FOREIGN DIRECT INVESTMENT AND ECONOMIC GROWTH IN ECONOMIES IN TRANSITION

by

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A thesis submitted in partial fulfilment of
the requirements for the degree of

Master of Arts in Economics

National University of "Kyiv-Mohyla Academy"
Economics Education and Research Consortium
Master's Program in Economics

2003

Approved by _____
Ms.Svitlana Budagovska (Head of the State Examination Committee)

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Program Authorized
to Offer Degree Master's Program in Economics, NaUKMA

Date _____

National University of "Kyiv-Mohyla Academy"

Abstract

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This thesis investigates the impact of foreign direct investment on economic growth of economies in transition. Using the model developed in the framework of endogenous growth theory, the author empirically estimates the direction and channels of the impact of FDI for 18 economies in transition, and finds statistically significant positive effect of FDI on growth. FDI is also found to be positively interacting with the absorptive capacity of a host economy, its level of human capital and domestic investment. In addition, the author addresses the issue of Granger causality relationship between growth and FDI but does not find it. The paper concludes with explaining the results and suggesting some policy recommendations.

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GLOSSARY

Net Capital Inflows. All recorded in the national and international statistics, net inflows that lead to a net liability vis-a-vis foreign residents (in the standard classification of the Balance of Payment Statistics Yeabook of IMF this is equal to the balance on the financial account minus changes in reserve assets).

Net Capital Inflow Composition. Categorization into (foreign) direct investment, portfolio investment, other investment (trade credits, deposits, loans), use of IMF credit and loans, and exceptional financing.

Foreign Direct Investment. Acquisition of a controlling interest in an overseas company or facility; a form of international inter-firm cooperation that involves a significant equity stake in, or effective control of, foreign enterprises.

Portfolio Investment. Investment into debt and equity securities below a certain threshold level (10%; above that threshold, the transaction would be considered a direct investment).

Foreign Ownership. Foreign ownership that exceeds 10% threshold (internationally accepted standard, IMF).

Conventionally, foreign direct investment occurs as a result of one of the following actions (Carbaugh, 2000):

- obtaining a stock package in a foreign company sufficient to control decision-making (possessing of 10% of the interest in a company, according to the US Department of Commerce standards);

- constructing or acquiring a new plant by a parent company in a foreign country;

- transferring funds overseas to finance an expansion of its foreign subsidiary;

- reinvesting the earnings of the foreign subsidiary into the plant expansion abroad.

Chapter 1

INTRODUCTION

While analyzing success cases among some developing nations, one observation comes as a surprise. It is the fact that most such countries have "leaped" in a single decade from the seventeenth into the twentieth century. But the "leap" becomes less surprising once one considers that many such economies succeeded mainly due to the transfer of goods and services from developed countries, thus overcoming the necessity to invent them by themselves, and importing their "great leap forward" (Hazlitt, 1999). In fact, not merely developing or backward countries, but every industrialized Western nation owes a great part of its present technological knowledge and productivity to inventions and discoveries imported from other countries. A large part of what they owe, not only products and services, but also the knowledge and the ideas, are acquired through international trade and international investment. Would it be reasonable to suppose that economies in transition can follow these successful examples?

The recent theoretical developments in the area of economic growth suggest that successful developing countries were able to grow in a large part due to the "catch-up" process in the level of technology (Borenzstein et al, 1998). One of the major channels of the access to advanced technologies is, in its turn, foreign direct investment. Thus, an investigation of enhanced economic growth through the advance in technology can be closely associated with modelling the relationship between growth and foreign direct investment. Again, recent theoretical developments allow researchers to model and evaluate not only the short-run, but also the long run impact of FDI on growth.

Despite a seemingly positive association between FDI and growth, the empirical literature has not reached a consensus on the direction of this impact however, suggesting that FDI can be either beneficial or harmful to growth. Moreover, in the framework of the economies of transition, little research has yet been done on the topic.

The purpose of this paper is to examine empirically the role of FDI in the economic growth process for economies in transition. The principal motivation is that for virtually all these economies, and for Ukraine in particular, the issue of economic growth is an important one. These countries have been stimulating growth with the help of various techniques, including policies that would aim at foreign capital and technology transfer. It is, thus, of interest to investigate whether the start of growth can be attributed to an increased inflow of FDI into these economies over the period of transition.

It would not be a too big an exaggeration to say that once the transition started, all economies were far away from the international technological frontier. But, unlike many developing countries, they did not start from the scratch, but had a complete industrial infrastructure and highly educated workforce, as Campos (2002) claims. It is in this sense that Campos refers to an economy in transition as to an ideal environment for testing whether FDI may really be viewed as contributing to technological progress. Economies in transition had a so-called "enabling environment", which could allow them, in opinion of that author, to realize potential gain from foreign direct investment.

Despite the unarguable fact that transition economies were initially highly endowed with human capital, it is not exactly true that a complete infrastructure was in place. On the contrary, much of the capital stock had to be rebuilt, as in many countries little renovation was taking place in the pre-transition period, and much of the physical capital had depreciated. Moreover, not only did capacities

have to be renovated, they had to be updated to comply with the new requirements of an open market economy, that these countries were starting to build. In this respect, FDI could be seen as not only bringing in the necessary technology, but also the physical capital. However, the physical capital transfer could have had positive as well as negative impacts: crowding out domestic investment, or having a market stealing effect. Thus, it is not a forgone conclusion that an economy in transition is an ideal environment for testing the impact of FDI, especially at the initial stages of transition. Hence, it is of interest to investigate whether economies in transition have, indeed, benefited from foreign direct investment. In addition, it is also of interest to test empirically whether foreign and domestic investments have complementary or substitute relation.

In accumulating their physical capacities, most of countries have had to rely on external aid, and in initial stages of transition this was in a large part a reliance on intergovernmental aid. Once foreign aid became less easily available, for both economic and political reasons, the countries found it advisable to try to attract foreign direct investment. In order to do so, it became necessary for these countries to abandon socialistic and inflationary policies, discriminatory taxation, restrictive legislation, and, at the same time, establish an actual record of respecting private property and maintaining free markets. These free-market policies eventually stimulated not only foreign, but also domestic investment, as well as overall stability and economic growth. Consequently, new profitable investment opportunities emerged. And in this light, another question arises: as time passes, is there only a one-way impact, such that FDI enhances growth? Another type of relationship appears possible: amount of foreign investment attracted into economy may be influenced by the prospects of economic growth in a recipient country. In other words, do the prospects for growth that appear in

transition economies lure foreign investors? Is there a double causality between FDI and economic growth? This paper will address this question as well.

The rest of the paper is organized as follows. Chapter II presents a literature review of the relevant theoretic and empirical studies on the topic of FDI and economic growth. In Chapter III the model used for empirical investigation is introduced. The data used in empirical estimations is discussed in Chapter IV, and the results are presented in Chapter V. Chapter VI provides conclusions.

Chapter 2

REVIEW OF STUDIES OF THE RELATIONSHIP BETWEEN FOREIGN DIRECT INVESTMENT AND ECONOMIC GROWTH

An analysis of the interrelation between FDI and output growth is not new in the economic literature. In order to carefully examine this relationship in the setting of economies in transition, it is important to look at both theoretical and empirical approaches undertaken to the investigation of this problem. Since I am interested in exploring the effect of FDI on growth, and also, in its turn, a possible effect of economic growth on FDI, I pay a close attention to studies which investigate both directions of the relationship. First, it is necessary to summarize the reasons for undertaking FDI and the reasons why FDI may be believed to play a significant role in influencing growth. Next, I provide a review of theoretical framework in which the validity of these reasons is analysed and tested. Finally, several examples of empirical studies in the area are examined.

2.1 Factors that influence FDI decision-making

It is reasonable to suggest that the process of careful planning precedes the final decision making about FDI activity on the top level of multinational corporations (MNSs). According to economic theory and empirical evidence, financial flows take place from the low-profit to higher-profit regions, making the future profit anticipation (profit-seeking) one of the key motivations for undertaking investment activity (Carbaugh, 2000). Although an important one, the expectation of high future profits is not the only factor that is taken into account. Other factors that influence the decision to invest into a foreign country may be

conditionally divided into two large groups of factors – "company-specific" and "country-specific" factors.

Company-specific factors are the factors that differ among foreign companies of the same or similar industry with regard to a specific country. These factors include but are not limited to demand and cost factors.

By demand factors it is understood that a company may view FDI activity as a means of its market expansion (de Mello, 1997). Whenever foreign demand for the product of a particular firm is strong, and whenever it is more profitable to produce goods in that country rather than export them, a company may undertake foreign direct investment into that country. Another demand reason for FDI is eliminating foreign competition: by acquiring a control package in a foreign firm, the parent company eliminates a competitor and expands its market further. In addition, the processes of globalization makes firms expand their markets and operate overseas. Clearly, such factors will vary for firms belonging to different sectors of economy, but may be similar for firms in one particular field.

Cost factors are concerned with the firm's struggle to increase profits by means of decreasing costs. Whenever the costs of labor and costs of resources and final goods transportation are comparatively low in a foreign country, the parent company may shift a part or even the whole production to that country (Carbaugh, 2000). Other cost factors include economies of scale considerations, relative factor prices, and the user cost of capital in a recipient country.

Country specific factors are more interesting for this research. These factors have a similar impact on decision-making of foreign companies operating in any sector, with regard to a specific country.

To start with, such factors include institutional features of the recipient economy (de Mello, 1997). These are political stability, the development of democracy, a sound legislation base regulating FDI and enforcing contracts, the status of intellectual property rights, the degree of government intervention into economy, bureaucratic procedures, the system of taxation and tax incentives. In addition, factors associated with economic stability and economic performance of a country are important, such as the degree of openness, availability of tax rebates, and import and export regulations. De Mello (1999) also points to such scale factors as balance of payments constraints, the size of the domestic market, all of which he refers to as to the absorptive capacity of the economy.

Since this study is concerned with investigating FDI in transitional economies, it is of interest to emphasize what factors have been dominant in attracting FDI to these economies. Hirvensalo (2001) indicates that according to the national investment promotion agencies of the Baltic Region transition economies, one of the main reasons why investors undertake investment activity in the Baltic States and Russia is the prospect of economic growth itself. This is followed by proximity to Western markets, favourable investment climate, political stability, highly educated and productive work force, well developed sectors of telecommunications and infrastructure. In addition, moving ahead with market-oriented reforms, introducing inflation-stabilizing policies, and adopting sound monetary and fiscal policies are factors that are thought to reduce macroeconomic risks and stimulate capital inflows in many Eastern European countries (Calvo et al, 1996).

Other factors that have been spurring FDI inflows into economies in transition are the processes of privatization, with immense opportunities for foreign countries to acquire a controlling interest in newly privatized companies.

2.2 The role of FDI: positive and negative aspects

In addition to the benefits that FDI brings to investors, the interest in studying FDI lies in the area of the effects flowing from FDI. Although it seems to have become publicly accepted wisdom that FDI is beneficial rather than harmful in enhancing growth, empirical literature has not reached a consensus on whether FDI has a positive impact on economic growth.

Since FDI represents a composite bundle of capital stock, technology, management, and know-how (Balasubramanyam et al., 1996), it is believed to have multidimensional impact on the recipient economy.

There are several ways in which FDI can stimulate economic growth. First, through capital accumulation, FDI is expected to be growth enhancing in that more new inputs are incorporated into production (Buckley, 2002). Output growth may additionally result from a wider range of intermediate goods in FDI-related production (Feenstra and Markusen, 1994).

Second, FDI is considered to be an important source of technological change and human capital augmentation (Buckley, 2002). Technological change occurs simultaneously through the process of capital deepening, as new varieties of knowledge-based capital goods are introduced, and through the human capital augmentation, as productivity-increasing labor training, new skills acquisition, alternative advanced management practices and organizational innovations take place.

More importantly, FDI leads to what is called "technology diffusion" – the transmission of ideas and new technologies, productivity spillovers, sharing and implementation of know-how, knowledge transfers (Borensztein et al., 1998), all of which are important factors of economic development. Technological change

occurs not only within the FDI-recipient firm, but also in the economy overall, due to the spillover effects which, as positive externalities, are enhanced by FDI.

Furthermore, FDI is believed to improve efficiency of the locally owned firms. Broadly speaking, the efficiency of firms in the host economy is supposed to be increased in direct and an indirect (spillover) ways.

Though the direct effect it is meant that FDI will contribute to the productivity of the sector in which a foreign firm operates. Some studies (Schoors et al, 2002) find that whenever firms in open sectors are owned domestically, productivity is not very high. They use cheap labor force as a source of comparative advantage. This is in contrast to the foreign-owned firms in the same sectors, which hire more expensive labor, but benefit from higher productivity.

On the other hand, cross-sector, or indirect, effects are also present: whenever labor and knowledge are moving from sector to sector, technology diffusion occurs. In addition, more productive foreign firms stimulate healthy competition in the domestic market.

In addition to the reasons mentioned above, FDI is believed to be especially important for economies in transition because these countries have much potential human capital, but lack the technology and capital necessary for development and growth. FDI is seen as serving as a stimulus for capital accumulation and technology transfer in these economies.

Moreover, as is widely known and understood, transitional economies lack capital and financial means, and they have to rely on foreign assistance. During the transition period a country is faced with reorienting its production and consumption structures and rebuilding its capital stock as a whole since the capital stock inherited from the past is old and inadequate for the new market

situation. Consequently, the speed of the transition may be related to the ability of a country to stimulate capital inflows (Garibaldi et al, 2002).

The experience of transition economies, however, suggests that such sources of external help as foreign aid and credits have proven themselves to not always be beneficial for the recipient countries, since much of the aid is being stolen or used ineffectively, whereas credits require interest payments. In this light, foreign direct investment plays an important role as an outward factor that can and does represent a real working financial injection into transitional economies (Balatsky, 1999).

Another reason why transition economies may be interested in attracting FDI, in words of Balatsky (1999) is, the ability of a foreign-owned sector to lead the economy out of a temporary shock or a short-run recession, provided it is not very deep. During such times domestic producers tend to be more vulnerable to. Furthermore, Calvo et al (1996) suggest that a large shift in capital flows to one or more large (or more developed) countries in the region (such as Hungary, Czech Republic, and Russia), may generate externalities for the neighboring countries, by means of making investors more familiar with the emerging markets and more willing to invest into countries with similar economic prospects.

Finally, other important outcomes of FDI include increase in consumer choice, enabling households to smooth consumption over time, provision of support for pension funds and retirement accounts (Calvo et al, 1996), improving tax collection on the local and state levels (Carbaugh, 2000), as well as a possible increase in domestic investment stemming from increased competition (de Mello, 1997).

It is important to note, however, that not all researchers are so sanguine with regard to the impact of FDI on the host economy. For example, with respect to

the spillover effects, some authors (Schoors et al, 2002; Blomstrom et al, 1998) draw attention to the fact that at the initial stages of the development and/or transition to the market economies, FDI may have a negative impact on the recipient economy. This fact is referred to as a "market stealing" effect, when domestic firms are so unproductive compared to the foreign ones, that foreign-owned firms drive domestic producers out of the market. Schoors et al (2002), however, find that the positive effect outweighs the negative one, and empirically show that this is the case in such transitional economy as Hungary. They also find that cross-section, or intersectional, spillover effects are more important than the spillover effects diffused within the sector into which FDI was injected. This happens because foreign-owned firms that operate on the domestic markets usually come into contact with firms of other sectors, suppliers and consumers of these firm's products. And, as suggested by Blomstrom et al (1998), since the foreign-owned firm is producing a high-quality output, it requires its partners to comply with this quality, driving up production standards of the firms from different sectors of the economy. Nevertheless, it is not clear whether results obtained by Schoors et al (2002) can be extended to other transitional economies, in which domestic production is still at the initial sages of development. And it is, therefore, not unequivocal that FDI can be viewed as a remedy for unemployment since not only workers may be hired by foreign-owned firms, but also workers may be fired by domestically-owned firms that cannot compete. Similarly, it is not clear whether FDI can strengthen domestic competition in the short run.

Other ambiguous consequences of FDI inflows are pointed out by Calvo et al (1996), who suggest that whenever capital inflows are large, they may have less desirable macroeconomic effects, such as "… rapid monetary expansion, inflationary pressures, real exchange rate appreciation and widening current account deficits" (p. 124). They also warn that FDI movements tend to possess

some cyclical components. In the case of developing countries, FDI may lead to "booms and busts in capital inflows", and, consequently, to economic upswings and downswings in the host country. Therefore, they suggest that developing capital-importing counties may be quite vulnerable to cyclically based FDI decisions, and special policies should be implemented to reduce such vulnerability.

Not surprisingly, de Mello concludes that "whether FDI can be deemed to be a catalyst for output growth, capital accumulation, and technological progress seems to be a less controversial hypothesis in theory that in practice" (1999, p. 148), and Campos points out that "a closer examination of the attendant empirical evidence disappoints all but the most fervent believer" (2002, pp.398).

Therefore, different opinions presented in the literature, as well as evolving macroeconomic situation in transitional economies stimulate further elaboration on the problem of FDI and economic growth interrelation.

2.3 Theoretical Framework for Empirical Studies

Given the number of reasons for the importance of foreign direct investment, it is next essential to turn to the theoretical framework in which the studies of the FDI effect on growth are undertaken.

Most of the empirical work in the area is grounded in models of endogenous and exogenous growth.

Whenever the impact of FDI on growth is analyzed within the framework of Solow-type standard neoclassical growth models, FDI is viewed as an addition to the capital stock of the recipient economy. FDI is treated equally with domestic

investment and the impact of the former is viewed as being no different from the impact of the latter. More importantly, in words of de Mello (1997),

> *… The basic shortcoming of conventional neo-classical growth models, as far as FDI is concerned, is that long-run growth can only result from technological progress and/or population/labor force growth, which are both considered to be exogenous. FDI would only affect output growth in the short run and, in the long run, under the conventional assumption of diminishing returns to capital inputs, the recipient economy would converge to its steady state, as if FDI had never taken place, leaving no permanent impact on output growth.*

Additionally, as concluded by Romer (2001), capital accumulation can not account for a large part of either long-run growth or cross-country income differences in the framework of Solow-type models.

Unsatisfied with a narrow and short-run impact interpretation of the role of FDI, researchers have tried to incorporate other channels through which FDI influences growth in both short and long run. They do so in the framework of endogenous growth models. Whenever growth is endogenised, there are several channels through which FDI affects growth permanently. As proposed by Campos (2002), it is convenient to think about these various effects by specifying how FDI affects each variable in the production function. As it was discussed in the previous section, FDI can affect output first of all by means of augmenting capital stock. Foreign and domestic capital may be viewed in this respect as either substitutes or complements. If they are treated as complements, the final impact of FDI on output is expected to be larger as a result of externalities. Second, FDI can affect labor efficiency, being an important source of human capital augmentation and technological change. Even if FDI does not add to the capital stock significantly, it promotes knowledge transfers and provides specific productivity-increasing skills, which are the most important mechanisms of

promoting growth (de Mello, 1997). Furthermore, through knowledge transfers and imitations by domestic firms, FDI also enhances productivity of domestic research and development (R&D) activities. Finally, in endogenous growth models, policy actions are also treated leading to permanent increases in the rate of output growth, and both success and failure of FDI-promoting policies are, therefore, long-lived (de Mello, 1999).

Further model specifications for empirical studies depend on the purpose of the research, and may involve examining FDI-growth relation to the framework of intertemporal utility maximization (Barro and Sala-i-Martin, 1995); accounting for domestic absorption in the host country; analyzing the relation between FDI and convergence; investigating the degree of complementarily and substitutability between foreign and domestic capital (Young, 1993); studying FDI impact in specific industries; exploring the degree of impact of FDI with respect to other macroeconomic factors, such as degree of openness and exports/imports ratios.

2.4 Empirical Evidence

An influential piece of work on the connection between growth and FDI is provided by Borensztein et al (1998). They conduct a study for 69 countries (OECD states, Latin American and several African countries) over two decades, 1970-79 and 1980-89. The authors extend the Romer (1990) model in which technical progress is viewed in terms of an increased variety of capital goods available as a result of "capital deepening". The researchers suggest that FDI should be treated differently from domestic capital by way of expanding the variety of intermediate goods and capital equipment, and in such a way raising productivity in the host country. Varying the model specifications, they consistently find that FDI has significant positive impact on growth in host

countries. However, the main conclusion of the research is that human capital and FDI display complementarily effects, and that there is a specific threshold level of human capital in an economy in order for FDI to contribute to growth. The impact of FDI on host economies, therefore, may be very different, depending on level of human capital development, and may even be negative in a country where this level is low.

In this respect, their finding is accorded with the research of de Mello (1997), who also concludes that preconditions in recipient economies help convert new capital effectively into higher levels of output in the recipient countries. In particular, an increase in the investment productivity can only be achieved provided there exists a sufficient level of human capital in an economy.

In relation to these studies, the research conducted by Campos (2002) is complementary. Campos uses similar model specifications and techniques to analyze the FDI impact on growth in economies in transition. As opposed to Borensztein et al, he finds that the effect of FDI on growth does not depend on the existence or absence of any specific threshold level of human capital. Campos explains this finding by the fact that in economies in transition the level of human capital is so high that it is already above the minimum threshold level. Campos's principal hypothesis is that transitional economies have the necessary level of physical and human capital, but are behind developed countries in terms of technology. Thus, according to Campos, the transitional economy is an ideal environment for testing whether FDI may really be viewed as contributing to technological progress, and he finds that FDI has a positive impact on the output growth in economies in transition.

Additionally, Campos is also concerned with testing for double causality between FDI and growth, but does not find it. The test serves as a prerequisite for further

econometric specification, as the use of instrumental variables techniques is justified whenever FDI is found to be endogenous to growth.

Another work in the field is conducted by Buckley et al (2002), who analyze FDI-growth relation on a regional level of provinces of China. This work is interesting because the author also finds positive relation between FDI and growth, but this time on the level of provinces, not on the national level. The author also includes various policy variables to "capture the determinants of Solow residual", such as the level of marketization, and growth rate of provincial exports and imports. Again, it is interesting to follow a scientific discourse of different researches with regard to the dependence of FDI productivity increase on a particular level of human capital. Similar to Campos, Buckley finds that there is no evidence for an existence of a threshold level of human capital after which FDI becomes more effective.

In relation to the opposite direction of causality, it is instructive to consider the results of empirical investigations of Garibaldi et al (2002). They provide an extensive analysis of various factors that stimulate foreign direct and portfolio investment, among them, the lagged values of real GDP growth. The authors find that FDI constitutes "… a large, relatively stable source of private financing in most transitional economies", and that the direct investment flows increase with good macroeconomic performance. Macroeconomic stability, the extent of reforms, trade liberalization, natural resource endowments and the direct barriers to inward investment all play a role in explaining the FDI pattern in economies in transition.

In relation to double causality, there are a number of studies that are primarily concerned with finding whether the reversed causality really takes place. Many of them (de Mello, 1996a; Kholdy, 1995) rely methodologically on the econometric techniques of Granger causality. These studies are motivated by the fact that

growth prospect may play a role in investors decision making, and that the increasing market size, developing financial infrastructure, economic stabilization, and other factors considered in the previous sections, all can potentially attract FDI.

In particular, Kholdy (1995) examines the direction of causality between FDI and technology spillovers in a number of high FDI inflow countries. The researcher does not find the evidence of double causality, and explains this finding in terms of price distortions and technology selection.

In their turn, their empirical findings of de Mello (1996a) are also not unequivocal with respect to double causation. De Mello suggests that both directions of causality depend on the trade regime of the host economy, which may range from import substitution to export promotion. He also concludes that the direction of causality to a large extend depends on the determinants of FDI: if these determinants have a close association with growth, it is possible to find that FDI is caused by growth. Whenever the evidence on double direction of causality is present, it additionally reinforces the hypothesis of the existence of a particular threshold of factor endowment, as of an important determinant of the FDI efficiency in the host economy.

In relation to the previous studies, my research will focus on testing the existence of positive impact of FDI on growth, as well as the direction of causality between FDI and growth in economies in transition. Although this study is primarily based on the theoretical framework developed by Borensztein and adopted by Campos, it will also utilize the approaches to double-causality applied by de Mello and Kholdy. A finding of the absence or existence of double causality between FDI and growth in economies in transition will serve a triple role in the research: it will suggests whether there is a presence of the threshold level of factor

endowments; it will be a precondition for further model specification; and it will have important policy implications.

Chapter 3

THE MODEL

Following the discussion on the theoretical framework for empirical studies of the previous chapter, in this section I present the model for testing the hypotheses of interest concerning FDI and growth.

3.1 Endogenous Growth Modelling: Starting Point

The development of endogenous growth theory stimulated research of the long-run impact of FDI on growth. It is conventional in the contemporary economic literature to derive the estimating equations from a basic augmented production function in which FDI enters as one of the factor inputs.

$$Y = A*f(K, L, F, P), \quad (1)$$

where:

Y = output (gross domestic product in real terms),

A = exogenous state of technology,

K = physical capital (domestic capital stock),

L = labor input,

F = foreign capital (foreign direct investment)

P = a vector of ancillary (including policy) variables.

Assuming (1) to be linear in logarithms, taking logarithms and time derivatives of an augmented Cobb-Douglas approximation of (1) yields the following expression describing the determinants of the growth rate of GDP:

$$g_y = g_\alpha + \beta_1 g_k + \beta_2 g_l + \beta_3 g_f + \beta_4 g_p, \qquad (2)$$

where g_i denote the rate of growth of individual variables i = Y, A, K, L, F, and ancillary variables, P. Coefficients β_1, β_2, β_3, and β_4 denote the output elasticities with respect to physical capital, labor, FDI and other variables frequently included as additional determinants of growth. Alternatively, these parameters may also be interpreted as partial derivatives of the growth rate of GDP with respect to the growth rates of the respective right hand side variable.

To capture the channels through which FDI can permanently affect growth (and which are extensively discussed in previous sections), one can further consider the model introduced by Borensztein et al (1998), who extend the Romer (1990) model. They derive a model from a production function in which the primarily inputs are human and physical capital. The authors treat foreign capital differently from domestic capital by way of expanding the variety of intermediate goods and capital equipment, and model FDI as the main channel of technological progress. Another peculiarity of the model is that it treats the effect of FDI on the growth rate of the economy as being positively associated with the level of human capital, so that a higher level of human capital in a host economy leads to a higher effect of FDI to the growth rate of that economy. Thus, letting country *i* and time *t* operate within this theoretical framework, the following equation is implemented for empirical estimation of the model and will be used in this thesis as a benchmark equation:

$$g_{yit} = \alpha + \beta_1 Y_{0i} + \beta_2 H_{it} + \beta_3 F_{it} + \beta_4 K_{it} + \beta_5 F_{it}*H_{it} + \beta_6 P_{it} \quad (3)$$

where, in addition to the previous notation, Y_0 stands for initial GDP per capita, H is a stock of human capital (an endowment) in an economy, and F*H is an interaction term between FDI and human capital.

3.2 Model Specification

It is next essential to discuss the precise specification of the model by defining its explanatory variables.

The initial level of GDP per capita is included consistently in endogenous growth theory, to capture the possibility of a convergence effect. The sign of its coefficient is theoretically expected to be negative, since economies with lower levels of per capita income will tend to grow faster in per capita terms (Barro, Sala-i-Martin, 1995; p.31).

The next explanatory variable is human capital. Following the developments of Mankiw, Romer, and Weil (1992), it is conventional to use the proportion of adult population enrolled in secondary school as a proxy for human capital investment. However, as pointed out by Temple (1999), there are some conceptual difficulties with the use of school enrolment data. These rates were initially regarded as one of the most robust and satisfactory variables in the growth literature, but in fact, they only rarely correspond to the human capital variables highlighted in theoretical models. It is also not always clear whether the rates of school enrollment are intended to represent a flow of investment in human capital or the stock. Due to data limitations school enrolment ratios are

still widely used as a proxy for human capital, and will be used as such in this work too. Nevertheless, it is important to remember the limitations of their interpretation.

Foreign direct investment is the variable of primarily interest in this study. When including it in the model, however, one should be careful with measurement. FDI by itself is a flow variable. As warned by de Mello (1997), other variables should also be specified as flows rather than stocks. For example, to avoid inclusion of stock and flow variables in one specification, de Mello proposes to either use an index of foreign-owned capital stock constructed by a perpetual inventory method instead of FDI, or to use the investment ratio as a proxy for the domestic capital stock. In the latter cases, it is necessary to define other variables as flows rather than stocks for them to be compatible with the inclusion of FDI flow as an additional input. In their turn, Balasubramanyam et al (1996) employ an approximation of the rate of growth of the domestic capital stock by the share of investment in GDP. Accordingly, they replace the rates of change in domestic and foreign capital inputs in equation such as (2) by the share of domestic investment and foreign direct investment in GDP. Following this proposition, FDI, domestic capital, and other policy variables will also be defined in similar terms in this paper. In particular, domestic capital is included as a ratio of gross capital formation over GDP, and serves as a proxy to domestic investment (as opposed to foreign).

In growth equation (3) P_{it} denotes a set of the variables included as determinants of growth in addition to human capital, initial GDP per capita and FDI. This set of variables in the original work of Borensztein et al (1998) comprises of government consumption, variables representing foreign exchange and trade distortions (e.g., a black market premium and a foreign exchange parallel market premium), as well as a set of regional dummies. Due to data limitations, out of

this proposed set of variables, my model specification based on (3) will include only government consumption and a black market premium (initial). According to Barro and Sala-i-Martin (1995), the black-market premium is a variable that serves as a proxy for government distortions of markets and is expected to affect growth rates negatively. The coefficient on government consumption may, actually, be of either sign. In the short run, an increase in government expenditures can lead to an increased number of transactions and increased output production. But since government consumption does not have direct impact on private productivity and it can lower saving and growth via distorting effects taxation or government-expenditure programs, in the long run it has a negative association with growth (Barro, 1991).

Before proceeding further, a few remarks concerning the model are necessary. It is not the purpose of this work to offer a new specification of the linkages between FDI and growth. Rather, the main objective is to shed new light on these linkages at the country-level for transition economies, by extending the models already tested for developed and developing countries. Consequently, this study employs additional theoretically pertinent variables, appropriate for the setting of transition economies, thus allowing a focus on a broader range of transition issues.

It is important to recognize the fact that the economic transition of East European and former USSR economies has been, in part, characterized by their endowments at the beginning of transition, that is, by their so called initial conditions. These initial conditionscan be captured by the data on PPP adjusted GDP per capita for the year 1989 (as calculated by de Mello, Denizer, Gelb, and Tenev, 1997), the share of agriculture in GDP, indices of natural resource endowment, the number of years under communism, the distance from Duesseldorf, foreign debt in the year proceeding transition, and secondary school

enrolment in pre-transition year (as presented by Fisher and Sahay, 2000). In this paper, I consider including only the data on PPP adjusted GDP per capita for the year 1989 and the secondary school enrolment in pre-transition year, as these factors are found by Fisher and Sahay to be playing a significant role in explaining growth during transition. Although the other variables are seemingly important, I exclude them from my final estimations. They do not perform well in any of the regressions, and in the panel data that I use they simply turn into a set of time-invariant constants.

Another policy variable that is frequently included into growth equations is the terms of trade, or, alternatively, current account over GDP ratio. In this paper the CA over GDP ratio is an important variable: Balasubramanyam et al (1996) show that the role which FDI plays in the growth process in the context of developing countries is to a large extent characterized by trade policy regimes. They show that the volume and the efficacy of income FDI will vary according to whether a country is following export promoting or import substituting strategy, and that an export promoting strategy is likely to both attract a higher volume of FDI and promote more efficient utilization of foreign capital.

Other policy variables that attempt to reflect the economic and political situation and the progress of reforms include various indices computed mainly by international organizations such as European Bank for Development and Research. In the estimations, I considered the indices of trade liberalization, of banking system reform, the indices of freedom and market perceptions of "country risk" (the latter being borrowed from Garibaldi et al (2002)). However, these variables did not to perform well in estimations.

The final set of variables used in the empirical part of this paper is summarized in Table 1.

Table 1. A Set of Variables and Data Sources

Variable	Measurement and Meaning	Source
Growth	Growth rate, as a percentage of the GDP of the previous year	IMF Yearbook 2001
GDP initial	Logarithm of the initial level of PPP adjusted GDP for the year 1989	de Mello, Denizer, Gelb, Tenev. World Development Indicators; World Economic Outlook. 1997
Human Capital	Initial level of human capital measured as secondary school enrollment in 1989 as a share of the school age population	Fisher S. "The Transition Economies After Ten Years." IMF Working Paper. 2000
Domestic Investment	Share of domestic investment in GDP, for a given year	IMF Yearbook 2001
Foreign Direct Investment	Share of FDI in GDP	Garibaldi P., Mora N., Sahay R., Zettelmeyer J.. IMF Working Paper 2002
Government Consumption	Share of government consumption in GDP, for a given year (serves as a policy variable)	IMF Yearbook 2001
Trade	Share of current account in GDP	IMF World Economic Outlook, 2000
Black Market Premium	Black market premium, initial data, 1990, in percents	IMF World Economic Outlook, 2000

3.3 FDI or Growth: What Comes First?

While equation (3) captures the impact of most of the important variables, it does not account for the possibility of bi-directional relation between growth and FDI, or reversed causality. The association between growth rates and FDI, which may be found quite strong in some empirical estimations, does not indicate causality, nor a temporal precedence between the two variables (de Mello, 1997), and the direction of causation may run either way. For example, growth prospects may

make foreign investment more attractive for investors, and unobservable factors related to the growth dynamics, or such factors as macroeconomic stability, trade regime of the host country, may have a stronger association with FDI than the growth itself. In the setting of transitional economies, many of which have been successfully promoting trade liberalization reforms and providing the necessary institutional framework for property rights and financial settlement, this hypothesis may well find an empirical support.

To capture the possible temporal causality relationships, one can proceed by employing the Granger-causality technique, developed by Granger (1980, 1987). FDI inflows can be said to Granger-cause the growth of output, if better predictions of output growth can be made by including lagged values of FDI in the conditioned information set, in addition to lagged values of output growth rates, than vice versa. Formally, the test involves estimating the following equations:

$$g_{y\,t} = \alpha_0 + \Sigma^{n}_{i=1} c_i\, g_{y\,t-i} + \Sigma^{n}_{i=1} f_i F_{t-i} + u_t \qquad (4)$$

and

$$F_t = \beta_0 + \Sigma^{m}_{i=1} d_i g_{y\,t-i} + \Sigma^{m}_{i=1} e_i F_{t-i} + v_t \qquad (5)$$

where $g_{y\,t}$ and F_t are growth and FDI series respectively; *n* and *m* denote the number of lags chosen so that *u* and *v* are white noise disturbance terms. Hence, the number of periods over which an effect of one variable over the other is observed is chosen by a researcher. By equation (4), F_t Granger causes $g_{y\,t}$ if $f_i \neq 0$. By equation (5), g_y Granger causes F_t if $d_i \neq 0$. Bi-directional Granger causality, thus, is obtained if $f_i \neq 0$ and $d_i \neq 0$.

Alternatively, the idea of the Granger causality can be presented in terms of conditional distributions. Causality is said to be absent when $f(x_t \mid x_{t-1}, y_{t-1})$

equals $f(x_t \mid x_{t-1})$, that is, when in conditional distribution, lagged values of y_t series add no information to explanation of movements of x_t series beyond that provided by lagged values of x_t itself (Greene, 2000). Using this idea, it is possible to test whether the economic growth observed in a previous period yields higher FDI inflow into the growing economy in the current period, and also, whether the volumes of FDI obtained in the previous year have any impact on growth in the current period.

Chapter 4

THE DATA

4.1 Data Sources and Preliminary Data Analysis

The data sources are summarized in Table 1. The data on macroeconomic variables for the economies in transition are obtained from international statistics, primarily from the International Monetary Fund Yearbook. This choice was not arbitrary, as the data coming from a single international source makes it possible to overcome the problems associated with gathering data on the national levels, such as different definitions of what constitutes particular economic indicators and different methods of gathering statistical information. The data on policy indices are obtained mainly from calculations of practicing economists.

I work with data on 25 economies in transition over a period of almost ten years. Due to the data limitations, the data for some countries is gathered for a period of less than ten years. Because the data on some variables of interest is missing, it is possible to use the data on only 18 countries for estimating purposes. However, since data on FDI is available for all 25 countries, I use them all in my graphical exposition. Summary statistics on the observations are presented in the Appendix, in Tables 1 through 3.

The analysis of foreign direct investment starts with investigating the aggregate data on foreign direct inflows into transition economies over the transition period. Conventionally, economies in transition are divided into three sub-groups: the countries of Central Europe (Albania, Bulgaria, Czech Republic, Croatia, Hungary, Macedonia, Slovak Republic, Slovenia, Romania, Poland), the countries

of the Commonwealth of Independent States or CIS (Armenia, Azerbaijan, Belarus, Moldova, Ukraine, Russia, Georgia, Kazakhstan, Kyrgyz Republic, Tajikistan, Turkmenistan, Uzbekistan), and the Baltic states (Estonia, Latvia, Lithuania). Figure 1 summarizes the FDI inflow over these three groups of countries over the period of nine years. In the subsequent analysis, I will use data for the years 1991 and 2000, but because these data are not available for all countries, the graph reflects only the information available for all countries in the respective time periods. Even so, the data for Croatia begins only in 1993, and that for Macedonia begins only in 1994. As the chart suggests, the largest share of FDI belonged to Eastern European countries, and FDI inflows were increasing to all three groups of countries over the period of study.

Figure 1. Inflows of Foreign Direct Investment, in millions US dollars, 1992-1999

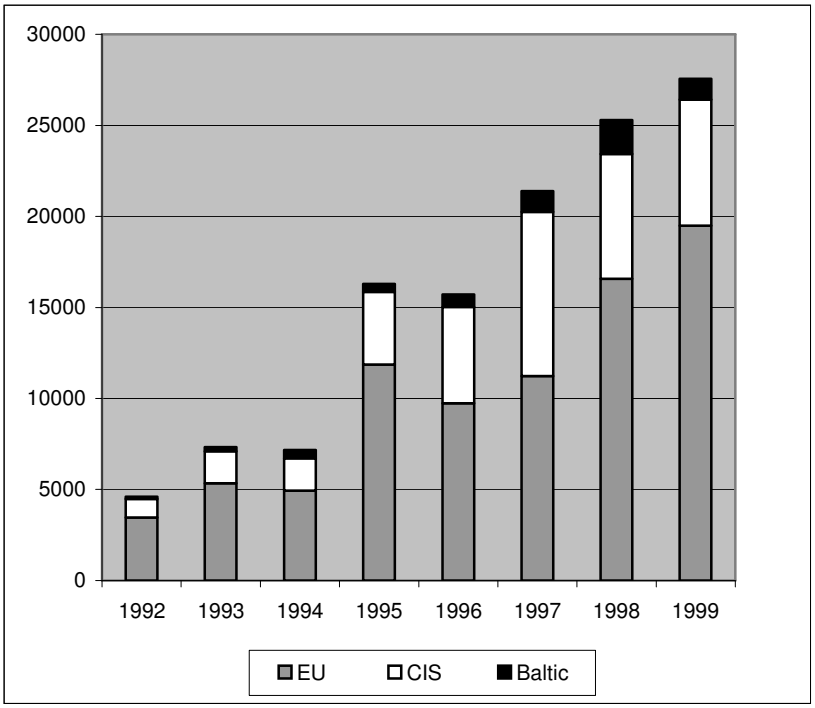
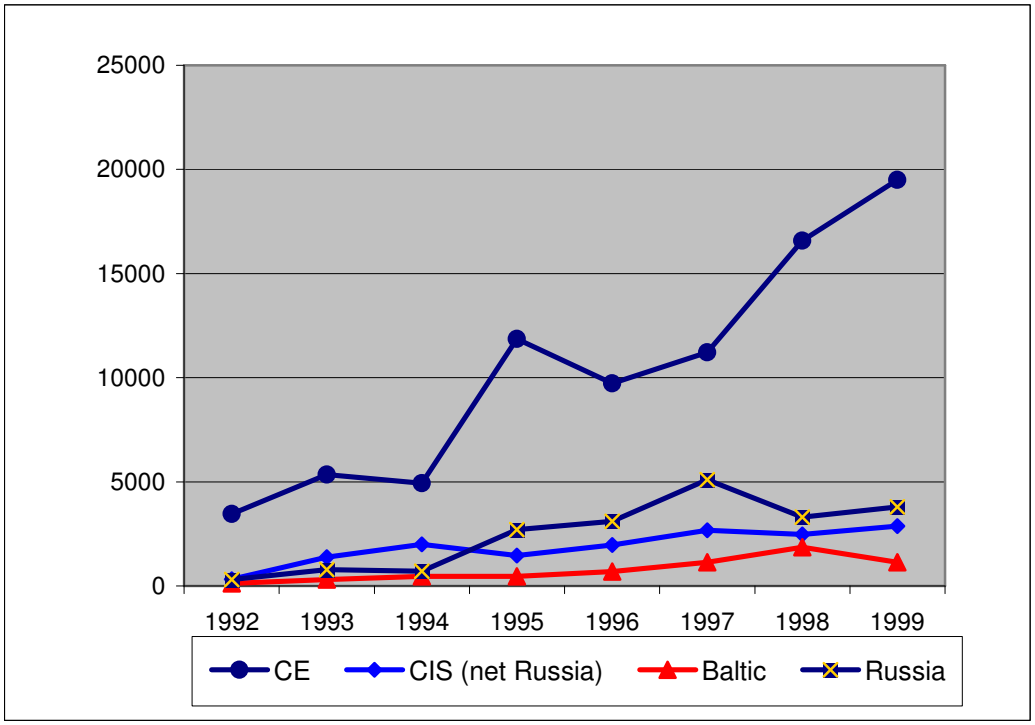


Figure 2. FDI Flows by Groups of Countries,
1991 - 1999, in millions US dollars



Data Source: Garibaldi et al (2001)

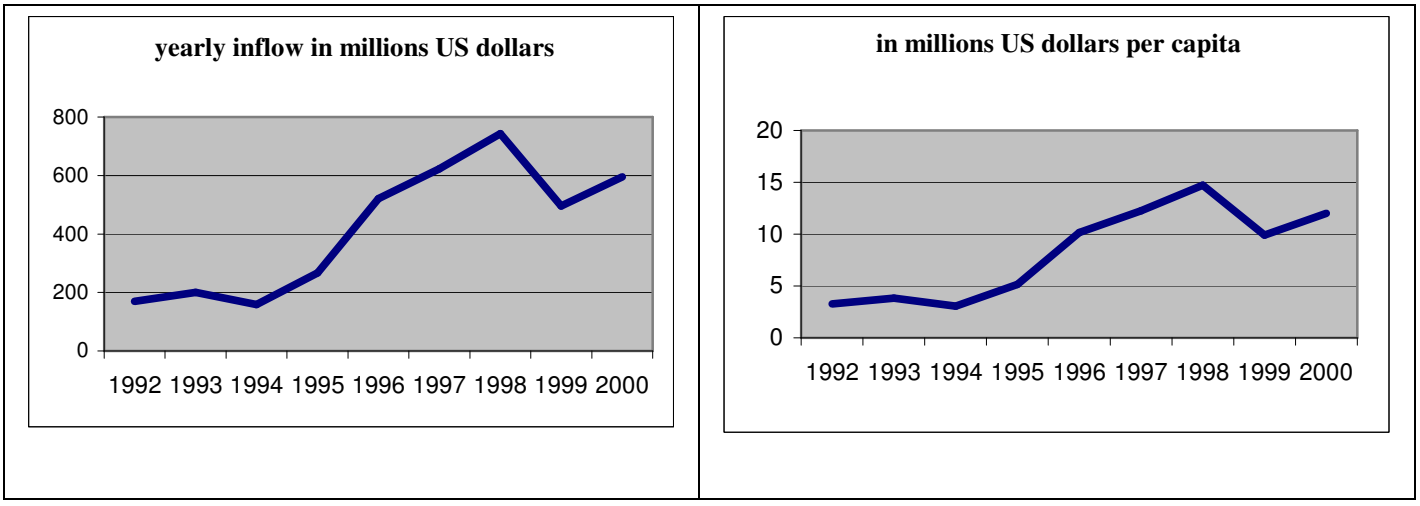
Figure 2 presents virtually the same information, but from a different angle. Here an emphasis is made not only on a comparison of the shares of FDI to different groups of countries, but also on the time trends. Russia is shown separately (and, thus, CIS group is shown net of Russia), and there are several important reasons why this is done in this way. The size of its economy represents 30 to 40 percent of the transition group, in terms of both GDP and population (Garibaldi et al, 2002). Moreover, Russia is the only net exporter of capital over the period of study (Hirvensalo, 2000). Overall, FDI seems to exhibit similar patterns across country groups, following an upward trend, with Central European (CE) group

attracting the largest inflows of FDI and Russia experiencing large fluctuations in 1997-1998.

Figure 3 presents separately the FDI inflow into the economy of Ukraine, in aggregate, and in per capita terms. The data are available for one additional time period, and show an upward trend. A large fall in FDI in the year 1998 can plausibly be explained by the financial crisis that occurred in the second half of the year. The situation improves rapidly, however, and in the year 2000 Ukrainian economy receives more FDI than in 1999.

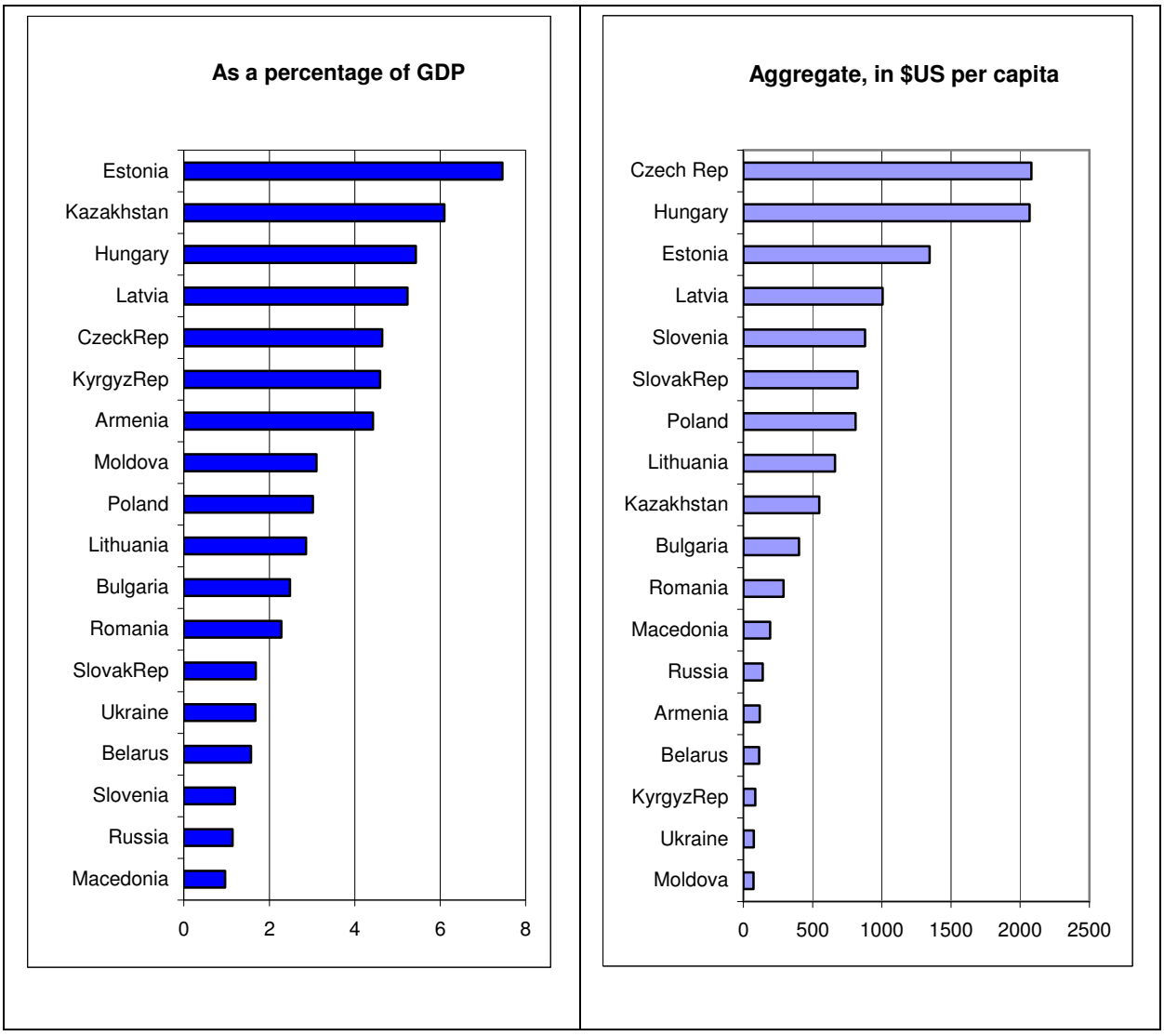
Next, we turn to the cross-country distribution of FDI, presented in Figure 4 (only 18 countries are included in this analysis). The data underlying this figure come from Garibaldi et al (2002) and suggest a vast differentiation in the amounts of FDI attracted by transition economies.

Figure 3. FDI into Ukrainian Economy



Data Source: IMF Yearbook (2000)

Figure 4. Cross Country Distribution of FDI over 1992-1999 (for selected countries)



Data Source: Garibaldi et al (2001)

The figure consists of two parts. The left-hand part presents the cross-country distribution of FDI as a percentage of GDP. Such presentation, however, may be somewhat misleading, as according to it, Estonia and Kazakhstan are found to be the leaders in FDI attraction, and such countries as Kyrgyz Republic, Armenia, and Moldova outperform several countries of Eastern Europe. While high receipts by Kazakhstan can be in part attributed to its rich natural resourse endowment, Garibaldi et al (2002) suggest that the puzzling results can be due to the problems with measuring (dollar) GDP. To overcome the possible confusion, one of the remedies they recommend is to use population as the adjusting factor. Thus, the right-hand side of the Figure 4 shows the result of this normalization: Eastern European and Baltic countries now occupy leading positions, whereas Kazakhstan leads the CIS group.

4.2 Panel Data: Advantages, Disadvantages, Implications for Empirical Testing

All data in the sample across all time periods and countries are grouped to form an unbalanced panel. Recently the use of panel data rather than cross-section or time series estimations became very popular due to numerous advantages that these technique offer. The main of them are worth mentioning here.

First, and most fundamentally, panel data can be used to deal with heterogeneity in the micro units, allowing to control for omitted variables that are persistent over time (Kennedy, 1998). Countless variables exist on a country-to country basis, which may in one way or another affect economic growth and/or be related to foreign direct investment. Clearly, although the countries of Central Europe and former Soviet Union are grouped into the single category of "transition economies", huge differences distinguish them. Just as an example,

one may consider the words of Roland (2002), who says that "far more than the economy is involved in the transition" (p. 47). These countries develop their institutions of democracy and governance, carry out legislative reforms, create new social norms and values, all of which directly or indirectly impact either economic growth, or stability, or both. The resulting economic performance also differs due to so-called "collective memory of bougeois economic relations" meaning that such countries as Hungary, Poland, Czech Republic, unlike CIS countries, had an experience of operating within capitalism prior to communism. At the present time they expect to access European Union, and such prospects present immense incentives to enforce law and protect property rights (Lehmann, 2002). All these and many other country specific characteristics are impossible to capture in a singe econometric equation. However, their omission may lead to bias in estimation. Thus, economists are fortunate to be able to use panel data estimation, which overcomes problems of what would be biased estimates.

Second, panel data may be referred to as "more informative data" (Baltagi, 1995), as it creates more variability through combining variation across micro units with variation over time. This feature alleviates the multicollinearity problem. Further, since more information is used in estimation, the efficiency of estimates raises.

Third, panel data allows for a better analysis of the dynamics of adjustment. The cross-section feature complemented by time dimension avoids the need for lengthy time series and provides knowledge on individual dynamic reactions. Since it combines cross section and time dimensions, one can construct more sophisticated models of human behavior with the use of panel data.

Another advantage is that several lags of the regressors can be used as instruments where required, thus alleviating measurement error and endogeneity biases (Temple, 1999).

Limitations of using panel data also exist. Most of them, however, (extensively discussed in Baltagi, 1995) concern data collection and, related to it, measurement errors, selectivity problems, and short time dimensions on the micro level. In the regressions, heteroscedasticity, which is almost always found in the panel data, and constructing a balanced panel are potential concerns. Nevertheless, the attractive features discussed above justify and outweigh the costs of using panel data. Further, modern econometric techniques allow the use of unbalanced panel and provide avenues to overcome the problems of heteroscedasticity.

Chapter 5

EMPIRICAL ESTIMATION AND RESULTS

This section presents the results of empirical estimation of the effect of foreign direct investment on growth.

Empirical estimation is conducted on the basis of the theoretical model discussed in Chapter 2 and Chapter 4, developed by Borenzstein et al (1998). The model allows for several interesting specifications. Basically, I am interested in estimating four model specifications. The first specification includes the FDI along with other variables discussed in Chapter 3. The second specification, which naturally flows from the theoretical model, allows for testing whether FDI and the level of human capital exhibit a complementary relation, and thus involves introducing an interaction term between FDI and Human capital variables in the regression. The third specification allows for inclusion of both the interaction term and the FDI variable itself into the regression. And, finally, the fourth one introduces an interaction term between foreign and domestic capital, thus allowing an investigation of the interrelation between these two types of capital.

While varying these specifications, I attempt to keep all other variables in the regression the same, to make the results of these specifications comparable. Specifically, after some specification search and following a "general-to-specific" approach, in the final regressions I keep the variables suggested by theory (domestic physical capital, human capital, initial GDP). Most of other policy variables, and especially transition and structural indices did not perform well,

turning out to be insignificant or affecting the signs or significance of other variables in almost all specifications. The only policy variables that seem to have a statistically significant impact on growth are the black market premium, government consumption and the trade variable, and thus I leave them in final specifications.

5.1 Estimation Procedures

Arriving to the final results involved several steps of the estimation. Interestingly enough, estimation of all four specifications followed virtually the same pattern, and, thus, it may be conveniently systemized in the following steps, which I subsequently undertook for every version of the model. All estimation results discussed below are summarised in Tables 2 through 5, for every model specification respectively.

Step 1. Despite the numerous advantages of the use of panel data, discussed in Chapter 4, the estimation of the panel requires certain statistical justification. Thus, the estimation starts with performing the triplet of tests, which allow to decide whether fixed effects, random effects, or simple OLS on pooled data should be preferred.

First, I look at panel versus simple OLS on pooled data estimation, and test whether the intercepts are different from one another. If they do not differ from one another, the preference should be given to panel data estimation, otherwise OLS on the pooled data should be the estimator of choice (Kennedy, 1998). The two tests applied here are an F-test and Breusch and Pagan LM test. The F-test is applied after carrying out the fixed-effects estimation and it is, basically, a Chow test with the null hypothesis being that the coefficients of the dummy variable

intercept estimates are identical. If the computed test statistic (F) exceeds its critical value, then we reject the null and give preference to panel estimation. Alternatively, the Breusch and Pagan LM test is the test applied after carrying out random effects estimation, and its null hypothesis is that the variance of the intercept component of the composite error term is zero (Greene, 2000). Thus, whenever the test statistic (chi-squared) exceeds its critical value, we reject the null and give preference to panel estimation rather than OLS.

Second, once both tests suggest that panel estimation should be preferred, the Hausman test is applied to discriminate between fixed and random effects estimation of the panel data. It is considered that random effects estimation is more advantageous, for it produces a more efficient estimator of the slope coefficients and allows the inclusion of time-invariant variables in the regression (while fixed effects estimation does not take into account time invariant factors). However, unlike the fixed effect estimator, the random effects estimator may be biased. Whereas in fixed effects estimation different intercept are explicitly assigned via dummy variables, with random effects the different intercepts are not explicitly accounted for and are incorporated into the composite error term (Kennedy, 1998). The Hausman test determines whether there is correlation between this composite error term and explanatory variables, that is, whether the bias created by random estimation is so "large" that it prohibits the use of random effects procedure. Under the null, there is no correlation between error and explanatory variables, and thus, if the null is not rejected, one may proceed with random effects estimation.

In my estimations, quite uniformly, the F-tests for all four specifications suggested that the null hypothesis could not be rejected at any conventional levels of significance, implying the use of OLS on pooled data. The Breusch and Pagan LM tests also lead to the same conclusion, and for all four specifications the null

could not be rejected at any conventional level of significance. Thus, applying Hausman test should not have been an option in this case, and although its results (again, quite uniformly), suggested the use of random effects estimation, I proceeded with pooled OLS as suggested by previous tests. All tests statistics, and their p-values are reported in Tables for every model specification respectively.

Step 2. Next, I carry out OLS estimation of the pooled data, and present the results in the first columns of Tables 2 - 5. After that, I conduct a Cook-Weisberg test for heteroscedasticity, using fitted values of the dependent variable (growth). The computed test statistics (chi-squared) for all specifications overwhelmingly reject the null hypothesis of constant variance. While the presence of the heteroscedasticity does not introduce bias into my estimation, it no longer allows to produce efficient estimators, and invalidates the inferences. Thus, I proceed further using the regressions with robust standard errors, that is, with "heteroscedasticity-consistent" variance-covariance matrix estimators. This corrects for the influence of non-spherical errors and provides a more reliable inferences for OLS results.

Step 3. The finding of the heteroscedasticity on the previous step suggests that the heteroscedasticity was also present on the Step 1. Again, since the inferences about the tests results could not be drawn correctly in the presence of heteroscedascticity, we may want to turn back to panel estimation, now applying General Least Squares. The GLS procedure produces more efficient estimators by minimising the weighted sum of squared composite residuals. The results of GLS estimation for the panel data are presented in second columns of Tables 2 - 5, and are, actually, quite comparable to OLS robust estimation of the pooled data, producing qualitatively similar results.

Step 4. OLS and GLS estimations are not the end of the story, however. One important aspect of the growth model used in my estimations is the possible

endogeneity of the FDI variable. The formidable problems associated with the endogeneity of variables are well highlighted in the recent econometric and economic literature. In the presence of endogeneity, independent variables are contemporaneously correlated with the disturbance term, which means that the estimates of their coefficients will be biased even asymptotically. If the error term and the independent variable are positively correlated, negative values of the disturbance will tend to correspond to low values of the explanatory variable. The OLS will overestimate the slope of the true relationship and may cause underestimation of the variance of the error term.

One way to solve the problem of endogeneity of variables is to use the instrumental variables estimation, and it is exactly the IV with which I proceed further. In order to do so, it is necessary to find an instrument for each regressor which is endogenous (contemporaneously correlated with the error term). The instrument must be a variable with two properties: it must be independent of the error term, and it must be as highly correlated as possible with the variable for which it will serve as an instrument.

An important issue to address here is also the appropriate number of instruments that should be used. If the number of instruments is just equal to he number of explanatory variables, the estimated IV coefficient has neither mean nor variance, and so it possesses poor properties in the finite samples (Kennedy, 1998). Including one additional instrument allows it to have a mean, and adding one more allows it to have a variance. Therefore, the number of instruments should equal the number of explanatory instrumented variables plus two. However, adding more instruments in small samples may be contradictory to the whole idea of IV technique: it may introduce bias that the IV procedure is trying to eliminate, since predicted values of the instrumented variable get closer and closer to their

true values. Thus, one should be careful in using more than the minimum number of instruments.

Since I suspect that only the FDI variable can cause endogeneity problem in my estimations, I need three instruments for it. The instruments of choice are the lagged value of FDI itself, and two dummy variables: FSU (for the countries of former Soviet Union) and Baltic (for three Baltic states).

Thus, I do the IV estimation on both panel and pooled data. The results for the panel data (for the reasons discussed below) are presented in the third columns of the four tables corresponding to the four model specifications. The results for the IV pooled data estimation are put into the Appendix (Table 4). The IV estimation of the two rather extreme cases provides virtually the same qualitative results.

Step 5. It is also important to note that the instrumental variable technique is not always a perfect remedy for the endogeneity problem. Although the estimates obtained through using the IV procedure are consistent, there is a price to pay for avoiding the asymptotic bias of OLS: the variance-covariance matrix of the IV estimator is larger than that of the OLS estimator. Thus, the final step is to use a Hausman test which allows to see whether the IV estimation pays off, whether it, indeed, should be preferred to "IV-free" estimation. The null hypothesis of the test is that the difference in coefficients obtained via two types of estimation is not systematic. An interesting result here is that for all estimations based on panel data, at any conventional level of significance the null is rejected, and thus the use of IV procedure is justified. For the pooled IV estimation, however, the IV procedure is preferred to OLS only for the second model specification. For the rest of modifications at 5% level of significance OLS is the choice.

5.2 Discussion of the Results

Now, after carrying out all appropriate tests and estimations, we can turn to the discussion and interpretations of the obtained results.

First, referring to Table 2, and model specification 1, which involves estimation of growth regression with inclusion of FDI variable, it is seen that all variables have theoretically expected signs. Column 1 shows the results of OLS estimation, and here FDI, the variable of interest, has a statistically significant positive effect on growth. When interpreting these results, we should bear in mind the measurement units of the variables. The dependent variable, growth, was measured in percent, while FDI, domestic investment, and government consumption were measured as ratios to the GDP level in the corresponding time periods. Thus, the coefficient on FDI indicates that for each percentage point of increase in the FDI to GDP ratio, the rate of growth in the recipient economy increases by almost 0.51 percentage points. In its turn, the sign of initial GDP variable is negative, as expected, indicating the convergence effect. This variable is significant at 10% in all estimations of the specification. Government consumption and black market premium are highly significant as well, with government consumption being positive. As it was discussed in Chapter 3, in the short run, this sign of the coefficient on government consumption is quite acceptable. Although human capital and domestic investment are not statistically significant at conventional levels, I keep them in the model as theoretically important variables. The trade variable (which is the ratio of current account to GDP) bears a negative sign although it is insignificant.

The results of GLS estimation are quantitatively comparable to the results of OLS estimation, though FDI becomes insignificant. In contrast with GLS, IV estimation suggests that FDI has a strong positive impact on growth.

Table 2. Model Specification 1. FDI and Economic Growth

Independent Variable	OLS for Pooled Data (robust)	GLS for Panel Data	IV for Panel Data
GDP Initial	-13.61 (0.09)*	-0.82 (0.02)**	-6.44 (0.10)*
Human capital	10.18 (0.27)	2.09 (0.75)	10.05 (0.36)
Domestic investment	4.83 (0.75)	7.09 (0.51)	-6.62 (0.72)
Foreign Direct Investment	50.69 (0.02)**	13.03 (0.47)	161.52 (0.00)**
Government consumption	34.11 (0.05)**	19.29 (0.09)*	6.32 (0.76)
Trade	-2.88 (0.51)	-2.25 (0.50)	0.84 (0.81)
Black market premium	-0.01 (0.00)**	-0.01 (0.00)**	-0.01 (0.01)**
Constant term	15.26 (0.74)	-2.12 (0.94)	4.53 (0.93)
Number of Observations	138	138	121
F-test for common intercept: F(16, 117) = 1.13; P-value: 0.22			
Breusch and Pagan LM test for random effects: $\chi2(1) = 0.00$; P-value: 0.97			
Hausman specification test: $\chi2(4) = 3.86$; P-value: 0.43			
Cook-Weisberg test for heteroscedasticity: $\chi2(1) = 28.06$; P-value: 0.00			
Hausman test: $\chi2(6) = 161.20$; P-value: 0.00			

*Note: p-values in parentheses; * - significance at 10%; ** - significance at 5%.*

Table 3. Model Specification 2. Interaction Term FDI*Human Included

Independent Variable	OLS for Pooled Data (robust)	GLS for Panel Data	IV for Panel Data
GDP Initial	-9.92 (0.12)	6.98 (0.24)	-2.51 (0.92)
Human capital	8.57 (0.34)	0.28 (0.96)	13.16 (0.21)
Domestic investment	9.51 (0.53)	7.36 (0.40)	-3.06 (0.85)
FDI*Human	0.05 (0.01)**	0.05 (0.01)**	0.05 (0.00)**
Government consumption	21.51 (0.11)	7.32 (0.52)	-5.50 (0.78)
Trade	-2.67 (0.54)	-2.15 (0.49)	1.44 (0.64)
Black market premium	-0.01 (0.00)**	-0.01 (0.00)**	-0.01 (0.00)**
Constant term	11.23 (0.81)	-15.14 (0.57)	-0.134 (0.99)
Number of Observations	138	138	121
F-test for common intercept: F(16, 117) = 1.39; P-value: 0.16			
Breusch and Pagan LM test for random effects: $\chi2(1) = 0.00$; P-value: 0.98			
Hausman specification test: $\chi2(4) = 5.89$; P-value: 0.20			
Cook-Weisberg test for heteroscedasticity: $\chi2(1) = 29.29$; P-value: 0.00			
Hausman test: $\chi2(6) = 20.65$; P-value: 0.00			

*Note: p-values in parentheses; * - significance at 10%; ** - significance at 5%.*

The domestic capital estimate has a negative sign in this estimation, but is insignificant. In IV, the number of observations drops from 138 to 121. This happens due to the use of lagged values of FDI as an instrument. And since we do not have lagged values for the very first period starting from which the data are available, exactly one period (first) is automatically excluded from estimation for each country. Overall, the results are consistent with those obtained by Borenzstein et al (1998) and Campos (2002). They also are robust in a sense that both in OLS and IV estimations provide qualitatively similar estimates.

The second specification (Table 3), replaces FDI variable with the product between FDI and human capital. Such specification aims to analyse the interaction between FDI and the stock of human capital in the FDI recipient economy. Again, the results obtained using different estimation methods convey the same information (indicating their robustness), and, quite strikingly, only two variables are persistently significant in all estimations: the interaction term and the black market premium. Under OLS, government consumption and initial conditions may be claimed significant at 11% and 12% respectively. The significance of the interaction term is an important result: it implies that FDI and human capital exhibit complementary effects. A strong positive interaction between FDI and the level of human capital suggests that FDI has a stronger positive effects on economic growth when the existing stock of human capital is high. This result reflects the idea that the flow of advanced technology brought by FDI can lead to the increase of the growth rate in the recipient economy only provided that it interacts with that country's absorptive capability. However, Borenzstein et al (1998) also suggest an additional inclusion of the FDI term into the specification itself, because, as they explain, the positive sign that the interaction term bears may be due to the omission of FDI itself.

Table 4. Model Specification 3. FDI and Interaction Term FDI*Human

Independent Variable	OLS for Pooled Data (robust)	GLS for Panel Data	IV for Panel Data
GDP Initial	-9.16 (0.71)	4.99 (0.71)	-0.14 (0.96)
Human capital	8.42 (0.34)	1.36 (0.82)	13.42 (0.20)
Domestic investment	10.64 (0.48)	9.91 (0.23)	-2.01 (0.90)
Foreign Direct Investment	-16.56 (0.46)	-39.00 (0.04)**	-43.23 (0.23)
FDI*Human	0.06 (0.03)**	0.08 (0.00)**	0.08 (0.00)**
Government consumption	18.95 (0.37)	-1.58 (0.89)	-10.66 (0.61)
Trade	-2.64 (0.55)	-1.90 (0.54)	1.52 (0.62)
Black market premium	-0.01 (0.00)**	-0.01 (0.00)**	-0.01 (0.00)**
Constant term	10.38 (0.82)	-12.64 (0.67)	-3.49 (0.94)
Number of Observations	138	138	121
F-test for common intercept: F(16, 116) = 1.37; P-value: 0.16			
Breusch and Pagan LM test for random effects: $\chi2(1) = 0.00$; P-value: 0.96			
Hausman specification test: $\chi2(5) = 7.76$; P-value: 0.17			
Cook-Weisberg test for heteroscedasticity: $\chi2(1) = 29.14$; P-value: 0.00			
Hausman test: $\chi2(7) = 57.40$; P-value: 0.00			
Tests for Joint Significance	F(2, 129) = 3.27 Prob>F = 0.04	$\chi2(2) = 10,.60$ Prob> $\chi2 = 0.005$	$\chi2\ (2) = 12.15$ Prob> $\chi2 = 0.002$

*Note: p-values in parentheses; * - significance at 10%; ** - significance at 5%.*

Thus, the third specification addresses this issue (Table 4). Now FDI itself is negative but insignificant in OLS estimation, while the interaction term bears positive sign, and is significant. The results are even more dramatic in GLS and IV estimation: FDI turns out to be negative and significant. While the results of OLS and IV estimations are consistent with those obtained by Borenzstein et al (1998) and by Campos (2002), the results of GLS estimation are contradictory and suggest that FDI affects the growth of a host economy in a negative way. Further application of the joint significance test for the FDI and FDI*Human variables being jointly significantly different from zero (the last row of Table 4) suggests that these coefficients can not be claimed jointly equal to zero. Hence, the finding is that although through the interaction with the level of human capital in the economy FDI adds positively to economic growth, by itself it has a negative impact on the latter, although not all methods uniformly support this idea.

Yet, one has to be careful with drawing a definite conclusion, and should take into account a purely econometric explanation of the obtained results. Since human capital variable is defined as *initial* school enrollment, it is invariant with respect to time. Its multiplication by FDI thus produces a variable highly correlated with FDI, which leads to the multicollinearity problem. In presence of high multicollinearity, the coefficients remain consistent and unbiased, but their variances become very large. This means that the precise estimation of the estimates is difficult. Moreover, the coefficients may have the wrong signs or implausible magnitudes (Greene, 2000).[1] Therefore, the result of including both FDI and interaction term into regressions, namely, the insignificant impact of FDI on growth in OLS and IV estimations, and also the negative impact of the variable should not be particularly surprising. It must be also noted that the

[1] I am grateful to Professor Peter Kennedy for suggesting this explanation, and also to Professors Magdalena Sokalska and Tom Coupe for insightful conversations on the topic.

multicollinearity problem is present at all stages of estimation of this very specification. Thus, the interpretation of results can be only suggestive rather than conclusive. This is quite important in the light of the debate present in the economic literature about the necessity of existence of a threshold level of human capital in a host economy after which FDI becomes effective. For example, Campos (2002) finds that the interaction term is insignificant, and thus, concludes that no threshold level of human capital is required in a host economy; while Borenzstein et al (1998) find that the interaction term is significant, and thus there should be a particular threshold level in an economy after which FDI starts playing a role. Neither of these authors account for the potential statistical problem of multicollinearity, however, when using the initial level of human capital. Hence, their results are open to question. Similarly, the statistically significant interaction term between FDI and human capital found in this study, which suggest that a threshold level of human capital is necessary, cannot be considered to be definite.

Finally, I am also interested in investigating the relationship between foreign and domestic investment. Comparing the coefficients for domestic and foreign investment in all previous specifications we notice that domestic investment in all cases is insignificant, suggesting that in the transition period domestic investment was not a very important factor in explaining economic growth. FDI, in its turn, has effects over and above domestic investment in growth equations, indicating also greater effectiveness of FDI.

To explore the issue further, I adopt model specification 4, introduced by Buckley et al (2002), which also rests on the theoretical developments of Borenzstein et al (1998). Table 5 reports the results of the estimation of growth regressions with an interaction term between domestic and foreign capital.

Table 5. Model Specification 4.

FDI, Interaction Term FDI*Domestic, and Economic Growth

Independent Variable	OLS for Pooled Data (robust)	GLS for Panel Data	IV for Panel Data
GDP Initial	-13.84 (0.51)	-1.21 (0.93)	-8.46 (0.77)
Human capital	10.53 (0.25)	2.02 (0.76)	15.21 (0.18)
Domestic investment	-1.01 (0.95)	6.18 (0.58)	1.33 (0.68)
FDI*Domestic	200.44 (0.02)**	44.12 (0.54)	161.18 (0.09)*
Government consumption	33.18 (0.05)**	19.27 (0.13)	3.75 (0.85)
Trade	-2.99 (0.51)	-2.07 (0.53)	1.33 (0.68)
Black market premium	-0.01 (0.00)**	-0.01 (0.00)**	-0.01 (0.01)**
Constant term	17.05 (0.71)	-0.91 (0.97)	9.89 (0.86)
Number of Observations	138	138	121
F-test for common intercept: F(16, 117) = 1.26; P-value: 0.23			
Breusch and Pagan LM test for random effects: $\chi2(1) = 0.00$; P-value: 0.97			
Hausman specification test: $\chi2(4) = 3.47$; P-value: 0.48			
Cook-Weisberg test for heteroscedasticity: $\chi2(1) = 26.72$; P-value: 0.00			
Hausman test: $\chi2(6) = 163.62$; P-value: 0.00			

*Note: p-values in parentheses; * - significance at 10%; ** - significance at 5%.*

While the domestic investment variable is insignificant, the interaction term in OLS and IV estimations turns out to be highly statistically significant and bears a positive sign. This is again an evidence of the idea that the flow of FDI can affect the economic growth of the host economy if it interacts with country's absorptive capacity. The coefficient of the interaction term suggests that FDI does not crowd out domestic investment. In fact, two types of capital are found to exhibit complementary effects. Other variables in this specification have expected signs, though most of them are insignificant.

When we compare the results obtained under GLS and IV or OLS estimations, we can notice that GLS produces insignificant results, while IV and OLS produce them significant. This comparison, thus, raises a concern of the robustness of the results. However, the concern should be less of a worry once we again consider the econometric intuition behind the estimations. The GLS estimation requires the knowledge and the use of the variance-covariance matrix of disturbances. In theory, GLS produces the best linear unbiased estimates. Yet in practice, the true variance-covariance matrix is not known. And so, it is the estimated variance-covariance matrix that is used in GLS, and the GLS procedure gains the name of feasible GLS. Since it uses the estimated and not the true variance – covariance matrix of disturbances, it produces unbiased estimates, but they may be inefficient. At the same time, robust OLS estimation has as its end result the White heteroscedasticity consistent estimator (Greene, 2000), which is efficient. And so, if a question arises as to which result is more robust – based on OLS corrected for heteroscedasticity, or on GLS, the answer would be that the result produced by OLS tends to be more powerful. Hence, we can conclude that FDI has a positive interaction with the domestic investment, and we can claim that this conclusion is robust.

The motivation for this last specification, which includes the interaction term between two types of investment – domestic and foreign – is similar to the specification 2, which includes the interaction term between foreign investment and human capital. Thus, it would also be instructive to look at how the results of the estimations change once the excluded variable, the FDI itself, is additionally introduced into the model. This would be analogous to specification 3. It does initially seem that the potential statistical problem of the specification 3 should be less severe in this new specification, since the domestic investment is not a constant in this case, but varies on a year-to-year basis just as foreign investment does. However, a closer inspection of the data suggests the contrary. Surprisingly, the interaction term FDI*Domestic and FDI have a correlation coefficient as high as 0.9496! (Appendix, Figure 1). Thus, just as in specification 3, the introduction of FDI again leads to multicollinearity, in the presence of which the inferences are invalidated and precise conclusions about the effect of any variable cannot be drawn. For this reason, I report the results of the estimation of such specification in Appendix, Table 5, for pooled OLS only, just to provide an idea of an estimation.

Lastly, it is also possible to estimate a specification that would nest the outlined specifications and include both interaction terms simultaneously. However, such specification would again suffer from multicollinearity. The results its estimation are presented in Appendix, Table 5. There all coefficients on all variables are found to be insignificantly different from zero.

5.3. Is Granger Causality an Issue?

Finally, I would like to address the question of the reverse causality, which can be attributed to the relation between FDI and economic growth of the host

economy. Following the theoretical discussion of section 3.3, I apply tests from which it is possible to infer whether lagged values of one variable have any explanatory power in a regression of another variable on lagged values of both of them, and thus to see whether movements in one variable cause movements in the other variable.

Since my data comprise a rather short time period, I use only one year-long lag period in the estimation. And so, the equations (4) and (5) of section 3.3 can be reproduced as:

$$g_t = \alpha_0 + c_i g_{t-1} + f_i F_{t-1} + u_t \qquad (4)$$

and

$$F_t = \beta_0 + d_i g_{t-1} + h_i F_{t-1} + v_t \qquad (5)$$

To test whether FDI Granger causes growth, we have to test whether $f_i = 0$, and, by analogy, to test whether growth Granger causes FDI, we have to test whether $d_i = 0$. Bi-directional Granger causality is obtained if $f_i \neq 0$ and $d_i \neq 0$.

Basically, for testing the first hypothesis, that is, FDI Granger causes growth, we need only the first equation of the system, and the second equation is irrelevant (Greene, 2000). A simple test applied here is just a t-test. From a regression of the growth on the lagged values of the growth itself and on the lagged values of FDI, we obtain a t-statistic of the coefficient of lagged FDI, and its p-value, which is sufficient to draw the inference about the significance of the coefficient, and thus, about the presence or absence of the causality. Similarly, to test the second hypothesis, that growth Granger causes FDI, it is enough to regress the current level of FDI on the lagged values of FDI itself and of the growth in the host economy. The t-statistic on the coefficient of the lagged growth will be the one on which we will conclude whether growth is causing the FDI inflow.

In order to confidently draw conclusions about presence or absence of the bi-directional relationship, these one-sided estimates (where the only one direction at a time is tested) estimations may not suffice. Since we would like to test the joint hypothesis, that the causality is running in both directions, and that the coefficients f and d in both regressions are nonzero simultaneously, we need a more careful procedure. It involves estimating the system of two equations and then conducting the joint test on the coefficients jointly being different from zero. Thus, I test for Granger causality in the vector autoregressive (VAR) model.

The results of all three estimations are summarised in Table 6. From the Table it can be inferred that in the regression with growth being a dependent variable (column 1), lagged FDI is insignificant. This means that the FDI inflow of a previous period does not add a lot to explaining growth in the current period. This also means that FDI does not Granger cause growth. It is worthwhile to pause and consider whether this result is a worrying one. In the previous section it was found that, overall, FDI has a positive effect on growth of the host economy. Here, we do not find a significant positive effect. But should this be of a concern? On the one hand, this finding is evidence of the fact that FDI of the previous period does not carry much power to the current period and does not enhance growth in the current period. But on the other hand, this finding does not undermine the result that the current period value of FDI has a positive impact on the current economic growth. All it says is that FDI has most of its impact on the recipient economy in the period when it is injected, but does not have a significant effect in subsequent periods. Still, it is difficult to be enthusiast about this result. In practise, it might have been nicer to see the host economies having on-going benefits from present foreign investment that serve to spur on the transition process. Unfortunately, but realistically, the results suggest that this is not the case.

Table 6. Granger Causality

	Dependent Variable			
	Growth	**FDI**	**Growth**	**FDI**
	Independent estimation		*System estimation*	
Lagged FDI	14.93 t= (0.83) P= (0.41)	0.63 t= (8.59) P= (0.00)	14.92 z= (0.84) P= (0.401)	0.63 z= (8.69) P= (0.00)
Lagged Growth	0.466 t= (8.21) P= (0.00)	0.0002 t= (1.27) P= (0.21)	0.46 z= (8.31) P= (0.00)	0.0002 z= (1.29) P= (0.19)
Constant	0.61 t= (0.81) P= (0.419)	0.14 t= (4.77) P= (0.00)	0.61 z= (0.82) P= (0.41)	0.014 z= (4.83) P= (0.000)
Number of observations	126	126	126	126
	F (2, 123): 36.36 (0.00)	F (2, 123): 40.91 (0.00)	*Joint Test:* [FDI] Lagged Growth = 0.0 [Growth] Lagged FDI = 0.0 $\chi^2(2) = 2.4$; Prob > χ^2=0.3	

In the regression with FDI being a dependent variable (column 2), the lagged value of growth is insignificant as well, implying that that the economic growth in a host economy in the previous period does not influence the amount of FDI in the current period. And so, we can say that growth does not Granger cause FDI. Finally, the results of the VAR system estimation support the results of independent estimations, and the joint hypothesis of the coefficients f and d in equations (4) and (5) being equal to zero is not rejected at all conventional levels. Hence, the data at hand do not support the idea that the news about growth in an

economy in transition is an impetus strong enough for foreign investors to relocate significantly different amounts of capital to these economies.

Chapter 6

CONCLUSIONS

Many countries, including developing and transition economies, have changed their attitude towards foreign direct investment over the past decade, by liberalizing their policies to attract investment from multinational companies (MNC), and by competing against one another in attracting investors by offering generous incentive packages. This study is an effort to further the understanding of the impact of foreign direct investment on economies in transition, and in particular, on their economic growth. It examines the direction of impact of FDI and goes beyond the existing studies for transition economies by shedding some light on channels through which this impact occurs. The study also addresses several econometric problems that may have biased the conclusions of earlier research.

The empirical results for 18 economies in transition suggest that, overall, foreign direct investment has a statistically significant positive impact on economic growth of the recipient economies. Moreover, there is some evidence that this positive effect is reinforced through FDI's interaction with the absorptive capacity of the host economies. The results suggest that FDI may be more effective the greater is the level of human capital in the recipient economy. In other words, workers with a higher level of education are a better ground to sow the seeds of knowledge and skills developed abroad and transferred by means of FDI than workers with a lower level of educational attainment.

With respect to the ongoing debate in the economic literature as to whether a specific threshold level of human capital is needed in an economy for FDI to be effective, I do not find conclusive evidence neither for nor against the necessity of having such threshold level. The presence or absence of the threshold level is usually justified in the literature on the basis of significance of the interaction term between FDI and human capital, which is included into the growth regressions along with FDI variable. This study points out, however, that the results of such estimations can only be tentatively suggestive, but by no means conclusive, because of the multicollinearity problem present in these type of estimations due to the use of the initial level of human capital only. While theory suggests the use of initial level of human capital only (rather than a year-to-year variant level of human capital), a possible remedy, which could be adopted in the future research, could be the development of a theory that extends the role of human capital in the growth models of this kind. In addition, better data for human capital could be used: not only data on school enrolment ratios, but also some measures which would be more reflective of workers skills and abilities.

Touching upon the data issues further, it should also be mentioned that I work only with that data on FDI which is recorded in the balance of payment statistics. This is, however, only reflect part of resources invested by a MNC (Borensztein et al, 1998), since a significant part of the investment may be also financed through debt or equity issues raised in the domestic market. Thus, the FDI measure used in the regressions underestimates the total value of fixed investment, and the coefficients may be proportionally overestimated. However, since the bias in FDI measurement is uniform across all countries of the sample, the qualitative results should not be affected.

Returning to the discussion of the channels of impact of FDI, we can in part attribute the positive impact of FDI on economic growth to its contribution to

the accumulation of capital stock. This would require that foreign investment does not crowd out domestic investment. In other words, this would also require that FDI does not have a market stealing effect and does not drive domestic investment from the market. The issue is analyzed by looking at the interaction between foreign and domestic capital. The major finding is that FDI does not crowd out domestic investment, and further, that both foreign and domestic investment are complementary to each other. Foreign injections are more effective when the host economy injects a certain amount of domestic investment as well; and domestic investment is more effective whenever there is a presence of foreign investment in an economy. The finding may be further explained by the fact that FDI stimulates competition inside the host country. Also, by exposing nationals to successful practices, by making them aware of modern technologies and know-how, and by showing them new profitable opportunities, FDI becomes an impetus for domestic investment and for adopting similar practises in the home country by nationals, leading to an overall increase of economic activity.

In this paper, I also addressed the issue of Granger causality between FDI and economic growth. While the data at hand suggests that neither FDI Granger causes economic growth, nor economic growth Granger causes FDI, this result does not undermine the previous finding of a positive impact of FDI on growth. However, it does suggest that foreign investment has a short-lived effect in a host economy, and that its direct impact on growth does not go beyond the period in which it is received. This is a somewhat disturbing result that suggests that nationals may be able to make a better use of transferred resources and also adopt practices which would allow foreign investment to be more long-lived. Additionally, the absence of Granger causality indicates that, while FDI is beneficial to growth, it is not growth or not the prospects of growth that make foreigners invest into transitional economies. Quite plausibly, this explanation is

due to the fact that over the period of study growth was sporadic in many countries, and factors other than growth were motivating investors, such as economic and political reforms, stabilization processes and the creation of good investment climate, as suggested by various studies.

The results of my investigations suggest that the policies aimed at attracting FDI should be among the priority policies of transition economists. Preferably, the governments should adopt FDI incentive policies and design incentive programs to stimulate FDI. As it is emphasized by Blomstrom et al (2003), "the incentives should ideally not be of an ex ante type that is granted and paid out prior to the investment, but should instead promote those activities that create a potential for spillovers. In particular, they include education, training, and R&D activities, as well as linkages between foreign and local firms" (p. 19). When incentives are based on the performance, they may affect not only the flow of new investment, but also the entire stock of investment. Taking into account their broad scope, Blomstrom et all (2003) suggest that such investment incentives should be considered part of the economy's innovation and growth policies rather than a policy area that is only of relevance for foreign investors.

Designing efficient incentive program may not be easy. For example, policies for attracting FDI such as subsidies to inward FDI are usually justified on the grounds that FDI create significant spillover benefits in terms of technology and skills transferred. The potential spillover benefits, however, can be realized by domestic firms only provided they have ability and incentives to invest in absorbing these foreign technologies and skills. Hence, to motivate subsidization of FDI, it is necessary, at the same time, to support banking and investment in local firms as well. As a result, not only will a country become more attractive for MNCs, but it is also "likely to be rewarded with increasing *overall* investment as well as with more capital inflows" (Hausmann et al, 2000; emphasis added).

Another example of government policy for attracting FDI is fiscal incentives, such as tax holidays and import duty exemptions to investment allowances, and accelerated depreciation (Morisset, 2003). However, the concern is that such incentives can result in various distortions, such as favoring primarily short-term investment; rewarding the founding of a new company rather than investment into existing companies; discriminating against investment that relies on long-depreciating capital. Moreover, such policies may result in favoring foreign investors at the expense of state and the welfare of citizens.

Therefore, although efficient incentive programs are needed, a care should be exercised in their development and implementation. With regard to this, future research can be undertaken in the direction of evaluating the welfare effects of policies aimed at attracting FDI to economies in transition. Finally, the latest proposals were to develop multinational policy coordination concerning FDI, so as to set "the rules of the game" in the same way as GATT/WTO has designed the rules for international trade policy, and to harmonize the use of investment incentives (Blomstrom et al, 2003). This is a new and exciting area for further research that is of great importance to transition economies.

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APPENDIX

Table 1. Summary Statistics

Variable	Number of Observations	Mean	Standard Deviation	Min	Max
Growth	144	-1.2667	8.4250	-35.2000	11.4000
GDP initial	144	2.1439	.04304	2.0548	2.2357
Human capital	138	.8707	.0992	.5700	1.000
Domestic investment	144	.2161	.0542	.1118	.3799
Foreign Direct Investment	144	.03145	.0291	.0001	.1207
Government consumption	144	.1794	.0422	.0975	.2881
Trade	144	-.1109	.2205	-1.8116	.5797
Black market premium	144	1116.6530	787.1757	27	1828
Structural index	144	.6849	.1741	.13	.93
Transition index	144	2.9542	.5103	1.5	3.7

Table 2. Summary Statistics of the Data on Growth and FDI used in Empirical Estimations

Country	Number of Observations	Period	Variables			
			GDP Growth, in %		FDI, a ratio over GDP	
			Mean	St. Dev.	Mean	St. Dev.
Armenia	6	1994-1999	5.333	1.705	.044	0.042
Belarus	8	1992-1999	-1.525	9.061	.016	.018
Bulgaria	9	1991-1999	-5.200	6.650	.026	.024
Czech Republic	8	1993-2000	1.625	2.603	.051	.037
Estonia	8	1992-1999	-1.175	9.972	0.075	0.024
Hungary	10	1991-2000	.870	5.195	.053	.023
Kazakhstan	6	1993-1998	-4.967	5.815	0.001	0.001
Kyrgyz Republic	6	1994-1999	-.450	10.941	.0517	.0243
Latvia	9	1992-1999	-3.222	13.917	.053	.023

Table 2 (continued)

Lithuania	8	1993-2000	-1.100	8.092	.0314	.026
Macedonia	6	1994-1999	3.283	1.618	0.009	.0113
Moldova	8	1992-1999	-10.112	12.9001	.031	.021
Poland	9	1991-1999	3.667	4.269	.027	.015
Romania	10	1991-2000	-1.750	6.416	.022	.019
Russia	9	1992-2000	-3.744	7.683	.013	.006
Slovak Republic	8	1993-2000	3.712	3.559	.029	.036
Slovenia	8	1993-2000	4.238	.857	.018	.004
Ukraine	8	1992-1999	-10.200	7.967	.016	.005

Table 3. Data on FDI used in Graphical Expositions

Countries in the sample	Number of observations
Albania	8
Armenia	7
Azerbaijan	7
Belarus	8
Bulgaria	10
Croatia	9
Czech Republic	10
Estonia	8
Georgia	6
Hungary	10
Kazakhstan	9
Kyrgyz Republic	7
Latvia	9
Lithuania	9
Macedonia	7
Moldova	8
Poland	9
Romania	10
Russia	9
Slovak Republic	10
Slovenia	10
Tajikistan	8
Turkmenistan	8
Ukraine	9
Uzbekistan	8

Table 4. Instrumental Variables Estimation for Pooled Data.

Dependent Variable: Growth

Independent Variable	Specification 1	Specification 2	Specification 3	Specification 4
GDP Initial	-5.93 (0.14)	-2.46 (0.90)	-0.04 (0.99)	-8.63 (0.66)
Human capital	11.37 (0.2)	11.96 (0.11)	11.42 (0.09)	14.64 (0.07)
Domestic investment	-7.18 (0.62)	2.13 (0.87)	5.55 (0.67)	0.46 (0.89)
Foreign Direct Investment	151.94 (0.00)	—	-46.95 (0.00)	—
FDI*Human	—	0.05 (0.002)	0.08 (0.00)	—
FDI*Domestic	—	—	—	178.93 (0.04)
Government consumption	8.86 (0.59)	-3.84 (0.82)	-11.04 (0.54)	10.68 (0.48)
Trade	0.32 (0.9)	0.97 (0.74)	1.23 (0.68)	0.46 (0.89)
Black market premium	-0.01 (0.00)	-0.01 (0.00)	-0.01 (0.00)	-0.01 (0.00)
Constant term	2.17 (0.96)	-0.91 (0.98)	-3.76 (0.92)	8.81 (0.82)
Number of Observations	121	121	121	121
Hausman Test	$\chi2(6) = 11.03$ (0.08)	$\chi2(7) = 17.38$ (0.01)	$\chi2(7) = 3.97$ (0.78)	$\chi2(6) = 0.90$ (0.98)

Note: p-values in parentheses

Table 5. Exploring Specifications Further: Interaction Term FDI*Domestic and Domestic Investment Variable; and a Nested Model

Dependent Variable: Growth

Independent Variable	FDI*Domestic: OLS for Pooled Data	Nested Model: OLS for Pooled Data
GDP Initial	-13.39 (0.56)	-9.16 (0.71)
Human capital	9.98 (0.28)	8.44 (0.35)
Domestic investment	9.86 (0.61)	9.88 (0.59)
Foreign Direct Investment	89.99 (0.31)	-23.25 (0.79)
FDI*Human	—	0.06 (0.11)
FDI*Domestic	-169.84 (0.63)	26.88 (0.93)
Government consumption	34.91 (0.06)	18.71 (0.40)
Trade	-2.79 (0.54)	-2.64 (0.55)
Black market premium	-0.01 (0.12)	-0.01 (0.09)
Constant term	13.72 (0.76)	10.59 (0.82)
Number of Observations	138	138

Note: p-values in parentheses

Figure 1. Correlogram of the Variables Used in Estimations

	Growth	GDP_init	Human	FDI_hum	DomInv	FDI_Dom	Gov
Growth	1.0000						
GDP_init	0.2199	1.0000					
Human	-0.0134	0.1336	1.0000				
FDI_hum	0.0167	-0.2197	0.3131	1.0000			
DomInv	0.2089	0.1632	0.2095	-0.0519	1.0000		
FDI_Dom	0.2165	0.1695	0.1919	**0.5925**	0.3277	1.0000	
Gov	0.0900	0.1975	0.2257	0.3190	0.2635	0.1189	1.0000
Trade	-0.0867	0.0139	-0.0571	-0.0561	-0.3110	-0.0804	-0.1166
BMP	-0.3104	-0.2473	0.2131	0.2579	-0.1585	-0.0365	0.2315
FDI	0.1791	0.0484	0.1209	**0.6812**	0.1011	**0.9496**	0.0402

	Trade	BMP	FDI
Trade	1.0000		
BMP	-0.0588	1.0000	
FDI	-0.0253	0.0199	1.0000