THE EFFECT OF FINANCIAL
INFLOWS ON MACROECONOMIC
GROWTH IN TRANSITION
ECONOMIES FROM 1993 TO 2007

by

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To Oksana Artamonova

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Abstract

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The current study explores the effect of financial inflows on macroeconomic growth in transition economies. Econometric models applied are Arellano-Bond dynamic panel GMM estimator and linear model with random effects. The obtained results do not fully support the hypothesis of positive impact of financial inflows on economic growth, in that only FDI and other investments have a positive effect on growth. The obtained results reflect the value of the research which lies in highlighting the importance of policy on FDI attraction and financial sector reforms.

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GLOSSARY

Net International Investment Position. The difference between a country's external financial assets and liabilities.

Financial Globalization. Integration of a country's local financial system with international financial markets and institutions.

INTRODUCTION

Financial inflows have been shown to have controversial effects as far as numerous financial crises are concerned (see World Economic Outlook, April, 2009). There is a debate about the costs and benefits of financial globalization. Rodrik (1998) and Stiglitz (2000) consider unleashed capital flows to be harmful to global financial stability. At the same time, Fischer (1998) and Summers (2000) suggest that the openness of an economy to capital flows has, in general, proved being beneficial for countries seeking to boost their economic growth, that this openness has strengthened stability among industrial countries. This debate is important for economic policy given the fact that after China and India have opened up their capital markets, they witnessed higher economic growth as opposed to the period when the economies were closed.

The goal of the current project is to test the macroeconomic effects of financial inflows in transition economies on growth. In addition to above-mentioned statements, developing economies, which have actively opened their borders for financial capitals, have witnessed higher economic growth than the countries that have not participated in financial globalization (Kose et al., 2006). However, not much research has been done on the effect of financial flows on macroeconomic growth in transition economies. Besides, the structure of capital in transition economies has a high weight of debt financing as opposed to emerging markets as a whole which tend to have more equity capital (see World Economic Outlook, April, 2009). In other words, the nature of the foreign capital is different. Due to debt repayments in future, debt capital effect on macroeconomic growth could be different from that of equity capital (Soto,

2000). Thus, the effect of financial integration of transition economies on economic growth may be different from that of developed and emerging markets, meaning that the existing studies not necessarily apply to transition countries. The question is worth of being addressed.

It is generally known that there are positive and negative benefits of financial inflows. Positive are 1) the development of the domestic financial sector, 2) better discipline on macroeconomic policies, 3) efficiency gains among domestic firms due to exposure to competition from foreign entrants, and 4) better government and corporate governance (see the evidence surveyed in Gillian and Starks, 2003, Prasad and Rajan, 2008). These are called "collateral benefits" that cause efficiency along with productivity growth. A negative effect is the risk of proliferating financial crises which emerge in one country and transmit to the others through integrated financial mechanisms. The other negative effect is dependence on foreign financial streams and reliance on foreign investors to stimulate macroeconomic growth. Balance of Payment imbalances can be considered also as a disadvantage of high degree of financial globalization (see Rajan and Zingales, 2003a and Stulz, 2005).

Nowadays considerable progress has been made at developing better measures of capital controls and better data on flows and stocks of international assets and liabilities. Thus, one can now measure international financial flows more precisely, and get better estimates of growth effects of financial integration (see Prasad and Rajan, 2008).

In Ukraine, for example, according to the data from 2006 to 2009 Net International Investment Position (NIIP) (stock of external assets minus the stock of external liabilities) has changed from 14% in 2006 to almost 50% of GDP in 2009 (-14,158 mln USD in 2006 and -40,184 mln USD in 2009) - a change of more than 120%. NIIP is considered the best measure of openness, because it reflects not only the size of financial flows over time, but asset

revaluation as well (assets' value changes over time). The latter allows for yearly adjustments to financial flows making them more precise (K. Rogoff et al., 2006). Subsequently, an increase in NIIP in Ukraine according to the above figures, tells about the increasing openness of Ukraine's economy to financial globalization over the past 3 years. This paper focuses on components of NIIP (ratios of financial inflows to GDP growth) which can possibly affect macroeconomic growth indicators (GDP per capita). The hypothesis to be tested is that the effect of increasing financial openness is positive according to economic theory which states that the higher the level of savings (both domestic and foreign), the higher the level of investments (domestic and foreign), and therefore the higher is the GDP. However, contrary to the economic theory predictions, in some countries low economic growth is observed simultaneously with the increasing financial openness, like for example in Ukraine during 2006-2009 period, calling for further investigation of the matter.

This study differs from many existing ones for several reasons. First, the dataset which is applied for the current research measures financial flows more precisely. It extracts financial flows not from Balance of Payments Statistics, but from NIIP data provided by IMF statistics. NIIP measures of financial flows include revaluation of assets which makes financial flows data more precise. Second, the period taken is from 1993 to 2007 which is longer than periods utilized by similar studies of the same countries. That increases the sample size. Third, despite using the methodology worked out by Soto (2000), better reasoning is made for using foreign capital in the classic Solow model. Arellano-Bond technique is applied to address simultaneity. All the above should contribute to more robust estimates of the effect of foreign financial inflows on economic growth in transition countries. In addition, as mentioned earlier, transition economies have a large share of debt relative to other emerging markets. Consequently, measuring financial inflows effect on GDP in transition

economies may produce results different from ones in existing studies for other developing economies.

The structure of the paper is the following. Chapter 2 gives an overview of the related literature on the effect of financial inflows on macroeconomic growth; Chapter 3 covers methodology and estimation techniques employed; Chapter 4 includes data description; Chapter 5 provides a detailed analysis of the estimation results; Chapter 6 provides conclusions and possible recommendations.

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LITERATURE REVIEW

This section of the research provides a review of existing literature on the issue of financial globalization and financial flows impact on GDP. A wide array of sides and components of international financial integration has been studied across all the literature considered. The structure of the literature review is the following. First, papers with general findings, both theoretical and empirical, about financial globalization are considered. The second part of the section narrows down to those findings which are closely interrelated with the current study, shortcomings and incentives for further research being mentioned.

According to Prasad and Rajan (2008), the main advantages of capital account liberalization and, therefore, financial globalization, turn out to be indirect and related to creating financial institutions, not just financing through capital inflows. Even though in some economies government may restrict capital inflows, Prasad and Rajan generally view a tendency for capital accounts to become more open over time. The result is that countries should aim at imposing less capital controls in order to obtain knowledge, better management practices which are positive externalities of foreign capital.

At the same time authors incorporate numerous theories to give a comprehensive overview of the cost-benefit analysis for poor countries in an attempt to examine the financial integration effect in countries with fragile institutions and policies. The authors state that capital account liberalization is not a major priority in such case. These economies need a strategy in dealing with capital inflows, rather than merely opening borders to international investors. Consequently, the main finding is that capital account liberalization and financial

globalization is efficient given "other policies are disciplined". Still the research does not include transition economies and their peculiarities.

The following study provides some evidence of financial globalization affecting macroeconomic growth, which is closer to the current research. The focus is on a particular channel: international financial integration - economic growth. This fundamental study is conducted by Kose et al. (2009). They state that a possible positive correlation between the international financial integration and economic growth can be driven by national savings (financial inflows lead to higher degree of saving) while savings are impacted by growth itself. Nevertheless, the higher the level of investments, which leads to higher savings, the higher is the growth. But the growth, as the authors find, is higher in countries with less reliance on foreign capital, because high growth causes higher domestic savings and countries need less foreign capital. Kose et al. now come to financial sector role. Efficient financial sector makes the growth in production translate into more borrowing and investments. Conversely, a weak financial sector will impede investment despite high level of savings. Besides, they state that weak financial systems cannot efficiently intermediate foreign capital. And on the whole, international financial globalization and reliance on foreign capital only can lead to currency overvaluation inflicting losses on export-oriented sectors, such as manufacturing which further hinders macroeconomic growth.

One of the frequently cited findings applied in the current research were made by Xuan Vinh Vo (2005a). In his work he empirically investigates the determinants of international financial integration. Emphasis is put on the systems of indicators which give a detailed quantitative characteristic of international financial integration. These are de-facto measures and de-jure measures. De-facto indicators are volume-based measures, such as FDI stocks as a share of GDP. It reflects the quantitative side of NIIP. De-jure indicators represent the legal barriers to capital flows and cannot be easily measured. This is

not the author's innovative approach, but rather the existing one applied by many authors in this field, some being mentioned below. The research covers 79 countries and a period from 1980 to 2003. Xuan Vinh Vo advances other studies by expanding the scope of countries under study as well as using panel data estimation techniques to alleviate bias in other researches. The main result of the analysis suggests that financial globalization is mostly explained by trade openness, IMF capital control policy dummy variable, domestic credit and economic growth. These conclusions give a basic explanation for a possible endogeneity problem of current research, since as stated, economic growth affects international financial integration as well as international financial integration itself is a driver for macroeconomic growth.

Another study is less comprehensive in terms of the sample of countries and years covered, but in results it is similar to those of Xuan Vinh Vo (2005a). It is done by Lane & Milezzi-Ferretti (2003) who examine the tendency of financial globalization in a small sample of 18 OECD countries. Similar to the above two papers, they connect globalization with the depth of financial markets, degree of financial restrictions and the openness to international trade. Then the authors look at returns on numerous types of assets and try to quantitatively estimate the degree of international diversification provided by international investments. Lane and Milezzi-Ferretti (2003) are the pioneers to start the topic of international financial integration. However, their study is restricted to a small number of countries.

A powerful empirical research that connects international financial globalization with macroeconomic growth is done by Xuan Vinh Vo (2005b). This study had a powerful impact on the current study. It is logically connected with the study conducted by Kose et al. (2009). However, it gives not just theoretical insight, but it rather applies a regression analysis to indicate a positive correlation between financial openness and macroeconomic growth. Vo, unlike

previous studies, applies numerous indicators, such as flow and stock measures, fiscal indicators, trade indicators, monetary indicators, banking system indicators, Indicators of Stock Market Size, Activity and Efficiency in order to proxy for international financial integration. Besides, the paper has a deeper analysis than many previous ones, since through introducing many proxies for financial integration the relationship "international financial integration-macroeconomic growth" becomes more complex and comprehensive, different economic conditions being considered. Vo (2005b) comes to a conclusion that based on his sample, higher degree of financial openness leads to a higher economic growth.

Soto (2000) performs the analysis of foreign capital inflows impact on macroeconomic growth in developing countries. His sample consists of 44 countries and covers a period of 11 years (from 1986 to 1997). The author breaks down capital flows into foreign direct investment, portfolio investment (both equity and bond flows) and bank credits. The results of Soto's study suggest that foreign capital (namely, FDI and equity) have better chances than domestic capital to boost macroeconomic growth.

Here are some mainstream findings that also became a background for the current research. The intention here is not to extensively analyze these, but overview how other approached and contributed to the issue discussed in the current work.

According to Edison et al. (2003), international financial integration can boost the domestic financial systems. At the same time the decrease in the profits of local firms, advantages of linkages across domestic firms can reduce input costs, increase profits thus contributing to positive growth effects. Uvarov (2003) studies the effect of financial development on economic growth in transition economies. He uses the following types of indicators to measure financial development: liquid liabilities of the financial system as a percentage of GDP, claims on private sector to GDP and to domestic credit ratios and share of

central bank assets in total domestic financial assets. Even though integration of a country into financial system may be linked to financial development, Uvarov (2003) does not cover the international side of financial development. Nor does he use any indicators measuring financial openness. Aleksinskaya (2003) studies the effect of FDI on macroeconomic growth in transition economies; FDI can indicate financial openness, but not solely. There should be some more variables to come into play (see Soto, 2000). Aleksinskaya uses FDI only as one component of capital flows. But other financial flows, such as portfolio investments (equity capital, debt capital, bank lending) can be considered to have some impact on GDP and thus may offset the influence of FDI leaving a room for possible bias. The other weakness of the above research is that Aleksinskaya used FDI based on Balance of Payments Statistics. Balance of Payments does not take into account the change of asset prices over time, but just gives flows. Hence, the results may be imprecise as opposed to results that are based on NIIP Statistics. This Statistics adjusts financial flows in accordance with financial assets revaluation over time.

In light of the above literature, the current research is relevant because it contributes to the topic by providing empirical evidence of financial flows effect on economic growth, namely in transition economies. The research is different from existing studies in the object of research: transition countries have not been included in the panel analysis of the above scholars. In particular, the structure of capital in transition economies has a high weight of debt financing as opposed to emerging market as a whole which tend to have more equity capital (see World Economic Outlook, April, 2009). This constitutes the fact that the effect of debt capital flows may be significant in the regression suggested for the current research. Thus, in transition economies the impact of financial openness on economic growth may come from a "debt channel". This puts higher weight on debt capital inflows which are embedded in such a broad category as financial

openness. Therefore, in transition economies the effect of financial openness, expressed through financial flows, may be different from that of developed and emerging Asian markets. This, basically, means that the results of existing studies cannot be extrapolated on transition countries and transition countries do deserve special attention and treatment.

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RESEARCH METHODOLOGY

In current paper the analysis of the impact of capital inflows on macroeconomic growth is based on the methodology worked out by Soto (2000). In his paper Soto relies on classical Solow's model and the regression that he obtained is based on Solow's model modification. The version of the model to be given further is not solely Soto's finding, but rather a general convention which is employed to address these types of problems. Subsequently, it is relevant to briefly outline the model as well as estimation techniques, advantages and drawbacks and reasoning behind it given by Soto (2000). Then some more theoretical arguments will be added to better motivate the use of foreign capital in Solow's modified model. The reason for that is the fragile theoretical motivation for adding foreign capital variables instead of domestic ones by Soto in his study. As a result, there should be more theoretical underpinnings for applying the model.

Solow's model is based on Cobb-Douglas production function $Y=F(K,L)$. After certain transformations the main outcome of the Solow's model is produced. Other things being equal, there exists one level of per capita capital stock such that investment equals disinvestment. Because investments are counterbalanced by disinvestments, capital stock does not change. Neither does income per capita. As a result, the economy tends to this steady state. And even though income per capita depends positively on savings rate, growth rate is not sustained after steady state is reached.

Then Soto refers to Sala-i-Martin (1995) to obtain the modification of Solow's model to further use it in his regression analysis. However, the regression

utilized by Soto is not just a time-discrete version. It is another modification of the modified Solow's model derived by Sala-i-Martin. Thus, the original modification, which was further modified and used by Soto as a tool for his regression, is the following equation (see Sala-i-Martin, 1995):

$$\gamma_{it} = - \Phi(k)\, y(t) + \Phi(k)\, y^* \tag{1}$$

Here γ_t is traditionally per capita production growth rate, y^* is the natural logarithm of a steady state production level, while $y(t)$ is the logarithm of production per capita at time t. $\Phi(k) = n(1-\alpha)$, where α is capital share in the production function and n is population growth.

Based on the above equation, Soto applies the standard approach in panel data regressions (see Wooldridge, 2002) and obtains the model:

$$y_{it} - y_{it-1} = \beta_1 y_{it-1} + X_{t-1}\beta_2 + \upsilon_i + \tau_t + \varepsilon_{it} \tag{2}$$

In this equation attention should be drawn to β_1 coefficient and variable X_{t-1}. The former is the convergence parameter showing the speed of convergence (corresponds to $-\Phi(k)$ from (1) equation derived by Sala-i-Martin). X_{t-1} can stand for the financial flows at date t-1 to account for a steady state reached. The other variables are traditionally a country specific- (υ_i) and period-specific effects (τ_t). Period-specific effect, unlike country-specific, is the same for all economies at a certain period in time.

Soto points out to the consistency problem which arises when this model is employed through fixed- and random-effect regressions. The reason is that there is a lagged dependent variable in the regression. The presence of the lagged dependent variable introduces contemporaneous correlation between the residual and the lagged dependent variable (see Wooldridge, 2002).

Although fixed effect can be removed by first-differencing, endogeneity problem still remains unsolved. As Soto suggests, y_{it-j} may be used as an instrumental variable. However, for this particular case, in order to address

simultaneity issue, Soto uses Arellano-Bond technique which he considers to be more efficient.

Arellano Bond procedure not only addresses simultaneity problem, but also automatically removes fixed effect by first-differencing (2). As a result, equation (2) is transformed into:

$$y_{it} - y_{it-1} = (\beta_1 + 1)(y_{it-1} - y_{it-2}) + (X_{t-1} - X_{t-2})\beta_2 + \varepsilon_{it} - \varepsilon_{it-1}, \qquad (3)$$

$$\gamma_{it} = (\beta_1 + 1)\gamma_{it-1} + (X_{t-1} - X_{t-1})\beta_2 + \mu_{it}, \qquad (4)$$

γ_{it} is the time-discrete version of the corresponding γ_{it} in equation (*); $\mu_{it} = \varepsilon_{it} - \varepsilon_{it-1}.$

Normally, similar empirical studies cover 30-40 year periods, 5 year averages being calculated (Soto, 2000). However, due to the fact that some of transition economies considered in the paper became independent and data on the NIIP has appeared there only after 1990, the period of study in the current paper is from 1993 to 2007. The analysis is based on 14 years of observations.

Due to the above reasons (short length of the sample, in particular), like in Soto's study, 3-year averages are calculated and the results are compared to check for robustness of the estimates and to analyze long-run effects of foreign capital.

As mentioned earlier, Solow's model does not include foreign capital, or more precisely, it does not specify what type of capital is included. The latter casts doubt on the motivation to use Solow's model as a theoretical underpinning for the regressions (2) and (4) in Soto's approach. Consequently, the question to be answered is "Why should foreign capital inflows have greater effect on macroeconomic growth compared to domestic capital and thus be included in the model?"

According to Obstfeld and Rogoff (1996), foreign capital as a regressor could be incorporated in growth models to account for "learning-by-doing" technology component. As they state, "production process (with the use of foreign capital) generates knowledge externalities", and "technological spillovers

raise the marginal productivity of capital throughout the economy", therefore, positively affecting growth. As they further argue, countries with low level of capital per capita have higher rates of return on investments as opposed to developed economies with higher level of capital per capita. Subsequently, capital tends to flow into countries with lower level of capital per capita. In other words, when there is a low original level in technology, the greater level of foreign capital inflows causes faster growth in technology due to catching up (see Obstfeld, Rogoff, 1996). Then faster growth in technology translates into faster economic growth. This fact applies directly to transition and developing economies.

Now it is relevant to analyze other channels through which financial inflows can affect macroeconomic growth.

First, capital flows can affect economic growth by increasing investments level (Nurdan, 2007). FDI leads to capital accumulation through purchases of new equipment. Even though FDI can decrease domestic investment by creating high competition among local firms and causing them to go out of business, FDI, normally, raises productivity and leads to technology spillovers, as noted earlier. Mergers and Acquisitions, for instance, may end up with foreign owners buying new equipment and making investments in new technologies (Nurdan, 2007). As a result of FDI, multinational corporations may increase demand for inputs produced by local firms, thus causing "investment spillovers" inside the host country.

Second, according to Nurdan, FDI and portfolio investment can also have an indirect effect on economic growth. In order to attract foreign investors, governments implement economic reforms, pursue sound policies, and take anticorruption measures.

Third, financial inflows can affect economic growth by lowering interest rates. Current account deficit has a negative impact on income according to the main macroeconomic identity:

Y = C+I+G+X-M. Therefore, the deficit must be financed to fill this gap. Obstfeld and Rogoff (1996) state that current account deficit can be financed by foreign capital inflow. The size of the inflow is equal to the size of the deficit. The size of the deficit is also equal to the difference between investments and savings levels (S-I). The gap between investments and savings, when investments exceed the level of national savings, defines the amount of foreign capital needed to finance current account deficit. As foreign capital, equity and debt, enters the host country, national investment increases due to technological and investment spillovers in host economy (as noted earlier). As a result, interest rates fall causing more activity among businesses to finance new projects.

Fourth, foreign capital, mostly FDI, leads to technology transfer (Javorcik, 2004). One of the channels is introducing better management environment and practices which are followed by increase in productivity and higher economic growth.

Therefore, the theory behind the impact of foreign capital on macroeconomic growth justifies the use of foreign capital among the regressors in the model utilized by the current paper. As a result, it is now relevant to state that foreign capital can be one of the variables denoted by X in the model. Namely, we start with the traditional Solow-Swan setting

$$Y(t) = [K(t)]^{\alpha}[K^{*}(t)]^{\beta}(A(t)L(t))^{1-\alpha-\beta} \tag{5}$$

$A(t)L(t)$ is an efficient labor in the equation. The new variable that appears in the model is foreign capital $K^{*}(t)$. The above model should be deemed as illustrative. The function is assumed to be Cobb-Douglas and there is a multiplicative relationship between foreign capital and domestic capital. The underlying assumption is that foreign capital should be different from domestic capital. Equipment taken from abroad can be different from the one manufactured in the host economy. Thus, the effect on GDP may be different. Otherwise, the foreign capital effect can be insignificant and then foreign and

domestic capital would be just substitutes. Then the interaction of both types of capital in the equation should be additive, not multiplicative. The latter is to be checked in current study. But in the current study the effect of foreign capital is assumed to be significant and its nature different from domestic one which explains the multiplicative relationship of two types of capital.

It can be shown that from the above expression the following evolution equations are obtained:

$$\acute{K}(t)=s_ky(t) - (n+g+\delta)k(t), \tag{6}$$

$$\acute{K}^*(t)=s_{k*}y(t) - (n+g+\delta)k^*(t) \tag{7}$$

Finding the steady state equations, plugging them into production function and taking logs gives the following equation which reveals the relationship between growth of income per capita, population growth and accumulation of domestic and foreign capital:

$$\ln(\frac{Y(t)}{L(t)})=\ln A(0) + gt-(\frac{\alpha+\beta}{1-\alpha-\beta})\ln(n+g+\delta)+(\frac{\alpha}{1-\alpha-\beta})\ln(s_k)+(\frac{\beta}{1-\alpha-\beta})\ln(s_{k*}) \tag{8}$$

Assuming that the level of technology differs across different countries, $\ln A(0) = a + \varepsilon$. Besides, instead of accumulation of domestic and foreign capital formation and foreign capital inflows as shares of GDP are used. Consequently, after replacing complex fractions by β's, the above expression transforms into:

$$\ln y(t) = \beta_1 - \beta_2\ln(n+g+\delta) + \beta_3\ln(i_k)+\beta_4\ln(i_{k*})+\varepsilon_{it} \tag{9}$$

Here $y(t)$ is per period and per capita level of income, i_k and i_{k*} are respectively domestic capital formation and foreign capital as shares of GDP. After first differencing and writing the dynamic equation, one can come up with equations (2) and (4) which are employed in the current study as well as employed by general convention in similar studies.

C h a p t e r   4

DATA AND DESCRIPTIVE ANALYSIS

The countries on which the sample is based correspond to transition economies according to the IMF classification starting from 1990. The overall number of countries with data available for the current study is 21. Table 1 lists the countries used in the study.

Approximately half of them correspond to Eastern European region, the other half belongs to Central and South-Eastern Europe. The countries have been selected on the basis of similarities not only in terms of geographical location, but the level of income and economic development and based on data availability. The common feature uniting most of these 21 countries is their past. Most of them used to have planned economies and from 1991 they started the process of transition into market economies. Some countries (e.g. Poland, Slovakia, Hungary) belong to EU and witness a faster transition process with higher level of production and income per capita. Nevertheless, the countries can be united together for a purpose of research. Due to potential selection bias, the results of the study should not be extrapolated to other emerging markets (e.g. Latin American countries, "Asian Tigers").

Table 1. Countries' Classification

Region	Countries
CIS (9 countries)	Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyz republic, Moldova, Russia, Ukraine
Central and Eastern Europe (12 countries)	Bosnia, Bulgaria, Croatia, Estonia, Hungary, Latvia, Lithuania, Macedonia, Poland, Romania, Slovakia, Slovenia

There has not been data on financial flows based on NIIP for Turkmenia, Tadjikistan and Uzbekistan. Therefore, these countries have been omitted from the analysis.

The dataset is constructed from 2009 World Economic Outlook provided by IMF. Capital formation index is obtained from the UN National Accounts data. Certain calculations, particularly connected with extracting of financial flows from (NIIP) stock variable, are performed by the author.

Some countries under study belong to Euro area and at certain periods Euro was introduced as a currency there making it more difficult to use proper exchange rates to convert GDP from national currencies into US dollars. It made the use of National Accounts data for GDP more tedious. Consequently, real GDP per capita measured at Purchasing Power Parity (PPP) was utilized.

As for the categories of financial flows, foreign direct investments (FDI), portfolio investments, equity flows, debt flows, bank credits and financial flows from government to government and monetary authorities are considered. The series are taken from one source (IMF statistics) and are "as end of the year" estimates. Because of technical difficulties to monitor short-term capital flows, the data on debt and equity flows are provided on 1-year basis. Besides, IMF and World Bank give reports on short-term flows according to sources from debtor-countries, not creditor ones.

The flows are extracted from the NIIP data, not from balance of payments statistics. The drawback of balance of payments statistics is that it gives only value of the flow in current prices. However, assets tend to change value over their life and statistically this phenomenon is captured by the NIIP statistic which takes into account inflation, exchange rate dynamics. That is why it is more relevant to use the NIIP data to obtain flows as opposed to balance of payments (see Rogoff, 2006).

The flows are reported in US dollars, consequently, GDP per capita is also taken in dollars for consistency and measured at Purchasing Power Parity (PPP). All financial flows are traditionally measured as a ratio to GDP. Thus, the current research is in line with the general convention.

Technological growth and depreciation term (g+δ) is the same for all countries and by general convention is equal to 5% (Mankiw et al. 1992). Define the n+g+δ term as disinvestment.

Barro and Sala-i-Martin (1995) suggest a number of *state* and *control* variables which determine the initial conditions and the steady state respectively. State variables can be the initial level of physical and human capital. The current study assumes that the information on these variables is embedded in the lagged GDP like in neo-classical model. Control variables which can include political factors, financial development and many others are assumed to be time constant, but specific to each country separately. All the changes are comprised in a country-specific effect according to the main regression equation given in previous section.

The data description is provided in the table below. In 1993 GDP per capita ranges from about $1,619 to $13,354 with a mean of approximately $6,480 relative to the range from $3,484 to $26,190 and a mean of $12,672 in 2007. The range for both years is pretty large because countries in the sample have certain differences in the level of income. This also applies to GDP growth expressed as a difference in logarithms. The average growth rate is about -4% in 1993 and 8% in 2007. The latter suggests differences not only across countries, but also over time. The variation of financial flows is less volatile compared to variation of GDP. But the result could not be generalized to imply low volatility of financial flows, because some countries were getting almost zero flows (Macedonia, Bosnia) in 1993. The largest deviation is in FDI and other investments for both years which is natural due to economic crises and political instability in certain

countries. There are no values for financial derivatives inflows in 1993 for all countries due to the fact that derivatives market was not developed in the transition economies in the relevant period.

Table 2. Data Statistics

Year	1993			
Variable	Mean	Standard Deviation	MIN	MAX
GDP (per capita), USD	6,480.868	2,907.816	1,619.495	13,354.570
GDP change (percentage)	-4.513	11.909	-27.648	15.303
Direct Investment in Economy (as a share of GDP)	0.001	0.001	0.0001	0.002
Equity Securities (as a share of GDP)	0.004	0.005	0.00008	0.007
Debt Securities (as a share of GDP)	0.0002	0	0.0002	0.0002
Financial Derivatives (as a share of GDP)				
Other Investment (as a share of GDP)	0.035	0.027	0.005	0.057
Monetary Authorities (as a share of GDP)	0.007	0.004	0.002	0.010
General Government (as a share of GDP)	0.031	0.015	0.021	0.042
Banks (as a share of GDP)	0.003	0.002	0.001	0.004
Other Sectors (as a share of GDP)	0.007	0.004	0.004	0.010
N = 21				

Table 2. Data Statistics - Continued

Year	2007			
Variable	Mean	Standard Deviation	MIN	MAX
GDP (per capita), USD	12,672.590	5,839.963	3,484.375	26,190.920
GDP change (percentage)	8.351	5.883	-.100	23.285
Direct Investment in Economy (as a share of GDP)	0.241	0.158	0.042	0.713
Equity Securities (as a share of GDP)	0.028	0.036	0.0002	0.135
Debt Securities (as a share of GDP)	0.050	0.060	0.000004	0.253
Financial Derivatives (as a share of GDP)	0.003	0.005	0.0000004	0.017
Other Investment (as a share of GDP)	0.263	0.143	0.098	0.624
Monetary Authorities (as a share of GDP)	0.010	0.020	0.000	0.090
General Government (as a share of GDP)	0.041	0.040	0.003	0.168
Banks (as a share of GDP)	0.134	0.132	0.019	0.501
Other Sectors (as a share of GDP)	0.107	0.054	0.024	0.225
N = 21				

C h a p t e r   5

EMPIRICAL RESULTS

The estimator model is based on the specification derived earlier, certain modifications being used. Applying Arellano Bond estimator uses the assumption that the dependent variable has a lagged effect on itself and for this reason it is included in the model. However, the assumption is that this effect can be a cumulative effect of other explanatory variables, such as FDI, Portfolio Investments and others which in turn have an impact on the lagged dependent variable. The goal is to reveal these effects on GDP and separate them from that of lagged GDP and that is why the financial flow variables are introduced as regressors.

One remark should be made about the nature of financial flows as explanatory variables in the equation. The variables are expressed in real terms and in the same way as GDP they enter the regression as stocks. As an example, the stock of FDI in year 1993 is the starting point; then in year 1994 the FDI stock is given. This is in line with the assumptions of Solow-Swan model. But when using the GMM difference estimator to the data (Arellano Bond Difference), the difference in these stocks is obtained. The latter is meant to be flows.

One of potential problems that may arise when addressing this issue is the possible collinearity in the explanatory variables. From the theoretical point of view, the variables should be correlated. Portfolio Equity flows usually go in tandem with FDI. And FDI itself is defined as being more than 10% of stake in a company. As a result, the border between these types of flows lies in the scale dimension.

According to the data, the correlation coefficient between FDI and Portfolio Equity is only 0.552 which is even lower than the correlation between Portfolio Debt flows and FDI. The highest correlation is between Financial Derivatives and Portfolio Debt. That is pretty obvious, because derivatives are linked to the underlying assets and in emerging markets debt capital was dominant during 1993-2009 period (IMF World Economic Outlook, April 2009). The correlation coefficient is thus 0.792 – the highest among the other variables. The results are summarized in the table below.

Table 3. Correlation matrix (major flows)

Correlations	FDI	PortfolioEquity	PortfolioDebt	Derivatives	Bank Loans
FDI	1.000				
PortfolioEquity	0.552	1.000			
PortfolioDebt	0.692	0.499	1.000		
Derivatives	0.648	0.364	0.792	1.000	
Bank Loans	0.412	0.176	0.099	0.131	1.000

Then seven regressions are run to obtain the corresponding coefficients. As discussed earlier, one lag of GDP is used in all regressions. It is also assumed that all flows should affect GDP with a lag. The lag is taken to be two for FDI not only because it gives statistically significant effect compared to the presence of one lag only, but also due to assumption that the impact of FDI flows should be lagged in time more than other financial inflows. The reason is that it usually takes more time to get FDI to work. FDI impact on economic growth usually starts after building a plant, buying new equipment, hiring new employees or having the old ones acquire necessary skills. Therefore, the effect of FDI on GDP can be considered lagged by one period more compared to the rest of the financial flows (Al-Iriani, 2007).

The author believes that all financial inflows come into play when explaining economic growth. For this reason all variables should be included in the regression (main regression, or regression (6), in table 4).

According to the regression (6) results, the effect of FDI is positive. The sign is expected. The positive effect may be explained by technological spillovers, efficiency increase and other reasons outlined in previous chapter. The coefficient of 0.340 implies that 1 percentage increase in FDI should bring 0.340 percentage increase of GDP on average.

The effect of portfolio equity flows is statistically insignificant. It is hard to interpret why this effect should be insignificant. However, portfolio equity flows have been relatively volatile, outflows taking place every two years on average. Besides, the financial systems of most transition economies are underdeveloped (see Prasad, 2008). Thus, foreign investors' funds obtained from equity placement may be utilized inefficiently.

The coefficient of portfolio debt flows shows negative impact on GDP. The share of debt capital including funds obtained through Eurobond placements, compared to other financial flows, is much larger in transition economies (see IMF World Economic Outlook, April 2009). Debt repayments due at maturity induce large financial outflows and that negative and sometimes lasting shock may explain the adverse effect of debt capital on GDP. The reason for borrowing could be the lack of funds in local debt and equity markets. As a result, considerable amount of money was borrowed from abroad either through loans or through Eurobond issue.

The effect of bank loans on economic growth is found to be insignificant. It is natural due to high volatility of bank capital inflows (refer to table 2) coupled with underdeveloped financial systems of transition countries. That hinders financial flows translating into GDP growth (see Prasad, 2008).

Financial derivatives, general government flows and flows between monetary authorities are less sizable in monetary terms as opposed to FDI, Portfolio Investment and Bank loans. For that reason the latter flows are called major flows and they are included in the regression as separate variables, whereas the rest are incorporated in the equation as a single variable named Other Investments. The effect of other investments is significant at 5%. The corresponding coefficient is 0.166 meaning that 1% increase in other investments, on average, leads to 0.166% increase in GDP. General government flows (loans from IMF to governments and loans between governments) comprise a lion share of other investments and presumably have positive impact on economic growth. When there is a lack of other sources of funds, government loans can increase GDP growth in a host economy (see Rogoff, 1996).

Since the model applied is a modified Solow-Swan model, the variables Disinvestment $(n+g+\delta)$ and Gross Capital Formation are included. They appear to be insignificant and play little role in explaining macroeconomic growth.

A remark should be made about the validity of Arellano Bond estimation. Even though the fixed effects were purified through differencing in GMM, the main problem is the simultaneity issue which in alternative estimation procedures would be addressed by including instrumental variables in time series regression. In current model, as mentioned earlier, the instruments are the lagged values of endogenous and pre-determined variables. For this reason the Sargan test is utilized. It checks the validity of the exogeneity assumption $E(X\varepsilon) = 0$, i.e. whether the instruments are exogenous. High p-value of 0.9839 implies that the null hypothesis of independence between instruments and error terms cannot be rejected. The instruments are exogenous and, as a result, a potential simultaneity problem of interdependence of GDP growth and foreign financial flows is seriously tackled. This also implies an appropriate specification of the model utilized (see Arellano, Bond, 1991).

The other test utilized in dynamic panel estimator is Arellano-Bond autocorrelation test which checks the validity of the null hypothesis of no AR(1) and AR(2) correlation among residuals. AR(1) test is not reported here because it usually rejects the null. It happens due to the fact that the first differences in GMM already contain both e_t and e_{t-1} in one equation leading to first-order correlation between residuals. Hence, second-order autocorrelation is of paramount importance, AR(2) statistics being reported to detect it. The statistics is equal to 0.149 and is sufficient not to reject the null of no autocorrelation (see Arellano, Bond, 1991).

For the sake of robustness check, additional regressions (1) through (5) are estimated. Similarly to the main one, each regression employs Arellano Bond procedure. However, in these regressions only one variable is included to measure the effect of each variable on GDP separately. The significant coefficient is that of FDI in regression (1). The sign of FDI coefficient is expected even though it is biased upward (0.405 versus 0.340). The bias can be explained by the omission of important variables which are present in the main regression. The other coefficients are statistically insignificant. Sargan statistics in the four regressions is very low: it is equal to 0.000 in (1) through (4) regressions rejecting the null hypothesis of instruments exogeneity and casting doubt on correctness of each model specification. Arellano-Bond test rejects the hypothesis of no second-order autocorrelation in regressions (1) and (4) pointing out to unreliability of estimates. Therefore, all variables are crucial to the model and should be included to better explain macroeconomic growth in countries under study.

In regression (5) all variables are included but the Other Investments. Nevertheless the signs are expected and the results show stability when compared to the main regression (6). General government flows, which comprise a major part of Other Investments, are important in explaining GDP growth in transition economies. That is why it is suggested that other investments be included in the

regression. Although instruments in regression (5) are relatively exogenous (Sargan statistic is 0.330) and despite the absence of autocorrelation, the main regression (6) suggests better indication of no exogeneity (Sargan statistics is 0.983). The latter adds more confidence to the correctness of initial specification when all variables, including Other Investments, are present.

The Arellano Bond estimator applied up to this point is a dynamic procedure. One of the drawbacks of the Arellano Bond method is its sensitivity to including/excluding variables in a regression and it is also sensitive to changes in the number of lags. Besides, it is geared to estimating short-term (1-year), but not long-term impact. In order to estimate long-run effect on financial inflows on economic growth, OLS model is preferred, the dependent variable being GDP in 2007 and explanatory ones being taken as of 1993. However, in this particular case observations number (21 countries) is too small to obtain reliable estimate of the long-run inflows effect on GDP. One would have to add more countries to the sample. Yet it goes beyond the goal of research which is to test the corresponding effect in transition countries only. Thus, a regression based on 3-year averages of all variables, including the dependent one, is utilized to measure the mid-term effect. The estimation technique serves two goals: 1) due to averaging autocorrelation problem is tackled; 2) because explanatory variables are taken with one lag, endogeneity issue is addressed as well. Consequently, there is no need in Arellano Bond procedure in this case. Instead, linear model with random effects is estimated.

According to the obtained results, FDI and Portfolio Debt have significant coefficients with the same direction of the effect as in regression (6). The coefficients of 1.201 and -1.779 near FDI and Portfolio Debt respectively are the estimates of the corresponding effects on GDP. Wald test reflects the overall significance of all variables in the regression. The mid-term effects are in line with short-term ones confirming the robustness of results.

Hence, the hypothesis about positive effect of financial inflows on macroeconomic growth stated earlier by the author cannot be referred to all variables. Only FDI have a positive impact on GDP both in short- and mid-term perspective. Debt flows have a negative impact on GDP also in short- and mid-term. Other investments have only a short-term positive effect on economic growth. The table below summarizes the results.

Table 4. Regression results, dependent variable: log (GDP_t) – log(GDP_{t-1})

Variable	Regression						
	Arellano Bond						RE
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
LD.GDP	.963 (.025)**	1.073 (.020)**	1.063 (.020)**	1.060 (.021)**	1.036 (.027)**	1.039 (.028)**	1.085 (.057)**
L2D. FDI	.405 (.089)**				.390 (.093)**	.340 (.097)**	1.201 (.446)*
LD. Portfolio Equity		0.170 (0.246)			.098 (.256)	.022 (.263)	.628 (1.387)
LD. Portfolio Debt			-.083 (.163)		-.454 (.178)*	-.425 (.182)*	-1.779 (.623)*
LD. Banks Loans				-.070 (.107)	-.020 (.103)**	-.245 (.147)	.301 (.529)
LD. Other Investments						.166 (.079)*	.310 (.210)
LD. Gross Capital Formation	.045 (.083)	-.443 (.119)**	-.325 (.123)*	.001 (.097)**	-.560 (.132)**	-.540 (.134)**	-1.690 (.595)
LD. Disinvestment $(n+g+\delta)$	-.249 (1.420)	1.607 (1.319)	1.537 (1.291)	.906 (1.539)	-.744 (1.288)	-.595 (1.30)	-3.939 (4.447)
Constant							-.150 (.467)
Observations	170	175	168	196	149	147	39
Sargan Test (prob. value)/Wald test Arellano-Bond test (prob. value)	0.000 0.010	0.000 0.209	0.000 0.154	0.000 0.020	0.330 0.215	0.983 0.149	827.74

Note: Standard errors in the parenthesis
* significant at 5%; ** significant at 1%.
Sargan test (probability value) checks the null of exogeneity of the instruments.
Arellano-Bond second order autocorrelation statistic tests the null of no second-order correlation between residuals.

C h a p t e r 6

CONCLUSION

The current paper explores the effect of financial inflows on macroeconomic growth in transition economies from 1993 to 2007. The time period is chosen on the basis of data availability, while countries are grouped together on the basis of similarities in the level of income, economic development and history. Financial inflows under study are FDI, portfolio equity and debt flows, bank loans and other investments which comprise general government, monetary authorities and other sectors flows.

The hypothesis is that there is a positive impact of financial inflows on economic growth expressed as GDP. The impact of financial openness in transition economies is analyzed by means of such econometric procedures as Arellano-Bond dynamic panel GMM estimator and linear model with random effects. The former is employed in related studies, especially when the problem of simultaneity is present. The latter is used to measure medium-term impact. The obtained coefficients do not give clear evidence of positive effect of the financial inflows on macroeconomic growth. FDI have positive impact on GDP, while portfolio debt affects GDP negatively both in short- and mid-term horizons. Other investments have also a positive impact on economic growth, but only in the short-term. The results are statistically significant and robust. At the same time, the effect of bank loans and portfolio equity is statistically insignificant due to high volatility of these flows and financial markets imperfection in transition economies which place obstacles in the transmission process of the inflows impact on GDP.

If the variables are taken separately to detect their effect on GDP, coefficient near FDI becomes biased due to omission of important regressors, whereas the rest variables have statistically insignificant effect. The above explains the relevance of all the variables as far as economic growth is concerned.

The results of the paper are applicable in the real world setting. Positive estimates of FDI impact on macroeconomic growth reflect the importance of the policy geared towards attraction of direct investments from abroad. But before reaping the advantages and externalities of FDI and portfolio equity flows which are closely related, transition economies should develop their financial sector, its transition mechanism, financial institutions, policy transparency and political environment in order to prevent capital outflows and negative effect on GDP.

The avenues for further research include investigating threshold levels when each inflow reaches maximum efficiency in explaining macroeconomic growth and beyond which the inflow's impact becomes diminishing.

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