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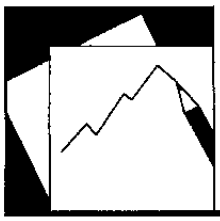

IMF Working Paper

What Moves Capital to Transition Economies?

Pietro Garibaldi, Nada Mora,
Ratna Sahay, and Jeromin Zettelmeyer

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Research Department

What Moves Capital to Transition Economies? [1]

Prepared by Pietro Garibaldi, Nada Mora, Ratna Sahay,
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Abstract

Between 1991 and 1999, capital flows to 25 transition economies in Europe and the former Soviet Union differed widely in terms of overall levels and the share and composition of private flows. With some exceptions (notably Russia), the main form of private inflows was foreign direct investment. Portfolio investment was volatile and concentrated in a handful of countries. Regressions show that direct investment can be well explained in terms of economic fundamentals, whereas the presence of a financial market infrastructure and a property-rights indicator are the only explanatory variables that seem to have had a robust effect on portfolio investment.

JEL Classification Numbers: F21, F32, F36, P20, P50

Keywords: Transition economies, capital flows, foreign direct investment, portfolio investment

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[1] A shorter version of this paper is forthcoming in *IMF Staff Papers*, Vol. 48, Transition Issue, 2002; earlier drafts were presented at a conference on "A Decade of Transition: Achievements and Challenges" held at the IMF in February 1999 and at the 1999 European Economic Association Annual Conference. We are grateful to John Cuddington, conference participants and seminar participants at the IMF, and particularly Oleh Havrylyshyn for comments and suggestions. Research assistance by Grace Juhn and Haiyan Shi is greatfully acknowledged.

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I. INTRODUCTION

Cross-border capital flows are an important part of the transition story. Access to external financing determines the size of the current account deficit that a country can run when it is reorienting its production and consumption structures and rebuilding its capital stock. So, there may be a link between the ability to attract capital inflows and the speed of transition. Moreover, the composition of capital flows likely affects how much they are associated with the transmission of know-how and changes in corporate governance, and the degree to which they are subject to sudden reversals. Finally, the magnitude, composition, and stability of capital flows during transition may be indicative of broader aspects of the transition process. How long did the economy rely mainly on official and exceptional financing, such as debt rescheduling? How large and volatile were portfolio inflows? What was the role of private inflows other than FDI and portfolio investment?

The objective of this paper is twofold. First, it seeks to document the magnitude and composition of capital flows to the transition economies of Central and Eastern Europe and the former Soviet Union from the early 1990s until 1999. We describe the main trends in time as well as cross-sectional variation between the main regions, and within regions. We particularly highlight cross-country heterogeneity in the behavior of (foreign) direct investment and portfolio investment, which played an important role in many countries as a source of financing and—in the case of portfolio investment—as a source of macroeconomic volatility. We then explore to what extent *inward* direct investment and portfolio investment flows in time and across countries can be accounted for using individual country characteristics and some common controls. The narrow focus on inward direct investment and portfolio investment (as opposed to a broader capital flows concept) enables us to interpret the empirical regularities we find in terms of the behavior of private foreign investors.

Existing analyses of aggregate capital flows to transition economies concentrate primarily on the determinants and effects of foreign direct investment flows to Central and Eastern Europe (see in particular Lansbury, Paine, and Smidkova, 1996; Holland and Paine, 1998; Brenton, di Mauro, and Lücke, 1999; and Bevan and Estrin, 2000). This study takes a broader view, characterizing capital flows more generally and exploring a wide range of potential determinants of both direct investment and portfolio investment in a larger sample of 25 transition economies that include the countries of the former Soviet Union. To our knowledge, the only study that adopts a similar perspective is Claessens, Oks, and Polastri, 1998, which analyzes capital flows for 21 transition economies until 1996. Claessens, Oks, and Polastri provide more qualitative and descriptive country information than we do, particularly on the early transition years, and run some regressions for broader capital-flow aggregates in addition to foreign direct and portfolio investment. Our paper analyzes in more detail the heterogeneity of levels and composition of capital flows to transition economies in quantitative terms, and covers three more years of data.[2] In view of the relatively large dataset, we are able to consider a wider range of potential explanatory variables for direct

[2] For a survey of the recent past, see also the EBRD's *Transition Report 2000*, which emphasizes developments during 1999–2000.

investment and portfolio investment flows than the earlier literature, and use standard specification search techniques to arrive at a parsimonious model rather than assuming a small number of potential determinants from the outset.

In addition, this paper contains some new data work. We build on the direct investment and portfolio investment data published in the IMF's 2000 *Balance of Payment Statistics Yearbook* by extending it for the earlier years and filling in the missing values using information from other sources, including IMF desk economists. To control for direct legal restrictions to both direct investment and portfolio investment flows in our regressions, we also created indices of direct investment and portfolio investment restrictions based on qualitative information recorded in the IMF's *Annual Report on Exchange Arrangements and Exchange Restrictions*.

The paper highlights both the quantitative importance of capital flows to transition economies as a group—which, since about 1993, have been higher than the average flows to other emerging market economies—and the high degree of heterogeneity across the transition countries. Foreign direct investment was generally the most important source of private capital, but portfolio investment also played a major role in a handful of countries, as did bank lending. Russia stands out as a special case in many respects: in spite of substantial official financing, it was a net exporter of capital over the period we study, and until 1998 it attracted much more portfolio investment than foreign direct investment. The regression results show that the cross-country pattern of foreign direct investment can be explained reasonably well by standard macroeconomic fundamentals, including institutional indicators. However, we find that it is much harder to "explain" the behavior of portfolio investment.

II. Capital Flows to Transition Economies: The Main Facts

This section presents the main stylized facts regarding the overall level, trends, and composition of net capital inflows to transition economies. By "net capital inflows" we mean all recorded net inflows that lead to a net liability vis-à-vis foreign residents.[3] This includes all capital flows, both official and private, except those based on current transactions, transfers, and unrecorded flows (which would be classified as "errors and omissions.") Net capital inflows are disaggregated on the basis of the analytical presentation of the balance of payments suggested in the *Balance of Payments Statistics Yearbook 2000* (Part 1, p. xi), into five categories: (foreign) direct investment, portfolio investment, other investment, use of IMF credit and loans, and exceptional financing. Exceptional financing comprises debt forgiveness and arrears accumulation. Portfolio investment includes investment in both debt and equity securities below a certain threshold (usually 10–20 percent of total equity; above that threshold, the transaction would be considered a direct investment). "Other" investment is a broad category including trade credits, deposits, and loans. Direct investment and portfolio investment are virtually all private. Other investment is mainly private, but also

[3] In the standard classification of the balance of payments (see IMF, *Balance of Payments Statistics Yearbook 2000*, Part 1), this is equal to the balance on the financial account minus changes in reserve assets.

includes non-IMF official loans. We first present the main facts on the level and composition of capital flows for transition economies as a whole and their main subgroups, and then look at the cross-country distribution of direct investment and portfolio flows.

A. Level and Composition of Flows to Transition Economies

A broad comparison of capital flows to transition economies with flows to other emerging markets and developing countries is presented in Figure 1. Even at this level of aggregation, we show flows to Russia separately, given the size of its economy (30–40 percent of the transition group, in terms of both GDP and population) and the fact that it is quite atypical, as we shall see. Figure 1a shows that that total net inflows to transition economies excluding Russia have been consistently above both the overall developing country average and the average to Latin America and Southeast Asia since 1995.[4] Net flows to Russia have been consistently smaller, reflecting in part Russia's current account surpluses over the period.

The lower two panels of Figure 1 show the two main items of private capital flows that are the focus of this paper: direct investment and portfolio investment. Direct investment exhibits a similar pattern across country groups, with the exception of Russia. Not counting Russia, direct investment inflows into transition economies are high, somewhat higher than in other emerging markets, and followed a sharply rising trend (even as a percentage of GDP). In Russia, net direct investment inflows were much smaller, and direct investment in dollar levels fell in 1998 and 1999; however, this was more than offset by the sharp reduction in dollar GDP (by over 30 percent) resulting from the 1998 devaluation.

Before 1997, portfolio investments to transition economies excluding Russia were generally below the international average. Since then, they have been about average or slightly above average—that is, transition economies other than Russia seem to have been somewhat less affected by the post-1997 contraction in emerging market financing. In the case of Russia, there were no inflows until 1995 followed by a sharp bubble that peaked in the first half of 1998, and was followed by outflows after the August crisis. Since annual inflows for 1998 are an average of pre-crisis outflows, the peak shows in 1997 in the annual data.

Moving to a more disaggregated picture of capital flows to transition economies, Figure 2 looks at total flows and the composition of flows for five groups of coutries: Central and Eastern Europe ("CEE," comprising Czech Republic, Hungary, Poland, Slovak Republic and Slovenia); Southeastern Europe ("SEE," comprising Albania, Bulgaria, Romania, and Croatia—unfortunately the former Yuogoslav Republic of Macedonia, Bosnia and Herzegovina, and Yugoslavia had to be excluded owing to data incompleteness), the three Baltic countries, Russia, and the remaining countries of the Former Soviet Union (other

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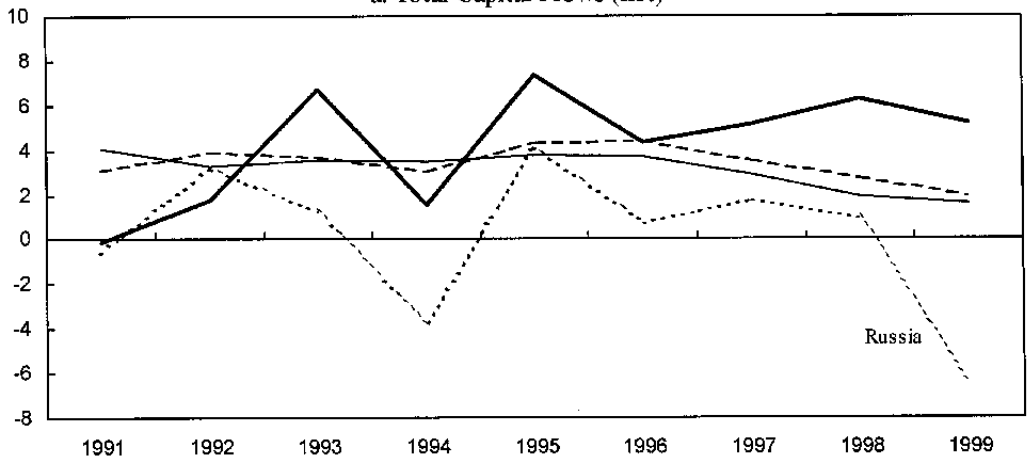
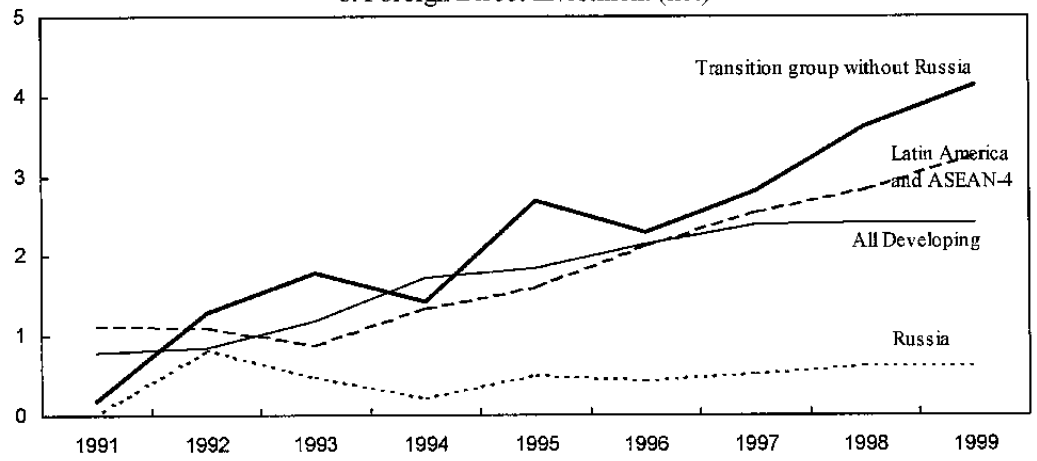
[4] By "total net capital inflows" we mean all recorded net inflows that lead to a net liability vis-à-vis foreign residents. In the standard classification of the balance of payments (see IMF, *Balance of Payments Statistics Yearbook*) this is equal to the balance on the financial account minus net changes in reserve assets. This definition excludes unrecorded flows (which are part of "net errors and omissions") and capital transfers, but is otherwise very broad; in particular, it includes some forms of exceptional financing (such as arrears accumulation) as well as lending by the IMF and other official creditors.

Figure 1. Capital Flows by Region, 1991–99
(In percent of GDP, annual data)

a. Total Capital Flows (net)



b. Foreign Direct Investment (net)



c. Portfolio Investment (net)

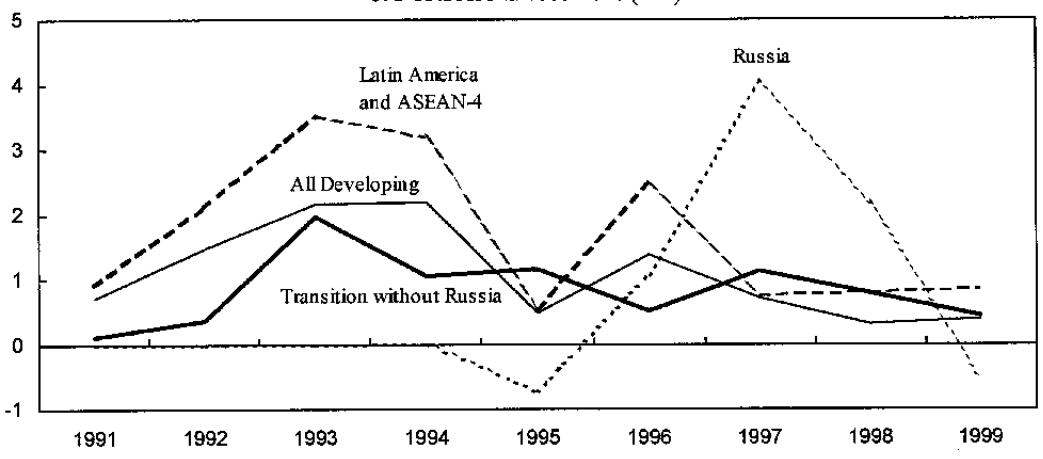
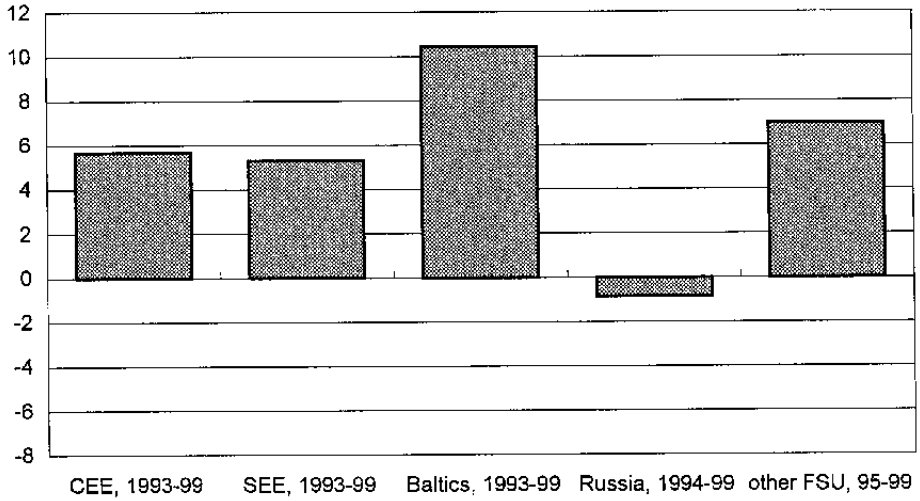
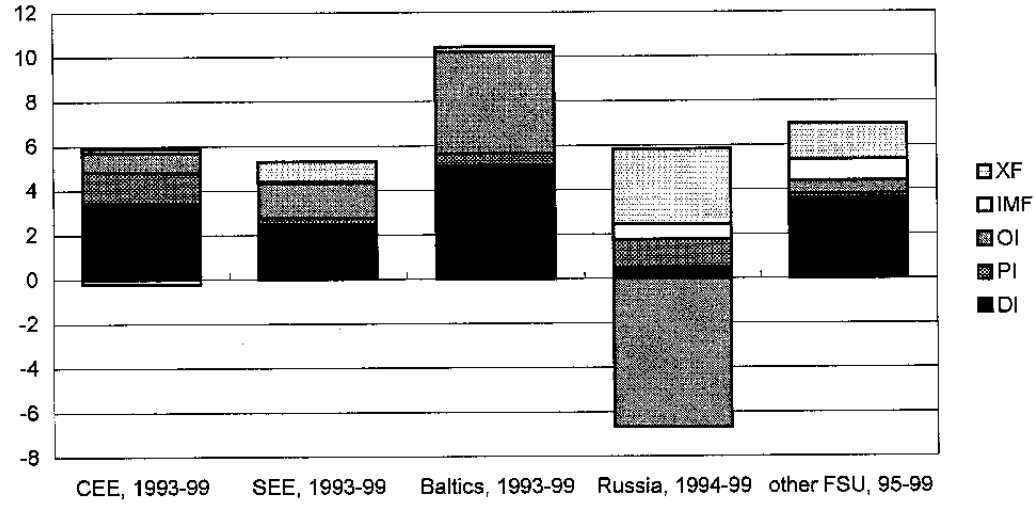


Figure 2. Total Capital Flows (Net), by Region
(In percent of GDP in the same period)

a. Total flows



b. Composition of Flows



Source: *International Financial Statistics*, and authors' calculations.
Notes: DI stands for direct investment, PI for portfolio investment, OI for other investment, IMF for use of IMF credits and loans, and XF for exceptional financing.

FSU). We show net inflows over the longest transition period consistent with stable group membership. Because of missing data, particularly in the early transition years, this leads to slightly different starting periods for each group.[5] However, the findings of the figure are quite robust to changes in the definition of the time window; in particular, they would not be affected by either choosing the same period in calendar time (1995–99) or in transition time (say, 1993–97 for Central, Eastern, and Southeastern Europe, and 1995–99 for the others).[6]

The figure shows stark differences in both the levels and the composition of capital flows to the region. The Baltic countries received by far the largest inflows as a percentage of GDP (and also per capita) terms over the period. These inflows consisted mostly of direct investment and "other investment," in about equal proportion; the latter refers mainly to private lending to banks and corporations. CEE, SEE, and the other FSU (other than Russia) come second. In GDP terms, the other FSU received slightly higher total inflows, while CEE received higher private inflows (the sum of direct investment, portfolio investment, and other investment) than both SEE and the other FSU. In both dollar and per capita terms, however (not shown), net inflows were much smaller in the other FSU, reflecting, in part, their lower levels of development.

Note also the differences in the composition of flows across the three country groups. In CEE, the main source of net inflows was direct investment, followed by sizable portfolio investment and other investment (mostly private lending). IMF financing was actually negative over the period, reflecting the repayment of loans prior to 1993, and there was almost no "exceptional financing." In SEE, there were almost no net portfolio inflows, and both direct investment and other investment were important sources of private financing. In the other FSU, finally, almost all private inflows took the form of direct investment, with very little private lending and almost no net portfolio investment (as we shall see in the next figure, there were some portfolio investment inflows prior to the 1998 crisis, but they are offset by outflows after the crisis). Instead, the bulk of nondirect investment financing was official lending, primarily by the IMF and the World Bank, and "exceptional financing," which comprises increases in external arrears (mainly to Russia and other energy exporters such as Turkmenistan) and debt reschedulings. Debt reschedulings also played an important role in SEE Europe.

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[5] Because of lack of data, the "other FSU" group excludes four countries: Georgia, Tajikistan, Turkmenistan, and Uzbekistan.

[6] The source of the data in Figures 2 and 3 is the IMF's 2000 *Balance of Payments Yearbook* (analytical presentation), or equivalently, the *International Financial Statistics*. This data has the advantage of being consistently compiled, but the disadvantage of containing major gaps in coverage. For this reason, in the first (February 1999) draft of this paper, which considered annual data until 1997, data was obtained directly from IMF desk economists for the purposes of this overview. By the time we revised the paper, we felt that the coverage of the IFS had sufficiently improved to warrant switching to that source, which has the advantage of being public. This said, large gaps remain, particularly for the earlier transition years. These gaps are not an issue in Figures 1b and 1c and also in our regressions, which use longer series for direct and portfolio investments compiled from several sources (see below).

Figure 2 shows again that Russia is highly unusual, in several respects. First, it is unique in experiencing cumulative net *outflows* over 1994–99. Given its status as a large commodities exporter, this is not in itself surprising. The "errors and omissions," in Russia's balance of payments were consistently negative and large (since 1995, about 2.5 percent of GDP on average). If "errors and omissions," which often reflect some form of capital flight that have not been officially recorded, were to be included in the definition of capital flows, net capital outflows from Russia would be even larger. Second, and perhaps more surprisingly, foreign direct investment was comparatively small. On a cumulative basis, it was overshadowed by substantial net *portfolio* inflows, large "exceptional financing" (debt reschedulings and increases in arrears), and even IMF loans. However, all these financing items together were *more than offset* by very large outflows of "other" investment, mostly of the private sector. This is usually interpreted as capital flight.[7]

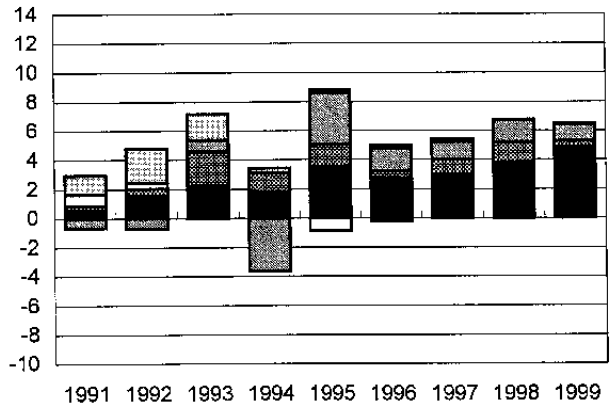
Figure 3 presents the composition of flows at each point in time. Data for 1991 and 1992 for the CEE and SEE groups have been added since they were available for these groups (except for Croatia, where data begins in 1993). Direct investment as a share of GDP followed an upward trend in all country groups except for Russia. Given the experience of positive growth in most transition economies following the initial "transitional recession," this implies a much sharper trend in dollar levels of direct investment, or in direct investment per capita. The figure also shows the "bubble" in portfolio investment in Russia, the "other FSU" countries and, to a lesser extent, SEE prior to the 1998 crash. In 1998 itself, net portfolio investment was still large and positive in Russia, as precrisis inflows were not completely offset by the post-August collapse, but already negative in the "other FSU" group. In 1999, however, it was negative in both cases.

Figure 3 also illustrates the changing role of exceptional financing and IMF lending. With one exception—Bulgaria, which received large IMF financing in 1997 in connection with a successful exchange-rate based stabilization program—the role of IMF lending as a significant net source of financing in Central and Eastern Europe, Southeastern Europe, and the Baltic countries was limited to the first years of transition (up to 1992 for Central and Eastern Europe, reflecting Polish debt restructuring, 1994 for Southeastern Europe, and 1995 for the Baltics). In Russia and the other countries of the former Soviet Union, however, it remained significant until 1998. "Exceptional financing" was nonexistent in the Baltics, and plays a role in the Central and Eastern Europe only in the early years (up to, and including 1993). Southeastern Europe is an intermediate case, with exceptional financing on a declining path, but still exceeding 1 percent of GDP on average until 1996, and remaining at close to 0.4 percent of GDP since then. In Russia and the other countries of the former Soviet Uniion, exceptional financing was important thoroughout the period. While it seems to have been on a declining path until 1997, it jumped back in the aftermath of the Russian crisis of 1998.

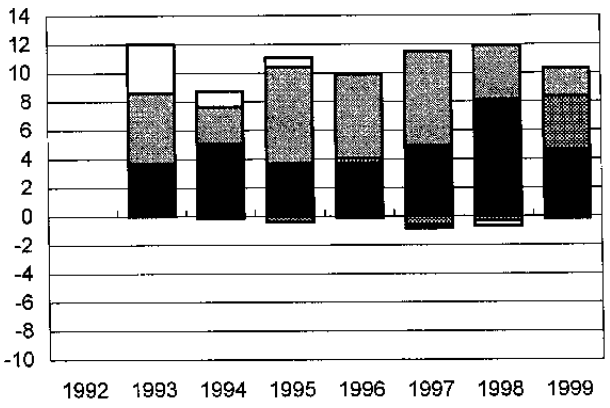
[7] See Loungani and Mauro (2000).

Figure 3. Composition of Capital Flows (Net), by Region and Over Time
(In percent of annual GDP)

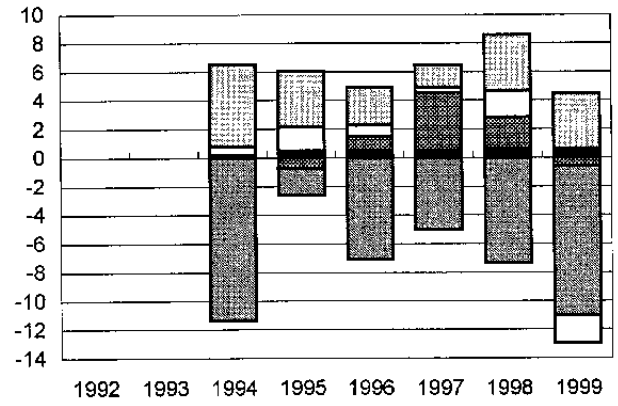
a. CEE+SEE: 1991-99



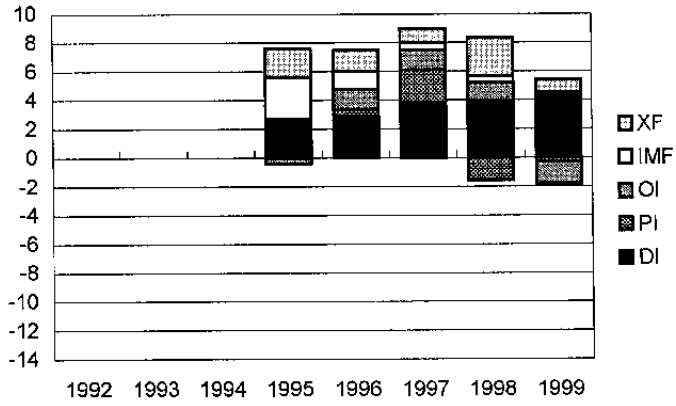
b. Baltics: 1993-99



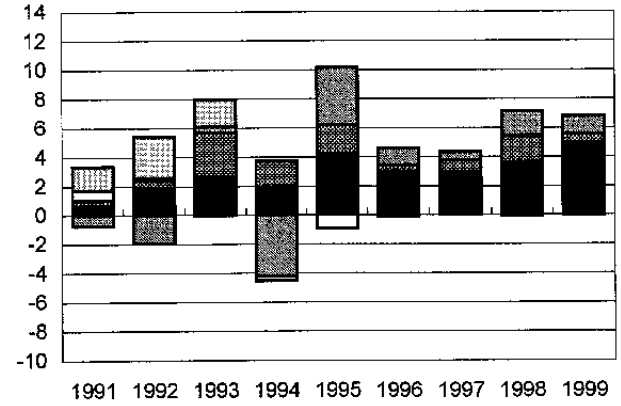
c. Russia: 1994-99



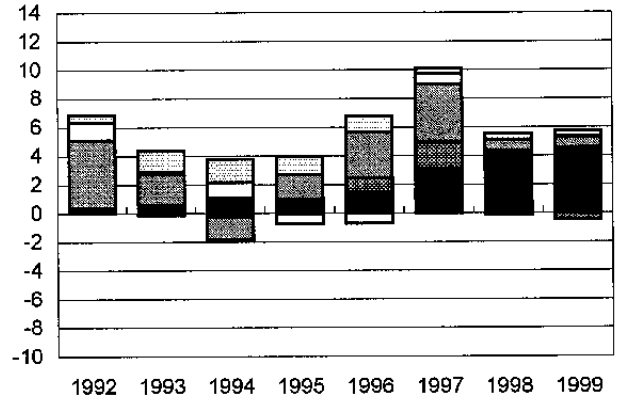
d. Other FSU: 1995-99



e. CEE: 1991-99



f. SEE: 1993-99



B. Cross-Country Distribution of Direct Investment and Portfolio Flows

In this subsection we disaggregate the two types of capital flows that are the subject of our econometric analysis in the next section—direct investment and portfolio investment. Unlike the previous subsection, which takes a net (inward plus outward) flows perspective, here we look at *inward* foreign direct investment and portfolio investment. We do this to simplify the interpretation of the results from the regression analyses, as reflecting the decisions of foreign investors. In practice, however, the inward flows and the net flows series are quite correlated, because the investments by transition economy residents abroad that were recorded as outward direct investment and portfolio investment flows are relatively small.

Note that even *inward* direct investment and portfolio investment are "net concepts" in the sense that they reflect the sum of net flows to transition economies with outflows due to the liquidation and repatriation of assets owned by foreign residents. In the period we are studying, this plays little role for inward direct investment, which is always positive or zero, but it does play an important role for inward portfolio investment, which is negative in some countries, in particular, due to outflows in 1998 and 1999 (see Figures 4 and 5, and Appendix I Table 4 for the complete series).

In addition to inward portfolio investment from the balance of payments, we also show a related concept, namely, bond, equity, and loan issues in international financial markets (Figure 6). The sum of bonds and equity overlaps with the definition of inward portfolio flows, but differs from this definition in two important respects. First, it only captures primary market issues, that is, it ignores any secondary-market activity (and thus all outflows). Second, it ignores domestic issues, which may, in part, be purchased by foreigners and thus give rise to capital inflows (as was the case, for example, with the Russian GKO issues). The main reason for reporting bond, equity, and loan issues even though the concept misses important components of portfolio investment is that we know exactly what is reported, and that it is much less likely to contain errors than the direct investment and portfolio investment data. The latter are compiled from individual country authorities, which may have weak reporting systems, particularly in the early transition years. In contrast, international issues data are collected from the major financial centers and involve no serious reporting problems. Moreover, the gross international issue series receives considerable attention from the major financial markets.

The data underlying Figures 4–5 (see Table 4 in Appendix I), is an extension of data published in the *International Financial Statistics*. Missing values, and in particular data for the earlier years, were filled in using information from IMF desk economists, the IMF's World Economic Outlook database and—for the early transition years of some Central European economies—data provided by Claessens, Oks, and Polastri (1998). The data underlying Figure 6 come from the IMF's Emerging Market Bonds, Equities and Loans database, which is used in the IMF's quarterly *Global Financial Stability Review* and a predecessor publication, *Emerging Market Financing.*

The main lesson of Figures 4–6 is that there is heterogeneity of inward direct investment and portfolio investment (we refer from now on only to inward investment), even within some of the broad country groups classified in the previous subsection. A look at the cross-country distribution of foreign direct investment (Figure 4) yields some surprises. Few would have

Figure 4. Inward Foreign Direct Investment 1992–99, by Country

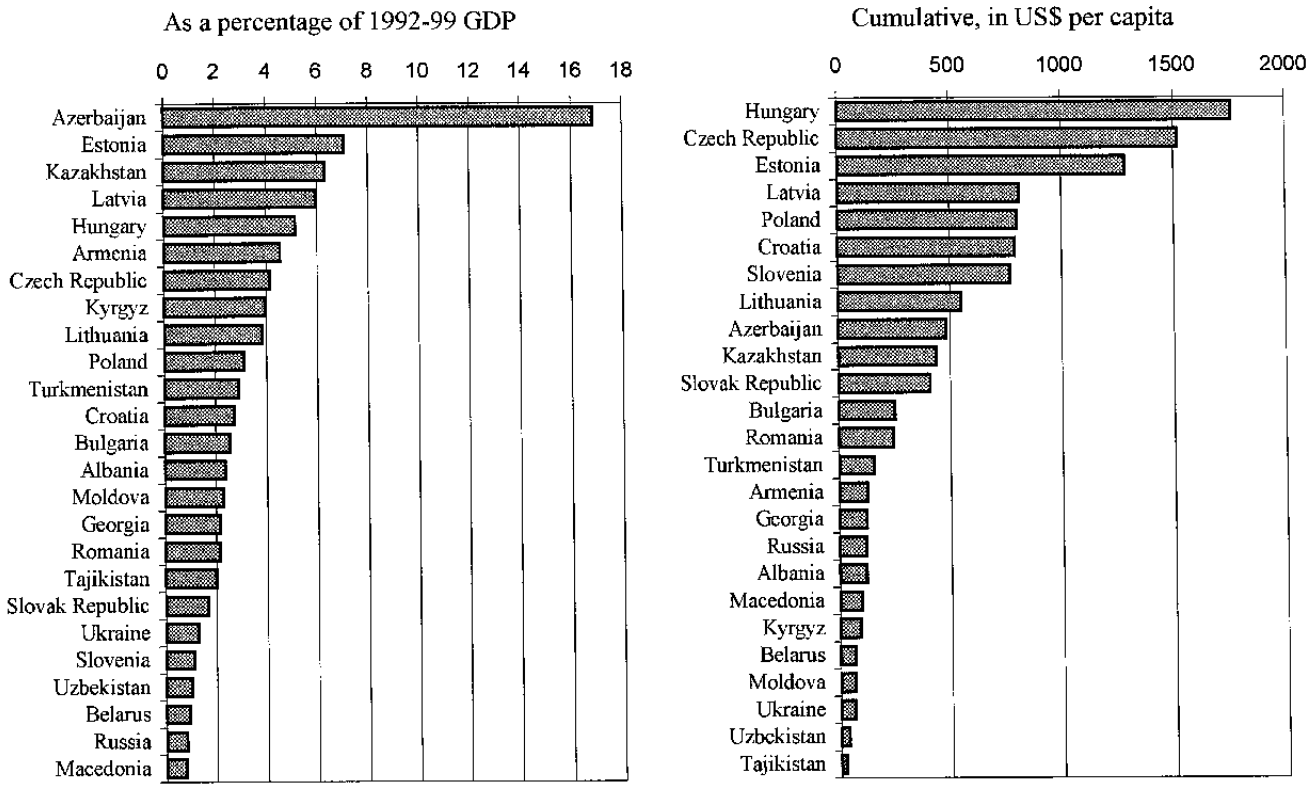


Figure 5. Portfolio Investment Liabilities 1995–99, by Country

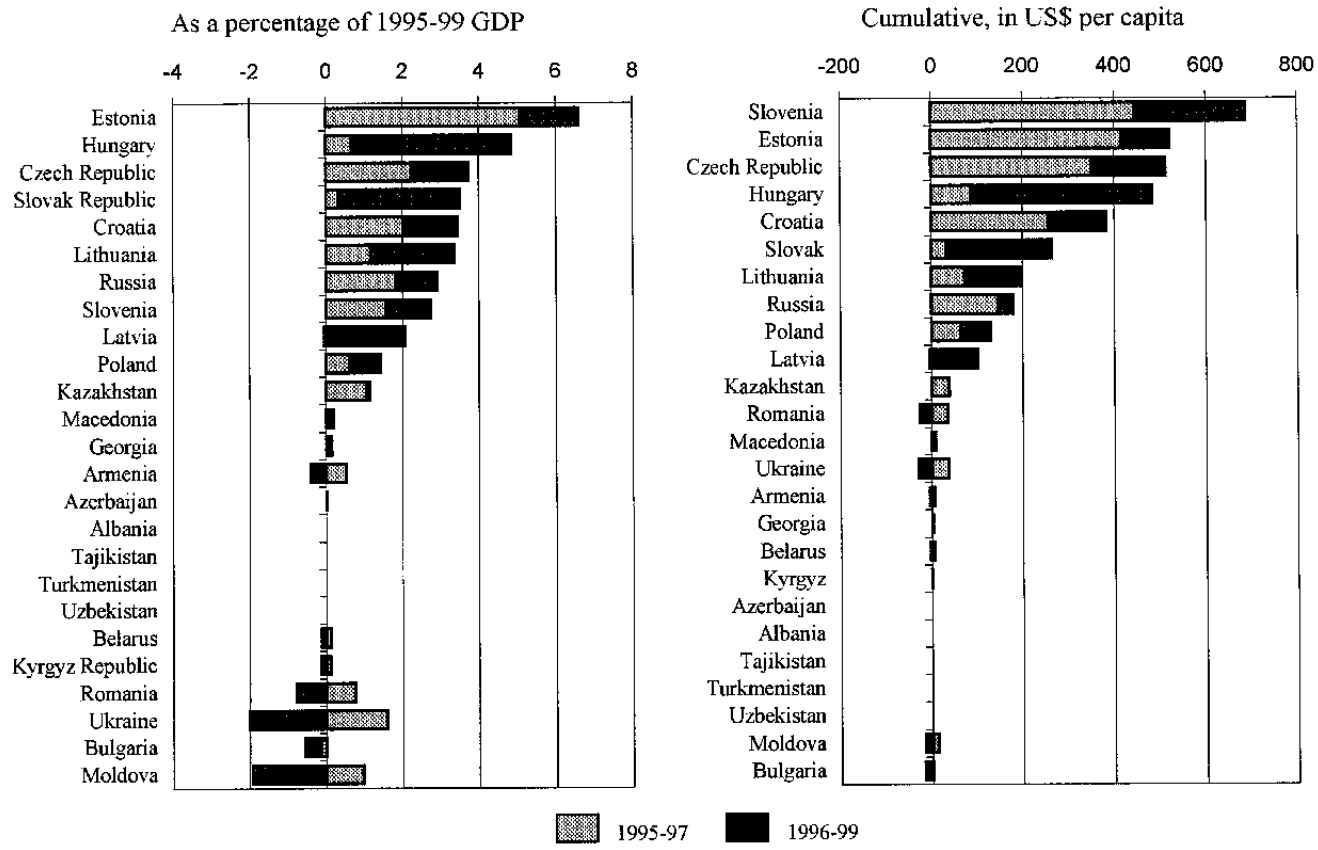
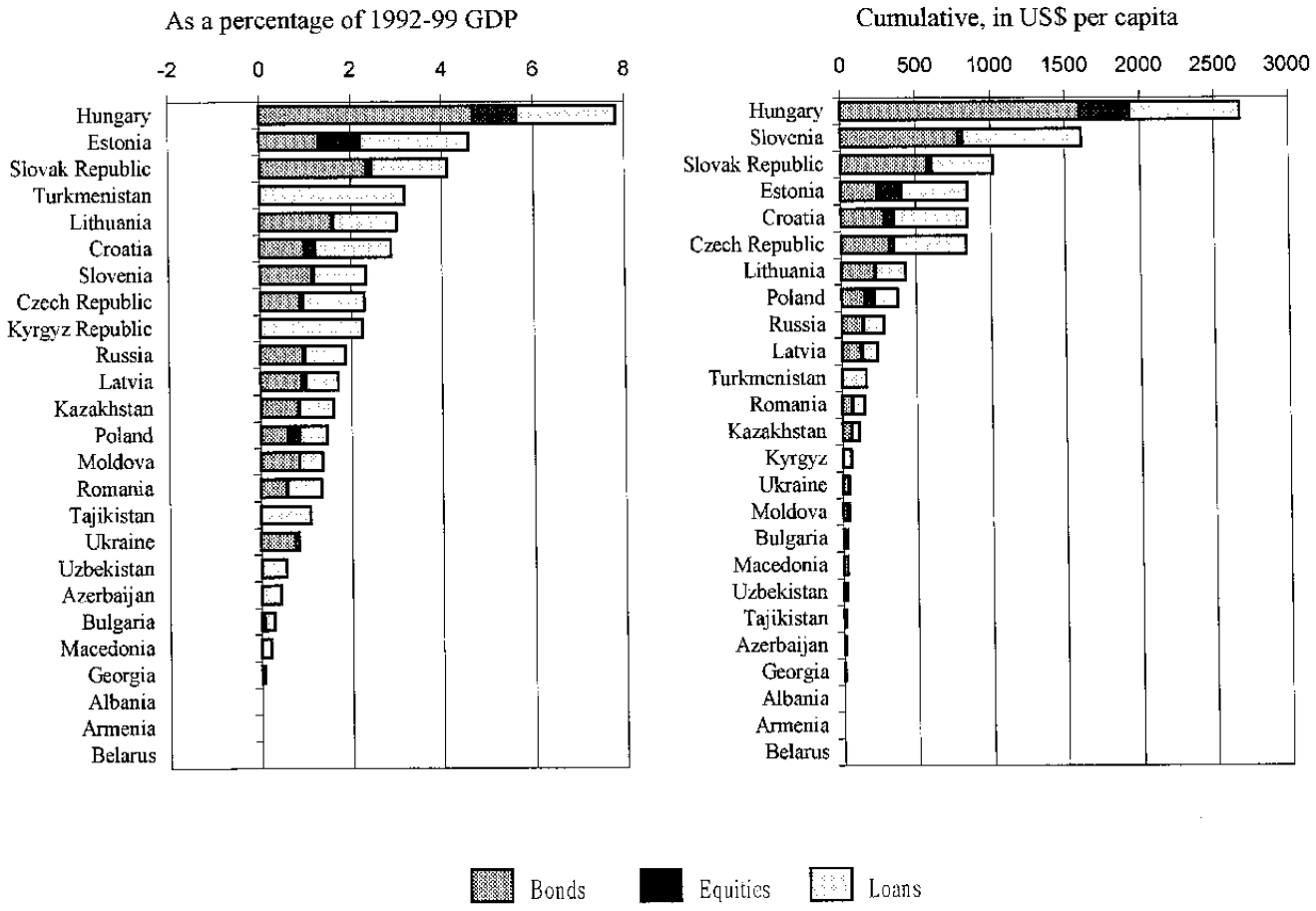


Figure 6. Bond, Equity, and Loan Issues in International Markets 1992–99, by Country



guessed that Azerbaijan, is the direct investment leader in the transition group by a large margin, when direct investment is measured as a percentage of GDP, or that Armenia edges out the Czech Republic and Poland as a recipient of direct investment as a share of GDP. In part, this truly reflects unusually high direct investment, for reasons which we will be exploring in the next subsection (for example, oil-related investments in Azerbaijan), but it may also have to do with problems with measuring (dollar) GDP. It is well known that the initial output decline may have been exaggerated in several transition countries, particularly in the former Soviet Union.[8] Perhaps more important, dollar GDP is computed using market exchange rates, which were probably strongly undervalued, particularly in the early transition years and in the countries of the Former Soviet Union.[9] For these reasons, it may be preferable to use either PPP-adjusted GDP or population to scale direct investment flows. Figure 4 shows that the choice of normalization has a significant impact on the cross-country rankings. After scaling by population, the central-eastern European countries and the Baltic countries appear as clear direct investment leaders. However, Azerbaijan and Kazakhstan are still leaders in the "other FSU" group, suggesting that natural resource endowments may be an important factor driving direct investment flows.

The portfolio investment and bond, equity, and loan issue rankings (Figures 5 and 6) are relatively less sensitive to the choice of scale variable. In both cases, the central-eastern European countries, the Baltic countries, and Russia rank ahead of others. The main surprise of Figure 5 is that the position of Russia as a top recipient of net inward portfolio investment flows over 1995–99 is not as pronounced as Figures 1–3 would perhaps have led one to believe. This is due to the fact that portfolio investment inflows to Russia were extraordinarily large during only one year, 1997, when they exceeded 4 percent of GDP. In 1995 and 1999, however, Russia suffered negative inward portfolio investment. In contrast, as Figure 3 showed, central-eastern Europe received much more sustained inflows. Similar observations apply to the bond, equity, and loan data.

III. What Moved Capital to Transition Economies? Econometric Results

Using panel data for 26 transition economies ranging from the early transition years (1990–92, depending on the country) to 1999, we explore how well potential explanatory variables account for the behavior of inward direct investment and inward portfolio investment flows. We chose these two series for two reasons: first, because they are important from a policy perspective (for example, because of their potential impact on growth and structural transformation) and second, because we have a good idea of what asset classes they contain. That is less clear in the case of wider flow concepts. The class "other investment," in particular, mixes a wide range of different types of flows, from lending by foreign banks to domestic capital flight, which makes it harder to interpret regression results.

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[8] See, among others, Berg (1993), Gavrilenkov and Koen (1994), and Kaufmann and Kaliberda (1996).

[9] See Halpern and Wyplosz (1997) and Krajnyák and Zettelmeyer (1998).

For several reasons, we decided not to include in the regression analysis the bond, equities, and loans issue series, which was discussed at the end of the previous subsection. While we know with great precision (asset by asset) what is included in this series, it would not be easy to interpret the results because primary issue flows mix decisions about the demand for capital—i.e., the decision to issue bonds, equities, or loans on the part of domestic authorities and residents—and decisions by foreign investors to supply capital. A similar identification problem exists for portfolio investment flows, but to the extent that these reflect inflows and outflows into an existing asset stock that is traded on secondary markets—as opposed to primary issues—it is not as severe a problem. At the limit, with large domestic asset markets, the supply of domestic portfolio assets would be elastic, enabling us to perfectly identify foreign demand for assets—i.e., to interpret the coefficients as reflecting foreign investor behavior. [10]

In the next subsection, we briefly review some methodological issues, including model selection and the selection of an appropriate scale variable (GDP or population). We then discuss a set of candidate explanatory variables for the regression analyses, and then we present our findings.

A. Methodology

In view of the large set of (possibly correlated) potential determinants of capital flows to transition economies, a challenge for any econometric exercise is to maintain a reasonable degree of parsimony while avoiding misspecification of the model. To deal with this, we used a general-to-specific model selection approach in the context of a dynamic panel of the form:

$$y_{i,t} = a_0 + a_1 y_{i,t-1} + \alpha(L) X_{i,t} + \beta Z_i + \varepsilon_{i,t},$$

where $y_{i,t}$ is the dependent variable (either direct investment or portfolio investment; see below), $X_{i,t}$ denotes a vector of time-varying variables, $\alpha(L)$ denotes a lag polynomial of coefficients, Z_i is a vector of initial conditions and time-invariant controls (e.g. regional dummies), and $\varepsilon_{i,t}$ is the error term. The time index denotes years since the beginning of transition, while the index i refers to countries. The advantage of this approach is that it enables us to "test down" among a reasonably large set of potential right-hand-side variables in the context of a flexible dynamic specification. This minimizes the chances of bias due to omitted variables and inappropriate dynamic restrictions. In practice, the initial lag length was limited to one or two lags, depending on the variable, given the shortness of our time series.

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[10] This said, secondary market volume was small relative to new issues in times when markets were rapidly expanding, such as in Russia prior to the 1998 crisis. For example, the decision to issue GKOs in 1997 was surely driven by variables that also influenced asset demand (e.g., the fiscal balance as a solvency indicator). We will return to this point when we interpret the results.

The presence of a lagged dependent variable precludes the use of the standard fixed or random effects estimators.[11] We thus used OLS estimates, which are consistent and efficient only if the model does not contain unobserved country-specific effects. This means that the specification we start out with must be sufficiently general to contain all country-specific effects that are correlated with other right-hand-side variables, a further reason to start out with a very broad initial specification.

The main drawback of our approach, as in any general-to-specific exercise, is the "path dependency" problem—the fact that the parsimonious specification obtained may be sensitive to the order of elimination, which in turn reflects the researcher's priors in giving some variables a relatively better chance to remain in the model (by ordering them last). It turns out that in this sample there is very little path dependency, given our initial model. To confirm this point, we perform a version of Leamer's (1983) "Extreme Bounds Analysis," which tests the robustness of the main explanatory variables surviving in our parsimonious models, and is described in Appendix III. The models shown below pass these robustness tests except for caveats pointed out in the text.

A final methodological issue concerns the choice of the variable used to normalize capital flows—that is, dollar GDP, PPP-adjusted dollar GDP, or population. As we saw in the previous subsection, this has a significant impact on the relative levels of direct investment and (to a lesser extent) portfolio investment across countries. The standard approach is to normalize using GDP evaluated at market exchange rates, but this could introduce distortions due to the large fluctuations of both exchange rates and real output in our sample.

Our preferred approach is thus not to impose any particular normalization on the data, but instead to use unscaled capital flow data (i.e. simply measured in millions of dollars), while controlling for several alternative scale variables on the right-hand-side. The scale variable that appears to be most relevant from the perspective of predicting capital flows can then be selected as part of the broader general-to-specific procedure.[12]

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[11] Fixed and random effects rely on a strong exogeneity assumption that is automatically violated in dynamic panels; see Keane and Runkle (1992).

[12] If both the capital flow data and the scale variable enter the regression in natural logs, this encompasses the standard approach (which is equivalent to imposing a coefficient of unity on the relationship between log flows and log GDP) as a special case. In any case, log-transforming the data is appropriate if one believes that the true structural model is multiplicative—which is just saying that a unit increase in a right hand side variable would always lead to some *percentage* increase in capital flows per capita, rather than some absolute increase. The problem is that the log transformation cannot be directly applied when there are zeros in the data. To deal with this problem, we transformed the DI data by taking the natural log of 1+DI. However, with portfolio investment, which contains large negative values, we worked with untransformed data, and ran all regressions using both a population normalization and a GDP normalization.

B. Explanatory Variables

We divide the potential determinants of capital inflows, beyond the scale variables discussed in the previous subsection, into three groups: those that are likely to affect both direct investment and portfolio investment, those that are specific to direct investment, and those that are specific to portfolio investment.

General Determinants

The basic variables of macroeconomic performance are *inflation*, the *fiscal balance*, and (lagged) *growth*. Macroeconomic stability is widely viewed by policymakers, academics, and the press as creating a conducive environment for foreign investors, so one expects inflation to have a negative effect on capital inflows. The expected signs on the fiscal balance and growth are more ambiguous. One view of the fiscal balance is as an alternative stabilization proxy (Fischer, Sahay, and Végh 1997); this would imply a positive sign (surpluses are better than deficits from the point of view of encouraging investment). However, a large deficit might also proxy a budgetary need for foreign financing—particularly if inflation has been adequately controlled for but not interest rates—which would suggest a negative relationship between the fiscal balance and portfolio inflows. Similarly, the *prima facie* expectations on the relationship between output growth and capital flows is probably that investors prefer entering an economy that has already turned the corner. This could be justified if profitability is related to domestic demand, or if output declines are associated with disruptions (including political and social) that are not controlled for through other variables. On the other hand, the output decline could be viewed as increasing the marginal product of *new* capital (by freeing resources held in the traditional sectors) and perhaps as lowering asset prices.

Indicators of the *exchange rate regime*, include whether or not a preannounced exchange rate peg was in place, and whether the country had unified the exchange rate or applied restrictions to convertibility that resulted in multiple exchange rate practices. To the extent that a peg credibly reduces exchange rate risk, it might attract higher inflows. Multiple exchange rates and restrictions to convertibility are typically believed to deter inflows, as they may create obstacles both for the repatriation of profits and for the import of intermediate goods that often go hand-in-hand with direct investment projects.

We used an indicator of *liberalization and privatization*, compiled by De Melo, Denizer, and Gelb (1996, 1997), and updated using similar indices compiled by the EBRD. The De Melo, Denizer, and Gelb index is an average of three subindices, which capture progress in internal (price) liberalization, external (trade) liberalization, and privatization, respectively. This reflects the view that countries that are further along in implementing structural reforms and privatizing will find it easier to attract foreign capital.

Indicators of *institutional quality and the legal framework* are included to capture the argument that institutional and legal shortcomings—including unpredictable and burdensome regulation, red tape, confiscatory taxation, and difficulties in enforcing contracts—are important impediments to private business in general, and particularly to foreign investments in transition countries. We rely on a set of five institutional indicators compiled by the World Bank in their 1997 survey of perceptions of the quality of governance (see Appendix II for details).

Initial conditions and other controls are included to capture potential determinants that are unrelated to policies during the sample period, including natural resource endowment, location (e.g. distance from western Europe), pretransition liberalization efforts, and a dummy for wars. Abundant natural resources should encourage inflows; location will affect transportation costs to export markets, and initial liberalization may have an effect (not just the most recent level of reforms might matter, but also how long they have been in place). The expected sign on the war dummy is not entirely obvious: wars should discourage inflows, but may also attract inflows to the extent that there is a large nonresident community that helps to finance the war effort (Armenia and Croatia might be examples). We also included the three-month U.S. Treasury bill rate as a basic opportunity cost variable.

A final question is whether or not to control separately for *market (investor) perceptions*, as captured by "country risk" ratings which are regularly published in investor magazines such as *Euromoney* or *Institutional Investor*. As we explain in more detail in Appendix II, these are overall indicators of investor perceptions that give about equal weight to a country's economic and political/institutional "performance." To the extent that we are already controlling for these factors, they should not matter. Nevertheless, we decided to include market perceptions among our regressors, for two reasons. First, whether or not perceptions matter even in the presence of variables that directly control for "fundamentals" is in itself an interesting question. More important, some institutional indicators are only available for a subset of our sample. Using market perception indicators to control for unmeasured institutional factors enables us to use a larger sample.

Thus, current and lagged values of market perceptions are generally included in the regressions reported below. To make the coefficients of the regression easier to interpret, we do not include the investor magazine scores directly into the regression, but rather we use the residuals of a first-stage regression of these scores on the remaining right-hand-side explanatory variables that were included in the regression. Thus, the coefficient on our perceptions variable represents the effect on direct investment of market perceptions that are *not attributable to factors that we are directly controlling for* in the regression model.

Specific Determinants of Direct Investment

Beyond the variables discussed so far, there are four sets of variables that could be relevant specifically for direct investment.

Competitiveness indicators would ideally comprise a measure such as (dollar) unit labor cost in manufacturing. However, while average wage data in manufacturing are generally available, indirect labor costs and productivity data for the manufacturing sector are much harder to come by on a consistent cross-country basis. Rather than attempting to compute unit labor costs, we separately include average monthly dollar wages. Since we control for aggregate productivity differences across countries by including both population and GDP measures as "scale variables" in the regression (see last subsection above), our specification encompasses aggregate unit labor costs (except for indirect labor costs).

Trade liberalization. Direct investment often takes place in businesses that either are export-oriented or require imported inputs, or both. In such cases, one would expect that the more a country's trade regime has been liberalized the greater the direct investment. One indicator capturing trade liberalization is the EBRD's index of external liberalization.

Restrictions to direct investment. The extent to which legal barriers that make foreign direct investment more difficult or more costly varies considerably across countries. We attempted to construct an index that captures these barriers (see Appendix II for details).

Method of privatization. While the *extent* of privatization is controlled for, at least rudimentarily, by the De Melo, Denizer, and Gelb liberalization index (see above), this disregards the potentially important effect on direct investment of *how* a country privatized. Direct sales with equal access by foreigners may offer an automatic opportunity for direct investment, while insider privatizations (privatization as a sale or gifts to the management and/or workers of a previously state-owned enterprise) may create barriers.[13] To capture this notion, three indicators of the privatization method based on EBRD information are included in the regression (see Appendix II for details about the construction of these variables).

Specific Determinants of Portfolio Investment

Securities market development. Countries that have more advanced securities markets and are equipped with a regulatory and legal framework specific to dealing with such transactions would be expected to receive higher flows of portfolio investment. One indicator capturing the extent of institutional development in this area is the EBRD transition indicator on securities markets and nonbank financial institutions (see next subsection for more details).

Restrictions on portfolio investment. This is analogous to the index on direct investment restrictions. The construction of an index of portfolio investment restrictions is described in Appendix II.

Indicators of default risk. The total external debt stock and international reserves are included as default risk indicators. Both are lagged one year, to reflect a perceptions lag and avoid endogeneity. In addition, we separately control for the ratio of short-term debt in total debt. One would expect that countries with lower short-term debt and higher reserves are less prone to default and hence attract higher portfolio inflows.

Treasury bill rates. To the extent that we fully control for the factors which determine default and exchange rate risk, portfolio flows should go to countries that offer relatively higher real interest rates on their government paper. However, this effect will be attenuated or reversed to the extent that risk factors have been omitted, since in this case high interest rates may themselves proxy for these omitted factors. We used the 3-month treasury bill rate from the IMF's *International Financial Statistics* (IFS), and filled the gaps as much as possible with similar short-term rates from country publications and IMF desk economists. However there still remained a substantial set of missing observations, which are typically due to countries and/or years in which treasury bill markets were nonexistent or in rudimentary stages. To

[13] See Holland and Paine (1998).

avoid restricting the sample size, we replaced these missing values by zero entries and at the same time defined a dummy that takes the value 1 when data is available and 0 otherwise.[14]

All the data used as explanatory variables, including sources and the notation used in the remainder of the paper, are summarized in Table 1. In addition, Appendix II gives details on the definition and compilation of those explanatory variables that are new or unusual in the context of a study of determinants of capital flows to transition economies. These include (1) the indices of restrictions on direct investment and portfolio flows that we construct for the purposes of this study, (2) indices of country-risk perceptions; (3) institutional, political, and legal proxies, particularly those compiled by the World Bank in their 1997 survey; and (4) indicators of the privatization *method*, which were also constructed for this study.

Our sample periods are 1990–99 for Hungary and Poland; 1991–99 for Bulgaria, Romania; the Czech Republic, and the Slovak Republic; and 1992–99 for the 19 remaining transition economies (Albania, Croatia, FYR Macedonia, and Slovenia, the three Baltic countries, Russia, and eleven other countries of the former Soviet Union). This gives a potential data set of 208 observations. However, the use of lagged variables further restricts the sample period and not all data series were available for all these countries and periods. In practice, our actual sample varied between 143 and 179 observations.

C. Regression Results

Results for Direct Investment Regressions

Regression results for foreign direct investment are shown in Table 2. Model 1 is derived by applying a general-to-specific selection process to a general model containing all potential explanatory variables described above under the rubrics "general determinants" and "specific determinants of direct investment," except for the institutional variables from the World Bank, which are not available for 5 out of the 25 economies we study. First lags (and in the case of the liberalization index, second lags as well) were included for the time-varying variables. The total number of variables included in the general direct investment model is 32.

In columns (2), (3), and (4), we experiment with adding regional dummies and (at the cost of using a smaller sample) the World Bank institutional indicators to Model 1. Model 5, finally, shows a parsimonious model derived from a general model that also includes the World Bank institutional indicators, and a dummy variable for Russia, using the smaller sample.[15] In Appendix III, we confirm the robustness of the two models generated through a general-to-specific variable selection (i.e. Models 1 and 5) using a version of Leamer's (1983) "extreme bounds analysis." It shows that, with few exceptions, the estimated coefficients in these

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[14] The priors on the sign of this dummy are unclear. For example, if countries with missing treasury bill rates behave "as if" they had positive rates, then the dummy should have a negative sign; if they behave as if they had negative rates, then the dummy should have a positive sign.

[15] This smaller sample excludes Croatia, Romania, Slovenia, Tajikistan, and Turkmenistan.

Table 1. Names and Definitions of Explanatory Variables

Variable Name	Definition	Source
Scale variables		
lpop	Natural log of population	*World Economic Outlook* database, IMF.
lgdp	Natural log of GDP in US dollars	*World Economic Outlook* database, IMF.
lppp	Natural log of PPP-adjusted GDP	*World Economic Outlook* database, IMF.
Macroeconomic variables		
growth	First lag of real GDP growth.	*World Economic Outlook* database, IMF.
linfav	Natural log of average annual current inflation	*World Economic Outlook* database, IMF.
err	Preannounced exchange rate regime dummy.	*Annual Report on Exchange Arrangements and Restrictions*, IMF.
mcp	Multiple exchange rates.	*Annual Report on Exchange Arrangements and Restrictions*, IMF.
fbal	General government balance as percent of GDP.	*World Economic Outlook* database, IMF.
Interest rate data		
rTbill0	Real domestic treasury bill rate, denoting not available with 0.	IFS, IMF.
Tbilld	Dummy variable, where 1 denotes that Tbill data is available.	authors' calculations.
rDeposit	Real domestic deposit rate.	IFS, IMF.
Structural reform variables		
li	Liberalization index Range from 0 to 1, where 1 denotes full liberalization.	De Melo, Denizer, and Gelb (1996) and extended for 1996 and 97 based on the EBRD indices. Refer to Berg, Borensztein, Sahay, and Zettelmeyer (1998) for more details.
Institutional quality and the legal framework		
wbpred	Predictability of laws and policies	World Bank, *World Development Report 1997* Survey.
wbprop	Political stability and security of property	
wbgovbus	Overall government-business interface	
wbredtape	Bureaucratic red tape	
wbgoveff	Efficiency of government in providing services (all range from 1 to 6, 6 is worst)	
Initial conditions and other controls		
war	War dummy.	Authors' calculations.
ldist	Natural log of distance from Duesseldorf (in km).	Internet map locator.
natrr	Natural resource abundance dummy variable	Authors' calculations.
li89	Initial liberalization index.	De Melo, Denizer, and Gelb (1996).
cee	Dummy variable for Central and Eastern Europe.	
bal	Dummy variable for Baltic countries.	
US3m	US 3-month treasury bill rate.	*International Financial Statistics*, IMF.
Market perceptions indicator		
em_res	Residual of Euromoney country risk rating in a regression on fundamentals, see text.	*Euromoney*, March and September issues various years.
Specific to FDI		
lwage	Natural log of average monthly manufacturing wages in US$.	OECD Short-term Economic Indicators, ILO, and IMF.
ebtrde	Trade and Foreign Exchange Index; range from 1 to 4, where 4 denotes comparable standards to advanced economies.	European Bank for Reconstruction and Development (EBRD), extended prior to 1994 based on LI described above.
diir	Foreign direct investment restrictions index. Range from -0.2 to 6 where 6 reflects most restrictions.	Authors' calculations based on *Annual Report on Exchange Arrangements and Restrictions*, IMF, various issues.
prsal, prvou, prins	The three privatization indicators: privatization by direct sale, by voucher, and insider respectively.	Authors' calculations based on EBRD Transition Reports. Refer to Appendix II for detailed description of methodology.
Specific to portfolio investment		
ebsecse	Securities market index Range from 1 to 4, where 4 denotes securities laws and regulations approaching IOSCO standards; substantial market liquidity and capitalization; well-functioning non-bank financial institutions and effective regulation.	European Bank for Reconstruction and Development (EBRD) and extended prior to 1994 based on LI described above.
pir	Portfolio investment restrictions index. Potential range from 0 to 2, where 2 indicates outright prohibition of portfolio flows.	Authors' calculations based on *Annual Report on Exchange Arrangements and Restrictions*, IMF, various issues.
rTbill0, Tbilld	*rTbill0* is the real treasury bill rate, where missing observations are replaced with a 0. *Tbilld* variable is a dummy that takes on the value of 1 in the cases that rates are available.	*International Financial Statistics* series 60c, supplemented by IMF staff and country reports.
debtpc	external debt per capita	*World Economic Outlook* database, IMF.
respc	international reserves per capita, respectively	*World Economic Outlook* database, IMF.
stdtd	ratio of short-term debt to total debt	*World Economic Outlook* database, IMF.

Table 2. Regression Results for Foreign Direct Investment
(Dependent variable: natural log of (1 + inward foreign direct investment in millions of US$), OLS estimates)

		(1)		(2)		(3)		(4)		(5)	
Group	Variable	Coefficient	t-value	Coefficient	t-value	Coefficient	t-value	Coefficient	t-value	Coefficient	t-value
	constant	-0.60	-1.39	-0.60	-1.28	0.08	0.12	2.89	2.20	2.97	2.10
	lagged dependent	0.42	9.22	0.39	8.91	0.35	6.61	0.32	5.97	0.29	5.33
Scale	*lgdp*	0.29	3.95	0.29	4.21	0.23	2.40	0.22	2.35		
variables	*lpop*	0.21	2.26	0.26	2.73	0.37	2.92	0.43	3.39	0.30	2.18
	lppp									0.37	3.22
Macroeconomic	*growth*	0.01	1.23	0.01	1.25	0.01	1.73	0.01	1.74	0.02	2.28
indicators	*fbal*	0.03	3.05	0.02	2.65	0.03	3.02	0.03	3.27	0.02	2.79
	linfav	0.29	3.35	0.24	2.96	0.22	2.48	0.20	2.22		
	linfav-1	-0.16	-2.38	-0.18	-2.71	-0.21	-2.81	-0.22	-3.04	-0.18	-3.23
Exch. rate regime	*err2*	0.28	2.73	0.48	4.20	0.62	4.47	0.54	3.87	0.45	3.32
Liberalization	*li*	1.39	3.42	1.16	2.64	1.02	2.11	0.72	1.49		
	Dli									1.75	2.95
Market Perceptions	*emres_di-1* [a]	1.39	2.56	1.12	2.10	1.06	1.70	1.01	1.64	1.29	1.97
Initial conditions	*natrr*	0.57	3.99	1.04	5.97	1.05	5.72	1.16	6.25	1.22	6.69
and specific	*diir-1*	-0.11	-2.30	-0.08	-1.83	-0.10	-2.08	-0.11	-2.33	-0.12	-2.68
direct investment	*Debtrde*	0.24	2.45	0.23	2.47	0.29	2.94	0.27	2.77		
determinants	*prsal*									0.40	2.56
	prins	-0.47	-3.98	-0.45	-3.97	-0.57	-4.22	-0.59	-4.39	-0.42	-3.27
di = 0 dummy	*dum0*	-2.64	-4.30	-3.12	-5.29	-3.25	-5.40	-3.46	-5.80	-3.71	-6.37
Regional	*cro*			0.56	2.45						
dummies	*rus*			-1.09	-3.59	-1.03	-3.21	-1.14	-3.56	-1.14	-3.84
	tkm			-0.91	-2.62						
WB Governance	*wbredtape*							-0.74	-2.43	-1.08	-3.73
Regression	R^2	0.90		0.92		0.92		0.93		0.93	
statistics	*N*	179		179		145		145		145	
	k	16		19		17		18		17	

[a] For Models (1) through (4): first lag of residual from a regression of the Euromoney country rating (see Appendix) on the other potential right-hand-side determinants of direct investment except for the World Bank subjective governance indicators, using 179 observations. For Model (5) residuals are generated from a regression that additionally includes the the World Bank subjective governance indicators, using 145 observations.

models retain their significance and sign if any three-variable combination of the variables that were eliminated from the most general model is added back to Model 1 or 5.

The main results are as follows. Consider first Model 1. Note the rather good fit (just over 0.9). The coefficients mostly confirm conventional priors. Direct investment flows increase with good macroeconomic performance, as measured by growth and a high fiscal balance, the state of economic liberalization (li), and reforms in the trade area (Debtrde, which measures the change in the EBRD trade reform index). Insider privatization (prins) discourages direct investment, as do direct restrictions on direct investment inflows (diir-1).

As expected, countries rich in natural resources (natrr) received more direct investmentCon average, almost 60 percent compared to otherwise similar resource-poor countries. Having an ex ante commitment to a fixed exchange rate (err2) is also positively associated with direct investment. Finally, note that the dummy dum0 for years in which there was zero direct investment is also highly significant and negative; this suggests some sort of start-up cost to inflows.

Three aspects of Model 1's predictions are unexpected. First, current inflation (linfav) comes in with the "wrong" sign. We have no explanation for this, except potential endogeneity, which may be an issue in spite of our efforts to avoid omitted variable problems.[16] The result goes away (in the sense that contemporaneous inflation is not significant and can be eliminated from the model) when the general-to-specific exercise is repeated on a smaller sample that includes the World Bank institutional variables (see Model 5). Second, after controlling for aggregate productivity—which we do indirectly, by having both log GDP and log population in the model—wages are insignificant and can be eliminated. Thus, in this broad sample,[17] wage costs seem to be overshadowed by more fundamental macroeconomic stability and governance issues. Third, the coefficient on log GDP is only about 0.3 and the sum of the coefficients on log population and log GDP only 0.5—that is, far below unity. This implies that, even controlling for all other characteristics that we are able to quantify, small countries were much better at attracting direct investment as a share of GDP. A doubling of country size, keeping everything else constant, is associated with an increase in direct investment by only about 50 percent. One question is the extent to which this result is driven by Russia—a very large country attracting relatively little direct investment.

This question is answered in Model 2, which includes a country dummy for Russia and two other countries that turn out to be outliers: Croatia, which received significantly more direct investment than Model 1 would predict, and Turkmenistan, which received significantly

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[16] Assuming the model is otherwise well-specified, reverse causality is not a major concern for variables such as inflation, since DI constitutes a relatively narrow capital flow item that is unlikely to have large simultaneous macroeconomic effects.

[17] In a sample that comprises only the more advanced transition countries in central and eastern Europe, Bevan, and Estrin (2000) and Holland and Paine (1998) do find the expected negative relationship between labor costs and direct investment.

less.[18] The coefficient on the Russia dummy is particularly large in absolute terms, and highly significant. Note that when the dummies are included in the model, the coefficient on the scale variables rises (from about 0.5 to 0.65), but remains significantly smaller than unity.

Which omitted variables might be driving the three significant country outliers? For Croatia, war-related inflows from the Croatian community abroad may play a role. For Russia and Turkmenistan, plausible candidates are variables related to the business climate and governance. This seems to be supported by the fact that the coefficient on the market perceptions residual (*emres_di*), which captures investor perceptions *not attributable* to differences in the remaining right-hand side variables, drops in the presence of the three country dummies.

The next step is to directly add governance measures to the model. To do that, we first rerun Model 2 on a smaller sample—which excludes Croatia and Turkmenistan—for which the 1997 World Bank governance measures are available (Model 3). The results are very close to those on the whole sample. We then add the five governance indicators. As it turns out, four of them are jointly and individually insignificant and can be eliminated, leaving just one, *wbredtape*, an index for bureaucratic red tape and corruption Model 4. As expected, the coefficient on *emres_di* falls further in the presence of *wbredtape*, and loses statistical significance. Surprisingly, however, the coefficient on the Russia dummy is not reduced—it even rises after the inclusion of *wbredtape* into the model. Thus, the puzzle of why Russia received so little direct investment is *not* resolved by adding this set of governance indicators to the model.

Finally, we check whether the results so far are the same if the governance variables are included at the beginning in the model selection process, rather than added at a later stage. The answer is a qualified yes. Model 5 confirms the basic story about direct investment being attracted mainly by a stable macroeconomic environment, economic reforms, the privatization method, and the presence of natural resources, although there are some differences in the details.[19] As far as the role of governance is concerned, the results mirror those of Model 4: *wbredtape* is again the only significant governance variable, and the Russia dummy stays highly significant in spite of its presence.

The main surprise in Model 5 is the continued significance of *em_resdi* as a predictor of direct investment flows, which represents any information contained in investor ratings that is not captured by the remaining right-hand-side fundamentals *including* the World Bank governance variables. There are several potential explanations for this result. The most

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[18] These are the *only* robust outliers, in the sense that they remain significant when any other country dummy is added, and that any other country dummy is insignificant when added to the model.

[19] Mainly, it is the *changes* in the general liberalization index, *Dli*, that seem to matter; changes in the specific trade liberalization index are insignificant and can be eliminated, and the impact of privatization enters not only through an adverse effect of insider privatization, but also via a beneficial effect of direct sales (*prsal*). The puzzling result is that the contemporaneous effect of inflation is insignificant.

obvious one is that to the extent that the right-hand side variables still do not give a full picture of the country's fundamentals, these might be captured by *em_resdi*. However, after controlling for the governance variables, it is not clear in what respect the information set upon which investor magazine ratings are based could be richer than the one we are already controlling for (see Appendix II on how these ratings are constructed). Two other related explanations that we find more plausible are as follows.

The first possible explanation has to do with reporting lags and errors in reflecting economic fundamentals. Not all the information that is contained on our right-hand side (in particular, on governance) was available when investors made their decisions. Suppose that investors use investor magazine scores (which were available twice a year since the early 1990s for most countries) as a proxy for the missing information. Ex post, these scores may turn out to have been wrong, in the sense that they either overstated or understated the quality of fundamentals in a particular country. But in the meantime, investment decisions may have been taken, which could be costly to reverse. Thus, if investors regard investor magazine scores as a "coincident indicator" of the quality of fundamentals, then the error component of this indicator—i.e. precisely the residual used in Model 5—should have an impact on investor decisions.

The second story relates to the problem of endogeneity, in the sense of simple reverse causality. In other words, high investor ratings could be driven by high observed inflows, rather than the reverse. This, however, is implausible here, since it is *lagged* investor ratings that matter in Model 5, and since the regression also controls for past inward direct investment directly. However, there may be a second, more plausible source of endogeneity–namely, that both investor ratings and capital inflows are to some extent driven by fads or biases, that is, by market perceptions that are not really justified by fundamentals. Since these are not directly included on the right-hand side of our regression models, they show up in the error term, which ends up being correlated with the investor score residual, *emres_di*. In principle, it should be possible to test this possibility by instrumenting *emres_di*; in practice, however, instruments that are both valid and sufficiently powerful are hard to find in this context.[20]

Regardless of which of these two stories is right, Model 5 suggests that investor ratings contain predictive power for direct investment flows beyond the information about fundamentals, which they embody. This may be either because they are used as imperfect proxies for economic fundamentals when direct information on these fundamentals is not readily available, or because they reflect market perceptions that are not attributable to fundamentals but nevertheless have an impact on investment decisions.

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[20] We tried using the EBRD's index for the development of domestic financial markets as an instrument for *emres_di*—which arguably was not a determinant of direct investment, since the latter occurred mostly through direct purchases in the context of privatization or greenfield investment, and as such did not require organized stock markets. Using this instrument, a Hausman test could not reject the hypothesis of no misspecification.

Results for Portfolio Investment Regressions

We now turn to a set of regressions, which explore the determinants of inward portfolio investment (Table 3). As explained before, negative inward investment flows—reflecting the liquidation of positions held by foreign residents—is a frequent occurrence in our data. This precludes log-transforming the data in the way we did in the direct investment regression, and forces us to make decision in advance on whether to run the regression in terms of investment per capita terms or investment per GDP. We did both, while additionally controlling for the scale variable that was not chosen for normalizing the flows. As it turns out, the population normalization fits the data better, which is not surprising given the problems with measuring dollar GDP discussed above. This is the normalization used in the regressions presented below. However, the conclusions of this section would not be affected if we had instead based the discussion on the GDP normalization. Model 1 was derived by simplifying a general model containing a total of 35 variables, which include all general and portfolio investment-specific potential explanatory variables discussed in the preceding subsection, with lags where appropriate, except for the institutional indicators, which are not available for several countries. Path dependency was a somewhat greater problem than in the direct investment regressions. In particular, we were not able to discriminate between the effects of lagged inflation and liberalization on portfolio investment, in the sense that the order of elimination determines which variable ends up in the parsimonious model. Thus, the variable "*lInf-1*" in Model 1 should be viewed as representative of the quality of macroeconomic policies, rather than as literally representing inflation. The remaining steps, however, go through regardless of whether the lagged inflation or liberalization is included in the model. For this reason, we do not separately show regressions results that include *LI* rather than *lInf-1*.

Given our findings for direct investment, the results of model (1) are striking in two respects. First, the fit is much worse than the fit of the corresponding direct investment regression, with an R^2 of approximately 0.4 as opposed to approximately 0.9. Part of this large difference is explained by the absence of a log transformation in Table 3, which dampened outliers and contributed to the overall good fit of the direct investment regressions. To get a sense of the importance of this effect, we reran Model 1 of Table 2 without the log transformation, using population for the purposes of normalization. The fit declines to 0.67, which is still much larger than that of the portfolio investment regressions. Thus, the basic insight is that differences in portfolio investment over time and across countries are much harder to model, even using a very rich set of determinants, than direct investment flows.

Table 3. Regression Results for Portfolio Investment
(Dependent variable: portfolio investment liabilities per capita, OLS estimates)

		(1)		(2)		(3)		(4)		(5)	
	Variable	Coefficient	t-value	Coefficient	t-value	Coefficient	t-value	Coefficient	t-value	Coefficient	t-value
	Constant	58.11	2.18	64.99	2.25	200.84	3.49	217.59	4.30	229.88	4.55
	lagged dependent	0.25	3.33	0.35	4.24	0.28	3.35	0.20	2.37	0.19	2.38
Inflation	*linfav-1*	-7.45	-1.89	-6.89	-1.60	-6.25	-1.48				
Exch. rate regime	*err2*	18.12	2.16	25.60	2.65	19.43	2.00				
Market perceptions	*emres pi* [a]	2.04	3.75	1.71	2.81	1.34	2.20				
U.S. interest rate	*US3m*	-11.79	-2.18	-13.346	-2.28	-10.85	-1.87	-8.48	-1.57	-8.82	-1.65
Specific	*ebsecse*							26.12	3.91	24.33	3.64
portfolio investment	*Debsecse*	42.33	2.66	43.199	2.73	33.49	2.11				
determinants	*respc-1*	0.07	4.43	0.038	1.91	0.01	0.61				
WB governance	*wbprop*					-31.82	-2.71	-48.17	-5.10	-49.94	-5.32
dummy variable	*rus97*									91.90	1.92
Regression	R^2	0.42		0.43		0.46		0.45		0.47	
statistics	*N*	177		143		143		143		143	
	k	8		8		9		5		6	

[a] For Models (1) through (3): first lag of residual from a regression of the *Euromoney* country rating (see appendix) on the other potential right-hand-side determinants of portfolio investment except for the World Bank subjective governance indicators, using 177 observations.

The second striking finding in Table 3, which is related to the first, is the relatively small number of explanatory variables that seem to play any role at all. Model 1 says that—ignoring governance indicators as a potential determinant, portfolio investment flows seem to have a systematic relationship only with past inflation (perhaps as a proxy for the quality of macroeconomic "housekeeping"), investor ratings, the exchange rate regime (where pegs are associated with bigger net inflows flows), the level of reserves, world interest rates, and improvements in the securities market infrastructure (*Debsecse*). This list is remarkable mainly for what it does *not* contain: solvency indicators such as the level of debt, economic growth, economic reforms as distinct from macro stability, domestic real interest rates, and direct legal restrictions to portfolio inflows.

The paucity of significant explanatory variables in the portfolio investment regression can be given several interpretations. Poor measurement may be a problem, both in the sense that some variables could be mismeasured (for example, debt and domestic real interest rates), and in the sense that we have not fully measured default risk directly, so that the domestic interest rate plays a role both as a proxy for country risk and as a "pull" factor attracting capital flows, with ambiguous net effects. The identification problem discussed at the beginning of the Econometric Results section almost surely plays a role as well, to the extent that the same variables enter the demand and supply equations for portfolio assets with opposite signs. For example, all things being equal one would expect the supply of government bonds to increase with an increase in the fiscal deficit but the demand for bonds to decrease; these effects may offset each other in the estimation. Finally, our results may indicate that portfolio inflows in transition economies were not very sensitive to solvency indicators apart from the level of international reserves. The fact that direct restrictions to portfolio movements do not have any explanatory power either indicates measurement errors, or suggests that portfolio flows can find a way around these restrictions.

Model 2 reruns Model 1 on a smaller sample that includes only the countries for which the World Bank institutional indicators are available. The results are very close, so the reduction of the sample itself does not have a major impact. Based on the reduced sample, Model 3 shows the consequences of adding the World Bank governance indicators to the model. Of the five indices, four have almost no explanatory power, and can be eliminated from the model at extremely high significance levels ($p = 0.97$). Only one variable—the indicator of respect for property rights, *wbprop*—turns out to be highly significant. The presence of *wbprop* also has a substantial impact on the remaining variables in the regression. The coefficient on reserves, in particular, drops to one-third and becomes insignificant. The coefficient on *emres_pi* also falls substantially, as one would expect, although it remains significant.

This leads to the question of how the results would have been affected if the World Bank indicators had been included in the general-to-specific model selection process from the outset. The answer is quite striking (Model 4). In the presence of the governance variables, and with a slightly different parametrization of the variable proxying the development of securities markets (*ebsecse*, which now captures the level of securities markets development rather than the change), *all other* country-specific variables that previously seemed to matter can be deleted from the model without loss in explanatory power (compare the R^2 of Models

4 and 2). Put differently: the only "fundamentals" that seem to have a robust effect on portfolio investment are the presence of a securities market infrastructure, and some confidence that the acquired assets would not be expropriated. In the presence of these two variables, no other country-specific variables (or for that matter, the residual information contained in investor ratings) seem to contribute significantly to explaining investment flows.

As before, we subjected the parsimonious Model 4 to a series of tests to see to what extent it could explain outliers in the raw data. Consider first portfolio inflows to Russia during 1997. Given what is known about the special circumstances driving these inflows, one would not expect a highly parsimonious, fundamentals-based model to fit this episode. The dummy variable for Russia is marginally significant at 5 percent. Note that the remaining coefficients are barely affected by the inclusion of this dummy, suggesting that this particular inflow episode was indeed unrelated to fundamentals. Next, we separately added dummy variables for the top (Estonia, Czech Republic, Hungary)[21] and some of the bottom (Bulgaria, Ukraine) portfolio investment recipients. None of these dummies are individually significant, nor do they affect the coefficients on *ebsecse* and *wbprop*. Only if dummies for *all three* top portfolio investment recipients are *jointly* added to the equation does the coefficient on *wbprop* decline substantially and become insignificant at the 5 percent level (not shown). Thus, the fact that these top recipients also stood out in terms of their perceived protection of property rights is indeed a factor driving the large coefficient on *wbprop* in Model 4 and Model 5.

As in the previous section, we applied an "extreme bounds analysis" to the two models derived via a general-to-specific selection procedure (Models 1 and 4 in Table 3) to examine the robustness of the estimated coefficients to the inclusion of variables eliminated during the model selection process (see Appendix III). The results confirm the conclusions drawn so far. Although Model 1 (which excluded governance proxies) contains six statistically significant determinants of portfolio investment, only two—the market perceptions indicator and the indicator of securities market development— turn out to be robust. In Model 4, the World Bank index of property rights is robust, as is (barely) the indicator of securities market development.

IV. Conclusions

Capital flows to transition economies have exhibited a diverse pattern in terms of both level and composition. Since 1993, private inflows in the Central and Eastern European countries have been high and consistently around 5–6 percent of GDP. They have been even higher in the Baltic countries, where they averaged 10 percent of GDP since 1995. Other regions, such as southeastern Europe and most CIS countries, witnessed lower and less stable inflows, and private flows to Russia were generally negative. Official flows and "exceptional financing"

[21] Slovenia, which also attracted exceptionally large amounts of portfolio investment (see Figure 5), is not part of this dataset because it is not covered by the 1997 World Bank governance indicators.

(arrears rescheduling and debt forgiveness) were important sources of financing in most countries during the early transition years, and continued to play an important role in most CIS countries at least until 1998.

Foreign direct investment was a large, relatively stable source of private financing in most transition economies. In contrast, portfolio investment inflows were generally smaller, much more volatile, and concentrated in half a dozen countries in Central and Eastern Europe, Russia (before 1998) and recently the Baltics. "Other" private investment, reflecting mainly bank lending, takes an intermediate position. It was an important source of net funds, surpassing direct investment in some countries. Also, it was generally more volatile than direct investment, although less volatile than portfolio investment. Russia is again an exception. It received relatively little foreign direct investment as a proportion of GDP, but instead large portfolio inflows (until 1998). Moreover, "other" investment flows to Russia were consistently large and *negative*, perhaps reflecting capital flight.

The regression results indicate that the pattern of inward direct investment in transition economies can be well explained in terms of a standard set of economic fundamentals. These include variables reflecting macroeconomic stability, the level of economic reforms, trade liberalization, natural resource endowments, the privatization method, direct barriers to inward direct investment, and a measure of government "red tape" that reflects obstacles to investment and entrepreneurship and is closely related to corruption. Unlike some of the earlier papers on Central and Eastern Europe, we do not find that wages have a robust effect on direct investment flows in our sample. With the exception of natural resource endowments, initial conditions—such as time under communism, or initial liberalization—also seem to have no effect (other than through their possible effect on policy choices). Interestingly, investor perceptions of the risk or attractiveness of a country—as measured by investor magazine ratings—seem to have some predictive value over and above their information about fundamentals perhaps because they reflect investor biases or fads that also affect capital flows.

In contrast, portfolio investment is very poorly explained by fundamentals. In part, this may be due to measurement problems or the problem of disentangling the determinants of demand and supply of portfolio assets at a time when secondary asset markets are still very small. The only country characteristics that seem to be robust predictors of portfolio investment are the presence of a financial market infrastructure (as measured by an index of securities markets development) and an indicator of the protection of property rights. In the presence of these two variables, none of the many other country fundamentals we control for has any robust, statistically significant explanatory role. Thus, our findings endorse the commonly expressed view that the quality of governance was an important factor in attracting capital flows. For direct investment, this is one important variable among several others. For portfolio investment, it seems to be just about the *only* country characteristic that helps to fit a volatile series, which otherwise bears no systematic relationship to country fundamentals.

I. CAPITAL FLOW DATA

Table 4. Inward Direct Investment, Portfolio Investment Liabilities, and International Issues
(In millions of US$)

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Albania											
Inward direct investment	0.0	0.0	0.0	20.0	58.0	53.0	70.0	90.1	47.5	45.0	41.2
Portfolio investment, liabilities	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Bond, equity, and loan issues	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Armenia											
Inward direct investment	0.0	0.0	0.0	0.0	0.8	8.0	25.3	17.6	51.9	220.8	122.0
Portfolio investment, liabilities	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.2	15.9	-16.6	1.6
Bond, equity, and loan issues	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Azerbaijan											
Inward direct investment	0.0	0.0	0.0	0.0	0.0	22.0	330.1	627.3	1114.8	1023.0	510.3
Portfolio investment, liabilities	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.0
Bond, equity, and loan issues	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	16.1	0.0	77.0
Belarus											
Inward direct investment	0.0	0.0	0.0	7.0	17.6	10.5	14.7	72.6	200.0	149.2	225.0
Portfolio investment, liabilities	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.2	41.8	-13.4	-18.3
Bond, equity, and loan issues	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Bulgaria											
Inward direct investment	0.0	4.0	55.9	41.5	40.0	105.4	90.4	109.0	504.8	537.2	806.1
Portfolio investment, liabilities	0.0	0.0	0.0	0.0	0.0	-9.8	-75.4	-122.2	146.5	-112.0	8.0
Bond, equity, and loan issues	625.1	6.7	41.3	0.0	0.0	150.0	0.0	0.0	23.0	10.0	54.0
Croatia											
Inward direct investment	0.0	0.0	0.0	13.0	120.3	116.9	115.1	506.0	529.6	897.7	1408.3
Portfolio investment, liabilities	0.0	0.0	0.0	0.0	0.4	9.9	4.5	622.0	565.8	15.0	574.5
Bond, equity, and loan issues	0.0	0.0	0.0	0.0	0.0	0.0	94.0	472.0	1320.0	528.0	1505.0
Czech Republic											
Inward direct investment	169.2	124.1	393.4	983.0	654.3	878.2	2567.6	1435.3	1286.5	2734.3	5093.3
Portfolio investment, liabilities	0.0	0.0	183.0	-36.0	1839.9	893.4	1695.5	770.5	1151.9	1145.7	499.6
Bond, equity, and loan issues	244.0	23.0	0.0	57.0	843.0	1088.0	816.0	2030.0	1281.0	1922.0	575.0
Estonia											
Inward direct investment	0.0	0.0	0.0	82.3	162.2	214.4	201.5	150.2	266.2	580.5	305.2
Portfolio investment, liabilities	0.0	0.0	0.0	0.0	0.2	8.4	11.1	198.1	427.5	1.1	153.3
Bond, equity, and loan issues	0.0	0.0	0.0	0.0	20.0	62.0	3.0	68.0	454.0	381.0	289.0
Georgia											
Inward direct investment	0.0	0.0	0.0	0.0	0.0	8.0	6.3	54.4	242.5	265.3	82.3
Portfolio investment, liabilities	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.4	0.0	6.2
Bond, equity, and loan issues	0.0	0.0	0.0	0.0	20.0	0.0	0.0	0.0	0.0	0.0	0.0
Hungary											
Inward direct investment	187.0	311.0	1462.1	1479.2	2349.7	1144.1	4518.6	2274.1	2167.0	2037.1	1950.5
Portfolio investment, liabilities	932.0	1071.0	1166.0	1011.0	3926.5	2457.8	2212.9	-395.8	-914.4	1924.7	2064.8
Bond, equity, and loan issues	1672.0	1085.0	1494.0	1699.0	5240.0	3019.0	4421.0	2898.0	3123.0	3346.0	3524.0
Kazakhstan											
Inward direct investment	0.0	0.0	0.0	100.0	473.0	635.0	964.2	1137.0	1321.4	1151.4	1587.0
Portfolio investment, liabilities	0.0	0.0	0.0	0.0	0.0	0.0	7.2	223.5	405.4	66.2	-39.9
Bond, equity, and loan issues	0.0	0.0	0.0	200.0	0.0	244.0	0.0	217.0	595.0	185.0	417.0
Kyrgyz Republic											
Inward direct investment	0.0	0.0	0.0	0.0	10.0	38.2	96.1	47.2	83.8	109.2	35.5
Portfolio investment, liabilities	0.0	0.0	0.0	0.0	0.0	0.0	1.8	-1.8	5.0	-4.1	0.0
Bond, equity, and loan issues	0.0	0.0	0.0	0.0	75.0	9.0	155.0	0.0	0.0	0.0	0.0

Table 4 (concluded). Inward Direct Investment, Portfolio Investment Liabilities, and International Issues
(In millions of US$)

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Latvia											
Inward direct investment	0.0	0.0	0.0	29.4	45.1	214.5	179.6	381.7	521.1	356.9	347.6
Portfolio investment, liabilities	0.0	0.0	0.0	0.0	0.0	0.0	0.0	23.8	-32.5	26.6	226.2
Bond, equity, and loan issues	0.0	0.0	0.0	0.0	35.0	47.0	45.0	0.0	63.0	114.0	289.0
Lithuania											
Inward direct investment	0.0	0.0	0.0	10.0	30.2	31.3	72.6	152.4	354.5	925.5	486.5
Portfolio investment, liabilities	0.0	0.0	0.0	0.0	0.0	0.0	4.0	89.6	180.5	-42.7	507.5
Bond, equity, and loan issues	0.0	0.0	0.0	0.0	45.0	40.0	92.0	124.0	320.0	35.0	960.0
Macedonia, FYR											
Inward direct investment	0.0	0.0	0.0	0.0	0.0	23.7	11.7	11.2	15.7	117.7	30.1
Portfolio investment, liabilities	0.0	0.0	0.0	0.0	0.0	0.0	1.3	0.8	4.6	8.4	0.5
Bond, equity, and loan issues	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.0	20.0	15.0	0.0
Moldova											
Inward direct investment	0.0	0.0	0.0	15.7	13.5	11.6	25.8	23.6	75.7	85.9	33.5
Portfolio investment, liabilities	0.0	0.0	0.0	0.0	0.0	0.6	-0.5	30.8	25.6	-53.8	-8.2
Bond, equity, and loan issues	0.0	0.0	0.0	0.0	0.0	0.0	0.0	55.0	75.0	0.0	40.0
Poland											
Inward direct investment	11.0	89.0	291.0	678.0	1715.0	1875.0	3659.0	4498.0	4908.0	6365.0	7270.0
Portfolio investment, liabilities	0.0	0.0	0.0	0.0	400.0	143.0	1176.0	22.0	1295.0	1827.0	691.0
Bond, equity, and loan issues	0.0	0.0	125.0	67.0	95.0	398.0	1211.0	846.0	3817.0	4247.0	3804.0
Romania											
Inward direct investment	0.0	0.0	40.0	77.0	94.0	341.0	419.0	263.0	1215.0	2031.0	1041.0
Portfolio investment, liabilities	0.0	0.0	0.0	0.0	0.0	0.0	54.0	193.0	540.0	129.0	-724.0
Bond, equity, and loan issues	0.0	12.0	0.0	169.0	60.0	101.0	369.0	1440.0	753.0	338.0	176.0
Russia											
Inward direct investment	0.0	0.0	0.0	700.0	900.0	690.0	2065.0	2579.0	4864.0	2764.0	3309.0
Portfolio investment, liabilities	0.0	0.0	0.0	0.0	0.0	-93.0	-739.0	4584.0	17796.0	6293.0	-1286.0
Bond, equity, and loan issues	0.0	0.0	0.0	756.0	1308.0	1780.0	2093.0	4623.0	17148.0	13156.0	167.0
Slovak Republic											
Inward direct investment	84.6	62.0	196.7	50.0	198.8	269.9	236.1	350.8	173.7	562.1	354.3
Portfolio investment, liabilities	0.0	0.0	73.0	0.0	464.6	304.5	53.5	28.9	92.7	841.4	405.0
Bond, equity, and loan issues	0.0	0.0	0.0	0.0	240.0	374.0	540.0	927.0	879.0	1501.0	995.0
Slovenia											
Inward direct investment	0.0	0.0	41.4	111.0	112.6	128.1	177.4	194.0	375.2	247.9	181.2
Portfolio investment, liabilities	0.0	0.0	0.0	0.0	4.5	0.0	15.5	630.5	236.1	119.8	361.6
Bond, equity, and loan issues	0.0	0.0	0.0	0.0	115.0	150.0	278.0	827.0	487.0	647.0	688.0
Tajikistan											
Inward direct investment	0.0	0.0	0.0	9.0	9.0	12.0	20.0	25.0	30.0	12.0	21.0
Portfolio investment, liabilities	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Bond, equity, and loan issues	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	75.0	0.0
Turkmenistan											
Inward direct investment	0.0	0.0	0.0	11.3	79.0	103.0	64.0	108.1	107.9	62.3	88.9
Portfolio investment, liabilities	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Bond, equity, and loan issues	0.0	0.0	0.0	0.0	0.0	0.0	72.0	0.0	0.0	612.0	0.0
Ukraine											
Inward direct investment	0.0	0.0	0.0	170.0	200.0	159.0	267.0	521.0	623.0	743.0	496.0
Portfolio investment, liabilities	0.0	0.0	0.0	0.0	0.0	0.0	16.0	199.0	1605.0	-1379.0	-75.0
Bond, equity, and loan issues	0.0	0.0	0.0	0.0	70.0	0.0	22.0	0.0	541.0	1100.0	291.0
Uzbekistan											
Inward direct investment	0.0	0.0	0.0	9.0	48.0	73.0	100.0	50.0	167.0	226.0	201.0
Portfolio investment, liabilities	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Bond, equity, and loan issues	0.0	0.0	0.0	0.0	0.0	38.0	241.0	14.0	41.0	0.0	142.0

II. COMPILATION OF EXPLANATORY VARIABLES USED IN REGRESSIONS

Restrictions on Capital Flows

We quantified the existence and magnitude of capital controls in transition economies on the basis of qualitative information reported in the IMF's *Annual Report on Exchange Arrangements and Restrictions*. For each country we constructed separate indices of restrictions on foreign direct investments and portfolio investments, as well as a composite index of overall restrictions, using the qualitative information reported under the subcategory "Capital Account."

The average values of the indices are reported in Table 5 for all countries in our sample. Larger values indicate larger restrictions on flows. The categories covered by the ***index of direct investment restrictions*** are approval requirements, extent to which profits can be remitted abroad, ease in liquidating assets, and preferential treatment of direct investment.[22] The index ranged from -0.2 to 6, where 6 reflects the most restrictive environment for direct investment. The table shows that Estonia had the least restrictive environment, with an overall *negative* value for the direct investment index, due to the absence of direct investment restrictions *and* the existence of subsidies to foreign direct investment inflows. At the opposite end of the scale is Belarus, whose direct investment regulations are the most restrictive.

The ***index of portfolio restrictions*** was constructed based on the 1997–2000 issues of the IMF's *Report* (which in fact cover the years 1996–99 respectively). Prior to these issues, the *Report* did not contain a sufficiently detailed discussion of controls on capital and money market instruments. To deal with this, we assumed that the measure constructed for 1996 could also applied to the earlier years; this implies that there is very little time variation in this data. The index rates both inward and outward controls according to their restrictiveness (no approval requirement, registration, approval, and outright prohibition). As shown in Table 5, the Baltic countries are the most open while the other FSU countries are the most restrictive, while Russia is similar to the average CEE country.

Market Perceptions

Market perceptions of "country risk" are represented by ratings of international private companies such as the *Institutional Investor*, *Euromoney*, and the *Economist Intelligence Unit*. We used the ratings issued by *Euromoney* because it provides virtually complete coverage of the transition economies during our sample period. Since each publication issues its ratings twice a year (in March and in September), we constructed simple annual averages based on the two published ratings. For both series, ratings range from 1 to 100, where 100 represents the best rating.

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[22] A detailed description on how these categories were weighted and rated is available from the authors on request.

Table 5. All Transition Economies: Indices of Restrictions on Capital Flows

	Direct investment restrictions Index, average 1993-99	Portfolio investment restrictions Index, average 1996-99
Albania	1.80	1.00
Armenia	0.43	0.00
Azerbaijan	0.80	0.63
Belarus	3.37	1.00
Bulgaria	1.27	0.38
Croatia	0.94	0.63
Czech Republic	0.29	0.09
Estonia	-0.03	0.00
Georgia	0.80	0.50
Hungary	1.12	0.44
Kazakhstan	2.64	1.00
Kyrgyz Republic	1.37	1.00
Latvia	1.40	0.00
Lithuania	2.80	0.00
Macedonia	0.80	0.88
Moldova	3.11	0.63
Poland	1.64	0.46
Romania	2.80	1.00
Russia	2.57	0.63
Slovak Republic	0.82	0.61
Slovenia	1.79	0.71
Tajikistan	1.80	1.00
Turkmenistan	2.80	1.00
Ukraine	1.80	1.00
Uzbekistan	2.80	1.00
Averages		
Central and Eastern Europe	1.33	0.62
Baltic countries	1.39	0.00
Russia	2.57	0.63
Other countries of the former Soviet Union	1.98	0.80

Source: Authors' calculations based on IMF *Annual Report on Exchange Arrangements and Restrictions*

The *Euromoney* ratings are computed on the basis of assessments of country-risk experts using the following nine weighted categories: economic performance (25 percent), political risk (25 percent), external debt indicators (10 percent), debt in default or rescheduled (10 percent), credit ratings (10 percent), access to bank finance (5 percent), access to short-term finance (5 percent), access to capital markets (5 percent), and discount on forfeiting (5 percent). The average rating for the transition countries for 1999 was 38.6 out of a total of 100. Table 6 (first column) shows that the Central and East European countries and the Baltics scored much better than Russia and other FSU countries.

Institutional and Legal Proxies

For institutional and legal proxies that capture governance-type issues and the existence of red tape, we use a World Bank data set compiled for the World Development Report in 1997. It is based on a cross-country survey of firms (local or with foreign participation). The aim of the survey was to capture the institutional uncertainty within a particular country from the viewpoint of local entrepreneurs, as opposed to the opinion of Western or international experts. The survey also recorded size, location, and whether or not the responding firm had foreign participation.[23]

The survey was divided into five broad sections. The first is "predictability of laws and policies"—whether changes in laws and policies are uncertain and whether the government takes into account concerns raised by business. The second is "political instability and security of property"—whether there is uncertainty in the political process and whether that has an impact on business decisions and property rights. The third, "overall government-business interface," asks participants to judge whether there are strong obstacles in certain policy areas like inflation, corruption, tax regulations etc. The fourth, "bureaucratic red tape," aims to evaluate the frequency, severity, and uncertainty of "additional payments" that need to be made. Finally, the survey asks for a rating of the efficiency of government in providing services such as customs, roads, and telecommunications.

The responses to each of the questions was converted into a 1 to 6 numerical scale, where 6 represented the worst perception of domestic institutional constraints. To obtain a general perception of each of the five categories and a total country score, we average the five sections' responses, and in Table7 (third and fourth columns) we report the final country scores based on all and foreign participation averages. The average for all the transition countries surveyed based on averaging across all firms was 3.85 while it was 3.75 when based on averaging across firms with foreign participation. In general, central and eastern Europe and the Baltic countries scored best, followed by Russia and the other FSU. Interestingly, firms with foreign participation rated all subgroups better than all firms. Also interesting is the fact that while all firms rated central and eastern Europe better than the Baltic countries, firms with foreign participation did not.

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[23] For more details, see the World Bank's 1997 *World Development Report* and Brunetti, Kisunko and Weder (1998) (website http://www.unibas.ch/wwz/wifor/staff/bw/survey/index.html.)

Table 6. All Transition Economies: Average Country Scores from Euromoney and World Bank Survey[a]

	Euromoney total rating [b]	Survey across all firms [c]	Survey across firms with foreign participation [c]
Albania	18.05	3.70	3.81
Armenia	25.43	3.68	3.70
Azerbaijan	33.38	4.03	3.71
Belarus	28.40	4.33	4.07
Bulgaria	38.60	4.40	n.a.
Czech Republic	61.41	3.40	3.39
Estonia	54.32	3.33	3.14
Georgia	26.25	3.84	3.79
Hungary	65.01	3.30	3.22
Kazakhstan	40.49	4.14	4.17
Kyrgyz Republic	32.83	4.05	4.06
Latvia	50.54	3.77	3.85
Lithuania	49.44	3.76	3.62
Macedonia	24.16	3.49	3.09
Moldova	30.91	4.08	4.15
Poland	62.31	3.66	3.71
Russia	21.94	3.95	3.90
Slovak Republic	48.69	3.78	3.80
Ukraine	30.28	4.11	3.94
Uzbekistan	29.29	4.13	4.12
Averages			
All	38.58	3.85	3.75
Central and eastern Europe	45.46	3.68	3.50
Baltic countries	51.43	3.62	3.54
Russia	21.94	3.95	3.90
Other countries of the former Soviet Union	30.80	4.04	3.97

Source: World Bank World Development Report 1997 Private Sector Survey, available at http://www.worldbank.org/html/prdmg/grthweb/wdr97.htm; authors' computations.

[a] Surveys for Croatia, Romania, Slovenia, Tajikistan, and Turkmenistan were not conducted.

[b] Ratings range from 1 to 100, where 100 represented the best rating or the least chance of default.

[c] Scores were averaged based on a 1 to 6 scale where 6 represented the worst perception of domestic institutional constraints

In our regressions modeling portfolio investment, we also used an *EBRD index of the degree of development of security markets and nonbank financial institutions*. For this index, (1) reflects little progress, (2) implies that securities exchanges and brokers have been set up along with some trading in bonds and securities, although the legal and regulatory framework dealing with such trading is still in its early stages, (3) reflects a large degree of private issues together with a more advanced legal framework, and the emergence of nonbank financial institutions like pension funds, and (4) means a highly developed market. The regional averages for this index exhibit little time variance. The other FSU countries lag behind at 1.5 while the CEE and Baltics average 2.3. Russia jumped to a rating of 3 in 1996, putting it at the same level of development as the more advanced CEE countries, such as the Czech Republic, Hungary, and Poland.

Indicators of the Privatization Method

To characterize the privatization method, we constructed three indicator variables: *prsal* (privatization through direct sales), *prvou* (privatization through auctions involving vouchers, this is sometimes referred to as "mass privatization"), and *prins* (insider privatization—either voucher privatizations with significant concessions to insiders, or management-employee buy-outs). Following the approach used by the EBRD in their 1997 summary of privatization methods,[24] we assigned a value of 1 to the series if the method it was supposed to characterize constituted the "primary" privatization method during this year, a 0.5 if it constituted the "secondary" privatization method, and a 0.25 if it constituted the "tertiary" method. If no privatization at all took place, all three indices were assigned a value of zero.

Our basic source on how each country privatized in each year was the EBRD's chronicle of large scale privatization as it appears in the country summaries of each *Transition Report*. We chose this over a pure cross-sectional index (which could have been derived directly and much more easily from the EBRD's 1997 summary of privatization methods) because we wanted to capture important changes in the privatization method over time. For example, a switch from, say, insider privatization to sales to outsiders could have led to a spike in direct investment, which a purely cross-sectional variable would be unable to explain. The disadvantage is that our classification necessarily involves some judgment, over and above the judgment applied by the EBRD itself. The resulting three series are reproduced in Table 7.

[24] 1997 *Transition Report*, Table 5.7.

Table 7. Dummy Variables for Privatization Method

		1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Albania	direct [a]	0	0	0	0	0	0	0.5	0	0	0
	voucher [b]	0	0	0	0	0	1	1	0	0	0.5
	insider [c]	0	0	0	0	0	0	0	0	0	1
Armenia	direct [a]	0	0	0	0	0	0	0	0.25	0	1
	voucher [b]	0	0	0	0	0	1	1	1	1	0
	insider [c]	0	0	0	0	0	0.5	0.5	0.5	0.5	0
Azerbaijan	direct [a]	0	0	0	0	0	0	0	0	0.5	0
	voucher [b]	0	0	0	0	0	0	0	1	1	0
	insider [c]	0	0	0	0	0	0	0	0.5	0	0
Belarus	direct [a]	0	0	0	0	0	0	0	0	0	0
	voucher [b]	0	0	0	0	0	0	0	0	0	0
	insider [c]	0	0	0	1	1	1	1	0	0	0
Bulgaria	direct [a]	0	0	0	0	0	0	0.5	1	1	1
	voucher [b]	0	0	0	0	0	0	1	0.5	0.5	0.5
	insider [c]	0	0	0	0	0	0	0	0	0	0
Croatia	direct [a]	0	0	0	0	0	0	0	0	0	0
	voucher [b]	0	0	0	0	0	0	0	0	1	1
	insider [c]	0	0	1	1	1	1	1	1	0	0
Czech Republic	direct [a]	0	0	0.5	0.5	0.5	1	1	1	0.5	1
	voucher [b]	0	0	1	1	1	0.5	0	0	1	0
	insider [c]	0	0	0	0	0	0	0	0	0	0
Estonia	direct [a]	0	0	0	1	1	1	1	1	1	1
	voucher [b]	0	0	0	0.5	0.5	0.5	0.5	0.5	0	0
	insider [c]	0	0	0	0	0	0	0	0	0	0
Georgia	direct [a]	0	0	0	0	0	0	0	1	1	1
	voucher [b]	0	0	0	0	0	1	1	0	0	0
	insider [c]	0	0	0	0	0	0.5	0.5	0	0	0
Hungary	direct [a]	1	1	1	1	1	1	1	1	1	1
	voucher [b]	0	0	0	0	0	0	0	0	0	0
	insider [c]	0	0	0	0	0	0	0	0	0	0
Kazakhstan	direct [a]	0	0	0	0.5	0.5	0.5	1	1	1	0
	voucher [b]	0	0	0	1	1	1	0.5	0.5	0	0
	insider [c]	0	0	0	0	0	0	0	0	0	0
Kyrgyztan	direct [a]	0	0	0	0	0	0.5	0.5	0.5	1	0
	voucher [b]	0	0	0	0	0	1	1	1	0	0
	insider [c]	0	0	1	1	1	0	0	0	0	0
Latvia	direct [a]	0	0	0	0	0.5	0.5	0.5	0.5	1	0
	voucher [b]	0	0	0	0	1	1	1	1	0	0
	insider [c]	0	0	0	0	0	0	0	0	0	0

Table 7 (concluded). Dummy Variables for Privatization Method

		1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Lithuania	direct [a]	0	0	0	0	0	0.5	1	1	1	1
	voucher [b]	0	0	1	1	1	1	0	0	0	0
	insider [c]	0	0	0.5	0.5	0.5	0	0	0	0	0
Macedonia, FYR	direct [a]	0	0	0	0	0	0	0	0	0	0.5
	voucher [b]	0	0	0	0	0	0	0	0	0	0
	insider [c]	0	0	0	1	1	1	1	1	1	1
Moldova	direct [a]	0	0	0	0	0	0.5	0.5	0.5	1	1
	voucher [b]	0	0	0	0	1	1	1	0	0	0
	insider [c]	0	0	0	0	0	0	0	0	0	0
Poland	direct [a]	0	0.25	0.25	0.25	0.25	0.25	0.25	0.25	1	1
	voucher [b]	0	0	0	0	0	1	1	1	0	0
	insider [c]	1	1	1	1	1	0.5	0.5	0.5	0	0
Romania	direct [a]	0	0	0	0.5	0.5	0.5	0.25	0.5	0	1
	voucher [b]	0	0	0	0	0	0	1	1	0	0
	insider [c]	0	0	0	1	1	1	0.5	0	0	0
Russia	direct [a]	0	0	0	0	0.25	0.5	0.5	0.5	0	0
	voucher [b]	0	0	1	1	0.5	0	0	0	0	0
	insider [c]	0	0	0	0	1	1	1	1	0	0
Slovak Republic	direct [a]	0	0	0.5	0.5	0.5	0.5	0.5	0.5	1	0
	voucher [b]	0	0	1	1	1	0.25	0.25	0.25	0	0
	insider [c]	0	0	0	0	0.25	1	1	1	0	0
Slovenia	direct [a]	0	0	0	0	0	0.25	0.25	0.25	0.25	0.25
	voucher [b]	0	0	0	0	0	0.5	0.5	0.5	0.5	0.5
	insider [c]	0	0	0	0	0	1	1	1	1	1
Tajikistan	direct [a]	0	0	0	0	0	0	0	0	1	1
	voucher [b]	0	0	0	0	0	0	0.5	0.5	0	0
	insider [c]	0	1	1	0	0	0	1	1	0	0
Turkmenistan	direct [a]	0	0	0	0	0	0	0	0	1	1
	voucher [b]	0	0	0	0	0	0	0	0	0	0
	insider [c]	0	0	0	0	0	0	0	0	0	0
Ukraine	direct [a]	0	0	0	0	0	0	0.25	0.25	0.5	0.5
	voucher [b]	0	0	0	0	0	0.5	1	1	1	1
	insider [c]	0	0	1	1	0	1	0.5	0.5	0	0
Uzbekistan	direct [a]	0	0	0	0	0	0	0	0	0	0
	voucher [b]	0	0	0	0	0	0	0.5	0.5	0	0
	insider [c]	0	0	0	0	1	1	1	1	0	0

[a] "direct" refers to privatization through direct sales.

[b] "voucher" refers to privatization through auctions involving vouchers (also known as "mass privitization").

[c] "insider" refers to insider privitization - either voucher privatization with significant concessions to insider, management-employee buy-outs.

III. EXTREME BOUNDS ANALYSIS

We now present results from an "extreme bounds analysis" in the spirit of Leamer (1983) to test the robustness of four models we derived using a general to specific approach, namely Model 1 and 5 of Table 2 and Model 1 and 4 of Table 3. The general to specific approach is of course itself intended to generate robust parsimonious models. However, its results may be path dependent, in the sense that the final model could depend on the order in which variables were generated from the general model. Depending on the dataset, this may or may not be an issue. In this paper, we use Leamer's approach to determine ex post whether path dependency was in fact an issue, by systematically adding sets of variables that were eliminated during the selection process back into the model, and examining the extent to which this affect the estimation results for the variables included in the parsimonious model.

We apply Levine and Renelt's (1992) version of the Leamer approach, using a *Stata* module written by Gregorio Impavido (eba.ado, Version 1.2; this program is freely available through the *Stata* website). Denote v a specific variable of the specific model whose robustness we wish to examine, $\mathbf{x}$ a vector with the remaining variables in the model, and $\mathbf{z}$ a vector of three variables chosen from the pool $\mathbf{Z}$ of n variables that were eliminated in the process of selecting the model. Thus, $\mathbf{Z}$ consists of the variables that are not in $(v,\mathbf{x})$, but were contained in the general model from which the specific model was derived. Then, run the following regression for all $n!/(3!(n-3)!)$ possible combinations of $\mathbf{z}$, keeping track of the coefficient and standard error estimated for v:

$$y_{i,t} = a_0 + a_v v_{i,t} + \beta' \mathbf{x}_{i,t} + \gamma' \mathbf{z}_{i,t} + \varepsilon_{i,t}$$

Following Levine and Renelt, the lower extreme bound is defined by the three variable vector $\mathbf{z}_{min}$ which minimizes the estimate of a_v minus two standard deviations. The upper extreme bound is defined by the vector $\mathbf{z}_{max, \text{which}}$ maximizes the estimate of a_v plus two standard deviations. We say that v has a robust effect if a_v is significantly different from zero and of the same sign at both the upper and lower extreme bounds.

Tables 8 and 9 present the lower and upper extreme bounds for all regressors (except lagged dependent variables and constants) in the four models of interest. For comparison purposes, the baseline estimates from Tables 2 and 3 are also reproduced. For each of the four cases, the vector $(v,\mathbf{x})$ is simply the set of regressors from the earlier tables, while the n-variable pool $\mathbf{Z}$ from which the three variable vector $\mathbf{z}$ is taken is as follows (see Table 1 for abbreviations):

For Model 1 of Table 2: $n = 17$, and
$\mathbf{Z} =$ (*lppp, growth-1, fbal-1, mcp, li-1, li-2, war, war-1, li89, us3m, ltcomm, ldist, lwage, diir, ebtrde, prsal, prvou*)

For Model 5 of Table 2: $n = 22$ and
Z = (*lgdpd, growth-1, fbal-1, linfav, mcp, li-1, li-2, war, war-1, li89, us3m, ltcomm, ldist, lwage, diir, debtrde, ebtrde, prvou, wbpred, wbprop, wbgovbus, wbgoveff*)

For Model 1 of Table 3: $n = 28$ and
Z = (*lpop, lgdpd, lppp, growth, growth-1, fbal, fbal-1, linfav, mcp, li, li-1, li-2, war, war-1, natrr, li89, ltcomm, ldist, debtpc-1, debtpc-2, stdptd, stdptd-1, rtbill0, tbilld, piir, piir-1, ebsec, em_res*)

For Model 4 of Table 3: $n = 35$ and
Z = (*lgdpd, lppp, growth, growth-1, fbal, fbal-1, linfav, linfav-1, err2, mcp, li, li-1, li-2, war, war-1, natrr, li89, ltcomm, ldist, respc-1, debtpc-1, debtpc-2, stdptd, stdptd-1, rtbill0, tbilld, piir, piir-1, ebsec-1, wbpred, wbgovbus, wbredtap, wbgoveff, em_res, em_res-1*)

Thus, the greater parsimony of the portfolio investment flow models of Table 3 is reflected in larger pools of excluded variables against which the robustness of the surviving variables is tested

The results are summarized as follows. In the two direct investment models (Table 8), the main economic variables are robust with some exceptions. There is no sign reversal (i.e. the signs of the upper and lower bound estimates of α_v are always the same and equal to the sign of the baseline coefficient), but in some cases the lower bound of a positive coefficient is no longer significantly greater than zero, or the upper bound of a negative coefficients is no longer significantly smaller than zero. The main conclusions from the section on direct investment are clearly robust. In the portfolio regressions, the picture is different. Of the six baseline coefficients from Model 1 shown in Table 9, four are not robust. The two exceptions are the indicator of securities market development (*debsecse*), which is barely robust, and the market perceptions indicator. In Model 4 there are only three coefficients of interest to begin with, of which one—the World Bank property rights indicator—is very robust, one—the level of securities market development—is again just robust, and one is not robust. Thus, we find only two robust regressors for portfolio investment in transition economies.

Table 8. Extreme Bounds Analysis: Foreign Direct Investment
(Dependent variable: natural log of (1 + inward foreign direct investment), OLS estimates)

		Model 1 of Table 2						Model 5 of Table 2					
		Baseline		Lower Bound		Upper Bound		Baseline		Lower Bound		Upper Bound	
		Coeff.	t-value	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value
Scale Variables	*lpop*	0.29	3.95	0.11	1.02	0.39	2.15	0.30	2.18	0.10	0.60	0.42	2.24
	lgdp	0.21	2.26	0.15	1.02	0.41	3.07	...	...	...	...	...	...
	lppp	...	...					0.37	3.22	0.17	0.74	0.56	3.93
Macro	*growth*	0.01	1.23	0.01	0.75	0.01	1.70	0.02	2.28	0.01	1.43	0.02	2.54
	fbal	0.03	3.05	0.02	2.10	0.03	2.84	0.02	2.79	0.02	1.33	0.03	3.06
	linfav	0.29	3.35	0.24	2.63	0.35	3.57	...	...	...	...	...	...
	linfav-1	-0.16	-2.38	-0.20	-2.84	-0.13	-1.77	-0.18	-3.23	-0.25	-3.80	-0.14	-2.16
	err2	0.28	2.73	0.24	2.19	0.33	2.89	0.45	3.32	0.35	2.26	0.50	3.50
Liberalization	*li*	1.39	3.42	1.20	2.79	2.98	2.69	...	...	...	...	...	...
	Dli	...	...					1.75	2.95	1.15	1.13	2.06	2.98
Market perc.	*em_total*	1.39	2.56	1.25	2.20	1.53	2.74	1.29	1.97	0.01	1.61	0.01	2.19
Initial conditions and specific FDI determinants	*NatRR*	0.57	3.99	0.40	2.40	0.59	4.08	1.22	6.69	1.00	4.61	1.30	6.84
	diir-1	-0.11	-2.30	-0.14	-2.77	-0.06	-0.77	-0.12	-2.68	-0.16	-2.94	-0.06	-0.66
	debtrde	0.24	2.45	0.06	0.39	0.28	2.75	...	...	...	...	...	...
	psal							0.40	2.56	0.29	1.78	0.45	2.70
	prins	-0.47	-3.98	-0.54	-4.19	-0.42	-3.48	-0.42	-3.27	-0.53	-3.76	-0.37	-2.71
Russia dummy	*rus*	...	...	...	...	...	...	-1.13	-3.84	-1.39	-3.99	-0.98	-3.04
WB governance	*wbredtape*	...	...	...	...	...	...	-1.08	-3.73	-1.48	-2.93	-0.73	-1.51
k		16		19		19		17		20		20	

Notes: Regressions also included lagged dependent variable, constant and in the extreme bounds regressions, three additional regressors (coefficients not shown). See text for methodology with which extreme bounds were computed.

Table 9. Extreme Bounds Analysis: Portfolio Investment
(Dependent variable: portfolio investment liabilities, OLS estimates)

		Model 1 of Table 3						Model 4 of Table 3					
		Baseline		Lower Bound		Upper Bound		Baseline		Lower Bound		Upper Bound	
		Coeff.	t-value	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value	Coeff.	t-value
Macro	*linfav-1*	-7.45	-1.89	-11.05	-2.06	-0.24	-0.04	...	...	...	...	...	...
	err2	18.12	2.16	11.05	1.19	22.50	2.62	...	...	...	...	...	...
Market percep.	*em_total*	2.04	3.75	1.84	3.26	2.15	3.93	...	...	...	...	...	...
US interest rate	*US3m*	-11.79	-2.18	-16.39	-2.82	-7.70	-1.33	-8.48	-1.57	-13.36	-2.01	-5.20	-0.87
Specific PI	*ebsecse*	...	...	...		...		26.12	3.91	16.05	1.65	49.66	2.87
determinants	*debsecse*	42.33	2.66	31.47	1.84	47.10	2.88	...	...				
	resapc1	0.07	4.43	0.03	1.25	0.07	4.66	...	...	...			
WB governance	*wbprop*	...	...	...	...	...	...	-48.17	-5.10	-76.66	-5.69	-39.52	-3.10
k		8		11		11		5		8		8	

Notes: Regressions also included lagged dependent variable, constant and in the extreme bounds regressions, three additional regressors (coefficients not shown). See text for methodology with which extreme bounds were computed.

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