

## Capital Flows to Russia, Ukraine, and Belarus: Does “Hot” Money Respond Differently to Macroeconomic Shocks?

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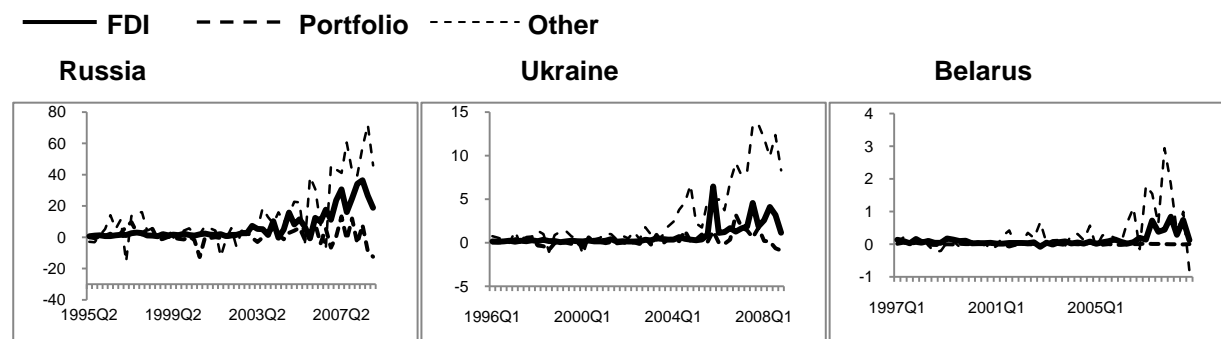
### ABSTRACT

Capital flows into the former Soviet bloc have increased tremendously since the mid-1990s. This study applies the structural VAR model of Ying and Kim (2001) to investigate the macroeconomic “push” and “pull” factors behind net flows of FDI, portfolio, and other investment into Russia, Ukraine and Belarus. Impulse-response and variance decomposition analysis shows that domestic income and monetary shocks, as well as foreign income and interest-rate shocks, have effects that vary by flow and by country. Russian FDI and portfolio investment show significant, but different, responses to income and foreign interest-rate shocks. In addition, Belarus responds to improved macroeconomic fundamentals.

### INTRODUCTION

With the ongoing transition to a market economy, foreign capital has poured into the former Soviet sphere. Some countries, particularly those that reformed rapidly enough to join the European Union in 2004, have been particularly attractive destinations for this investment. While others (such as the Balkan countries and most former Soviet republics) have not received as much in relative terms, they have still been able to attract a considerable amount of foreign capital. Russia, for example, attracted more than U.S. \$16 billion in Foreign Direct Investment (FDI) and \$8 billion in portfolio investment during the fourth quarter of 2007. Figure 1 shows the growth in FDI, portfolio, and Other investment flows into Russia, Ukraine, and Belarus since the mid-1990s. While FDI has been increasing, particularly in recent years, Other investment (classified by the IMF to include loans and trade credits) has grown even faster.

Figure 1. Net Capital Inflows (Real, Billions of U.S. dollars).



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While these flows can be beneficial—FDI can facilitate technology transfers and other positive spillover effects, and portfolio investment can help deepen a country's capital markets—there are also risks. Capital can also be withdrawn, particularly “hot money” flows such as portfolio investment. These outflows can cause major problems—including, as Melecky (2005) noted, slower future growth. Russia, for example, experienced a capital outflow in late 2008 that could be simultaneously attributed to the world recession, domestic factors, or investor dissatisfaction after the Georgia invasion.

As a result, it is important to empirically model the macroeconomic determinants of capital flows, both for various countries as well as for different flows. This paper examines the effects of macroeconomic shocks for Russia, Ukraine, and Belarus in particular. At the same time, two sources of ambiguity in the literature—the effects of income shocks and the differences between the responses by different types of capital flow—are given considerable attention. The application of a structural VAR using quarterly data provides some surprising and useful results.

## RELATIONSHIP TO THE LITERATURE

The so-called “push-” and “pull factors” that drive capital flows can include income and monetary shocks. Economic theory, however, suggests that the effects of these shocks are ambiguous; they can decrease capital flows as well as increase them. Glick and Rogoff (1995) show that current accounts are driven by savings and investment decisions that differ depending on the persistence of income shocks. Since extra income can be saved or invested abroad in varying proportions, the current account (and thus capital flows) can be pro- or countercyclical and must be modeled empirically.

Likewise, this paper addresses another source of ambiguity: Whether FDI and non-FDI flows really behave differently from one another. The literature is divided between two views. One, proposed by Claessens *et al.* (1995) suggests that these differences might be minimal. On the other hand, Chuhan *et al.* (1996) and Sarno and Taylor (1999) find that these flows might indeed exhibit unique properties.

The three countries in question are also dissimilar, since each is in a different stage in the transition process. Belarus is the smallest and has the weakest market economy; as a result, it has attracted the smallest net inflows. Russia's oil exports make it more dependent on global factors, but the country's political situation might make investors wary. Ukraine has also recently undergone a series of currency devaluations, in addition to having a rocky relationship with Russia. Thus, variation among the countries in general can also be expected.

This type of analysis has not been done for these countries, however. Previous research on capital flows to Central and Eastern Europe has neither focused on individual countries nor included foreign macroeconomic influences. Lipschitz *et al.* (2006) provide a theoretical framework behind the movement of capital (or lack thereof) to transition economies, emphasizing the importance of structural and institutional factors, without focusing on any specific economy. Working papers such as those by Ötoker-Robe *et al.* (2007) and Von Hagen and Siedschlag (2008) describe recent developments regarding the growth of capital inflows, but omit Russia, Ukraine, and Belarus entirely. Other studies, such as Garibaldi

*et al.* (2001), include these three countries, but focus on more microeconomic variables. Likewise, Lane and Milesi-Ferretti (2007) omit these three economies and the role of foreign shocks in their analysis. Hegerty (2009) investigates the role of foreign shocks using a VAR methodology, but looks only at six recent EU entrants in Central Europe.

As a result, there is ample room in the literature for a study that looks at the macroeconomic determinants of these countries capital flows, while also focusing on the theoretical ambiguities regarding income shocks and “hot money.” Using a structural VAR method based on Ying and Kim (2001) to model the effects of macroeconomic variables for Russia, Ukraine and Belarus, this study finds that FDI, portfolio, and Other flows do indeed respond differently from one another, and that the effects of income shocks vary from country to country as well.

## METHODOLOGY

The effects of a set of domestic and foreign macroeconomic shocks on capital flows will be assessed with a structural Vector Autoregressive (SVAR) model that will allow for impulse-response and variance decomposition analysis for Russia, Ukraine, and Belarus. Quarterly time series beginning in the mid-1990s are used to study the impacts of these macroeconomic shocks to net FDI, portfolio, and Other investment for each country. Per Ying and Kim (2001) (or a later extension of the paper by De Vita and Kyaw, 2007), each flow is modeled as a function of a set of (unobservable) shocks to Foreign income, the Foreign interest rate, Domestic productivity, Domestic money, and the capital flows themselves:

$$flow_t = f_1(u_t^{FY}, u_t^{FR}, u_t^{DS}, u_t^{DM}, u_t^{FLOWS}) \quad (1)$$

Because the shocks are unobservable, the model uncovers the underlying structural model through the following VAR model:

$$Y_t = \sum_{i=0}^{\infty} A_i U_{t-i} = A(L)U_t \quad (2).$$

In this extension of the model, which includes disaggregated capital flows in place of the capital account,  $A_i$  is matrix of impulse responses to endogenous variables to exogenous shocks and

$$Y_t = (\Delta y_t^*, \Delta r_t^*, \Delta y_t, \Delta m_t, fdi_t, port_t, other_t)' \quad (3a);$$

$$U_t = (u_t^{FY}, u_t^{FR}, u_t^{DS}, u_t^{DM}, u_t^{fdi}, u_t^{port}, u_t^{other})' \quad (3b);$$

$$A(L) = \sum_{i=0}^{\infty} A_i L^i \quad (3c).$$

$$\begin{bmatrix} \Delta y_t^* \\ \Delta r_t^* \\ \Delta y_t \\ \Delta m_t \\ fdi_t \\ port_t \\ other_t \end{bmatrix} = \begin{bmatrix} * & 0 & 0 & 0 & 0 & 0 & 0 \\ * & * & 0 & 0 & 0 & 0 & 0 \\ * & * & * & 0 & 0 & 0 & 0 \\ * & * & * & * & 0 & 0 & 0 \\ * & * & * & * & * & 0 & 0 \\ * & * & * & * & * & * & 0 \\ * & * & * & * & * & * & * \end{bmatrix} \begin{bmatrix} u_t^{FY} \\ u_t^{FR} \\ u_t^{DS} \\ u_t^{DM} \\ u_t^{fdi} \\ u_t^{port} \\ u_t^{other} \end{bmatrix} \quad (4) .$$

The structural model makes use of a set of long-run restrictions (following the Blanchard-Quah decomposition) that stipulates the following: Foreign variables can only be affected by foreign shocks, and monetary shocks do not have any long-run impact on domestic output. In addition, capital-flow shocks do not affect any other variable. The three capital flows are ordered as in (3a) or (3b) because FDI is thought to be more stable than portfolio investment, and Other investment is shown (using the sample standard deviations of the time series) to be more variable than portfolio investment. Thus, the  $A(L)$  or  $A(1)$  matrix is as above. Except for the flows, all variables are in logs, as well as first differences. The flow series are in levels, but deflated by each country's nominal GDP for the sake of stationarity (see below). Using the software *JMULTI* (see Lütkepohl and Krätzig, 2004), impulse-response functions and forecast error variance decompositions are obtained for capital flows for each country.

## RESULTS

Quarterly data from the International Financial Statistics of the IMF are used in this study. The data and exact time spans are explained further in the Appendix. The Phillips-Perron stationarity test is first performed on each variable; the results are provided in Table 1. Capital flows are tested using two deflators that are standard in the literature: each country's GDP deflator (to capture real flows in domestic currency) or GDP itself. While the macroeconomic variables are first-difference stationary, or  $I(1)$ , the test suggests that the flows as shares of GDP show more evidence of stationarity in levels. A SVAR(1) is then estimated for each country using flows deflated by GDP; it was also estimated using flows in terms of real national currency, but the results are very similar. While the capital flows themselves can influence each other, only the impulse response functions (IRFs) for shocks to the four main macroeconomic variables are presented. IRFs with 8-quarter horizons, as well as bands of  $\pm 1.96$  standard errors (representing 95 percent confidence intervals), are given in Figure 2.

We first look at Russia. Our main finding is that non-FDI flows, particularly portfolio investment, react more strongly to macroeconomic shocks. Some of these effects are expected: A decrease in the European interest rate results in an increase in portfolio investment (and an increase in the rate would reduce it), implying that foreign capital might seek out Russia as a profitable place to invest. On the other hand, the effect on FDI is small, but becomes positive after about a year. This suggests that Russian FDI is more strongly determined by structural and institutional factors, rather than simply the interest rate.

The three types of flow clearly seem to behave differently with regard to monetary shocks. Portfolio investment sees a decrease a few months after an increase in the domestic money supply. Investors may be withdrawing these short-term investments as inflation or deterioration in the Russian economy becomes apparent. At the same time, FDI and Other investment increase after a positive monetary shock, but to a lesser degree.

Income shocks appear to have an influence on all types of investment, but again, the effects on non-FDI are stronger. Foreign shocks reduce FDI, suggesting that people in other countries may be choosing to save the gains from increased productivity, or invest them at home, rather than make long-term investments in Russia. On the other hand, portfolio investment increases after such an income shock. This again highlights the differences between “hot” money and FDI, and the fact that foreigners might make more short-term investments after they experience growth in their own economies. Investors may be less willing to commit to long-term projects in Russia.

**Table 1.** Phillips-Perron Stationarity Tests.

Country		<i>Real (GDP Deflator)</i>		<i>Share of GDP</i>	
		Level	1st Diff.	Level	1st Diff.
<b>Russia</b>	FDI	-2.839	-14.369	-3.904	-15.043
	PORT	-5.922	-14.419	-5.512	-13.454
	OTHER	-4.244	-14.825	-5.464	-15.475
	M	1.227	-7.348		
	Y	1.182	-5.251		
<b>Ukraine</b>	FDI	-4.984	-14.002	-5.472	-14.013
	PORT	-5.79	-16.272	-6.513	-16.708
	OTHER	-1.737	-9.274	-2.837	-11.342
	M	-0.329	-6.203		
	Y	0.414	-7.183		
<b>Belarus</b>	FDI	-3.664	-16.258	-4.483	-13.748
	PORT	-5.673	-11.759	-5.566	-11.979
	OTHER	-4.937	-12.48	-5.29	-12.922
	M	0.285	-7.637		
	Y	0.87	-6.503		
<b>Germany</b>	r*	-1.304	-5.065		
	Y*	-2.441	-3.641		

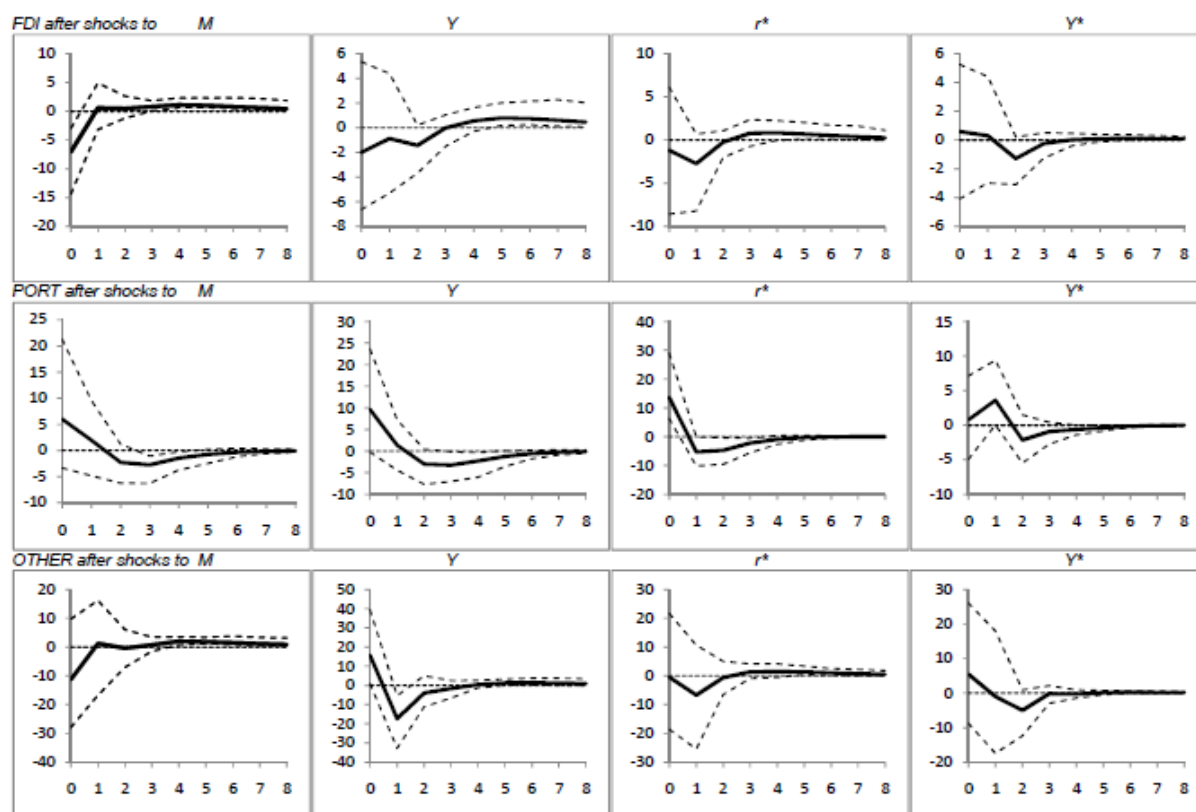
Critical Values: -3.60, -2.90, and -2.60 at 1, 5, and 10 percent, respectively.

The differences among flow types hold for domestic income shocks as well. Growth in Russia reduces all three types of net capital flows in the short term. Portfolio investment experiences a sustained

and significant reduction, which could represent a capital outflow to havens abroad. FDI, however, registers a significantly positive effect after a year. This again suggests that investors are less willing to undertake FDI in Russia; only sustained growth might encourage them to do so.

In Ukraine, however, the effects of these variables are weaker for all flow types. The foreign interest rate has little effect, except on FDI, which responds positively to an interest-rate increase. This finding is difficult to explain, but it is plausible that the “wealth effect” is responsible. The only other significant effect of note is that of domestic monetary shocks, which tend to reduce FDI. This is highly plausible, since Ukraine’s experience with inflation will make investors less confident in the country’s prospects for macroeconomic stability. This Ukraine’s local macroeconomic environment plays more of a leading role in attracting foreign capital than was the case in Russia, and that the country’s relative financial isolation makes it less sensitive to global shocks in general.

**Figure 2a:** Structural VAR Impulse-Response Functions (With  $\pm 1.96$  S.E. Bands), Russia.

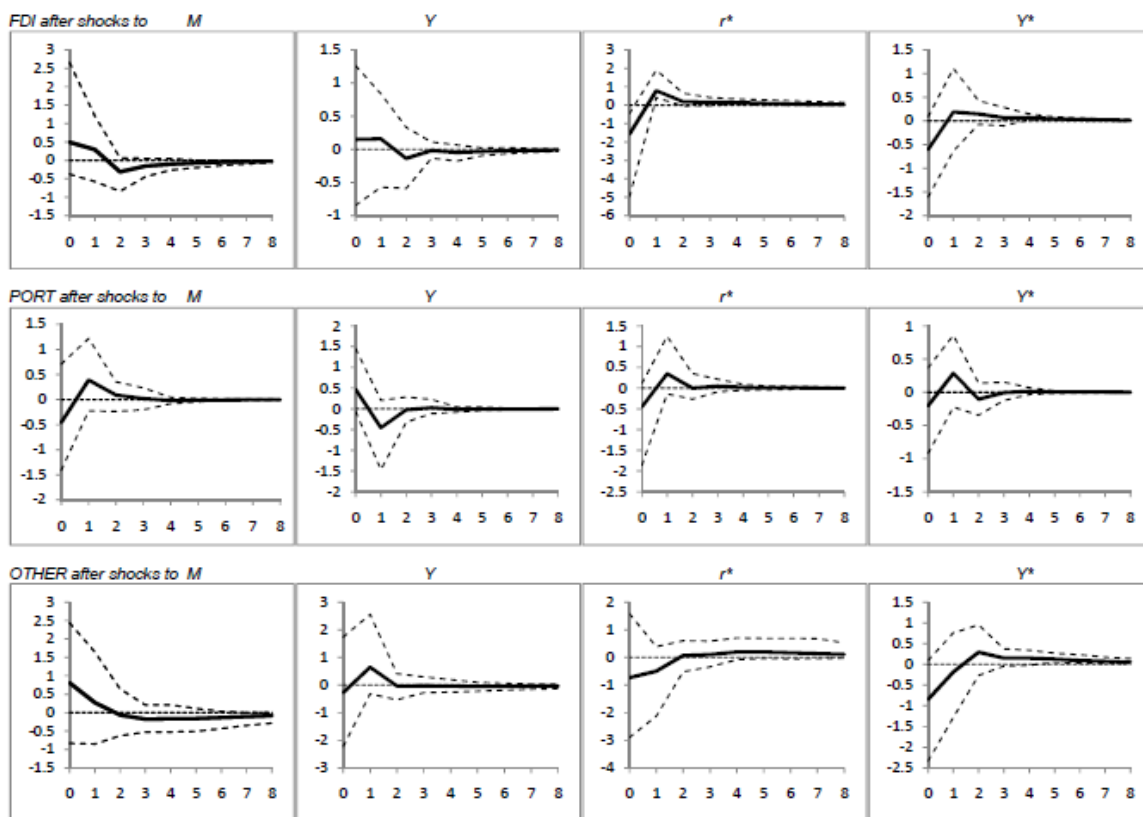


Belarus shows a stronger response to these shocks. Two key results are noted: First, FDI increases after a decrease in the foreign interest rate, while Other investment goes the other direction, and portfolio investment is not affected. Belarus’ relatively closed economy means that “hot money” (other than lending) is not drawn in as with Russia. Second, FDI responds negatively to a domestic income increase, while portfolio investment registers a positive effect. The small size of these flows make these results

more difficult to interpret, but this hints at the role of domestic macroeconomic factors (including investor confidence) driving investment in Belarus. Improving economic fundamentals might be more influential in attracting capital into Belarus than are more traditional factors such as returns on investment.

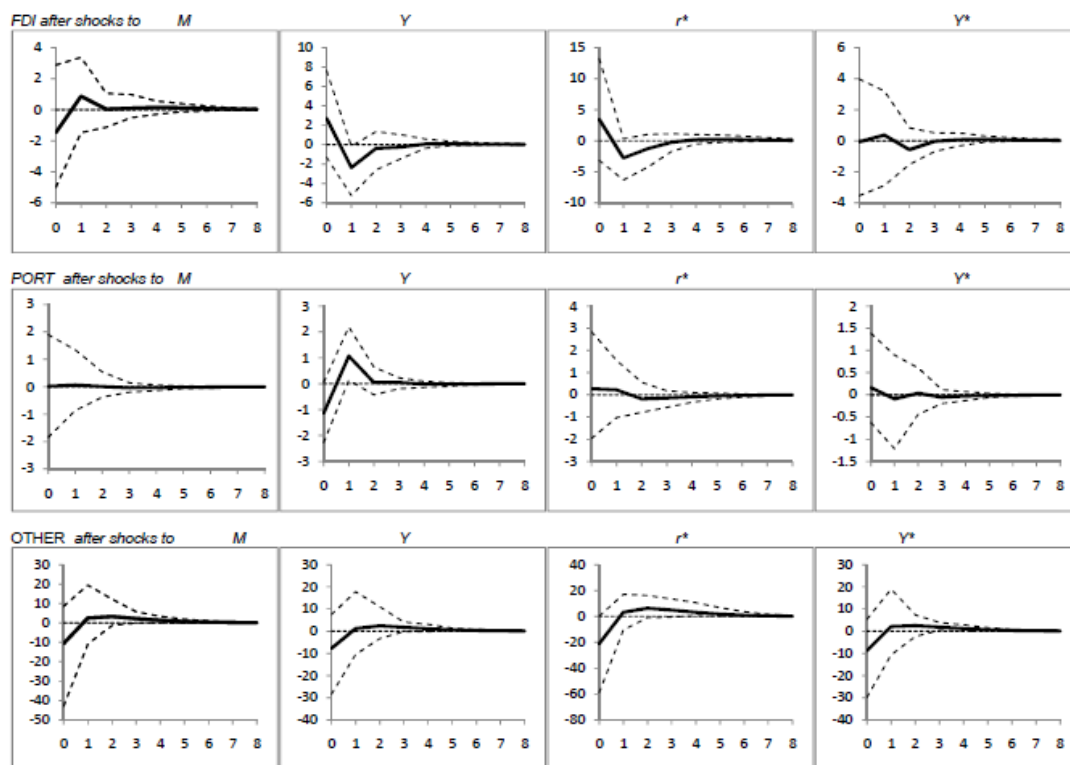
To further assess the influence of each variable, we turn to the forecast error variance decompositions (FEVDs) for the flows in each SVAR. They are reported in Table 2 at one and four quarters. In general, they confirm many of the conclusions from our impulse-response analysis; they also show that the contributions of many of these variables are time-varying.

**Figure 2b:** Structural VAR Impulse-Response Functions (With  $\pm 1.96$  S.E. Bands), Ukraine.



The foreign interest rate makes a large contribution to the forecast error of Russian portfolio investment—this value is as large as 18 percent after four quarters. Domestic income also makes a large contribution to Russian portfolio and Other investment (about nine percent). These results further suggest that investment inflows are helped by relatively high interest rates, while income growth (a domestic factor) might prompt capital (out)flows. In Ukraine, most of the variance of the flows is from the flows themselves, with one main exception: that of  $r^*$  on FDI. This matches the key result from the IRFs. In Belarus, the foreign interest rate has a fairly large effect on Other investment, as well as a lesser effect on FDI. In addition, domestic income is a contributing factor in net portfolio flows, corroborating the idea that economic growth in Belarus helps make the country a more attractive place to invest.

**Figure 2c:** Structural VAR Impulse-Response Functions (With  $\pm 1.96$  S.E. Bands), Belarus.



**Table 2. Forecast Error Variance Decompositions.**

<i>Russia</i>								<i>Ukraine</i>							
<i>FDI</i>	<i>Other</i>	<i>Port</i>	<i>FDI</i>	<i>M</i>	<i>Y</i>	<i>r*</i>	<i>Y*</i>	<i>FDI</i>	<i>Oth</i>	<i>Port</i>	<i>FDI</i>	<i>M</i>	<i>Y</i>	<i>r*</i>	<i>Y*</i>
1	0.35	0.01	0.52	0.10	0.01	0.00	0.00	1	0.18	0.00	0.62	0.02	0.00	0.16	0.02
4	0.54	0.01	0.36	0.06	0.01	0.01	0.00	4	0.29	0.01	0.50	0.02	0.00	0.16	0.02
<i>Portfolio</i>								<i>Portfolio</i>							
1	0.01	0.69	0.02	0.03	0.08	0.17	0.00	1	0.01	0.69	0.02	0.03	0.08	0.17	0.00
4	0.01	0.66	0.02	0.04	0.08	0.18	0.01	4	0.01	0.66	0.02	0.04	0.08	0.18	0.01
<i>Other</i>								<i>Other</i>							
1	0.53	0.02	0.36	0.03	0.06	0.00	0.01	1	0.53	0.02	0.36	0.03	0.06	0.00	0.01
4	0.55	0.02	0.30	0.02	0.09	0.01	0.01	4	0.55	0.02	0.30	0.02	0.09	0.01	0.01
<i>Belarus</i>															
<i>FDI</i>	<i>Other</i>	<i>Port</i>	<i>FDI</i>	<i>M</i>	<i>Y</i>	<i>r*</i>	<i>Y*</i>								
1	0.35	0.01	0.52	0.10	0.01	0.00	0.00								
4	0.54	0.01	0.36	0.06	0.01	0.01	0.00								
<i>Portfolio</i>															
1	0.01	0.69	0.02	0.03	0.08	0.17	0.00								
4	0.01	0.66	0.02	0.04	0.08	0.18	0.01								
<i>Other</i>															
1	0.53	0.02	0.36	0.03	0.06	0.00	0.01								
4	0.55	0.02	0.30	0.02	0.09	0.01	0.01								



Overall, we find that the IRFs and FEVDs support the same conclusions. Each country—and each flow—responds to different macroeconomic “push” and “pull” factors. Russia, with the largest flows in dollar terms, sees outflows of all types of capital after a domestic income increase. Increases in the foreign interest rate, however, make Russia a more attractive destination for portfolio investment. Russian income shocks also have an effect on its capital flows. In addition, while Ukraine shows comparatively little response to the main macroeconomic determinants, Belarus might see its relatively small capital inflows increase if its macroeconomic fundamentals—particularly economic growth—improve.

## CONCLUSION

While not as attractive as some other emerging markets, the former Soviet republics of Russia, Ukraine, and Belarus have drawn in a growing amount of foreign capital in recent years. Since these flows can be highly destabilizing, it is important to study their macroeconomic determinants, and responses to foreign and domestic shocks. Since the underlying theory suggests that the effects of these shocks can be either positive or negative, they must be studied empirically.

This study examines quarterly time series of each country’s FDI, portfolio, and Other investment, from 1995 to 2008, and finds that each country and each flow do indeed respond differently from one another. The flow series are placed in a Structural VAR model that was introduced by Ying and Kim (2001). Applying an appropriate set of long-run restrictions, the flows are modeled as functions of domestic monetary and income shocks, as well as foreign interest-rate and income shocks.

Impulse responses and variance decompositions uncover certain key results. First, a distinction must be made between portfolio investment and FDI flows. Second, the impact of macroeconomic shocks can vary over time. Finally, each country shows a unique response for each type of flow. Many of these effects are surprising, but can explain specific issues within each country.

In Russia, for example, certain flows follow what might be expected intuitively. Portfolio investment responds positively to a decrease in European interest rates, suggesting that investors are attracted to a higher rate of return. At the same time, they also increase along with increased foreign income, suggesting that foreigners are choosing to invest this income abroad. On the other hand, these flows decrease after a positive shock to home income. This implies that capital flight is indeed an issue, particularly if Russia continues its recent growth. The differences between the flow types support the “hot money” hypothesis: FDI responds only to income shocks—but only weakly, and temporarily after about two quarters.

The other two countries show unique responses as well, both with regard to the other countries’ results and across each type of flow. Ukraine registers very little response for any flow, perhaps due to the fact that it is not yet very well integrated with Western Europe. Belarus might see portfolio inflows increase as a result of economic growth, but this effect does not hold for FDI. As a result, further studies of these countries’ capital accounts, now that sufficient time series are available, should take care to pay attention to the country-specific differences between “hot” portfolio flows and FDI.

These results have important policy conclusions. First of all, the region should be aware of the fragility of capital inflows and the possibility of a damaging outflow—but this potential is greater for Russia, and for non-FDI investment. Secondly, this study underscores the fact that these countries cannot be considered a homogenous unit. While Russian investment most closely patterns the “typical” pattern by which foreign capital seeks the highest rate of return, Belarus’ closed economy and Ukraine’s experiences with partial reform and hyperinflation mean that their capital inflows are driven more by local determinants rather than global ones.

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**APPENDIX: DATA SOURCES AND DEFINITIONS**

All data are taken from the International Financial Statistics of the IMF. Quarterly GDP series are seasonally adjusted using the Census X-12 procedure. The data spans for the estimations are as follows (difference terms are constructed using data beginning in the previous quarter):

Russia: 1995q2-2008q4; Ukraine: 1996q3-2008q4; Belarus: 1997q1-2008q4

Net capital flows are measured in shares of GDP for each country. They include net FDI (inward minus outward), as well as portfolio and Other investment (liabilities minus assets). These are taken from the Balance of Payments section of the IFS database. As a secondary measure, net flows (in local currency) are also deflated by each country's GDP deflator (2005 = 100).

The explanatory variables are as follows:

$M$  = domestic M2, divided by the country's GDP deflator (in logs)

$Y$  = domestic real GDP (in logs)

$r^*$  = Euro Area Interbank Rate

$Y^*$  = German real GDP (in logs)

In the SVAR, all explanatory variables are entered in first differences.