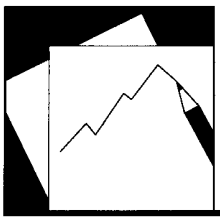
WP/09/277



IMF Working Paper

How Russia Affects the Neighborhood: Trade, Financial, and Remittance Channels

Fahad Alturki, Jaime Espinosa-Bowen, and Nadeem Ilahi

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Middle East and Central Asia Department

How Russia Affects the Neighborhood: Trade, Financial, and Remittance Channels

Prepared by Fahad Alturki, Jaime Espinosa-Bowen, and Nadeem Ilahi [1]

Authorized for distribution by Ana Lucía Coronel

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Abstract

We test the extent to which growth in the 11 CIS countries (excluding Russia) was associated with developments in Russia, overall, as well as through the trade, financial and remittance channels over the last decade or so. The results point to the continued existence of economic links between the CIS countries and Russia, though these links may have altered since the 1998 crisis. Russia appears to influence regional growth mainly through the remittance channel and somewhat less so through the financial channel. There is a shrinking role of the trade (exports to Russia) channel. Russian growth shocks are associated with sizable effects on Belarus, Kazakhstan, Kyrgyz Republic, Tajikistan, and, to some extent, Georgia.

JEL Classification Numbers: F15, F21, F42, F43, N15

Keywords: Spillovers, business cycle, emerging markets, growth linkages, Russia, Commonwealth of Independent States (CIS), regional linkages, decoupling, divergence, convergence, remittances, capital flows, and trade

Author's E-Mail Address: falturki@imf.org; jespinosabowen@imf.org; nilahi@imf.org;

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I. INTRODUCTION

During the last decade, the economic relationship between Russia and the former Soviet Republics, known as the Commonwealth of Independent States (CIS) [2], has undergone significant change. Cross border financial transactions and labor-remittance flows between Russia and these countries have become increasingly important compared to the traditional trade links that dominated the relationship prior to the 1998 Russian crisis. For instance, between 2001 and 2008, remittance outflows from Russia increased more than tenfold, to $25 billion, with the CIS countries accounting for the vast majority of these—available data on bilateral remittance flows indicate that the share of CIS countries in total remittances out of Russia was near 90 percent.[3] Financial linkages have also become stronger over time for some of the CIS countries—e.g., a sizable portion of the Armenian banking system has Russian ownership and Kazakhstan's largest bank, BTA, has 40 percent of its assets in Russia. This has all happened at a time when Russia's share of CIS exports has seen a steady decline (see figures 1 and 2).[4]

To the extent that there was unprecedented growth in CIS countries over the last decade when Russia experienced a large oil-led boom, a relevant question to ask is if the latter spilled over to the former and if so, then whether trade, financial and remittance linkages were the spillover channels. This paper explores whether growth in CIS countries, in the decade or so after the 1998 Russian crisis, was influenced by factors related to financial and labor market integration between Russia and the CIS, and the extent to which the traditional trade links continued to play a role. Of course, the fact that a large part of this period was a time of high growth for the global economy and an increasing globalization of finance, labor and trade, any analysis of the links between CIS and Russia would have to control for these changes in the global economy.

[2] The 11 CIS members, excluding Russia, are Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyz Republic, Moldova, Tajikistan, Turkmenistan, Ukraine, and Uzbekistan.

[3] The share of CIS countries is 30–40 percent in the more encompassing category of transfers abroad by individuals. These data on bilateral remittances from Russia to CIS countries are not available for the years before 2006.

[4] Obiora (2009) observes a similar decline in the trade links between Baltic countries and Russia since 2000, and an increase in the links with Europe.

Figure 1. Average share of CIS countries' exports to Russia and Europe, in percent

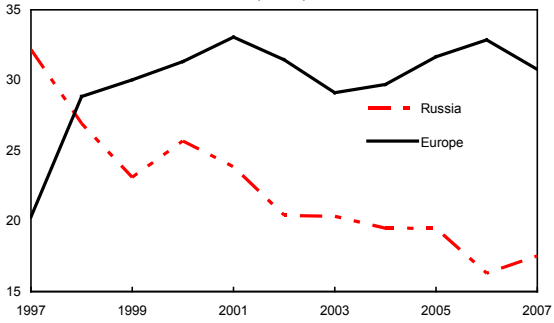
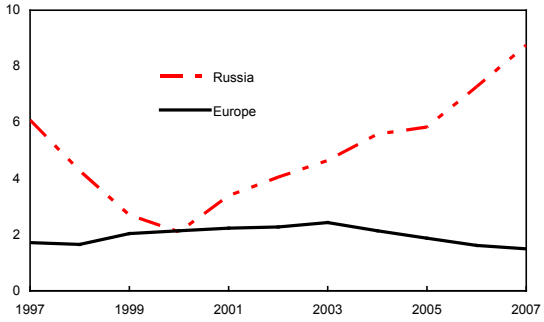
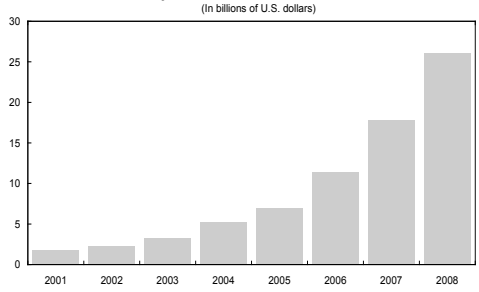


Figure 2. Ratio of remittances from Russia and Europe to GDP of non-Russian CIS countries, in percent

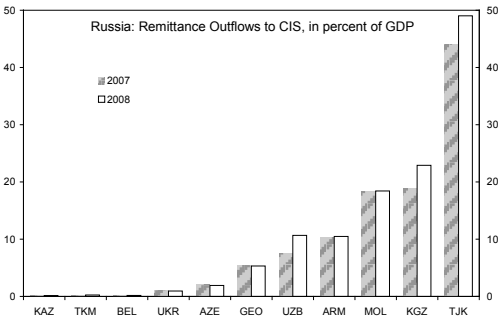


Source: National authorities; and IMF staff calculations.

Figure 3. Outflow of Remittances 1/ from Russia
(In billions of U.S. dollars)



Source: BOP Database, IMF.
1/ Remittances are defined as the sum of workers' remittances, compensation of employees, and migrant transfers.



Source: Central Bank of Russia

We conduct econometric analysis to explore these linkages. We estimate panel (cross section and time series) growth regressions for the 11 CIS countries (excluding Russia) and test the extent to which growth in these countries was associated with developments in Russia, overall, as well as through the trade, financial and remittance channels. For the CIS countries for which we have detailed quarterly information, we also conduct Vector Autoregression (VAR, time series) estimation to disentangle spillover effects of growth in Russia on growth in CIS countries.

The results point to the continued existence of economic links between the CIS countries and Russia, though these links may have altered since the 1998 crisis. Russia appears to influence regional growth mainly through the remittance channel and somewhat less so through the financial channel. There is a shrinking role of the trade (exports to Russia) channel. Russian

growth shocks are associated with sizable effects on Belarus, Kazakhstan, Kyrgyz Republic, Tajikistan, and, to some extent, Georgia.

II. BACKGROUND

The empirical evidence on the existence of linkages and cycle co-movement is quite convincing. Studies of inter-country growth cycle linkages, focusing on spillovers of northern (developed) countries' growth on other northern, emerging, and developing countries find that Northern growth is strongly associated with growth in other countries. For example, Kouparitsas (2001) finds as high a correlation between North and South (developing) countries' growth as between regions of the North, implying that the international business cycle also extends to the South. Arora and Vamvakidis (2004a) find a U.S. growth slowdown reduces growth in the rest of the world by up to one-to-one. Lumsdaine and Prasad (2003) study the common component of international economic fluctuations and find evidence of a "world business cycle" as well as a distinct European common component.

Empirically, the role of trade as the channel of cycle co-movement is also clear. Pairs of industrialized countries that trade more with each other exhibit a higher degree of business cycle co-movement (see among others, Frankel and Rose (1998), and Kose and others (2003a, 2003b). More generally, Arora and Vamvakidis (2005) find a country's growth is strongly correlated with trading partner growth, even after controlling for common global and regional trends. In assessing the impact of U.S. downturn on global growth, the IMF (2007) argues for distinguishing between relatively benign mid-cycle slowdowns and serious U.S. recessions—indicated by a significant slowdown in U.S. non-oil import demand from the rest of the world.

Growth spillovers from large regional countries to their relatively smaller neighbors have also been attracting increasing attention.

- Arora and Vamvakidis (2005) find that South Africa is an "engine" of growth for the rest of Africa. There is a strong growth correlation, though it cannot be explained through an explicit trade linkage (i.e. through net bilateral exports to South Africa). They ascribe it to greater efficiency, economies of scale and technological gains associated with trade, as well as non-tangible factors—namely, economic sentiment and financial linkages.

- Obiora (2009) finds there are significant cross-country spillovers to the Baltic countries from the EU countries and Russia, though the spillovers from the EU to the Baltic countries may be more than those from Russia, especially in the context of the changes in trade shares between the two major trade partners. Shocks from trading partners; financial conditions and trade linkages explain a significant share of variation in GDP growth.

- Ilahi and Shendy (2008) find growth rates of real GDP, private consumption and private investment in Middle East and North African countries (including Pakistan) are strongly associated with remittance outflows from, and the accumulation of financial surpluses in the oil-driven Gulf Cooperation Council (GCC) countries. This suggests strong labor and financial channels of spillover from GCC to regional countries.

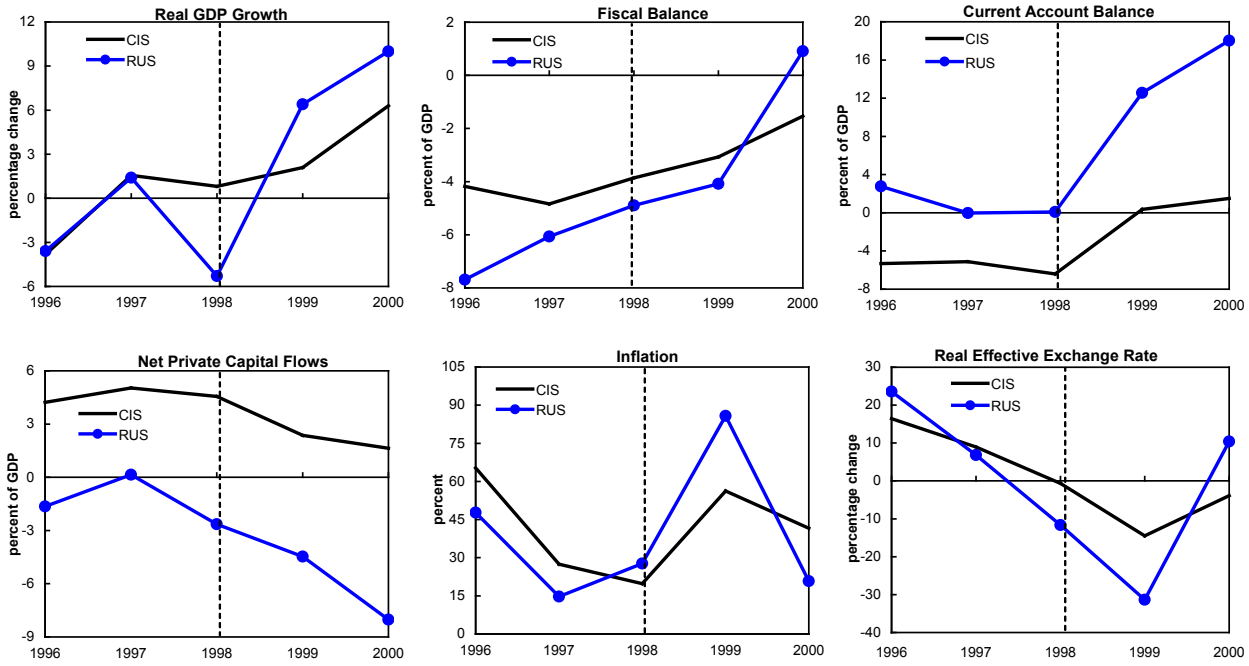
In a study of relevance to this paper, Shiells and others (2005) explore whether the countries traditionally linked to Russia decoupled from it after the 1998 crisis; they find that Russian growth was indeed significantly associated with growth in regional economies, but that the link weakened after the 1998 crisis. While they do not explicitly test for the export, remittances or financial channels, they suggest that these may be important.

The panel approach in this paper closely follows that used in Ilahi and Shendy (2008). Indeed in terms of linkages with a large oil producing economy, the CIS countries' links with Russia closely resemble those between the non-GCC Middle East and North African countries (including Pakistan) and the GCC. The last oil boom saw large investment and financial outflows as well as remittance flows from GCC and Russia to MENAP and CIS countries respectively.

This paper focuses on the relationship between Russia and the other CIS over a time period of sustained oil-driven growth in Russia, with the accumulation of sizable financial savings and import of migrant labor from neighboring states. However, the period immediately surrounding the 1998 Russia crisis—a time of severe macroeconomic dislocation in Russia, and subsequently in the CIS countries—provides another angle on the linkages. Russia's debt default and subsequent slump resulted in significant macroeconomic spillovers to the CIS countries, though not in an obvious manner.

While there was a severe economic contraction in Russia in 1998 (about 6 percent on an annual basis), most of the CIS countries (except Kazakhstan, Moldova and Ukraine), experienced a slowdown in growth to near zero (figure 4). The non-Russian CIS countries went into the crisis with sizable external and fiscal imbalances (the latter also for Russia), which meant there was a sharp adjustment of the real exchange rate as the nominal rates followed the Ruble collapse. Net private capital flows fell sharply in Russia and this spilled over to the CIS, though as Shiells et al (2005) point out, common investor sentiment may also have played a role. The turnaround appears to have been swift in both Russia and the rest of CIS as the fiscal and current account deficits started improving in 1998 and the real effective exchange rate (REER) followed a year later, though private capital inflows continued to worsen.

Figure 4. Russia and CIS: The Crisis of 1998



Sources: National authorities; and IMF staff calculations.
* CIS aggregate was calculated using PPP GDP country weights.
** CIS aggregate excludes Turkmenistan due to data limitations.

III. Empirical Specification

A. The Panel

We specifically test the existence of the association of growth in individual CIS countries (except Russia) with growth in Russia, as well as the various channels through which such a growth association is possible—trade (export) channel, financial links and remittances. The specification closely follows that in Ilahi and Shendy (2008). The estimation controls for the impact of "non-Russia" factors, captured here by equivalent variables for Europe or OECD.

To the extent we have only a short time series, 12 annual observations, we are unable to take 5- or 10-year averages to assess long run growth trends, as is typical in many growth determinants studies. As annual growth is likely to be influenced by the persistence of earlier shocks, we employ a dynamic specification by using lagged dependent variables on the right hand side. However, dynamic panel estimators tend to be biased in the presence of fixed effects, as the estimated effect is correlated with the lagged dependent variable. The extent of the bias is inversely related to the length of the time series, which in our case, given the relatively short time span, is likely to be large. We correct for the bias of the least squares dummy variable (LSDV) panel estimator directly and obtain unbiased estimates of the coefficients for all time-varying variables using the approach suggested by Kiviet (1995) and

Bruno (2005). Note that we avoid using the GMM type estimators as they are likely to yield unstable estimates for short samples.

- In the first set of regression, the CIS country growth rate is regressed on growth in Russia and Europe, OECD or the world. A number of control variables are also employed in the regressions. An important driver of the link between Russia and regional countries is, of course, oil prices, as sustained oil booms result in the accumulation of financial surpluses in and remittance outflows from Russia. But for oil importing countries in the region, an increase in oil price could also negatively affects growth (a terms-of-trade shock). These countervailing effects are controlled for by including oil price growth on the right hand side and running a separate set of regressions for oil importing countries. We also use other standard control variables typically used in growth regressions—inflation, real effective exchange rate (CPI based) and trade openness (ratio of trade to GDP). These control variables are employed in all the subsequent regressions.

- In the second set, which tests for the trade linkage, growth in CIS countries is regressed on trade (export) determinants. Here we employ non-oil import growth in Russia (real) and in Europe. Another regression replaces these by Russia growth rate, weighted by the share of exports to Russia in total exports of the CIS country in question—as the share of Russia has been on a decline in CIS exports this specification would control for the shrinking width of the trade channel over time (see Arora and Vamvakidis, 2004b).

- The third set tests for financial linkages. The International Monetary Fund (2008) tests for the extent of Russia's financial integration with some of the CIS countries by analyzing equity market correlations and finds developments in Russia have little effect. It posits the small size of non-Russian CIS economies, along with their relatively illiquid, less-developed financial systems as the primary reasons. To the extent that linkages may be captured by more than equity market effects, we conduct a more general test. Given the lack of data on direct bilateral financial flows, we employ, using the approach in Ilahi and Shendy (2008), Russia's current account balance—an indicator of the national savings that are available for investment abroad—expressed as a ratio of the combined GDPs of the CIS economies (excluding Russia) as a proxy that show the relative "financial" muscle of Russia. As Russia's external grants abroad are excluded from the calculation of its current account, by definition, but capture one form of financial flow, we also use an alternative current account variable where grants made abroad by Russia are added back into the current account balance.

- The fourth set of regressions test the association between CIS growth and remittances from Russia. The existing empirical evidence does not strongly support the view that remittances spur investment and growth (Chami and others, 2008; Lucas, 2005);

however, to the extent that migrant remittances result in consumption booms in receiving countries (Taylor and others, 1996) they may explain growth spurts (Ilahi and Shendy, 2008). As mentioned earlier, bilateral remittance flows between Russia and CIS countries are observable only for recent years (after 2006) so a direct bilateral test is not possible. But we test an indirect correlation by employing a variable that captures the outflow of remittances from Russia.[5]

B. The Vector Autoregression Model Specification

We employ a Vector Autoregressive (VAR) model to precisely determine the separate spillover effects of unexpected changes in growth in Russia and Europe on the growth path of individual CIS countries for which we have detailed data. The VAR model allows us to assess the country-level impact of changes in Russia growth.

The model, in general terms is given by

$$x_t = d_t + A_1 x_{t-1} + A_2 x_{t-2} + \cdots + A_h x_{t-h} + e_t$$

where, x_{t-i} is the vector of the endogenous variables under consideration, with $i = 0, \ldots, h$, A_i are matrices of parameters, d_t is a vector of deterministic components, e_t is a vector of residuals, and h is the order of the VAR. A separate five-variable VAR model is estimated for Belarus, Georgia, Kazakhstan, Kyrgyz Republic and Tajikistan. This VAR is partitioned into a foreign block—GDP growth in Russia and Europe, denoted by Y^E and Y^R respectively—and a country block—own country GDP growth (Y), CPI inflation (P), and change in the real effective exchange rate ($REER$).[6]

To determine the order of integration of the variables, we test the null hypothesis of a unit root on Y, P, $REER$, Y^R, and Y^E. The results of the augmented Dickey-Fuller (ADF) t-test are reported in Table 1.[7] The value of the ADF t-test is less than the 5 percent critical value (reported in parentheses) suggesting that the null hypothesis of an extra unit root is rejected for all the variables. Therefore, these variables are stationary and, accordingly, the original variables in log levels are stationary in first differences.

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[5] Our hypothesis here is contrary to Roache and Gradzka (2007) who find that remittance outflows from the U.S. are not a function of the U.S. growth cycle, but similar to one used in Ilahi and Shendy (2008). The sharp drop in US remittances to Central America following the onset of recent recession lends support to our hypothesis.

[6] Another version of the model replaces terms of trade with the REER; this does not alter the results.

[7] The first column shows the number of lags included in the ADF tests. The second column shows the values of the ADF t-test from a regression of the left-hand side variable on this variable lagged one year and on its first difference.

Table 1. Testing for unit root

	Lags	$\rho = 1$		*Lags*	$\rho = 1$		*Lags*	$\rho = 1$
Y^{KAZ}	3	3.03**	P^{KAZ}	6	3.36***	$REER^{KAZ}$	1	9.30*
Y^{KGZ}	1	6.6*	P^{KGZ}	9	2.93***	$REER^{KGZ}$	3	6.43*
Y^{TJK}	2	8.15*	P^{TJK}	10	15.62*	$REER^{TJK}$	8	3.34**
Y^{GEO}	3	5.97*	P^{GEO}	8	8.86*	$REER^{GEO}$	0	4.04*
Y^{MDA}	10	3.34**	P^{MDA}	1	18.77*	$REER^{MDA}$	3	4.91*
Y^{BLR}	0	3.71*	P^{BLR}	10	5.01*	$REER^{BLR}$	1	6.60*
Y^{UZB}	9	2.69***	P^{UZB}	7	2.59***	$REER^{UZB}$	4	3.16**
Y^{R}	1	2.78***						
Y^{E}	0	6.92*						

Note:

1) Null hypothesis: $\rho = 1 \text{ in } x_t = \rho x_{t-1} + \sum_{i=1}^{p} \beta \Delta x_{t-i} + e_{xt}$ $\rho = 0$ $\rho = 1$ where *x* refers to the variables in the 1st column.

2) * is at 1%, ** at 5%, *** is at 10%

3) The number of lags is based on the Schwarz Information Criterion.

For the deterministic components as well as the order of the VAR the AIC, BIC, and log-likelihood tests point to a VAR specification between VAR(1), VAR(2) and a VAR(3). To keep the model simple and to avoid over parameterization, we employ the minimum suggested number of lags for each variable. A constant term is included for all estimations.

IV. Data and Summary Statistics

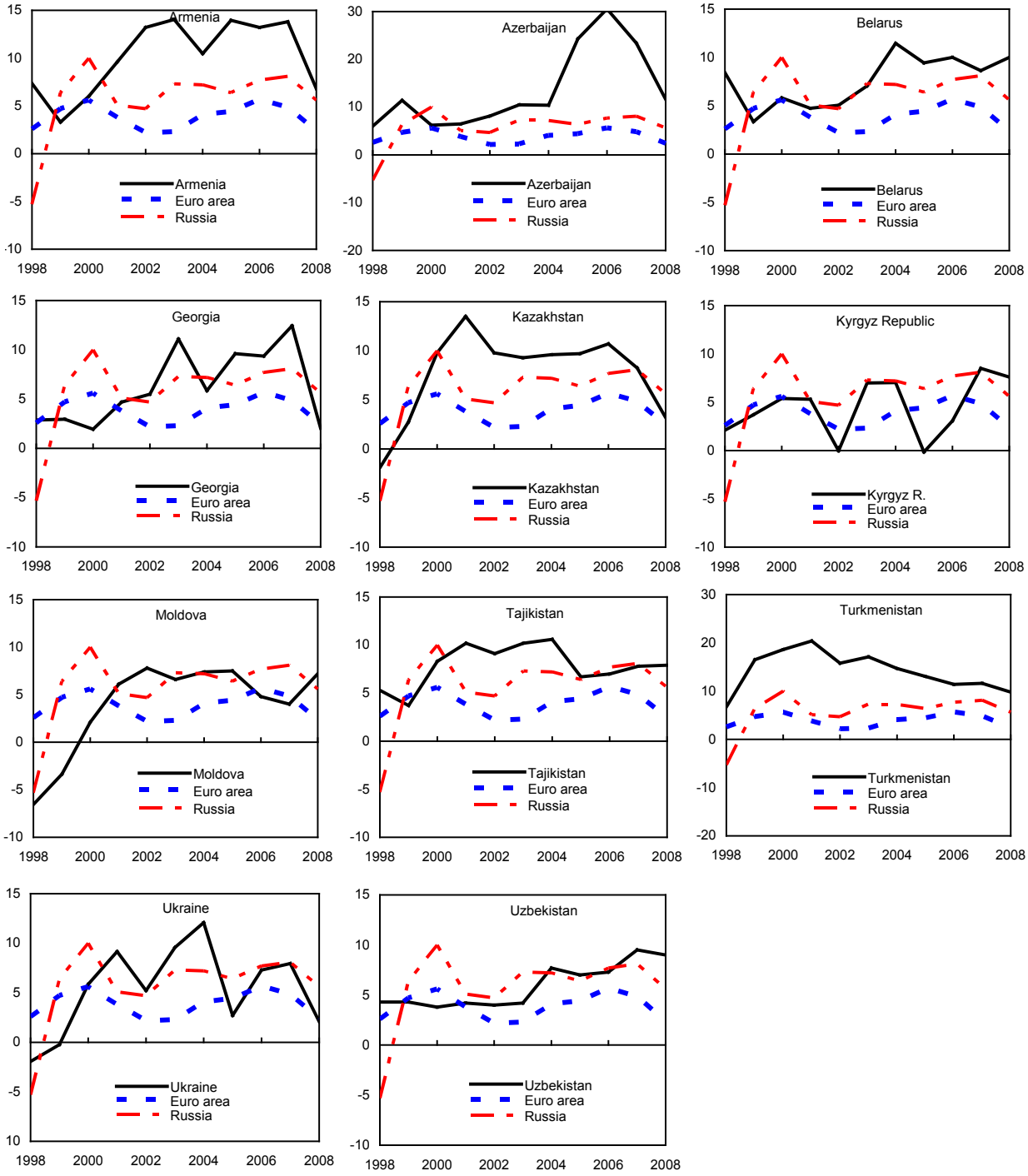
The panel data are annual observations (1997–2008) for a cross section of 11 CIS countries. Table 2 presents summary statistics of the sample. Growth averaged 8 percent and inflation about 17 percent, though the latter shows a wide spread. Trade openness (ratio of exports and imports to GDP) averages about 78 percent, significantly lower than that recorded in period from independence to 1997; it also exhibits a wide variation, with some countries recording extremely low share of trade in GDP and others a very high share. About one third of the countries in the sample are oil exporters (Azerbaijan, Kazakhstan and Turkmenistan).

For the Russia and Europe explanatory variables, a few observations are worth noting. First our financial linkage variable—Russia's current account balance as a ratio of non-Russia CIS GDP—exhibits a wide variation from a small level of near zero in 1998 to about 50 percent in 2000, though the variation of the European current account control variable is even larger—from -39 percent to +80 percent. The same can be observed for the net foreign assets variables. Second, Russian remittance outflows are much smaller than those from Europe, on average by a factor of 9. However, it is the variation in these variables over time and the co-movement with CIS growth that we are interested in, not the level. Third, Russian remittances exhibit a much higher variation (both types of variables) than do European remittances, indicative of the oil driven boom-bust economic and remittance cycle in the former.

Table 2: Summary statistics

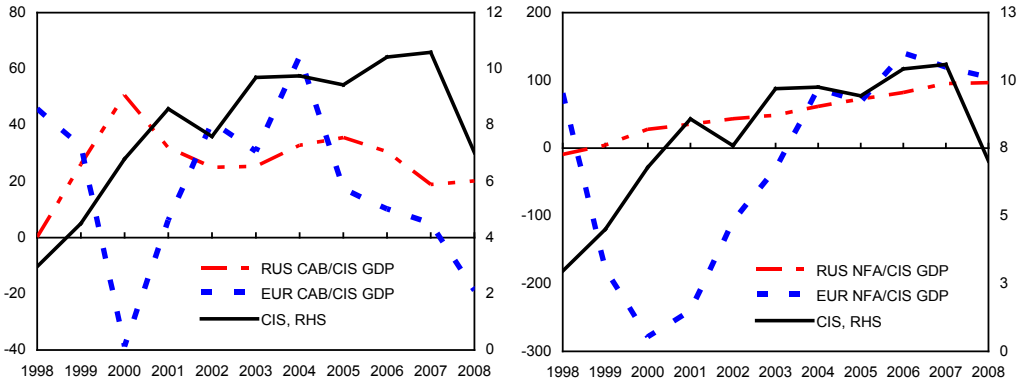
Variables	Obs	Mean	Std. Dev.	Min	Max
CIS country variables					
GDP growth (real)	121	7.9	5.3	-6.5	30.5
Real effective exchange rate (REER; + means an appreciation)	121	96.2	23.2	22.0	147.0
CPI inflation	121	16.6	31.4	-8.5	293.7
Open (ratio of exports & imports to GDP)	121	78.4	26.1	31.6	161.4
Oil exporter dummy	121	0.3	0.4	0.0	1.0
Russia, Europe and other right hand variables					
Russia GDP growth (real)	12	5.4	4.0	-5.3	10.0
Europe GDP growth (real)	12	3.7	1.3	2.2	5.7
Russia non-oil import growth (real)	12	12.9	17.2	-29.1	26.0
Europe non-oil import growth (real)	12	6.6	4.1	0.8	12.6
Russia curr. acct. balance (as % of CIS GDP, ln)	12	24.8	14.2	-0.1	50.6
Europe curr. acct. balance (as % of CIS GDP, ln)	12	23.0	33.4	-38.7	79.8
Russia curr. acct. balance, excl. grants (as % of CIS GDP, ln)	12	24.6	14.1	0.3	50.7
Europe curr. acct. balance, excl. grants (as % of CIS GDP, ln)	12	54.0	37.2	-4.4	118.6
Russia NFA (as % of CIS GDP, ln)	12	46.7	36.3	-9.1	96.8
Europe NFA (as % of CIS GDP, ln)	12	-2.4	161.3	-278.6	205.9
Russian remittances outflow/CIS GDP	12	2.8	1.2	1.2	5.1
European remittances outflow/CIS GDP	11	24.7	4.2	17.8	30.1
Russian remittance growth (real)	12	20.3	34.1	-40.9	69.5
European remittance growth (real)	11	8.3	4.9	-0.4	17.2
Oil price growth (real)	12	13.3	25.1	-34.7	51.4

Figure 5. Growth in CIS countries, Russia and Euro Area, in percent



Source: National authorities; and IMF staff calculations.

Figure 6. Russian Current Account Balance, NFA and CIS Growth
(in percent)



Source: WEO; and IMF staff calculations.

V. The Findings

A. Panel Results

Overall growth co-movement

The main aim of the current paper is to explore the channels through which Russia could affect CIS growth, however, we begin first with the overall growth correlations. Table 3 presents the results of bias-corrected LSDV estimation where growth rates in CIS countries (except Russia) are regressed on Russian GDP growth, lagged own growth and other control variables. Russian growth is strongly associated with CIS growth, with a 1 percentage point increase in Russian growth associated with about a 0.35–0.45 percentage point increase in growth in CIS countries. This association is somewhat stronger for the oil importing CIS countries—the estimated coefficients range from 0.45–0.50. Own growth dynamics are also important, with the association between prior and current year's growth in the range of 0.4–0.5.

Table 3. Determinants of GDP growth in CIS countries §/

Variables	All CIS countries (excl. Russia)			Oil importer CIS countries (excl. Russia)		
Own GDP growth (lagged)	0.480***	0.489***	0.441***	0.442***	0.454***	0.421***
Russia GDP growth	0.352**	0.449***	0.378***	0.518***	0.512***	0.452***
Euro GDP growth	0.44			-0.07		
OECD GDP growth		0.59			0.126	
World GDP growth			0.645			0.572
CPI inflation	-0.008	-0.008	-0.004	-0.011	-0.011	-0.009
Oil price growth	-0.049**	-0.059***	-0.058***	-0.053**	-0.057**	-0.063***
Open (exports+imports)/GDP	0.063***	0.062***	0.063***	0.040*	0.041*	0.042*
Real Effective Exchange Rate (REER)	-0.026	-0.024	-0.021	-0.003	-0.004	-0.003
Sample size	121	121	121	88	88	88

§/ Dynamic panel Least Squares Dummy Variable Estimates corrected for bias using Kiviet (1995)
Legend: * p<.1; ** p<.05; *** p<.01; Standard errors obtained using 200 bootstrap iterations

The results for the remaining explanatory variables in the regression are discussed below:

- To control for developed country growth, we employ three different indicators—growth in Europe (25 countries), in the OECD, as well as overall global growth. After controlling for growth in Russia, the association between CIS and developed country

growth is weak (for the oil importers) and statistically insignificant (for all), suggesting that unlike for other developing countries, growth in the CIS sample countries is not associated with "northern" growth (Akin and Kose, 2008).

- Trade openness is positively associated with GDP growth suggesting that the lower the share of trade in a country's GDP, the lower its growth rate during this time period, though the higher coefficient estimates for oil exporting countries suggests that this may be partly due to a higher growth rate experienced by oil exporters.
- But CPI inflation and the real effective exchange rate do not appear to be strongly associated with GDP growth. It is probable that these variables tend to have longer term impacts on GDP growth and that is difficult to pick up over a 11 year period (lagged values of these independent variables did not yield different results).
- Growth in oil prices is negatively associated with GDP growth and the estimated coefficients of energy exporters and importers do not appear any different, somewhat surprisingly for the former group.

Exploring the linkages

Trade

If co-movement of growth with trade-related indicators is a guide, then Russia's trade linkages with CIS still exist, though they seem to have weakened since the 1998 crisis. In the regressions reported in table 4, we replace overall growth in Russia and developed countries on the right hand side with trade indicators. The results show that real growth of non-oil imports in Russia is strongly associated with CIS GDP growth—a 10 percentage-point increase in the former yields a ½ percentage point rise in the latter; the effect is much more pronounced for oil importing CIS countries, at 0.9. At the same time, there is no statistically significant association with European countries' non-oil import growth. A more direct test that interacts the non-oil import growth in Russia and Europe with their respective export shares in the CIS country exports, respectively, also yields a statistically significant correlation for Russia but not Europe. Export weighted GDP growth in Russia is also significantly associated with CIS GDP growth.

Table 4. Determinants of GDP growth in CIS countries--Trade channel §/

Variables	All CIS countries (excl. Russia)			Oil importer CIS countries (excl. Russia)		
Own GDP growth (lagged)	0.452***	0.561***	0.495***	0.330***	0.521***	0.418***
Russia non-oil import (real) growth	0.058***			0.086***		
Europe non-oil import (real) growth	0.087			0.010		
Russia growth (export weigthed)		1.070**			1.066**	
Oecd growth (export weigthed)		1.111			0.509	
Russia non-oil import (real) growth (export weigthed)			0.270***			0.263***
Europe non-oil import (real) growth (export weigthed)			0.317			-0.027
CPI inflation	-0.001	-0.009	0.012	0.000	-0.015	0.006
Oil price growth	-0.006	-0.035**	-0.009	-0.003	-0.031	-0.002
Open (exports+imports)/GDP	0.060**	0.053**	0.048*	0.040*	0.036	0.03
Real Effective Exchange Rate (REER)	-0.027	-0.030	-0.031	-0.006	-0.015	-0.015
Sample size	121	121	121	88	88	88

§/ Dynamic panel Least Squares Dummy Variable Estimates corrected for bias using Kiviet (1995)
Legend: * p<.1; ** p<.05; *** p<.01; Standard errors obtained using 200 bootstrap iterations

Financial flows

The estimation results, reported in table 5 show that the estimated coefficient of our proxy for Russian financial savings—the ratio of Russian current account balance and combined CIS GDP (excluding Russia)—is statistically significant in the CIS GDP growth regressions, after controlling for counterpart financial savings in European countries and all the other control variables employed in the previous regressions. The results with respect to the current account hold for both the definitions we employ—overall current account and current account including grants made abroad. The scaling of the Russian current account balance with respect to CIS GDP, and its logarithmic transformation, make it difficult to interpret the estimated coefficient. Results from a regression based on untransformed variables reveal that a 10 percentage point increase in the ratio of Russian current account balance-to-CIS GDP is associated with, on average, a 0.8 percentage point increase in growth rates, respectively.

The evidence of financial linkages is not entirely conclusive. While the current account variable yielded statistically significant association with CIS growth, other specifications did not.[8] We also tried a current account-CIS GDP ratio growth variable and did not find it to be associated with CIS growth. Similarly, employing an alternative measure of the stock of Russian national savings—its accumulated net foreign assets also expressed as a share of CIS GDP, (table 5) did not yield statistically significant estimates.

Table 5. Determinants of GDP growth in CIS countries (excluding Russia)--Financial linkages

Variable			
Own GDP growth (lagged)	0.513***	0.521***	0.469***
Russia curr. acct. balance (as % of CIS GDP, ln)	12.020**		
Europe curr. acct. balance (as % of CIS GDP, ln)	0.936		
Russia curr. acct. balance excl. grants (as % of CIS GDP, ln)		11.030**	
Europe curr. acct. balance excl. grants (as % of CIS GDP, ln)		0.679	
Russia NFA (as % of CIS GDP, ln)			7.79
Europe NFA (as % of CIS GDP, ln)			-0.5
CPI inflation	-0.007	-0.008	-0.005
Oil price growth	-0.027	-0.026	-0.012
Open (exports+imports)/GDP	0.065***	0.064***	0.063**
Real Effective Exchange Rate (REER)	-0.027	-0.029	-0.03
Sample size	121	121	121

§/ Dynamic panel Least Squares Dummy Variable Estimates corrected for bias using Kiviet (1995)
Legend: * p<.1; ** p<.05; *** p<.01; Standard errors obtained using 200 bootstrap iterations

Remittances

The results for remittances indicate a clear linkage through this channel. We employ two separate remittance variables to test the impact of remittances from Russia on CIS growth—the ratio of outflow of remittances from Russia to CIS GDP and the growth rate of "real" remittances from Russia. To control for the fact that the early part of the current decade saw a

[8] For brevity, we do not report some of the insignificant results here.

global remittance boom, we also employ parallel variables for the European countries as control variables. The results clearly show statistically significant association between the Russian remittance variables and CIS growth (Table 6). The results for the remittance growth variable indicate a 10 percentage point increase in growth of remittances in Russia is associated with a 0.3 percentage point GDP growth increase in the CIS countries, with a 0.4 percentage point increase in oil importing CIS countries. European remittance growth does not have a strong and significant impact—while it is statistically significant in one specification for oil importing countries, it is about one-fifth of that for Russian remittances. It is worth noting that while European remittances are significantly higher in magnitude than those from Russia, the latter are more strongly associated with CIS growth rates because a larger fraction flows to the rest of CIS countries.

Table 6. Determinants of GDP growth in CIS countries--Remittances

Variables	All CIS countries (excl. Russia)		Oil importer CIS countries (excl. Russia)	
Own GDP growth (lagged)	0.467***	0.475***	0.327***	0.314***
Russian Remittances Outflow/CIS GDP		1.804*		4.159***
European Remittances Outflow/CIS GDP		0.305		0.812***
Russian remittance growth (real)	0.029**		0.040***	
European remittance growth (real)	0.05		-0.169	
CPI inflation	0.000	0.000	-0.001	-0.002
Oil price growth	0.01	0.003	0.040*	-0.009
Open (exports+imports)/GDP	0.083***	0.084***	0.051**	0.044*
Real Effective Exchange Rate (REER)	-0.01	-0.011	0.02	0.023
Sample size	110	110	80	80

§/ Dynamic panel Least Squares Dummy Variable Estimates corrected for bias using Kiviet (1995)
Legend: * p<.1; ** p<.05; *** p<.01; Standard errors obtained using 200 bootstrap iterations

Consolidated results

While all the three linkages separately appear to have a role in how developments in Russia influence the region, it is not clear which is important relative to the others. Table 7 presents results where we judge the relative importance of these linkages against each other by employing together the variables that capture trade with and financial and remittance flows from Russia on the right hand side of CIS GDP growth regression. The results for the full CIS sample show that jointly, it is difficult to determine which channel is important since multicollinearity could affect the individual significance of the right hand side variables. However, the regression for the CIS oil importers shows clearly that the remittance linkage dominates the other two channels. This result is understandable as the oil importing countries are also the ones that have significant migrants in Russia.

The panel results in Tables 3–7 confirm the association between developments related to financial savings and remittances in Russia and growth in the other CIS countries during 1997–2008, a period that spans two crisis years—1998 and 2008. Shiells and others (2005) argue that when they excluded the crisis year, 1998, in their estimation (which covered 1999–2003), the association between Russia and the rest of CIS became insignificant, implying that Russia had little impact on the CIS countries following the Russian crisis. However, we feel that this argument misses the point about spillovers, especially those over short time periods: that they occur during periods of stable growth, but also during times of stress. Nevertheless, when we exclude the stress years—1998 and 2008—from our sample,

we find that Russian remittances remain significantly associated with CIS growth, though the financial and trade variables do not.

Table 7. Determinants of GDP growth in CIS countries--combined

Variables	All CIS countries (excl. Russia)		Oil importer CIS countries (excl. Russia)	
Own GDP growth (lagged)	0.497***	0.486***	0.392***	0.347***
Russia growth (export weigthed)	0.689	0.701	0.542	0.525
Russia curr. acct. balance (as % of CIS GDP, ln)	9.803	4.773	13.459*	-1.214
Russian Remittances Outflow/CIS GDP	0.261		0.777**	
Russian remittance growth (real)		0.011		0.032**
CPI inflation	-0.008	-0.007	-0.008	-0.006
Oil price growth	-0.044**	-0.026	-0.053**	-0.002
Open (exports+imports)/GDP	0.052**	0.053**	0.039	0.040*
Real Effective Exchange Rate (REER)	-0.025	-0.023	-0.01	-0.005
Sample size	121	121	88	88

§/ Dynamic panel Least Squares Dummy Variable Estimates corrected for bias using Kiviet (1995)
Legend: * p<.1; ** p<.05; *** p<.01; Standard errors obtained using 200 bootstrap iterations

B. VAR Results

Impulse Response Functions (IRF)

The dynamic analysis of the spillover effects of Russian and European GDP growth on the growth rates in individual CIS countries are shown in the impulse-response functions associated with the estimated country specific VAR models. We consider the impact of a temporary one-time innovation of the growth rates in Russia and Europe on the growth rates of CIS countries. We expect this temporary shock to affect the growth rates of the other variables only temporarily, although it will have permanent effects on the levels of these variables.[9]

Figures 7 and 8 show the response of the growth rates in seven CIS countries (for which quarterly data are available) to shocks in GDP growth rates in Russia and Europe, respectively. Two standard-deviation confidence bands are also shown to identify the significance of the responses. It is important to note here that due to small sample size, the confidence bands are large in some of these IRFs. The Russian growth shock has a significant impact on GDP growth in Belarus, Kazakhstan, Tajikistan, and to some extent on Georgia, and Kyrgyz Republic. In Belarus, Kazakhstan, and Tajikistan the spillover effects on local GDP growth of a one standard deviation shock to the Russian GDP (about 2 percent) peak after two quarters to reach 0.6 percent, 1.7 percent, and 2 percent, respectively and the impact lasts between 3 and 6 quarters. In the case of Georgia and Kyrgyz Republic, the effects are less significant and peak in the third quarter following the Russian GDP shock and last for one quarter only. The country-by-country effects of shocks to European growth on growth in CIS countries are displayed in figure 8. Spillovers from Europe appear sizable only in Georgia. The above model was also used to test for intra-regional spillover effects within

[9] We also examined the impulse response functions under a structural VAR model, where the impact of CIS countries' growth is set to have zero impact on Russian and European GDP growth. The size, shape and direction of these IRFs are similar to those presented here.

CIS countries; the results indicate significant one-for-one spillovers from Kazakhstan to Kyrgyz Republic, controlling for the effects of Russia.

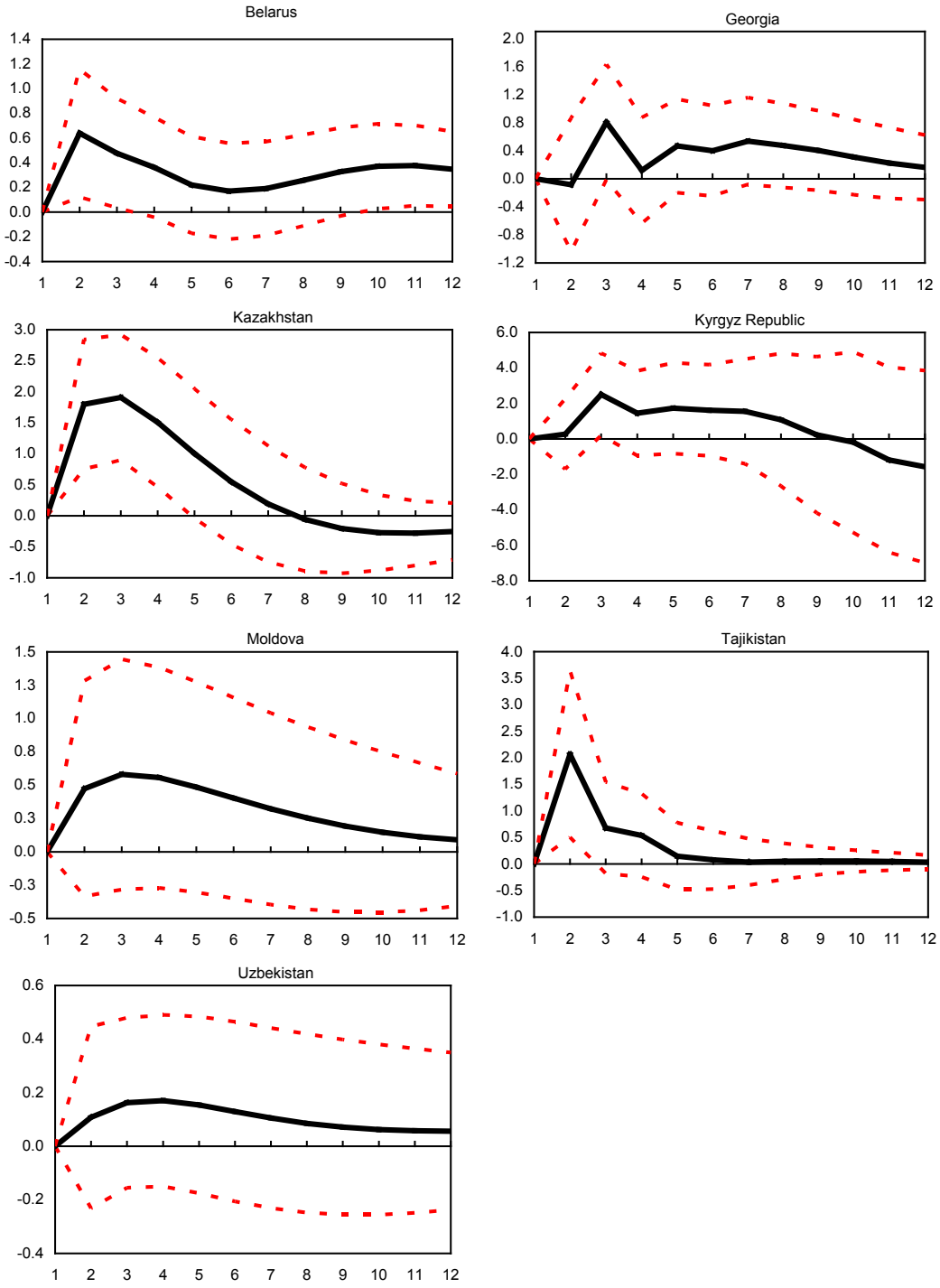
Forecast Error variance decompositions

Next we turn to the question of how growth rates in Russia and Europe compare with other country specific variables as a predictor of the domestic GDP growth in the individual CIS countries. We analyze the relative importance of the Russian economy, controlling for European growth, in accounting for forecast error variance of GDP growth in individual CIS countries. Variance decomposition indicates the percentage of the forecast error variance in one variable that is due to errors in forecasting itself and each of the other variables.

The results in Table 8 show that the deviation of expected growth in Russia contributes more to the 12-quarter variances of the growth rate of Belarus, Kazakhstan, Kyrgyz Republic, Tajikistan, and Uzbekistan than the deviation of expected growth in Europe. The significance of the variance of Russian GDP growth among the variables in the model appears to be the weakest in the case of Uzbekistan. Not surprisingly, the variance of European growth, on the other hand, seems to be more significant in contributing to the variance of the growth rates in Georgia and Moldova.

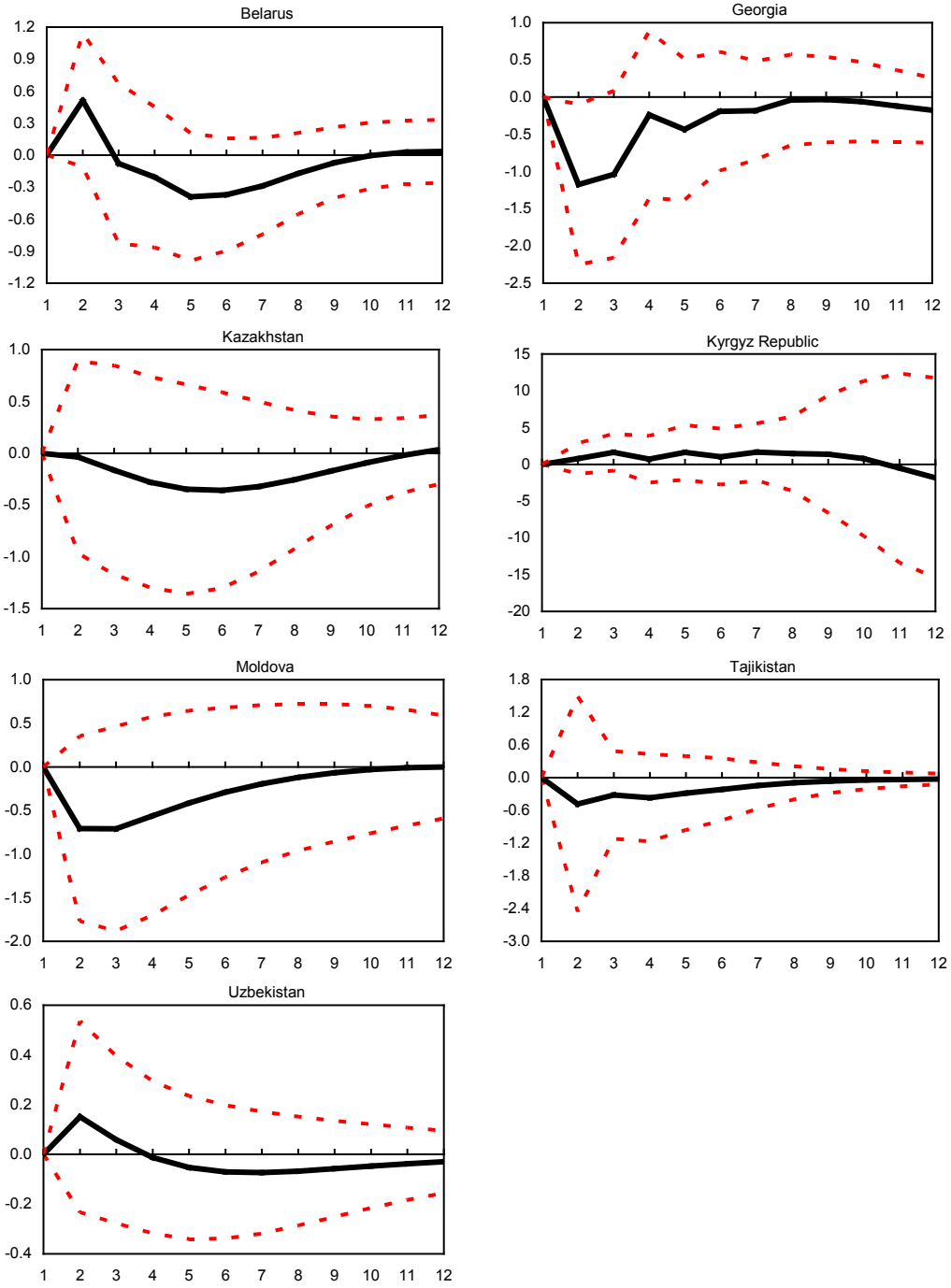
The variance decomposition results can also be used to compare the importance of the variances in growth rates in Russia and Europe across CIS countries. This is shown in figure 9. Among the CIS countries, the variance of Russian growth rate seems to be more important in Kazakhstan, Kyrgyz Republic, and Belarus than the rest of the CIS countries. The variance of the European growth rate, on the other hand, appears to be more significant in Georgia, Kyrgyz Republic, and Belarus then other CIS countries.

Figure 7. Impact of Russian Growth on Growth in CIS Countries: Effects by Country 1/
(in percent)



Source: National authorities; and IMF staff calculations.
1/ Dotted lines represent two standard deviations intervals from the impulse response.

Figure 8. Impact of Euro Area Growth on Growth in CIS Countries: Effects by Country 1/
(in percent)



Source: National authorities; and IMF staff calculations.
1/ Dotted lines represent two standard deviations intervals from the impulse response.

Table 8. Forecast Error Variance Decompositions of Growth in CIS

	1	2	3	4	8	12	24
Belarus							
Y	100.0	79.9	78.5	76.8	71.2	67.0	66.8
P	0.0	2.0	1.7	1.6	2.3	2.6	5.9
REER	0.0	7.7	7.9	8.1	7.5	8.0	6.7
Y^R	0.0	6.4	8.3	9.6	10.9	14.9	14.4
Y^E	0.0	4.1	3.5	3.9	8.2	7.4	6.2
Georgia							
Y	100.0	78.9	70.2	69.3	64.1	61.4	59.9
P	0.0	10.7	12.4	13.1	14.5	15.8	16.3
REER	0.0	1.6	2.1	2.2	2.4	2.9	3.3
Y^R	0.0	0.1	3.3	3.3	6.9	8.0	8.2
Y^E	0.0	8.8	12.1	12.1	12.2	11.9	12.3
Kazakhstan							
Y	100.0	83.7	69.7	62.1	55.5	54.3	53.8
P	0.0	3.3	5.9	6.8	6.9	8.5	8.9
REER	0.0	1.0	3.1	5.6	10.6	10.5	10.5
Y^R	0.0	12.0	21.2	25.1	25.7	25.5	25.3
Y^E	0.0	0.0	0.1	0.3	1.3	1.3	1.4
Kyrgyz Republic							
Y	100.0	90.1	67.4	64.6	42.7	30.6	6.8
P	0.0	3.2	8.1	7.5	14.0	29.1	52.2
REER	0.0	4.9	6.0	6.6	11.5	10.0	8.8
Y^R	0.0	0.2	12.3	14.8	18.8	16.3	9.9
Y^E	0.0	1.7	6.2	6.5	13.1	13.9	22.3
Moldova							
Y	100.0	95.7	92.2	90.3	88.7	88.7	88.6
P	0.0	0.1	0.2	0.3	0.7	0.7	0.7
REER	0.0	1.0	1.7	1.9	1.7	1.9	1.9
Y^R	0.0	1.0	2.2	3.0	4.2	4.2	4.3
Y^E	0.0	2.3	3.8	4.6	4.7	4.5	4.5
Tajikistan							
Y	100.0	92.9	90.2	89.0	88.5	88.5	88.5
P	0.0	2.4	2.6	2.6	2.8	2.8	2.8
REER	0.0	0.7	2.8	3.7	3.9	3.9	3.9
Y^R	0.0	3.9	4.1	4.3	4.3	4.3	4.3
Y^E	0.0	0.2	0.3	0.4	0.5	0.5	0.5
Uzbekistan							
Y	100.0	89.9	82.9	78.2	69.0	66.0	64.4
P	0.0	6.8	11.3	14.2	20.6	23.3	24.5
REER	0.0	2.4	4.2	5.5	7.0	7.1	7.0
Y^R	0.0	0.3	0.9	1.5	2.5	2.7	3.1
Y^E	0.0	0.6	0.6	0.6	0.9	1.0	1.0

Figure 9. Proportion of the CIS growth variations that are due to Russian growth (in percent)

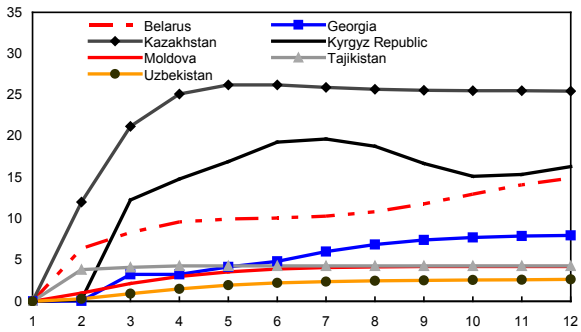
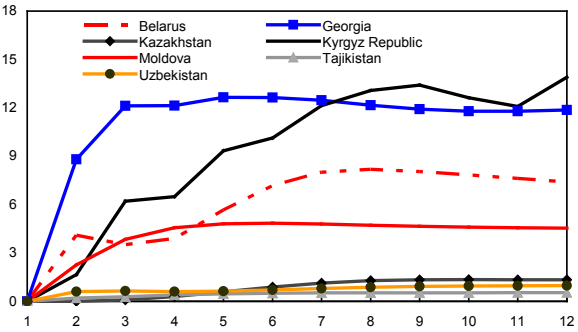


Figure 10. Proportion of the CIS growth variations that are due to Euro Area growth (in percent)



Source: National authorities; and IMF staff calculations.

VI. Conclusion

Almost two decades after independence from the Soviet Union, the countries of the CIS have developed deeper links with the rest of the world. While their economic links with Russia appear to still be strong, the direction of these links has seen some change, whereby remittance and financial channels have taken on an increasingly important role, the former more so than the latter. This paper provides evidence of the existence of such links. Our analysis is constrained by the lack of good bilateral flows data between Russia and the CIS countries so we have had to resort to indirect evidence.

Our findings, based on regression of growth in CIS countries on growth and various indicators capturing trade, remittance and financial developments in Russia, suggest that these three channels are important, in that developments in Russia appear to spill over to the CIS countries. The oil-led growth in Russia since 1998 has helped it solidify its links with the CIS through remittances and financial flows, while the role of trade links has diminished relatively.

The findings in the paper also throw some light on the potential transmission channels through which the current 2008–09 crisis may be affecting the CIS countries. It is not surprising to that the crisis in Russia has affected regional countries through financial channels, including Kazakhstan, where the initial trigger was not from Russia, but where banks' exposure to Russian assets exacerbated the banking problems. Remittance-receiving neighbors (especially Tajikistan and Kyrgyz Republic) have seen a sharp drop in remittances from Russia and a subsequent adverse impact on their growth. Lastly, the trade slowdown experienced in the CIS countries is a consequence of the global slowdown, but the role of slowdown in Russia cannot be discounted.

Appendix Table 1: Correlation

	Russia GDP growth	Euro GDP growth	Russia non-oil growth (real)	Euro non-oil growth real	Real Effective Exchange Rate (REER)	Inflation (CPI)	Open (trade)	Oil price growth (real)	CAB Russia/CIS GDP	CAB Euro/CIS GDP	NFA Russia/CIS GDP	NFA Euro/CIS GDP	Remittance Russia/CIS GDP	Remittance Euro/CIS GDP	Remittance Russia Growth (real)	Remittance Euro Growth (real)
Russia GDP growth	1.0															
Euro GDP growth	0.6	1.0														
Russia non-oil growth (real)	0.5	0.1	1.0													
Euro non-oil growth real	-0.1	0.6	-0.4	1.0												
Real Effective Exchange Rate (REER)	-0.3	0.0	-0.3	0.2	1.0											
Inflation (CPI)	0.0	0.1	-0.3	0.2	0.0	1.0										
Open (trade)	0.1	0.0	0.1	0.0	0.0	0.3	1.0									
Oil price growth (real)	0.8	0.6	0.1	0.4	-0.2	0.1	0.1	1.0								
CAB Russia/CIS GDP	0.8	0.6	0.4	0.1	-0.2	0.0	0.1	0.8	1.0							
CAB Euro/CIS GDP	-0.5	-0.6	-0.3	-0.2	0.0	-0.1	0.0	-0.4	-0.6	1.0						
NFA Russia/CIS GDP	0.6	0.4	0.8	-0.2	-0.3	-0.3	0.1	0.3	0.3	-0.1	1.0					
NFA Euro/CIS GDP	-0.2	0.0	0.2	0.1	-0.1	-0.3	-0.1	-0.2	-0.5	0.4	0.5	1.0				
Remittance Russia/CIS GDP	0.1	0.2	0.4	0.0	-0.2	-0.3	0.0	-0.1	-0.3	0.1	0.8	0.9	1.0			
Remittance Euro/CIS GDP	0.2	-0.3	-0.1	-0.1	0.0	0.2	0.1	0.3	0.5	-0.1	-0.5	-0.8	-0.9	1.0		
Remittance Russia Growth (real)	0.3	0.1	0.8	-0.5	-0.3	-0.3	0.0	-0.1	0.2	0.0	0.8	0.3	0.5	-0.3	1.0	
Remittance Euro Growth (real)	0.5	0.5	-0.1	0.4	0.0	0.2	0.0	0.8	0.7	-0.6	-0.1	-0.5	-0.5	0.4	-0.4	1.0

VII. REFERENCES

Akin, Cigdem and Ayhan Kose, 2007, "Changing Nature of North-South Linkages: Stylized Facts and Explanations" *IMF Working Paper* WP/07/280 (Washington: International Monetary Fund).

Arora, Vivek, and Athanasios Vamvakidis, 2005, "The Implications of South African Economic Growth for the Rest of Africa," *IMF Working Paper* WP/05/58 (Washington: International Monetary Fund).

_____, 2004a, "How Much Do Trading Partners Matter for Economic Growth?" *IMF Working Paper* WP/04/26 (Washington: International Monetary Fund).

_____, 2004b, "The Impact of U.S. Economic Growth on the Rest of the World: How Much Does It Matter?" *Journal of Economic Integration* 19 (March), pp. 1–18.

Bruno, G. S. F., 2005, "Approximating the bias of the LSDV estimator for dynamic unbalanced panel data models". *Economics Letters*, Vol. 87, pp. 361–366.

Chami, Ralph, Adolfo Barajas, Thomas Cosimano, Connel Fullenkamp, Michael Gapen and Peter Montiel, 2008, "Macroeconomic Consequences of Remittances," *Occasional Paper* 259 (Washington: International Monetary Fund)

Frankel, Jeffrey A., and Andrew K. Rose, 1998, "The Endogeneity of the Optimum Currency Area Criteria," *Economic Journal*, Vol. 108 (July), pp. 1009–25.

Ilahi, Nadeem and Riham Shendy, 2008, "Do the Gulf Oil-Producing Countries Influence Regional Growth? The Impact of Financial and Remittance Flows," *IMF Working Paper* WP/08/167 (Washington: International Monetary Fund).

International Monetary Fund, 2007, "Decoupling the train? Spillovers and Cycles in the Global Economy," Chapter 4, *World Economic Outlook*, (Washington: International Monetary Fund).

Kiviet, Jan F., 1995, "On bias, inconsistency, and efficiency of various estimators in dynamic panel data models," Journal of Econometrics, Vol. 68(1), pp. 53–78

Kose, M. Ayhan, Eswar Prasad, and Marco E. Terrones, 2003a, "Volatility and Co-movement in a Globalized World Economy: An Empirical Exploration," *IMF Working Paper* WP/03/246 (Washington: International Monetary Fund).

_____, 2003b, "How Does Globalization Affect the Synchronization of Business Cycles?" *American Economic Review, Papers and Proceedings,* Vol. 93 (May), pp. 57–62.

Kouparitsas, Michael A., 2001, "Evidence of the North-South Business Cycles," *Economic Perspectives,* Federal Reserve Bank of Chicago, Vol. 25, No.1, pp. 24–45.

Lucas, Robert E. B., 2005 *International Migration and Economic Development: Lessons from Low-Income Countries*, (Northampton, MA and Cheltenham, UK: Edward Elgar)

Lumsdaine, Robin L., and Eswar S. Prasad, 2003, "Identifying The Common Component of International Economic Fluctuations: A New Approach," *The Economic Journal*, 113, 101–127.

Obiora, Kingsley, 2009, "Decoupling from the East Toward the West? Analyses of Spillovers to the Baltic Countries," *IMF Working Paper* WP/09/125 (Washington: International Monetary Fund)

Roache, Shaun K. K. and Gradzka, Ewa, 2007, "Do Remittances to Latin America Depend on the U.S. Business Cycle?" *IMF Working Paper* WP/07/273 (Washington: International Monetary Fund)

Shiells, Clinton R., Marco Pani, and Etibar Jafarov, 2005, "Is Russia Still Driving Regional Economic Growth?" *IMF Working Paper* WP/05/192 (Washington: International Monetary Fund).

Swiston, A. and T. Bayoumi, 2008, "Spillovers Across NAFTA," IMF Working Paper WP/08/3 (Washington: International Monetary Fund)

Taylor, J. Edward, Joaquin Arango, Graeme Hugo, Ali Kouaouci, D. S. Massey and Adela Pellegrino, 1996, "International Migration and National Development" *Population Index*, 62 (2) pp. 181–212

Wooldridge, J.M. 2002, *Econometric Analysis of Cross Section and Panel Data* (Cambridge, MA: MIT Press).