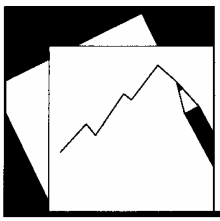
WP/05/192



IMF Working Paper

Is Russia Still Driving Regional Economic Growth?

Clinton R. Shiells, Marco Pani, and Etibar Jafarov

INTERNATIONAL MONETARY FUND

 WP/05/192

IMF Working Paper

IMF Institute, Middle East and Central Asia Department, and European Department

Is Russia Still Driving Regional Economic Growth?

Prepared by Clinton R. Shiells, Marco Pani, and Etibar Jafarov[1]

Authorized for distribution by Eric V. Clifton, Edward H. Gardner, and Lorenzo U. Figliuoli

September 2005

Abstract

This paper investigates whether the linkages between economic growth in Russia and growth in other countries in the region have weakened over time, particularly following the 1998 Russian crisis. It specifies an econometric model that includes standard growth determinants as well as Russian economic growth, and which allows for the effects of Russian growth to vary over time. The paper finds that Russian growth was indeed a significant determinant of regional economic growth prior to the Russian crisis, but that this link weakened significantly thereafter.

JEL Classification Numbers: F15, F43, O40

Keywords: Economic growth, Russia, CIS, Baltics

Author(s) E-Mail Address: cshiells@imf.org; mpani@imf.org; ejafarov@imf.org

[1] The authors would like to thank Balázs Horvath, Gabriela Inchauste, Shigeru Iwata, Yuko Kinoshita, Vitali Kramarenko, Nienke Oomes, and Mika Saito for helpful comments and suggestions.

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I. INTRODUCTION

More than a decade has passed since the demise of the Soviet Union. The fifteen countries that have emerged from it have undergone deep economic, social, and political transformations. All countries have introduced their own national currencies, many have opened their borders to trade, seven have joined the World Trade Organization (WTO), and the three Baltic countries have become members of the European Union (EU). In this process, the structures of these economies have been reoriented, away from a single centralized command economy, and toward more decentralized, diversified economies that respond to price signals and incentives. As a result, the strong interconnections that characterized these economies at the start of independence have weakened, while links to the rest of the world have increased.[2]

As shown in the following table (and Appendix Table 1), there was a precipitous drop in the simple correlations between real GDP growth in Russia on the one hand and in the other CIS and Baltic countries on the other—even for energy-exporting countries—roughly coincident with the 1998 Russian crisis: [3]

Table 1. Simple Correlation Coefficients Between Real GDP Growth in Russia and the Other CIS and Baltic Countries, 1993–2003
(Average across countries)

	1993–97	1998–2003	1993–98	1999–2003
CIS	0.81	0.27	0.74	—
Energy exporters	0.91	0.32	0.82	–0.02
Energy importers	0.77	0.25	0.70	—
Baltics	0.73	0.06	0.70	0.03

Source: IMF World Economic Outlook database; Fund staff estimates.

[2] Michalopoulos and Tarr (1994, Chapter 1) describe the sharp contractions in trade and output during the period immediately following the breakup of the former Soviet Union, including due to the collapse of the trade agreements of the Council for Mutual Economic Assistance (CMEA) in 1991 and other serious impediments to interstate trade including payments problems, massive terms of trade shifts, export restraints, state trading and imperfect competition, and an erratic framework of regional trade preferences and discrimination. These impediments to trade were gradually dismantled. Michalopoulos (1999) reviews the subsequent trade and trade policy developments.

[3] The Commonwealth of Independent States (CIS) is an economic alliance of 12 of the former Soviet republics: Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, the Kyrgyz Republic, Moldova, Russia, Tajikistan, Turkmenistan, Ukraine, and Uzbekistan. The Baltic countries consist of Estonia, Latvia, and Lithuania.

The paper considers whether this drop is evident—even after controlling for other factors—by adding Russian real GDP growth to a standard growth regression for the other CIS and Baltic countries. The model will be estimated using annual data for 1993–2003 pooled across the 13 CIS and Baltic countries (excluding Turkmenistan, for which data quality is poor and data are scarce, and of course Russia itself) using a one-way error component regression model.[4] The study tests whether there has been a change in the relationship between growth in Russia and growth in the other CIS and Baltic countries related to the Russian crisis. As suggested by the simple correlations, the econometric evidence supports the hypothesis of a weakening of the link that broadly coincided with the crisis. The paper also considers some possible reasons and transmission channels for this change, including a decline in trade and financial flows.

The paper is organized as follows. Section II provides a brief literature review. Section III discusses the data. Section IV presents unit root tests. Section V lays out the econometric model. Section VI discusses model selection and sensitivity analysis. Section VII presents estimates of the model. Possible transmission channels are considered in Section VIII. Section IX concludes.

II. Previous Studies

Researchers studying the international correlation of output changes have mainly analyzed the transmission of business cycles between the industrial countries, although some papers have studied the business cycles of developing countries.[5] Given the short period since independence, these studies have limited relevance for the present study. Arora and Vamvakidis (2004) examine the effect of changes in U.S. economic growth on long-run economic growth in the rest of the world by including the U.S. growth rate as an explanatory variable in a regression of other countries' growth rates on standard determinants of growth. Similarly, Arora and Vamvakidis (2005b) estimate a model of economic growth for sub-Saharan African countries, augmented by growth in South Africa, to analyze the effect of South African growth on other countries in the region. More generally, Arora and Vamvakidis (2005a) examine the extent to which a country's economic growth is influenced by its trading partner economies, based on a panel of over 100 countries.

Empirical studies of the former Soviet Union have focused on the determinants of economic growth within each country rather than regional growth linkages and mostly refer to the period prior to the Russian crisis. A number of studies have estimated growth regressions for the transition economies, including notably Fischer, Sahay, and Végh (1998), Havrylyshyn, Izvorski, and van Rooden (1998), Berg and others (1999), and Havrylyshyn and van Rooden

[4] See Baltagi (2001), Chapter 2.

[5] See, for instance, Backus, Kehoe, and Kydland (1992), Backus and Kehoe (1992), Agénor, McDermott, and Prasad (1999), Doyle and Faust (2002), and Helbling and Bayoumi (2003).

(2000).[6] The studies have identified a variety of macroeconomic, structural, and institutional factors as determinants of economic growth in transition economies. Berg and others (1999) use perhaps the most extensive array of econometric techniques to address possible simultaneity bias, dynamics and unit roots, structural change, and panel data issues. In contrast to these previous studies, the present paper estimates the growth linkages between Russia and the other CIS and Baltic countries econometrically and considers how these may have changed following the Russian crisis.

The variables identified in past studies as determinants of economic growth in the transition economies may be classified into three broad categories: initial conditions (including institutions); macroeconomic variables (including both policy indicators and outcomes); and structural reform indices. A list of possible explanatory variables is presented in Table 2. Following Havrylyshyn, Izvorski, and van Rooden (1998) and Havrylyshyn and van Rooden (2000), growth in transition economies appears to be correlated with a set of initial conditions. The present study utilizes Havrylyshyn and van Rooden's (2000) two "clusters" of initial conditions—capturing respectively macroeconomic distortions and unfamiliarity with market processes (IC1) and the level of socialist development and its associated distortions (IC2)—and initial income.[7] Variables capturing macroeconomic performance include consumer price index (CPI) inflation (following for instance Berg and others, 1999; and Havrylyshyn and van Rooden, 2000) and government expenditure as a percentage of GDP (this measure was used—instead of the fiscal balance measure used by Berg and others, 1999; Fischer, Sahay, and Végh, 1998; and others—due to problems of noncomparability and breaks in series). A structural reform index has been compiled by the European Bank for Reconstruction and Development (EBRD). Other candidates for explanatory variables, not falling directly into one of these three categories, include: growth in other trading partners (real GDP growth in the EU; and in the world);[8] measures of the real exchange rate (the CPI-based real exchange rate vis-à-vis Russia; and the trade-weighted real effective exchange rate); and measures of trade dependence (the share of exports to Russia; openness defined as exports plus imports divided by GDP).

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[6] These studies are surveyed by Havrylyshyn (2001), who also summarizes the large literature that explores possible reasons for the output collapse in the former Soviet Union during the early 1990s and describes how numerous studies containing growth regressions have attempted to control for these explanatory factors.

[7] As explained by Havrylyshyn, Izvorski, and van Rooden (1998, p. 14), IC1 includes: repressed inflation, the black market premium, trade dependency, market memory, existence as an independent state prior to 1989, and location. IC2 includes: 1989 per capita income, the level of urbanization and over-industrialization, prior economic growth, and the richness of natural resources.

[8] This may introduce some multicollinearity into the regression because EU and world growth may also affect Russian growth.

It is also worth noting that other studies have examined related aspects of economic growth performances in the CIS countries. Loukoianova and Unigovskaya (2004), for instance, analyze recent growth developments in the low-income CIS countries using standard demand-side growth decompositions and growth accounting. Berengaut and others (2002) consider various possible explanations for the pickup in Ukraine's economic growth following several years of decline, such as increased utilization of the capital stock inherited from the Soviet period. Elborgh-Woytek (2003) documents the shift in trade by the CIS countries away from intra-CIS trade and toward the rest of the world, including notably the EU, and compares actual with potential trade.

III. DATA

Annual data for real GDP growth, CPI inflation, and government expenditures as a percentage of GDP were obtained from the IMF World Economic Outlook database, which reflects the data used by country desk officers. These data are displayed in Figures 1-3. Figure 1 shows that the graphs of real GDP for most of the CIS countries exhibit a "smile" pattern, while the Baltics experienced an increasing output trajectory. Trends in real GDP data are extensively discussed in Campos and Coricelli (2002).[9] Consumer price inflation data are displayed in Figure 2. They show in many cases rapid disinflation in the early 1990s and low inflation thereafter. Movements in government expenditure as a share of GDP—shown in Figure 3—are varied. Data describing initial conditions were taken from Havrylyshyn and van Rooden (2000). The reform index was obtained from the European Bank for Reconstruction and Development (EBRD) reform indices, which summarize a variety of indicators of reform progress.

The data suffer from several weaknesses. Gross domestic product data likely include serious biases due to underreporting by private enterprises to avoid taxes and regulations.[10] Moreover, government expenditure data may not be fully comparable across countries depending on the progress in achieving transparency of government operations, as well as on differences in definitions and coverage.[11] For example, it is not particularly meaningful to compare fiscal expenditures in Belarus directly, where there are sizeable and time-varying quasi-fiscal expenditures, with those of the Baltic countries, where fiscal transparency is much higher. Social safety net expenditures are included in the definition of expenditure in

[9] Their survey describes the growth performances of the transition countries, reviews the theoretical macroeconomic literature on transition, and assesses whether the empirical literature supports the theory.

[10] Many countries do however incorporate—albeit partially—an estimate of the underground economy into their official GDP data. See Johnson, Kaufmann, and Shleifer (1997) for estimates of the unofficial economy in transition countries.

[11] Measures of fiscal deficits appeared to suffer from greater problems of non-comparability across countries and over time than the government expenditure measures due to breaks in series.

some countries but not others. Even the quality of consumer price inflation data may vary considerably across countries. Owing to the poor quality of the data, the years prior to 1993 were excluded from the sample. For this same reason, Turkmenistan was not included in the analysis.[12]

IV. Unit Root Tests

There are two main views in the literature on whether growth rates or levels of output should be analyzed. Arora and Vamvakidis (2004) assert that "[s]ince the regressions are on growth rates, it is not necessary to test for unit roots and co-integration relationships in the data." In contrast, Berg and others (1999) seek to determine whether the dependent variable in the regression should be the level of output or its growth rate by conducting unit root tests, while assuming that the independent variables included in the regression are stationary based on the argument that "policy variables evolve (or 'revert') toward some international standard defined by market economies."

Table 3 provides test statistics for the null hypothesis that the level of real GDP exhibits a unit root. Based on a presumption that real GDP series are trended, both a constant and a time trend are included in the Dickey-Fuller (DF) and augmented Dickey-Fuller (ADF) regressions.[13] The null hypothesis of a unit root is rejected in 7 of 13 cases at the 5 percent level based on the DF test but in only 2 of 13 cases based on the ADF test. Using the specification that minimizes the Akaike Information Criterion (AIC), the tests reject the null hypothesis in 5 of 13 cases. The Im, Pesaran, and Shin (2003) t-bar test strongly rejects the null hypothesis that all cross-sectional units have a unit root based on either the DF or ADF test statistics. Given that the levels of real GDP for most countries appear to have a unit root, regressions will be estimated below using real GDP growth rates.

V. Econometric Model

The regression model estimated in this paper is of the following general form:

$$y_{it} = \alpha + \beta_1 y_{Rt} + \beta_2 y_{R,t-1} + \beta_3 x_{it} + \beta_4 y_{i,t-1} + u_{it} = Z_{it}\delta + u_{it} \quad (1)$$

where y_{it} is real GDP growth for country i in year t, y_{Rt} is real GDP growth for Russia in year t, x_{it} is a vector of exogenous determinants of growth in country i, and u_{it} is a random disturbance term, with

$$u_{it} = \mu_i + v_{it}$$

and

[12] See IMF (1999) for a description of weaknesses in the data for Turkmenistan.

[13] The ADF regressions include one lag. It is also possible that the trend is nonlinear, reflecting transition effects.

$$Z_{it} = \left(1, y_{Rt}, y_{R,t-1}, x_{it}, y_{i,t-1}\right); \delta = \left(\alpha, \beta_1, \beta_2, \beta_3, \beta_4\right)'$$

This is a one-way error component regression model. If x_{it} includes both current and one-period lags, this model is in the form of a first-order autoregressive distributed lag model. Inclusion of a lagged dependent variable gives rise to a bias in standard estimators of either the fixed or random effects model.[14]

Allowing for a possible shift in the regression coefficients following the Russian crisis, the regression equation is as follows:

$$\begin{aligned} y_{it} &= \alpha + \gamma_0 d_t + \beta_1 y_{Rt} + \gamma_1 d_t y_{Rt} + \beta_2 y_{R,t-1} + \gamma_2 d_t y_{R,t-1} \\ &\quad + \beta_3 x_{it} + \gamma_3 d_t x_{it} + \beta_4 y_{i,t-1} + \gamma_4 d_t y_{i,t-1} + \mu_i + d_t \mu_i + v_{it} \\ &= Z_{it}\delta + d_t Z_{it}\delta_d + \mu_i + d_t \mu_i + v_{it} \end{aligned} \tag{2}$$

where d_t is equal to 0 prior to the Russian crisis and 1 thereafter.[15] While there is prior information that the regression coefficients may have changed at the time of the Russian crisis, there is some uncertainty regarding the precise timing of this possible shift, suggesting the desirability of a searching within a neighborhood of the Russian crisis for the most likely shift point.[16]

VI. Model Selection and Sensitivity Analysis

Starting with the general fixed effects model with first-order lagged dependent and independent variables, not surprisingly, the estimates with the full set of explanatory variables included in the regression are not informative, owing to the close correlation between variables common to all countries in a panel data model. Apart from coefficients for a few of the country dummy variables, coefficients had insignificant t-statistics in the general

[14] See for instance Baltagi (2001), Chapter 8. As discussed there, Arellano and Bond (1991) and others develop estimators that avoid this inconsistency by using instrumental variables.

[15] Under the assumption of fixed country effects, the restrictions that the sums of the μ_i s and $d_t \mu_i$ s are equal to zero need to be imposed on the estimation of equation (2) to avoid the dummy variable trap. Initial conditions must also be excluded from x_{it} under the assumption of fixed effects (but can be included under the assumption of random effects) since the initial conditions vary across countries but not over time and hence are perfectly collinear with the country effects.

[16] Maddala and Kim (1998, p. 398) argue that prior information on the regime switch point should be used if it is available—asking the question of whether there was a structural change around that period—rather than simply endogenizing the breakpoint.

model.[17] This appears to stem from the inclusion of first-order lags for all explanatory variables notwithstanding the short time series (11 observations). In particular, if lagged values of the explanatory variables are omitted, coefficients on most explanatory and dummy variables are significant, as discussed below. If these lags are not omitted, it is very difficult to find a specification that yields significant and economically sensible results. The remainder of the econometric analysis therefore proceeds from the general model, including a lagged dependent variable to permit some dynamics but excluding all of the lagged independent variables.[18]

Two well-known model evaluation and selection methods could alternatively have been used: (i) the general-to-specific approach associated with David Hendry and others;[19] and (ii) the Bayesian Averaging of Classical Estimates (BACE) approach developed by Sala-i-Martin, Doppenhofer, and Miller (2004). However, these approaches do not seem well suited to the estimation problem in this paper, for the reasons discussed in Box 1.

Box 1. Model Evaluation and Selection Methods

The general-to-specific approach starts with a general model, such as equation (2), that includes current and lagged values of the dependent and independent variables, and considers multiple paths along which combinations of explanatory variables may be excluded based on standard statistical tests. It is a priori agnostic as to which combination of explanatory variables should be included in the regression, a quandary that led Berg and others (1999) to apply the general-to-specific methodology "loosely" by always simplifying first among time constants, then initial conditions, and finally policy variables. This appears well suited to the aim in Berg and others (1999) of disentangling the role and timing of macroeconomic and structural reform policies from initial conditions as explanations of economic growth performances in transition economies. In the present study, however, once the specification has been narrowed to exclude dynamics that appear excessively demanding given the short time series, the need to narrow the specification further is limited.

The BACE approach, developed to sort through a large number of possible explanatory variables suggested by alternative theories of economic growth by forming weighted averages of coefficient estimates based on all possible combinations of regressors, is agnostic as to the correct specification except for model size. The main issue of model specification in the present paper is rather that there are insufficient time-series observations to permit the estimation of dynamics.

[17] Results for this general model, including lags for all explanatory variables, are available from the authors upon request.

[18] Results should be interpreted with caution since lagged explanatory variables may be important.

[19] For a review, see for instance Ericsson, Campos, and Tran (1990).

VII. ECONOMETRIC RESULTS

Table 4 presents a comparison of results for a variety of different specifications that were estimated following the exclusion of lagged independent variables from the general model in equation (2). Results for the general model (albeit excluding lagged independent variables) are presented in column (1). This specification includes lagged own-country growth, country dummies, the CPI, government expenditure in percent of GDP, the EBRD structural reform index, EU growth, the real exchange rate, Russian growth, the trade openness ratio,[20] and interactions between a post-Russian-crisis dummy variable and all of the other explanatory variables. This specification assumes that the structural break point was 1998; the dummy is equal to 0 prior to 1998 and 1 in 1998 and onwards. Additional results are presented below based on the alternative assumption that the break point occurred in 1999; structural change tests based on endogenizing the break point are also discussed. The coefficient on Russian growth is quite substantial (0.96) and significant.[21] The coefficient on the Russian crisis dummy interacted with Russian growth is –0.91 and also highly significant. These results imply that, on average, a one percentage point increase in Russian growth was associated with a 0.96 percentage point increase in another country's growth rate, holding other factors constant, before the Russian crisis. After the crisis, this effect dropped to 0.05 percentage points and was not significantly different from zero. As described below, this finding is robust to changes in the set of included explanatory variables, use of initial conditions instead of country dummies, and many other specification choices.

While countries' growth linkage to Russia fell on average following the Russian crisis, the own-country effect rose in 9 of 12 cases following the crisis. This is reflected in the many positive (and significant) coefficients on the interactions between the Russian crisis dummy and the country dummies. These results suggest that pickups in economic growth in the last few years are explained by own-country effects and do not appear to reflect higher growth in Russia.

Based on the results in column (1), the coefficient on CPI inflation is not significant and is near zero, as is the coefficient on the interaction between CPI inflation and the Russian crisis dummy. While the coefficient on government expenditure (as a percent of GDP) is also insignificant and essentially near zero, its interaction with the Russian crisis dummy is –0.5 and statistically significant. Growth in the EU has a negative coefficient (–2.9) and is significant prior to 1998, while in the 1998–2003 period it becomes insignificant and close to zero. The negative coefficient on EU growth during 1993–97 appears to be a statistical reflection of declining output in the CIS countries coincident with growth in the EU, whereas

[20] Alternative specifications were also estimated that included exports to Russia as a proportion of the country's total exports but this variable was not statistically significant.

[21] This result is broadly consistent with the finding in Arora and Vamvakidis (2005a) that a 1 percentage point increase in economic growth of trading partners is correlated with as much as a 0.8 percentage point increase in domestic growth.

the finding that the coefficient on EU growth was insignificant during 1998-2003 suggests that the regression is capturing more than a shift in trade patterns. The coefficient on EU growth would need to become positive and significant if the results were just a reflection of the EU taking up the role that Russia used to play. Lagged Russian growth is not significant.

Estimation of an alternative specification, including initial condition measure IC2 (IC1 was not significant) but not country effects, is shown in column (2) of Table 4. The results are broadly similar to those obtained above. The estimated coefficient on Russian growth is 0.67 and highly significant prior to 1998, while thereafter it fell to 0.19 and was insignificant. Interestingly, estimated coefficients corresponding to the CPI and government expenditure in percent of GDP are statistically significant in this specification, although the coefficient on the CPI is still near zero. These findings are consistent with the observation above that the country fixed effects partly capture the effects of missing macroeconomic variables on each country's economic growth.

In contrast to the negative (expected) sign found by Havrylyshyn and others (1998), the estimated coefficient for initial conditions is positive and highly significant. In other words, unfavorable initial conditions appear to have had a persistent, depressing effect on growth in the model estimated by Havrylyshyn and others (1998), while in the present study they seem to have had a positive effect, probably by creating more incentives to "catch up." This difference is probably due to the different sample of countries and time periods (the sample used by Havrylyshyn and others, 1998, included transition countries in Central and Eastern Europe and covered only the period up to 1997). Rerunning the regressions estimated by Havrylyshyn and others (1998) using the sample of countries and years included in the present study, the impact of initial conditions appears to be positive.

A regression equation including regional dummy variables (Baltics; the Caucasus and Moldova; and Central Asia—Belarus and Ukraine constitute the reference group) instead of country effects was also estimated. The equation includes the same variables as in column (1) except that all terms involving country dummies are omitted and the following variables involving regional dummies are added: (i) the regional dummies themselves; and (ii) regional dummies interacted with the Russian crisis dummy. Results reported in column (3) of Table 4 are broadly similar to the results in column (1).

The results are insensitive to the choice of whether the Baltics are included in the sample, which suggests importantly that the paper's findings are quite robust with respect to changes in the country sample. Column (4) of Table 4 presents estimates based on the previous specification but excluding the Baltics. The coefficient on growth in Russia is 1.37 and is highly significant while the coefficient on the Russian crisis dummy interacted with Russian growth is –1.32 and highly significant; their difference is 0.06 and is insignificant. For completeness, column (5) includes estimates using data only for the Baltics.

Two other variants are obtained by including a CPI-based bilateral real exchange rate vis-à-vis Russia either instead of, or in addition to, the multilateral real effective exchange rate index, in the previous specification. Results obtained by including these variables should be interpreted with care owing to several shortcomings in the calculation of these indices. For

instance, real exchange rate measures are based on official exchange rates, whereas various countries (e.g., Belarus and Uzbekistan) have operated systems of multiple exchange rates. Moreover, while the CPI may be a highly inaccurate index of price competitiveness, possibly more appropriate indicators such as the producer price index (PPI) are not available for all countries and all years in the sample. With these caveats, results from these regressions—reported in columns (6) and (7) of Table 4—are very similar to those reported above for the key variables of interest. In column (7), for instance, the coefficient on Russian growth is 0.78 and highly significant prior to 1998, while it falls to 0.06 and becomes insignificant thereafter.

The table includes estimates for a variety of other specifications, results of which are all broadly similar for the key variables of interest—namely, Russian growth and its interaction with the crisis dummy. Column (8) provides estimates for a specification that excludes both country fixed effects and initial conditions. Possible nonlinearity in the response of growth to inflation is explored in column (9) by including INF, the natural logarithm of percent changes in CPI inflation, in place of CPI. The coefficient on (log) CPI inflation is still insignificant, while the coefficients on Russian growth are similar to those reported earlier, indicating that the results are robust to changes in the functional form. Column (10) includes estimates based on substituting world growth for EU growth. While the coefficient on world growth is insignificant, once again the coefficients on Russian growth are similar to the earlier results.

It is likely that the Russian crisis was associated with changes in the output linkages between Russia and the other CIS and Baltic countries, although the timing of changes in these relationships is somewhat uncertain. These changes probably occurred in either 1998 or 1999. To assess whether the choice of 1998 as the structural break point is appropriate and whether a different choice would affect the results, estimates are presented in Table 5 for the same specifications as in Table 4 but assuming that the break occurred in 1999 rather than 1998. The fit of these regressions is (except for the Baltics-only regression) uniformly worse using a break point of 1999 compared to regressions using a break point of 1998, as reflected in the lower values of the log-likelihood function, the higher values of the Akaike information criterion (AIC), and the smaller number of significant t-statistics. While the coefficients are generally less precisely estimated using a break point of 1999, results are very similar in many respects to those presented in Table 4 above. In particular, the coefficient on Russian growth is broadly similar in magnitude to the estimates based on a 1998 break point and highly significant in all but one specification. However, the coefficient on the Russian crisis dummy interacted with Russian growth ranges widely and is no longer significant in any of the specifications. Moreover, the effect of Russian growth on growth in the other CIS and Baltic countries is not significantly different from zero following the break point in any of the specifications and the magnitude of the post-crisis effect varies widely.

Taken together, these results provide support for the choice of 1998 as the structural break point. This finding may appear somewhat surprising in view of the fact that the authorities allowed the Russian ruble to float on August 17, 1998, leaving only a limited amount of time in the remainder of 1998 for the Russian crisis to influence the output linkages between Russia and the other CIS and Baltic countries. Upon further consideration, however, it seems

reasonable that the break point could have been in 1998. Expectations appear to have converged by early 1998 that macroeconomic imbalances were emerging in Russia. Moreover, links between Russia and the other CIS and Baltic countries may have been disrupted even before the currency crisis by the same macroeconomic imbalances and financial sector vulnerabilities that eventually precipitated the crisis (see Owen and Robinson, 2003, Chapter 2).

To assess further the sensitivity of the results to changes in the break point, and notwithstanding the prior information, Andrews's (1993) Sup W, Sup LM, and Sup LR tests—which allow for uncertainty regarding the break point—were applied to assess whether there was a structural break using a range of possible break points. These tests also have power against alternatives that involve gradual changes in regression coefficients. Results of these tests did not allow to reject the null hypothesis of parameter constancy, either for the entire coefficient vector or for the coefficient on Russian growth. Reflecting partly the limited number of observations, the data set provides insufficient information either to reject the null hypothesis of parameter constancy or to accept it based upon the tests proposed by Andrews. The reason for this indeterminacy is also related to the fact that these tests are based on sums of squared regression residuals; imprecision in the estimation of coefficients on the many control variables in the model appears to have contaminated the findings concerning the constancy of the coefficient on Russian real GDP growth. In contrast, the standard tests of constancy of the coefficient on Russian real GDP growth presented above are not contaminated in this way, suggesting that the standard tests are more reliable in this context.

As noted above, inclusion of a lagged dependent variable in the error components model leads to a bias in least-squares dummy variable (LSDV) estimators. Arellano and Bond (1991) and others provide consistent instrumental variables estimators for this model. In Table 6, results based on LSDV estimation, presented in column (1), are compared with results based on Arellano-Bond estimation in column (11) and for an alternative specification in column (12).[22] Coefficients on Russian growth are broadly comparable to those obtained using LSDV estimation, although the coefficient is significant only in one of two specifications. Arellano-Bond estimates of the coefficient on the interaction between the crisis dummy and Russian growth are also comparable to the LSDV estimates and are significant in both specifications.[23] Results of the Sargan test do not reject the null hypothesis that the overidentifying restrictions underlying the Arellano and Bond (1991) estimation method are satisfied, suggesting that the instruments are valid. Finally, the null hypotheses of second-order serially uncorrelated errors are not rejected, fulfilling a necessary condition for

[22] The Arellano and Bond (1991) estimates presented in Table 6 correspond to a one-step procedure, using one-period lags of the independent variables as instruments. Results using a two-step procedure and robust standard errors are similar to those presented in Table 6.

[23] The Arellano-Bond procedure uses first differences of strictly exogenous regressors as instruments and hence time-invariant strictly exogenous regressors such as the country fixed effects drop out.

consistency of the Arellano-Bond estimation procedure. Column (13) presents Arellano-Bond estimates that also correct for possible endogeneity of the explanatory variables CPI and EXP, using one-period lagged values of these variables as instruments. These estimates are very similar to estimates based on the assumption that the explanatory variables are exogenous. While the Arellano-Bond estimator is consistent under the stated assumptions, it may nevertheless exhibit large bias in finite samples and will have higher standard errors than ordinary least-squares. Therefore, even the endogeneity-corrected coefficient estimates presented in Table 6 need to be treated with caution and should not necessarily be presumed superior to the LSDV estimates presented in Table 4.

For the random effects model, estimates of the variance of the random country effect μ_i were negative. As discussed in Baltagi (2001), this problem occurs only when the true variance is small and close to zero. In these circumstances, the generalized least squares estimator for the random effects model reduces to ordinary least squares.

VIII. Possible Transmission Mechanisms

Disruptions in trade and financial flows are two candidates for explaining the drop in the effect of Russian economic growth on growth in the other CIS and Baltic countries. The Russian crisis reduced Russia's demand for imports. Capital flows into the region declined as well, both as a result of reduced Russian investment and reflecting the sharp cutbacks in international capital flows into emerging markets generally in response to the crisis.[24] Worker remittances from Russia to the other CIS countries may also have been affected by the crisis. An alternative explanation for the declining effect of changes in Russian real GDP growth on growth in the other CIS countries could be transition-related effects (see for instance Havrylyshyn, 2001, pp. 54–56). In 1993–98, real GDP in the CIS countries may have fallen together due to transition effects. Once these effects had begun to play themselves out, output may have rebounded at different rates.

Concerning trade flows, Figure 4 (and Appendix Table 2) shows that merchandise exports from the CIS and Baltic countries to Russia, as a percent of their total merchandise exports, were generally on a declining trend during 1993–2003. The drop in exports to Russia as a share of total exports during 1997–99 was pronounced for the Baltics, whereas for the CIS countries it was more gradual and started prior to the crisis. As noted above, the share of exports to Russia in total exports was statistically insignificant in alternative specifications of the growth regressions reported in Section VII above.

Aggregate growth decompositions provide little support for the hypothesis that net external demand played a crucial role in economic growth of the CIS and Baltic countries

[24] Reductions in capital flows would lead to simultaneous reductions in Russian and other CIS countries' growth but do not necessarily provide a reason why a decline in Russian growth would cause a decline in other CIS countries' growth.

(Appendix Table 3).[25] External demand usually was not a large factor in accounting for real GDP growth and the effects of the Russian crisis on real GDP growth via external demand are not very evident. Exports to Russia generally contributed only a small amount to real GDP growth in these countries and there is little evidence that this contribution declined following the Russian crisis.[26] Notwithstanding these aggregate figures, it would be premature to discard the hypothesis that a decline in Russian export demand helps explain lower growth in the other CIS countries and the decline in growth correlations. Although exports to Russia did not account for a large portion of their growth directly, indirect effects that are difficult to capture may be even more important than the direct effects. Specifically, export production generates purchases of domestically produced inputs whose value added contributes to GDP.

While net capital inflows did slow markedly during the crisis (Figure 5), data on capital inflows from Russia are unavailable.[27] It is reasonable to suppose that at least some of the additional capital (and other foreign exchange) flows into Russia in the post-crisis period were invested in other CIS countries which, if true, might tend to strengthen rather than weaken the growth linkages.

IX. Conclusions

This paper has investigated whether the growth linkages between Russia and the other CIS and Baltic countries have become weaker over time, particularly following the 1998 Russian crisis. After the breakup of the former Soviet Union, the countries faced severe output shocks and implemented far-reaching macroeconomic and structural reforms, which have proceeded at different speeds. The resulting economic, social, and political transformation has led to a

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[25] Strictly speaking, only net exports should be compared with GDP. Caution is needed in comparing exports and GDP because the former includes the imported intermediate inputs used to produce exports whereas the latter includes only value added. In addition, the data underlying these decompositions are subject to substantial shortcomings such as weaknesses in the expenditure decomposition of GDP.

[26] The contribution of exports to Russia from one of the CIS and Baltic countries is estimated as follows: $100 \times \Delta[(XR_t / X_t)x_t] / y_{t-1}$ where XR_t and X_t are the values of exports to Russia and total exports of merchandise, respectively, x_t is real total exports of goods and services, and y_{t-1} is real GDP.

[27] In the early years of the transition, the central banks of the CIS countries had a payment agreement that resulted in significant debts to Russia by the other CIS countries, resulting in de facto financing of these countries' net exports to Russia by the Central Bank of Russia. In the mid-1990s, this payment agreement was abandoned. Efforts to reduce barter and other noncash types of transactions in the economy following the Russian crisis may also have contributed to the declines in the share of exports to Russia in total exports of the other CIS countries.

substantial reorientation of production and trade away from other former republics and toward other trading partners.

To investigate whether these growth linkages have weakened, the paper specified an econometric model which includes standard determinants of growth identified in the literature on transition economies (initial conditions, macroeconomic variables, and measures of progress with structural reform) as well as the economic growth rate of what had been the leader and dominant player in the region—Russia. The model also allows for the effects of Russian growth to vary over time, in particular between the periods before and after the Russian crisis. A variety of sensitivity tests were performed on the resulting econometric estimates.

Based on this methodology, the paper found that indeed Russian economic growth was a significant determinant of economic growth in the other CIS and Baltic countries in the period prior to the Russian crisis, with each percentage point of additional growth in Russia leading to around 0.8–0.9 percentage points of additional growth in the other countries on average and holding other factors constant. Beginning in 1998, a 1 percentage point increase in Russian real GDP appears to have induced an increase in the real GDP of the other CIS and Baltic countries of less than 0.2 percentage points on average. Moreover, this link was statistically insignificant in the period starting in 1998, the most likely break point given the data. These findings are quite robust with respect to the choice of explanatory variables and estimation methods. While there may have been substantial variations in the extent to which countries saw their growth links with Russia fall after the Russian crisis, the results indicate that on average this drop was statistically significant. These findings should however be interpreted with care in light of substantial weaknesses in the data and the limited number of time-series observations.

Exploring the role of trade and financial flows as growth channels at an aggregate level did not yield a clear-cut explanation for why the link between Russian economic growth and growth in other CIS and Baltic countries fell substantially in the post-crisis period. Exports to Russia fell quite a lot over time, albeit gradually and starting prior to the crisis. Net external demand generally, and exports to Russia in particular, did not, in most cases, account for a large proportion of real GDP growth even before the crisis. However, indirect effects of trade on growth are difficult to measure and may even exceed the direct effects. Capital flows were clearly affected by the crisis in many countries but there is little information on how Russian investment into neighboring countries may have been affected. Further investigation into the links between trade and financial flows in the region are needed, possibly at a disaggregated level, in order to explain the apparently significant break in economic growth links that this paper found in the post-crisis period. An alternative explanation discussed in the paper is that output fell during 1993–98 due to transition effects, resulting in a high correlation, but that countries rebounded at different rates.

Table 2. List of Possible Variables for the Growth Regressions

Variable type	Acronym	Definition
Dependent		
	GR	Real GDP growth for each CIS and Baltic country
Initial conditions		
	IC1	Initial conditions cluster capturing macroeconomic distortions (Havrylyshyn and van Rooden, 2000)
	IC2	Initial conditions cluster capturing the level of socialist development and its associated distortions (Havrylyshyn and van Rooden, 2000)
Macroeconomic performance		
	CPI	CPI (percentage change)
	INF	CPI (natural logarithm of percentage change)
	EXP	Government expenditure (as a percentage of GDP)
Structural reforms		
	RI	EBRD transition index
Others		
	GRRUS	Real GDP growth in Russia
	EUGR	Real GDP growth in the EU
	WORLDGR	Real GDP growth in industrial countries
	RER	CPI-based real effective exchange rate
	RRUS	CPI-based real exchange rate vis-à-vis the Russian ruble
	OPEN	Exports plus imports as a percent of GDP
Dummy variables		
	D98	Equal to zero for 1993-97 and one for 1998-2003
	D99	Equal to zero for 1993-98 and one for 1999-2003
	D1	Equal to one for Armenia and zero otherwise
	D2	Equal to one for Azerbaijan and zero otherwise
	D3	Equal to one for Belarus and zero otherwise
	D4	Equal to one for Estonia and zero otherwise
	D5	Equal to one for Georgia and zero otherwise
	D6	Equal to one for Kazakhstan and zero otherwise
	D7	Equal to one for the Kyrgyz Republic and zero otherwise
	D8	Equal to one for Latvia and zero otherwise
	D9	Equal to one for Lithuania and zero otherwise
	D10	Equal to one for Moldova and zero otherwise
	D11	Equal to one for Tajikistan and zero otherwise
	D12	Equal to one for Ukraine and zero otherwise
	D13	Equal to one for Uzbekistan and zero otherwise
	BALT	Equal to one for Baltics (Estonia, Latvia, and Lithuania) and zero otherwise
	BLRUKR	Equal to one for Belarus and Ukraine and zero otherwise
	CASIA	Equal to one for Central Asian (Kazakhstan, the Kyrgyz Republic, Tajikistan, and Uzbekistan) and zero otherwise
	CAU	Equal to one for the Caucasus (Armenia, Azerbaijan, and Georgia) and Moldova and zero otherwise

Table 3. Unit Root Tests for Real GDP by Country, 1993-2003
(Italics indicates statistically significant at the 5 percent level)

	Dickey-Fuller (DF) test	**Augmented Dickey-Fuller (ADF) test** [1]	**Preferred Specification** [2]
Armenia	2.94	0.92	DF
Azerbaijan	*-10.38*	-2.07	*DF*
Belarus	*-5.16*	*-6.75*	*ADF*
Estonia	-2.57	-1.67	DF
Georgia	-3.12	-2.06	ADF
Kazakhstan	-2.02	-0.89	DF
Kyrgyz Republic	*-8.94*	*-4.88*	*ADF*
Latvia	-0.86	-1.48	DF
Lithuania	-2.73	-0.67	DF
Moldova	*-7.79*	-0.63	ADF
Tajikistan	*-10.63*	-1.12	*DF*
Ukraine	*-6.64*	-2.43	ADF
Uzbekistan	*-5.29*	-1.21	*DF*
Im, Pesaran, and Shin t-bar test [2]	*-22.48*	*-12.09*	

Notes:

[1] Dickey-Fuller regression were augmented by adding a single lag.

[2] Based on minimizing the Akaike Information Criterion (AIC).

[3] The critical value for the t-bar test at the 5 percent level is -2.74 (N=10, T=10).

Table 4. Coefficient Estimates in Real GDP Growth Regressions with Structural Break in 1998, CIS and Baltic Countries, 1993-2003

(Bold indicates statistically significant at the 1 percent level; italics indicates significance at the 5 percent level) [1]

	(1)	(2)	(3)	(4) [2]	(5) [3]	(6)	(7)	(8)	(9)	(10)
CONSTANT	*23.99*	*10.91*	**17.94**	**34.57**	-0.52	22.64	*25.72*	5.23	*24.94*	13.55
	(2.11)	(2.00)	(2.59)	(2.96)	(-0.01)	(1.91)	(2.36)	(0.97)	(2.24)	(1.22)
GR_{-1}	0.07	**0.38**	**0.38**	*0.20*	-0.43	0.11	*0.18*	**0.43**	0.07	0.04
	(0.84)	(4.98)	(4.77)	(2.22)	(-1.17)	(1.21)	(2.10)	(5.43)	(0.82)	(0.40)
CPI	0.00	**0.00**	**0.00**	0.00	-0.29	0.00	0.00	**0.00**		0.00
	(-0.12)	(3.42)	(3.04)	(0.50)	(-0.76)	(1.08)	(1.52)	(3.60)		(-0.16)
INF									-0.54	
									(-0.52)	
EXP	-0.04	**-0.21**	*-0.17*	0.11	-0.13	-0.01	-0.05	-0.12	-0.03	-0.09
	(-0.35)	(-2.89)	(-1.95)	(0.95)	(-0.37)	(-0.09)	(-0.44)	(-1.71)	(-0.30)	(-0.80)
RI	-1.23	*2.98*	-0.30	-5.72	5.31	-1.99	-1.98	**4.10**	-1.88	0.86
	(-0.31)	(2.00)	(-0.13)	(-1.39)	(0.18)	(-0.48)	(-0.52)	(2.70)	(-0.47)	(0.22)
GRRUS	**0.96**	**0.67**	**0.81**	**1.37**	0.21	**1.15**	**0.78**	**0.66**	**0.93**	**0.90**
	(4.86)	(4.22)	(4.27)	(5.81)	(0.52)	(5.76)	(3.91)	(3.91)	(4.56)	(2.61)
EUGR	*-2.94*	-2.78	-3.15	**-5.98**	-0.69	*-3.30*	**-4.01**	-2.97	-2.78	
	(-2.06)	(-1.78)	(-1.94)	(-3.54)	(-0.18)	(-2.21)	(-2.89)	(-1.80)	(-1.91)	
WORLDGR										0.45
										(0.58)
RER	**-0.07**	*-0.05*	*-0.05*	**-0.59**	0.03		**-0.15**	*-0.04*	**-0.07**	**-0.07**
	(-3.38)	(-2.34)	(-2.46)	(-2.64)	(0.28)		(-4.71)	(-2.01)	(-3.36)	(-3.20)
RRUS						-0.02	**0.11**			
						(-0.88)	(2.97)			
OPEN	-0.03	0.00	-0.02	-0.14	0.03	-0.01	-0.03	0.00	-0.03	-0.04
	(-1.36)	(0.00)	(-1.08)	(-0.53)	(0.23)	(-0.38)	(-1.42)	(-0.19)	(-1.12)	(-1.57)
IC2		**2.35**								
		(2.95)								
D98	-25.49	3.16	-3.77	*-54.70*	34.35	-24.40	-27.37	0.75	-27.43	-13.52
	(-1.18)	(0.43)	(-0.39)	(-2.25)	(0.38)	(-1.08)	(-1.34)	(0.11)	(-1.28)	(-0.82)
IC2×D98		-0.39								
		(-0.35)								
GR_{-1}×D98	0.25	0.02	0.09	0.11	-0.17	0.21	0.14	0.08	0.25	0.28
	(1.48)	(0.09)	(0.53)	(0.63)	(-0.29)	(1.17)	(0.83)	(0.49)	(1.51)	(1.62)
CPI×D98	0.00	-0.01	-0.01	0.00	*1.45*	0.00	0.00	-0.01		0.00
	(-0.07)	(-0.57)	(-0.39)	(0.26)	(2.16)	(-0.10)	(-0.11)	(-0.34)		(-0.08)
INF×D98									1.59	
									(0.43)	
EXP×D98	*-0.47*	-0.04	-0.08	**-0.64**	-0.15	*-0.52*	**-0.48**	-0.01	*-0.48*	*-0.44*
	(-2.39)	(-0.33)	(-0.65)	(-2.90)	(-0.35)	(-2.48)	(-2.57)	(-0.09)	(-2.43)	(-2.14)
RI×D98	6.69	*-4.38*	-0.49	*18.49*	-8.62	7.61	7.56	*-4.33*	7.76	3.82
	(0.88)	(-2.17)	(-0.16)	(2.07)	(-0.26)	(0.95)	(1.04)	(-2.14)	(1.02)	(0.64)
GRRUS×D98	**-0.91**	**-0.48**	**-0.61**	**-1.32**	-0.19	**-1.09**	**-0.72**	*-0.44*	**-0.88**	*-0.89*
	(-4.07)	(-2.52)	(-2.79)	(-4.97)	(-0.38)	(-4.80)	(-3.26)	(-2.20)	(-3.87)	(-2.45)
EUGR×D98	*3.10*	2.28	2.77	**6.34**	-1.88	*3.47*	**4.15**	2.61	2.91	
	(1.95)	(1.39)	(1.62)	(3.42)	(-0.45)	(2.08)	(2.69)	(1.51)	(1.80)	
WORLDGR×D98										0.00
										(-0.12)
RER×D98	**0.08**	*0.05*	**0.06**	**0.07**	-0.02		**0.16**	*0.05*	**0.08**	**0.08**
	(3.60)	(2.41)	(2.54)	(2.80)	(-0.24)		(4.78)	(2.10)	(3.61)	(3.54)
RRUS×D98						0.03	**-0.11**			
						(1.10)	(-2.79)			
OPEN×D98	*0.11*	0.02	0.03	0.07	-0.04	0.08	*0.11*	0.02	0.10	*0.11*
	(2.05)	(0.91)	(1.23)	(1.17)	(-0.28)	(1.53)	(2.22)	(0.84)	(1.92)	(2.11)

Notes:

[1] T-statistics are in parentheses beneath the coefficient estimates.

[2] Regression (4) includes the CIS countries only (i.e., the Baltics are excluded).

[3] Regression (5) includes the Baltic countries only (i.e., the CIS countries are excluded).

Table 4. Coefficient Estimates in Real GDP Growth Regressions with Structural Break in 1998, CIS and Baltic Countries, 1993-2003 (cont'd)
(Bold indicates statistically significant at the 1 percent level; italics indicates significance at the 5 percent level)

	(1)	(2)	(3)	(4) [1]	(5) [2]	(6)	(7)	(8)	(9)	(10)
D2	**-12.19**			**-10.88**		**-10.85**	**-9.20**		**-12.46**	**-12.10**
D3	-5.84			**-8.78**		-6.81	-4.20		-6.15	-4.49
D4	2.29					1.80	6.77		2.10	0.99
D5	-0.46			1.22		-1.08	2.49		-0.27	-1.16
D6	**-11.23**			*-6.97*		*-7.39*	*-7.37*		**-11.03**	**-12.56**
D7	*-6.54*			-1.92		-3.95	-2.41		*-6.48*	*-7.67*
D8	-1.97					-0.25	1.63		-2.06	-3.23
D9	-1.17					-1.61	1.07		-1.23	-2.11
D10	**-15.82**			**-14.66**		**-15.44**	**-10.80**		**-16.25**	**-16.06**
D11	*-9.24*			**-10.98**		**-12.59**	-5.95		*-9.95*	-8.32
D12	**-15.59**			**-15.30**		**-15.17**	**-12.45**		**-15.80**	**-15.36**
D13	**-7.36**			*-6.80*		-5.67	*-5.30*		**-7.26**	**-7.37**
BALT			*6.42*							
CASIA			-1.11							
CAU			0.27							
D2×D98	**15.46**			**16.45**		**14.21**	**12.58**		**15.90**	**15.14**
D3×D98	16.74			*28.38*		18.18	15.45		16.76	15.06
D4×D98	-8.52					-8.07	-13.18		-8.60	-6.15
D5×D98	-3.85			-6.63		-3.25	-6.81		-4.15	-3.12
D6×D98	**9.50**			5.12		5.70	5.66		**9.23**	**10.89**
D7×D98	4.32			0.05		1.85	0.26		4.16	5.60
D8×D98	4.46					2.89	0.99		4.33	6.45
D9×D98	-0.56					-0.04	-2.79		-0.70	1.05
D10×D98	**13.44**			**12.93**		**13.20**	8.48		**13.72**	**13.96**
D11×D98	3.74			10.64		7.07	0.26		4.51	2.29
D12×D98	**19.16**			**20.63**		**18.96**	**16.21**		**19.33**	**19.11**
D13×D98	*11.58*			*15.39*		10.12	9.77		*11.38*	**11.22**
BALT×D98			-6.78							
CASIA×D98			-2.80							
CAU×D98			-3.05							
Memorandum items:										
GRRUS	**0.96**	**0.67**	**0.81**	**1.37**	0.21	**1.15**	**0.78**	**0.66**	**0.93**	**0.90**
GRRUS×D98	**-0.91**	**-0.48**	**-0.61**	**-1.32**	-0.19	**-1.09**	-0.72	*-0.44*	**-0.88**	*-0.89*
Sum	0.05	0.19	0.20	0.06	0.02	0.06	0.06	0.21	0.05	0.01
F-test	0.27	3.28	3.45	0.22	0.00	0.27	0.34	*3.80*	0.20	0.01
P-value	0.60	0.07	0.07	0.64	0.96	0.60	0.56	0.05	0.66	0.94
Number of parameters	42	20	24	36	18	42	44	18	42	42
Log-likelihood	-323.92	-358.24	-358.91	-244.81	-54.65	-330.57	-315.15	-366.36	-323.68	-326.75
AIC	2.82	2.98	3.06	2.81	2.19	2.92	2.72	3.08	2.81	2.86
R^2	0.87	0.77	0.77	0.90	0.86	0.85	0.88	0.74	0.87	0.86
Adjusted R^2	0.80	0.73	0.72	0.84	0.67	0.78	0.82	0.70	0.80	0.79

Notes:

[1] Regression (4) includes the CIS countries only (i.e., the Baltics are excluded).

[2] Regression (5) includes the Baltic countries only (i.e., the CIS countries are excluded).

Table 5. Coefficient Estimates in Real GDP Growth Regressions with Structural Break in 1999, CIS and Baltic Countries, 1993-2003
(Bold indicates statistically significant at the 1 percent level; italics indicates significance at the 5 percent level) [1]

	(1)	(2)	(3)	(4) [2]	(5) [3]	(6)	(7)	(8)	(9)	(10)
CONSTANT	3.91	*9.64*	*12.97*	5.75	7.11	6.69	5.90	4.94	9.16	10.95
	(0.43)	(2.06)	(2.29)	(0.57)	(0.15)	(0.75)	(0.64)	(1.07)	(0.96)	(0.88)
GR_{-1}	**0.25**	**0.45**	**0.47**	**0.36**	-0.46	**0.28**	**0.26**	**0.49**	*0.18*	**0.22**
	(3.05)	(6.18)	(6.37)	(3.70)	(-1.92)	(3.53)	(3.19)	(6.69)	(2.22)	(2.89)
CPI	0.00	**0.00**	**0.00**	*0.00*	-0.33	**0.00**	*0.00*	**0.00**		0.00
	(1.73)	(3.02)	(3.00)	(2.21)	(-1.24)	(2.57)	(2.12)	(3.26)		(1.64)
INF									-1.05	
									(-0.94)	
EXP	-0.15	**-0.21**	**-0.21**	-0.07	-0.12	-0.15	-0.15	-0.12	-0.10	-0.15
	(-1.25)	(-3.10)	(-2.73)	(-0.50)	(-0.50)	(-1.27)	(-1.29)	(-1.84)	(-0.83)	(-1.27)
RI	5.07	2.29	1.15	4.08	2.67	3.93	4.25	*3.21*	1.92	3.78
	(1.60)	(1.74)	(0.67)	(1.16)	(0.15)	(1.25)	(1.32)	(2.40)	(0.55)	(1.12)
GRRUS	**0.75**	**0.74**	**0.76**	**0.97**	0.19	**0.78**	**0.76**	**0.72**	**0.71**	**0.87**
	(4.39)	(4.81)	(4.60)	(4.60)	(0.75)	(4.75)	(4.44)	(4.55)	(3.88)	(4.21)
EUGR	-0.32	-1.43	-1.12	-1.30	-0.70	-0.52	-0.42	-1.89	0.20	
	(-0.25)	(-1.13)	(-0.83)	(-0.84)	(-0.33)	(-0.41)	(-0.33)	(-1.44)	(0.16)	
WORLDGR										-1.12
										(-0.83)
RER	0.00	0.00	0.00	0.01	0.00		0.00	0.00	0.01	0.00
	(1.37)	(0.26)	(0.47)	(1.00)	(0.78)		(0.56)	(0.33)	(1.82)	(1.27)
RRUS						0.01	0.00			
						(1.77)	(1.22)			
OPEN	-0.02	0.00	-0.01	-0.01	0.04	-0.02	-0.02	0.00	-0.01	-0.02
	(-0.83)	(0.02)	(-0.67)	(-0.42)	(0.40)	(-0.96)	(-0.94)	(-0.13)	(-0.45)	(-0.95)
IC2		**2.31**								
		(3.09)								
D99	-33.69	-1.51	-6.31	-59.92	68.15	-37.65	-36.54	-3.76	-38.41	-30.15
	(-1.04)	(-0.18)	(-0.65)	(-1.52)	(1.00)	(-1.18)	(-1.13)	(-0.56)	(-1.17)	(-1.38)
IC2×D99		-0.86								
		(-0.69)								
GR_{-1}×D99	0.11	-0.01	0.04	0.05	0.49	0.11	0.10	0.05	0.17	0.08
	(0.45)	(-0.05)	(0.19)	(0.17)	(0.89)	(0.47)	(0.40)	(0.27)	(0.67)	(0.37)
CPI×D99	0.00	-0.01	0.00	0.01	1.11	0.00	0.00	0.00		0.01
	(0.06)	(-0.30)	(-0.20)	(0.26)	(1.66)	(0.01)	(0.02)	(-0.19)		(0.33)
INF×D99									2.23	
									(0.48)	
EXP×D99	-0.25	0.01	0.04	-0.25	-0.24	-0.13	-0.07	0.01	-0.31	-0.09
	(-0.92)	(0.04)	(0.24)	(-0.70)	(-0.75)	(-0.42)	(-0.22)	(0.13)	(-1.10)	(-0.30)
RI×D99	9.99	-2.83	-1.43	18.88	-21.91	10.71	10.04	-2.78	13.08	7.60
	(0.87)	(-1.37)	(-0.62)	(1.32)	(-0.90)	(0.94)	(0.87)	(-1.39)	(1.12)	(1.05)
GRRUS×D99	-0.74	-0.12	-0.10	-1.21	0.96	-0.76	-0.79	-0.07	-0.69	0.42
	(-1.45)	(-0.30)	(-0.26)	(-1.88)	(1.54)	(-1.53)	(-1.54)	(-0.18)	(-1.31)	(0.48)
EUGR×D99	1.21	0.61	0.40	2.72	-2.72	1.49	1.34	1.26	0.61	
	(0.64)	(0.42)	(0.26)	(1.20)	(-0.94)	(0.80)	(0.71)	(0.84)	(0.32)	
WORLDGR×D99										-1.64
										(-0.68)
RER×D99	-0.01	-0.04	-0.05	0.00	-0.14		0.04	-0.05	-0.01	-0.01
	(-0.20)	(-0.67)	(-0.93)	(0.06)	(-1.30)		(0.52)	(-0.96)	(-0.21)	(-0.15)
RRUS×D99						-0.04	-0.06			
						(-0.90)	(-1.01)			
OPEN×D99	0.06	0.01	0.02	0.08	0.01	0.05	0.06	0.01	0.05	0.05
	(0.89)	(0.53)	(0.70)	(0.86)	(0.05)	(0.73)	(0.78)	(0.44)	(0.72)	(0.66)

Notes:

[1] T-statistics are in parentheses beneath the coefficient estimates.

[2] Regression (4) includes the CIS countries only (i.e., the Baltics are excluded).

[3] Regression (5) includes the Baltic countries only (i.e., the CIS countries are excluded).

Table 5. Coefficient Estimates in Real GDP Growth Regressions with Structural Break in 1999, CIS and Baltic Countries, 1993-2003 (cont'd)
(Bold indicates statistically significant at the 1 percent level; italics indicates significance at the 5 percent level)

	(1)	(2)	(3)	(4) [1]	(5) [2]	(6)	(7)	(8)	(9)	(10)
D2	-4.40			-2.96		-4.26	-4.36		*-6.54*	-5.26
D3	0.91			-0.42		0.78	0.87		-1.97	0.17
D4	-2.40					-0.62	-1.00		-2.05	-1.05
D5	-4.38			-3.63		-3.86	-4.02		-2.60	-4.49
D6	**-10.12**			**-8.21**		**-8.30**	**-8.76**		**-10.04**	**-10.17**
D7	*-6.09*			-4.56		-4.78	-4.85		*-6.06*	-5.86
D8	-2.94					-1.63	-1.91		-3.00	-2.14
D9	-2.64					-2.22	-2.10		-2.44	-1.95
D10	**-12.13**			**-11.82**		**-10.91**	**-11.20**		**-14.31**	**-12.09**
D11	-5.43			-4.81		-5.05	-5.21		*-8.59*	-6.18
D12	**-9.50**			**-8.96**		**-8.79**	**-8.99**		**-11.89**	**-9.99**
D13	-3.54			-3.54		-3.34	-3.35		-4.51	-3.83
BALT			3.14							
CASIA			-3.15							
CAU			-1.92							
D2×D99	10.27			11.14		9.54	9.45		*12.43*	*9.72*
D3×D99	19.24			25.37		16.83	14.66		21.66	12.34
D4×D99	-10.51					-12.33	-12.95		-10.57	-9.95
D5×D99	-0.43			-1.30		-0.60	-0.37		-2.33	0.13
D6×D99	*9.69*			7.46		*7.94*	*8.24*		*9.57*	**9.91**
D7×D99	5.02			2.83		3.20	2.47		4.91	3.63
D8×D99	-5.77					-3.33	-4.11		-0.38	-2.14
D9×D99	-5.40					-6.30	-7.34		-5.48	-5.62
D10×D99	10.99			9.14		9.40	8.66		*13.08*	9.75
D11×D99	8.20			11.47		9.26	9.23		11.21	8.94
D12×D99	*14.42*			13.47		*12.42*	11.52		**16.78**	*12.28*
D13×D99	12.74			18.13		11.26	10.64		13.31	8.57
BALT×D99			-2.77							
CASIA×D99			1.11							
CAU×D99			0.84							
Memorandum items:										
GRRUS	**0.75**	**0.74**	**0.76**	**0.97**	0.19	**0.78**	**0.76**	**0.72**	**0.71**	**0.87**
GRRUS×D99	-0.74	-0.12	-0.10	-1.21	0.96	-0.76	-0.79	-0.07	-0.69	0.42
Sum	0.01	0.62	0.65	-0.25	1.16	0.02	-0.03	0.65	0.02	1.29
F-test	0.00	2.92	3.07	0.16	4.13	0.00	0.01	2.99	0.00	2.30
P-value	0.99	0.09	0.08	0.69	0.06	0.97	0.94	0.09	0.97	0.13
Number of parameters	42	20	24	36	18	42	44	18	42	42
Log-likelihood	-343.37	-364.52	-365.59	-267.63	-49.25	-342.08	-341.62	-371.02	-344.86	-341.84
AIC	3.11	3.08	3.16	3.27	1.83	3.10	3.12	3.15	3.14	3.09
R^2	0.82	0.75	0.75	0.84	0.90	0.82	0.82	0.72	0.81	0.82
Adjusted R^2	0.73	0.71	0.69	0.75	0.77	0.74	0.74	0.68	0.73	0.74

Notes:

[1] Regression (4) includes the CIS countries only (i.e., the Baltics are excluded).

[2] Regression (5) includes the Baltic countries only (i.e., the CIS countries are excluded).

Table 6. Arellano–Bond[1] Estimates of Real GDP Growth Regressions with a Structural Break in 1998, CIS and Baltic Countries, 1993-2003
(Bold indicates statistically significant at the 1 percent level; italics indicates significance at the 5 percent level)

	LSDV Estimates		Strictly Exogenous Explanatory Variables				Endogeneity Correction [2]	
	(1)		(11)		(12)		(13)	
	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic	Coefficient	t-statistic
CONSTANT	*23.99*	2.11	1.50	1.73	0.60	1.79	0.49	1.42
GR_{-1}	0.07	0.84	**0.32**	4.50	**0.45**	6.36	**0.43**	6.17
CPI	0.00	-0.12	*0.00*	2.15	*0.00*	2.39	**0.00**	3.17
EXP	-0.04	-0.35	-0.11	-1.16	*-0.20*	-2.02	**-0.36**	-3.04
RI	-1.23	-0.31	4.34	1.46				
GRRUS	**0.96**	4.86	0.39	1.72	**0.69**	4.52	**0.79**	5.31
EURGR	*-2.94*	-2.06	-2.35	-1.82				
WORLDGR					0.28	0.36	0.33	0.43
RER	**-0.07**	-3.38	-0.02	-1.68				
OPEN	-0.03	-1.36	0.00	0.15				
D98	-25.49	-1.18	3.73	0.50	**-4.12**	-2.81	**-3.89**	-2.68
GR_{-1}×D98	0.25	1.48	0.00	-0.14				
CPI×D98	0.00	-0.07	-0.01	-0.43				
EXP×D98	*-0.47*	-2.39	**-0.28**	-2.52				
RI×D98	6.69	0.88	**-5.86**	-2.66				
GRRUS×D98	**-0.91**	-4.07	**-0.52**	-2.87	**-0.63**	-3.55	**-0.74**	-4.35
EURGR×D98	*3.10*	1.95	**3.73**	2.52				
RER×D98	**0.08**	3.60	0.04	1.43				
OPEN×D98	*0.11*	2.05	*0.07*	2.40				
Memorandum items:								
Sargan test of overidentifying restrictions			52.31	0.18 [3]	30.99	0.93 [3]	80.07	1.00 [3]
Arellano-Bond test for AR(1)			-1.83	0.07 [3]	-3.08	0.00 [3]	-2.95	0.00 [3]
Arellano-Bond test for AR(2)			0.03	0.98 [3]	0.47	0.64 [3]	0.37	0.71 [3]

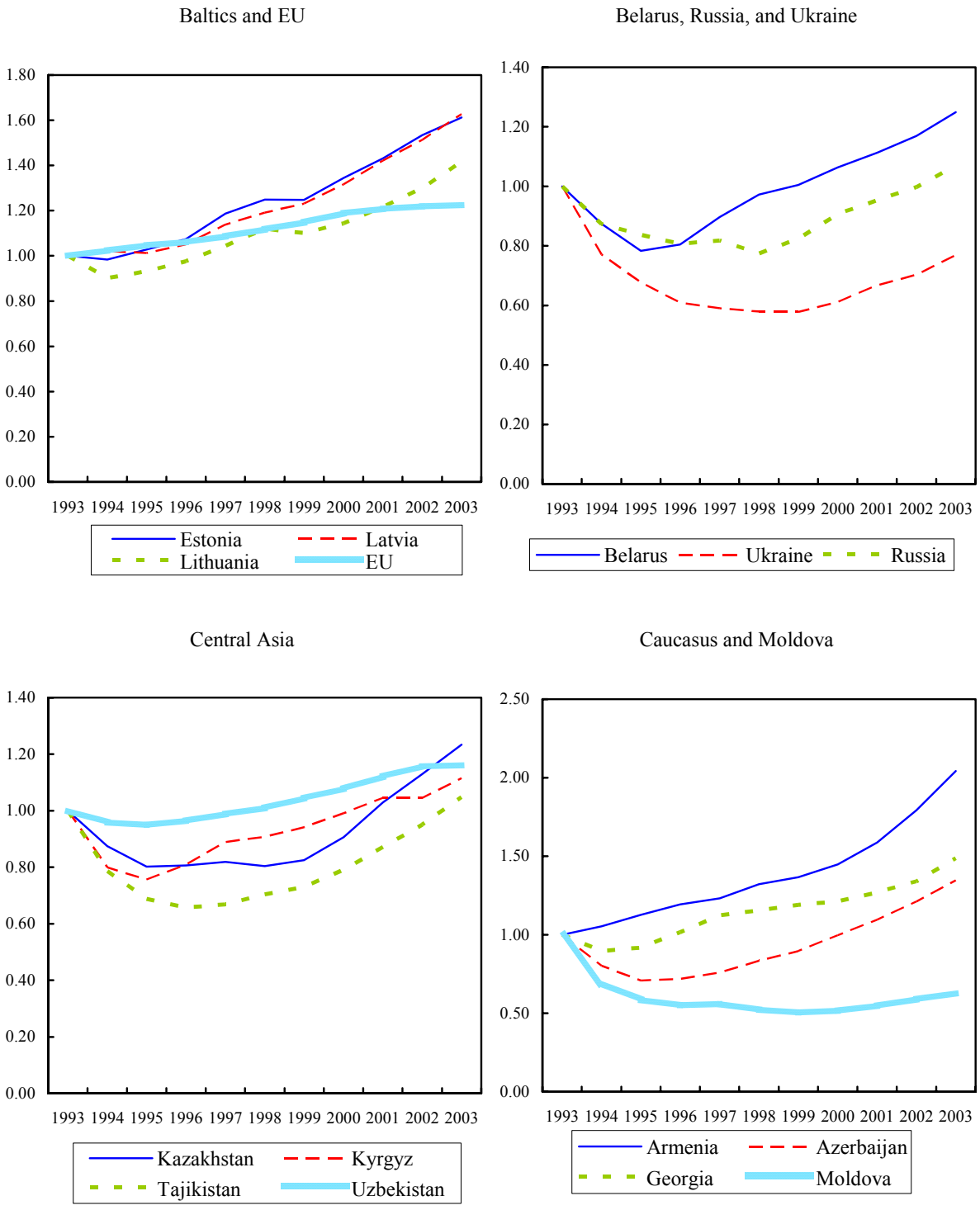
Notes:

[1] Arellano and Bond, 1991.

[2] Coefficient estimates in this column assume that CPI and EXP are endogenous. First-order lagged values of these variables are used as instruments.

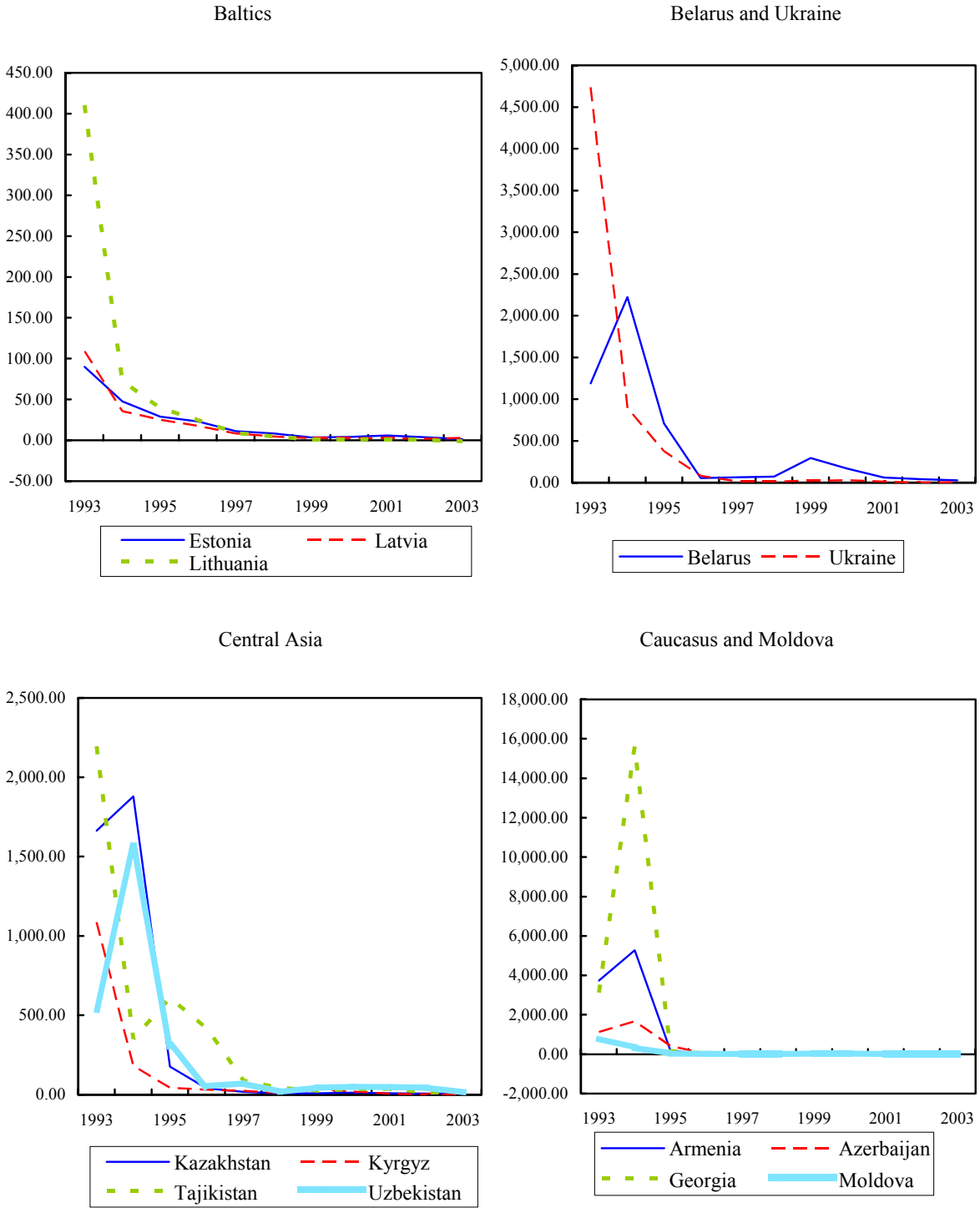
[3] These figures refer to p-values instead of t-statistics.

Figure 1. Real GDP in the CIS and Baltic Countries, 1993–2003
(1993=1)



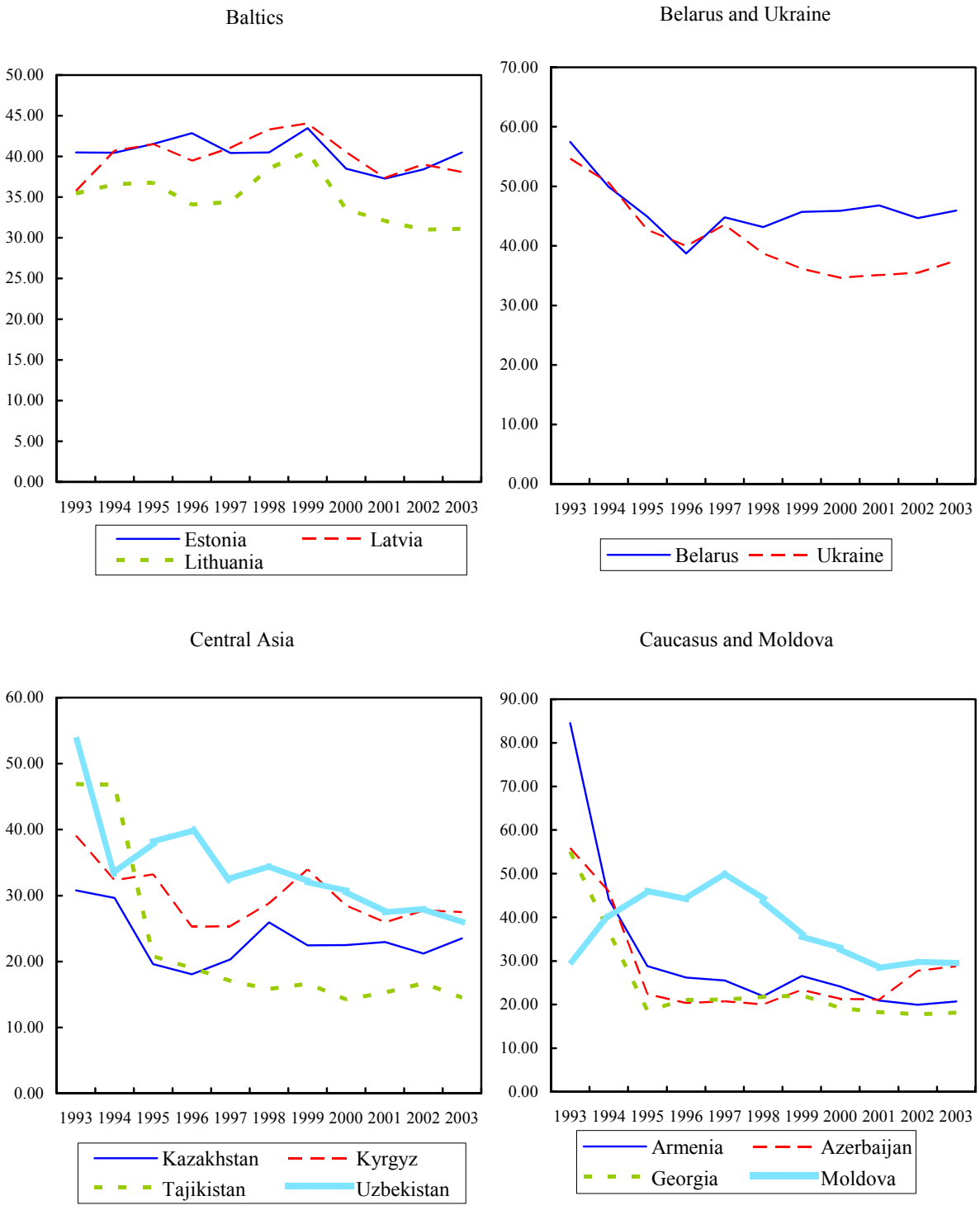
Source: IMF World Economic Outlook database; Fund staff estimates.

Figure 2. Consumer Price Inflation in the CIS and Baltic Countries, 1993–2003
(In percent change per annum)



Source: IMF World Economic Outlook database; Fund staff estimates.

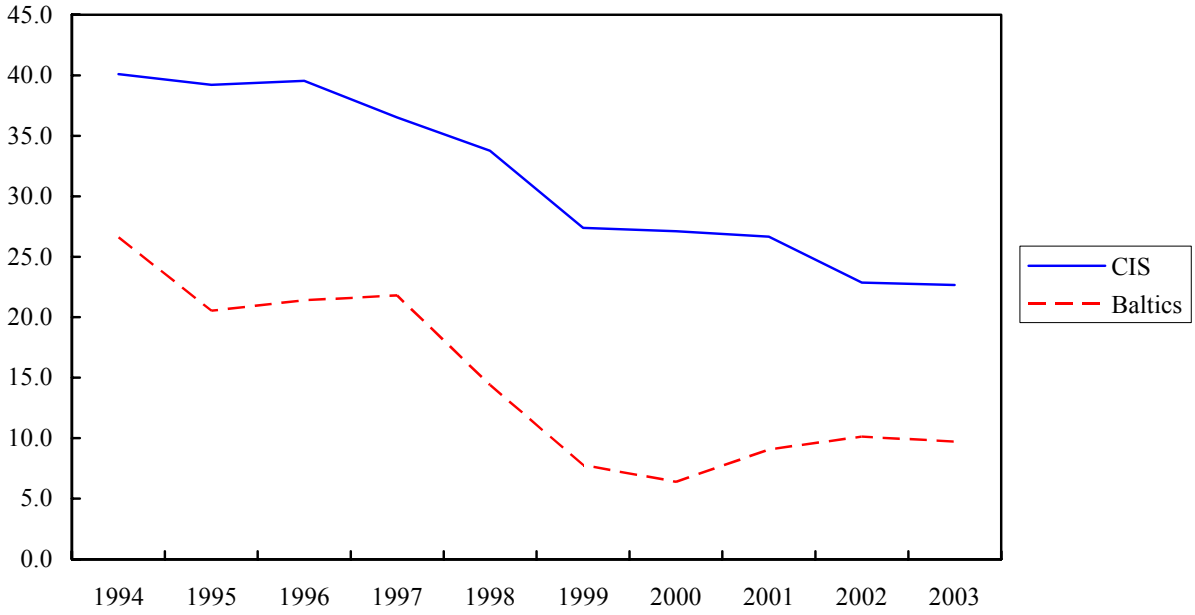
Figure 3. Government Expenditure in the CIS and Baltic Countries, 1993–2003
(General government expenditure and net lending; in percent of GDP)



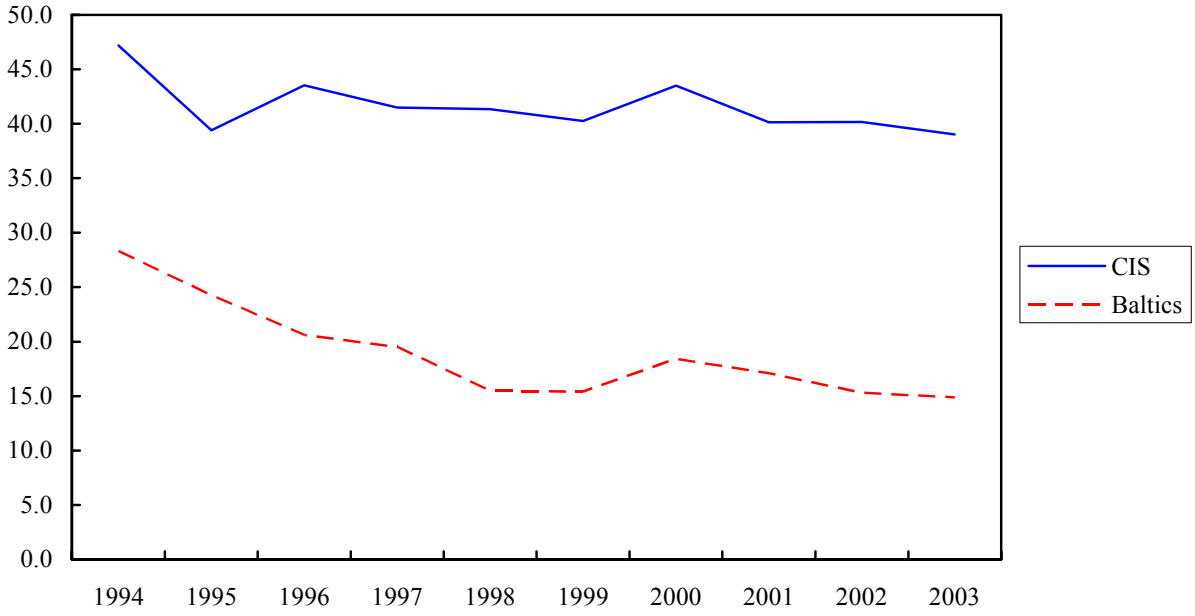
Source: IMF World Economic Outlook database; Fund staff estimates.

Figure 4. Merchandise Trade with Russia as a Percent of Total Merchandise Trade for the CIS and Baltic Countries, 1994–2003

Exports to Russia

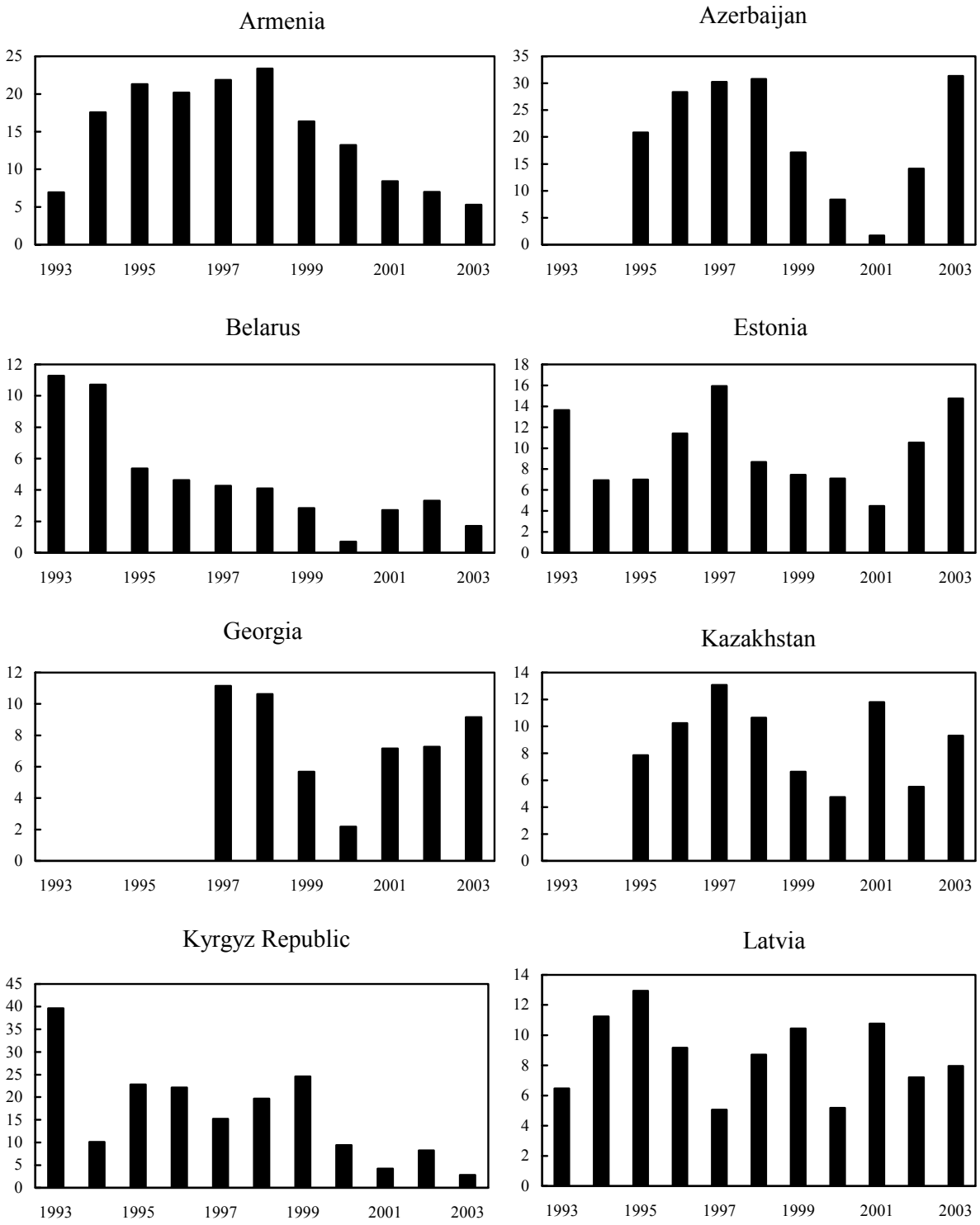


Imports from Russia



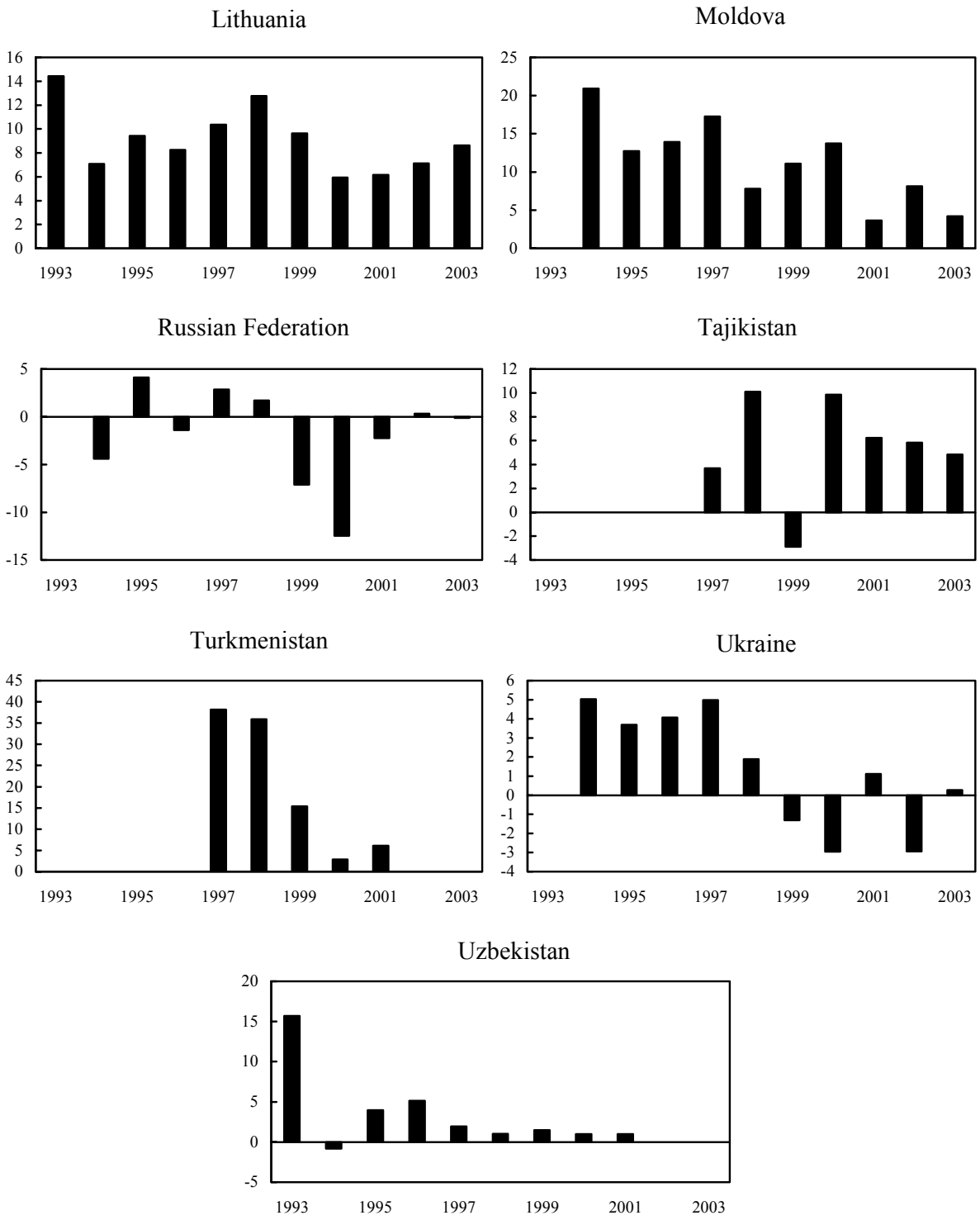
Source: IMF Direction of Trade database; Fund staff estimates.

Figure 5. CIS and Baltics: Net Capital Inflows, 1993-2003
(In percent of GDP)



Sources: IMF Balance of Payments database, national authorities, and Fund staff estimates.

Figure 5. CIS and Baltics: Net Capital Inflows, 1993-2003 (Continued)
(In percent of GDP)



Sources: IMF Balance of Payments database, national authorities, and Fund staff estimates.

Appendix Table 1a. Simple Correlation Coefficients Between Real GDP Growth Rates, 1993–97

	EST	LVA	LTU	BLR	UKR	KAZ	KGZ	TJK	UZB	ARM	AZE	GEO	MDA	RUS	EU
EST	1.00														
LVA	0.89	1.00													
LTU	0.96	0.80	1.00												
BLR	0.70	0.60	0.74	1.00											
UKR	0.70	0.40	0.71	0.88	1.00										
KAZ	0.74	0.60	0.77	0.95	0.89	1.00									
KGZ	0.85	0.66	0.89	0.89	0.90	0.97	1.00								
TJK	0.64	0.42	0.66	0.95	0.97	0.95	0.91	1.00							
UZB	0.78	0.56	0.83	0.91	0.96	0.98	0.99	0.96	1.00						
ARM	0.74	0.82	0.74	0.13	0.06	0.25	0.40	0.02	0.27	1.00					
AZE	0.91	0.81	0.91	0.90	0.82	0.95	0.97	0.85	0.94	0.53	1.00				
GEO	0.95	0.89	0.98	0.62	0.59	0.73	0.84	0.57	0.76	0.83	0.90	1.00			
MDA	0.22	-0.07	0.26	0.73	0.85	0.72	0.63	0.87	0.74	-0.45	0.49	0.12	1.00		
RUS	0.82	0.53	0.84	0.85	0.98	0.88	0.94	0.93	0.95	0.27	0.88	0.73	0.72	1.00	
EU	0.76	0.86	0.67	0.16	0.08	0.17	0.33	0.00	0.20	0.93	0.48	0.75	-0.46	0.27	1.00

Source: IMF World Economic Outlook database; Fund staff estimates.

Appendix Table 1b. Simple Correlation Coefficients Between Real GDP Growth Rates, 1998–2003

	EST	LVA	LTU	BLR	UKR	KAZ	KGZ	TJK	UZB	ARM	AZE	GEO	MDA	RUS	EU
EST	1.00														
LVA	0.77	1.00													
LTU	0.70	0.69	1.00												
BLR	0.40	0.15	0.84	1.00											
UKR	0.52	0.92	0.48	-0.14	1.00										
KAZ	0.54	0.84	0.26	-0.40	0.93	1.00									
KGZ	-0.04	0.45	0.05	0.01	0.55	0.37	1.00								
TJK	0.74	0.98	0.71	0.10	0.94	0.86	0.34	1.00							
UZB	0.02	-0.11	-0.53	-0.64	-0.16	0.23	-0.31	-0.16	1.00						
ARM	0.53	0.68	0.84	0.29	0.66	0.49	-0.01	0.80	-0.49	1.00					
AZE	0.89	0.78	0.82	0.59	0.59	0.45	0.18	0.77	-0.43	0.68	1.00				
GEO	0.06	0.48	0.59	0.18	0.61	0.34	0.36	0.59	-0.74	0.82	0.41	1.00			
MDA	0.54	0.81	0.44	-0.27	0.91	0.92	0.17	0.90	-0.01	0.76	0.54	0.58	1.00		
RUS	0.07	0.38	-0.29	-0.60	0.63	0.71	0.51	0.40	0.11	0.04	0.13	0.20	0.59	1.00	
EU	-0.18	-0.51	-0.60	0.01	-0.62	-0.47	-0.01	-0.66	0.40	-0.91	-0.34	-0.88	-0.74	-0.11	1.00

Source: IMF World Economic Outlook database; Fund staff estimates.

Appendix Table 1c. Simple Correlation Coefficients Between Real GDP Growth Rates, 1993–98

	EST	LVA	LTU	BLR	UKR	KAZ	KGZ	TJK	UZB	ARM	AZE	GEO	MDA	RUS	EU
EST	1.00														
LVA	0.89	1.00													
LTU	0.95	0.81	1.00												
BLR	0.70	0.64	0.76	1.00											
UKR	0.68	0.46	0.76	0.91	1.00										
KAZ	0.75	0.62	0.78	0.94	0.86	1.00									
KGZ	0.85	0.68	0.89	0.88	0.86	0.97	1.00								
TJK	0.62	0.47	0.72	0.95	0.98	0.88	0.84	1.00							
UZB	0.78	0.60	0.86	0.93	0.95	0.97	0.97	0.95	1.00						
ARM	0.75	0.83	0.76	0.24	0.21	0.30	0.44	0.19	0.36	1.00					
AZE	0.84	0.79	0.91	0.92	0.88	0.90	0.91	0.90	0.94	0.58	1.00				
GEO	0.95	0.89	0.95	0.62	0.57	0.74	0.85	0.54	0.75	0.83	0.82	1.00			
MDA	0.24	-0.04	0.29	0.70	0.77	0.72	0.64	0.76	0.72	-0.39	0.47	0.14	1.00		
RUS	0.81	0.52	0.78	0.76	0.82	0.86	0.91	0.74	0.87	0.26	0.73	0.72	0.71	1.00	
EU	0.76	0.86	0.72	0.32	0.29	0.26	0.38	0.26	0.34	0.93	0.60	0.74	-0.36	0.25	1.00

Source: IMF World Economic Outlook database; Fund staff estimates.

Appendix Table 1d. Simple Correlation Coefficients Between Real GDP Growth Rates, 1999–2003

	EST	LVA	LTU	BLR	UKR	KAZ	KGZ	TJK	UZB	ARM	AZE	GEO	MDA	RUS	EU
EST	1.00														
LVA	0.83	1.00													
LTU	0.72	0.89	1.00												
BLR	0.63	0.74	0.93	1.00											
UKR	0.70	0.97	0.92	0.77	1.00										
KAZ	0.85	0.95	0.78	0.50	0.88	1.00									
KGZ	-0.04	0.36	0.16	0.45	0.46	0.17	1.00								
TJK	0.82	0.98	0.96	0.76	0.97	0.91	0.22	1.00							
UZB	0.02	-0.22	-0.50	-0.74	-0.30	0.09	-0.42	-0.30	1.00						
ARM	0.53	0.68	0.93	0.67	0.74	0.57	-0.08	0.82	-0.55	1.00					
AZE	0.89	0.85	0.86	0.92	0.80	0.71	0.19	0.86	-0.44	0.69	1.00				
GEO	0.06	0.42	0.72	0.64	0.59	0.19	0.28	0.54	-0.86	0.82	0.43	1.00			
MDA	0.77	0.83	0.95	0.62	0.82	0.82	-0.12	0.93	-0.25	0.92	0.77	0.56	1.00		
RUS	0.17	0.06	-0.13	0.44	0.01	-0.11	0.54	-0.08	-0.27	-0.36	0.33	-0.20	-0.34	1.00	
EU	-0.18	-0.43	-0.76	-0.41	-0.55	-0.35	0.12	-0.60	0.53	-0.92	-0.36	-0.87	-0.76	0.61	1.00

Source: IMF World Economic Outlook database; Fund staff estimates.

Appendix Table 2a. Merchandise Exports to Russia as a Percent of Total Merchandise Exports, 1993-2003

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Armenia	34.2	34.7	25.4	33.1	27.0	18.1	14.6	14.8	17.7	14.8	12.0
Azerbaijan	22.0	21.9	18.1	17.6	23.1	17.4	8.9	5.6	3.4	4.4	4.4
Belarus	40.7	47.1	44.4	53.2	64.2	65.2	54.5	50.6	53.1	49.6	49.1
Estonia	22.6	23.0	17.6	16.4	18.8	13.3	9.2	6.8	8.6	10.0	11.4
Georgia	45.5	33.6	31.0	28.5	29.8	17.4	12.5	21.0	23.4	17.4	17.7
Kazakhstan	...	44.6	45.0	41.9	35.2	29.2	20.3	17.7	19.4	15.5	15.2
Kyrgyz Republic	31.5	17.2	23.7	26.5	16.2	16.5	15.6	12.9	13.6	16.5	16.7
Latvia	28.5	28.1	24.9	23.1	21.0	12.0	6.6	4.2	5.7	5.8	5.4
Lithuania	4.2	28.2	20.4	23.8	24.5	16.5	7.0	7.1	11.0	12.1	10.1
Moldova	35.6	51.1	48.3	54.0	58.1	53.7	41.3	44.5	43.7	37.2	39.0
Tajikistan	17.9	9.4	12.7	10.2	7.9	8.0	16.7	33.6	16.1	11.9	6.6
Ukraine	...	40.3	39.8	38.7	26.2	23.0	20.7	24.1	22.6	17.8	17.8
Uzbekistan	...	38.9	29.7	22.6	31.9	20.5	21.6	27.6	25.4	20.0	22.0
CIS excl. Russia	...	40.1	39.2	39.6	36.5	33.8	27.4	27.1	26.7	22.9	22.7
Baltics	17.6	26.6	20.5	21.4	21.8	14.4	7.8	6.4	9.1	10.1	9.7

Source: IMF Direction of Trade database; Fund staff estimates.

Appendix Table 2b. Merchandise Imports from Russia as a Percent of Total Merchandise Imports, 1993-2003

	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Armenia	30.1	28.4	19.4	14.6	24.2	21.2	21.5	15.5	19.8	11.9	11.6
Azerbaijan	23.1	15.1	13.2	16.5	19.1	18.0	21.9	21.3	10.7	16.9	15.5
Belarus	46.0	62.9	56.1	50.8	53.6	54.8	56.4	64.8	65.2	65.1	65.8
Estonia	17.2	16.6	16.1	13.4	14.4	11.1	13.5	13.4	12.5	12.0	10.2
Georgia	4.1	7.8	12.4	18.5	13.4	9.2	7.4	13.8	12.4	15.4	14.0
Kazakhstan	...	39.4	49.9	54.7	45.8	39.1	36.6	48.3	44.6	38.7	39.0
Kyrgyz Republic	35.4	21.9	26.8	21.9	26.9	24.3	17.9	23.9	18.3	19.9	24.7
Latvia	28.1	23.5	21.6	20.3	15.6	11.8	10.5	11.6	9.2	8.8	8.7
Lithuania	23.7	39.3	31.2	26.0	25.3	21.1	20.1	27.4	25.3	21.2	22.0
Moldova	35.2	46.9	33.1	30.0	28.6	22.3	23.6	15.4	16.1	14.8	13.0
Tajikistan	15.7	11.1	16.8	11.1	15.3	14.4	13.9	15.7	19.0	23.0	20.2
Ukraine	...	54.1	37.8	50.1	45.8	48.1	47.2	41.7	36.8	37.2	35.9
Uzbekistan	...	37.4	29.9	24.5	21.2	18.2	10.6	14.6	17.5	24.0	22.3
CIS excl. Russia	...	47.2	39.4	43.5	41.5	41.4	40.2	43.5	40.1	40.2	39.0
Baltics	23.3	28.3	24.2	20.6	19.5	15.5	15.4	18.4	17.1	15.3	14.9

Source: IMF Direction of Trade database; Fund staff estimates.

Appendix Table 3. Contribution of External Demand and Exports to Russia to Real GDP Growth in the CIS and Baltic Countries, 1993-2003
(In percentage points of real GDP)

		1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	Averages 94-97	Averages 98-03	Averages 94-98	Averages 99-03
Armenia	Real GDP	-14.1	5.4	6.9	5.9	3.3	7.3	3.3	6.0	9.6	13.2	13.9				
	Domestic demand	...	...	32.9	87.1	8.0	6.3	-16.1	28.2	3.7	17.5	14.5				
	Net exports	...	...	-26.0	-81.2	-4.7	1.0	19.4	-22.2	5.9	-4.3	-0.6				
Belarus	Real GDP	-7.6	-11.7	-10.4	2.8	11.4	8.4	3.4	5.8	4.7	5.0	6.8				
	Domestic demand	...	...	...	4.8	11.9	14.8	0.6	8.8	0.3	6.2	4.5				
	Net exports	...	...	...	-2.0	-0.5	-6.4	2.9	-3.0	4.4	-1.2	2.3				
	Exports	...	...	...	17.4	27.5	-11.5	11.4	8.0	6.7	8.2	9.4				
	o/w Russia	...	...	...	13.7	24.8	-6.7	-0.9	1.2	5.4	1.3	4.2	19.3	0.7	10.6	2.2
	Imports	...	...	...	-19.4	-28.0	5.1	-8.6	-11.0	-2.3	-9.4	-7.1				
	o/w Russia	...	...	...	-6.9	-17.0	1.8	-6.1	-14.1	-1.8	-6.0	-5.2				
Estonia	Real GDP	-8.2	0.9	4.5	4.5	10.5	5.2	-0.1	7.8	6.4	7.2	5.1				
	Domestic demand	-8.6	5.2	5.3	7.5	12.5	6.3	-4.8	8.7	8.5	9.8	10.1				
	Net exports	0.4	-4.3	-0.8	-3.0	-2.0	-1.1	4.8	-0.9	-2.1	-2.6	-4.9				
	Exports	13.8	12.2	3.2	1.7	17.2	8.3	0.5	21.0	-0.2	0.7	4.5				
	o/w Russia	...	3.0	-2.6	-0.4	4.6	-2.7	-3.0	-0.4	1.6	1.2	1.7	1.1	-0.3	0.4	0.2
	Imports	-13.4	-16.5	-4.0	-4.7	-19.1	-9.4	4.3	-21.9	-1.9	-3.3	-9.4				
	o/w Russia	...	-2.5	-0.3	1.1	-3.4	1.5	-1.4	-2.8	0.6	0.0	0.6				
Kazakhstan	Real GDP	-9.2	-12.6	-8.3	0.5	1.6	-1.9	2.7	9.8	13.5	9.8	9.2				
	Domestic demand	...	...	-27.8	-10.2	4.5	-1.1	8.0	1.3	21.5	7.7	4.7				
	Net exports	...	...	19.5	10.7	-2.9	-0.8	-5.3	8.5	-8.0	2.1	4.5				
Kyrgyz Republic	Real GDP	-13.0	-19.8	-5.8	7.1	9.9	2.1	3.7	5.4	5.3	0.0	6.9				
	Domestic demand	...	-22.6	-7.3	20.2	-3.5	5.8	5.1	2.7	2.9	2.5	9.1				
	Net exports	...	2.8	1.5	-13.1	13.3	-3.7	-1.4	2.7	2.4	-2.5	-2.2				
	Exports	...	-6.3	-5.8	4.6	6.7	-3.1	-3.3	2.8	-0.9	1.9	2.7				
	o/w Russia	...	-5.9	0.8	2.1	-2.2	-0.4	-0.8	-0.3	0.1	1.1	0.5	-1.3	0.0	-1.1	0.1
	Imports	...	9.1	7.4	-17.6	6.6	-0.6	1.9	-0.2	3.4	-4.5	-4.9				
	o/w Russia	...	7.6	0.0	-2.2	-0.6	0.9	2.8	-2.1	2.5	-1.3	-2.8				
Latvia	Real GDP	-11.4	2.2	-0.9	3.8	8.3	4.7	3.3	6.9	8.0	6.4	7.5				
	Domestic demand	-13.9	6.6	4.0	7.8	6.1	11.9	3.2	4.5	11.4	6.2	12.4				
	Net exports	2.5	-4.4	-4.9	-4.0	2.2	-7.2	0.1	2.4	-3.4	0.3	-5.0				
	Exports	9.9	-0.6	3.0	7.4	5.6	2.2	-2.8	4.9	2.9	2.6	1.8				
	o/w Russia	...	-0.3	-0.3	1.1	0.2	-3.7	-2.6	-0.8	0.8	0.2	-0.1	0.2	-1.0	-0.6	-0.5
	Imports	-7.3	-3.8	-7.9	-11.5	-3.4	-9.4	2.9	-2.5	-6.3	-2.4	-6.8				
	o/w Russia	...	0.4	-1.1	-1.8	1.8	0.8	1.0	-0.9	0.6	0.0	-0.5				

Appendix Table 3. Contribution of External Demand and Exports to Russia to Real GDP Growth in the CIS and Baltic Countries, 1993-2003 (cont'd)
(In percentage points of real GDP)

		1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	Averages 94-97	Averages 98-03	Averages 94-98	Averages 99-03
Lithuania	Real GDP	-16.2	-9.8	3.3	4.7	7.0	7.3	-1.7	3.9	6.4	6.8	9.7				
	Domestic demand	...	...	...	...	10.6	8.5	-0.3	2.2	5.9	6.8	11.8				
	Net exports	...	...	...	...	-3.6	-1.2	-1.3	1.8	0.5	-0.1	-2.1				
	Exports	...	...	...	...	8.7	2.4	-8.4	4.2	9.5	10.0	3.9				
	o/w Russia	...	...	...	...	2.4	-3.7	-5.4	0.3	2.8	1.8	-0.7	2.4	-0.8	-0.6	-0.2
	Imports	...	...	...	...	-12.3	-3.6	7.1	-2.4	-9.1	-10.0	-5.9				
	o/w Russia	...	...	...	...	-2.8	1.7	2.0	-4.4	-1.2	0.2	-1.8				
Moldova	Real GDP	-1.2	-30.9	-15.3	-5.9	1.6	-6.5	-3.4	2.1	6.1	7.8	6.3				
	Domestic demand	23.5	-38.4	-9.5	8.8	10.8	-0.5	-24.5	18.4	7.2	12.9	27.1				
	Net exports	-24.7	7.5	-5.8	-14.6	-9.1	-6.0	21.2	-16.3	-1.1	-5.1	-20.8				
	Exports	-94.0	-5.1	12.3	-5.1	1.0	-15.5	1.4	4.8	8.7	11.6	10.7				
	o/w Russia	...	2.3	4.8	0.7	3.0	-10.9	-5.1	3.7	3.4	0.5	5.4	2.7	-0.5	0.0	1.6
	Imports	69.4	12.6	-18.1	-9.6	-10.1	9.4	19.7	-21.2	-9.8	-16.7	-31.4				
	o/w Russia	...	1.2	-0.5	-0.8	-1.8	7.9	3.5	2.5	-2.2	-1.3	-2.3				
Russia	Real GDP	-8.7	-12.7	-4.1	-3.6	1.4	-5.3	6.3	10.0	5.1	4.7	7.3				
	Domestic demand	-10.1	-12.2	-4.2	-4.6	1.7	-11.2	-2.8	12.3	7.7	4.4	6.9				
	Net exports	1.4	-0.5	0.1	1.0	-0.3	5.8	9.1	-2.3	-2.6	0.3	0.5				
	Exports	-0.6	1.4	1.9	1.4	-0.2	0.7	4.8	4.2	1.9	4.2	6.3				
	Imports	1.9	-1.9	-1.8	-0.4	-0.1	5.1	4.4	-6.5	-4.5	-4.0	-5.8				
Ukraine	Real GDP	-14.2	-22.9	-12.2	-10.0	-3.0	-1.9	-0.2	5.9	9.2	5.3	9.4				
	Domestic demand	...	-23.7	-20.7	-9.2	-3.4	-4.1	-1.9	0.4	9.5	3.4	11.2				
	Net exports	...	0.8	8.6	-0.9	0.4	2.1	1.7	5.4	-0.4	1.9	-1.8				
	Exports	...	-4.7	1.6	3.6	-1.3	-5.8	-4.3	8.0	3.6	3.2	4.5				
	o/w Russia	...	...	0.5	1.0	-6.2	-2.8	-1.9	3.2	0.2	-1.5	0.8	-1.6	-0.3	-1.9	0.2
	Imports	...	5.5	7.0	-4.5	1.7	8.0	6.0	-2.6	-4.0	-1.3	-6.4				
	o/w Russia	...	...	9.9	-7.5	3.0	2.6	3.2	1.1	0.5	-0.6	-1.8				
Average													3.3	-0.3	1.0	0.5

Source: IMF Direction of Trade and World Economic Outlook databases; Fund staff estimates.

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