Capital Flows to Transition Economies: Implications for Investment

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Abstract

At the beginning of the 1990's, transition countries started with trade liberalization, which, coupled with capital and financial integration paved the way for foreign capital inflows and outflows. The magnitude and sequence of this capital account liberalization was not the same throughout the transition countries. Two thirds of total capital inflows to transition countries (excluding the ex Soviet countries) concentrated in only three of them, the Czech Republic, Poland and Hungary. Capital inflows can have positive impacts on the developing (transition) countries. Most importantly, capital inflows can directly enhance economic growth by increasing level and efficiency of investments and through the development of the domestic financial sector. Access to foreign capital can also smooth consumption, improve risk management between domestic and foreign investors and deepen integration with international financial markets. This paper focuses on some of these positive effects. We analyze the implications of capital inflows into transition countries on domestic investment. For that purpose, we conducted regression analysis on panel data on a sample of 11 transition countries (Bulgaria, Croatia, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, the Slovak Republic and Slovenia). We used the instrumental variables method, due to the endogenous nature of capital inflows. Our findings indicate a positive relation between capital inflows and the level of domestic investment. Other foreign investments (mainly foreign loans) have the highest impact on domestic investment. Foreign direct investments (FDI) have a positive and significant influence on domestic investment, while foreign portfolio investments have no significant impact on domestic investment activity.

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Introduction

At the beginning of the 1990s, the countries of Central and Eastern Europe began the transition process from a centrally managed system toward a market economy. A large number of structural and institutional reforms occurred simultaneously, while the price and market liberalization substantially increased the openness of national economies. These processes of liberalization, in conjunction with the beginning of privatization, contributed the most to the foreign capital inflow in transition economies.

This paper analyzes the positive aspects of the inflows of foreign capital in transition economies with an emphasis on the relationship between foreign capital inflows and domestic investment activities in transition economies. The following hypothesis is put forth, stating that during the period of 1993-2002, in 11 of the selected Central and Eastern European countries foreign capital stimulated domestic investments (a "crowding in" effect). Moreover, the study then continues to analyze the impact of individual categories of foreign capital inflows including foreign direct investments, portfolio investments and other foreign investments, on domestic investments in transition economies.

This paper contains five parts. After the introduction, the first part gives a short methodological framework, which lists the basic categories of foreign investment. The second part shows the findings of other authors who analyzed the influence of foreign capital inflows on recipient countries. In the third and fourth part the emphasis is placed on transition economies. The development of international investments in these countries is shown first, followed by the results of the regression analysis testing the basic hypothesis. Concluding remarks as well as the list of references and appendices are given at the end.

1 Methodological Framework

An international flow of capital is formed when the resident of a country invests capital in another country by using different types of investments. Investments could be in the form of a loan to the resident of another country, the purchase of securities of a company or country, or a share in a non-residential company. From this definition it can be seen that there are several categories of international investments. According to IMF

definition, foreign investments can be divided into foreign direct investments, foreign portfolio investments and other foreign investments.[1]

All of the transactions within individual categories of international investments are recorded in the balance of payments, specifically in the financial account of the balance of payments. The rules of bookkeeping and methodology for the composition of the balance of payments for all their members are stipulated by the IMF. The balance of payments data are sourced from the International Financial Statistics - IFS.

2 Empirical Literature About the Foreign Capital Inflows in Developing Countries

The issue of international flows of capital is often explored in economic theory. A large number of textbooks and papers are concerned with the theoretical aspects of international capital transactions. The empirical literature covering this theme is, however, relatively small compared to the theoretical, but still sufficient for a useful analysis and study. If individual categories of international capital flows are taken, one can easily notice more theoretical as well as empirical literature on the topic of foreign direct investments, while the impact of the inflow of foreign portfolio investments and other foreign investments are significantly less explored. This provided additional motive for exploring the influence of all categories of international capital flows in this paper.

The inflow of capital in developing countries is also a broadly analyzed theme. Theoretical and empirical literature on the subject of capital flows in developing countries during the 90s can be grouped into 4 basic categories, according to subject. The first category deals with the *reasons for international capital transactions* in developing countries.[2] In these studies authors were trying to find out whether the expansion of foreign capital inflows in developing countries was relatively more influenced by external factors ("push") or internal factors ("pull"). Examples of external factors are the interest rates differential or the business cycles of the US and EU, while internal factors include the intensification of the privatization processes, implemented structural reforms or successful stabilization programs in some of the developing countries.

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[1] *IMF (1993).*

[2] *For example, Calvo, Leiderman, Reinhart (1996). Determinants of foreign direct investments in transition economies are dealt by Resmini (2000). That study places an emphasis on foreign direct investments in individual sectors of the manufacturing industry.*

The second group of studies examines the *challenges for the creators of economic policy* brought on by the inflow of foreign capital. One of the most commonly analyzed theme is the well known "trilema" (impossible trinity)[3], according to which the countries in the conditions of free flows of capital must decide between fixing the foreign exchange rate and retaining the independence of monetary policy. A large part of the literature from this category deals with restrictions and controls of capital transactions.

The third group of studies is concerned with the *characteristics of individual categories of foreign investments*. By comparing individual categories of international capital flows, conclusions are drawn concerning the characteristics and differences between foreign direct investments, foreign portfolio investments, and other foreign investments.[4] Furthermore, these studies explore the historical development of individual categories of international capital.

Finally, the fourth group of theoretical and empirical literature deals with the *effects of capital flows on domestic economies*. Generally, this topic explores the relationship between the flows of foreign savings and the domestic aggregates, such as economic growth, exports, national savings and domestic investments.

This paper falls into the fourth category, as it examines the influence of foreign capital on domestic investments. It attempts to provide an answer to the question of whether foreign capital in selected transition economies stimulated domestic investment activity (a "crowding in" effect) or displaced it (a "crowding out" effect).

These issues in particular were analyzed in the study of Bosworth and Collins (1999). The authors examined the effect of foreign capital inflows and each individual category on savings and investments in developing countries. The principal conclusion of the analysis was that foreign capital inflows in 58 countries of Latin America, East Asia and Africa during the period 1978-1995 stimulated the growth of domestic investments but also decreased national savings. The result of this influence of foreign capital inflows was a growth in the current account deficit of the observed countries.

This general conclusion shelters the specifics of individual forms of foreign capital. Namely, different categories of inflows have different effects on the domestic economy.

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[3] *Obstfeld (1998).*

[4] *For example Fernandez-Arias and Hausmann (2000) examine the stability of each individual category of international investments.*

According to the results of the analysis, foreign direct investments stimulate domestic investments and national savings, while the influence on the current account was negligible. Portfolio foreign investments stimulate domestic investments, while the estimated affect on national savings was very small with an insignificant coefficient. Finally, other foreign investments stimulate domestic investments and at the same time decreased national savings, thus presenting the largest influence on the current account deficit.

Mody and Murshid (2004) in their analysis followed up on the work of Bosworth and Collins. They also examined the relationship between total foreign capital inflows and domestic investments in developing countries. In contrast to the previous analysis, the authors expanded the observed period until 1999. The results of the analysis confirmed the thesis that domestic investments could be stimulated through foreign capital inflows.

The authors divided the period of observation into two periods, the eighties and the nineties of the 20th century, followed by additional analysis. In that way they sought to examine the relationship between domestic investments and foreign capital inflows separately during the two periods. Their main conclusion was that over time, the relationship weakened. In other words, in the nineties the effect of stimulating domestic investments through foreign capital inflows in developing countries was relatively smaller than in the eighties, although there was still a positive relationship between the variables.

One more study, which empirically analyzed the influence of foreign capital on the domestic economy, was the paper by Borensztein, De Gregorio and Lee (1998). This study examined the influence of foreign direct investments on economic growth and domestic investments in 69 developing countries during the seventies and the eighties of the 20th century.

The results of these analyses show that the flow of foreign direct investments in developing countries is an important mechanism for technology transfer, which has a relatively larger influence on economic growth rather then on domestic investment activity. The conclusion is that encouraging technological development, and therefore overall efficiency, is the primary channel through which foreign direct investment influences economic growth. The increasing accumulation of capital (investment) has an influence on economic growth, but that effect is relatively smaller than the increase in efficiency.

The paper by Krkoska from 2001 was the empirical contribution to the topic of foreign capital inflows and their implications on domestic economic activity in transition countries. The author analyzed the influence of foreign capital inflows on domestic investment activity in 25 transition economies in the period 1989-2000. In contrast to previous studies, in his analysis Krkoska included domestic and foreign sources of financing investments.

The basic conclusion of the analysis was that foreign direct investments in the observed transition economies on average stimulated domestic investment activity. A positive significant relationship was also noted between domestic investments and domestic loans. However, the coefficient for that variable was less significant than the coefficient for the variable foreign direct investment. A positive significant relationship was also found for bond issues and other securities from domestic firms. Neither the variable nor the result could be fully classified as foreign portfolio investments since the buyer of those securities could not be unambiguously identified. Investors in this case could be foreign or domestic. Foreign loans (the category of other investments) were shown to be insignificant in the model, although they showed a positive relationship with domestic investments.

3 Flows of Foreign Capital in Transition Economies

There are numerous advantages foreign capital flows usually bring with. In the case of developing countries, and therefore of transition economies, foreign capital flows can directly increase economic activity of the country. Two of the most common channels for stimulating economic activity are by increasing total domestic investments and by increasing the quality and efficiency of investments. Increasing the efficiency of domestic investments relates to the transfer of technological innovations, called "know-how", generally a characteristic of foreign direct investments. Foreign capital flows can increase economic activity of the country through the spillover effect[5], whereby increasing investments and efficiencies of one industry causes other industries and units to improve and innovate as well.

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[5]*Concerning the spillover effect and other benefits of developing countries from the inclusion in international financial flows see in Prasad et al. (2003).*

Foreign capital flows can stimulate the development of the country's domestic financial sector and its integration in the international financial markets. This case in particular emphasizes the spillover effect, since the financial sector is connected with all other sectors of an economy. The integration in the international capital markets and the flow of foreign capital upgrades the risk management system between foreign and domestic investors. The other positive impacts that foreign capital flows on the recipient country are consumption smoothing, the increase in specialization of the country and its comparative advantages.

The necessary precondition for achieving positive effects of foreign capital inflows in a developing country is optimal liberalization sequencing. This international financial integration is connected to four steps necessary if the maximum positive effects of foreign capital inflows are to be realized. First of all, it is necessary to reduce the fiscal deficit of the country to a sustainable level, followed by price and foreign market liberalization. Next step is to liberalize and deregulate (re-regulate) the financial institutions thereby strengthening them, and finally liberalizing the capital and the financial account of the balance of payments.[6]

The stated order is very logical. In developing countries, a fiscal imbalance is a typical source of instability for the whole economy. For that reason it is necessary to remove the sources of imbalances in the public sector. After that, the price and market liberalization should enable increases in the efficiency of the real sector, in a way that removes the risks of further accumulation of losses and insolvency. The liberalization and deregulation of the domestic financial sector allows an increase of the efficiency and transparency in accumulating and placing savings.

Transition economies attempted following the theoretical model of liberalization. However, the liberalization process demands adjustments over the long-term period. At the very beginning of transition, countries were faced with large falls in output (high negative rates of growth), unemployment growth, high inflation and lower rates of national savings. Furthermore, it is noteworthy that the equipment and production processes were obsolete and there were generally low capital stocks in the economy. In that situation the flows of foreign capital were desirable as an impetus for the recovery to begin. These are primarily the most important reasons why transition countries did not

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[6] *McKinnon (1991).*

gradually, one after another, follow the above mentioned steps of liberalization, but the steps were conducted in parallel only partially, at varying speeds and intensities.

In the initial stages, the inflow of foreign capital into transition economies has strictly been related to the initiated processes of privatization and liberalization of the balance of payments capital and financial account. Further inflows of capital depended on the success of the transition and on the implementation of structural and institutional reforms. Some of the previously analyzed motives had a large influence on attracting foreign capital. Higher earnings on capital, higher rates of economic growth[7], new markets and possibilities of further expansion, lower labor costs and others are among the most important motives.
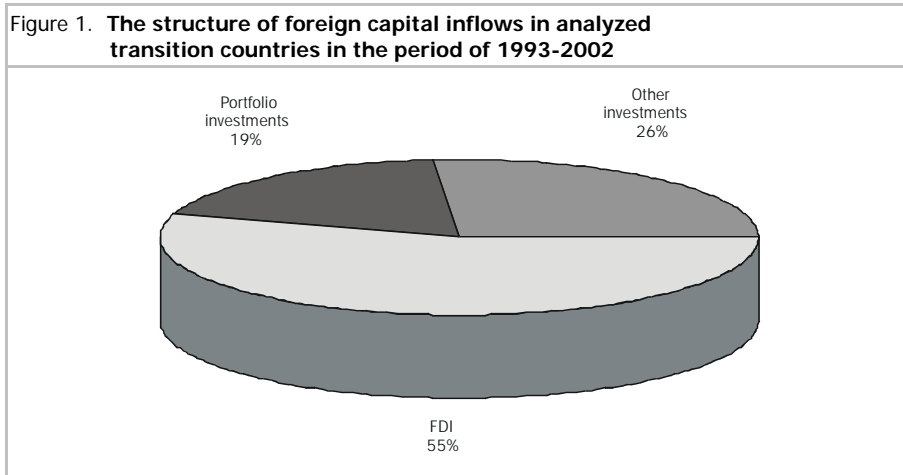
Taken individually, not all transition countries simultaneously began with attracting foreign capital. Hungary was the first to begin with the liberalization of the capital and financial balance of payments and the first to engage foreign capital into its privatization process. Poland and the Czech Republic followed suit. The other transition economies were somewhat more cautious towards foreign capital. The first significant penetration of foreign capital in all observed transition economies occurred in 1993, thus justifying the decision to base the analyses in this study on the period of 1993 to date.

In the period of 1993-2002 in the selected transition economies it was recorded that total inflows of foreign capital were 236 billion USD. In the same time period outflows of capital amounted to 45 billion USD. The most often used form of foreign investments in transition economies was foreign direct investment, then other investments and finally portfolio investments (Figure 1).
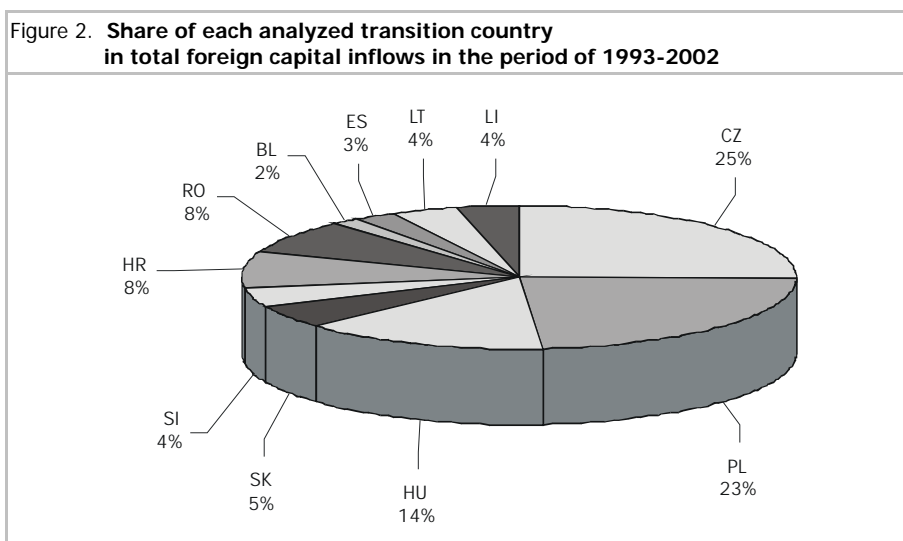
The countries in focus were not only at the forefront according to the criteria of the first to attract foreign capital, but also according to the criteria of total inflows of foreign capital. Almost two thirds of total foreign capital was directed into those three countries (the Czech Republic 25%, Poland 23%, Hungary 14% - Figure 2). Poland was at the forefront in attracting foreign direct investments, Hungary in attracting foreign portfolio investments, while the Czech Republic lead in the category of other foreign investments. The order changes if the inflows of foreign capital are analyzed in per capita terms or as a percentage of country's gross domestic product. In this case, the most successful

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[7] *In the period 1993-2002 11 of the selected transition economies grew on average at a rate of 3.6 percent, while in the period 1995-2002 the rate of growth of the EU 15 was 2.2 percent.*

country is the Czech Republic, followed by the smaller economies of Estonia, Slovenia, Latvia and Croatia (see Appendix 1, Table 3 and 4).

Figure 1. **The structure of foreign capital inflows in analyzed transition countries in the period of 1993-2002**

Portfolio investments 19%

Other investments 26%

FDI 55%

Source: IFS, authors' calculations.

Figure 2. **Share of each analyzed transition country in total foreign capital inflows in the period of 1993-2002**

ES 3%

LT 4%

LI 4%

BL 2%

CZ 25%

RO 8%

HR 8%

SI 4%

SK 5%

HU 14%

PL 23%

Source: IFS, authors' calculations.

4 The Analysis of the Influence of Foreign Capital Inflows on Domestic Investments of the Transition Economies

Two separate estimations of the regression equation are made in this analysis. The first estimation is the relationship of total foreign capital inflows to domestic investments in transition economies, while the second examines the impacts of each individual category of total foreign capital inflows on domestic investments. Domestic investments *(INV)* are defined as the function of foreign capital inflows *(FORCAP)* and the rate of economic growth *(GDP)*, and as a function of individual categories of foreign capital *(FDI, PORT, OTH)* and the rate of economic growth.

$$INV = f (FORCAP, GDP),$$

$$INV = f (FDI, PORT, OTH, GDP).$$

The analysis uses panel data of 11 transition economies during a 10-year period (1993-2002). The advantage of using panel analysis stems from the fact that such data is more oriented toward the observed units, rather than towards the observed time. It is stated that panel data is wide and short, meaning that a sufficient number of observed units are sampled while the observation time does not necessarily need to be long. Actually, the whole transition period is quite short, justifying the argument for using panel data analysis instead of time series analysis. Panel data allowed control of the country-specific effects (fixed effects)[8] when estimating the relationship between domestic investments and capital inflows. Fixed effects approach was used in this analysis since it captures specific characteristics of each individual transition country.

It should be taken into consideration that the limiting factor when analyzing transition economies is the availability of data. This is another reason why the analysis in this work was conducted for the period from 1993 onward, as new methodology for the calculation of the balance of payment was used from that point on.

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[8] *Concerning panel data models and fixed effects approach see in Greene (2000).*

4.1 Influence of Total Foreign Capital Inflows on Domestic Investments

The regression equation of the analysis of the influence of total foreign capital inflows on domestic investments in transition economies in the period of 1993-2002 is the following

$$INV_{i,t} = \alpha_i + \beta_1 FORCAP_{i,t-1} + \beta_2 GDP_{i,t-1} + \varepsilon_{i,t}, i = 1,...,11, t = 1,...,10$$

where are:

$INV_{i,t}$ domestic investments of country i in year t, calculated as the share of gross fixed capital formation in gross domestic product, all in current prices,

$FORCAP_{i,t}$ total inflows of foreign capital in transition economy i in year t calculated as the share in gross domestic product,

$GDP_{i,t}$ the rate of growth of real gross domestic product of country i in year t.

When analyzing the influence of foreign capital inflows on domestic investments, it should be noted that a large part of foreign capital was probably attracted by successfully implemented or announced investment projects in transition economies. In that case the model would indicate the presence of endogeneity. This means that the model analyzes the dependence of the dependent variable on one or more independent variables. However, another model could be constructed wherein one of the independent variables from the initial model could be explained using the dependent variable from the initial model. In our case, another model could be constructed to analyze the influence of domestic investments on foreign capital inflows. Endogeneity in the model violates the basic assumptions of regression analysis, which is the absence of correlation between one or more independent variables and residuals.

Endogeneity in the model may lead to biased coefficient estimation. However the direction of this bias is unclear. For example, some measure of domestic economic policy can influence the increase of earnings on capital. Foreign investors will very quickly recognize the opportunity for realizing higher earnings on their investment, so there will be an increase in the inflow of foreign capital into that country. On the other hand, the increased earnings on invested assets will also help stimulating domestic

investments. In this way, a domestic factor (an instrument of monetary policy for example) influences the increase of investments as well as foreign capital inflows. This would tend to bias the coefficient on capital inflows in the investment equation upward. There could also be another situation in which domestic policy change increases the interest rate in a country. According to the classical theory of investment higher interest rates would mean decreasing investments. But, foreign investors would increase their investments with the aim of realizing higher interest rates, and therefore capital inflows would increase. This situation would also bias the regression coefficient, but this time downwards.

Therefore, at the very beginning of our analysis, it is important to examine the issue of endogeneity in the model. Endogeneity in the model is tested using Hausman's test. This test simultaneously examines and justifies the use of the method of instrumental variables as possible solution for endogeneity issue. The choice of instrumental variables is extremely important. The basic idea is to find a group of variables (instrumental variables) which are simultaneously correlated with "suspect" independent variable in the regression equation and uncorrelated with the residuals.

Instrumental variables are used enabling the removal of the correlation between independent variables and residuals. In the model, that would mean choosing and incorporating instrumental variables that would isolate external factors of foreign capital inflows in transition economies from the internal ones. In that way, it would be possible to carry out an analysis of the influence of foreign capital inflows, as exogenous variables, on domestic investment activity.

In the case of the analysis of foreign capital inflows on domestic investments of transition economies, instrumental variables can be divided into two groups. One would consist of instrumental variables that are the same for all countries, while the other would consist of those which were country specific.

The first group of variables is exclusively related to external factors of foreign capital inflows in transition economies. Since transition economies mostly rely on the European Union as the main source of foreign capital, instrumental variables from the first group are the rate of growth of real gross domestic product *(EUGDP)* and the real interest rate *(EUIR)* of the European Union. Both instrumental variables in the model have a time lag of one year *(t-1)*. Instrumental variables from the second group are the share of foreign debt in gross domestic product of transition economies *(FDEBT)* with a time lag of one

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year, and domestic investment *(INV)*. This last variable *(INV)* is actually a dependent variable in the model, with a time lag of one year *(t-1)*.

Hausman's test was conducted according to the adjustable version, which was created by Davidson and MacKinnon[9], and it contains two steps or two phases. After the initial model is formulated, the analysis conducted[10], and the existence of endogeneity is assumed, then testing can begin. The first phase of the test is conducted according to what is called the auxiliary regression analysis, in which the "suspect" variable from the first model, total foreign capital inflows *(FORCAP)*, is taken as the dependent variable. This means that the independent variable that is a potential cause of endogeneity in the first model becomes a dependent variable. The independent variables chosen are the remaining independent variables, the dependent variables with the time lag, and all of the instrumental variables from the initial model. The estimated coefficients have no meaningful economic interpretation. The only important result from the auxiliary regression is the residuals, which is named as a new variable *(RESID)*. This new variable is then used in the second step of the analysis. See Appendix 2, Table 6.

The second phase of Hausman's test returns to the first regression model and it is supplemented with the new independent variable *RESID*. In this step, the primary interest is the obtained regression coefficient on the variable *RESID*. If the regression coefficient is significantly different from zero, the null hypothesis that both methods of analysis (with and without instrumental variables) were consistent can be rejected. This would prove the presence of endogeneity in the model and justify the use of instrumental variables. On the other hand if the regression coefficient on the variable *RESID* is not significantly different from zero then the null hypothesis is accepted, whereby it would not be important whether instrumental variables were included or not. The results of the second phase of Hausman's test are shown in Appendix 2, Table 7.

The regression coefficient on the variable *RESID* was found to be significantly different from zero, meaning that the null hypothesis could be rejected and the alternative hypothesis was accepted ($p = 0.032$, $t = 2.18$). In short, this means that the endogeneity in the model was proved and the use of the selected instrumental variables in the model was justified.

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[9] *Davidson, MacKinnon (1993).*

[10] *The results of the dependence of domestic investments on foreign capital inflows, without using instrumental variables, are shown in Appendix 2., Table 5.*

After having conducted Hausman's test for endogeneity and including instrumental variables in the model, regression was run again. Because of the instrumental variables, we run two-stage least squares method of estimation (TSLS). The regression analysis results are presented in Table 1. Results confirm the initial hypothesis, which stipulated that foreign capital inflows in selected transition economies during the period of 1993-2002 on average stimulated domestic investments.

Table 1. **Analysis of the influence of foreign capital inflows on domestic investments of transition economies**				
Dependent Variable: INV Estimation Method: Two-Stage Least Squares Instrumental Variables: EUIR (-1), EUGDP (-1), FDEBT (-1), INV (-1) Sample: 1994-2002 Included Observations: 11 Total System (Unbalanced) Observations: 92				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
FORCAP (-1)	0.308743	0.066080	4.672291	0.0000
GDP (-1)	0.260668	0.075217	3.465548	0.0009
Fixed Effects				
_HR—C	17.49704	0.954777	18.32579	0.0000
_BL—C	13.91218	0.747645	18.60801	0.0000
_CZ—C	24.48876	1.140708	21.46803	0.0000
_ES—C	21.19468	1.279804	16.56088	0.0000
_LT—C	18.11732	1.317310	13.75327	0.0000
_LI—C	18.18900	1.013421	17.94813	0.0000
_HU—C	18.85851	0.933033	20.21206	0.0000
_PL—C	19.29800	0.828685	23.28750	0.0000
_RO—C	18.59037	0.881963	21.07840	0.0000
_SK—C	27.04722	0.964628	28.03901	0.0000
_SI—C	21.29432	0.876734	24.28825	0.0000

The formal interpretation of the regression coefficient is that during the observed period an increase of the share of foreign capital inflows in GDP by 1 percentage point, on average, caused an increase in the share of domestic investments in GDP by 0.31 percentage points. Empirical t statistics for the coefficient on the variable total foreign capital inflows *(FORCAP)* variable is 4.67, what proves its significance in the model. The regression coefficient on the *FORCAP* is somewhat lower than that from the study by Bosworth, Collins (0.52). However, it should be reemphasized that the two analyses differ in terms of the sample countries used and the observation periods.

Furthermore, it is also useful to compare the above results with the results of the analysis when the method of instrumental variables is not used (Appendix 2, Table 5). Analysis

without instrumental variables also confirms the initial hypothesis of a "crowding in" effect. However, the values of the regression coefficients were lower. The regression coefficient on the variable *FORCAP* was 0.21, with empirical *t* statistics 3.91. Thus, by using instrumental variables, the problem of endogeneity in the model is solved, and the results were shown to be improved.

The real rate of growth *(GDP)* was also shown to be significant in the model ($t = 3.47$). The regression coefficient tells us that on average the real growth of 1 percentage point leads to an increase of the share of domestic investments in GDP by one quarter of a percentage point (0.26).

4.2 Influence of Different Categories of Foreign Capital Inflows on Domestic Investments

So far we have analyzed influence of total foreign capital inflow on domestic investments. In this part we conducted additional regression analysis in order to identify the influence of each individual category of foreign capital inflow on domestic investments. The regression equation of the analysis of inflows of each individual category of foreign capital on domestic investment is the following:

$$INV_{i,t} = \alpha_i + \beta_1 FDI_{i,t-1} + \beta_2 PORT_{i,t-1} + \beta_3 OTH_{i,t-1} + \beta_4 GDP_{i,t-1} + \varepsilon_{i,t}, i = 1,...,11, t = 1,...,10$$

where are:

$INV_{i,t}$ domestic investments of country *i* in year *t*, calculated as the share of gross fixed capital formation in gross domestic product, all in current prices,

$FDI_{i,t}$ total inflows of foreign direct investments in transition economy *i* in year *t*, expressed in its share in gross domestic product,

$PORT_{i,t}$ total inflows of foreign portfolio investments in transition economy *i* in year *t* expressed in its share in gross domestic product,

$OTH_{i,t}$ total inflows of other foreign investments in transition country *i* in year *t*, expressed in its share in gross domestic product,

$GDP_{i,t}$ the rate of growth of real gross domestic product of country *i* in year *t*.

Before the analysis we again conducted the Hausman's test. It is possible to test one potentially "suspect" variable at the time, so three tests of that kind were performed (for each category of foreign capital inflow). Endogeneity was confirmed for variable other foreign investments *(OTH)*. This was enough justification for the inclusion of the instrumental variables in the initial model.

After including the same set of instrumental variables as before (EUGDP, EUIR, FDEBT, INV) with time lag (t-1) we run regression analysis again. Regression results are presented in Table 2.

Table 2. **Analysis of the influence of inflows of individual categories of foreign capital on domestic investments of transition countries**			
Dependent Variable: INV Estimation Method: Two-Stage Least Squares Instrumental Variables: EUIR (-1), EUGDP (-1), FDEBT (-1), INV (-1) Sample: 1994-2002 Included Observations: 11 Total System (Unbalanced) Observations: 87			
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
FDI (-1)	0.237046	0.115399	2.054154	0.0436
PORT (-1)	0.036910	0.143349	0.257484	0.7975
OTH (-1)	0.332138	0.076085	4.365352	0.0000
GDP (-1)	0.223633	0.070308	3.180751	0.0022
Fixed Effects				
_HR—C	18.28117	0.923573	19.79397	0.0000
_BL—C	14.33630	0.846916	16.92766	0.0000
_CZ—C	25.42874	1.139756	22.31069	0.0000
_ES—C	22.31436	1.327936	16.80380	0.0000
_LT—C	19.51431	1.386926	14.07018	0.0000
_LI—C	18.88265	0.969923	19.46820	0.0000
_HU—C	20.21099	1.000004	20.21091	0.0000
_PL—C	20.39696	0.946891	21.54099	0.0000
_RO—C	18.86571	0.855319	22.05694	0.0000
_SK—C	27.92090	0.914634	30.52685	0.0000
_SI—C	22.13418	0.863811	25.62385	0.0000

According to the results variable with the most significant *t* statistics was other foreign investments *(OTH)*, *t* = 4.37. Regression coefficient (0.33) tells us that on average one third of the inflows of other foreign investments were used in stimulating the domestic investment activities.

Taking into consideration the results of other empirical studies, a somewhat disappointing and unexpected result was the regression coefficient on the variable foreign direct investments *(FDI)*. Foreign direct investments during the observed period also stimulated domestic investments of selected transition countries (0.24), but in the model they were only significant at the 5% level ($p = 0.044$, $t = 2.05$).

The results about the effect of portfolio investments were expected, especially considering the results of other empirical studies. Portfolio investments *(PORT)* had a small but positive relationship with domestic investments. This variable was shown to be insignificant in the model ($p = 0.798$, $t = 0.26$), but was kept, so that the differences between the individual categories of foreign capital could be observed. Variable real economic growth *(GDP)* is shown to be significant in this model as well as in the first analysis dealing with total capital inflows. Regression coefficient (0.22) and the empirical t statistics ($t = 3.18$) are negligibly lower in comparison with the analysis of total capital inflows on domestic investments.

5 Conclusion

Transition countries beginning their processes of liberalization and privatization opened their doors to foreign capital inflows. In the 11 observed countries during the 10-year period from 1993 to 2002, the recorded annual inflow of foreign capital was approximately 23 billion USD. Two thirds of total foreign capital inflows were directed into only three countries, the Czech Republic, Poland and Hungary. The dominant category of foreign investments was foreign direct investments.

Out of numerous advantages that foreign capital can bring to recipient countries, this paper analyzes the impact of foreign capital on domestic investments.

The analysis uses panel data of 11 transition economies during a 10-year period (1993-2002). Fixed effects approach was used in this panel data analysis since it captures specific characteristics of each individual transition country. Two-stage least squares method was used since the Hausman's test detected the presence of endogeneity.

According to the result of the regression analysis the initial hypothesis is confirmed. It states that foreign capital inflows in transition economies have stimulated domestic investment activity. On average in all of the analyzed countries an increase of the share

of foreign capital inflows in GDP by 1 percentage point increased the share of domestic investments in GDP by 0.31 percentage points.

The regression analysis confirmed expected differences between the influences of each individual category of foreign capital inflows. According to the model, variable other foreign investments (0.33) demonstrated the most powerful relationship with variable domestic investments ($p = 0.000$, $t = 4.37$). Although in total, the most represented category of foreign capital, variable foreign direct investments (0.24) in the model was found to be significant only at 5% level of significance ($p = 0.044$, $t = 2.05$). The variable portfolio investments turned out not to be significant in the model ($p = 0.798$, $t = 0.26$) as numerous research confirmed before. That means that foreign portfolio investment transactions do not have a significant influence on domestic investment activity.

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Appendix 1. Capital inflows in transition economies

Table 3. **Average foreign capital inflows per capita in analyzed transition economies, 1993-2002, USD**				
	FDI	**Portfolio investments**	**Other investments**	**Total capital inflows**
Croatia	167	82	188	438
Bulgaria	55	-6	-1	49
Czech Rep.	289	100	256	648
Estonia	223	76	173	472
Hungary	216	143	18	334
Latvia	125	19	228	373
Lithuania	102	45	101	246
Poland	130	27	1	158
Romania	39	6	35	79
Slovak Rep.	98	75	121	293
Slovenia	187	92	240	518

Source: IFS, authors' calculations.

Table 4. **Foreign capital inflows in analyzed transition economies in percentage of GDP, 1993-2002, in %**				
	FDI	**Portfolio investments**	**Other investments**	**Total capital inflows**
Croatia	3.8	1.8	4.0	9.6
Bulgaria	3.6	-0.3	-0.3	2.9
Czech Rep.	5.6	2.2	5.7	13.5
Estonia	7.6	2.3	6.3	16.2
Hungary	4.8	3.2	0.3	7.5
Latvia	5.2	0.6	9.6	15.5
Lithuania	3.4	1.5	4.7	9.5
Poland	3.4	0.7	-0.3	3.7
Romania	2.3	0.3	2.2	4.8
Slovak Rep.	2.7	2.2	3.3	8.3
Slovenia	2.0	1.1	2.7	5.8
Total	3.5	1.3	1.7	6.5

Source: IFS, authors' calculations.

Appendix 2. Hausman's test of endogeneity

Table 5. **Analysis of the influence of foreign capital inflows on domestic investments of transition economies (without instrumental variables)**				
Dependent Variable: INV Estimation Method: Pooled Least Squares Sample: 1994-2002 Included Observations: 11 Total System (Unbalanced) Observations: 95				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
FORCAP (-1)	0.207822	0.053105	3.913454	0.0002
GDP (-1)	0.245716	0.065969	3.724742	0.0004
Fixed Effects				
_HR—C	18.48913			
_BL—C	14.18714			
_CZ—C	25.88388			
_ES—C	22.87349			
_LT—C	18.45770			
_LI—C	19.93525			
_HU—C	19.79283			
_PL—C	19.74979			
_RO—C	19.09083			
_SK—C	27.94586			
_SI—C	21.86833			
R Squared	0.801022	S. E. of regression		2.394037
Adjusted R Squared	0.771903	F-Statistic		330.1054

Table 6. **The first phase of Hausman's test of endogeneity in the model of the influence of total foreign capital inflows on domestic investments of transition economies**				
Dependent Variable: FORCAP Estimation Method: Pooled Least Squares Sample: 1994-2002 Included Observations: 11 Total System (Unbalanced) Observations: 91				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
FORCAP (-1)	0.084188	0.103979	0.809664	0.4207
GDP (-1)	0.126043	0.100451	1.254762	0.2135
INV (-1)	0.117813	0.212435	0.554583	0.5809
EUIR (-1)	-0.629149	0.310327	-2.027375	0.0462
EUGDP(-1)	0.115032	0.530632	0.216782	0.8290
FDEBT (-1)	-0.116194	0.038437	-3.022992	0.0034

Table 7. **The second phase of Hausman's test of endogeneity**				
Dependent Variable: INV Estimation Method: Pooled Least Squares Sample: 1994-2002 Included Observations: 11 Total System (Unbalanced) Observations: 91				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
FORCAP (-1)	0.224811	0.048165	4.667543	0.0000
GDP (-1)	0.274777	0.063637	4.317854	0.0000
RESID	**0.117053**	**0.053668**	**2.181080**	**0.0322**