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Russia and the WTO: The “Gravity” of Outsider Status

Bogdan Lissovolik and Yaroslav Lissovolik

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Prepared by Bogdan Lissovolik and Yaroslav Lissovolik

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Abstract

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With China’s accession to the WTO in 2001, Russia is by far that organization’s most prominent nonmember. This paper applies the gravity model to gauge whether this “outsider” status has been affecting Russia’s export structure. On the basis of cross-section and panel regressions for 1995–2002, we find that Russian exports to WTO members have fallen short of the model’s predictions. The paper discusses possible explanations of this result, including Russia’s exclusion from various WTO procedures, although own-export restrictions could have a similar effect. The model points to Russia’s further trade reorientation toward WTO members after a putative accession. Our results also prompt some ideas that may resolve the recent empirical controversy over the WTO’s overall role in promoting trade.

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Authors’ E-Mail Addresses: blissovolik@IMF.org, ylissovolik@IMF.org

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I. INTRODUCTION

The role of the World Trade Organization (WTO) in international trade has recently come under increased scrutiny. In a provocative study, Rose (2002a) concluded—on the basis of a gravity model—that the effect of the WTO on trade was insignificant. This result was disputed by Subramanian and Wei (2003), who employed an augmented specification of the gravity model to estimate the relationship between trade and WTO membership. The latter authors have argued that the organization strongly promotes trade, although with considerable asymmetries across sectors and groups of countries. In particular, WTO liberalization appears to be useful to members to a larger degree than nonmembers; although the latter also could benefit somewhat from the spillover effect of expanding global trade. Rose has countered, however, that these asymmetries are not central to the WTO's overall role, and thus the debate is ongoing.

This paper uses a gravity model to evaluate the impact of the WTO on the trade of Russia—currently the largest nonmember. The single-country focus is motivated by several reasons. First, it would partly gauge the insights of the “multi-country” gravity models, since these should, to a certain degree, apply to large countries with reasonably diversified trade flows. Second, it would assess the WTO-related issues from a national perspective, which is, in practice, a key focus of most policy decisions. Third, Russia's case is particularly important due both to its size and the fact that its accession negotiations provide a reference point for some other nonmember countries (notably in the Commonwealth of Independent States (CIS)) involved in a similar process. Finally, Russia's WTO accession has been a very contentious topic, whether in terms of its domestic political economy or with respect to entry conditionality demanded by some WTO members.

Our main conclusion is that the impact of Russia's accession to the WTO on structure and possibly the level of trade may be quite significant and may be much higher than the existing estimates. As a first step, we find cross-section and panel data evidence that, on average, after adjusting for the customary gravity model and country-specific effects, Russia's exports to the WTO countries underperformed its exports to other countries in 1995–2002. These results are somewhat surprising, both in light of the general trade-promoting view of the WTO and the overwhelming “casual” evidence of Russia's trade reorientation toward the more advanced developed and developing countries, all of which are or have recently become WTO members.

As a second step, we explore the possible reasons for this empirical result, which include (i) Russia's nonparticipation in WTO procedures; (ii) Russia's own export restrictions; (iii) possible model specification and data caveats; (iv) structural path dependence in Russia's exports; (v) insufficient quality of Russia's products; and (vi) Russia's comparative advantage in bargaining with WTO nonmembers. The first two factors come out as more plausible and consistent with the stylized facts, and thus it appears that Russia would further reorient its trade in line with the gravity model with WTO accession, which is expected to relieve factors (i) and (ii). If so, the magnitude of the trade-related benefits from joining the WTO appears quantitatively large in the long term, although the precise parameter estimates have to be interpreted with caution, given the partial nature of the model and data problems.

Finally, we also discuss how our results might help shed some light on the current empirical controversy over the WTO's overall role in influencing trade. We conclude that, while the WTO exhibits some trade-promoting features, the asymmetry between members and nonmembers also may constrain trade, as well as obscure econometric evidence on the WTO's role in multilateral models. The reason is that a large country like Russia may be a local center of "gravity" for some non-WTO members, and the customary controls of the gravity model do not eliminate this effect fully. This may bias any multilateral inferences derived from implicitly treating all country observations as independent.

The structure of the paper is as follows. Section II offers an overview of Russia's trade performance and its WTO accession issues, and outlines the scope for the paper's contribution to the literature. Section III describes the methodology and data set. Section IV presents the main empirical results. Section V explores the economic rationale for the gravity model results and several of its implications. Section VI presents some concluding remarks and suggestions for further research.

II. RUSSIA'S EVOLVING INTEGRATION INTO THE WORLD TRADING SYSTEM

A. Trade Developments

After proclaiming independence in late 1991, Russia embarked on a difficult transition from central planning to the market economy. The key dimension of this transition has concerned the opening up and integration of Russia's economy into the world economy, with the primary focus on trade's role in unleashing incentives in line with the fundamental principle of comparative advantage. This process seemed critical, as much of external trade of the socialist bloc had not been based on market principles but reflected priorities imposed by political and ideological factors. Thus, export and import flows had been heavily concentrated in the former socialist economies and involved various forms of explicit or implicit subsidization. The sudden change in the policy course was exacerbated by the severe economic dislocation of the early 1990s, with further significant effects on the extent, direction, and time profile of adjustment in the external trade sector.



In the event, Russia experienced large shifts in levels and structure of external trade during the transition period. In terms of levels, the shock of Soviet disintegration caused a trade implosion in 1991–92 (see Figure 1), which was followed by a steady rebound in 1993–2003 (save for a brief slippage in 1997–98).

The significant structural changes in Russia's trade occurred mostly in the early 1990s. The main geographical trend was a reorientation away from the former socialist economies toward more advanced market economies (see Table 1). Trade with the former socialist economies contracted very abruptly, as the value of Russia's exports to those countries more than halved in 1991 alone.² Since the mid-1990s, however, changes in the geographical composition have not been very large.

Table 1. Geographical Structure of Russia's Exports in 1990, 1995, and 2002
(In percent of total exports)

	1990	1995	2002
CIS	64.0	18.5	14.6
EU	...	33.6	34.9
Former COMECON	15.5	11.0	10.7
US	...	6.6	6.1
China	...	4.4	6.3

Sources: own calculations based on *Direction of Trade Statistics*.
Daviddi and Espa (1996) for the 1990 data

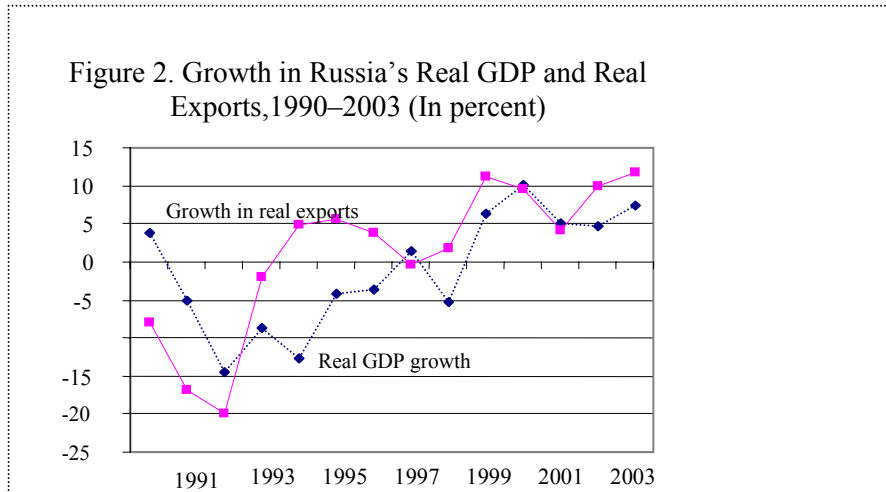
The commodity composition of trade also has changed significantly compared to socialist times, particularly on the export side, with a reduction in machinery exports accompanying a steady expansion in shipments of energy, and, to a smaller extent, of semiprocessed goods (metals and chemicals). For example, the share of machinery in Russia's exports to non-CIS countries fell from 18 percent in 1990 to 7 percent in 1993 (Daviddi and Espa, 1996). To some extent, these changes reflected the expected market-based pressure to downsize low- or negative-value-added activities. While there were further changes in the commodity composition of exports between 1995 and 2002 (see Table 2), they were much less pronounced than in the early 1990s. In the end, Russia's exports still remained geographically diversified, at least compared to the CIS countries. Thus, the share of Russia's three main export markets in total exports was 23 percent in 1995, compared with between half and two-thirds for other CIS countries (see Elborgh-Woytek (2003)). In 2001, this figure stood at 22 percent for Russia, compared with a 31–65 percent range for other CIS countries.

² See Granville (1995). However, pre-1994 data on Russia's trade are highly imperfect for a variety of reasons, including very weak compilation capacity and distorted valuation.

Table 2. Sectoral Structure of Russia's Exports in 1995 and 2002
(In percent, current U.S. dollar value terms)

	1995	2002
Agricultural products	3.3	2.6
Minerals	42	55.2
Chemical industry products	9.9	7
Wood, pulp and paper	5.6	4.6
Textiles	1.5	0.8
Metals and precious stones	26.1	18.6
Machinery and transport equipment	9.9	9.5
Other	1.7	1.7

Source: Goskomstat



These trade-related developments appear to have had a sizable and continual impact on the key macroeconomic and structural dimensions of Russia's transition. On the macroeconomy, the trade contraction greatly exacerbated the early output

decline and "disorganization," (see Blanchard and Kremer (1997)), while the subsequent start of trade recovery preceded the stabilization of output (see Figure 2), as well as that of the exchange rate and prices in the mid-1990s.³ The setback of the 1998 currency crisis was in no small measure triggered by adverse shocks for Russia's exports, while the post-1998 recovery relied on the reversal of those shocks, in conjunction with the substantial expansionary impact of the real depreciation of the ruble. Regarding structural issues, trade has not only subjected enterprises to competitive pressures and world price signals, but also helped keep in check barter and other forms of a noncash economy, which had plagued Russia's structural transformation for most of the 1990s.

Despite its largely beneficial effect in terms of market-based adjustment, the role of foreign trade in Russia's economy has been contained by domestic and external policy decisions.

³ See various issues of IMF country reports and the European Bank for Reconstruction and Development (EBRD) transition reports for an overview of macroeconomic and structural developments in Russia.

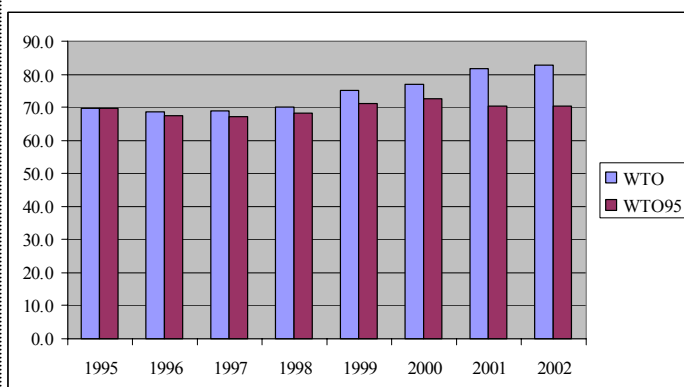
Domestically, these reflected discretionary government interference, with more than occasional administrative actions at federal and local levels against the principles of free trade. A case in point is various export restrictions or bans imposed by local governments to “protect the supply of essential products” during the 1990s. Another example is federal government decisions to tax or restrict exports of energy products more heavily starting in 1999 (see below for details). Whatever the specific merit of some of these steps, they caused concern over trade policy reversal in the absence of a comprehensive strategy and framework for such decisions. Externally, the key problem concerned the substantial remaining restrictions on Russia’s exports by industrialized and some developing countries, which have mostly affected semiprocessed products like metals and chemicals. These policies might have something to do with the above evidence that trade-related structural changes generally occurred in the early 1990s, but slowed substantially thereafter.

B. The WTO Entry Debate

Reflecting these problems, Russia’s accession to the WTO has emerged as a key step for further market-oriented reform (see Lissovolik and Liventsev (2002)).⁴ On the one hand, this accession could harmonize Russia’s domestic legislation and practices with those of its major trading partners. On the other hand, it would remove the main remaining obstacles to Russia’s exports to the WTO members, amplifying the substantial gains from trade that Russia has already been able to generate. The unused potential for further trade reorientation is illustrated by the fact that Russia’s exports to the WTO accounted for “only” about 80 percent of its total exports in 2002 (Figure 3), compared with the 95 percent share of the WTO members in world trade. Furthermore, the share of Russia’s exports to WTO countries that became members of the organization in 1995 hardly changed in 1995–2002, with the growth in the share of exports directed to all WTO countries largely accounted for by the increase in the WTO’s membership. However, despite these arguments and the concomitant proclamation of WTO entry as Russia’s key policy priority, the debate on the benefits of Russia’s membership has become more ambiguous lately, causing substantial delays in the already protracted accession process.

⁴ A short chronology of Russia’s ongoing WTO accession process is provided in the Appendix Table A1.

Figure 3. Share of Russia's exports to WTO countries in its total exports (1995-2002)



Source: *Direction of Trade Statistics, IMF*

Note: the WTO series shows the share of Russia's exports to all WTO members in each year, while the WTO-95 series gives the same indicator only for those countries that were WTO members by the end of 1995.

The uncertainty over Russia's benefits from WTO membership has derived from several considerations. First, the last few years have seen less optimism over the benefits and prospects of free trade, both around the world (following the well-known events in Seattle and Cancun) and within Russia. Second, domestic opponents of Russia's WTO entry have argued that "additional" gains from membership would be limited, since the country already enjoys most-favored-nation (MFN) status from many WTO members, while some advanced countries have accorded preferential

treatment to Russia under the Generalized System of Preferences (GSP). Third, there have been concerns over asymmetric treatment, as Russia's "concessions" (in the form of lower tariffs) on imports (and a possible short-term output contraction) would "far outweigh" any benefits for its exports. Fourth, some of the conditionality demanded during the accession process—particularly on the liberalization of domestic energy prices—has been widely unpopular due to its perceived economic and social consequences inside Russia. Finally, there has been a determined opposition to WTO entry from some sectoral lobbies, as well as from the ideological opponents of economic "liberalism."

The advocates of WTO accession have not been short of counterarguments. They point to the possibility that the benefits from past and future trade liberalizations would largely accrue to WTO members, and would benefit nonmembers much less. Importantly, some of the benefits of WTO membership may not be explicitly imbedded in the lower tariff levels but regard "intangibles" like access to the dispute settlement body of the WTO, which are important for establishing a "level playing field" with WTO members. Thus, Russia's "outsider" status not only deprives it of automatic MFN treatment but also of the option of defending its interests through the institutional framework of the WTO. Regarding other counterarguments, the possible short-term losses from import competition may be manageable in light of longer-term efficiency gains. The latter would likewise result from the level playing field facilitated by appropriate pro-market structural reforms and by constraints on vested interests.

While the issue of WTO accession has proved a true bone of contention, there has been a relative dearth of quantitative evidence to help resolve or anchor this debate. Russia's accession to the WTO has been the subject of a number of studies, but these have had fairly disparate frameworks, while the results have varied in significance. The more comprehensive studies have generally focused on the output implications of such accession. Thus, the Russian Academy of Sciences and the National Investment Council (RAS, 2002) focused on the consequences of the accession-related reductions in import duties for sectoral and

regional output dynamics, using an input-output model. The overall output effect was estimated at 1 percent of GDP. Another study by Jensen, Rutherford, and Tarr (2002) employed a computable general equilibrium (CGE) model, which, in addition to changes in import duties, also estimated the effects of foreign investment, concluding that the latter was likely to account for up to 70 percent of Russia's benefits from WTO accession. On this basis, GDP gains were estimated to range from 3 percent in the medium term to about 25 percent in the longer term.

One major underlying problem with these estimates has been the lack of a reasonably comprehensive projection of the effect of accession on Russia's exports, which may be of primary importance both for the derivation of the output effects and in its own right. Alexeev and others (2003) briefly explore this issue within a CGE model, on the assumption that Russia's export competitiveness would be enhanced with lower import duties. This yields a broad-based (across all sectors), but very modest, estimate of a 0.9 percent export expansion. However, the calculation disregards the likelihood that the level of Russia's exports may already be constrained as a consequence of nonmembership. Berglof and others (2003) put the latter shortfall at US\$3 billion, or about 3 percent of Russia's total exports, based on an assessment of actual restrictions on Russia's exports across various sectors. Still, one may argue that this effect could be very different in the longer term, as the economy adjusts to the improved market access. So far, we know of no studies that explore such a "general equilibrium" effect within a model of Russia's external trade, such as the gravity model, and thus we intend to fill this gap in what follows.⁵

III. ECONOMETRIC SPECIFICATION AND DATA

A. Model

The gravity model has been one of the notable successes in empirical economics (see Anderson and van Wincoop (2003)). Its applications have by now become standard for evaluation of various issues in trade, migration, investment, currency unions, etc. In particular, it has served as both as an alternative and a complement to the CGE models (Greenaway and Milner, 2002). It also has been recently used to assess the effect of the WTO on multilateral trade patterns (Rose (2002a) and Subramanian and Wei, 2003), who evaluated the sign and magnitude of the "WTO dummy" after controlling for the customary "gravity effects." Likewise, we will employ a "Russia-centered" gravity model to evaluate Russia's trade determinants and patterns, with particular reference to the role of the WTO.⁶

⁵ Dean, Eremenko, and Mankovska (2003) used gravity model simulations for Ukraine and concluded that there would be no measurable improvement of its market access in the event of WTO accession. However, their model did not explicitly include a WTO-related variable but rather posited inferences from an assumed link between measurable trade restrictions and trade flows.

⁶ The gravity model was already used for Russia and the former Soviet Union in several studies, notably by van Selm (1997) and Gros and Steinherr (1995). This research pointed to the high predictive power of the model with respect to the intra-Soviet trade flows.

The standard gravity model specification relates total trade turnover or exports/imports as an independent variable to distance and GDP as dependent variables. Most gravity models also include additional independent variables such as population, GDP per capita, and/or dummy variables denoting borders, islands, former colonies, as well as membership in free trade areas (FTAs), currency unions, etc. Accordingly, our basic model is given by

Equation 1

$$\ln(X_i) = \ln(D_i) + \ln(Y_{\text{rus}} * Y_i) + \ln(y_{\text{rus}} * y_i) + \text{USSR}_i + \text{COMECON}_i + \text{EAEC}_i + \text{BORDER}_i + \text{WTO}_i$$

where X stands for Russia's exports to country i ; D is the distance between Russia and country i ; the subsequent two terms denote the products of Russia's and partner's GDPs and GDPs per capita respectively; USSR and COMECON are dummy variables denoting the partner country's former status as a Soviet republic or a former member of the Council of Mutual Economic Assistance; EAEC stands for the countries forming the Eurasian Economic Community; BORDER denotes the status of bordering countries, and the WTO dummy variable reflects the partner country's membership in the WTO. To check the robustness of the basic results, more independent variables common to the literature will be added to the basic regression, in particular those reflecting trade regimes and restrictions (i.e., tariffs and the GSP, as well as those that allow us to check country and sectoral asymmetries identified by Subramanian and Wei (2003) as important for assessing the general impact of WTO on trade.

We define distances between Russia and its trading partners as the "great circle" distances between Moscow and the respective capitals of the partner countries. Given Russia's size, there may be a problem with this definition, as, for example, a country like Morocco is deemed closer to Russia than China, even though Russia shares an extensive border with the latter. One way to resolve this problem was proposed by Steinherr (1995), who disaggregated Russia's economic space into several macroregions, whose distances to Russia's trading partners were estimated separately. In our analysis we confine ourselves to adding a dummy variable for bordering countries, which in part addresses the "distortion" of distance measurement. We believe that our capital-distance-corrected-for-border approach may be reasonable, given that much of Russia's economic potential is heavily concentrated in the European part of the country, of which Moscow is an approximate center.

Regarding global trading arrangements, our analysis focuses narrowly on the role of the WTO proper, leaving the effects of its predecessor—the General Agreement on Tariffs and Trade (GATT)—outside the scope of this study. This is largely because the WTO was born only three years after Russia's independence and about the time when Russia's trade flows were beginning to be guided mostly by market forces. There are also important differences between the WTO and the GATT that may rationalize their separate treatment in empirical studies (although much of the existing empirical literature has ignored them): (i) the WTO is an intergovernmental organization (while the GATT was essentially a set of rules) with an institutional framework and a greater role of multilateral agreements; (ii) the WTO dispute settlement system appears significantly more efficient than this system under the GATT; and (iii) the WTO has a much wider coverage of trade issues.

Our specification of the gravity model differs in several ways from that of most models employed in the related literature, reflecting the particular aims and constraints of our exercise. First, we confine the data set to the post-Soviet period of 1995–2002, thereby skipping the “statistical chaos” in the Russian export series of the early 1990s. However, this comes at the cost of significantly reducing the number of periods for time-series analysis. Second, the model investigates only Russia’s pairwise trade with other countries, as opposed to the multilateral setup of most gravity models. This country-centered specification of the gravity model is not unusual (see Hufbauer and Oegg (2003)) and allows us to focus on idiosyncratic patterns of Russia’s foreign trade through a more precise modeling of the country-specific parameters. However, we should be cautious about generalizing some of our conclusions on the effects of WTO membership, since Russia’s specific characteristics may impart a bias or complicate the interpretation of the WTO variable.

B. Data

While existing data sets on the gravity model (most notably that of Andrew Rose, posted on his website) served as a guide, the bulk of the data have been compiled from various sources. The data set spans a period of eight years from 1995 to 2002 and encompasses 171 countries. In order to account for data imperfections in the course of the sensitivity analysis, five countries were excluded from the data set for reasons of likely measurement error and incomplete observations.⁷ The exact definitions of the variables is presented in the Appendix Table A2. The data on exports are derived from IMF’s *Direction of Trade Statistics*, with the occasional gaps covered by Russia’s customs statistics. The sectoral dummy variables (for the metals and oil sectors) were derived with the help of data from the Customs Committee of the Russian Federation. The information on world population has been obtained from the UN, as well as the U.S. Census Bureau. GDP figures across countries are taken from the IMF’s *World Economic Outlook* (WEO) database. The data on distances from world capitals to Moscow have been derived from computer software that is readily available on the website of the U.S. Department of Agriculture. All regressions were performed using Stata 8.0. Our classification of countries as “developed” and “developing” basically follows that of Subramanian and Wei (2003), although it is slightly different from other such classifications, including within the WTO itself.

As recognized by Rose, the data on the GSP are imperfect, though United Nations Conference on Trade and Development (UNCTAD) has been making an effort to compile and update the data on the beneficiaries of GSP regularly. One such database posted on the official website of UNCTAD contains a list of countries that granted Russia GSP status as of June 1, 2001. Of the 19 countries that have accorded GSP status to Russia, 15 are members of the European Union (EU), while the four remaining countries are the Czech Republic, Slovak Republic, the United States, and Canada.

⁷ Including the estimates for these countries and territories (North Korea, Serbia and Montenegro, Iraq, Bermuda, and Cuba) does not alter the statistical significance of the results or their qualitative nature.

The summary statistics of the variables used in the regression analysis are presented in the Appendix Table A3. Data on Russia's exports in 1995–2002 exhibit significant volatility across time, with exports to most countries in Africa and Latin America emerging only toward the second half of the 1995–2002 period. Due to the conversion of exports into natural logarithms, the observations denoting zero exports to trading partners were treated as missing by Stata, thereby significantly reducing the overall number of observations in the panel data set. To check for this problem, we also transform the underlying data in various ways: either by adding 1 to the number under the logarithm or by assigning negligible values to the missing observations. These changes did not have a significant effect on the basic regression results.

IV. ECONOMETRIC RESULTS

To throw light on the factors behind Russia's export performance, we run several sets of gravity model regressions. We begin with simple cross-country ordinary least squares (OLS) regressions. This allows us to gauge to which country or group of countries at a given point in—or over a given period of—time Russia tended to export more (less), after controlling for variables imbedded in the gravity model. We then proceed to exploit the time series dimension of the data by running pooled, time effects and country fixed-effects panel regressions. In the process, we will continually explore various modifications to the underlying model to check the robustness of our results.

A. Cross-Section Regressions

Table 4 presents the main cross-section results, which are tabulated as sequential independent regressions with each of the year-specific WTO dummies for the 1995–2002 period. The outcomes appear reassuring in many respects. The gravity model seems to fit Russia's export data quite well, as can be seen from the high *R-squared*, averaging some 70 percent across the regressions for different years. Distance and output coefficients are all significant, with their signs and magnitude similar to those of other applied gravity models. In particular, the coefficient on distance is generally slightly lower than -1, while the sum of coefficients on output and output per capita is close to unity. The former Soviet Union and COMECON dummy variables are also highly positive and significant. The dummies for common border and the EAEC also are of the right sign but are generally not significant, at 5–10 percent levels.

Interestingly, the WTO coefficient is always negative, although in most cases (with the exception of 1996) statistically insignificant at the 5 percent level. At the same time, the coefficient is close to being significant at the 10 percent level for most years, while truly negligible only for 1998 data. However, 1998 was the year of severe macroeconomic crisis in Russia and thus could possibly reflect some specific factors. The persistently negative sign on the WTO dummy basically means that, after controlling for the gravity factors, Russia systematically tended to export more to non-WTO countries than to WTO countries.

To summarize cross-country results and even out year-specific idiosyncrasies, we run a cross-section regression on the means of the model's variables (Table 5). These “core”

regressions include the dummy variable reflecting WTO's membership at end-1995 and at end-1996, the last year when changes in membership took place on a significant scale.⁸ The basic "gravity" coefficients on distance and total GDP continue to be highly significant and appropriate in sign and magnitude, as are the dummies on the former Soviet Union and COMECON. The WTO dummy becomes statistically significant and numerically larger, while those that denote the customs union and the Russia-bordering countries do not, possibly because their effect is already captured by the strongly significant variable reflecting the status of the former Soviet republic.

The above results generally hold not only for exports as the dependent variable in the regression, but also for the overall trade turnover. The WTO coefficient remains statistically significant and negative in all those regressions. The absolute value of the distance coefficient is smaller than with exports as the dependent variable, while the opposite is true for the GDP coefficient. Additionally, the results were robust to different gravity model specifications (Linnemann, 1966; Bergstrand, 1985; Wang and Winters, 1992), some of which included single-country population and GDP variables separately (instead of per capita GDP or a product of country-pair GDPs). In all such specifications, the statistical significance of the negative WTO coefficient remained largely intact.

Despite their widespread use in the academic literature, cross-section gravity regressions have a number of limitations compared to full-fledged panel data regressions. First, they entail a loss in the number of observations that could be used in the regression, thereby possibly affecting the robustness of the results. Second, they disregard time variation in the data, and thus may result in inconsistent estimates (Matijas, 1997). Third, they do not (fully) answer some policy questions of interest, for example, regarding (i) any effects of the model on the direction of change in trade flows or (ii) a trade effect of a Russian partner country's joining the WTO.

B. Pooled Regressions

As a further step, (OLS) pooled regressions were performed on all of the observations of the data set for 1995–2002. Compared with the cross-section regressions, the WTO dummy becomes time varying, so instead of the period-specific WTO dummies we construct a single WTO dummy variable. The results do not appear to differ much from those of cross-section regressions (see first column of Table 6), with the WTO coefficient negative and statistically significant. Also, the customs union and border dummies become statistically significant at the 5 percent level, which is to be expected with the large increase in the number of observations.

This pooled regression was tested through several robustness checks, none of which mattered for the basic results, including the WTO variable. To account for the possible correlation of country observations over time, we also used robust standard errors (column 2 of Table 6).

⁸ The coefficient for WTO membership remains negative and statistically significant at the 5 percent level for every year in the 1995–2002 period.

We also experimented with the inclusion or exclusion of alternative country-specific observations (columns 3 to 5 and 7), as well as with the quadratic gravity term (column 6).

In order to trace the changes in the coefficients of the WTO variable through time, Table 7 contains cumulative sequential regressions for various periods covering 1995–2002. After rising significantly in 1996, this coefficient declines persistently through 1998 but stays roughly constant thereafter, which is roughly consistent with the pattern inferred from cross-section data. The WTO coefficient remains statistically significant in all of these regressions at the 5 percent level. In sum, the pooled regressions confirm the results of cross-section data but do not appear to add much new qualitative insight. This may indicate that the main driving force for the results appears to be heterogeneity across countries.

While pooled regressions appear to reinforce cross-sectional results (including on the role of the WTO), this method imposes identical coefficients across countries and thus may induce misspecification. Thus, a more sophisticated framework would be helpful to check the robustness of the results, including by disentangling the time-invariant and country-specific effects.

C. Time, Fixed, and Other Effects

Table 8 presents panel data regressions with time effects. The results remain very similar to those for pooled regressions and withstand a number of robustness checks. In particular, the WTO coefficient continues to be significantly negative throughout. In addition to the robustness checks run in a pooled regression, we test separately (and simultaneously) the significance of GSP preferences and of the asymmetry between Russia's exports to the developed and developing economies (through a developed-country dummy). While the WTO coefficient is not affected by these additions, the latter modifications enter with statistically significant coefficients. In particular, the sign on the developed-country dummy is negative, thereby indicating that for some reason Russia's exports to developed countries were "limited" compared with those to other countries, *ceteris paribus*. The sign on the GSP dummy is, as expected, positive. Also, real-GDP-weighted least squares do not affect the significance of the negative sign on the WTO variable (not shown).

Table 9 presents augmented robustness checks to the time effects regressions, which do not affect the negative sign of the WTO variable. These include a number of additional controls common in the gravity model literature, such as islands, landlocked areas, the size of the country's area, and import duties. Additionally, country and sectoral asymmetries are tested, including by dummies for nations that import oil and steel from Russia. Accounting for these specificities may be important, given the somewhat skewed structure of Russia's exports of those products, and because of pronounced trade idiosyncrasies in those sectors (i.e., large trade restrictions for steel). Incidentally, both the oil and steel dummies have large, positive, and significant coefficients. Finally, a variable, GATT-94, has been included to measure the impact for those countries that were the founders of the WTO, since they could be seen as a "core group" of economies with a long-term commitment to multilateral trade liberalization. Interestingly, the coefficient on this term is significantly negative, and its inclusion does not have much impact on the coefficient of the broader WTO variable.

Table 10 contains results of the “between-effects” panel estimation, which basically runs a regression on group averages. This answers the “between” question of whether Russia’s exports to WTO members exhibit a different pattern from those to non-WTO members. The bottom line is similar to the cross-section, pooled or basic time effects regressions, although there are some notable differences. Specifically, the absolute estimate of the WTO coefficient is somewhat larger than in the previous regressions, in the range of 0.7–0.9, compared with 0.4–0.5. Standard errors on the WTO variable increase as well, but the coefficient remains robustly statistically significant. Again, the posited robustness checks do not matter for these and other basic gravity results. The signs on the developed-country and GSP dummy remain the same as in the previous exercise, although these latter variables cease to be statistically significant.

We also attempted to infer from time variation in the data, although this exercise was somewhat constrained by modeling and data problems. The last column of Table 9 contains estimates of a country fixed-effects regression⁹ with country-specific dummies (with standard adjustments to avoid the overidentification problem). In such regressions, all time-invariant variables (distance and most regional and country dummies) can be seen as being subsumed into the constant term, thereby exploiting only the variation between four variables: total and per capita GDP, WTO, and exports. With respect to the WTO variable, this essentially asks a “within” question: What does joining the WTO do to a country’s imports from Russia? The positive (albeit not significant at the 10 percent level) coefficient on the WTO dummy weakly suggests, in line with intuition, that the countries that joined the WTO over the sample period actually favored Russian exports at the margin. However, this result has to be taken with caution, because (i) the time period of analysis is short and the number of observations fairly small; and (ii) important “control” variables (regional dummies) and the distance variable drop out from the analysis, which may substantially modify the relationship within this “aborted” gravity model.

V. DISCUSSION OF THE RESULTS

We now proceed to develop an economic story that could put the above regression results in perspective. In particular, we intend to elaborate— and, at times, speculate—on four questions: (i) What do these inferences mean in terms of economic intuition? (ii) What are the underlying causes for the results? (iii) What could be the implications of Russia’s joining the WTO on the basis of these insights? and (iv) How the insights of the multilateral gravity models of Rose (2004) and others can be interpreted in light of these results?

⁹ A random effects regression seems less appropriate given that its underlying assumption—that unobserved individual heterogeneity is uncorrelated with the included variables—seems somewhat heroic in the case of our model (for example, heterogeneity with respect to the GDP variable). In any case, the results from the random effects regression showed a negative coefficient on the WTO variable, albeit small and insignificant.

A. Economic Interpretation

The main result is that within a well-fitting gravity model for Russia, the WTO coefficient is negative and statistically significant in the baseline cross-section and most panel data regressions. On this basis, it looks like the structure of Russia's trade remains in some sense "suboptimal" or "different" compared with the benchmark offered by the gravity model, in that it trades "too little" with the WTO members and/or "too much" with non-WTO members. This may not seem surprising given that a good portion (but by no means all) of non-WTO members are former socialist economies, with significant historical and systemic ties with Russia. However, these results *are* somewhat surprising, since we control for these specificities through various regional dummy variables, which are themselves intuitive, with large coefficients, and highly significant.

This basic result applies to the 1995–2002 period on average, but does not yet indicate how this "bias" evolved over time. There are several ways to throw some light on this issue. First, judging from Table 4, the WTO coefficient in independent cross-section regressions was negative, albeit volatile, in 1996–98 and thereafter stabilizing within a remarkably narrow range around -0.55 in 1999–2002, which incidentally is about the same value as in 1995. This indicates that the extent of anti-WTO trade bias appeared to be roughly constant over the sample period. Second, the cumulative pooled regressions of Table 7 offer a similar qualitative picture (the bias was roughly constant except for the spike in data for 1996), although the results are not fully comparable over time, given the different number of observations for each year. Third, the fixed-effects regression with country-specific dummies actually suggests that Russia's trade with the WTO was encouraged at the margin, since some 30 countries that joined the WTO after 1995 tended to favor Russian exports, *ceteris paribus* (Table 3).¹⁰ This may be a consequence of the general trade-liberalizing measures that these countries undertook in the process of WTO accession and thus be consistent with the overall WTO positive spillover effect found by Subramanian and Wei (2003). Still, our regressions show only a limited "within" effect during 1995–2002 and thus do not reject a possibility of a "trap," or some persistence of an "anti-WTO equilibrium."

¹⁰ The full list of WTO and non-WTO members, as well as the year of entry for the former, is contained in Appendix Table A4.

Table 3. Annual Increase in WTO Membership, 1995–2003

Members as of January 1, 1995	76
1995	112*
1996	16
1997	4
1998	1
1999	2
2000	5
2001	3
2002	1
2003	2
Total WTO members as of end-2003	146
Numbers of observers as of end-2003	30

* including those countries that became members of the WTO as of January 1, 1995.

Source: WTO

In sum, the highlighted bias concerns the trade structure in terms of levels, while the evidence on the direction of adjustment is largely inconclusive. Numerically, the value of the WTO coefficient in most regressions suggests that, in the long run, Russia exports on average at least one-third less [$\exp(-0.4)-1$] to members of the WTO than to its trading partners. The upper-bound coefficient estimate of -0.9 in the “between” regressions puts this number at almost 60 percent. In any event, these are very large estimates, implying potentially huge trade costs of nonmembership in the WTO, subject to a number of qualifications. The extent and nature of such costs will be investigated below.

B. Factors Behind the Regression Results

Why does the structure of Russia’s trade differ from that suggested by the gravity model? Clearly, there are various groups of factors that could account for Russia’s particular trading pattern, ranging from statistical and historical reasons to more substantive economic and policy issues. It could thus be useful to examine the most plausible factors, while acknowledging that sometimes it is difficult to discriminate between them.

First, Russia’s exports may be constrained by **restrictions imposed by its WTO trading partners**. This may occur either because Russia does not enjoy the full benefits from the trade liberalization rounds under way in the WTO, or due to specific barriers—formal or informal—levied by individual WTO members. Arguably, WTO member countries may impose these barriers on nonmembers (such as Russia) more easily than on members, in part because the former can not retaliate because of a lack of clout in the WTO’s dispute settlement bodies, or other limitations.

There is much casual and anecdotal evidence on the prevalence of trade restrictions on Russia’s exports. By far the most “popular” forms of such barriers have been antidumping

duties, totaling together with quotas and other non-tariff restrictions 120 by mid-2001.¹¹ Most antidumping duties were levied on Russia during 1997–2001, a fourfold increase (in the number of cases) during that period. These duties may have amplified the effects of other trade restrictions or denied the benefits of explicit trade liberalizations. For example, after the recent repeal of the much-disputed U.S. steel tariffs in 2004, in large measure in response to WTO action, the possibility of increasing steel exports by Russia to the US market was estimated by most observers as small, because of the retention of the US-Russia bilateral agreement on steel (concluded in 1999), which effectively imposed “voluntary” quotas on Russia’s steel exports. The sectoral composition of trade restrictions on Russia’s exports is heavily skewed toward ferrous metals, which account for 50 percent of the total number of antidumping cases launched against Russia. Chemicals account for another 15 percent, followed by machinery and other manufactured goods (12 percent) and fertilizers (7 percent).

To get a sense of the influence of trade barrier effects on our regression results, one could look at identifiable trade policy variables in the gravity model. However, the available data on trade policies or restrictions do not look adequate for the purpose at hand. Specifically, a measure of the effective trade barriers imposed by each trading partner on its imports from Russia only would be needed. In contrast, available measures, like those on the level of a country’s import duties, refer to the countries’ aggregated imports. The data on GSP preferences do capture some of the bilateral trade policy dimension, but they do not cover all relevant aspects of trade policies. We have included a separate GSP term in the regressions (Tables 9 and 11): it carries an expected positive sign, but has only a marginal impact on the significance of the WTO sign. We also have controlled for the level of explicit import duties (Table 9): the sign is, as expected, negative, but the economic and statistical significance of the coefficient is again marginal. This may suggest a role for “implicit” and “microlevel” restrictions, like antidumping actions, or the probability of recourse to them.

To examine the sensitivity of our results to the de facto trade barriers (including implicit barriers), we have introduced sectoral dummies within the gravity model regressions (Tables 9 and 11). We focused on two benchmark commodities in Russian trade that are starkly different from the point of view of trade restrictions: steel and oil. As is trivially expected, both dummies appear highly significant and have positive coefficients. Thus Russia’s overall exports depend positively on the inclusion of oil and steel importers as separate variables. Including a steel importer dummy, which controls for a sector where trade restrictions (explicit and implicit) are prevalent, reduces the size of the coefficient on the WTO variable, while an oil importer dummy—with no perceptible trade restrictions on the part of importers—increases the absolute size of the negative coefficient.¹² These results argue in

¹¹ Russia’s Ministry of Trade and Economic Development, quoted in http://www.opec.ru/news_doc.asp?tmpl=news_doc_print&d_no=20233.

¹² Oil, with the substantial role played by pipeline infrastructure and, hence inertia, in its exports, may not a perfect example. But a fair portion of Russian crude is exported by sea and can be redirected at the margin. We also gauged the extent of the “pipeline inertia” problem for the gravity model by using non-oil exports only. The main results basically held for the years for which the data were readily available in sufficient detail (1995 and 1996).

favor of a positive link between the extent of the anti-WTO bias and the restrictions on Russia's exports. The evidence is suggestive rather than conclusive, since the changes in the WTO coefficient are fairly small. But these changes likely reflect the fact that dummy variables are very rough proxies for these sectoral measures.

Second, the export pattern may have been influenced by Russia's **domestic export restrictions**. Russia had various export restrictions, in the form of export duties, at the start of our sample period, but most were gradually dropped by mid-1996. As mentioned above, some of the restrictions were introduced or reintroduced in 1999-2000, especially with regard to the energy sector.¹³ Even when virtually no formal restrictions were in place during 1997-98, one could argue that some de facto restrictions remained, for example, due to the unchecked monopoly of the pipeline operator Transneft' or price controls on domestic energy products. The logic for the negative sign of the WTO coefficient rests on the likelihood that most of the domestic restrictions are imposed on oil and gas, which, at the margin, are likely to be exported to WTO members, mostly industrialized countries.

There is at least some evidence consistent with the conjecture that these domestic export restrictions may have played a role in generating the gravity model's negative WTO coefficient. Thus, on the basis of the cross-section results of Table 4, the significance of the WTO variable becomes much lower in 1997 and essentially breaks down in 1998, when domestic export restrictions were minimal. At the same time, this stylized fact could well have an alternative explanation based on our first conjecture (WTO countries' restrictions on Russia's exports). For example, one may argue that Russia's 1997-98 declining export performance was a product of the concurrent global crisis, during which some preset trade restrictions—like import quotas—became nonbinding as a result of the contraction in global trade.

Third, the negative sign on the WTO variable may be connected to Russia's excessively good **bargaining position vis-à-vis some non-WTO members**, which may be labeled as "relatively small and dependent economies." This argument is somewhat awkward, since the notion of a bargaining position is a relative concept, thus invoking questions as to whether it is the WTO members' negotiating position that is "excessively" punishing to Russia instead. Also, the coefficient on the real GDP in the regressions is large, positive, and—at around unity—perfectly consistent with those from other gravity model applications. This, *ceteris paribus*, suggests that Russia may not "excessively" benefit from trade with smaller countries.

Fourth, it may be argued that, because of disorganization or some inherited structural reasons, the **insufficient quality of Russia's processed products** may deter Russian producers from exporting to the more "demanding" industrialized countries, all of which happen to be WTO members. While this may be another plausible reason for the negative sign of the WTO variable, there are a number of logical and practical qualifications to it. For

¹³ In early 1999, duties were levied on exports of crude oil, petroleum products, alcohol, wood, fertilizers, chemicals, and some food products.

example, why would Russia's fairly high cost competitiveness not balance its lack of competitiveness in exporting quality products to developed countries? If the quality argument is the main explanation for the underperformance of metals exports, why would there be a substantial incidence of industrialized countries' trade restrictions on Russia's metal exports? Thus, *Severstal*—a major metals producer with a very solid reputation for product quality and for eagerness to restructure—said in its 2002 annual report that a series of antidumping investigations sharply reduced the enterprise's share of the U.S. market. Also, why would the low quality of Russia's products not be an issue for nonmembers of the WTO given that the "traditional" machinery and manufacturing links are to some extent captured by the regional dummy variable?

Fifth, one also can argue that, despite its good fit, the gravity model is susceptible to **specification problems**. Thus, Anderson and van Wincoop (2003) have recently shown that theoretically grounded gravity model applications should account for the so-called "multilateral resistance" term, which is an *average* barrier for a given pair of countries to trade with all of their partners. An omission of this term may lead to inconsistent estimates, in particular of border effects when intranational and international trade are estimated simultaneously. In the context of international trade, Subramanian and Wei (2003) have interpreted this insight as a practical requirement to always include country fixed effects in the regressions. We believe that our Russia-centered specification already addresses this particular concern. As one partner country in our trade model—Russia—is always fixed, this specification already goes some way toward replicating the country fixed-effects condition of the multilateral gravity models. The explicit inclusion of country fixed effects would in our model be analogous to estimating country-pair fixed effects, yielding a completely different model. Given this analogy and because there is no need to assess the relative importance of international and intranational trade, the Anderson and van Wincoop's (2003) critique should not apply to our setup.

Another misspecification possibility for our cross-section and panel results (with the exception of country fixed-effects regressions) is the "endogeneity bias," in that WTO membership may be affected negatively because of extensive trade with Russia, for example because of the latter's bilateral trade preferences granted to some nonmembers of the WTO like Belarus or Ukraine. Some logical arguments and our econometric results attenuate these endogeneity concerns, at least for the horizon of our data. First, joining the WTO is a generally protracted and complex process, so that Russia's existing trade preferences would seem a fairly minor element in the decision, especially over the fairly short time frame of the regressions. In addition, Russia's specific trade preferences have not been very reliable in practice and have included some threats and reversals, which may be viewed by some countries as an "undesirable dependence" on Russia. For example, an important subset of Ukrainian policymakers actually think that Ukraine's entry prior to Russia's would strengthen the former's bargaining position in bilateral trade negotiations. Also, the coefficient in the country fixed-effects regression (which measures the dynamic effect on Russia's exports only of those countries that entered the WTO) is positive and insignificant—and in the case of endogeneity it would be expected to be significantly negative. Finally, the GATT-94 coefficient that controls for the "established" WTO members

(which is not affected by endogeneity) is significantly negative in all other specifications of the gravity model.

A related argument is that of a “simultaneity bias,” whereby the presence of a third factor may affect both a country’s likelihood of being out of the WTO and its propensity to trade with Russia. This logic has some intuitive appeal. For example, due to particular political or ideological preferences or historical factors, some countries may exhibit a propensity to be simultaneously “pro-Russia” and “anti-WTO” in their trade patterns and policies. Still, the relatively short horizon and the results of the country fixed-effects specification seem to run counter to the simultaneity hypothesis for our data. In sum, while the possibility of a simultaneity bias for our cross-section results cannot be fully excluded,¹⁴ we have attempted to control for as many identifiable third factors as possible through various dummy variables, which is in line with the standard practice of most applied gravity models (i.e., controls for borders, colonies, etc.).

Sixth, and this may be a variation on the misspecification theme, **Russia’s trade pattern may be geared toward some particular countries** (or groups of countries) in ways that the gravity model has not captured (whether due to historical, sectoral, or other factors). To the extent those countries are nonmembers of the WTO, this may predictably bias our results. One obvious group candidate from this point of view is the countries of the former Soviet Union—for which we control in all regressions through a dummy variable. To check this “former country grouping” effect more thoroughly, we experimented with deleting all the CIS or Baltic country observations from the sample, but the extent and significance of the negative sign of the WTO variable were not affected much.

We also have checked the sensitivity of our results to the established country groupings more generally. Thus, industrial countries—all of which were WTO members during the sample period—appear to be particularly “nonreceptive” to Russia’s exports. As transpires from Tables 9 and 11, a dummy for those countries is significant in most of our benchmark regressions, and always with a negative sign. If we split the WTO dummy into the developed- and developing-country dummies, the developed-country dummy has a larger absolute value of almost -1.1, compared with the developing-country WTO dummy of -0.55, with both being significant.

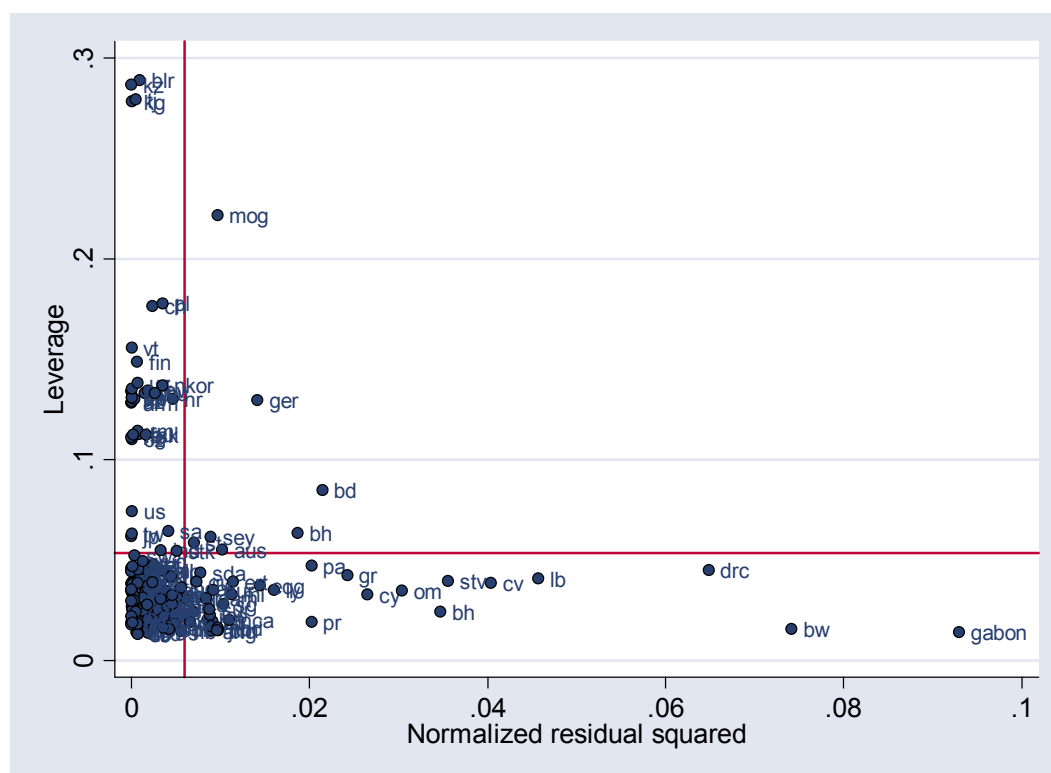
Furthermore, we have examined the sensitivity of the regression results to individual country observations. Figure 4 plots a composite measure of such sensitivity—leverage against normalized squared residuals—for a cross-section regression on country averages (Table 5). The “leverage” measure indicates the extent to which an observation is influential for the regression results, while greater residuals denote outliers. One can see that the observations high in leverage (Belarus, Kyrgyz Republic, etc.) are not the ones that are large outliers

¹⁴ We have not been able to identify convincing econometric approaches to deal with the simultaneity problem, i.e., without losing the valuable information imbedded in the time-invariant variables of our gravity model. This applies, inter alia, to the Arellano-Bond GMM dynamic panel estimator.

(Gabon, Botswana, and the Democratic Republic of the Congo). Moreover, excluding the most important outliers or leveraged observations does not alter the results with respect to the sign and the significance of the WTO dummy (Tables 12 and 13). Thus, while there may indeed be some country specificities in Russia's trade pattern, the negativity of the WTO variable is quite robust to various country-related alterations in the model.

The list of the above reasons is by no means exhaustive. Still, the gravity model's outcomes and manipulations lend some credence to the link between export restrictions, both from outside and within Russia, and the "anti-WTO tilt" in Russia's trade. This is also consistent with the anecdotal evidence on the evolving importance of these restrictions for Russia's trade performance. While separating the effects of external from domestic restrictions requires more detailed data and approaches, the available evidence argues for at least some independent effect of external trade barriers on our results. The evidence for a separate effect of domestic export restrictions is not as conclusive, but it cannot be excluded. Other identifiable reasons, including model and dummy specification issues, appear to be less compelling.

Figure 4. Russia's Trading Partners: Leverage Against Residuals



Finally, based on the positive (albeit insignificant) sign on the WTO coefficient in the "within" regressions, one may argue that the **anti-WTO bias is normal**, in that it is being resolved as part of Russia's ongoing market-based adjustment. Even if some of trade

reorientation is ongoing, the above evidence on the role of trade restrictions in the regressions may suggest the extent of, and reasons for, the slowness and tentativeness of the adjustment. In any case, the combination of the “overall” and “within” results reinforces a lack of broader evidence that *established* WTO members have been receptive as others to Russia’s exports.

C. Implications for Russia’s WTO Accession

Assuming that the gravity model results can proxy Russia’s export structure following its WTO entry, one may be tempted to simulate Russia’s putative trade developments in a “post-entry” world. However, a reasonable simulation exercise may require a separate effort, since a number of additional structural characteristics need to be incorporated and analyzed. In particular, one would want to have a reasonable model of Russia’s macroeconomy, especially of variables denoting the relative adjustment between tradable and nontradable sectors, including capacity utilization rates in the tradable sector. These would be needed both to make sense of the long-run effects and to possibly model the time profile of future trade developments. Also, our basic gravity model has Russia’s exports—not trade—as a dependent variable (although using trade instead of exports does not appear to alter the main result substantially). Still, a more complete model of the external sector that would incorporate the role of—and projections for—imports, would be desirable. Leaving these exercises for future research, we would limit ourselves to some cautionary remarks on the need to treat these gravity estimates carefully for practical purposes.

The numerical coefficients in our regressions imply that, in the long run, Russia’s exports (and possibly, trade) with WTO members could expand by a very large amount, according to most regressions by around 50 percent.¹⁵ A major issue is the extent to which this adjustment would occur through exports expansion, as opposed to exports reorientation. In the former case, the large quantitative estimates would approximate total export expansion. In the latter case, there would be a “substitution effect,” and a much smaller increase in Russia’s exports to the WTO countries would suffice to align its export structure with that prompted by the gravity model. In all likelihood, both these effects would be present, but a precise configuration could not be modeled without a more detailed structure, as well as knowledge of the relative role of domestic and external export restrictions. Generically, though, there has to be at least some export expansion. In particular, if the main economic reasons for our underlying results are trade restrictions of any type, it is highly unlikely that the trade-off between exportables and nontraded goods would be unaffected after those restrictions on exports have been relaxed. In any case, our estimates indicate an asymptotic upper bound of the long-run effect that is likely less in reality. In the short run, the WTO-related export expansion may be further limited, given the evidence that, in some key export-oriented sectors, such as metals, Russia’s capacity utilization rate has approached fairly high levels. Russia’s capacity utilization rate in the metals sector, which was estimated at 70–80

¹⁵ Our “baseline” assumption is that, in the long run, the gravity model coefficient on the WTO would approximate zero, which is roughly consistent with the multilateral results of Rose (2004).

percent in 2000 (FIRA 2001), increased substantially in 2002–03. In this situation, a further export expansion hinges on substantial investment and would, at best, be delayed.

Another caveat with respect to future projections is our “narrow” interpretation of the WTO membership dummy as the main causal channel within the gravity model. It also is possible that the WTO variable proxies other factors important in their own right, but which may not always be the same as membership. One such example is the recognition of Russia as a market economy for antidumping purposes of anti-dumping action. Indeed, Russia was formally recognized as a market economy by most major countries by late 2002, without becoming a WTO member. *Severstal* hailed this move in its 2002 annual report, adding that it would help significantly in fighting antidumping procedures. In view of these considerations, the magnitude of the WTO dummy should be interpreted not so much as a precise elasticity, but more as an indication of the importance of this broad channel. Note that with our data set ending in 2002, the market status argument would play little independent role. Still, some Russian analysts and lawyers have argued that only full-fledged WTO membership would ensure a level playing field for Russia in terms promoting its exports and countering antidumping procedures.

D. Implications for WTO-Related Multilateral Studies

In what way can the “negative” WTO result for Russia be generalized? On the surface, the apparent persistence of an anti-WTO bias in Russia’s trade structure appears to call into question the WTO’s trade-promoting role and relevance, including the spillover effects emphasized by Subramanian and Wei (2003). However, this kind of reasoning leads to an uneasy puzzle, since the WTO membership in general and for particular countries is considered “important” not only in academic and public circles, but also in practical negotiations, decisions, and outcomes.¹⁶ We feel that our results point to why the WTO may be relevant. While our analysis cannot prove or disprove the insights of Rose (2004), it suggests that the situation may be much more complex, and that just focusing on “averages” may be insufficient for understanding the WTO’s exact role and the associated policy issues.

In particular, we would argue that several types of asymmetries (additional to those emphasized by Subramanian and Wei (2003)) may be important in generalizing insights from our results. First, the asymmetry between members and nonmembers should be studied more carefully. Our negative WTO result for Russia’s trade pattern may crucially depend on Russia being a nonmember country. It is thus possible that a strong anti-WTO bias for some country pairs/combinations is (largely) offset by pro-WTO results for other combinations, even if one controls for the usual gravity factors.

The second type of asymmetry is between larger and smaller countries, as it may be quite logical that larger countries like China or Russia may be generating more concern over their

¹⁶ The recent debate on WTO’s role in “job outsourcing” in the United States and Europe is a case in point. In Italy, Prime Minister Berlusconi often expresses concern that China’s WTO entry in 2001 has hurt Italy’s producers.

export potential and, hence, may face more restrictions from third countries. This may explain why our Russia-centered results are more significant than Rose's multilateral average for nonmembers.

Third, there are asymmetries based on political and systemic alliances that affect differently WTO members and nonmembers and at the same time influence the direction of trade. As an example, a stark division of the world into (pro-)socialist (largely non-WTO) and capitalist (largely WTO) camps for much of the postwar period may substantially bias the results of the long-term models and may have contributed to the emergence of "localized centers of gravity." These issues may not be fully accounted for in gravity models, and a country-centered model seems better suited to include essential policy-cum-political dummies, than multilateral gravity models. For this purpose, the role of country-specific fixed effects results becomes more important, and the results are much more positive for the WTO's trade-promoting role both in the multilateral and the Russia-centered framework.

Interestingly, our evidence on the specific asymmetry between developed and developing countries emphasized by Subramanian and Wei (2003), differs from that of the authors. While the latter have linked the lack of trade openness within the WTO to developing countries, Russia's exports to the industrialized WTO members appeared to be disadvantaged to the same or even greater extent than those to developing WTO countries. This in part reflects our "within" result that Russian exports seemed to benefit (albeit slightly) from trade liberalization of new WTO members, all of which were either developing or transition countries. Thus, our results imply that WTO membership may be particularly important for access to developed country markets by current nonmembers.¹⁷

The conjecture that restrictions imposed by WTO members may have greater incidence on nonmembers gets some factual confirmation from international experience. In recent years there was some anecdotal evidence on WTO accession directly facilitating exports to the WTO countries. One example is Macedonia, whose sectoral composition of exports is highly concentrated in steel and textiles. Thus, in March 2002 the United States invoked safeguards, based on the perception of harm inflicted by foreign competition to the American steel industry. However, a number of developing countries were exempted from these safeguard measures. Macedonia would have qualified for exemptions if it had been a WTO member at the time, and once the WTO accession negotiations between the US and Macedonia were completed, the US safeguards with respect to Macedonian steel producers were lifted.

More generally, our results point to the possibility of a "domino effect" in the expansion of WTO membership that is akin to the similar effect found in the operation of regional trading arrangements (RTAs). The latter effect was empirically tested and validated with respect to

¹⁷ This conclusion would run counter to Rose's (2004) point that developed WTO country members indiscriminately extend trading preferences to nonmembers; instead it would support a study by UNCTAD (2004) arguing that the world's poorest countries are receiving only limited benefits from preferential trade schemes designed to help them because of gaps in coverage and restrictive rules of origin.

Western European trade (see Sapir, 2000) and a number of other RTAs. The driving force behind the operation of the domino effect is the costs of nonmembership, which are countered by applying for membership in an RTA. Like any RTA, incomplete WTO membership creates a wedge between members and nonmembers, which may turn out to be costly to the latter.

In sum, we are more comfortable with this complex “differentiated” view, which also goes some way toward explaining the WTO “irrelevance puzzle.” Thus, the WTO appears relevant and may have inner trade-promoting features that appear to average out in the simple gravity comparisons between members and nonmembers, especially since the latter are relatively few and experience various asymmetries, including as a result of nonmembership. At the same time, we would not want to be too categorical on this point, since Russia’s specific circumstances as a nonmember and the short period of analysis weaken comparability with the long-term multilateral studies.

VI. CONCLUDING REMARKS

We show that Russia’s export structure, after controlling for gravity effects and several country- and region-specific factors, was tilted significantly away from WTO members in 1995–2002. The evidence of trade reorientation toward the predicted pattern during the same period is quite weak, as it affects only new WTO members and does not apply to Russia’s exports to advanced economies. We reason that these results may be at least partially related to the external and possibly domestic constraints on Russia’s exports, which, in turn, depend on Russia’s continued nonmembership in the WTO. This would suggest that Russia’s WTO accession may redirect and/or expand Russia’s exports substantially, although possibly only in the very long term. While it cannot be fully ruled out that Russia’s historical, cultural, or other idiosyncratic factors may bias our results, various methods and controls for most country- and region-specific observable effects did not eliminate the significance of the negative influence of the WTO variable.

Our findings are related to two strands of WTO-related research: global and Russia-specific. Globally, this is an interesting case study within a general debate between Rose (2002a and 2004) and Subramanian and Wei (2003) on the extent of the WTO-induced gains from trade. As explained above, our results suggest that the WTO impact is quite relevant, but likely combines trade promotion among members with some implicit trade frictions between members and nonmembers, while nonmembers may have additional reasons to trade with each other that cannot be captured by the gravity model. This pattern may bias inferences from multilateral gravity models, which also may neglect a number of additional asymmetries that we highlighted. At the same time, our analysis does not formally prove or disprove the multilateral insights, and further rigorous testing is required.

With respect to Russia-specific issues, our results actually suggest tangible long-term trade gains for Russia from its WTO accession, not least *because* of the highlighted friction between members and nonmembers. Although the time profile of Russia’s gains is uncertain, our findings indicate that waiting to join the WTO is likely not an attractive option, given the weak pace of the underlying reorientation to date. One may argue that, even after WTO accession, Russia’s exports may not fully align themselves with the gravity model, perhaps

because of the insufficient quality of Russia's processed and manufactured products. While this assertion requires deeper analysis, China's early experience seems to (albeit casually) confirm the WTO membership's strong effect on exports.¹⁸ It also should be cautioned that the empirical model is a simplification, in that it treats WTO accession as a binary choice (accession or nonaccession), while the reality is more complicated, as the effect of Russia's WTO accession obviously depends on the outcome of the negotiations.

Still, at the very least, we have shown that (i) there is an underlying bias in Russia's trade structure that may need to be addressed; and (ii) entering the WTO appears the most logical way to address it. Regarding current trade policy, Russia should, through WTO membership, benefit from a stronger focus on ensuring uniformity and a level playing field across regional trading patterns. The sheer size and diversity of the country favor trade integration via WTO membership rather than through some regional arrangements. Also, Russia's entry would make the WTO nearly universal, thereby possibly giving a multilateral boost to global trade.

Further research may relax some limitations of our analysis in both the general and country-specific contexts. In a multilateral setup, it could be useful to revisit the role of the WTO through a more detailed empirical analysis of nonmembers' trade patterns, in order to ascertain the extent to which our revealed anti-WTO bias is Russia specific. Other important nonmembers like Ukraine could offer interesting case studies in this connection. Regarding Russia's situation, the paper's insights would be further tested as longer time series and more adequate variables (i.e., reflecting pairwise trade policy restrictions) become available, and/or when uncertainty over the WTO membership is resolved. In addition, it would be useful to integrate the gains from trade revealed in this study into the general equilibrium models that address costs and benefits of the WTO entry. The use of more disaggregated trade data by sector also could help verify the above conclusions and test additional hypotheses. This would permit a meaningful study of sectoral issues and asymmetries, including whether the semi-processing sectors that appear most touched by the trade restrictions have a special role to play in generating further economic growth and restructuring.

¹⁸ In 2002–03 according to the IMF *Direction of Trade Statistics*, China's annual growth in exports and net foreign direct investment was 27 and 14 percent respectively, compared with corresponding annual averages of 17 and 7 percent over the decade prior to its WTO entry (1992–2001).

Table 4. Cross-Section Regressions, 1995–2002
(Dependent var.: Russia's exports; stand. errors below)

	1995	1996	1997	1998	1999	2000	2001	2002
Log distance	-0.98	-1.22	-0.96	-1.01	-0.96	-1.35	-1.35	-1.63
	0.20	0.20	0.21	0.18	0.24	0.21	0.22	0.29
Log product real GDP	0.72	0.75	0.65	0.64	0.84	0.88	0.91	1.02
	0.10	0.08	0.08	0.07	0.08	0.07	0.07	0.09
Log pr. real per capita GDP	0.11	0.38	0.26	0.18	0.06	0.08	0.07	-0.01
	0.11	0.10	0.10	0.08	0.10	0.09	0.09	0.12
Common Border	0.11	0.23	0.40	0.39	0.59	0.44	0.56	0.30
	0.45	0.45	0.47	0.40	0.58	0.51	0.53	0.69
WTO	-0.55	-1.19	-0.45	0.00	-0.55	-0.55	-0.54	-0.54
	0.38	0.36	0.36	0.28	0.34	0.31	0.32	0.43
USSR	2.01	1.82	2.17	1.91	1.93	1.51	1.77	1.80
	0.62	0.59	0.60	0.49	0.70	0.62	0.63	0.82
COMECON	2.14	2.66	2.62	2.00	2.36	2.22	2.18	1.98
	0.50	0.49	0.52	0.43	0.62	0.54	0.56	0.73
EAEC	0.89	0.95	0.73	0.89	0.96	1.20	1.06	0.94
	0.76	0.76	0.80	0.69	1.00	0.88	0.91	1.20
_cons	5.93	7.06	5.65	6.42	4.70	7.74	7.04	8.51
	1.89	1.89	1.94	1.61	2.21	1.93	2.01	2.67
R-squared	0.62	0.75	0.70	0.76	0.69	0.76	0.76	0.69
Number of observations	92	103	117	123	153	153	146	155
Root mean square error	1.28	1.28	1.35	1.15	1.68	1.48	1.52	2.01
F-test	16.97	35.23	31.39	45	40.19	57.6	53.5	40.97

Table 5. Cross-Country Regressions on Annual Means, 1995–2002

Panel A: WTO 95.

Number of obs	168	
F(8, 159)	63.86	
Prob > F	0.0000	
R-squared	0.7627	
Adj R-squared	0.7507	
Exports (dep. var)	Coef.	Standard error
WTO95	-.76	.32
EAEC	1.10	1.04
COMECON	2.22	.61
USSR	2.13	.72
GDP per capita	.14	.10
Distance	-1.38	- .24
GDP	1.0	.08
Border	.23	.60
_cons	6.18	2.29

Panel B: WTO 96

Number of obs	168	
F(8, 159)	65.12	
Prob > F	0.00	
R-squared	0.77	
Adj R-squared	0.75	
Exports (dep. var)	Coef.	Standard error
WTO96	-0.98	.34
EAEC	1.09	1.03
COMECON	2.30	.60
USSR	2.00	.72
GDP per capita	0.15	.10
Distance	-1.34	.24
GDP	0.99	.07
Border	0.18	.60
_cons	6.10	2.27

Table 6. Pooled Regressions, 1995–2002

	Simple	Robust SE	All countries**	Over \$0.5 million	Excluding poor data countries*	Weighted by real GDP	Quadratic gravity term	Excluding outliers of over 2sd
Log distance	-1.22	-1.22	-1.15	-1.15	-1.29	-1.30	-0.21	-1.16
	0.08	0.08	0.06	0.07	0.08	0.07	1.67	0.07
Log product real GDP	0.82	0.82	0.72	0.70	0.85	0.86	0.38	0.72
	0.03	0.03	0.02	0.02	0.03	0.03	0.14	0.02
Log product real per capita GDP	0.11	0.11	0.15	0.14	0.06	0.06	0.07	0.13
	0.04	0.04	0.03	0.03	0.04	0.04	0.06	0.03
Common Border	0.37	0.37	0.53	0.44	0.27	0.31	0.44	0.43
	0.19	0.14	0.16	0.15	0.20	0.18	0.20	0.16
WTO	-0.52	-0.52	-0.32	-0.41	-0.40	-0.44	-0.52	-0.41
	0.12	0.13	0.09	0.10	0.13	0.12	0.12	0.10
USSR	1.86	1.86	1.96	1.60	1.89	1.83	2.36	1.66
	0.23	0.15	0.19	0.19	0.23	0.23	0.20	0.19
COMECON	2.27	2.27	2.35	2.07	2.20	2.08	1.91	2.11
	0.20	0.13	0.17	0.16	0.21	0.19	0.25	0.17
EAEC	0.97	0.97	0.96	0.94	0.98	0.95	0.89	0.95
	0.32	0.12	0.28	0.26	0.32	0.34	0.32	0.27
cons	6.78	6.78	6.74	6.78	7.13	7.11	4.51	7.19
	0.73	0.66	0.60	0.73	0.76	0.67	7.07	0.62
	All	Robust	>all	>0.5	*	Weight	Quad	2sd
R-squared	0.72	0.72	0.78	0.74	0.73	0.73	0.72	0.75
Number of observations	1042	1042	1366	992	1006	1042	1042	1007
Root mean square error	1.53	1.52	1.31	1.26	1.52	1.45	1.52	1.28
F-test	330.45	268.01	603.99	351.39	340.18	348.90	244.02	370.99

*excluding: North Korea, Serbia and Montenegro, Iraq, Bermuda, and Cuba

** Logarithmic transformation on the dependent variable: $\log(x+1)$

Table 7. Sequential Pooled Regressions, 1995–2002

	1995	1995- 1996	1995- 1997	1995- 1998	1995- 1999	1995- 2000	1995- 2001	1995- 2002
Log distance	-0.98	-1.12	-1.06	-1.05	-1.06	-1.11	-1.13	-1.16
	0.20	0.14	0.12	0.10	0.09	0.08	0.07	0.07
Log product real GDP	0.72	0.75	0.70	0.67	0.66	0.69	0.71	0.72
	0.10	0.06	0.05	0.04	0.03	0.03	0.03	0.02
Log product real per capita GDP	0.11	0.24	0.25	0.21	0.17	0.15	0.15	0.13
	0.11	0.08	0.06	0.05	0.04	0.04	0.03	0.03
Common Border	0.11	0.15	0.26	0.32	0.39	0.39	0.43	0.43
	0.45	0.32	0.26	0.22	0.20	0.18	0.17	0.16
WTO	-0.55	-0.90	-0.70	-0.45	-0.41	-0.45	-0.45	-0.41
	0.38	0.26	0.21	0.17	0.14	0.13	0.11	0.10
USSR	2.01	1.98	2.03	1.94	1.78	1.69	1.69	1.66
	0.62	0.43	0.34	0.28	0.25	0.23	0.21	0.19
COMECON	2.14	2.42	2.49	2.32	2.21	2.20	2.18	2.11
	0.50	0.35	0.29	0.24	0.21	0.20	0.18	0.17
EAEC	0.89	0.92	0.85	0.89	0.90	0.95	0.96	0.95
	0.76	0.54	0.45	0.37	0.34	0.31	0.29	0.27
_cons	5.93	6.55	6.24	6.49	6.77	7.03	7.01	7.19
	1.89	1.34	1.09	0.90	0.80	0.72	0.66	0.62
R-squared	0.62	0.69	0.69	0.71	0.72	0.74	0.74	0.75
Number of observations	92	195	312	435	580	729	868	1007
Root mean square error	1.28	1.29	1.30	1.26	1.28	1.29	1.28	1.28
F-test	16.97	51.11	85.25	129.27	186.59	251.04	311.72	370.99

Table 8. Regressions with Time Effects, 1995–2002

	Simple	Simple	All countries**	Over \$0.5 million	Excluding poor data countries*	Quadratic gravity term	Excluding outliers of over 2sd
Log distance	-1.21	-1.18	-1.10	-1.13	-1.28	0.13	-1.14
	0.08	0.09	0.06	0.07	0.08	1.66	0.07
Log product real GDP	0.83	0.84	0.73	0.71	0.85	0.41	0.74
	0.03	0.03	0.02	0.02	0.03	0.14	0.02
Log product real per capita GDP	0.12	0.16	0.19	0.16	0.08	0.09	0.16
	0.04	0.04	0.03	0.03	0.04	0.06	0.03
Common Border	0.36	0.45	0.51	0.42	0.26	0.45	0.41
	0.19	0.19	0.15	0.15	0.20	0.20	0.16
WTO	-0.54	-0.51	-0.44	-0.47	-0.41	-0.52	-0.47
	0.12	0.12	0.09	0.10	0.13	0.12	0.11
USSR	1.92	1.91	2.02	1.67	1.95	1.98	1.73
	0.23	0.23	0.18	0.19	0.23	0.25	0.19
COMECON	2.30	2.10	2.40	2.13	2.23	2.39	2.16
	0.20	0.21	0.16	0.16	0.21	0.20	0.17
EAEC	0.97	0.98	0.95	0.95	0.98	0.89	0.95
	0.32	0.32	0.26	0.26	0.32	0.32	0.27
GSP		0.64					
		0.23					
Developed economy		-0.84					
		0.23					
_cons	6.55	6.24	6.23	7.06	6.92	2.83	6.90
	0.73	0.76	0.58	0.61	0.76	7.05	0.62
	All	All	>all	>0.5	*	quad	2 sd
R-squared	0.72	0.72	0.78	0.74	0.73	0.72	0.75
Number of observations	1042	1042	1366	992	1006	1042	1007
F-test	310.83	252.85	665.4	343.65	319.25	229.29	360.13

*excluding: North Korea, Serbia and Montenegro, Iraq, Bermuda, and Cuba

**Logarithmic transformation on the dependent variable: $\log(x+1)$

Table 9. Robustness Checks (time effects), 1995–2002

	1	2	3	4	5	6	7*
Log distance	-1.13	-1.11	-1.08	-1.00	-1.07	-1.07	-1.41
	0.09	0.09	0.09	0.09	0.09	0.12	0.30
Log product real GDP	1.04	1.08	1.06	0.94	0.95	0.97	1.79
	0.04	0.04	0.04	0.05	0.05	0.06	1.04
Log product real per capita GDP	2.39	-0.10	-0.09	-0.04	-0.03	-0.10	-1.93
	0.20	0.05	0.05	0.05	0.05	0.06	1.05
Common Border	0.50	0.46	0.53	0.57	0.50	0.47	-3.77
	0.19	0.19	0.19	0.19	0.19	0.25	3.32
WTO	-0.57	-0.41	-0.41	-0.43	-0.40	-0.35	0.20
	0.12	0.14	0.14	0.13	0.13	0.16	0.19
USSR	1.97	1.98	2.00	1.17	1.31	0.94	-2.54
	0.22	0.22	0.22	0.26	0.24	0.34	1.24
COMECON	2.39	2.37	2.25	1.96	2.21	1.70	2.97
	0.20	0.20	0.21	0.21	0.21	0.28	1.97
EAEC	1.29	1.30	1.26	1.11	0.96	1.27	4.08
	0.32	0.32	0.32	0.31	0.32	0.38	1.81
Landlocked	-0.28	-0.26	-0.25	-0.29	-0.39	-0.46	-1.08
	0.14	0.14	0.14	0.14	0.14	0.16	0.56
Island	-0.10	-0.10	0.01	-0.16	0.05	-0.36	-2.78
	0.17	0.17	0.18	0.18	0.17	0.22	1.16
Log area	-0.25	-0.26	-0.24	-0.20	-0.20	-0.21	-1.38
	0.04	0.04	0.04	0.04	0.04	0.05	0.61
GSP			0.55	0.16	0.84	0.12	2.13
			0.24	0.24	0.23	0.29	0.58
Developed economy			-0.43	-0.50	-0.86	-0.64	6.32
			0.24	0.24	0.25	0.29	1.74
Oil				1.03		1.18	-3.07
				0.16		0.21	3.15
Steel					1.06		
					0.16		
import duties						-0.07	
						0.11	
GATT-94		-0.32	-0.33	-0.21	-0.32	-0.14	-8.38
		0.13	0.13	0.13	0.13	0.15	3.23
_cons	8.13	7.89	7.42	7.09	7.45	7.76	31.70
	0.77	0.77	0.80	0.79	0.78	1.03	6.41
R-squared: overall	0.73	0.73	0.74	0.75	0.75	0.75	0.92
Number of observations	1042	1042	1042	1042	1042	795	1042
F-test	242.39	223.83	192.92	189.79	190.56	145.00	58.19

*fixed effects regression with country dummies included

Table 10. Between-Effects Regressions, 1995–2002

	Simple	Simple	All countries**	Over \$0.5 million	Excluding poor data countries*	Quadratic gravity term	Excluding outliers of over 2sd
Log distance	-1.17	-1.13	-1.08	-1.07	-1.24	-1.79	-1.12
	0.21	0.23	0.15	0.16	0.22	4.34	0.16
Log product real GDP	0.88	0.89	0.74	0.70	0.90	0.41	0.76
	0.06	0.07	0.05	0.05	0.06	0.30	0.05
Log product real per capita GDP	0.17	0.18	0.20	0.19	0.12	0.09	0.16
	0.09	0.09	0.06	0.07	0.09	0.13	0.07
Common Border	0.36	0.45	0.51	0.47	0.27	0.34	0.43
	0.51	0.52	0.37	0.38	0.55	0.56	0.39
WTO	-0.93	-0.93	-0.55	-0.75	-0.81	-0.94	-0.67
	0.32	0.32	0.23	0.25	0.33	0.32	0.24
USSR	2.07	2.07	1.99	1.63	2.08	2.10	1.79
	0.62	0.62	0.45	0.46	0.64	0.66	0.47
COMECON	2.57	2.41	2.42	2.26	2.49	2.69	2.30
	0.54	0.57	0.39	0.40	0.58	0.55	0.41
EAEC	0.97	0.97	0.95	0.93	0.99	0.94	0.94
	0.88	0.89	0.64	0.66	0.88	0.89	0.67
GSP		0.67					
		0.64					
Developed economy		-0.66					
		0.63					
_cons	5.82	5.43	6.13	6.79	6.23	10.34	6.49
	1.93	2.02	1.41	1.46	2.00	18.30	1.47
	all	all	>all	>0.5	*	quad	2sd all
R-squared: overall	0.72	0.72	0.78	0.74	0.73	0.72	0.75
Number of observations	1042	1042	1366	992	1006	1042	1007
F-test	76.35	60.94	112.93	84.45	76.23	55.9	98.25

*excluding: North Korea, Serbia and Montenegro, Iraq, Bermuda, and Cuba

**Logarithmic transformation on the dependent variable: $\log(x+1)$

Table 11. Between-Effects Regression: Additional Robustness Checks, 1995–2002

	1	2	3	4	5	6	7
Log distance	-1.12	-1.10	-0.98	-1.11	-1.11	-1.03	-1.04
	0.09	0.09	0.09	0.08	0.09	0.09	0.09
Log product real GDP	1.03	1.04	0.91	0.95	0.93	0.91	0.86
	0.04	0.04	0.05	0.04	0.05	0.05	0.05
Log product real per capita GDP	-0.07	-0.11	-0.08	-0.08	-0.01	-0.03	0.01
	0.05	0.05	0.05	0.05	0.05	0.05	0.05
Common Border	0.56	0.52	0.58	0.45	0.53	0.59	0.56
	0.19	0.19	0.19	0.19	0.19	0.19	0.19
WTO		-0.58	-0.59	-0.57	-0.54	-0.53	-0.52
		0.12	0.12	0.12	0.12	0.12	0.12
USSR	1.97	1.99	1.24	1.40	1.28	1.13	0.81
	0.22	0.23	0.25	0.24	0.24	0.25	0.26
COMECON	2.24	2.39	2.14	2.46	2.20	1.94	1.98
	0.21	0.20	0.20	0.20	0.21	0.21	0.21
EAEC	1.26	1.28	1.13	1.05	0.96	1.10	0.91
	0.32	0.32	0.32	0.32	0.32	0.31	0.31
Landlocked	-0.25	-0.29	-0.36	-0.42	-0.39	-0.29	-0.38
	0.14	0.14	0.14	0.14	0.14	0.14	0.14
Island	0.03	-0.09	-0.25	-0.13	0.07	-0.15	-0.07
	0.18	0.17	0.17	0.17	0.17	0.18	0.18
Log area	-0.22	-0.25	-0.22	-0.23	-0.18	-0.19	-0.17
	0.04	0.04	0.04	0.04	0.04	0.04	0.04
GSP	0.51	0.15			0.80	0.12	0.43
	0.24	0.17			0.23	0.24	0.24
Developed economy	-1.10				-0.97	-0.57	-0.89
	0.26				0.24	0.23	0.24
Oil			0.98			1.06	0.81
			0.15			0.16	0.17
Steel				0.90	1.07		0.81
				0.16	0.16		0.17
DPingWTO	-0.55						
	0.12						
_cons	7.73	7.98	7.35	8.32	7.75	7.28	7.40
	0.79	0.79	0.76	0.75	0.78	0.78	0.77
R-squared: overall	0.73	0.73	0.74	0.74	0.75	0.75	0.75
Number of observations	1042	1042	1042	1042	1042	1042	1042
F-test	206.32	222.18	234.58	231.89	202.8	202.85	194.97

Table 12. Cross-Country Regression on Annual Means, 1995–2002
(Without Outliers)

Number of obs	160	
F(8, 151)	101.90	
Prob > F	0.0000	
R-squared	0.8437	
Adj R-squared	0.8354	
Exports (dep. var)	Coef.	Standard error
WTO96	-1.163217	.2771466
EAEC	1.099938	.7971297
COMECON	2.20221	.4689152
USSR	1.82006	.5634035
GDP per capita	.2046425	.0804273
Distance	-1.301995	.1898822
GDP	.9751183	.0591615
Border	.0794885	.4640411
_cons	6.177337	1.767967

Note: based on the “leverage vs. squared residuals” plot, outliers were identified as including: St. Vincent and Grenadines, Bahrain, Cape Verde, Botswana, Gabon, DRC, Oman, and Liberia

Table 13. Cross-Country Regression on Annual Means, 1995–2002
(Without High-Leverage Observations)

Number of obs	164	
F(7, 156)	70.41	
Prob > F	0.0000	
R-squared	0.7596	
Adj R-squared	0.7488	
Exports (dep. var)	Coef.	t-statistic
WTO96	-.9708534	.346756
EAEC	-	-
COMECON	2.276183	.6113265
USSR	1.95225	.7341529
GDP per capita	.1544773	.1018986
Distance	-1.345509	.2481838
GDP	.9914112	.0747817
Border	.2574013	.6363016
_cons	6.1829	2.30984

Note: based on the “leverage vs. squared residuals” plot, high-leverage observations were identified to include: Belarus, Kazakhstan, Kyrgyzstan, and Tajikistan

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Table A1. Chronology of Russia's WTO Accession Process

Stages of accession:	
1. Request for accession	1993
2. Memorandum on the foreign trade regime to be submitted to the Working Party	March 1994, May 2001, November 2001
3. Questions and replies: the submission of the memorandum is to be followed by examination of questions (by the members of the Working Party) and answers of the acceding country	June 1995, June 1996
3. Working Party multilateral negotiations , which are to determine the general conditions of accession, including commitments to observe WTO rules and the length of transitional periods necessary to insure their implementation	20 meetings of the Working Party in 1995-2003
4. Working Party bi-lateral negotiations. Each accession working party takes decisions by consensus, hence the accession country needs to reach an agreement with all of the members of the Working Party.	Agreements on market access concluded with several countries, including with the EU in May 2004.
<p>5. The accession package:</p> <p>The results of the negotiations are reflected in three documents, which form the so-called "accession package":</p> <ul style="list-style-type: none"> - Report of the Working Party that contains a summary of proceedings and conditions of entry - Protocol of Accession The document provides all the general terms and conditions of membership, including the areas of the administration of trade regime, non-discrimination, the use of non-tariff measures, etc. - Schedules of market access commitments in goods and services that reflect the agreements reached with the members of the Working Party by the acceding country 	Draft Working Party Reports (March 2002, November 2002, May 2003)

Table A2. Definition of Variables

Variable	Definition
Log exports	Natural logarithm of Russia's annual exports in 1995-2002 deflated by US CPI
Log turnover	Natural logarithm of Russia's annual trade turnover in 1995-2002 deflated by US CPI
Log product GDP	Natural logarithm of the product of Russia's GDP and that of Russia's trade partners in 1995-2002 deflated by US CPI
Log product GDP per capita	Natural logarithm of the product of Russia's GDP per capita and that of Russia's trade partners in 1995-2002 deflated by US CPI
Log distance	Natural logarithm of the distance from Moscow to the capitals of Russia's trade partners
COMECON	Dummy variable (1=former COMECON member (GDR excluded), 0=not a former member of COMECON)
WTO	Dummy variable (1=member of the WTO, 0=the country is not a member of the WTO)
USSR	Dummy variable (1=former member of the USSR, 0=not a former member of the USSR)
EAEC	Dummy variable (1=member of EAEC, 0=not a member of EAEC)
Developed	Dummy variable (1=developed country, 0=developing country)
GSP	Dummy variable (1=trading partner accords GSP to Russia, 0=trading partner does not accord GSP treatment to Russia)
Island	Dummy variable (1=island country, 0=non-island country)
Landlocked	Dummy variable (1=landlocked country, 0=non-landlocked country)
Log product area	Natural logarithm of the product of Russia's area (in sq. km) and that of Russia's trade partners
Oil	Dummy variable (1=importer oil, from Russia in 1995, 0=all other countries)
Steel	Dummy variable (1=importer of steel from Russia, 0=all other countries)
GATT-94	Dummy variable (1=member of the WTO as of January 1, 1995, 0=all other countries)
Import duties	Natural logarithm of the average import tariff in Russia's trading partners.
DPingWTO	Dummy variable (1=developing country that is a member of the WTO, 0=all other countries)

Table A3. Summary Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
log exports	1043	3.92	2.87	-6.86	9.01
WTO	1368	0.72	0.45	0	1
log product GDP per capita	1366	1.27	1.69	-2.19	8.16
log product GDP	1366	8.09	2.27	2.04	14.93
log distance	1368	8.48	0.74	6.52	9.71
COMECON	1368	0.05	0.22	0	1
USSR	1368	0.08	0.27	0	1
Border	1368	0.08	0.27	0	1
EAEC	1368	0.02	0.15	0	1
Developed	1368	0.13	0.34	0	1
GSP	1368	0.11	0.31	0	1
Island	1368	0.18	0.39	0	1
Landlocked	1367	0.20	0.40	0	1
Log product area	1368	14.47	2.37	6.81	18.95

Table A4. List of WTO Members

WTO members (as of June, 2004):

Albania 8 September 2000, Angola 23 November 1996, Antigua and Barbuda 1 January 1995, Argentina 1 January 1995, Armenia 5 February 2003, Australia 1 January 1995, Austria 1 January 1995, Bahrain, Kingdom of 1 January 1995, Bangladesh 1 January 1995, Barbados 1 January 1995, Belgium 1 January 1995, Belize 1 January 1995, Benin 22 February 1996, Bolivia 12 September 1995, Botswana 31 May 1995, Brazil 1 January 1995, Brunei Darussalam 1 January 1995, Bulgaria 1 December 1996, Burkina Faso 3 June 1995, Burundi 23 July 1995, Cameroon 13 December 1995, Canada 1 January 1995, Central African Republic 31 May 1995, Chad 19 October 1996, Chile 1 January 1995, China 11 December 2001, Colombia 30 April 1995, Congo 27 March 1997, Costa Rica 1 January 1995, Côte d'Ivoire 1 January 1995, Croatia 30 November 2000, Cuba 20 April 1995, Cyprus 30 July 1995, Czech Republic 1 January 1995, Democratic Republic of the Congo 1 January 1997, Denmark 1 January 1995, Djibouti 31 May 1995, Dominica 1 January 1995, Dominican Republic 9 March 1995, Ecuador 21 January 1996, Egypt 30 June 1995, El Salvador 7 May 1995, Estonia 13 November 1999, European Communities 1 January 1995, Fiji 14 January 1996, Finland 1 January 1995, Former Yugoslav Republic of Macedonia (FYROM) 4 April 2003, France 1 January 1995, Gabon 1 January 1995, The Gambia 23 October 1996, Georgia 14 June 2000, Germany 1 January 1995, Ghana 1 January 1995, Greece 1 January 1995, Grenada 22 February 1996, Guatemala 21 July 1995, Guinea 25 October 1995, Guinea Bissau 31 May 1995, Guyana 1 January 1995, Haiti 30 January 1996, Honduras 1 January 1995, Hong Kong, China 1 January 1995, Hungary 1 January 1995, Iceland 1 January 1995, India 1 January 1995, Indonesia 1 January 1995, Ireland 1 January 1995, Israel 21 April 1995, Italy 1 January 1995, Jamaica 9 March 1995, Japan 1 January 1995, Jordan 11 April 2000, Kenya 1 January 1995, Korea, Republic of 1 January 1995, Kuwait 1 January 1995, Kyrgyz Republic 20 December 1998, Latvia 10 February 1999, Lesotho 31 May 1995, Liechtenstein 1 September 1995, Lithuania 31 May 2001, Luxembourg 1 January 1995, Macao, China 1 January 1995, Madagascar 17 November 1995, Malawi 31 May 1995, Malaysia 1 January 1995, Maldives 31 May 1995, Mali 31 May 1995, Malta 1 January 1995, Mauritania 31 May 1995, Mauritius 1 January 1995, Mexico 1 January 1995, Moldova 26 July 2001, Mongolia 29 January 1997, Morocco 1 January 1995, Mozambique 26 August 1995, Myanmar 1 January 1995, Namibia 1 January 1995, Nepal 23 April 2004, Netherlands — For the Kingdom in Europe and for the Netherlands Antilles 1 January 1995, New Zealand 1 January 1995, Nicaragua 3 September 1995, Niger 13 December 1996, Nigeria 1 January 1995, Norway 1 January 1995, Oman 9 November 2000, Pakistan 1 January 1995, Panama 6 September 1997, Papua New Guinea 9 June 1996, Paraguay 1 January 1995, Peru 1 January 1995, Philippines 1 January 1995, Poland 1 July 1995, Portugal 1 January 1995, Qatar 13 January 1996, Romania 1 January 1995, Rwanda 22 May 1996, Saint Kitts and Nevis 21 February 1996, Saint Lucia 1 January 1995, Saint Vincent & the Grenadines 1 January 1995, Senegal 1 January 1995, Sierra Leone 23 July 1995, Singapore 1 January 1995, Slovak Republic 1 January 1995, Slovenia 30 July 1995, Solomon Islands 26 July 1996, South Africa 1 January 1995, Spain 1 January 1995, Sri Lanka 1 January 1995, Suriname 1 January 1995, Swaziland 1 January 1995, Sweden 1 January 1995, Switzerland 1 July 1995, Chinese Taipei 1 January 2002, Tanzania 1 January 1995, Thailand 1 January 1995, Togo 31 May 1995, Trinidad and Tobago 1 March 1995, Tunisia 29 March 1995, Turkey 26 March 1995, Uganda 1 January 1995, United Arab Emirates 10 April 1996, United Kingdom 1 January 1995, United States of America 1 January 1995, Uruguay 1 January 1995, Venezuela 1 January 1995, Zambia 1 January 1995, Zimbabwe 5 March 1995

Observer governments:

Algeria, Andorra, Azerbaijan, Bahamas, Belarus, Bhutan, Bosnia and Herzegovina, Cambodia, Cape Verde, Equatorial Guinea, Ethiopia, Holy See (Vatican), Iraq, Kazakhstan, Lao People's Democratic Republic, Lebanese Republic, Russian Federation, Samoa, Sao Tome and Principe, Saudi Arabia, Serbia and Montenegro, Seychelles, Sudan, Tajikistan, Tonga, Ukraine, Uzbekistan, Vanuatu, Viet Nam, Yemen