EUROPEAN CENTRAL BANK
EUROSYSTEM

WORKING PAPER SERIES
NO 871 / FEBRUARY 2008

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by Elitza Mileva

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Elitza Mileva[2]

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1 This paper was written during a 2006 summer internship at the European Central Bank (ECB). The opinions expressed in this paper are those of the author and do not necessarily reflect the views of the European Central Bank. The author is indebted to Adalbert Winkler of the ECB and Darryl McLeod of Fordham University for their support and advice.

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ISSN 1561-0810 (print)
ISSN 1725-2806 (online)

CONTENTS

Abstract

During the 1990s most transition economies undertook a series of market reforms, including opening their capital accounts. This paper uses static and dynamic panel techniques to assess the effect of FDI, foreign loans and portfolio flows on domestic investment. In this partial adjustment setup, capital flows can have contemporaneous and long-term effects on investment. For countries with less developed financial markets and weaker institutions, our estimates for the FDI coefficient are larger than one, suggesting FDI stimulates investment in other sectors of the economy ("spillover" effects). Over the longer term, each dollar of FDI generates at least one additional dollar of local investment. In transition countries with stronger governance indicators, long-term loans raise domestic investment and FDI produces small spillover effects in the long run. Limited portfolio flows into the transition economies have no effect on capital formation in either group.

Keywords: transition economies; capital inflows; domestic investment; international financial integration

JEL classification: F21, F30, P33

Non-technical summary

In the 1990s capital account liberalization was an important part of the market reforms introduced by governments in the transition economies. As a result, these countries attracted large amounts of foreign capital – $106 of the $271 billion net private capital inflows to the emerging markets and developing countries in 2005, for example. Excluding Russia, the transition economies' net private capital inflows in 2005 were $105 billion and a third of these flows were used to finance a current account deficit of $34 billion. In contrast, all emerging markets and developing countries as a group ran a current account surplus of $438 billion and used the capital flows to accumulate foreign reserves (WEO and IFS, 2006).

Bosworth and Collins (1999) examine the capital flows – investment relationship in a set of 60 developing countries, none of which economies in transition. We follow their methodology and consider the three types of long-term private capital flows: foreign direct investment (FDI), loans and portfolio flows. Applying the same econometric techniques as in Mody and Murshid (2005), we use two specifications of our basic model – a static one, which shows the contemporaneous effects of capital flows on investment, and a dynamic one, which demonstrates the long-term impact of foreign financing. Our sample consists of 22 transition countries during the period 1995 to 2005.[3] The two earlier papers allow for an insightful comparison with the rest of the developing world. Although in most respects the transition economies are not unlike the other low- and middle-income countries, our results reveal significant differences between countries at an advanced stage of transition compared to the ones, which lag behind.

As in most developing countries, FDI constituted the largest portion of capital inflows to the transition economies – around half of the total. Our full-sample results suggest that beyond adding to existing capital stock, FDI may stimulate small amount of additional investment in other sectors of the host economy ("crowding in" or "spillover" effects). The next step is to divide these transition countries into two groups: new EU member states, acceding and candidate countries (as of 2005) and the remaining

[3] Our sample includes 11 new EU member states, acceding or candidate countries as of 2005 (Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Latvia, Lithuania, FYR Macedonia, Poland, Romania and Slovakia) and 11 other transition economies (Albania, Armenia, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Moldova, Russia, Tajikistan, Ukraine and Uzbekistan).

transition economies, that is the CIS members and Albania (see footnote 3). As expected, the first group scores higher on the EBRD transition index (i.e. complete or nearly-complete transition to market economy), while the second group has weaker institutions and less developed financial markets as indicated by low EBRD indicators. In the countries from the first group FDI does not produce significant spillovers. In the less advanced transition economies, however, each dollar of FDI creates additional 84 cents of investment by local firms in the short run, while the effect is even larger in the long term – at least one for one. Limited sources of local financing as well as the high risk premiums the countries in this group require mean that foreign investors are better off entering these markets with their own capital.

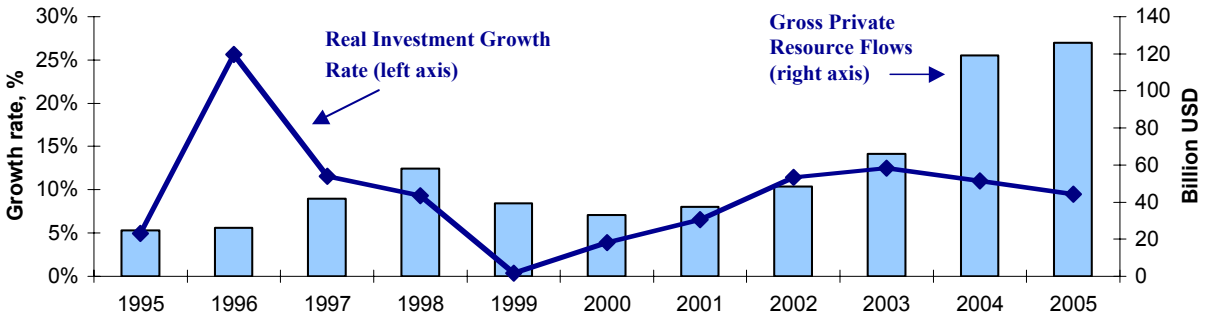
The second largest type of foreign capital flow into the transition countries is loans. The importance of loan flows grew toward the end of the sample period, as many foreign banks acquired subsidiaries in the transition countries. In fact, in 2003, the average asset share of foreign-owned banks was 54 percent (that share was even higher in the new EU member states). Thus, a large part of the loan inflows were actually loans from parent banks to their local subsidiaries. We find that around 50 cents of each dollar of foreign loans are used for fixed capital formation both in the short and long run. Loans have no impact on investment in the countries with low EBRD transition indicators. On average the ratio of foreign loans to PPP GDP in the new EU member states, acceding and candidate countries was six times larger than the same ratio for the other sub-sample. This shows that the countries with better-developed financial markets attract more foreign capital in the form of loans and use a large portion of it directly for investment.

Finally, our regressions yield no significant coefficients for portfolio flows in either group. The reason for this is the relatively underdeveloped equity and bond markets in the transition countries. The average 2004 stock market capitalization as a share of GDP in the transition economies, which do have stock markets, was less than half that in the countries in East Asia and the Pacific. Moreover, portfolio flows have been much larger than loans in the low- and middle-income countries as a group since the beginning of the 1990s. Thus, with respect to portfolio investment, the transition countries have yet to catch up with their peers.

1. Introduction

In the 1990s the transition economies implemented extensive reforms to move from central planning to market economy. Since 1995 real domestic investment growth in these countries has averaged a robust 10 percent annually (see figure 1). The transition process invariably included opening up to international trade and capital flows and as a result these economies attracted large amounts of foreign capital. Gross private resource flows to the transition economies increased fivefold between 1995 and 2005, about twice the rate to all developing countries. In 2005 the transition economies attracted $106 of the $271 billion net private capital inflows to all developing countries. The utilization of these flows was also quite different: excluding Russia, the transition economies' net capital inflows of $105 were used in part to finance a $34 billion current account deficit,[4] whereas the developing countries as a group used their net capital inflows to accumulate foreign reserves running a current account surplus of $438 billion in 2005 (WEO and IFS, 2006). Given this difference in the use of capital flows, this paper investigates how various types of capital inflows affect investment in the transition economies.

Figure 1: Real investment growth rate and gross private resource flows in the transition economies, 1995 – 2005



Source: GDF (2005), WDI (2005) and author's calculations.

There are two approaches to the analysis of the effects of foreign capital flows on host economies. One method is to focus on GDP growth as the dependent variable. Gruben and McLeod (1998) first test empirically the relationship between growth and disaggregated capital flows in a panel of 18 mainly Asian and Latin American developing

[4] This total excludes Russia, which has been running current account surpluses in most years.

countries and find that both FDI and portfolio flows have significant positive impact on real GDP growth. The second approach, which this paper follows, comes from the neoclassical growth literature and uses fixed capital formation instead. Two previous papers by Bosworth and Collins (1999) and Mody and Murshid (2005) study the relationship between domestic investment and the three main types of capital inflows (FDI, loans and portfolio flows) in a panel of around sixty counties, but do not include any transition economies. We apply their methodology to the case of the transition economies. Our results show that FDI stimulates investment by other firms in host countries with relatively weak institutions and underdeveloped financial systems: each dollar of FDI is directly related to 84 cents of additional domestic capital formation in the short run and at least a dollar in the long term. Foreign loans have a positive effect on capital accumulation in the countries with bigger and more mature domestic financial markets: about half of loan flows add directly to domestic investment. Finally, portfolio flows do not contribute to higher investment rates, perhaps due to the relatively underdeveloped equity and bond markets characteristic of most transition countries during our sample period.

The remainder of the paper is organized as follows: the next section reviews the literature on the impact of capital flows on domestic investment; section 3 explains the methodology and data used in the empirical analysis; section 4 analyzes the results and the final section draws conclusions.

2. The capital flows – domestic investment relationship in the literature

Capital flows can affect domestic investment in several ways. First, FDI contributes directly to new plant and equipment ("greenfield" FDI). Second, FDI may produce investment spillovers beyond the direct increase in capital stock through linkages among firms. For example, multinational corporations (MNCs) may purchase inputs form domestic suppliers thereby encouraging new investment by local firms. FDI for mergers and acquisitions (M&A) does not contribute to capital formation directly unless the new foreign owners modernize or expand their acquisitions by investing in new technology. FDI may also "crowd out" domestic investment, if MNCs raise productivity and force

local competitors out of the market. This is usually the case when MNCs use imported inputs or enter sectors previously dominated by state-owned firms. Finally, FDI, foreign loans and portfolio investment may reduce interest rates or increase credit available to finance new domestic investment. On this last point, a study by Harrison, Love and McMillan (2004) finds that FDI in particular eases the financing constraints of firms in developing countries and that this effect is stronger for low-income than for high-income regions.

In addition to these direct effects, foreign capital can have indirect impact on domestic investment through what Kose, Prasad, Rogoff and Wei (2006) call "collateral benefits". To attract foreign investors governments of developing countries have to implement sound macroeconomic policies, develop their institutions and improve governance. Loans and portfolio flows also contribute to the deepening and broadening of financial markets. In addition to the "collateral benefits", FDI usually results in the transfer of managerial skills and new technology and, consequently, improves productivity. Lastly, even when not applied toward capital formation directly, foreign loans may be used to raise or smooth consumption, thus increasing GDP growth during periods of sluggish demand.

This paper focuses on the direct impact of capital inflows on domestic investment, because previous studies have not included the transition countries and comparisons with the other developing countries are useful. Also, the high variability of foreign capital flows and investment that characterizes the transition countries provides a good test of the direct effects of capital flows on domestic investment. Bosworth and Collins (1999) and Mody and Murshid (2005) both find that aggregate foreign capital flows raise domestic investment, but the evidence on the different types of flows is more nuanced. Bosworth and Collins show that the impact of a one-dollar increase of FDI is an 81-cent contemporaneous rise in domestic investment and that of foreign loans is a 50-cent rise, while they do not find a statistically significant relationship between portfolio flows and capital formation. The static analysis of our sample of transition economies produces results very similar to the ones by Bosworth and Collins. Mody and Murshid obtain coefficients of 0.72 for FDI, 0.61 for foreign loans and 0.46 for portfolio investment from their static specification and a long-run coefficient of above 3 for FDI from the dynamic specification. Mody and Murshid also divide their dataset in two periods and find that the

impact of both FDI and loan inflows declined in the 1990s relative to the 1980s even as developing countries relaxed their capital account restrictions in the 1990s.

The next section explains the ad-hoc model we employ to examine the impact of FDI, loans and portfolio flows on domestic investment as well as the econometric issues that arise from the model and data.

3. Methodology and data

Adhering to Mody and Murshid (2005), the effects of gross long-term capital inflows on domestic investment are modelled as follows,

$$I_{it} = \beta_1 K_{it} + \beta_2 X_{it} + \beta_3 I_{i,t-1} + \varepsilon_{it}. \qquad (1)$$

In equation (1) $i = 1,2,...,22$ refers to each of the 22 transition economies in our sample[5] and $t = 1995,...,2005$ denotes the time period. I_{it} is gross fixed capital formation measured in percent of GDP. K_{it} is a matrix of the three main components of foreign resource flows – FDI, loans and portfolio (equity and bonds) – measured in percent of PPP GDP. To the extent foreign investment goes toward the purchase of nontradables, GDP in purchasing power parity (PPP) dollars better represents the greater real purchasing power of foreign currency. If investment only involved tradables, however, the market exchange rate would be the appropriate deflator. [6] Using PPP exchange rates mitigates large swings in the nominal exchange rates, which artificially revalue or devalue the purchasing power of capital flows. Exchange rate fluctuations, such as the devaluations that took place in many transition countries in the 1990s, are not relevant to the longer time horizons of most investment projects.

For models such as equation (1) it is sometimes argued that net flows should be used rather than gross, because foreign capital may just replace domestic capital, if the latter leaves the host developing country. We focus on gross capital inflows instead of net

[5] Please refer to Table A1 in Appendix A for a list of the countries in our sample.
[6] The results we obtained from regressions on FDI, loans and portfolio measured as shares of GDP at market exchange rates are similar to the ones reported in the paper. The coefficient estimates, however, are somewhat smaller, which points to the validity of the purchasing power parity argument.

inflows for two reasons. First, foreign capital coming from the developed countries may be more productive than domestic capital and so examining its effect is important whether or not there is domestic capital flight. Second, during the period we study, recorded capital outflows were small in the transition economies and capital flew predominantly out of Russia (see table 1). Similarly, Russia accounted for most of the net errors and omissions, which are believed to account for unrecorded (or illegal) capital outflows from developing countries.

Table 1: Partial financial account balances for the transition economies, 1995-2004.

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
FDI, Loans, Portfolio: Assets	6,093	7,319	-511	81	-62	-1,767	-7,648	-14,331	-27,943	-24,712
of which Russia	6,333	8,404	3,660	3,821	2,905	1,777	-3,195	-7,144	-12,266	-12,822
FDI, Loans, Portfolio: Liabilities	36,332	35,780	98,023	54,006	35,867	24,820	26,591	41,555	75,349	123,886
Net Errors and Omissions	-6,814	-8,529	-6,678	-12,159	-8,431	-10,140	-6,390	-9,769	-13,369	-7,223
of which Russia	-9,115	-7,712	-8,808	-9,808	-8,555	-9,158	-9,350	-6,502	-8,228	-8,381

Source: Balance of Payments and International Investment Position Statistics, IMF (2005) CD-ROM and author's calculations. (Uzbekistan is excluded from Table 1 due to lack of data.)

The control variables included in X_{it} in equation (1) are the following: lagged real GDP growth to account for the accelerator effect; a measure of uncertainty; the change in the log terms of trade to gauge the price of imported capital goods; and the deviation of M2 from its three-year trend as a proxy for the liquidity available to finance investment. Following Serven (1998), to construct the measure of uncertainty we estimate an autoregressive model with a constant, one lag of the dependent variable and a time trend to forecast real GDP growth. The estimation is performed individually for each country and recursively, so that the forecast uses only information available up to the period when it is made. The actual measure of uncertainty is the mean absolute value of the one step ahead growth forecast error averaged over a three-year period. The third term on the right-hand side of equation (1), I_{it-1}, accounts for persistence in the dependent variable and its coefficient, $ß_3$, is restricted to zero in the static specification. Our sample consists of 22 transition economies (see table A1 in the appendix), for which data are available, and covers the period from 1995 to 2005. There are very few missing values. All data in our analysis are annual. The data on capital flows are from the Global Development Finance database and the rest of the variables come mainly from the World Development Indicators database, both provided by the World Bank (see table A2 in the appendix for a

detailed description of all variables and data sources). To fill in some missing values we have used also the 2005 Transition Report of the European Bank for Reconstruction and Development (EBRD).

Several econometric problems may arise from estimating equation (1). First, time-invariant country characteristics, such as geography and demographics, may be correlated with the explanatory variables. Second, following Bosworth and Collins (1999), the capital flows variables are assumed to be endogenous. Because causality may run in both directions – from capital inflows to investment and vice versa – these regressors may be correlated with the error term. Third, the presence of a lagged dependent variable in the dynamic specification gives rise to autocorrelation. Finally, our panel dataset has a short time dimension ($T = 11$) and a larger country dimension ($N = 22$). To cope with all of these issues we use the Arellano – Bond (1991) difference GMM estimator first proposed by Holtz-Eakin, Newey and Rosen (1988). Transforming the regressors by first differencing removes the unobserved country-specific effect. The endogenous regressors, FDI, loans and portfolio, are instrumented with their lagged levels as well as other exogenous instruments as discussed in the next paragraph.[7] The first-differenced lagged dependent variable is also instrumented with its past levels. And last, the Arellano – Bond estimator is designed to overcome problems encountered in small-T large-N panels (Roodman, 2006).

The exogenous instruments we use are the sum of the long-term capital inflows to the countries in our sample as a percentage of the sum of their PPP GDP (we label these 'regional flows'), and the EBRD transition index. The first instrumental variable, regional flows, does not depend on the individual countries in our sample and reflects a range of supply-side factors, such as economic conditions in the developed or the other developing countries (Bosworth and Collins, 1999). Other instruments proposed by the literature in place of the regional flows are the total flows to all developing countries as a share of the sum of their GDP, the US interest rates and the Euro area interest rates (see, for example, Calvo, Leiderman and Reinhart, 1992). However, in our case these instruments are either not orthogonal to the error process or perform worse than the regional flows variable.

[7] In fixed-effects instrumental variables estimation the first-stage statistics point to weak instruments. With weak instruments the fixed-effects IV estimators are likely to be biased in the way of the OLS estimators (see Staiger and Stock (1997) or Baum, Schaffer and Stillman (2003)).

The transition index is the average of the EBRD transition indicators, which consist of a number of different scores grouped by four main categories: enterprise privatization and restructuring, prices and trade liberalization, financial institutions development and infrastructure reforms. The indicators range from 1 to 4 with 1 representing little or no change from central planning and 4 indicating an industrialized market economy (EBRD, 2005).

4. Analysis of the empirical results

4.1 Capital flows and domestic investment in 22 transition economies

Table 2 reports our results for the full sample of 22 countries. In all six regressions the Arellano – Bond test for second-order correlation does not reject the null hypothesis of no autocorrelation. Since the Arellano – Bond test is applied to the residuals in differences, negative first-order autocorrelation is expected, because the differenced error terms in periods *t* and *t-1* both include $\varepsilon_{i,t-1}$. Therefore, it is meaningful to check for second-order correlation in differences in order to determine the presence of first-order correlation in levels. Table 2 also shows the p-values of the Sargan test of overidentifying restrictions, which does not reject the null hypothesis that the instruments are exogenous in any specification.

Table 2: The impact of FDI, loans and portfolio flows on investment in 22 transition economies, 1995 – 2005.

Dependent variable: Investment as a share of GDP

	Static Specification			Dynamic Specification				
Independent variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Foreign direct investment	0.74**	0.83*	0.77*	0.49*	0.47*	0.34	0.41*	
	(0.34)	(0.44)	(0.46)	(0.26)	(0.26)	(0.22)	(0.25)	
Loans	0.46**	0.41*	0.55*	0.35**	0.36*	0.21		0.31*
	(0.21)	(0.21)	(0.33)	(0.16)	(0.22)	(0.26)		(0.16)
Portfolio flows	0.17	0.18	-0.08	0.20	0.22	0.17		
	(0.23)	(0.28)	(0.85)	(0.17)	(0.24)	(0.22)		
Lagged investment				0.30**	0.39**	0.44***	0.30*	0.61**
				(0.14)	(0.16)	(0.14)	(0.18)	(0.26)
Uncertainty		-0.04	0.02		0.01	0.02	-0.02	0.04
		(0.06)	(0.05)		(0.06)	(0.06)	(0.08)	(0.05)
Deviation of M2/GDP		0.13***	0.03		0.12**	0.05	0.01	0.02
		(0.05)	(0.06)		(0.05)	(0.06)	(0.06)	(0.07)
Change in log terms of trade		-0.11	-0.17		0.17	-0.37	-1.30	-1.02
		(2.48)	(2.23)		(2.31)	(1.94)	(2.11)	(1.60)
Lagged growth			0.10*			0.11**	0.09**	0.12**
			(0.05)			(0.05)	(0.05)	(0.05)
Observations	219	212	195	197	195	195	195	195
Number of countries	22	22	22	22	22	22	22	22
Number of instruments	15	16	9	17	20	21	15	10
Arellano-Bond AR(1) test: p-value	0.54	0.87	0.73	0.20	0.18	0.06	0.16	0.12
Arellano-Bond AR(2) test: p-value	0.97	0.52	0.55	0.83	0.55	0.34	0.37	0.48
Sargan statistic: p-value	0.64	0.83	0.61	0.65	0.83	0.86	0.94	0.56
Long-run coefficients:								
Foreign direct investment				0.70	0.77		0.59	
Loans				0.50	0.59			0.79
Wald test p-values:								
FDI coefficient = 1	0.44	0.71	0.62	0.05	0.04		0.02	
Long-run FDI coefficient = 1				0.34	0.63		0.29	

Source: Author's regressions

Arellano - Bond (1991) difference GMM panel estimator (program in Stata: xtabond2 due to Roodman, 2006).

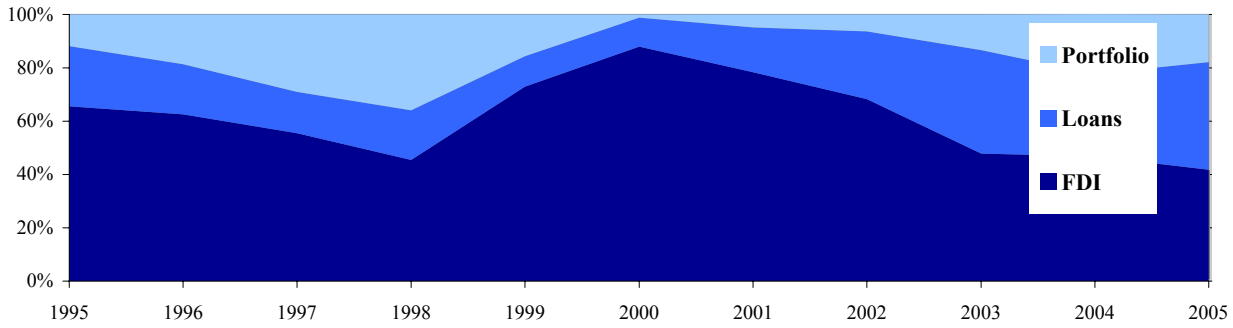
*Robust standard errors in parentheses (*** p<0.01, ** p<0.05, * p<0.1).*

The static specification in the first column shows that FDI has the strongest positive impact on domestic investment – each dollar of foreign flows results in 74 cents of domestic capital formation. The estimates from the regression with control variables (columns 2 and 3) are similar and the effect of FDI on capital accumulation is still the largest among the three types of flows.[8] As in most developing countries, FDI was the most important type of capital flow in the transition economies during our sample period – about half of total inflows (see figure 2). Cross-border M&A constituted about a third

[8] Additional robustness tests for all of our results, such as performing all regressions by dropping one country at a time, are available from the author upon request.

of FDI flows as many of the transition countries allowed foreign participation in their privatization efforts. After the financial crises of the late 1990s, the transition economies saw a significant fall in loan and portfolio flows, which raised the share of FDI. After a peak in 2000, however, the share of FDI started to decline.

Figure 2: Composition of private resource flows to 22 transition countries, 1995 - 2005 (in percent of total private resource flows)



Source: GDF (2005) and author's calculations (2005 figures exclude the Czech Republic).

Turning to the results from the dynamic specification, the short-run coefficient of FDI is 0.49 (column 4). The persistence in the dependent variable (the coefficient of lagged investment is 0.30) is less pronounced than the one reported by Mody and Murshid (2005) for the sample of developing countries they analyze (0.84), but it is still sizeable. The lower persistence in our sample may simply be due to shorter time series or to the higher volatility of investment rates in the transition economies due to the numerous structural reforms and bouts of economic instability that occurred in the 1990s. The latter is evidenced by the large within variance of the investment to GDP ratio reported in the descriptive statistics for this panel in table A3 in the appendix.

The long-term impact of capital flows on investment, β_{LR}, is calculated by setting I_{it} equal to I_{it-1} in equation (1) in steady state yielding

$$\beta_{LR} = \frac{\beta_1}{1-\beta_3}. \qquad (2)$$

Thus, the long-run coefficient of FDI is 0.70. Adding uncertainty, the deviation of M2/GDP and the change in log terms of trade to the regression does not change the

dynamic coefficients. Including lagged growth in the dynamic specification (column 6) renders the coefficients of FDI and loans insignificant. As discussed above, FDI can affect investment through two channels. One is via better technology and management skills, which raises productivity. Like any other capital inflow, FDI can also increase the total supply of savings to finance investment and, as a foreign currency inflow, it can help strengthen the exchange rate, making investment goods cheaper. This liquidity component of the impact of FDI, however, is the same as the effect of foreign loans and portfolio flows. Therefore, once we control for growth in our regression, the portion of the FDI effect that does not affect investment through productivity becomes correlated with loans or portfolio flows. Hence, if we regress investment on either only FDI or only loans as in columns 7 and 8 of table 2, the coefficients are similar to those in column 5 (i.e. 0.47 for FDI and 0.36 for loans).

Although the coefficients on FDI reported in table 2 are positive and statistically significant, their interpretation warrants further discussion. FDI flows consist of both "greenfield" investment and mergers and acquisitions (M&A). Since the former is included in the figure for domestic gross fixed capital formation, a coefficient of one in a regression on "greenfield" investment would only show this accounting fact. Therefore, a coefficient larger than one is required. At the same time, we have not been able to find reliable data on "greenfield" investment, which would allow us to run such a regression. We use cross-border M&A data from the *FDI Online* database of the United Nations Conference on Trade and Development (UNCTAD)(2005) to subtract from total FDI and thus approximate "greenfield" investment.[9] Calculated this way, "greenfield" investment flows average more than two thirds of FDI flows to the transition economies for the period 1995 – 2005. According to a Wald test, the null hypothesis that the FDI coefficients in the first three regressions are equal to one cannot be rejected. A coefficient of one for FDI and a share of "greenfield" investment of 2/3 of total FDI suggest that FDI may have contributed slightly to domestic investment beyond adding to existing capital stock. The results of the dynamic specification are similar for the long run: the coefficients on FDI are not statistically different from 1.

[9] M&A figures in the UNCTAD database are not measured on a net basis as required by balance-of-payments accounting and also include deals financed by borrowing locally. That is why we refrained from using the data in our regressions.

Table 3: Comparison between the transition economies and a sample of 60 other developing countries.

Dependent variable: Investment as a share of GDP

	Transition Economies		**Mody and Murshid (2005)**	
Independent variable	Static	Dynamic	Static	Dynamic
Foreign direct investment	0.74**	0.49*	0.72***	0.51*
Loans	0.46**	0.35**	0.61***	0.22
Portfolio flows	0.17	0.20	0.46*	-0.70(*)
Lagged investment		0.30**		0.84***
			Dynamic 1980s	Dynamic 1990s
Foreign direct investment			0.94*	0.23
Loans			0.49**	-0.02
Portfolio flows			-0.61	0.21
Lagged investment			0.73***	0.26

Source: Author's regressions and regression results by Mody and Murshid (2005).
(*** p<0.01, ** p<0.05, * p<0.1, (*) p<0.15)

We can compare the transition economies with the rest of the developing world in terms of the effect of FDI on investment, although we need to keep in mind that none of the studies separate FDI into "greenfield" and M&A flows. Bosworth and Collins (1999) obtain a coefficient of 0.81 for the contemporaneous effect of FDI on investment and Mody and Murshid (2005) report a similar coefficient of 0.72. Despite the positive coefficients reported in their papers, one cannot conclude with certainty that FDI produces spillovers without an estimation of the M&A flows. The long-run coefficient Mody and Murshid estimate in their dynamic specification, however, is (0.51)/(1 – 0.84) = 3.19 (see table 3), thus pointing to significant "crowding in" effects in their sample of developing countries in the long term. An empirical study by Agosin and Mayer (2000) determines that for the period 1970 – 1996 the Asian developing countries experienced mostly the "crowding in" effect of FDI. In Africa FDI caused a one-for-one increase in domestic capital formation until the mid-1980s and later stimulated additional capital creation. In contrast, domestic investment in Latin America was mostly "crowded out" by FDI. Borenzstein, De Gregorio and Lee (1998) find that FDI produces spillovers in the host country, but their results are not robust to alternative specifications. Therefore, the authors conclude that the main benefit of FDI is realized indirectly through technology transfers rather than directly through increases in the rate of capital accumulation. The approach of Agosin and Mayer and Borenzstein et al. is to interpret coefficients above

one as "crowding in" and those below one as "crowding out". Thus, they may underestimate the effect of "greenfield" FDI in countries with large M&A flows.

Next, we focus on the relationship between loan flows and investment. According to our static specification, 46 cents of each dollar of long-term foreign loans are used to finance capital formation. The short-run coefficient from the dynamic model is 0.35, while the long-run coefficient is (0.35)/(1 – 0.30) = 0.50. Bosworth and Collins show a short-run coefficient estimate of 0.50 and Mody and Murshid of 0.61. Interestingly, the dynamic specification of the latter study yields insignificant results for the period after 1990 pointing to a declining importance of loans in the developing countries in the aftermath of the debt crisis. The authors presume this is due to the lack of large-scale public investment projects. In contrast, in the transition economies the share of loans in total foreign capital inflows has increased in recent years (see figure 2 above). The banking sectors in these countries differ from most other developing countries in the large number of subsidiaries of foreign banks. In 2003 the average asset share of foreign-owned banks was 54 percent (EBRD, 2005), while the share goes up to 76 percent in the non-CIS countries. Thus, much of the loans flowing to the transition economies are actually loans from parent banks to their banking subsidiaries and they are part of the reason for the domestic credit boom observed in many of these countries. Our results show that a large portion of these loans contribute directly to domestic investment.

Finally, we discuss the results pertaining to portfolio flows. The estimates for the effect of equity and bond flows in all specifications are not statistically significant. This is not at all surprising since the equity and bond markets in almost all transition countries were at an early stage of development during the sample period. In fact, the World Bank data shows zero values for this variable for a considerable number of observations. The 2004 stock market capitalization of the transition economies in our sample, which had stock markets, was on average 18 percent of GDP (EBRD, 2005), while that of the countries in East Asia and the Pacific was 41 percent of GDP (World Bank, 2005). Moreover, portfolio flows have been much larger than loans in the low- and middle-income countries as a group since the beginning of the 1990s. In contrast to our results, the study by Mody and Murshid finds a positive effect of portfolio flows on investment.

4.2 The case of the transition economies, which are EU members, acceding or candidate countries

For the discussion in the next two sections we have divided our sample into two groups of countries. The first one consists of the countries that were EU member states, acceding countries or candidate countries in 2005 (hereafter "EU group"). All countries in the "EU group" scored three or higher on the 2005 EBRD transition index, in which a score of four means complete transition to market economy. The second sub-sample includes all other countries in our panel, namely 10 CIS states and Albania. These countries (except Armenia) scored below three on the 2005 EBRD transition index. Thus, the countries in our "EU group" had either concluded their transition process or were close to doing so at the end of the sample period. The countries in our second sub-sample, on the other hand, lagged behind in the process of establishing market economies.

In addition to splitting our sample in two, we also reduce the time dimension of the sub-samples to 5 years (2001 through 2005 with lagged variables starting in 2000).[10] While the estimation results for the "EU group" obtained from the longer time series and the shorter one are very similar, for the other subset there are significant differences. The regressions for the sample of mostly CIS members for the years 1995 – 2005 hardly yield any statistically significant coefficients. It appears that the results are dominated by the impact of the 1998 Russian financial crisis, which affected the economies of the former Soviet republics more than the rest of the transition countries due to the high dependence of the former on exports to Russia.

Table 4 reports the results for the "EU group" of countries. The Arellano – Bond tests show no second-order correlation in differences, which implies no first-order serial correlation in levels. The Sargan statistic in all specifications indicates that the instruments are orthogonal to the error term.

[10] Reducing the number of countries from 22 to 11 also poses a problem when using the Arellano – Bond GMM estimator. Having too many instruments weakens the Sargan test of overidentifying restrictions and may produce biased estimates. Generally, it is recommended that the number of instruments be kept to less than the number of countries in the panel (Roodman, 2006). Since the standard GMM instrument matrix generates one column for each time period and lag available, having a large-T relative to N sample increases significantly the instrument count. Although for all regressions in this paper we have limited the number of lags of the endogenous variables to one or at most two and in many cases we have resorted to the use of the "collapse" option for the instrument matrix available with xtabond2 (see Roodman, 2006), reducing the T-dimension for the small sub-samples also helps.

Table 4: The effect of FDI, loans and portfolio flows on investment in nine new EU member states, Croatia and FYR Macedonia, 2001 – 2005.

Dependent variable: Investment as a share of GDP

	Static Specification			Dynamic Specification		
Independent variable	(1)	(2)	(3)	(4)	(5)	(6)
Foreign direct investment	0.59***	0.64**	0.61*	0.55***	0.63**	0.60**
	(0.22)	(0.31)	(0.32)	(0.20)	(0.27)	(0.25)
Loans	0.49***	0.38***	0.44*	0.39**	0.39**	0.42*
	(0.19)	(0.12)	(0.26)	(0.17)	(0.17)	(0.26)
Portfolio flows	-0.00	0.23	0.22	0.08	0.12	0.05
	(0.19)	(0.14)	(0.15)	(0.16)	(0.25)	(0.27)
Lagged investment				0.40**	0.36	0.20
				(0.17)	(0.41)	(0.43)
Uncertainty		-0.15	-0.09		-0.14	-0.14
		(0.12)	(0.18)		(0.12)	(0.14)
Deviation of M2/GDP		0.53	0.72*		0.23	0.19
		(0.43)	(0.43)		(0.23)	(0.18)
Change in log terms of trade		-22.08*	-23.56*		-21.54	-19.09
		(11.42)	(12.77)		(15.67)	(13.88)
Lagged growth			0.04			0.01
			(0.17)			(0.19)
Observations	54	54	54	54	54	54
Number of countries	11	11	11	11	11	11
Number of instruments	8	11	12	10	9	10
Arellano-Bond AR(1) test: p-value	0.15	0.42	0.43	0.11	0.23	0.21
Arellano-Bond AR(2) test: p-value	0.17	0.78	0.88	0.17	0.35	0.39
Sargan statistic: p-value	0.30	0.86	0.92	0.35	0.70	0.62
Long-run coefficients:						
Foreign direct investment				0.92		
Loans				0.65		
Wald test p-values:						
FDI coefficient = 1	0.07	0.25	0.21	0.03	0.17	0.11
Long-run FDI coefficient = 1				0.84		

Source: Author's regressions

*Arellano - Bond (1991) difference GMM panel estimator (program in Stata: xtabond2 due to Roodman, 2006). Robust standard errors in parentheses (*** p<0.01, ** p<0.05, * p<0.1).*

As shown in table 4, we cannot confirm that FDI flows produce investment spillovers in the "EU group" of countries in the short run, because the coefficient on FDI in column (1) is less than one according to the Wald test. Possible causes for this result may be that MNCs in these countries use imported inputs or that more productive foreign firms may be replacing less efficient, formerly state-owned local enterprises in existing sectors. When controlling for uncertainty, availability of local financing, the change in the terms of trade and growth, however, it appears that FDI may stimulate slightly

domestic investment. Considering that foreign privatization flows were more significant in the "EU group" (more than a third of total FDI) than in the rest of our sample (less than 20 percent of total FDI), then FDI may have a small long-run "crowding in" effect, because the long-run coefficient is 0.92 and is not statistically different from 1. The estimate for loans indicates that about half of each dollar is used for capital accumulation in the short term and 65 cents in the long run. As in the full sample, the coefficients of portfolio flows are not statistically significant. However, the equity markets of the countries in this subset are better developed (with average market capitalization at 21 percent of GDP in 2004) than the ones of the transition economies excluded from the "EU group". Therefore, our regression results may point to a phenomenon also observed by Mody and Murshid for their dataset, namely that portfolio flows entered the transition economies for portfolio diversification purposes and thus had no direct effect on domestic capital formation.

4.3 A closer look at 10 CIS members and Albania

The regressions on the subset of 10 CIS members and Albania also reveal some interesting relationships. The econometric output in table 5 shows no first-order serial correlation as evidenced by the Arellano – Bond tests. The Sargan statistics validate the orthogonality conditions for the instruments. Portfolio flows are excluded from these specifications, because for most of the countries and years the values are zero. In the regressions reported in table 5 we use a "loans variable" instead of the foreign loan flows due to significant correlation between FDI and loans in this sample of countries.[11] Foreign firms bringing FDI to the transition economies included in this sub-sample seem to provide their own financing as well. The "loans variable" consists of the residuals from a pooled-data regression of loans on FDI and a constant.

The coefficient estimates for the loans variable are not statistically significant in any specification reported in table 5. Neither is the coefficient on loans reported in

[11] Regressions excluding loans from the set of explanatory variables produce statistically significant coefficients on FDI, while including loans resulted in insignificant estimates for FDI. The coefficient estimates for loans are not significant in any specification no matter whether FDI is included on the right-hand side or not.

column 2. Relatively small foreign loan flows are probably the reason why loans have no impact on domestic investment in the 10 CIS countries and Albania as opposed to the "EU group". On average the ratio of foreign loans to PPP GDP in the latter sub-sample was four times larger than the same ratio for the other group. Kyrgyzstan and Tajikistan were actually repaying debt obligations for most of the sample period.

Table 5: The impact of FDI, loans and portfolio flows on investment in 10 CIS members and Albania, 2001 – 2005.

Dependent variable: Investment as a share of GDP

	Static Specification				Dynamic Specification		
Independent variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Foreign direct investment	1.84**		1.38**	1.71*	1.71***	1.53**	1.35*
	(0.81)		(0.68)	(1.00)	(0.59)	(0.72)	(0.72)
Loans variable	1.34		-0.34	2.41	-0.16	0.14	0.31
	(1.50)		(1.95)	(2.07)	(1.28)	(0.98)	(0.97)
Loans		3.88					
		(3.14)					
Lagged investment					0.59*	0.40*	0.35*
					(0.33)	(0.21)	(0.19)
Uncertainty			-0.29	-0.15		-0.23*	-0.23**
			(0.21)	(0.23)		(0.12)	(0.11)
Deviation of M2/GDP			1.06	0.48*		0.23	0.16
			(0.78)	(0.28)		(0.22)	(0.22)
Change in log terms of trade			13.83	3.78		-4.07	-4.12
			(12.19)	(11.09)		(3.01)	(3.20)
Lagged growth				0.10			0.06
				(0.13)			(0.11)
Observations	55	55	55	55	55	55	55
Number of countries	11	11	11	11	11	11	11
Number of instruments	8	3	10	9	9	12	13
Arellano-Bond AR(1) test: p-value	0.68	0.82	0.45	0.76	0.27	0.26	0.33
Arellano-Bond AR(2) test: p-value	0.13	0.21	0.30	0.21	0.18	0.39	0.23
Sargan statistic: p-value	0.41	0.24	0.57	0.82	0.80	0.97	0.87
Long-run coefficients:							
Foreign direct investment					4.17	2.55	2.08
Wald test p-values:							
FDI coefficient = 1	0.30		0.58	0.48	0.23	0.46	0.63
Long-run FDI coefficient = 1					0.44	0.37	0.44

Source: Author's regressions

Arellano - Bond (1991) difference GMM panel estimator (program in Stata: xtabond2 due to Roodman, 2006).

*Robust standard errors in parentheses (*** p<0.01, ** p<0.05, * p<0.1).*

The estimate for FDI in this sub-sample is much larger than in our full-sample or "EU group" estimations. The Wald tests of the hypothesis that all FDI coefficient estimates are not significantly different from one do not reject the null hypothesis,

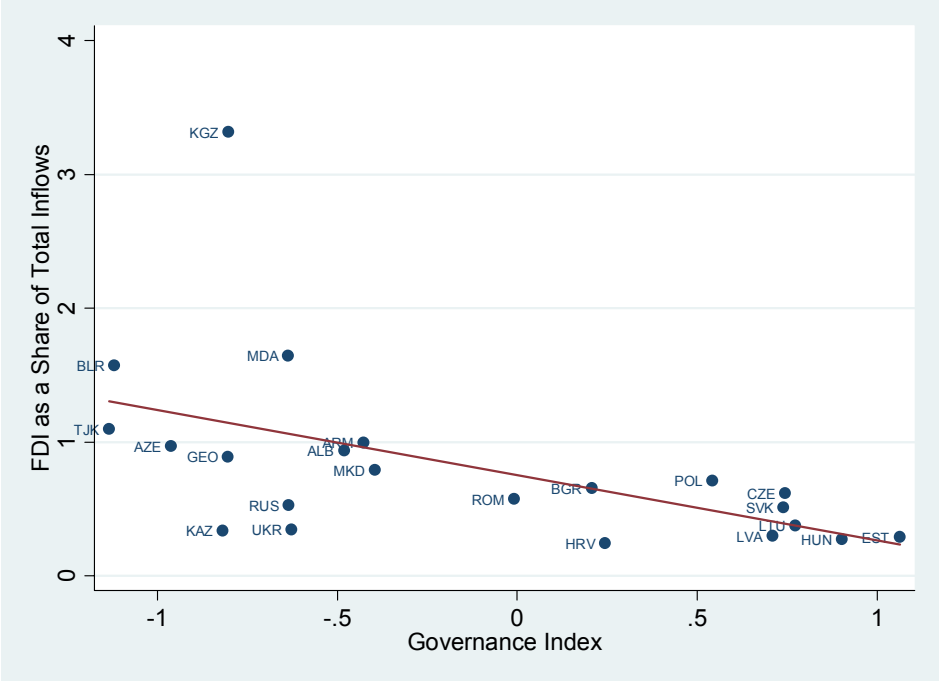
although in this case we expected a rejection of the null to imply that the coefficient is statistically larger than one. It is known, however, that the Wald test does not perform well in small samples. The long-run coefficients calculated from the dynamic specifications range between 2.08 and 4.17 and point to significant spillover effects from these foreign capital flows: for every dollar of FDI at least a dollar (and up to 3 dollars) of domestic investment is created in the long run. Thus, domestic investment in the countries, which scored low on the EBRD transition index, depends to a large extent on FDI flows. Although these countries on average did not attract more FDI (measured as a share of PPP GDP) than the countries in our "EU group", they did attract considerably less foreign loan and portfolio flows.

In their paper Fernandez-Arias and Hausmann (2000) argue that countries that are riskier and have weaker institutions and underdeveloped financial markets tend to attract less capital, but more of it in the form of FDI. The need for FDI financing, the authors point out, arises for several reasons. First, it may be easier to protect intellectual property rights when the foreign investor owns and operates the domestic firm rather than relying on local franchises. Second, the inefficiency or lack of domestic debt and equity markets forces foreign investors to enter these markets with their own capital. Moreover, using FDI as opposed to foreign debt financing is cheaper for the international investor considering the credit risk premiums most of these countries require.

The arguments of Fernandez-Arias and Hausmann are confirmed by the findings of our study. In 2004 domestic credit to the private sector in the "EU group" of countries was 30 percent of GDP, while in the other group it was only 15 percent. In the same year, the average stock market capitalization in the former set of countries was 21 percent of GDP, while in the latter it was 12 percent (8 percent, if Russia is excluded). Albania, Belarus and Tajikistan did not have stock markets in 2004. To show the relationship between institutional quality and the share of FDI in total inflows we plot the latter against the average of the six governance indicators constructed by Kaufmann, Kraay and Mastruzzi (2005): voice and accountability, political stability, government effectiveness, regulatory quality, rule of law and control of corruption. These indices capture both objective and subjective measures of governance and are based on 37 different data sources. The countries that scored high on the 2004 EBRD transition index are also ranked higher according to these governance indicators. Figure 3 clearly points to a

negative relationship between the two variables. So the countries with better institutions and policies and relatively more developed financial markets relied less on FDI and more on foreign loans, while domestic investment in the countries in the other group was stimulated considerably by FDI flows.

Figure 3: FDI as a share of aggregate long-term capital inflows (vertical axis) and governance in the transition economies, 2004.



Source: Governance indicators by Kaufmann, Kraay and Mastruzzi (2005), GDF, WDI and author's calculations. Note: The FDI/Total Flows ratio for four countries is higher than one due to loan repayments, which decrease the gross total flows figures (refer to GDF database manual for more details).

5. Conclusion

Since they liberalized their capital accounts in the early 1990s, the transition economies have attracted large foreign capital inflows: predominantly FDI, but also loans and portfolio investment. This paper investigates the relationship between capital inflows and domestic investment. Our empirical estimation shows that FDI flows may produce small investment spillovers in host economies for the full sample or for the group of countries, which have either completed the transition process or are in its final stages. In ten CIS countries and Albania, however, FDI flows crowd in domestic investment. These

results are consistent with the view that countries with relatively underdeveloped financial markets and weak institutions tend to depend more on FDI compared to countries with bigger financial markets and better institutions. The countries at a late stage of the transition process, however, are better able to attract foreign loans and use them to raise domestic capital formation. As to portfolio investment, the transition economies still lag behind their emerging market peers in terms of stock and bond market development. The portfolio flows that do flow into the transition countries have no direct effect on domestic investment. Instead, foreign investors seem to be led by diversification goals. Thus, in terms of the consequences of capital account liberalization, the transition economies by and large follow in the footsteps of the other developing countries.

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Appendix

Table A1: List of countries

"EU" Group of Countries (new member states, acceding countries and candidate countries as of 2005)*:
Bulgaria
Croatia
Czech Republic
Estonia
Hungary
Latvia
Lithuania
Macedonia, FYR
Poland
Slovak Republic
Romania

"Non-EU" Group of Countries:
Albania
Armenia
Belarus
Georgia
Kazakhstan
Kyrgyz Republic
Moldova
Russian Federation
Tajikistan
Ukraine
Uzbekiistan

* Slovenia is excluded, because it is not covered in the GDF dataset (World Bank, 2005), on which the empirical analysis relies.

Table A2: Variables and data sources

Variable	Description	Data Source and Database Code
Investment	Gross fixed capital formation (% of GDP)	World Development Indicators (2005) NE.GDI.TOTL.ZS
FDI	Foreign direct investment, net inflows* (% of PPP GDP**)	Global Development Finance (2005) BX.KLT.DINV.CD.DT
Loans	[PPG, commercial banks + PNG, commercial banks and other + PPG, other private creditors] (% of PPP GDP)	Global Development Finance (2005) DT.NFL.PCBK.CD + DT.NFL.PNGC.CD + DT.NFL.PROP.CD
Loans variable	Residuals obtained from a pooled-data regression of Loans on FDI and a constant in Stata 9 (see table A5).	
Portfolio	[Portfolio investment, bonds (PPG + PNG) + Portfolio investment, equity)] (% of PPP GDP)	World Development Indicators (2005) DT.NFL.BOND.CD + BX.PEF.TOTL.CD.DT
Growth rate	GDP growth (annual %)	World Development Indicators (2005) NY.GDP.MKTP.KD.ZG
Uncertainty	An autoregressive model with a constant, one lag of the dependent variable and a time trend was used to forecast real GDP growth. The model was estimated recursively and individually for each country in Stata 9. The uncertainty measure is the mean absolute value of one-step ahead forecast error averaged over 3 years.	World Development Indicators (2005) NY.GDP.MKTP.KD.ZG
Change in terms of trade	Difference in the logs of "Terms of trade, goods and services"	World Economic Outlook (2005) WEO.A.914.TT; for Slovakia WEO.A.936.TTT
Deviation of M2	Deviation of "Money and quasi money (M2) as % of GDP" from three-year moving average	World Development Indicators (2005) FM.LBL.MQMY.GD.ZS
Transition index	Average of all EBRD transition indicators.	EBRD Transition Report 2005: business in transitition
Regional flows	Sum of Private net resource flows for the sample of countries (% of the sum of PPP GDPs)	Global Development Finance (2005) DT.NFA.PRVT.CD

** Net inflows (or net lending or net disbursements) are disbursements minus principal repayments (GDF, 2005).*

*** GDP, PPP (current international $) from World Development Indicators (2005) (Database code NY.GDP.MKTP.PP.CD) is used as a denominator for all capital flow variables.*

Table A3: Investment to GDP ratio in 22 transition countries – summary statistics

	Mean	Standard Deviation	Variance	Minimum	Maximum
Overall	21.51	5.21	27.14	4.03	36.80
Between		4.12	16.97	13.63	28.37
Within		3.29	10.82	5.35	31.16

Source: Author's calculations based on 242 observations, 22 countries and 11 years.

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ISSN 1561-0810