4.9	-6.1	-3.6	-9.3	-6.0	-5.8	-8.1
TRO	-6.2	-11.0	-7.5	-2.3	-15.6	-1.8	-19.4	-2.2	-10.0	-1.1
CNM	-7.4	-11.4	-5.6	-8.0	-7.1	-9.0	-12.7	-14.1	1.6	-15.7
OTH	-7.0	-13.9	-8.7	-13.3	-6.9	-14.7	-7.0	-17.2	-4.6	-21.1
FOO	-13.5	-11.9	-10.6	-8.8	-11.3	-12.5	-17.1	-13.9	0.4	-17.0

See Tables 1 and 2 for sector and regional market definitions.

Source: Authors' calculations.

Table 16. Impact of WTO Accession on Skilled Employment by Sector and Regional Market
(percentage change)

Good	Central	Siberia	South	North	Urals	Far East	Moscow	St. Peters.	Tumen	North- west
FME	33.4	13.7	45.0	24.0	16.5	19.4	45.9	355.6		11.3
CHM	8.4	22.1	10.6	-1.6	14.0	-0.1	4.8	5.6	46.1	29.5
NFM	11.3	5.1	34.3	10.8	24.3	6.0	38.0	0.9		-10.7
TMS	9.2	5.5	9.2	17.0	-1.3	16.6	-2.7	16.5	11.9	17.5
TRK	7.1	5.2	6.6	9.3	3.5	10.5	3.9	10.7	7.1	11.6
COL	8.0	5.3	8.0	8.0	7.6	6.9				
TRD	5.2	3.8	3.5	3.2	4.7	3.5	5.7	6.0	2.1	7.6
OIL	5.0	-1.5	4.4	3.3	0.0	3.5	1.5	-1.2	7.3	
HOU	1.3	1.9	2.4	2.5	1.8	2.0	3.5	2.4	3.0	2.7
ELE	2.1	2.1	2.1	1.3	2.6	0.5	2.1	2.6	0.8	4.8
RLW	3.2	0.3	1.1	0.7	1.6	0.6	0.3	5.2	1.2	3.1
SCI	-1.4	1.2	-0.3	2.8	-0.9	3.1	1.2	4.7	-0.3	4.2
HEA	0.4	1.2	1.4	1.2	1.3	0.9	2.7	1.4	1.5	1.3
CON	0.3	-1.3	0.6	-1.3	0.6	-1.7	3.0	-2.4	2.6	-4.5
CRU		-1.5	0.3	-0.4	0.1	-0.9			1.7	-2.9
PST	-0.9	-0.7	-0.3	-1.1	-0.1	-1.2	1.1	-1.2	-0.4	-0.8
TPP	-7.3	-4.5	-10.1	-0.6	-1.8	29.3	-12.0	-8.7	15.6	-10.5
AIR	-2.8	-5.8	-2.4	-0.1	-3.7	-1.0	-2.1	-3.9	4.2	-4.1
CLI	-2.4	-4.3	-2.0	-3.0	-2.8	-3.2	-2.2	-6.1	1.9	-7.2
AGR	-2.7	-3.2	-1.6	-3.8	-0.3	-5.2	-1.5	-8.5	3.7	-10.2
OTI	-4.5	-6.1	-2.7	-4.6	-4.0	-6.3	1.2	-3.7	-1.1	-6.3
PIP	-3.2	-5.1	-4.0	-5.6	-2.0	-6.3	-4.7	-6.4	-0.9	-1.6
MWO	-10.6	-0.3	-2.6	-7.2	-9.2	-5.6	9.5	-3.5	-2.2	-12.2
MAR	-5.3	-12.1	-7.6	-6.0	-5.9	-5.2	-8.6	-6.9	-6.3	-9.0
TRO	-6.6	-11.0	-7.9	-2.7	-15.1	-2.7	-18.5	-2.3	-10.0	-1.2
CNM	-7.5	-11.1	-5.4	-7.7	-6.2	-9.2	-11.2	-13.6	2.2	-15.2
FIN	-8.8	-8.8	-8.5	-9.7	-8.0	-9.8	-7.2	-9.0	-9.3	-8.5
FOO	-13.1	-11.2	-10.1	-8.2	-10.1	-12.3	-15.4	-12.9	1.2	-16.1
OTH	-8.1	-14.3	-9.3	-13.9	-7.0	-15.6	-6.2	-17.9	-4.8	-21.9
GAS		-16.0	-9.6	-14.1	-12.4	-15.0			-0.9	-22.7

See Tables 1 and 2 for sector and regional market definitions.

Source: Authors' calculations.

Table 17. Impact of WTO Accession on Unskilled Employment by Sector and Regional Market (percentage change)

Good	Central	Siberia	South	North	Urals	Far East	Moscow	St. Peters.	Tumen	North-west
FME	35.2	14.0	45.3	24.3	17.0	20.1	44.1	359.0		12.5
CHM	9.9	22.5	10.9	-1.3	14.4	0.5	3.5	6.4	45.5	30.9
NFM	12.9	5.4	34.6	11.1	24.8	6.6	36.3	1.7		-9.7
TMS	10.7	5.8	9.4	17.3	-0.9	17.3	-3.9	17.4	11.5	18.7
TRK	8.6	5.5	6.8	9.6	3.9	11.2	2.6	11.5	6.6	12.8
COL	9.5	5.5	8.3	8.2	8.0	7.5				
TRD	6.6	4.1	3.7	3.4	5.1	4.1	4.4	6.8	1.7	8.8
OIL	6.4	-1.2	4.6	3.6	0.4	4.1	0.3	-0.4	6.9	
HOU	2.7	2.2	2.6	2.7	2.2	2.6	2.2	3.2	2.6	3.8
ELE	3.5	2.4	2.3	1.6	3.0	1.1	0.8	3.4	0.4	5.9
RLW	4.6	0.6	1.3	1.0	2.0	1.3	-0.9	5.9	0.8	4.2
SCI	0.0	1.5	-0.1	3.0	-0.5	3.7	0.0	5.4	-0.7	5.3
HEA	1.8	1.4	1.6	1.4	1.7	1.5	1.5	2.2	1.0	2.4
CON	1.7	-1.1	0.8	-1.1	1.0	-1.2	1.7	-1.6	2.2	-3.5
CRU		-1.2	0.5	-0.1	0.5	-0.3			1.3	-1.9
PST	0.5	-0.5	-0.1	-0.8	0.3	-0.6	-0.1	-0.5	-0.8	0.3
TPP	-6.0	-4.2	-10.0	-0.4	-1.3	30.1	-13.0	-8.0	15.1	-9.5
AIR	-1.5	-5.5	-2.2	0.1	-3.4	-0.4	-3.3	-3.2	3.8	-3.0
CLI	-1.0	-4.1	-1.8	-2.8	-2.4	-2.6	-3.4	-5.4	1.5	-6.2
AGR	-1.3	-2.9	-1.4	-3.5	0.1	-4.6	-2.7	-7.8	3.3	-9.2
OTI	-3.2	-5.9	-2.5	-4.4	-3.6	-5.8	-0.1	-3.0	-1.5	-5.3
PIP	-1.8	-4.8	-3.8	-5.4	-1.6	-5.7	-5.9	-5.7	-1.3	-0.6
MWO	-9.3	0.0	-2.4	-7.0	-8.9	-5.0	8.2	-2.8	-2.6	-11.3
MAR	-3.9	-11.9	-7.4	-5.7	-5.5	-4.6	-9.7	-6.2	-6.6	-8.0
TRO	-5.3	-10.8	-7.7	-2.5	-14.7	-2.1	-19.5	-1.5	-10.4	-0.1
CNM	-6.2	-10.8	-5.2	-7.4	-5.8	-8.6	-12.3	-13.0	1.8	-14.3
FIN	-7.5	-8.5	-8.3	-9.5	-7.6	-9.3	-8.3	-8.4	-9.7	-7.5
FOO	-11.9	-11.0	-10.0	-7.9	-9.7	-11.8	-16.4	-12.3	0.8	-15.2
OTH	-6.8	-14.1	-9.1	-13.7	-6.7	-15.1	-7.4	-17.3	-5.2	-21.1
GAS		-15.8	-9.4	-13.8	-12.1	-14.5			-1.3	-21.9

See Tables 1 and 2 for sector and regional market definitions.

Source: Authors' calculations.

Table 18. Impact of WTO Accession on Exports by Sector and Regional Market
(percentage change)

Good	Central	Siberia	South	North	Urals	Far East	Moscow	St. Peters.	Tumen	North-west
FME	61.0	30.1	76.6	49.7	34.2	45.1	70.2	423.5		26.3
CHM	31.6	39.8	35.4	18.7	32.1	21.0	23.2	21.8	82.8	44.2
SCI	21.3	18.6	22.0	42.6	17.2	43.0	19.1	41.9	25.6	39.8
NFM	21.2	11.3	47.7	19.3	34.0	14.6	48.3	3.2		-11.2
TMS	14.9	5.8	13.8	28.0	-0.3	27.0	-4.3	21.0	20.9	20.4
CLI	15.6	7.8	14.7	12.1	11.3	12.1	9.3	4.5	22.9	1.8
COL	9.1	1.6	9.4	10.4	3.9	9.7				
OIL	9.4	-1.6	9.0	7.3	-0.4	8.1	2.2	-1.1	13.0	
TRK	7.0	1.5	5.8	6.5	2.4	7.5	2.6	4.7	8.5	4.4
FIN	5.0	0.2	4.9	6.8	1.4	6.9	3.2	5.7	6.6	4.9
TPP	0.9	-4.8	-2.0	6.0	0.9	36.1	-6.6	-5.2	28.2	-10.2
MWO	-1.4	5.3	7.9	2.2	-3.0	4.2	19.1	4.3	11.0	-7.7
AGR	6.5	-3.3	7.2	4.2	1.0	3.4	-0.6	-4.7	16.8	-9.5
CRU		1.6	2.4	2.9	1.3	2.1			2.9	1.3
OTI	2.1	-2.9	4.4	0.3	0.5	-1.7	8.4	2.9	4.6	-1.3
CNM	3.5	-6.6	6.5	3.1	-1.6	2.2	-5.3	-7.1	17.9	-11.4
PST	2.6	-1.7	2.9	1.1	-0.7	0.7	-2.1	-5.0	7.1	-5.8
AIR	0.7	-6.6	0.2	2.6	-3.4	1.8	-2.6	-4.3	9.5	-5.3
HEA	0.9	-2.9	-0.2	-3.0	0.2	-3.0	-0.2	-3.8	1.3	-5.2
CON	0.9	-3.8	1.1	-3.0	-0.2	-3.3	3.7	-6.4	4.7	-9.8
ELE	-0.1	-3.1	0.2	-2.6	-1.4	-3.3	-1.5	-5.7	0.9	-4.9
TRD	0.9	-3.8	0.0	-2.9	-2.3	-2.0	-2.8	-6.2	1.9	-6.5
FOO	-4.6	-9.0	-1.6	-1.8	-6.3	-5.4	-10.8	-6.9	12.9	-14.1
HOU	-3.6	-5.7	-2.4	-5.2	-4.1	-5.5	-2.9	-9.6	0.4	-10.6
RLW	-1.6	-7.4	-4.1	-7.2	-3.2	-7.6	-5.1	-6.9	-1.4	-9.9
MAR	-3.6	-14.7	-6.2	-4.5	-7.1	-3.6	-9.1	-8.5	-3.4	-11.7
TRO	-5.8	-13.4	-7.1	-3.3	-16.4	-3.0	-19.2	-6.6	-7.4	-6.8
OTH	-6.2	-17.2	-8.8	-15.8	-6.3	-18.5	-7.0	-22.7	-1.9	-27.5
GAS		-40.8	-17.0	-33.2	-31.6	-33.9			2.3	-71.2
PIP										

See Tables 1 and 2 for sector and regional market definitions.

Source: Authors' calculations.

Table 19. Piecemeal Sensitivity Analysis -- Welfare Impacts as a percent of GDP by Region
(% change from base year)

Parameter being changed	Overall average	Moscow	St. Peters.	Tumen	North-west	North Central	South	Urals	Siberia	Far East	
Central Results for reference	4.3	4.7	5.7	3.1	6.2	4.7	4.2	4.7	3.3	4.2	5.2
regional investment potential variation ^{a/}	4.2	5.1	6.0	3.3	5.6	4.0	3.8	4.2	3.2	3.6	4.6
esubconsumer = 1.5	4.5	5.0	6.1	3.2	6.1	5.0	4.5	5.0	3.5	4.5	5.5
esubconsumer = 0.5	4.1	4.5	5.4	3.0	5.9	4.1	4.0	4.5	3.1	4.0	4.9
esubs = 2.0	5.5	5.9	7.3	4.3	7.2	6.1	5.5	6.0	4.3	5.4	6.6
esubs = 0.5	3.5	4.0	4.8	2.4	5.2	2.4	3.6	3.9	2.6	3.5	3.9
sigmadm = 4	4.3	4.8	5.8	3.2	6.3	4.8	4.2	4.8	3.3	4.3	5.2
sigmadm = 2	4.3	4.7	5.7	3.1	6.2	4.7	4.2	4.7	3.3	4.2	5.2
etaf = 17.5	4.8	5.2	6.1	3.5	6.7	5.2	4.7	5.3	3.8	4.8	5.6
etaf = 12.5	3.7	4.2	5.2	2.7	5.6	3.9	3.6	4.1	2.7	3.6	4.6
etad = 10	4.4	5.2	6.1	3.1	6.4	5.0	4.3	4.6	3.3	4.3	5.5
etad = 5	4.0	4.1	5.1	3.1	6.0	4.3	4.1	4.5	3.3	4.1	4.7
esub = 4	4.3	4.7	5.5	3.2	6.0	4.6	4.2	4.7	3.4	4.3	5.1
esub = 2	4.3	4.7	5.5	3.2	6.0	4.6	4.2	4.7	3.4	4.3	5.1
esubprimary = 1.5	4.3	4.7	5.7	3.1	6.3	4.7	4.3	4.7	3.4	4.2	5.1
esubprimary = 0.5	4.3	4.9	5.7	3.1	5.9	4.8	4.0	4.8	3.1	4.2	5.4
etadx = 7	4.3	4.8	5.8	3.0	6.3	4.7	4.3	4.8	3.3	4.2	5.2
etadx = 3	4.3	4.6	5.6	3.3	6.1	4.7	4.2	4.7	3.3	4.2	5.1

Source: Authors' calculations.

^{a/} We vary etaf by region as follows: Moscow = 20; St. Petersburg = 18.3; Tumen = 17.1; Northwest = 11.3; North = 10; Central = 12.5; South = 11.5; Urals = 14.3; Siberia = 10.8; Far East = 10.8.

Notes:

- The piecemeal sensitivity analysis employs central values for all parameters (see below) other than the tested parameter and lump sum tax replacement.
- Hicksian equivalent variation as a percent of the value of consumption in the benchmark equilibrium.

Parameter	Central value	Definitions of the parameter (see figures, especially figure 4) for more precise elasticity structure).
esubs	1.25	Elasticity of substitution between value-added and business services
esub	3	Elasticity of substitution between firm varieties in imperfectly competitive sectors
sigmadm	3	"Armington" elasticity of substitution between imports and domestic goods in CRTS sectors
esubprimary	0	Elasticity of substitution between primary factors of production in value added
esubintermed	0	Elasticity of substitution in intermediate production between composite Armington aggregate goods
esubconsumer	1	Elasticity of substitution in consumer demand
etadx	5	Elasticity of transformation (domestic output versus exports)
etad	7.5	Elasticity of Russian service firm supply with respect to price of output
etaf	15	Elasticity of multinational service firm supply with respect to price of output

Figure 1. Sales for Constant Returns to Scale Sectors: Determined by Constant Elasticity of Transformation Production Structure

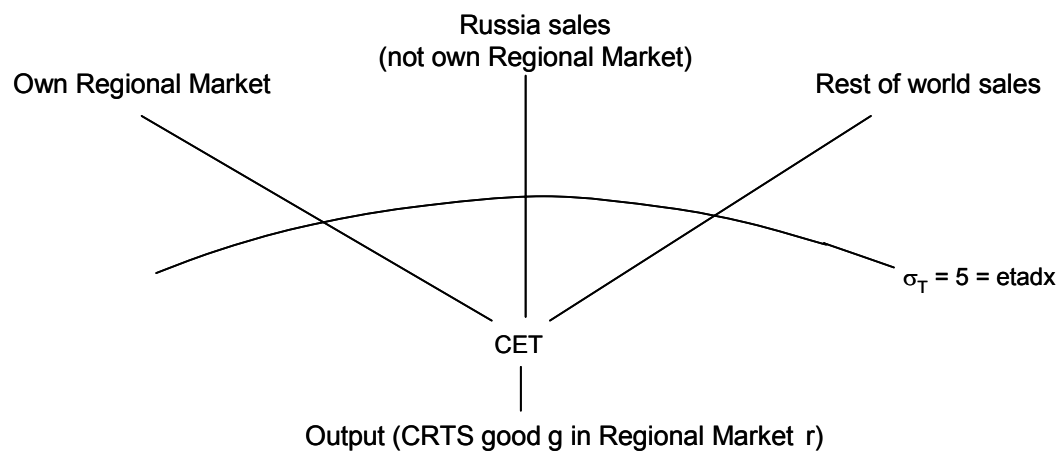
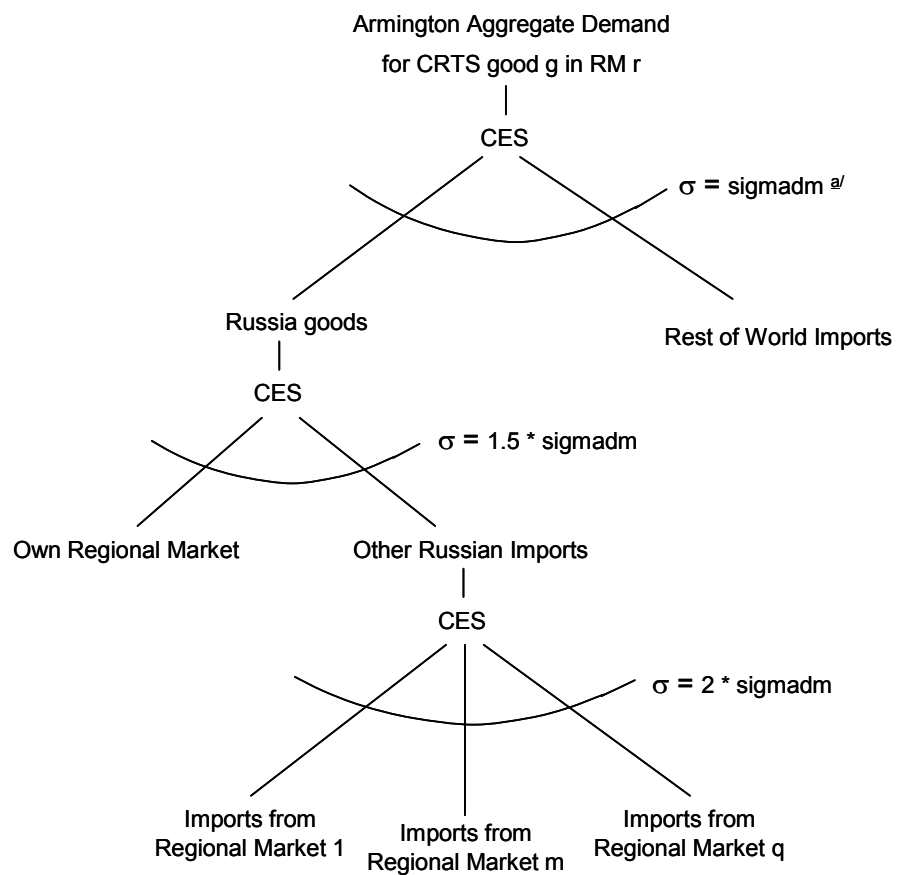
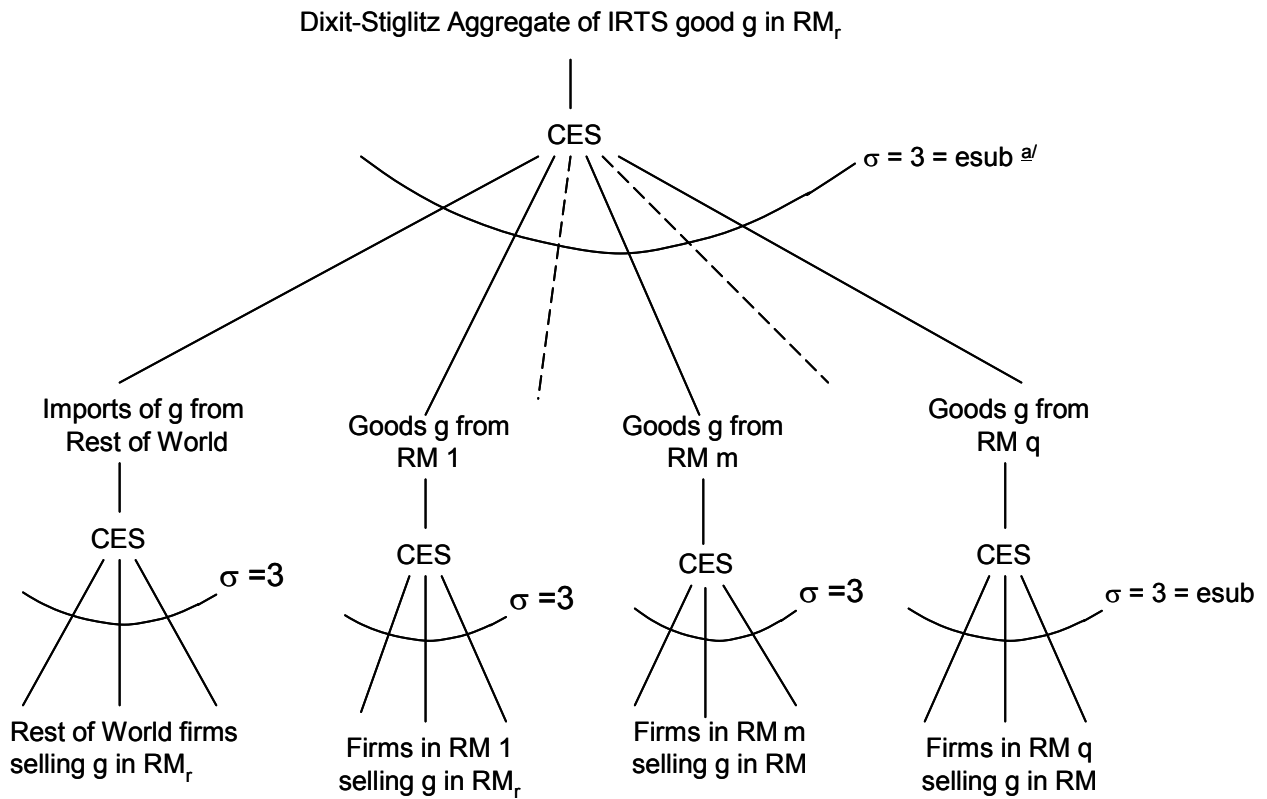


Figure 2. Demand for Representative CRTS good g in Regional Market r



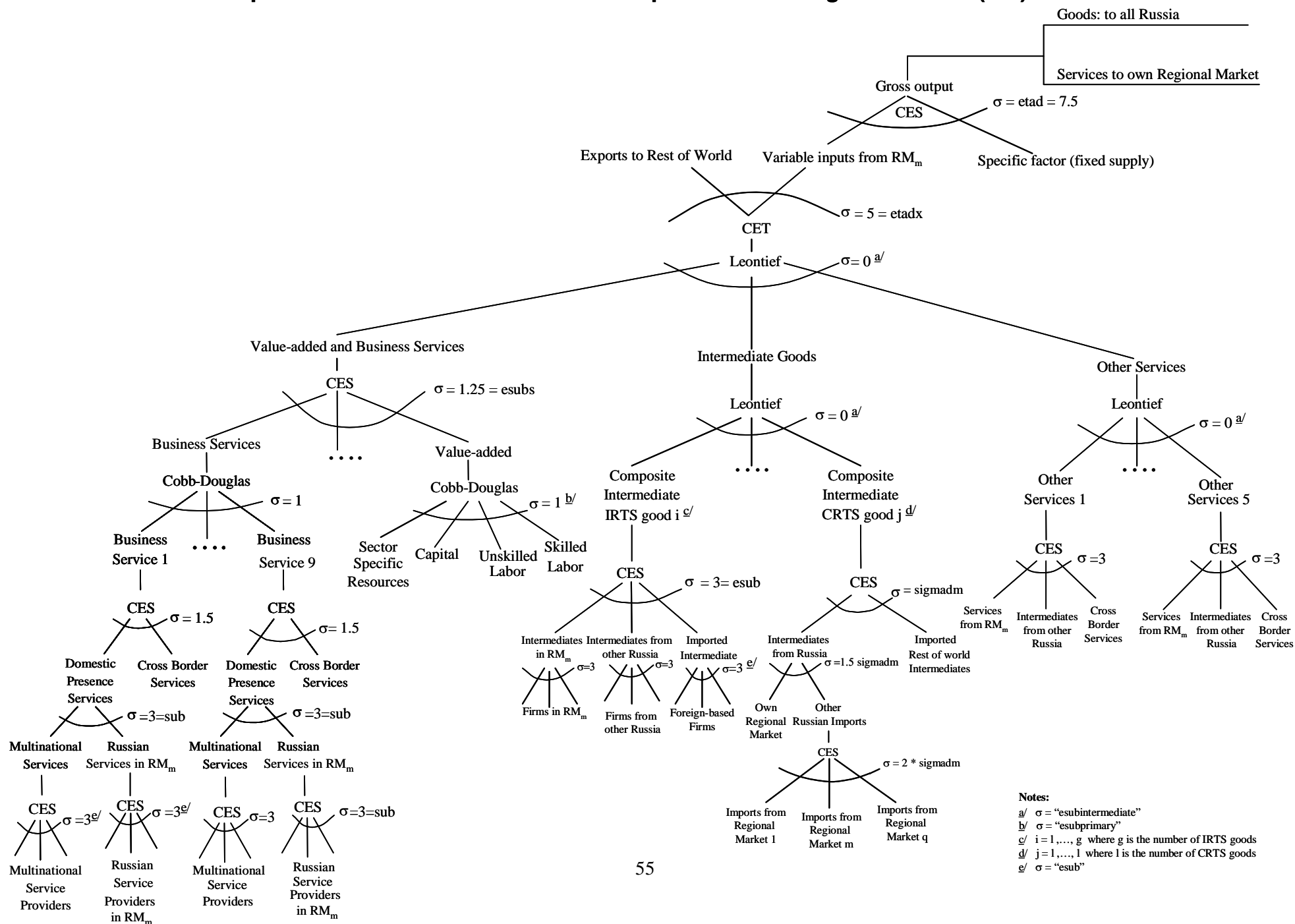
^{a/} $\text{sigmadm} = 3$ in CRTS sectors, except in OTH (other goods producing sectors). For OTH we rely on estimates from Ivanova (2005).

**Figure 3. Demand for Representative Dixit-Stiglitz (IRTS)
good g in Regional Market r**

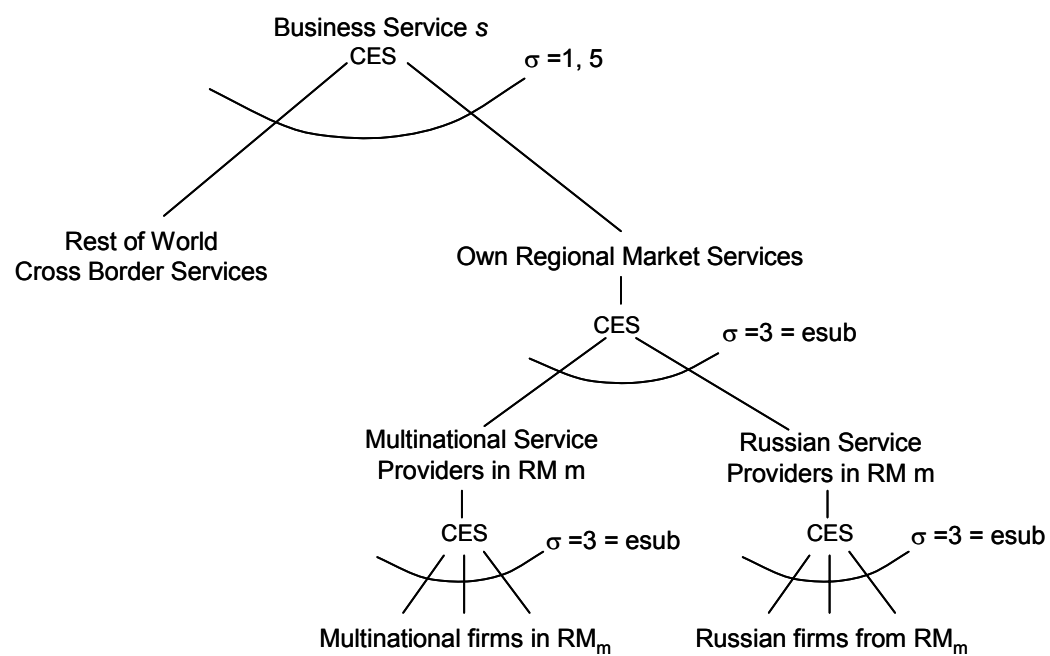


^{a/} We take $\sigma = 3$, except based on Ivanova (2005), we take $\sigma = 3.1$ in MWO; $\sigma = 2.6$ in TPP; $\sigma = 2.5$ in CNM; and $\sigma = 1.8$ in OTI.

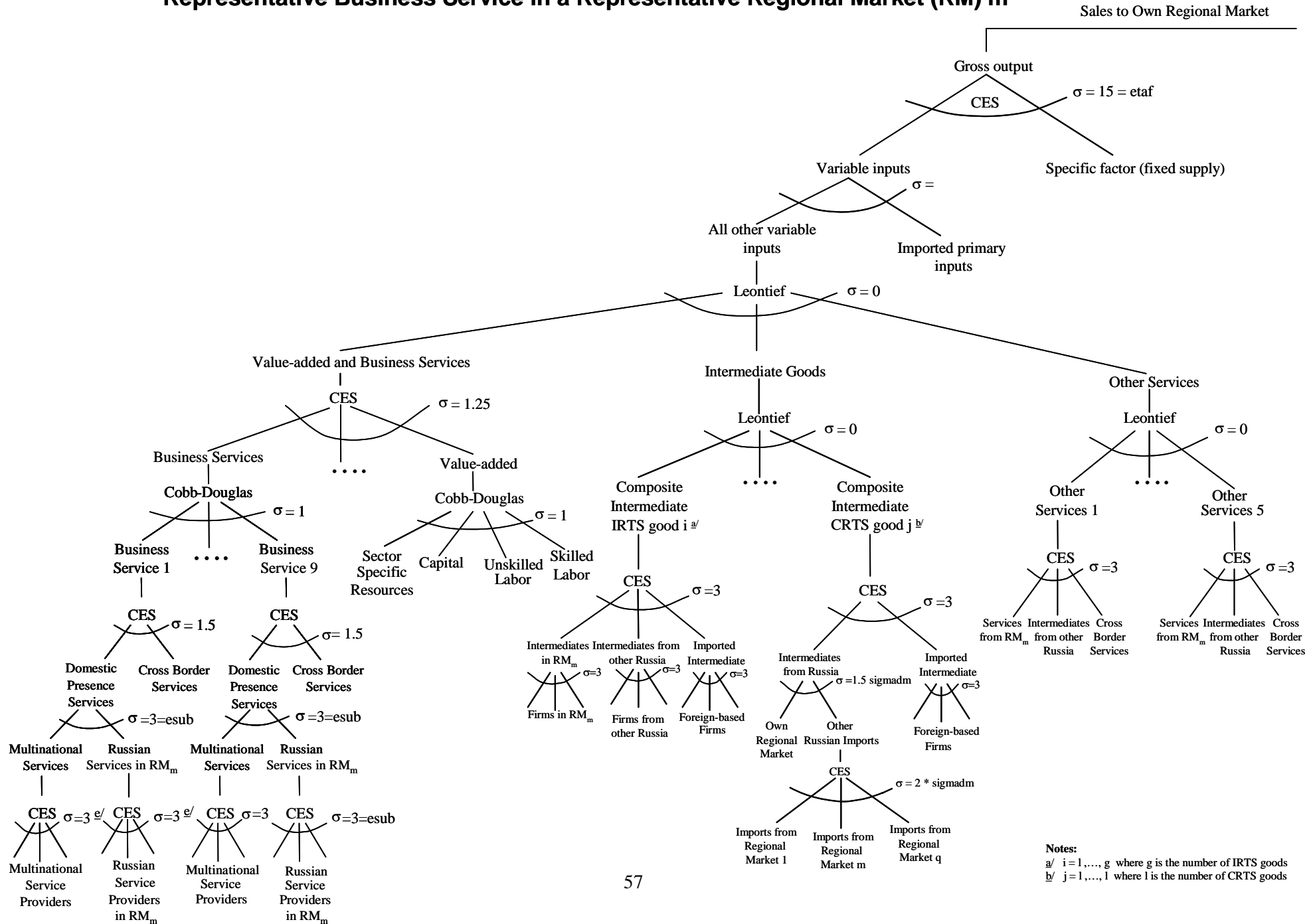
**Figure 4. Structure of Production for Increasing Returns to Scale Russian Firms:
Representative Good or Service in a Representative Regional Market (RM) m**



**Figure 5. Demand for Representative Business Service s
(Dixit-Stiglitz) Sectors in Regional Market (RM) m**



**Figure 6. Structure of Production for Increasing Returns to Scale Multinational Business Service Firms:
Representative Business Service in a Representative Regional Market (RM) m**



Appendix A

Data on multinational shares of service sectors

We consulted four sources of information: (1) estimates from Russian service sector institutes of the share by sector of multinational ownership in the key services sectors; (2) the NOBUS survey; (3) *Regions of Russia (2003)* by Rosstat; and (4) the “BEEPS survey. Of these four sources, only the NOBUS survey provides data that allows us to estimate shares of multinational ownership by both region and sector. We thus start with the NOBUS information (our results by region and service sector are summarized in table A4 below).

When we aggregate the NOBUS shares across regions or sectors, however, we find that the other three sources of information, show considerably higher foreign ownership shares than the NOBUS survey. We believe that the NOBUS survey estimates are too small, and adjust them. The estimates of the service sectors institutes are lower than those from the BEEPS or *Regions of Russia*, and thus involve less adjustment of the NOBUS data. We employed least squares adjustment of the NOBUS data so that the weighted average over all of Russia in each sector is consistent with the national estimates we received from the specialist service sector research institutes in Russia. This process will give us a structure of ownership based on the NOBUS survey, with the economy-wide average by sector determined by the national data. The results are in table 12b. In this appendix we explain the details of how we obtained the and calculated the data.

1. Data

We use three sources of data to calculate regional shares of output produced by multinational companies by regions and sectors, and we combine this with our national estimates from our Russian service sector experts. The regional data are:

- 1.1 The National Survey of Household Welfare and Program Participation (NOBUS) that was implemented in 87 “oblasts” of the Russian Federation in 2003 by means of random sampling procedures. The survey was conducted on the basis of voluntary participation of selected households. The households that refused to participate in the survey were replaced by the households from the same voting district. Total number of households that agreed to participate in the survey is 44,529.

- 1.2 The Statistical handbook “Regions of Russia: Social and economic indicators: 2003” published by Roskomstat. The handbook contains the major economic and social statistical indicators for Russia since 1990 by economic region.
- 1.3 Business Environment and Enterprise Performance Survey (BEEPS) 2002 developed jointly by the World Bank and the European Bank for Reconstruction and Development. BEEPS is a survey of managers and owners of 6,636 firms across the countries of Eastern Europe, the former Soviet Union, and Turkey.

2. Calculations

- 2.1. **NOBUS.** Respondents in the NOBUS survey report their wage income, the industry in which they work and whether the company is Russian owned, foreign owned or mixed ownership. For each region and industry we calculate the share of wage income earned in foreign or mixed ownership companies compared with the share of wage income earned in Russian companies. We take this wage share (in foreign plus mixed ownership companies) as a proxy for the share of output in each region and industry. Documentation of the details follows.

2.1.1 Variables

First, we define a variable *industry i* based on the Question 17, Part C of the survey²⁴. We assign a three letter code according to the Table A1

Table A1 Mapping of the survey Question 9, part C into IO table sector code

Industry	Code	IO table code	Question 9, Part C
Agriculture & forestry and food	AGF	AGF, FOO	1,2
Mining	MIN	FME NFM COA OLE	3
Manufacturing	MNF	MWO TPP CNM CLO OTHT OIN	4
Electric industry	ELE	ELE	5
Construction	CON	CON	6
Trade	TRD	TRD	7
Catering	CAT	CAT	8
Communication and transport	COM	RLW TRK PIP MAR AIR TRO TMS PST	9
Financial services	FIN	FIN	10
Communal & consumer services	PSM	PSM	15, 16
Administration & public associations	ADM	ADM	12, 17
Education & culture & art	ECM	ECM	13
Science & science servicing	SCS	SCS	11
Public health & sports & social security	SSM	SSM	14

²⁴ Industries are encoded using a 2-digit code from the list of economic activity classification groups given in the Questionnaire form and based on National Classifier of Economic Activities OK 029-2001 (OKVED).

Second, we define a **region code** j as shown in the Table 2.

Third, we define a variable **ownership** based on the Question 9, Part C of the survey. For each respondent k who worked during the sample period²⁵, we define **ownership** as *foreign* if the respondent answered that she worked at the enterprise with mixed (both Russian and foreign) ownership, or with foreign ownership. Otherwise, we define ownership as *local*.

Finally, for each respondent k who worked during the sample period, we define a variable **wage** according to the respondent's answer to the Question 13, Part C of the survey: what was your wage in rubles in the last 30 days?

2.1.2 Aggregation

All regions

We replicate observations according to the weight $kvzv_{ijk}$ that is assigned to each respondent and aggregate the variable **wage** $_{ijk}$ by regions and industries according to the type of ownership:

$$foreign_{ij} = \sum_{k \in foreign} kvzv_{ijk} * wage_{ijk}$$

$$local_{ij} = \sum_{k \in local} kvzv_{ijk} * wage_{ijk}$$

i is an industry code as defined in the second column of the Table 1

j is a region as defined in the Table 2

and calculate a share of foreign owned enterprises calculated as

$$foreign_share_{ij} = \frac{foreign_{ij}}{foreign_{ij} + local_{ij}}$$

The results are presented in the Table A2.

²⁵ A respondent worked during the investigated period if she answered “Yes” to the Question 1 or the Question 2, Part C of the survey.

Table A2 Share of foreign owned companies

<i>Region</i>	<i>ADM</i>	<i>AGF</i>	<i>CAT</i>	<i>COM*</i>	<i>CON</i>	<i>ECM</i>	<i>ELE</i>	<i>FIN</i>	<i>MIN**</i>	<i>MNF***</i>	<i>PSM</i>	<i>SCS</i>	<i>SSM</i>	<i>TRD</i>
<i>alt</i>	0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.13
<i>amu</i>	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00
<i>arh</i>	0.00	0.01	0.00	0.01	0.01	0.00	0.00	0.00	0.00	0.08	0.00	0.00	0.00	0.00
<i>ast</i>	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.03	0.34	0.00	0.00	0.01	0.00
<i>bel</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00
<i>bry</i>	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<i>vla</i>	0.00	0.00		0.00	0.00	0.00	0.00		0.00	0.08	0.00	0.00	0.00	0.00
<i>vlg</i>	0.00	0.01	0.00	0.00	0.00	0.00	0.08	0.00	0.13	0.01	0.00	0.00	0.00	0.00
<i>vol</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00
<i>vor</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.01
<i>msk</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.12	0.33	0.00	0.00	0.03	0.00	0.01
<i>spb</i>	0.04	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.25	0.06	0.00	0.03	0.00	0.03
<i>eao</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<i>iva</i>	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<i>irk</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.38	0.00	0.00	0.00	0.00
<i>kab</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<i>klg</i>	0.00	0.00	0.00	0.00	0.00	0.10	0.00	0.00	0.00	0.00	0.24	0.00	0.00	0.03
<i>kal</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00
<i>kam</i>	0.00	0.01	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.16	0.00	0.00	0.00	0.00
<i>kar</i>	0.00	0.00		0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00
<i>kem</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00
<i>kir</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.03	0.00	0.00	0.00	0.00
<i>kos</i>	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.06	0.00	0.04	0.00	0.00	0.00	0.00
<i>kdk</i>	0.00	0.00	0.00	0.02	0.07	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.01	0.00
<i>kra</i>	0.00	0.00	0.15	0.00	0.01	0.00	0.02	0.00	0.02	0.06	0.00	0.00	0.00	0.00
<i>krq</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<i>krs</i>	0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<i>len</i>	0.00	0.10	0.24	0.09	0.00	0.00	0.00	0.00	0.00	0.07	0.00	0.00	0.00	0.00
<i>lip</i>	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.10	0.00	0.00	0.00	0.00
<i>mag</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00
<i>mos</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<i>mur</i>	0.01	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.00	0.00	0.00	0.00
<i>niz</i>	0.00	0.00	0.11	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.02	0.00	0.01	0.00
<i>nov</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.12	0.00	0.54	0.00	0.00
<i>nvs</i>	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.06	0.00	0.00

<i>Region</i>	<i>ADM</i>	<i>AGF</i>	<i>CAT</i>	<i>COM*</i>	<i>CON</i>	<i>ECM</i>	<i>ELE</i>	<i>FIN</i>	<i>MIN**</i>	<i>MNF***</i>	<i>PSM</i>	<i>SCS</i>	<i>SSM</i>	<i>TRD</i>
<i>oms</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<i>ore</i>	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00	0.02	0.00	0.00	0.00	0.00
<i>orl</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.31	0.00	0.00	0.02	0.00	0.00	0.00	0.01
<i>pen</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		0.05	0.00	0.00	0.00	0.00
<i>per</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<i>pri</i>	0.00	0.19	0.31	0.05	0.00	0.00	0.02	0.00	0.00	0.09	0.01	0.00	0.00	0.02
<i>psk</i>	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.14	0.17	0.00	0.00
<i>sev</i>	0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<i>ady</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<i>alr</i>	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00
<i>bas</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.01	0.00	0.00	0.00	0.00
<i>bur</i>	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.08	0.08	0.00	0.00	0.00	0.00
<i>dag</i>	0.00	0.00	0.00	0.07	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00
<i>ing</i>	0.00	0.00		0.00	0.00	0.23	0.00			0.00	0.00	0.00	0.00	0.00
<i>klr</i>	0.00	0.00		0.00	0.00	0.00	0.00			0.00	0.00	0.00	0.00	0.00
<i>krl</i>	0.00	0.50	0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00
<i>kom</i>	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.01
<i>mar</i>	0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00
<i>mor</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<i>sah</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.03
<i>tat</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.21	0.00	0.03
<i>tyv</i>	0.00	0.00		0.00		0.00	0.00	0.00	0.00		0.00		0.00	0.00
<i>hak</i>	0.00	0.00		0.00	0.00	0.00	0.00		0.00	0.00	0.00		0.00	0.00
<i>ros</i>	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
<i>rya</i>	0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<i>sam</i>	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.06	0.00	0.00	0.02	0.02
<i>sar</i>	0.00	0.00		0.00	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00
<i>sao</i>	0.00	0.02	0.00	0.03	0.00	0.01	0.02	0.00	0.38	0.00	0.01	0.11	0.00	0.00
<i>sve</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.03	0.00	0.00	0.00	0.00
<i>smo</i>	0.00	0.00		0.00	0.00	0.00	0.00		0.00	0.00	0.00		0.00	0.00
<i>sta</i>	0.00	0.00		0.00	0.00	0.00	0.00	0.00		0.00	0.00		0.00	0.00
<i>tam</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<i>tve</i>	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
<i>tom</i>	0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<i>tul</i>	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00		0.00	0.00
<i>tum</i>	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.03	0.02	0.00	0.04	0.00	0.00

Region	ADM	AGF	CAT	COM*	CON	ECM	ELE	FIN	MIN**	MNF***	PSM	SCS	SSM	TRD
udm	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.22	0.00	0.00	0.00	0.00	0.00
ulo	0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
hab	0.00	0.15	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.01
chl	0.00	0.09	0.00	0.02	0.00	0.00	0.00	0.00	0.15	0.23	0.00	0.00	0.00	0.00
chi	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.12	0.02	0.00	0.00	0.00	0.00
chv	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.08	0.00	0.00	0.00	0.00
chu	0.00	0.00	0.00	0.00	0.51	0.00	0.06	0.00	0.00		0.00	0.00	0.00	0.00
yar	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00

* COM (communication and transport) includes RLW TRK PIP MAR AIR TRO TMS PST

** MIN(mining) includes FME NFM COA OLE

*** MNF (manufacturing) includes MWO TPP CNM CLO OTHT OIN

Source: NOBUS 2003

10 bigger regions

Table A3 presents shares of foreign owned enterprises for 10 bigger regions: Moscow, Saint Petersburg, Tumen, Northwest, North, Center, South, Ural, Siberia, and Far East regions.

Aggregation from the regional level to the 10 big regions is conducted according to the following formula:

$$foreign_share_{kj} = \frac{\sum_{i \in k} foreign_{ij}}{\sum_{i \in k} foreign_{ij} + local_{ij}}$$

where i is a region that belongs to a bigger region k.

Table A3 Share of foreign owned companies for 10 regions

	<i>ADM</i>	<i>AGF</i>	<i>CAT</i>	<i>COM*</i>	<i>CON</i>	<i>ECM</i>	<i>ELE</i>	<i>FIN</i>	<i>MIN**</i>	<i>MNF***</i>	<i>PSM</i>	<i>SCS</i>	<i>SSM</i>	<i>TRD</i>
Moscow	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.101	0.222	0.000	0.000	0.025	0.000	0.009
Saint Petersburg	0.021	0.082	0.042	0.032	0.006	0.000	0.000	0.000	0.111	0.060	0.000	0.023	0.000	0.030
Tumen	0.000	0.000	0.000	0.000	0.008	0.000	0.000	0.000	0.028	0.021	0.000	0.037	0.000	0.000
Northwest	0.000	0.004	0.000	0.000	0.000	0.040	0.000	0.000	0.000	0.024	0.086	0.192	0.000	0.010
North	0.006	0.115	0.000	0.003	0.002	0.000	0.000	0.000	0.025	0.044	0.000	0.000	0.000	0.004
Center	0.000	0.000	0.000	0.003	0.005	0.000	0.005	0.003	0.000	0.026	0.000	0.000	0.000	0.003
South	0.000	0.000	0.000	0.006	0.023	0.006	0.013	0.000	0.023	0.024	0.000	0.000	0.004	0.000
Urals	0.000	0.005	0.016	0.005	0.000	0.000	0.001	0.000	0.034	0.046	0.002	0.035	0.003	0.005
Siberia	0.000	0.001	0.069	0.000	0.010	0.000	0.005	0.000	0.021	0.141	0.000	0.013	0.000	0.013
Far East	0.000	0.121	0.077	0.018	0.006	0.001	0.008	0.000	0.096	0.046	0.004	0.012	0.000	0.010

* COM (communication and transport) includes RLW TRK PIP MAR AIR TRO TMS PST

** MIN(mining) includes FME NFM COA OLE

*** MNF (manufacturing) includes MWO TPP CNM CLO OTH T OIN

2.2 Regions of Russia 2003

Table 3.5 of “Regions of Russia 2003” reports the distribution of labor force by regions and types of ownership in 2002. The types of ownership include state, city, private, NGO, mixed Russian²⁶, and foreign²⁷ ownership. Unfortunately, the handbook does not have the sectoral distribution of labor by the types of ownership within a region. Therefore, we can calculate only the regional distribution of workers.

²⁶ Any mix of state, city, private, and NGO ownership

²⁷ Includes both fully and partially foreign ownership

The share of the foreign owned firms in the region is defined as

$$foreign_share_j = \frac{foreign_j}{total_j}$$

where j is a region as defined in the Table 2

foreign_j is a number of workers in foreign owned companies in the region j

total_j is a total number of workers in the region j

Results are presented in the Table A4:

Table A4 Distribution of labor force by type of ownership

Code	Region	Share of workers by type of ownership					
		State	City	Private	NGO	Mixed Russian	Foreign
rus	Russian Federation	0.21	0.16	0.50	0.01	0.09	0.03
cen	Central Federal Okrug	0.20	0.15	0.51	0.01	0.09	0.04
bel	Belgorodskaya	0.13	0.19	0.61	0.01	0.06	0.01
bry	Bryanskaya	0.19	0.17	0.56	0.01	0.07	0.01
vla	Vladimirskaia	0.17	0.17	0.53	0.01	0.09	0.03
vor	Voronezhskaya	0.20	0.15	0.58	0.01	0.06	0.01
iva	Ivanovskaya	0.22	0.15	0.52	0.02	0.08	0.02
kal	Kaluzhskaya	0.22	0.15	0.51	0.01	0.07	0.03
kos	Kostromskaya	0.21	0.21	0.49	0.01	0.07	0.01
krs	Kurskaya	0.22	0.11	0.58	0.01	0.07	0.02
lip	Lipetskaya	0.15	0.18	0.47	0.01	0.07	0.12
mos	Moskovskaya	0.22	0.18	0.47	0.01	0.09	0.03
orl	Orlovskaya	0.21	0.13	0.48	0.01	0.14	0.02
rya	Ryazanskaya	0.17	0.17	0.56	0.01	0.07	0.02
smo	Smolenskaya	0.22	0.18	0.51	0.01	0.07	0.01
tam	Tambovskaya	0.20	0.18	0.55	0.01	0.04	0.02
tve	Tverskaya	0.20	0.17	0.51	0.01	0.09	0.01
tul	Tulskaya	0.16	0.16	0.45	0.01	0.16	0.06
yar	Yaroslavl'skaya	0.16	0.18	0.48	0.01	0.15	0.03
msk	Moscow city	0.22	0.11	0.51	0.01	0.11	0.06
nor	North West Federal Okrug	0.26	0.13	0.49	0.01	0.07	0.05
krl	The Republic of Karelia	0.24	0.21	0.39	0.01	0.10	0.05
kom	The Republic of Komi	0.21	0.22	0.39	0.00	0.13	0.05
arh	Arkhangelskaya	0.29	0.21	0.38	0.00	0.06	0.06
nao	Nenetskiy AO	0.27	0.19	0.45	0.00	0.03	0.06
vol	Vologodskaya	0.15	0.19	0.49	0.00	0.14	0.03
klg	Kaliningradskaya	0.24	0.16	0.50	0.01	0.06	0.03
len	Leningradskaya	0.17	0.18	0.54	0.00	0.05	0.06
mur	Murmanskaya	0.30	0.20	0.38	0.00	0.10	0.02
nov	Novgorodskaya	0.19	0.21	0.45	0.01	0.09	0.06
psk	Pskovskaya	0.22	0.18	0.54	0.01	0.03	0.02
spb	Saint Petersburg city	0.34	0.00	0.55	0.01	0.05	0.05
sou	South Federal Okrug	0.18	0.15	0.57	0.01	0.07	0.01
ady	The Republic of Adygeya	0.21	0.18	0.53	0.01	0.06	0.00

<i>Code</i>	<i>Region</i>	Share of workers by type of ownership					
		<i>State</i>	<i>City</i>	<i>Private</i>	<i>NGO</i>	<i>Mixed Russian</i>	<i>Foreign</i>
<i>dag</i>	The Republic of Dagestan	0.25	0.15	0.55	0.01	0.04	0.01
<i>ing</i>	The Republic of Ingushetia	0.34	0.15	0.49	0.01	0.02	0.01
<i>kab</i>	Kabardino Balkaria	0.19	0.19	0.49	0.01	0.11	0.00
<i>klr</i>	The Republic of Kalmykia	0.28	0.22	0.43	0.01	0.07	0.00
<i>kar</i>	Karachaevo Cherkessia	0.30	0.09	0.57	0.01	0.04	0.00
<i>sev</i>	North Osetia	0.30	0.18	0.45	0.01	0.06	0.01
<i>cher</i>	The Chechen Republic
<i>kdk</i>	Krasnodarsky krai	0.15	0.17	0.58	0.01	0.08	0.01
<i>sta</i>	Stavropolsky krai	0.22	0.09	0.59	0.01	0.05	0.04
<i>ast</i>	Astrakhanskaya	0.23	0.19	0.46	0.01	0.06	0.05
<i>vlg</i>	Volgogradskaya	0.15	0.18	0.59	0.01	0.07	0.01
<i>ros</i>	Rostovskaya	0.15	0.15	0.59	0.01	0.09	0.01
<i>pvl</i>	Provlzhsky Federal Okrug	0.21	0.16	0.48	0.01	0.13	0.02
<i>bas</i>	Bashkortostan	0.19	0.22	0.37	0.01	0.22	0.00
<i>mar</i>	The Republic of Mari El	0.23	0.19	0.44	0.01	0.12	0.01
<i>mor</i>	The Republic of Mordovia	0.25	0.16	0.40	0.01	0.17	0.00
<i>tat</i>	The Republic of Tatarstan	0.35	0.05	0.38	0.01	0.16	0.05
<i>udm</i>	The Republic of Udmurtia	0.21	0.18	0.45	0.01	0.14	0.01
<i>chv</i>	The Republic of Chuvashia	0.16	0.17	0.49	0.02	0.14	0.02
<i>kir</i>	Kirovskaya	0.22	0.16	0.48	0.01	0.10	0.03
<i>niz</i>	Nizhegorodskaya	0.17	0.17	0.55	0.01	0.08	0.02
<i>ore</i>	Orenburgskaya	0.16	0.19	0.54	0.00	0.11	0.01
<i>pen</i>	Penzenskaya	0.26	0.11	0.55	0.01	0.06	0.00
<i>per</i>	Permskaya	0.17	0.18	0.51	0.01	0.09	0.03
<i>kpao</i>	Komi-Perm AO	0.28	0.15	0.49	0.00	0.07	0.01
<i>sam</i>	Samarskaya	0.14	0.16	0.51	0.01	0.15	0.03
<i>sar</i>	Saratovskaya	0.21	0.16	0.55	0.01	0.04	0.02
<i>ulo</i>	Ulyanovskaya	0.21	0.17	0.41	0.01	0.19	0.01
<i>ura</i>	Urals Federal Okrug	0.18	0.19	0.49	0.01	0.08	0.06
<i>kr</i>	Kurganskaya	0.19	0.18	0.56	0.01	0.05	0.01
<i>sve</i>	Sverdlovskaya	0.21	0.18	0.40	0.01	0.07	0.12
<i>tum</i>	Tumenskaya	0.12	0.20	0.58	0.00	0.09	0.01
<i>hmao</i>	Hanty-Mansi AO	0.08	0.21	0.60	0.00	0.09	0.01
<i>ynao</i>	Yamal-Nenets AO	0.09	0.22	0.55	0.00	0.12	0.01
<i>chl</i>	Chelyabinskaya	0.19	0.19	0.46	0.01	0.09	0.07
<i>sib</i>	Siberia Federal Okrug	0.22	0.19	0.48	0.01	0.08	0.02
<i>alr</i>	Altay republic	0.28	0.23	0.45	0.01	0.03	0.00
<i>bur</i>	The Republic of Buryatia	0.25	0.22	0.41	0.02	0.06	0.04
<i>tyv</i>	The Republic of Tyva	0.34	0.32	0.30	0.00	0.04	0.00
<i>hak</i>	The Republic of Khakasia	0.23	0.16	0.51	0.01	0.07	0.04
<i>alt</i>	Altaisky krai	0.18	0.20	0.54	0.01	0.05	0.02
<i>kra</i>	Krasnoyarsky krai	0.21	0.20	0.42	0.00	0.11	0.06
<i>tao</i>	Tajmyr AO	0.36	0.17	0.43	0.00	0.03	0.00
<i>evao</i>	Evenkskiy AO	0.49	0.21	0.20	0.00	0.11	...
<i>irk</i>	Irkutskaya	0.21	0.20	0.46	0.00	0.10	0.02
<i>uoao</i>	Ust-Ordyn Buryat AO	0.15	0.25	0.52	0.00	0.07	0.00
<i>kem</i>	Kemerovskaya	0.16	0.22	0.50	0.00	0.11	0.00
<i>nvs</i>	Novosibirskaya	0.28	0.15	0.48	0.01	0.07	0.01
<i>oms</i>	Omskaya	0.19	0.17	0.56	0.01	0.07	0.01
<i>tom</i>	Tomskaya	0.23	0.18	0.49	0.00	0.08	0.01
<i>chi</i>	Chitinskaya	0.33	0.19	0.38	0.01	0.07	0.02
<i>abao</i>	Aginsk Buryat AO	0.35	0.07	0.54	0.01	0.02	0.01
<i>far</i>	Far East Federal Okrug	0.29	0.15	0.42	0.00	0.11	0.02
<i>sah</i>	The Republic of Sakha	0.52	0.01	0.28	0.00	0.18	0.00
<i>pri</i>	Primorsky krai	0.23	0.16	0.47	0.01	0.11	0.03
<i>hab</i>	Khabarovskiy krai	0.29	0.18	0.38	0.00	0.11	0.03

Code	Region	Share of workers by type of ownership					
		State	City	Private	NGO	Mixed Russian	Foreign
amu	Amurskaya	0.26	0.17	0.47	0.00	0.08	0.01
kam	Kamchatskaya	0.28	0.18	0.46	0.00	0.07	0.00
koao	Koryak AO	0.29	0.27	0.38	0.00	0.06	0.00
mag	Magadanskaya	0.23	0.21	0.46	0.00	0.08	0.02
sao	Sakhalinskaya	0.19	0.19	0.52	0.01	0.07	0.02
ea	Jewish AO	0.31	0.21	0.40	0.00	0.07	0.01
chu	Chukotsky AO	0.47	0.23	0.18	0.00	0.11	0.02

Source: Regions of Russia 2003

Distribution of labor force by type of ownership for 10 bigger regions

Table A5 presents shares of total regional labor force employed by state, city, local private company, non-government, mixed Russian, and foreign organizations for 10 bigger regions: Moscow, Saint Petersburg, Tumen, Northwest, North, Center, South, Ural, Siberia, and Far East regions. Aggregation from the regional level to the 10 big regions is conducted according to the following formula:

$$share_{kj} = \frac{\sum_{i \in k} Labor_by_ownership_{ij}}{\sum_{i \in k} Total_labor_i}$$

where i is one of the 89 regions of Russia that belongs to a bigger regional market k, and j is a type of ownership.

Table A5 Distribution of labor force by type of ownership. Ten bigger regions

Code	Market	Share of workers by type of ownership					
		State	City	Private	NGO	Mixed Russian	Foreign
Msc	Moscow	0.22	0.13	0.49	0.01	0.10	0.05
Stp	Saint Petersburg	0.30	0.04	0.54	0.01	0.05	0.05
Tmn	Tumen Region	0.12	0.20	0.58	0.00	0.09	0.01
Vgd	Northwest	0.19	0.19	0.50	0.01	0.09	0.03
Nor	North	0.26	0.21	0.38	0.00	0.09	0.05
Cen	Center	0.19	0.16	0.53	0.01	0.09	0.03
Sou	South	0.19	0.16	0.56	0.01	0.07	0.02
Url	Ural	0.21	0.16	0.46	0.01	0.12	0.04
Sib	Siberia	0.23	0.18	0.47	0.01	0.09	0.02
Far	Far East	0.26	0.18	0.44	0.01	0.10	0.02

Source: Regions of Russia 2003

2.3 BEEPS

2.3.1 Variables

We define a variable **workers_{ijk}** as a number of permanent, full time employees that a firm k in industry i from country j had in 2002 (Question 91a1 of the survey).

We define an industry i according to the firm's main area of activity in terms of sales (Question S.3)

Finally, we define a variable **ownership** that takes two values: *foreign* and *local*. A company k is the *foreign* owned company if at least 10% of the company is owned by a private foreign company or organization (Question S.4c).

2.3.2 Country Aggregation

We aggregate the variable **workers_{ijk}** in two categories:

$$foreign_{ij} = \sum_{k \in foreign} worker s_{ijk}$$

$$local_{ij} = \sum_{k \in local} worker s_{ijk}$$

Then, the share of the foreign owned firms in an industry i in a country j is defined as

$$foreign_share_{ij} = \frac{foreign_{ij}}{foreign_{ij} + local_{ij}}$$

The results are presented in the Table A6.

Country	Sector				
	Mining	Construction	Manufacturing	Transport communication and	Trade repair and Rent servi
Albania	1.00a	0.11	0.18	0.36	0.10
	<i>0.00b</i>	<i>0.32</i>	<i>0.39</i>	<i>0.50</i>	<i>0.30</i>
	2c	19	62	14	42
Armenia	0.33	0.00	0.19	0.10	0.17
	<i>0.58</i>	<i>0.00</i>	<i>0.39</i>	<i>0.32</i>	<i>0.38</i>
	3	11	64	10	47
Azerbaijan	0.00	0.11	0.24	0.40	0.09
	<i>0.00</i>	<i>0.32</i>	<i>0.43</i>	<i>0.52</i>	<i>0.29</i>
	3	27	49	10	57
Belarus	.	0.07	0.38	0.40	0.18
	.	<i>0.26</i>	<i>0.49</i>	<i>0.50</i>	<i>0.38</i>
	0	68	42	25	80
BiH	0.00	0.00	0.10	0.17	0.18
	<i>0.00</i>	<i>0.00</i>	<i>0.31</i>	<i>0.39</i>	<i>0.39</i>
	3	12	67	12	56
Bulgaria	0.33	0.00	0.24	0.16	0.17
	<i>0.58</i>	<i>0.00</i>	<i>0.43</i>	<i>0.37</i>	<i>0.38</i>
	3	19	49	25	93
Croatia	0.33	0.09	0.14	0.07	0.31
	<i>0.58</i>	<i>0.29</i>	<i>0.35</i>	<i>0.26</i>	<i>0.47</i>
	3	23	37	15	58

Czech	0.00 <i>0.00</i> 3	0.18 <i>0.38</i> 40	0.21 <i>0.41</i> 68	0.14 <i>0.36</i> 21	0.12 <i>0.33</i> 67
Estonia	0.00 <i>0.00</i> 3	0.15 <i>0.37</i> 20	0.17 <i>0.38</i> 30	0.13 <i>0.34</i> 16	0.21 <i>0.41</i> 48
FYROM	0.00 <i>0.00</i> 2	0.00 <i>0.00</i> 13	0.09 <i>0.29</i> 45	0.14 <i>0.36</i> 14	0.19 <i>0.40</i> 62
Georgia	1.00 <i>0.00</i> 1	0.30 <i>0.48</i> 10	0.15 <i>0.36</i> 34	0.18 <i>0.39</i> 17	0.12 <i>0.33</i> 58
Hungary	0.00 <i>0.00</i> 4	0.11 <i>0.32</i> 36	0.55 <i>0.50</i> 51	0.25 <i>0.45</i> 16	0.13 <i>0.33</i> 79
Kazakhstan	0.17 <i>0.41</i> 6	0.06 <i>0.24</i> 48	0.24 <i>0.43</i> 54	0.07 <i>0.26</i> 15	0.16 <i>0.37</i> 69
Kyrgyzstan	0.25 <i>0.50</i> 4	0.10 <i>0.30</i> 21	0.24 <i>0.43</i> 49	0.17 <i>0.39</i> 12	0.13 <i>0.34</i> 52
Latvia	. <i>.</i> 0	0.17 <i>0.39</i> 12	0.50 <i>0.51</i> 28	0.21 <i>0.43</i> 14	0.08 <i>0.27</i> 80
Lithuania	0.00 <i>0.00</i> 3	0.04 <i>0.19</i> 28	0.15 <i>0.36</i> 40	0.13 <i>0.34</i> 24	0.21 <i>0.41</i> 48
Moldova	.	0.00	0.34	0.18	0.07

	.	0.00	0.48	0.40	0.25
	0	5	50	11	74
Poland	.	0.11	0.15	0.17	0.20
	.	0.31	0.36	0.38	0.40
	0	76	114	54	168
Romania	.	0.17	0.21	0.25	0.12
	.	0.38	0.41	0.44	0.32
	0	24	82	20	68
Russia	0.29	0.08	0.17	0.24	0.16
	0.49	0.27	0.38	0.43	0.36
	7	80	128	37	135
Slovakia	.	0.18	0.17	0.40	0.22
	.	0.39	0.38	0.51	0.42
	0	17	29	15	46
Slovenia	0.00	0.00	0.36	0.00	0.15
	0.00	0.00	0.49	0.00	0.36
	3	28	47	16	40
Tajikistan	0.20	0.00	0.10	0.17	0.00
	0.45	0.00	0.31	0.39	0.00
	5	20	48	12	47
Turkey	0.00	0.03	0.17	0.21	0.10
	0.00	0.17	0.37	0.42	0.30
	8	33	151	28	165
Ukraine	0.00	0.04	0.15	0.14	0.27
	0.00	0.19	0.36	0.35	0.45
	2	57	139	29	114
Uzbekistan	0.00	0.02	0.39	0.16	0.18
	0.00	0.16	0.49	0.37	0.39

	5	41	51	19	92
Yugoslavia	0.00	0.06	0.12	0.23	0.27
	<i>0.00</i>	<i>0.24</i>	<i>0.32</i>	<i>0.43</i>	<i>0.45</i>
	4	18	68	22	73
<hr/>					
Total by sector	0.14	0.08	0.21	0.19	0.16
	<i>0.35</i>	<i>0.27</i>	<i>0.41</i>	<i>0.40</i>	<i>0.37</i>
	77	806	1676	523	2018

Notes: a Share of employed by a company with at least 10% of foreign ownership

Country	Mining	Construction	Manufacturing	Transport and communication	Trade and repair	Rental, business services	Hotels and restaurants	Other	Total by country
Albania	1.00^a	0.11	0.18	0.36	0.10	0.11	0.08	0.00	0.15
	<i>0.00^b</i>	<i>0.32</i>	<i>0.39</i>	<i>0.50</i>	<i>0.30</i>	<i>0.33</i>	<i>0.28</i>	<i>0.00</i>	<i>0.36</i>
	2 ^c	19	62	14	42	9	13	9	170
Armenia	0.33	0.00	0.19	0.10	0.17	0.10	0.25	0.00	0.16
	<i>0.58</i>	<i>0.00</i>	<i>0.39</i>	<i>0.32</i>	<i>0.38</i>	<i>0.32</i>	<i>0.45</i>	<i>0.00</i>	<i>0.37</i>
	3	11	64	10	47	10	16	10	171
Azerbaijan	0.00	0.11	0.24	0.40	0.09	0.13	0.22	0.00	0.16
	<i>0.00</i>	<i>0.32</i>	<i>0.43</i>	<i>0.52</i>	<i>0.29</i>	<i>0.35</i>	<i>0.44</i>	<i>0.00</i>	<i>0.37</i>
	3	27	49	10	57	8	9	6	169
Belarus	.	0.07	0.38	0.40	0.18	0.13	0.20	0.07	0.20
	.	<i>0.26</i>	<i>0.49</i>	<i>0.50</i>	<i>0.38</i>	<i>0.35</i>	<i>0.45</i>	<i>0.26</i>	<i>0.40</i>
	0	68	42	25	80	15	5	15	250
BiH	0.00	0.00	0.10	0.17	0.18	0.29	0.07	0.13	0.13
	<i>0.00</i>	<i>0.00</i>	<i>0.31</i>	<i>0.39</i>	<i>0.39</i>	<i>0.49</i>	<i>0.26</i>	<i>0.35</i>	<i>0.33</i>
	3	12	67	12	56	7	15	8	180
Bulgaria	0.33	0.00	0.24	0.16	0.17	0.18	0.10	0.06	0.16
	<i>0.58</i>	<i>0.00</i>	<i>0.43</i>	<i>0.37</i>	<i>0.38</i>	<i>0.39</i>	<i>0.30</i>	<i>0.24</i>	<i>0.37</i>
	3	19	49	25	93	22	21	17	249
Croatia	0.33	0.09	0.14	0.07	0.31	0.18	0.10	0.00	0.18
	<i>0.58</i>	<i>0.29</i>	<i>0.35</i>	<i>0.26</i>	<i>0.47</i>	<i>0.39</i>	<i>0.32</i>	<i>0.00</i>	<i>0.38</i>
	3	23	37	15	58	28	10	10	184
Czech	0.00	0.18	0.21	0.14	0.12	0.16	0.13	0.17	0.16
	<i>0.00</i>	<i>0.38</i>	<i>0.41</i>	<i>0.36</i>	<i>0.33</i>	<i>0.37</i>	<i>0.34</i>	<i>0.39</i>	<i>0.37</i>
	3	40	68	21	67	32	23	12	266
Estonia	0.00	0.15	0.17	0.13	0.21	0.25	0.07	0.22	0.18
	<i>0.00</i>	<i>0.37</i>	<i>0.38</i>	<i>0.34</i>	<i>0.41</i>	<i>0.44</i>	<i>0.26</i>	<i>0.44</i>	<i>0.38</i>

Country	Mining	Construction	Manufacturing	Transport and communication	Trade and repair	Rental, business services	Hotels and restaurants	Other	Total by country
	3	20	30	16	48	28	15	9	169
FYROM	0.00	0.00	0.09	0.14	0.19	0.09	0.14	0.17	0.13
	0.00	0.00	0.29	0.36	0.40	0.30	0.36	0.41	0.34
	2	13	45	14	62	11	14	6	167
Georgia	1.00	0.30	0.15	0.18	0.12	0.16	0.17	0.09	0.15
	0.00	0.48	0.36	0.39	0.33	0.37	0.39	0.29	0.36
	1	10	34	17	58	19	12	23	174
Hungary	0.00	0.11	0.55	0.25	0.13	0.27	0.20	0.06	0.23
	0.00	0.32	0.50	0.45	0.33	0.45	0.41	0.24	0.42
	4	36	51	16	79	30	15	17	248
Kazakhstan	0.17	0.06	0.24	0.07	0.16	0.14	0.18	0.10	0.15
	0.41	0.24	0.43	0.26	0.37	0.35	0.40	0.32	0.36
	6	48	54	15	69	37	11	10	250
Kyrgyzstan	0.25	0.10	0.24	0.17	0.13	0.00	0.50	0.09	0.17
	0.50	0.30	0.43	0.39	0.34	0.00	0.53	0.30	0.38
	4	21	49	12	52	14	8	11	171
Latvia	.	0.17	0.50	0.21	0.08	0.12	0.00	0.00	0.16
	.	0.39	0.51	0.43	0.27	0.33	0.00	0.00	0.37
	0	12	28	14	80	25	9	7	175
Lithuania	0.00	0.04	0.15	0.13	0.21	0.09	0.27	0.33	0.16
	0.00	0.19	0.36	0.34	0.41	0.29	0.45	0.52	0.36
	3	28	40	24	48	23	26	6	198
Moldova	.	0.00	0.34	0.18	0.07	0.67	0.00	0.14	0.17
	.	0.00	0.48	0.40	0.25	0.58	0.00	0.35	0.37
	0	5	50	11	74	3	9	22	174
Poland	.	0.11	0.15	0.17	0.20	0.13	0.21	0.04	0.15
	.	0.31	0.36	0.38	0.40	0.34	0.43	0.20	0.36
	0	76	114	54	168	47	14	25	498
Romania	.	0.17	0.21	0.25	0.12	0.27	0.12	0.11	0.18
	.	0.38	0.41	0.44	0.32	0.45	0.33	0.32	0.38
	0	24	82	20	68	26	17	18	255
Russia	0.29	0.08	0.17	0.24	0.16	0.23	0.21	0.12	0.16
	0.49	0.27	0.38	0.43	0.36	0.42	0.42	0.33	0.37
	7	80	128	37	135	40	19	58	504
Slovakia	.	0.18	0.17	0.40	0.22	0.11	0.00	0.17	0.18
	.	0.39	0.38	0.51	0.42	0.31	0.00	0.39	0.38
	0	17	29	15	46	38	12	12	169
Slovenia	0.00	0.00	0.36	0.00	0.15	0.12	0.07	0.00	0.15
	0.00	0.00	0.49	0.00	0.36	0.33	0.26	0.00	0.36
	3	28	47	16	40	33	15	6	188
Tajikistan	0.20	0.00	0.10	0.17	0.00	0.00	0.00	0.00	0.05
	0.45	0.00	0.31	0.39	0.00	0.00	0.00	0.00	0.21

Country	Mining	Construction	Manufacturing	Transport and communication	Trade and repair	Rental, business services	Hotels and restaurants	Other	Total by country
	5	20	48	12	47	18	10	14	174
Turkey	0.00	0.03	0.17	0.21	0.10	0.26	0.07	0.05	0.12
	0.00	0.17	0.37	0.42	0.30	0.45	0.25	0.21	0.33
	8	33	151	28	165	34	73	22	514
Ukraine	0.00	0.04	0.15	0.14	0.27	0.22	0.21	0.03	0.17
	0.00	0.19	0.36	0.35	0.45	0.41	0.42	0.19	0.38
	2	57	139	29	114	65	28	29	463
Uzbekistan	0.00	0.02	0.39	0.16	0.18	0.04	0.12	0.10	0.17
	0.00	0.16	0.49	0.37	0.39	0.20	0.33	0.32	0.38
	5	41	51	19	92	25	17	10	260
Yugoslavia	0.00	0.06	0.12	0.23	0.27	0.15	0.17	0.06	0.17
	0.00	0.24	0.32	0.43	0.45	0.37	0.38	0.24	0.38
	4	18	68	22	73	26	18	17	246
Total by sector	0.14	0.08	0.21	0.19	0.16	0.16	0.14	0.08	0.16
	0.35	0.27	0.41	0.40	0.37	0.37	0.34	0.28	0.37
	77	806	1676	523	2018	673	454	409	6636

Notes: a Share of employed by a company with at least 10% of foreign ownership

b Standard deviation

c Number of observations

Source: BEEPS 2002

Appendix B

Investment Ratings of the Regions of Russia

To assess the investment climate and barriers to foreign direct investment, we use “The Rating of Investment Climate of Russia’s Regions in 2002-2003” published by Expert Rating Agency (Expert RA). Expert RA is a rating agency founded by *Expert* Magazine that has published its “Investment Rating of Russia’s Regions” every year since 1996. The evaluation of the investment climate is carried out for each of the 89 regions of Russia based on more than a hundred statistical indicators of regional development from various sources that include Rosstat, the Ministry of Finance, the Ministry of Economic Development, and The Central Bank.

The rating of investment climate is formed based on two primary measures: **investment risk** and **investment potential** of each region. The aggregate measure of investment risk is calculated based on the seven types of risks: legal, political, economic, financial, social, criminal, and ecological risks. The rating of a region by each type of risks is defined based on the **index of risk** calculated as the deviation from the all-Russia average level of risk that is set equal to 1 and aggregated to the overall index of risk. An **investment potential** of a region is derived based on the eight regional indicators of economic potential in the following categories: labor, consumer demand, production, financial potential, institutional quality, innovations, infrastructure, and natural resources. The region’s potential rating in each category is calculated according to the regional share in that category. The overall rating of investment potential is derived as a weighted average of investment potential in each category. For our sensitivity analysis, we chose the “investment potential rankings.”

Table 2 Investment Risk in 2003

Region	Investment risk rating in 2003	Index of investment risk	Seven components of investment risk						
			Leg al	Polit ical	Econo mic	Fina ncial	Soc ial	Crimi nal	Ecolo gical
Novgorodskaya	1	0.861	3	44	9	20	7	39	19
Yaroslavskaya	2	0.871	1	74	48	22	2	45	50
Saint Petersburg city	3	0.872	52	76	6	2	3	40	44
Belgorodskaya	4	0.876	58	26	14	24	4	16	11
Orlovskaya	5	0.885	24	6	15	23	8	33	74
The Republic of Tatarstan	6	0.886	64	2	23	27	17	43	40
Vologodskaya	7	0.897	30	23	16	10	6	41	70
Moskovskaya	8	0.902	9	28	8	14	40	24	43
Nizhegorodskaya	9	0.907	2	72	52	16	9	29	18
The Republic of Bashkortostan	10	0.923	4	7	3	35	38	63	42
The Republic of Mordovia	11	0.924	49	1	49	47	42	14	23
Rostovskaya	12	0.944	44	21	4	31	25	46	21
Lipetskaya	13	0.949	42	55	21	25	5	5	73
Permskaya	14	0.953	10	35	26	11	11	69	67
Moscow city	15	0.959	76	34	1	1	1	85	26
Tomskaya	16	0.976	7	40	7	3	37	77	54
Leningradskaya	17	0.977	11	58	10	9	50	26	72
Kaluzhskaya	18	0.979	26	36	20	18	13	47	71
Krasnodarsky krai	19	0.986	8	24	12	26	35	67	56
The Republic of Chuvashia	20	0.988	18	46	64	33	27	23	8
Samarskaya	21	0.992	28	63	36	8	18	66	60
Kaliningradskaya	22	0.992	45	68	29	6	12	72	36
Saratovskaya	23	1.022	53	13	35	63	26	20	39
Tverskaya	24	1.023	34	48	67	53	20	25	3
Voronezhskaya	25	1.037	17	67	56	50	28	27	33
Nenetskiy AO	26	1.04	75	11	2	4	58	8	83
Arkhangelskaya	27	1.049	16	27	33	38	49	18	76
Penzenskaya	28	1.055	15	30	74	67	36	1	29
Smolenskaya	29	1.058	38	62	45	51	10	55	45
Ryazanskaya	30	1.06	70	57	58	49	15	7	66
The Republic of Khakasia	31	1.06	6	56	24	30	54	59	49
The Republic of Adygeya	32	1.062	29	10	79	60	53	12	6
Kirovskaya	33	1.066	5	49	72	58	48	13	31
Murmanskaya	34	1.073	51	22	39	48	19	42	79
Kemerovskaya	35	1.078	27	33	25	55	16	52	78
Kostromskaya	36	1.078	48	53	66	59	34	17	28
Volgogradskaya	37	1.095	59	79	51	15	32	61	41
Orenburgskaya	38	1.105	22	60	42	28	55	56	57
Yamal-Nenets AO	39	1.11	25	5	17	7	44	53	88
Hanty-Mansi AO	40	1.113	61	9	5	5	14	79	87
Stavropolsky krai	41	1.113	36	78	18	57	23	70	15
The Republic of Buryatia	42	1.117	12	32	13	61	62	54	48
Chukotsky AO	43	1.117	89	3	62	13	56	22	80

Region	Investment risk rating in 2003	Index of investment risk	Seven components of investment risk						
			Leg	Polit	Econo	Fin	Soc	Crimi	Ecolo
			al	ical	mic	ncial	ial	nal	gical
The Republic of Udmurtia	44	1.121	57	19	65	17	76	30	53
Khabarovskiy krai	45	1.123	13	37	38	37	24	82	68
Pskovskaya	46	1.127	39	52	34	34	80	34	13
The Republic of Karelia	47	1.129	55	43	30	39	57	50	65
Tambovskaya	48	1.136	21	41	60	69	47	19	55
The Republic of Sakha	49	1.147	47	12	75	42	75	15	64
Kurskaya	50	1.148	78	61	61	52	43	32	32
Omskaya	51	1.157	63	45	44	19	65	73	51
Sverdlovskaya	52	1.162	74	47	19	21	67	57	69
Amurskaya	53	1.168	46	69	46	68	22	65	52
Astrakhanskaya	54	1.17	33	65	31	12	79	75	34
Tumenskaya	55	1.183	41	18	11	46	30	86	62
Ulyanovskaya	56	1.187	77	50	59	64	51	31	12
Krasnoyarsky krai	57	1.194	19	77	41	40	39	58	81
Vladimirskaia	58	1.196	54	71	40	45	83	28	7
Chelyabinskaya	59	1.196	62	42	37	41	31	44	86
Altay republic	60	1.198	69	39	28	70	63	49	27
Tul'skaya	61	1.199	43	85	47	43	46	11	82
Irkutskaya	62	1.209	66	73	27	44	33	76	77
Aginsk Buryat AO	63	1.225	89	4	68	73	73	4	24
Novosibirskaya	64	1.231	14	16	32	29	82	83	30
Primorsky krai	65	1.242	65	83	53	32	41	80	59
Bryanskaya	66	1.255	23	66	76	65	21	36	85
Chitinskaya	67	1.263	37	31	81	62	52	71	61
Kurganskaya	68	1.271	68	54	71	66	68	64	14
The Republic of Mari El	69	1.329	32	81	80	78	59	35	10
The Republic of Kabardino Balkaria	70	1.332	60	82	43	84	64	6	5
Sakhalinskaya	71	1.341	79	80	22	56	81	68	46
Komi-Perm AO	72	1.342	67	25	69	85	61	9	9
Ivanovskaya	73	1.38	31	64	73	71	87	37	17
Altaisky krai	74	1.387	35	84	54	75	84	51	47
The Republic of Komi	75	1.419	72	59	50	54	74	78	84
Jewish AO	76	1.419	56	20	82	81	29	84	38
Evenkskiy AO	77	1.435	81	15	86	74	78	3	58
The Republic of Kalmykia	78	1.448	50	38	88	76	71	48	20
The Republic of North Osetia	79	1.449	20	70	55	80	45	87	22
Tajmyr AO	80	1.474	89	17	78	36	60	10	89
Magadanskaya	81	1.525	80	51	83	72	85	62	63
Kamchatskaya	82	1.563	83	75	84	79	66	74	37
The Republic of Tyva	83	1.604	71	8	70	86	77	81	25

Region	Investment risk rating in 2003	Index of investment risk	Seven components of investment risk						
			Leg	Polit	Econo	Finan	Soc	Crimi	Ecolo
			al	ical	mic	ncial	ial	nal	gical
The Republic of									
Karachaevo Cherkessia	84	1.621	89	86	57	83	69	38	16
The Republic of									
Dagestan	85	1.625	40	87	63	82	70	60	4
Ust-Ordyn Buryat AO	86	1.644	82	29	85	88	72	2	1
The Republic of									
Ingushetia	87	2.493	89	88	77	87	86	88	2
Koryak AO	88	2.861	73	14	87	77	89	21	75
The Chechen Republic									
	89	13.791	89	89	89	89	88	89	35

Table 3 Investment Potential in 2003

Region	Investment potential rating 2003	Share in overall potential of Russia	Eight components of investment potential							
			Lab	Cons	Produ	Finan	Institu	Innov	Infrastr	Reso
			or	umer	ction	cial	tional	ation	ucture	urces
Novgorodskaya	65	0.433	66	65	56	64	57	48	30	79
Yaroslavskaya	33	0.803	31	34	33	35	26	25	27	80
Saint Petersburg city	2	6.572	2	3	5	4	2	3	1	89
Belgorodskaya	25	1.105	36	31	27	41	36	41	9	9
Orlovskaya	58	0.516	55	56	57	57	62	38	21	76
The Republic of										
Tatarstan	9	2.049	10	9	7	8	7	10	35	34
Vologodskaya	39	0.73	46	35	19	27	39	39	63	62
Moskovskaya	3	4.511	3	2	3	3	3	2	4	48
Nizhegorodskaya	6	2.239	6	10	15	15	9	4	33	57
The Republic of										
Bashkortostan	15	1.822	12	8	10	6	18	14	47	25
The Republic of										
Mordovia	62	0.452	53	68	55	60	69	47	34	66
Rostovskaya	12	1.969	5	7	16	12	6	11	13	29
Lipetskaya	38	0.74	47	38	21	31	53	65	14	73
Permskaya	11	1.97	22	14	14	11	16	12	58	5
Moscow city	1	17.781	1	1	1	1	1	1	2	89
Tomskaya	45	0.681	48	37	37	33	41	22	70	28
Leningradskaya	21	1.228	29	36	18	32	23	6	5	52
Kaluzhskaya	40	0.726	40	55	48	55	44	15	17	71
Krasnodarsky krai	10	2.017	4	5	12	9	5	27	6	30
The Republic of										
Chuvashia	52	0.615	39	53	47	53	49	36	19	83

Region	Investment potential rating	Share in overall potential of Russia	Eight components of investment potential							
	2003		Lab or	Cons umer	Produ ction	Finan cial	Institu tional	Innov ation	Infrastr ucture	Reso urces
Samarskaya	8	2.16	7	6	6	10	8	7	20	45
Kaliningradskaya	37	0.741	52	58	53	52	29	54	3	40
Saratovskaya	20	1.262	9	21	23	21	19	19	23	35
Tverskaya	44	0.682	37	48	41	47	33	29	26	63
Voronezhskaya	28	1.032	23	22	29	30	28	16	18	55
Nenetskiy AO	85	0.091	86	83	74	78	81	83	86	69
Arkhangelskaya	43	0.685	41	33	43	39	42	46	66	19
Penzenskaya	49	0.628	27	46	51	51	55	35	39	49
Smolenskaya	54	0.565	51	47	45	56	56	57	15	74
Ryazanskaya	48	0.628	42	49	40	45	46	42	22	56
The Republic of Khakasia	73	0.31	71	70	69	71	71	75	67	27
The Republic of Adygeya	75	0.254	75	73	76	76	73	79	25	86
Kirovskaya	55	0.56	34	45	44	42	47	51	64	53
Murmanskaya	32	0.926	43	40	38	36	37	30	31	13
Kemerovskaya	13	1.95	16	11	13	16	24	26	57	4
Kostromskaya	69	0.344	68	69	64	69	65	49	59	72
Volgogradskaya	22	1.175	19	16	20	17	22	20	43	32
Orenburgskaya	30	0.957	24	27	22	29	35	55	44	18
Yamal-Nenets AO	16	1.682	67	41	9	13	25	73	80	2
Hanty-Mansi AO	5	2.554	26	15	2	2	27	37	81	6
Stavropolsky krai	27	1.035	14	19	31	24	20	32	51	41
The Republic of Buryatia	57	0.521	57	54	62	58	61	66	74	15
Chukotsky AO	70	0.339	81	81	77	73	82	81	78	14
The Republic of Udmurtia	41	0.725	32	39	28	37	30	40	41	60
Khabarovskiy krai	23	1.143	20	29	25	22	34	34	61	10
Pskovskaya	63	0.443	59	62	67	67	63	68	12	77
The Republic of Karelia	60	0.473	65	57	54	61	54	62	36	36
Tambovskaya	59	0.515	49	44	58	54	64	43	32	67
The Republic of Sakha	19	1.372	64	32	26	23	43	44	85	1
Kurskaya	35	0.766	45	51	42	49	51	53	7	21
Omskaya	31	0.937	25	20	34	20	21	21	53	43
Sverdlovskaya	4	2.771	8	4	4	5	4	5	48	8
Amurskaya	50	0.617	56	61	60	62	66	71	65	12
Astrakhanskaya	56	0.536	60	52	59	44	52	59	46	26
Tumenskaya	34	0.801	38	25	50	28	11	23	62	51
Ulyanovskaya	46	0.649	50	42	46	50	48	18	42	54

Region	Investment potential rating	Share in overall potential of Russia	Eight components of investment potential							
	2003	in potential of Russia	Lab or	Cons umer	Produ ction	Finan cial	Institu tional	Innov ation	Infrastr ucture	Reso urces
Krasnoyarsky krai	7	2.175	13	13	11	7	14	17	75	3
Vladimirskaya	36	0.75	30	50	39	43	32	24	16	70
Chelyabinskaya	14	1.886	11	12	8	14	12	9	24	24
Altay republic	83	0.126	78	79	82	80	78	80	72	50
Tulskaya	29	0.977	33	30	30	38	31	13	8	61
Irkutskaya	17	1.551	17	18	17	18	17	31	73	7
Aginsk Buryat AO	88	0.052	84	84	87	84	88	82	83	85
Novosibirskaya	18	1.373	15	17	24	19	13	8	50	37
Primorsky krai	24	1.126	18	24	35	25	10	33	45	17
Bryanskaya	47	0.644	28	43	52	48	50	50	10	68
Chitinskaya	51	0.616	63	63	66	59	60	64	69	11
Kurganskaya	67	0.421	62	60	65	63	59	45	49	65
The Republic of Mari El	71	0.32	70	71	70	72	67	61	54	44
The Republic of Kabardino Balkaria	68	0.403	61	59	68	65	72	69	28	47
Sakhalinskaya	61	0.472	69	64	49	46	40	56	55	39
Komi-Perm AO	87	0.061	82	82	85	85	83	77	84	82
Ivanovskaya	66	0.426	44	67	63	66	58	60	37	84
Altaysky krai	26	1.037	21	23	32	34	15	28	52	23
The Republic of Komi	42	0.69	54	28	36	26	45	52	79	22
Jewish AO	78	0.19	80	77	78	81	77	74	60	38
Evenkskiy AO	84	0.094	87	88	88	89	89	89	89	31
The Republic of Kalmykia	82	0.138	76	78	80	74	76	76	76	64
The Republic of North Osetia	64	0.435	58	66	72	68	70	70	11	58
Tajmyr AO	77	0.235	85	85	86	83	85	85	71	16
Magadanskaya	72	0.311	74	75	73	75	74	72	82	20
Kamchatskaya	74	0.269	73	72	71	70	68	58	68	42
The Republic of Tyva	81	0.138	79	76	81	79	79	78	88	33
The Republic of Karachaevo Cherkessia	76	0.239	72	74	75	77	75	67	56	59
The Republic of Dagestan	53	0.613	35	26	61	40	38	63	40	46
Ust-Ordyn Buryat AO	86	0.066	83	86	84	87	84	89	77	81
The Republic of Ingushetia	79	0.177	77	80	83	82	80	84	38	87
Koryak AO	89	0.047	88	87	79	86	86	89	87	78
The Chechen Republic	80	0.155	89	89	89	88	87	89	29	75

Appendix C

Key Elements of the GAMS code for creating the Regional Input-Output Tables

Below are the key elements of the GAMS code for creating the regional input-output tables:

```

positive
variable
    y(g,r)          Regional shares of output (imputed),
    rtm(mrg,g,r)    Regional shares of margin provision,

    cd(r)           Region shares of final consumption,
    id(r)           Regional shares of investment
    gd(r)           Regional shares of government demand;

*   Define shares of industrial and energy output based on
*   economic indicators and industrial share statistics from
*   the Regions of Russia. Notice that this covers industrial
*   goods, fuels, refined products and agricultural output:

y.fx(g,r)$indsec(g) = indic(r,"Indus")*indshare(r,g) /
                    sum(rr,indic(rr,"Indus")*indshare(rr,g));

y.fx(fuel,r) = regfuel(r,fuel);
y.fx("oil",r) = oil(r,"oil")/sum(rr,oil(rr,"oil"));

y.fx("agr",r) = indic(r,"totagr") / sum(rr, indic(rr,"totagr"));

*   Use "Commissioning of total living area" to allocate
*   construction:

y.fx("con",r) = indic(r,"housing") / sum(rr,
indic(rr,"housing"));

```

* Use industrial output to allocate other goods and services:

```
y.fx("oth",r) = indic(r,"indus")/sum(rr,indic(rr,"indus"));
```

* Consumptino demand levels are assumed proportional to
* expenditure per capita times population:

```
cd.l(r) = indic(r,"exppc")*indic(r,"pop") /  
          sum(rr,indic(rr,"exppc")*indic(rr,"pop"));
```

* Investment shares are likewise based on indicator data:

```
id.l(r) = indic(r,"invest")/sum(rr, indic(rr,"invest"));
```

* Government demand is assumed proportional to GRP:

```
gd.l(r) = indic(r,"grp")/sum(rr, indic(rr,"grp"));
```

Here, then, is the system of linear equations which determine service sector supplies -- note that these equations are defined in terms of submatrices taken from the national input-output table, hence we retain the input-output characteristics from the national table when setting up the regional statistics, and we only calibrate regional shares of output:

positive

variable a(g,r) Armington activity level;

equations pamkt, pdmkt, pmmkt;

* Armington composite goods supply and demand:

```
pamkt(g,r)$(a.lo(g,r) ne a.up(g,r))..
```

```
      a(g,r) * a0_(g) =e= sum(gg, id0_(g,gg)*y(gg,r))  
          + ac0_(g)*cd.l(r) + ai0_(g)*id.l(r) + ag0_(g)*gd.l(r);
```

* Market for domestic supply:

```
pdmkt(g,r)$(y.lo(g,r) ne y.up(g,r))..
```

```

      (d0_(g)+s0_(g))*y(g,r) =e=
      sum((mrg,gg), rtmd0_(g,mrg,gg)*rtm(mrg,gg,r)) +
ad0_(g)*a(g,r);

```

* Market for imported supply:

```

pmmkt(mrg,g,r)$(rtm.lo(mrg,g,r) ne rtm.up(mrg,g,r))..
      rtm(mrg,g,r) * rtm0_(mrg,g) =e=
      sum(gg, y(gg,r) * md0_(mrg,g,gg))
      + y(g,r) * ei.l(r,g) * md0_(mrg,g,"x")
      + cd.l(r)*md0_(mrg,g,"c")
      + id.l(r)*md0_(mrg,g,"i")
      + gd.l(r)*md0_(mrg,g,"g");

```

After having constructed input-output tables, we then integrate and rebalance trade statistics to match these production and consumption statistics.