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Master's Thesis:

The effects of foreign direct investment on economic growth of Central and Eastern European countries.

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Contents

Summary

This thesis analyses the effects of FDI on GDP per capita growth rates of selected CEE countries in the period 1994 – 2014. The theoretical model of cross-country growth regression forms a basis for an estimation using panel data techniques. The study finds a positive, direct impact of FDI inflows on economic growth as hypothesises, while the other hypothesis concerning the conditionality of this impact is not supported by evidence – what is found is a lack of dependence of FDI growth effect on openness and private credit amount and a negative dependence on market institutions' quality.

Introduction

One of the most important results of the increasing interconnectedness and openness of world economies has been a rise in foreign direct investment flows. This phenomenon has been examined in many studies, however there is conflicting evidence on a crucial issue regarding FDI – how does it affect the economic growth of its recipients? Since a number of governments are keen on attracting FDI, convinced it will have beneficial effects on their economies, it is very useful if not essential to be able to predict whether it has a positive impact on economic growth and how significant. This topic is particularly relevant for the region of Central and Eastern Europe (CEE), comprising of countries which used to belong to the communist bloc, which has been one of the top destinations of FDI in the world in recent years. These flows started rather suddenly when the CEE countries began transitioning from the failed centrally-planned economy model with little foreign involvement to a market-based one, in principle more open to trade and investment (Lipsey, 2006). The fact that at the same time FDI was starting to peak on a world-wide scale and other characteristics of the transition economies, which gave them an 'enabling environment' for FDI, arguably make the transition experience a suitable testing ground for the effects of FDI on growth (Campos & Kinoshita, 2002).

The literature on this subject provides differing theoretical predictions and empirical evidence, often suggesting a dependence of this phenomenon on countries' characteristics and taking various methodological approaches. This problem is the premise for this paper, which analyses the effects of FDI on economic growth rates in CEE countries by considering other relevant determinants of growth in transition economies and factors which may affect the consequences of FDI for these economies. In particular, it takes into account the specific context of transitions and differences between countries in structural reforms and institutional environments. A theoretical model based on canonical cross-country regressions by Mankiw, Romer and Weil (1992) is developed, which is then estimated empirically using panel data for 15 selected CEE states in the period 1994 – 2014. The results provide evidence for a positive influence of FDI inflows on economic growth rates and give support to a number of other growth determinants.

The structure of the paper is as follows: the first chapter provides background information and some simple analysis of the economic growth and FDI in CEE countries, indicating the ways in which FDI is influential. Chapter 2 is a literature review, where theory and empirical studies on growth and FDI lead to hypotheses. Chapter 3 presents the theoretical model and data used for estimations, the next chapter describes estimations and their results. Chapter 5 discusses their implications, limitations and potential research directions and concludes.

1. Stylized facts on economic growth and FDI in CEE

1.1. Economic growth in transition countries

This section provides an overview of the economic growth experience in transition countries. It also highlights some important characteristics of it which point to potentially significant effects of foreign direct investment on growth rates.

A crucial challenge for the new authorities in all former socialist states at the beginning of the transition in 1989/1990 was reforming the economies, with the ultimate goal of transforming them into Western-style market economies. All CEE countries embarked on a path of economic transition, sharing many common moves, but with much variation in the extent and pace of them, as well as in the resulting economic development. At the beginning of the transition, the overall direction of changes and a few key elements were clear in all CEE countries: democracy, a rule of law, market economy with domination of private ownership, and some sort of social security system. However, the eventual economy models aimed for ranged from the American-style mixed economy to a West European–style welfare state to market socialism. Initially, the crucial issue was the pace and character of changes – in other words, should the transformation be radical or gradual. (Åslund, undated)

The first option was in essence a "shock therapy" in the "Washington consensus" style, a comprehensive and radical market reform. This programme contained moves such as quick and far-reaching liberalization of prices and trade, deep cuts of budget deficits, strict monetary policy and early, wide privatization. The motivation behind such a program was rooting out as many distortions of the socialist system as possible and attraction of investment. Shock therapy was applied in Poland, the Czech Republic, and the three Baltic states (Åslund, undated).

Other reform programmes opted for eased transition, in which all or few of the policies – deregulation, price and trade liberalization, deficits reduction, tackling inflation – were more gradual. Many argued against quick privatization, giving more weight to its quality. Programs of this type dominated in Hungary, southeast Europe, and most of the former Soviet Union (Åslund, undated).

The initial period of transition, 1990–94, was marked by large costs of the shock and reforms. Output losses were in many cases sharp and the GDP per capital decreased in every CEE country. Afterwards, the phase of recovery began as new policies and other developments stabilised economies and brought about growth (Abiad & Leigh, 2006).

Country/Year	*GDP pc 1995*	*GDP pc 2014*	*Cumulative growth rate*
Slovenia	$ 12 423	$ 19 172	54%
Czech Rep.	$ 9 944	$ 14 934	50%
Slovakia	$ 7 685	$ 15 797	106%
Hungary	$ 7 610	$ 11 931	57%
Croatia	$ 6 604	$ 10 547	60%
Poland	$ 5 235	$ 11 253	115%
Estonia	$ 5 150	$ 12 374	140%
Lithuania	$ 3 971	$ 11 096	179%
Latvia	$ 3 568	$ 9 655	171%
Romania	$ 3 365	$ 6 259	86%
Bulgaria	$ 2 593	$ 5 031	94%
Macedonia	$ 2 511	$ 3 979	58%
Albania	$ 1 499	$ 3 897	160%
Ukraine	$ 1 277	$ 2 081	63%
Moldova	$ 650	$ 1 191	83%

Table 1. Comparison of GDP per capita values in 1995 and 2014 in selected CEE countries. Data source: World Development Indicators (2016).

Looking at the cumulative growth over the period from the recovery start, the stand-out performers have been the Baltic states and Albania, managing to increase their per capita income over 2,5 times. Poland and Slovakia managed to more than double their 1995 per capita output, while the others have increased their GDP p/c by between 50% and 94%. It is noticeable that the highest growth rates were achieved in the middle of initial GDP pc distribution and while the top two countries grew the slowest, the bottom ones did not manage to close the gap to the others. The conditional convergence hypothesis does not show within this sample, although overall a number of these states have been effectively catching-up with the developed economies, as expected.

Figure 1 shows that high growth was common across the CEE after 1995 and that the growth paths of many of these countries were remarkably similar, showing their proximity, similarities in the transition experience and dependence on the same external factors.

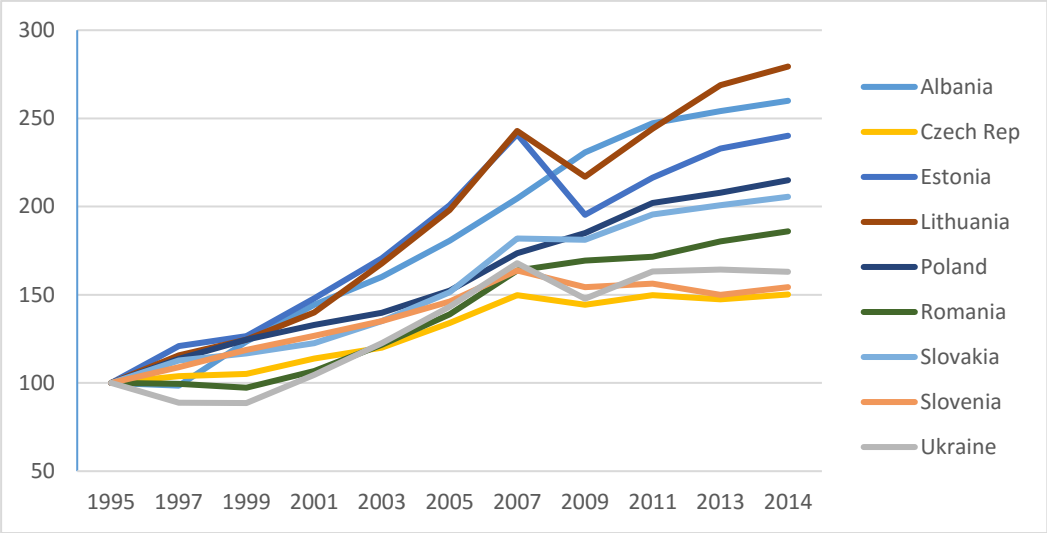

Figure 1. GDP per capita value evolution of chosen CEECs, 1995-2014 ('95=100). Source: own calculation based on data from World Development Indicators (2016).

This growth experience in the last two decades had a different character than development of some of the other emerging market regions. While at the beginning of the transition, CEE economies were far away from the global technological frontier, they started out with a complete industrial structure and a relatively educated work force, differently from many developing countries. As such, they could be regarded not so much developing countries as 'misdeveloped' (Barro and Lee, 1996).

One of the most noticeable features of the centrally-planned economy was its large-scale inefficiency due to unproductive resource allocation. It is then not surprising that massive re-allocation occurred, for example in the form of labour shedding which accompanied relatively fast output growth. Employment rates in the CEECs fell to far below average for emerging market countries (Abiad & Leigh, 2006). Importance of increases in productivity can be shown by analysing the growth drivers of CEE-10 countries[1] by breaking down their GDP growth using Solow theoretical framework and comparing to other emerging regions.

[1] CEE EU members (excluding Croatia): Bulgaria, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia, Slovenia

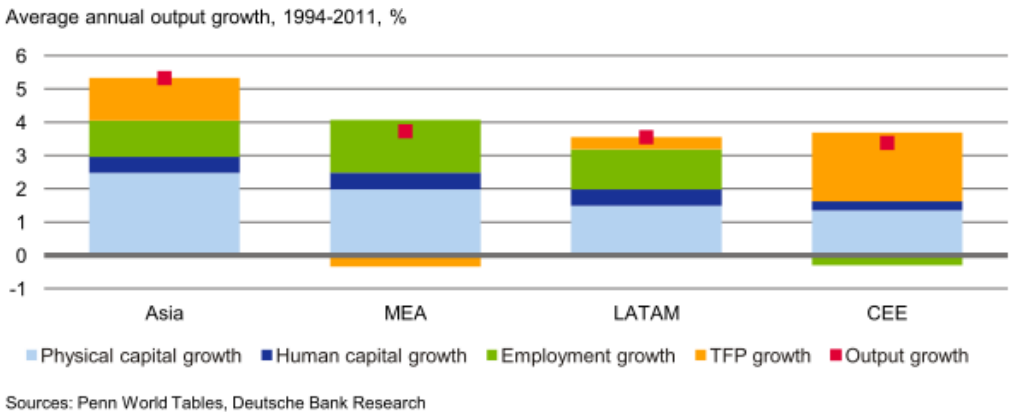

Figure 2. Comparison of growth factors contributions (from Muehlberger & Koerner, 2014)

The chart shows that the growth in CEE-10 countries between 1994 and 2011 was dominated by large increases in total factor productivity. In contrast to other regions, employment and human capital growth had little impact, which may be due to CEE's unfavourable demographics and already relatively well-educated workforce. Physical capital growth had an important contribution, similarly to other regions (Muehlberger & Koerner, 2014).

What is important, these trends have a high chance of continuation in the next years. European Commission estimates that TFP will remain a key source of growth for several CEE countries, especially those equipped with a strong industrial base. Innovation is progressing well in CEE, according to the European Innovation Scoreboard, with Estonia and Slovenia the regional leaders. It is thus expected that total factor productivity will keep increasing in the long term. Physical capital will likely remain the second growth driver, as its stock is still much lower than in advanced economies and the capital-labour ratios are low, hence the marginal returns to capital should be high (Abiad & Leigh, 2006, Muehlberger & Koerner, 2014).

As for the sources of investment in production technology and capital, CEE countries have had low domestic savings rates and investment ratios, but they have been supplemented by foreign savings, which is reflected in large current account deficits. Strong international financial integration has been a central aspect of the catch-up process of the CEE countries. Removal of barriers to trade and openness to foreign investment has been characteristic of most transition economies. Financial markets emerged and sustained flows of capital began, including foreign direct investment, portfolio flows and bank lending (Fabrizio et al, 2010).

1.2. The characteristics of FDI in CEECs

First, it is useful to define the term FDI, since it is broader than intuitively understood. A handy summary is provided by de Mello (1999):

> FDI is conventionally defined as a form of international inter-firm co-operation that involves significant equity stake and effective management decision power in, or ownership control of, foreign enterprises. FDI is also considered to encompass other broader, heterogeneous non-equity forms of co-operation that involve the supply of tangible and intangible assets by a foreign enterprise to a domestic firm. Those broader collaborative associations include most types of quasi-investment arrangements, such as licensing, leasing, and franchising; start-up and international production sharing arrangements; joint ventures with limited foreign equity participation; and broad R&D co-operation.

The region as a whole has attracted a large amount of FDI since the transition started. The distribution of these flows (also per capita) between regions within CEE and countries has been uneven, though.

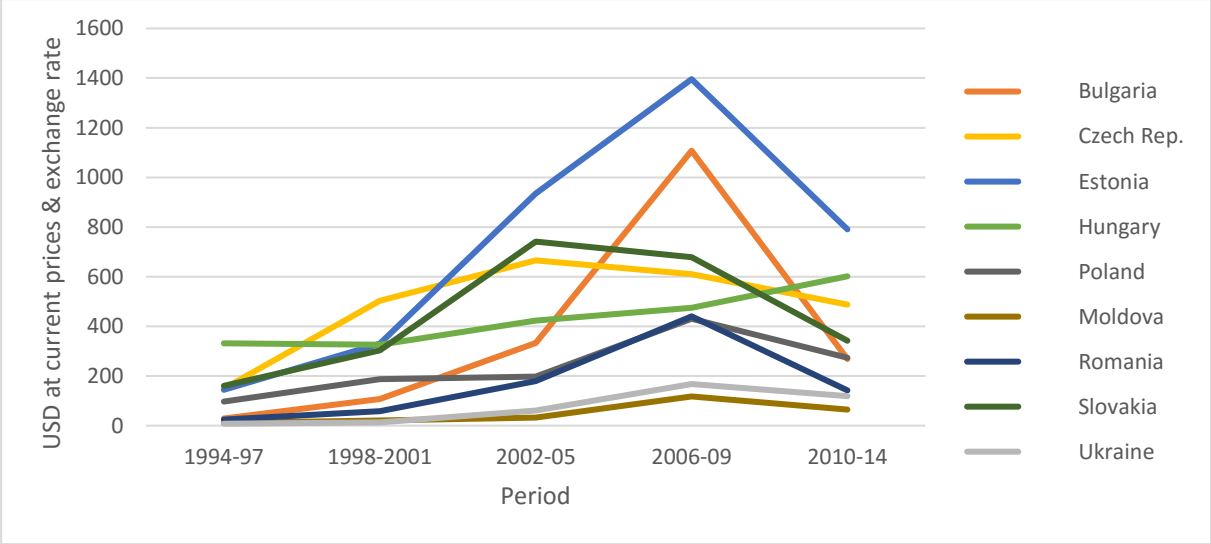

Figure 3. Net inward FDI flows per capita in selected CEEC's. Values are yearly averages in a period.

The Baltic countries, Czech Republic, Slovakia and Hungary consistently received the highest per capita shares of FDI among the CEEC's. The inflows visibly increased in the 2002-05 period and peaked in the run up to the financial crisis. Even though FDI inflows more than halved in 2009 when Europe and the rest of the world dived into the global financial crisis, they remained positive in net terms while other capital flows (e.g. cross-border bank lending) sank. FDI also started to recover quickly, even though inflows remain below pre-crisis levels (Muehlberger & Koerner, 2014).

As for the providers of FDI, the EU has been clearly the main one, contributing about 75% of the flows to the CEE-10. Within the EU, the Netherlands, Germany and Austria are the top three origin countries of FDI (Muehlberger & Koerner, 2014).

The size of the FDI inflows depends on the country characteristics and is related to factors such as macroeconomic environment (economic fundamentals, market size, natural resources endowment), political determinants (progress in transition reforms, political stability), and gravity factors (proximity to Western markets). (Sapienza, 2010). In addition, institutional system is likely to be an attractor of FDI, as its development leads to lower transaction costs (e.g. corruption-related) and more security of the investment in effective legal and political system (Demekas et al., 2007).

The FDI inflows to the CEE can be divided into two main types, according to their goal: market-seeking and efficiency-seeking. Since none of these states is particularly rich in attractive natural resources, the resource-seeking type has been marginal. The first type has flowed to countries with large domestic market – Poland, Ukraine, Romania – or a growing economy (e.g. Bulgaria or Croatia) with local market that attracts greenfield investments in the consumer goods sector.
Countries such as the Czech Republic, Hungary, Poland, Slovak Republic and Slovenia have been destinations for the second type, often because of their relatively cheap, but well-educated workforce, good infrastructure and gravity factors, related to the prospective and actual membership of the European Union (Sapienza, 2010).

What specifically attracted investors to certain companies or industries was, for instance, the policy of the governments: privatisation. A number of state-owned enterprises (SOEs) were put on sale and they often made an attractive target for foreign companies. Privatisation processes have generated a large share of FDI in transition countries and stimulated mergers and acquisitions as the dominant mode of entry into these markets. It is noticeable that the two of top three targeted industries (financial intermediation, transportation and telecommunications) were often controlled mostly by the state before privatisation and contained big monopolistic or oligopolistic firms. They were also among the fastest-growing sectors of the economy during the transition, which may be explained by either their bright prospects in the “new” economy in any case or by growth-spurring activities of the foreign investors – or both (Bacic et al, 2005).

The acquired enterprises usually underwent a process of restructuring and this relation was evidenced by a number of studies, with some more showing that foreign-owned companies in advanced transition countries invested more than domestic ones and were among the best performers in their

industries. Foreign investors turned out to be usually better at leading the restructuring process than the native owners and managers, particularly in the first decade of transition. These strategic investors had at their disposal necessary resources (financial, network) and management and marketing skills, which were in shortage in economies previously reliant on central planning. These attributes were often indispensable in reforming and modernizing ailing enterprises. What also helped was transferring technological know-how and linking companies into the global value networks, as well as capital investments. (Krkoska, 2002). It was usually the case in acquired companies that these actions resulted in increased quality and competitiveness of offered goods and services, gains in productivity and scale expansion, domestically and abroad (Pavlinek, 2004).

One can also bring an example of indigenous IT and automotive sectors, in which access to newest technology and production efficiency are crucial. The liberalization of trade forced them to compete with Western companies having clear advantages in these aspects. In order to survive, they often had to be restructured by foreign investors, with many successful examples of subsequent impressive performance (Broadman (ed.), 2006).

The benefits of technological and organizational changes were not confined to the companies in which they took place, but they spilled over to the other firms through company links, staff turnover and imitation (Alguacil et al., 2011). Another important consequence of FDI inflows was better integration of the host countries into the Western European production networks and increased involvement in international trade, since a majority of foreign affiliates produce for export. Their exports drove the shift of CEE economies exports from based on unskilled-labour-intensive goods (clothing and furniture) to capital intensive ones (in automotive, IT and other high-tech industries) (Hanousek, 2004; Broadman (ed.), 2006).

The next chapter reviews the literature on economic growth – general and of transition countries – as well as studies investigating how it is affected by FDI in various settings.

2. Literature review

2.1. Economic growth models

In the first chapter, the economic growth breakdown was presented, based on the method of Solow growth accounting, which was developed as an empirical way of testing the neoclassical growth model

of Solow and Swan. Their theoretical framework assumes a standard neoclassical production function of the economy, in which output is produced by a combination of capital, K, and labour, L, at a given level of production technology, A. Then, economic growth is mostly explained by the accumulation of physical capital and labour. The part of growth which is not explained by either of these factors is assigned to technological progress. Its sources are not explained; hence it remains exogenous in the model, while in the growth accounting it is shown as total factor productivity (Neuhaus, 2006).

In general, the effects of the accumulation of inputs fade out in the long run. Permanent per capita output growth results from technological progress, ΔA. Other researchers aimed to explain factors which can change A and lead to permanent growth. The idea arose that there can be two of them: the quality of the factor inputs and the knowledge of combining both factors in the production process. This enabled the development of growth models with endogenous technological progress. The quality of capital was the object of models of technological change through *capital deepening* by Romer (1990) and Aghion and Howitt (1992). They provided additional insights into the evolution of physical capital stock. In the Solow-Swan framework, it happened only as *capital widening* -increase in the amount of the existing types of capital goods. The proposition of Aghion and Howitt was that capital stock can experience technological progress in the form of quality improvements of the existing types of capital goods. Due to firms' investment in R&D and resulting continuous invention, higher qualities of goods are constantly invented, replacing the "obsolete" goods in a Schumpeterian "creative destruction". Another type of capital deepening happens through an increase in the variety of capital goods, as modelled by Romer. In this model, R&D activities lead to inventions of completely new, different goods with different functions. They are added to the other capital goods used in production, do not replace them. Both endogenous growth models can be regarded as complementary, as technological progress is driven by both types of inventions at the same time. Altogether, capital widening and both channels of capital deepening lead to economic growth (Neuhaus, 2006; Barro & Sala-i-Martin, 2004).

The following two sections look in more detail at the nature and determinants of economic growth, in general and specifically in transition economies, to see what should be accounted for when modelling the influence of FDI on growth.

2.2. General determinants of growth

Growth theory, as shown in the previous section, focuses on physical and human capital accumulation and, in the endogenous growth models, on technological change. However, these are at best proximate *causes* of economic growth. The underlying issue is what these phenomena stem from – or in the context of international comparisons, what makes them differ so wildly between countries. There have been many attempts to find the factors which can account for differences in economic growth. One can identify three strands of thought which stand out (Rodrik et al., 2004).

The first, historical and distinguished one, proposes that geography is the most important in the story of growth. It is identified as a key determinant of climate, natural resources endowment, disease burden, transport costs and even diffusion of knowledge and technology. Geography thus has a strong impact on agriculture and the human capital quality.

The second strand puts emphasis on the role of international trade as a driver of productivity change. It can be called the integration view, since it is in other words the degree and other aspects of market integration which determine economic convergence between advanced and developing regions. Within this camp, there is a perspective which gives trade and integration the leading role in the growth of poor countries.

The third way of explaining growth gives such a role to institutions, particularly property rights and the rule of law. They matter the most among the factors causing economic growth and need to be conducive to desirable economic behaviour (Rodrik et al., 2004).

The theories then suggest that geography, integration and institutions can be thought of as the "deeper" determinants of economic development. However, it has been historically a complex, nuanced phenomenon, which none of these factors individually can sufficiently and universally explain and their interrelation is difficult to disentangle. Despite that, e.g. Rodrik et al. (2004) attempt to estimate the independent contributions of these determinants to the international variation in income levels of 79 countries. Their results are very interesting and rather clear: "the quality of institutions trumps everything else" (p. 131). Controlling for this factor removes the significance of integration and weakens the geography effects. Altogether, the specification explains about half of the income variance.

The key role of institutions is also suggested by a number of other studies. The way institutions work in this regard is by setting the "rules of the game" that determine the incentives for production, investment, and consumption. There are three levels on which institutions have been characterized in

empirical analyses: (1) organizational entities and regulatory frameworks (such as central bank independence and international trade agreements); (2) assessments of public institutions (quality of governance, private property rights and politicians' accountability); and (3) "deep determinants" of growth, which are in essence institutions with a long historical reach (Abiad & Leigh, 2006). Two main categories of market-friendly institutions which can be measured and affect economic performance are legal framework for economic activity (including e.g. legislation for free economic activity, bankruptcy, contract law – and transparent and even-handed enforcement of these laws) and political and civic freedom (including e.g. democratic process, freedom of assembly and speech, equal treatment by political and judicial bodies). This freedom is also related to overall political stability, which as a variable has had good statistical results (Havrylyshyn & Rooden, 2003).

Other useful and important determinants of long-term growth are examined by Sala-i-Martin, Doppelhofer, and Miller (2004) on a sample of 88 countries from 1960 to 1996. From the set of 67 variables, a few policy variables consistently linked to growth are identified. The relative price of investment and (primary) schooling enrolment have the most robust link to growth. Other significant contributors to growth are higher trade openness (measured as the number of years with an "open" trade regime and the ratio of exports and imports to GDP) and smaller government (government consumption as a share of GDP). From the structural variables, initial per capita GDP and, less consistently, population growth, are evident to be significant factors.

2.3. Growth of transition economies

Collapse of the centrally-planned economy system was a unique shock to the countries where it was present. It was shown in the first chapter that the initial reaction was a sharp contraction in output (possibly exaggerated due to previous overestimations thereof). The experiences of many countries show that such contractions in output due to crisis, wars, or other major shocks to the economy may be followed by strong growth that offsets the initial decline. This combined with corrective policies and structural reforms to reduce inefficiencies could spur strong economic recovery above the original trend line (Iradian, 2009). This view was developed theoretically by Friedman (1993, cited in Cerra & Saxena, 2008) in his plucking model, in which the shock has no long-run impact and growth during the recovery phase is faster than in normal expansion. However, other model of output loss, Hamilton (1989, cited in Cerra & Saxena, 2008), assumes that output undergoes switching between positive and negative drift rates and the regime switch would affect the permanent component of output and then

the loss would be permanent – the resumed growth path is below the original trend. Concepts of both models are illustrated in Figure 4.

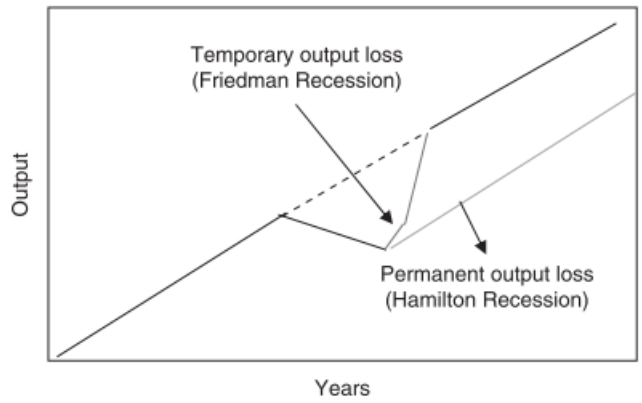

Figure 4 Two scenarios of shock and recovery (from Iradian, 2009)

The growth models and theories presented so far in this paper are meant to be universally applicable to analyse long-run growth. However, the character of the transformation which all the countries in the sample have undergone differentiates their patterns of growth in the period being analysed, particularly the first decade or so, from other emerging or market economies. The drivers of economic growth have been specific to the period of transition, a part of which the economies spent on recovery from the initial output decline. Transition models have been created, which do not consider a long-run equilibrium path of growth, but a short- to medium-term adjustment of the economy from a high degree of central plan period inefficiency and the subsequent recovery. Growth differences between countries undergoing transition could be then explained in terms of three main categories of explanatory factors: (1) macroeconomic (stability) variables, such as the level of inflation and the size of the budget deficit; (2) variables measuring progress of structural reforms, in particular price, trade and foreign exchange liberalisation and privatisation; and (3) variables characterising initial conditions, such as the degree of macroeconomic and structural distortions at the beginning of transition, or wars and internal conflict (Havrylyshyn & Rooden, 2003; Havrylyshyn et al., 1998).

There is clear evidence that stabilising inflation was usually a necessary, but not sufficient, condition for the output recovery to start. Economic restructuring was characterized by stages of high inflation which has a negative effect on economic growth, as it e.g. inhibits long-term financial contracting (Eller et al., 2006)

Initial conditions are also viewed as important, but with differing stances on how much and how long their influence matters. Some think it remains for long, others argue that their effect diminishes over

time and is not so significant in explaining economic growth when the stabilization and liberalization have taken place. Another view is that initial conditions do not have a direct impact on growth in this phase, but determine the extent and pace of reforms introduced (Havrylyshyn & Rooden, 2003; Havrylyshyn et al., 1998).

What is significant for an analysis of FDI effects is that even though investment is agreed to be a major engine of growth in the medium to long term, transition economies are characterized by substantial inherited inefficiencies and under-utilized capacity, hence the role of new investment is likely to be relatively smaller. (Havrylyshyn & Rooden, 2003; Havrylyshyn et al., 1998)

Still, the main conclusion of the previous section is applicable to the analysis of the transition countries. Institutional quality matters in these cases as well and is worth investigating, as the institutions of central planning were a key constraint on growth prior to transition and a profound institutional change has taken place (Abiad & Leigh, 2006). For instance, de Melo et al. (1997) analysed the degree of correlation between political freedom and the economic liberalisation index and argued that the level of political freedom to a certain extent 'explains' differences in the degree of economic liberalisation, which is in turn a very significant variable in growth regressions. Policies, some of them aimed at development of various types of institutions, have been helpful. Small government, openness to trade, better education and institutional development benefited particularly the Baltic countries. The Central European economies also gained from the latter three factors but their larger government sizes hold back their growth, according to some models (Fabrizio et al, 2010). Iradian's (2009) results provide strong evidence for a key role of improvements in macroeconomic policies and introducing market reforms in growth, but also suggest that the growth acceleration between 2001 and 2006 was helped by favourable external environment in the form of e.g. global technological innovation.

After looking at economic growth in more detail, I will now review what the literature claims about the theoretical and empirical connection between FDI and economic growth.

2.4. FDI and economic growth in theory

In Solow-type standard neoclassical growth models, FDI is viewed as another input of production, an addition to the accumulation of physical capital stock. There are no substantial differences between domestic and foreign capital and its effect on growth is transitory. However, since FDI is known to affect the technological progress, its impact on growth should be more visible and longer-lasting.

Capital deepening models described above and others including knowledge spillovers are better able to predict FDI influence (Neuhaus, 2006). Before I turn to the explanation of it, I will review the basic transmission channels of FDI on economic growth.

Firstly, if investment involves setting up production in the recipient country (greenfield investment), the company directly employs its production technology there. Since FDI is typically carried out by multinational corporations which invest large amounts in R&D and employ advanced technologies, the investment can increase the physical amount of capital goods as well as the quality and variety of the goods available. The contribution to technological change through the latter two channels of capital deepening is particularly important for the long-term growth rate of the economy. This channel is called *direct transmission.*

Secondly, *indirect transmission* happens when ownership participation causes an indirect shift of management expertise and production know-how through e.g. labour training and skill acquisition, and setup of new practices and organizational arrangements, all of which can also facilitate higher quality or variety of good produced. The amount of knowledge transferred to the firm is smaller than in the case of direct employment of it in greenfield investment (Neuhaus, 2006; de Mello, 1999)

Thirdly, presence of foreign, technologically advanced firms in a less developed market makes it easier for the domestic firms to adopt new technologies and improve their activities. Knowledge which appears in the country can spread through R&D and human capital spillovers, such as labour turnover and linkages with the investing corporations. This phenomenon is called technology diffusion or knowledge spillover effects and can be named *second-round transmission* (Neuhaus, 2006).

The idea from the last transmission channel was modelled in the endogenous growth framework by Romer (1993), who suggested that the main obstacle to catch-up of developing economies to advanced ones is the gap between them in knowledge or ideas rather than in physical capital. “The notion of an idea gap includes something broader than a simple technology gap, some kind of economic activity that does not take place in the factories but outside. Ideas include the innumerable insights about packaging, marketing, distribution, inventory, control, payments and information system, transaction processing, quality control and worker motivation that are all used in the creation of economic value in an economy”. Ideas are generated by R&D investment and take the form of blueprints for new products or processes. When these are created from blueprints, they are used as inputs in the production of final goods and raise productivity (Romer, 1990). An external effect of R&D is ‘knowledge spillover’, happening when new knowledge generated by the R&D activities of one agent stimulates

the development of new knowledge by others, or improves their technological capability. Spillovers are then able to further reduce the idea gap. Multinational companies and their FDI are conduits of ideas flow from the technological frontier across borders, thus they play a special role in closing the idea gap (Sapienza, 2010).

With regard to emergence of these spillovers, Kokko (1996), argues that they are not automatic results of FDI, but rather appear in certain conditions and not in all kinds of industries. The likelihood of positive spillovers is lower in in industries with highly differentiated products and large economies of scale. High differentiation may mean that foreign and local companies use much different technologies, while economies of scale can cause crowding out of local firms from their markets by foreign-owned enterprises. Moreover, spillovers are also determined by the competition in the market – highly competitive environment forces local companies to adopt by imitation and learning the more productive technologies. However, if the productivity gap between foreign and domestic firms and foreign presence in the market are large, spillovers are less likely. Finally, they may not occur at all if foreign affiliates operate in enclaves with little in common in terms of products and technology with local companies. These arguments help explain why spillovers do not appear in many cases.

Contrary to the dominant views on the positive influence of FDI on growth, there are arguments showing its negative effects. First, it creates displacement effects (crowding out) of domestic investment and distorts the development of local industry if the capital intensive technology transferred does not match factor supplies in the host country (Amsden, 2009).
Furthermore, it may promote patterns of demand inappropriate to the level of development of the receiving countries and disproportionately increase imports, which has an adverse effect on the balance of payments, as does evading taxes by investors by transfer pricing (Thirlwall, 1989). Another possible negative effect of FDI is a reduction in the availability of finance and other factors to domestic enterprises, caused by privileged access of foreign investors to them, which imposes a long-term cost on the economy (Agosin & Mayer, 2000).

The conditionality of spillovers and evidence for these and other FDI effects is presented in the next section.

2.5. Evidence for the effects of FDI on growth

The transmission channel which is predominantly examined in the recent literature is the second-round channel of knowledge spillovers, in contrast to the earliest studies of FDI which treated it merely

as an addition to the capital accumulation (Neuhaus, 2006). An acclaimed study of FDI spillovers by Borensztein et al. (1998) analyses also FDI's effect on investment and find that an increase in the net inflow of FDI is associated with a proportionally higher increase in total investment in the recipient economy, but the result does not appear to be very robust. A conclusion, which seems to be shared by most other authors, is that FDI contributes to economic growth mainly by stimulating technological progress.

Both the macro and micro empirical evidence on the positive externalities of FDI is mixed. It has been shown to have both beneficial and detrimental effects on growth, while at the same time, many studies find no effect. Firm level studies usually suggest that FDI does not accelerate economic growth (Görg & Greenaway, 2004).

In contrast, many macroeconomic studies of a broad cross-section of countries identify the positive role of FDI in economic performance, although often only in particular environments and there are some exceptions such as Carkovic & Levine (2002) and Mencinger (2003).

This diversion between theory and empirical evidence led Lipsey (2006) to state that the search for universal relationship between FDI and growth seems to be futile. The key reason why it may not exist at all is that each country has certain local conditions and characteristics, which can determine or limit a country's capacity to take advantage of FDI externalities. In other words, there are absorptive capacities, differing between countries and regions, which need to be taken into account when analysing the impact of FDI on economic performance. These capacities are related to the structure of economy and policy issues and may directly affect economic performance as well. Moreover, the same factors that are identified as responsible for the benefits of inward FDI are also important attractors of it, further strengthening their influence (Alguacil et al, 2011). However, there is no variable which consistently determines the FDI growth effects and their significance depends on the combination of conditioning factors analysed (Lipsey & Sjoholm, 2004). An overview of evidence on FDI-growth nexus shows what these factors are and what role they play.

Among the most important of them is macroeconomic background. Lack of stability at the macro level is detrimental to capital accumulation and wider to economic growth. It works in various ways, but it has been shown that high inflation, external debt and government deficits increase uncertainty and worsen the business climate, which consequently discourages foreign (and domestic) investment and reduces its productivity (Alguacil et al, 2011; Pruefer & Tondl, 2008). Many studies are also suggesting that positive FDI growth effects require a stable institutional environment, such as an efficient legal framework, as it directly influences business operating conditions and may increase spillovers (Bengoa & Sanchez-Robles, 2005; Prüfer & Tondl, 2008).

A number of studies find certain conditions which have to be present for the FDI effects to be significant. Borensztein, De Gregorio and Lee (1998) find that a positive impact of FDI on growth is obtained only for those countries that have accumulated a minimum threshold stock of human capital. Transition economies are above this threshold, which is how Campos and Kinoshita (2002) explain their result that FDI's growth effect does not depend on the level of human capital. Blomstrom, Lipsey, and Zejan (1994) do not conclude on the key role of educational attainment, but they argue that FDI has a positive impact on growth when a country is sufficiently wealthy.

Financial development is also sometimes pointed out as essential for a working transmission mechanism from FDI to growth. The main argument for this states that FDI can boost growth only when the financial markets and banking of FDI host countries are developed well enough to efficiently channel foreign capital to finance productive investment. In addition, knowledge spillovers from these investments can emerge only if local companies are able to invest in absorbing foreign technology, which underdeveloped financial markets may prevent them from doing due to a lower availability of credit and other financing option (Adams, 2009; Alfaro et al, 2010)

De Mello (1999) finds that FDI is growth-enhancing only for those OECD countries in which domestic and foreign capital are complements. Balasubramanyam et al (1996) argue that trade openness is a key condition for obtaining the positive influence of FDI on growth. The quality of domestic infrastructure, in particular communication and transportation facilities, seems to be an additional relevant factor for a positive FDI-growth nexus (Easterly, 2001).

In addition, Glass and Saggi (1998) show that a wider development gap between a host country and developed economies results in a lower quality of technology transferred via FDI and more limited capabilities of domestic firms to benefit from potential spillovers from investment. Bijsterbosch and Kolasa (2010) similarly conclude that in case of CEE, such a rule applies to FDI effect on productivity – the smaller the productivity gap, the higher the effect.

With regard to the evidence specifically for the CEE countries, Campos and Kinoshita (2002) find positive impact of foreign investment in 27 CEE countries between 1990 and 1998. Nath (2005) finds for 13 transition countries that the interaction between trade and FDI seems important for growth.

On the microeconomic level, Javorcik and Spatareanu (2005) and Damijan et al. (2003) find evidence for positive FDI spillovers in Romania, while Djankov et al. (2000) and Konings (2001) observe negative effects in Bulgaria and Romania and no effect in Poland. Bacic et al. (2005) claim that the extent of

spillovers from inward FDI onto domestic companies that would enhance economic growth in transition countries was limited and even the most advanced CEE countries had problems with the transfer and application of knowledge. Some limitations stem from small sizes of industries and markets in smaller CEE states (like the Baltic states, Moldova, Macedonia) and high proportion of inflows going into trade and finance industries (Mencinger, 2003).

Havrylyshyn, Izvorski and van Rooden (1998) conclude in their study of 25 transition economies that FDI influences growth only when reforms index is excluded from the model, but that influence is less significant than that of reforms. In another work, they find that initial conditions, economic policies along with the institutional, legal and political framework, are significant factors of growth in the region. The authors argue that FDI may influence growth after conditions pertaining to growth have been achieved – which is, economy has stabilized and structural reforms have been implemented. World Bank report (Broadman (ed.), 2006) points out that such an achievement also works in another way: pace of transition to competitive markets is correlated with success in attracting FDI inflows. The critical variable is institutions or, more specifically, the pace of progress in establishing market-supporting institutions that establish sufficient protection and enforcement of property rights.

On the other hand, Mencinger (2003) finds a negative relationship between FDI and growth among the CEE countries. He explains this by arguing that it is caused by takeovers as the main mode of entry of foreign investors and elimination of local competitors because of their inability to compete with foreign investment enterprises. The relatively lower amount of greenfield investment can be explained by the presence of privatization programmes, which created an abundance of assets to be acquired for competitive (sometimes too much) prices and enabled faster, less costly investment with fewer bureaucratic obstacles and easier integration into trade networks. The acquisitions were not automatically investments in real assets and proceeds from sales financed consumption and imports, which is evidenced by a lack of relationship between FDI and gross fixed investment and positively related FDI and current account deficits, increasing foreign debt. Bacic et al. (2005) support the first suggestion, stating that FDI, mostly in the form of brownfield investments, did not complement capital formation strongly enough to stimulate growth directly. In contrast, Krkoska (2002) finds that FDI was an important source of capital formation financing in CEE in the first decade of transition, being a substitute for domestic credit and having a positive relation with foreign credit.

Finally, it should be noted that some of the varying results could be due to the fact that, some of the studies used cross-section methods which exhibit several methodological shortcomings. Differing

estimates could also be caused by other econometric issues and differences in the sample selection procedure. The direction of causality is the one of the main problems that researchers in this topic have faced, since economic growth attracts foreign capital inflows and the question arises whether growth rate increases due to more FDI or the other way around. Endogeneity biases have to be taken into account, yet it is not easy to identify suitable instrumental variables, namely those which are correlated with FDI inflows but not with growth (Sapienza, 2010).

2.6. Summary and hypotheses

To sum up the review of economic growth studies, there are various factors which can explain how it occurs and while there are theoretical propositions which are widely accepted and tested, a large number of other growth determinants have been proved influential in certain circumstances and periods. The neoclassical framework states that the accumulation of physical capital and labour is the most important, the rest of growth assigned to technological progress. Endogenous growth theories assume that capital can be not just widened, but also deepened – through quality improvements of the existing types of capital goods or an increase in the variety of capital goods, both driving technological progress.

The underlying causes of differences in growth rates between countries have been analysed in many ways. Three distinguished strands of thought focus on geography, international trade and institutions, respectively. The key role of the latter is particularly emphasised in recent studies. Other consistently significant factors include schooling, trade openness, size of the government or initial income per capita. In regard to the group of countries this study focuses on, their transition and growth has been driven in particular by complex structural reforms required to become market economies, which should be best visible in the institutional development.

What is the role of FDI in this complex phenomenon of economic growth? The studies review show that it used to be treated mainly as an addition to the capital accumulation, but nowadays it is usually claimed to be a significant contributor by stimulating technological progress, while the effects on capital accumulation are varying. The table below outlines the main effects of FDI on growth identified in the literature.

Positive effects	**Direct transmission**: increase in the physical amount of capital goods as well as in the quality and variety of the goods available.
	Indirect transmission: transfer of management expertise and production know-how to subsidiary
	Second-round transmission: technology diffusion through R&D and human capital spillovers • Limited: dependent on industry, local competition and firms' productivity gaps **Absorptive capacities** (country-level "moderators" of the effects of spillovers on growth): • Macroeconomic background, stability • Level of human capital • Level of development of financial system and markets • Institutional environment • Complementarity between foreign and domestic capital • Quality of infrastructure • Trade openness • Development gap
Negative effects	• Crowding out of domestic investment • Reduced availability of finance and other factors to local industry • Distortions in development of domestic industries and regions • Increase in imports and creating balance of payment imbalances

Hypotheses

Based on the literature review, there are certain main effects which foreign direct investment can be expected to show in an economic growth regression and they will become hypotheses to be examined empirically.

1) FDI is expected to have a positive, direct effect on the rate of GDP growth per capita in the sample of transition countries, all else constant.
2) Interactions between FDI and absorptive capacities, from which the level of development of financial system, trade openness and institutions will be tested, are expected to positively affect the GDP per capita growth rate.

3. Model development and data

3.1. Theoretical framework

The analysis of country growth determinants in practice requires specification of a statistical model of cross-country growth differences, which allows to identify the effects on growth of various included factors. Such models are derived from theoretical growth models and most of them are based on the neoclassical framework; the standard cross-country growth regression is one of them (Durlauf et al., 2005).

In the theoretical derivation, the growth rate of a country is decomposed into two distinct components. One measures growth caused by technological progress (g_i), while the other measures the influence of the gap between initial output per worker and its steady-state value.

Mankiw, Romer and Weil (MRW) (1992) in a seminal paper produce a growth regression which is linear in observable variables. Their model assumes that aggregate output obeys a three-factor Cobb-Douglas production function,

$$Y_{i,t} = K_{i,t}^{a} H_{i,t}^{\phi} (A_{i,t} L_{i,t})^{1-\alpha-\phi}$$

where for economy i at time t, $Y_{i,t}$ is output, $L_{i,t}$ is the labour force ($L_{i,t} = L_{i,t} e^{n_{i,t}}$), where the population growth rate n_i is constant); $K_{i,t}$ denotes physical capital and $H_{i,t}$ denotes human capital, $A_{i,t}$ is the level of technology as the level of efficiency of each worker with $A_{i,t} = A_{i,0} e^{g_{i,t}}$, where g_i is the rate of technological progress (augmenting labour).

MRW argue that the initial technology term $A_{i,0}$ can be understood as showing not just the technology, which they assume to be the same for all countries, but country-specific determinants of growth such as geography, institutions or resource endowments.

Other growth studies extended the MRW model by additional control variables (Z_i) which allow for differences in the steady-state growth term g_i and initial technology and can function as proxies for predicting differences in g_i, less so in the initial technology. Therefore, these variables help explain the likely differences in TFP growth between countries over a twenty- or thirty-year sample (since in the long run there is an assumption of equal TFP growth due to steady-state growth).

The canonical cross-country growth regression, based on MRW work with extension, generally includes initial conditions term, saving rates of physical (and human – in extensions) capital, population growth rate and the rate of technological progress – these are the growth determinants suggested by the

Solow growth model and usually appear in empirical studies on growth. Selection of additional control variables varies a lot between studies. In general, though, "this regression model has been the workhorse of empirical growth research" (Durlauf et al., 2005, p. 35).

The model which forms the basis of the empirical estimations in this paper can be presented as:

$$y_i = \alpha_i Y_{i,0} + \beta X_i + \gamma_i FDI_i + \delta Z_i + \varepsilon_i$$

The basic model's dependent variable is the **rate of real GDP per capita growth**. Based on the version described above, the explanatory variables include the **real per capita GDP** at the start of the period as initial conditions term. The 'core' explanatory variables are gathered in the X_i vector and include the **population growth rate, gross fixed capital formation** (as a share of GDP) and the **level of human capital**. The latter is considered as its inclusion alongside physical capital is a key extension of the neoclassical growth model and its level has been shown to be important for the effects of FDI.
Foreign direct investment (as a share of GDP) is the variable of main interest and enters the equation next to the core explanatory variables. Additional control variables chosen for the regressions are in the Z_i vector as other important growth determinants. **Inflation rate** is a proxy for macroeconomic stability, which is crucial in many growth studies, as mentioned. Bringing down inflation was for most of the transition countries a significant challenge on their way to stabilisation and those which achieved it earlier and in a more pronounced way benefited from this. Another factor in the state policy area is **government consumption** (a ratio of central government expenditures to GDP), which has been shown to hinder growth if too high, and post-communist countries had a naturally large size of inefficient state (Bassannini, 2001). **Openness** is one of the important general growth determinants mentioned before and is included in the model, measured as a ratio of the sum of imports and exports to GDP. Proxies for the **development of the financial system** and **quality of institutions** are also among the control variables and their measurement is explained in the next section. A dummy variable for the **EU membership** (from the year of joining) is another variable, which can be used to investigate whether the EU entry of some of the CEECs had a significant impact on economic growth on its own. It is likely since becoming a part of the European single market formally opens it to new entrants without tariffs and other barriers and attracts new investment.

3.2. Data

Data for the estimation are collected for 15 of CEE countries, which are Albania, Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Macedonia, Moldova, Poland, Romania, Slovakia,

Slovenia, Ukraine. Other Balkan states and Belarus are not included in the analysis due to issues with data availability. The period tested will be from 1994, a year from which most of the data are available and when majority of these economies stabilized and an output recovery phase started. The final year for which all the data can be obtained is 2014.

Macroeconomic data are largely obtained from the World Development Indicators database (WDI, 2016) – this source is very comprehensive and has been used in many empirical works that analyse the FDI-growth relationship. Human capital measure is taken from Penn World Table (Feenstra et al., 2013) and defined as index of human capital per person, based on years of schooling (Barro & Lee, 1996) and returns to education (Psacharopoulos, 1994). The measure which has been proved as correlated with economic growth is average high school attainment by Barro and Lee, but it is currently only available at 5-year intervals, thus it is not suitable for this analysis based on annual data.

FDI variables are obtained from a common source for international investment data, UNCTAD (2016). It is generally measured in two ways: as (net) inflows or as a stock. Both are used in the reviewed studies and other literature, but FDI inflows are most commonly used. Since the inflows may have a delayed impact on economic growth, their one-year-lagged values will also be used in the robustness check.

FDI stocks can be considered a better proxy than flows for the extent of international production, hence reflecting the foreign capital accumulation. FDI stocks are presented at book value or historical cost, not at the replacement cost, which makes it an imprecise measure and accounts for technologies which may already be old (Boudier-Bensebaa, 2008).

Development of the financial system can be measured in various ways. Liquid liabilities of the financial system, usually equal to M2, is commonly used as a broadest measure of financial intermediation and shown to influence long-term growth (Borensztein et al.,1998). However, this indicator was not available for several of the sample countries and I decided to include a measure used in e.g. Alfaro et al. (2004): private sector credit, equal to the value of credits by financial intermediaries to the private sector divided by GDP. This measure should reflect the capacity of firms to finance investment, e.g. in new technologies, which has been mentioned as an important FDI absorptive capacity.

Measuring institutions is challenging and inherently subjective, however such measures are often used in growth regressions. Many different agencies, both public and private, produce rankings or ratings of countries on some metric of institutional development. Some are general indicators of business risk (e.g. the International Country Risk Guide, ICRG), or country competitiveness (e.g. The World

Competitiveness report), or degree of corruption (e.g. Transparency International). Others provide further detail of institutional development. Among the most comprehensive and easily accessible indicators are those compiled annually by the Heritage Foundation (USA), by Freedom House (USA) in their annual Survey of Freedom and also for transition countries in the Nations in Transit publication (Havrylyshyn & Rooden, 2003). Since institutions are a key determinant of economic growth and can act as both a determinant and absorptive capacity for FDI, I try three different variables as proxies for institutional development. The fourth one is specific to transition countries and measures their progress in reforms, which also contributed to building sound market economy institutions.

Two indicators for the estimation are taken from the first source, 'Index of Economic Freedom' published by the Heritage Foundation and the Wall Street Journal. The index focuses on four key aspects of the economic environment over which governments typically exercise policy control: rule of law, government size, regulatory efficiency and market openness. In assessing conditions in these four categories, the Index measures 10 specific components of economic freedom, the overall score being the arithmetic average of the 10 scores[2] (Heritage Foundation, 2016). This score is one indicator and the other I construct from the average of 6 indicators. The government size area is excluded since there is already a proxy for it among the variables; monetary freedom is mostly a measure of price stability, for which again there is another variable (inflation) and labour freedom has missing values for most of the countries up to 2004.

The third indicator is a widely used measure of democracy score from the 'Survey of Freedom', an annual assessment of civil liberties and political rights published by Freedom House (2016). Countries are coded from 1 to 7, with 1 being the most free and 7 being the least free. The dataset obtained contains inverted scores and their inverted means are used in the analysis.

The last 'institutional' variable is an arithmetic average of transition indicators published by the European Bank for Reconstruction and Development (EBRD, 2016). The progress in transition is assessed by indicators tracking reform developments in post-communist countries since 1989. Progress is measured against the standards of industrialised market economies for six policy areas[3], reflecting the assessments of EBRD country economists.

[2] These are: rule of law, property rights, freedom from corruption, fiscal freedom, government size, business freedom, labour freedom, as well as monetary, trade, investment and financial freedoms.

[3] TI areas: Large scale privatisation, Small scale privatisation, Governance and enterprise restructuring, Price liberalisation, Trade and foreign exchange system, Competition policy. The measurement scale for the indicators ranges from 1 to 4+, where 1 represents little or no change from a rigid centrally planned economy and 4+ represents the standards of an industrialised market economy.

4. Empirical analysis

The goal of the following analysis is empirical verification of hypotheses set out in chapter 2. Before the estimation starts, a quick look at the data statistics presented below allows to notice a large degree of heterogeneity among the observations. There is considerable variation in the variable of main interest, share of FDI in GDP, as well as in the growth rates, both of which were rather expected. The negative mean value of population growth shows that these countries have to cope with loss of population or a very low growth thereof. At the same time, human capital level seems to be evenly distributed and on a rather high level, which was predicted. Any missing values were filled in using averages of values on both sides and in few cases in which they were at the beginning of a series, an average rate of change for the next years was used to estimate the values. Human capital variable is completely missing for Macedonia and FDI stock growth does not have values for year 1994, since it was derived from level data which started in that year.

Variable	*Obs*	*Mean*	*Std. Dev.*	*Min*	*Max*
GDP pc growth	294	3.47886	5.362728	-30.71279	14.22232
Initial GDP pc	294	4907.257	3147.257	656.7489	11945.52
Population growth	294	-.4173794	.6118443	-3.820174	1.720757
Gross fix. Inv.	294	24.02312	5.48579	5.385321	40.47286
Human capital	294	3.010349	.2081048	2.56084	3.535638
FDI inflows	294	4.478912	3.755044	.10	28.39126
FDI stock	294	33.7305	22.4115	.8615954	98.13341
Inflation	294	18.55384	84.51541	-1.418123	1058.374
Gov. Expenditure	294	18.67603	3.408324	9.195024	27.39892
Openness	294	104.2148	31.66684	41.40479	183.4276
Private credit	294	35.2565	23.72135	1.125519	135.9638
Economic freedom	294	60.12007	8.690592	30	78
Reforms index	294	35.42347	3.896414	16.11667	40.55
Democracy score	294	6.035714	.9444918	3.5	7

Table 2. Descriptive statistics of the model variables

As for the possible relationships between these variables, table in Appendix 1 presents correlations of all the variables used in the estimations. The dependent variable of interest, GDP per capital growth, has the highest positive correlation with gross fixed investment (0,25) and almost equal ones with FDI inflows (pos.) and population growth and private credit (negative). The correlation with lagged FDI inflows is very small and with FDI stock small and negative. FDI inflows are rather highly correlated

with their lagged values (0,63), while correlation with stock is smaller (0,32). Three institutional variables are highly correlated with each other, as expected.

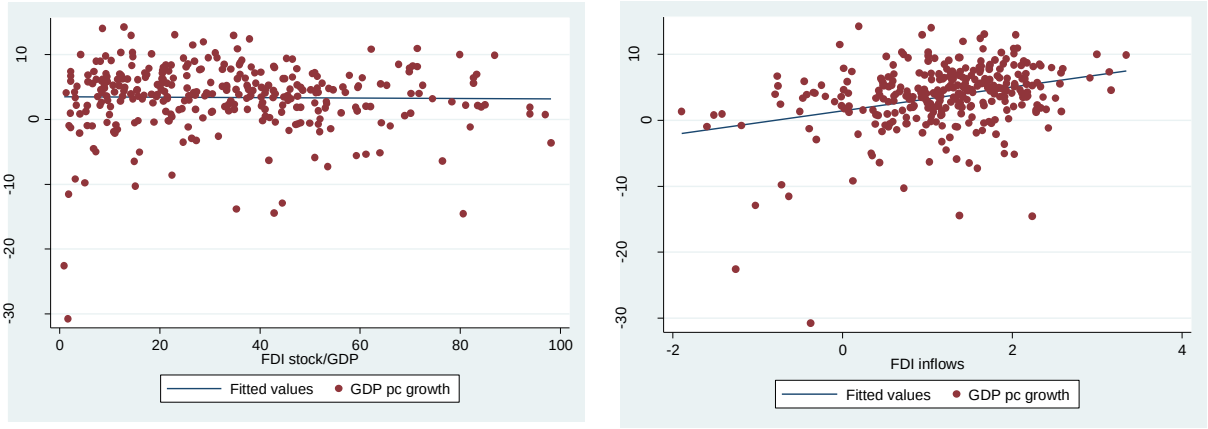

Figure 5. Scatterplots of GDP per capita growth rate vs FDI stock (left) and (log of) FDI inflows.

Plotting GDP per capita growth and FDI inflows and stock gives a better idea of the relationship between these two variables. The inflows have a skewed distribution and some outliers on the right-hand side, hence they are taken in this graph in a natural logarithm format, which in general helps transform the data to a better suited (close to normal) distribution. There are a few outliers in the growth variable at the low extreme, which are observations for a few different countries, including Moldova (the lowest single value of growth in the sample), Ukraine and Albania.

FDI stock does not have any recognizable correlation with GDP per capita growth, while inflows seem to have a slightly positive one, which is even lighter for their lagged values.

On a country level, most of the sample states exhibit positive correlation between FDI inflows and economic growth. There is little or no clear relationship between these two variables in cases of Romania, Slovenia, Hungary and Estonia and slightly negative one for Albania and Croatia.

4.1. Estimation method and procedure

Panel data estimation is a widely applied method of estimating economic growth models as well as more specifically those which investigate FDI-growth nexus. It has some advantages compared to cross-section regression: it increases the degrees of freedom and reduces the collinearity among explanatory variables — hence improving the efficiency of econometric estimates. Also, availability of time dimension as well as individual entities across it makes it easier to control for variables that are not observed or measured (while persistent over time) and those which change over time but not across entities (individual heterogeneity) (Hsiao, 2003; Torres, 2007).

Externalities generated by FDI are difficult to measure, remain persistent over time and vary across countries and country-specific effects can take them into account. These effects are included in fixed effects models (FE), which explore the relationship between predictor and outcome variables within an entity. They control for all time-invariant differences between the entities, so the estimated coefficients of the fixed-effects models cannot be biased because of omitted time-invariant characteristics (within-entity), which are common and important in case of countries. An important assumption of FE models is that those time-invariant characteristics are unique to the individual and should not be correlated with other individual characteristics. Each entity is different, therefore the entity's error term and the constant (which captures individual characteristics) should not be correlated with the others (Torres, 2007).

Fixed effects model seems to be a suitable model for estimating the relationship between growth and its determinants, including FDI. The data is available on annual frequency and while it provides more observations, growth regressions based on them often reflect short-run business cycle fluctuations or shocks (Eller et al., 2006). The period of analysis had a few shocks which will be reflected in growth rates of CEEC's, hence I follow the practice of including time-specific effects to account for influence of each year. Also, tests performed on regressions without them reject the null that the coefficients for all years are jointly equal to zero, therefore it is confirmed that they have statistical significance. The panels can be made dynamic by including lags of the dependent variable among the regressors, but since the theoretical model does not indicate such need, my panel will be static.

There are some important limitations and drawbacks of using panel data models and specifically, fixed effects ones, which should be considered. Despite country-specific effects, the model may still suffer from omitted variable problems if an important 'time-variant' variable is excluded. However, due to possible mutual correlation between variables, including many time-variant variables may cause the problem of collinearity. In the analysed sample, geographic contiguity and similarity of economic, social and political processes and characteristics among the CEE states make it likely that the variables describing them are affected by some common factors. A drawback of including many variables, given the rather small timespan, is the weakness of the estimates (Carter Hill et al., 2011; Sapienza, 2014). Despite these similarities, there is heterogeneity in the sample, which is likely to cause heteroscedasticity. Finally, there are several variables in the sample which change slowly and do not vary a lot within an entity and FE method has problems with estimating such data (Torres, 2007).

Diagnostic tests performed at the beginning of the estimation using fixed effects method detect issues which are addressed. Modified Wald test for groupwise heteroscedasticity indicates a presence thereof, hence all the fixed effects are then estimated with heteroscedasticity-robust standard errors and covariance to allow for reliable significance interpretations. These errors also correct for serial correlation, which is also discovered, using Wooldridge test for autocorrelation in panel data. Serial correlation otherwise causes the standard errors of the coefficients to be smaller than they actually are and a higher R-squared. Another way to deal with these issues is estimation through feasible generalized least squares, which allows the presence of AR(1) autocorrelation within panels and heteroscedasticity across panels.

Additionally, Breusch-Pagan LM test of independence is run to check whether residuals across entities are correlated. Common factors among CEEC's make it likely, while such cross-sectional dependence is a problem in macro panels with long time series (over 20-30 years) (Torres, 2007). The test discovers cross-sectional correlation, which can be dealt with in a few ways. Within the framework of fixed effects model, one can produce Driscoll and Kraay standard errors for coefficients, which are heteroscedasticity consistent and robust to very general forms of cross-sectional and temporal dependence when the time dimension becomes large. This method is not well applicable to the sample at hand, as it is too short and also narrow (Hoechle, 2007). The other method which allows for both contemporaneous correlation and cross-sectional heteroscedasticity is the seemingly unrelated regression, which permits equation coefficients and variances to differ across groups and such differences between sample countries are expected (Carter Hill et al., 2011). The sample meets the condition for this method that N<T. Therefore, this method is ultimately used and the final models are estimated as pooled GLS with SUR assumptions (Stata: *xtgls* with correlated panels) and incorporating common first order serial correlation between the errors for each equation.

4.2. Results

The first estimation of the model was made using the fixed effects method in several specifications. The first contains estimation just with the basic variables of the model: population growth, gross fixed investment, human capital, inflation (in ln+2), and government expenditure. The next one adds FDI inflows (in ln) and this model forms a basis for other variables to be added to it in each specification. Further ones include two other determinants of growth: openness and private credit. Four versions of an estimation with institutional variables were made, one for each of these variables: economic freedom, constructed limited index of economic freedom, reforms progress and democracy score.

Next, an EU entry influence was investigated by adding its dummy to the column 3 variables. The last specification included a variable representing external conditions: average growth of OECD economies for every year. This variable is not in the theoretical model, but it is included in 'experimental' specifications.

The table presenting selected results from this estimation is in Appendix 2. In the first model, without FDI, only population growth variable is significant with an expected, negative sign. It is also significant in three other specifications, which points to the conclusion that falls in population, common across sample countries and over time, influenced positively the average GDP per capita growth. FDI inflows variable added in the second model has a significant, positive coefficient in this and all the other modules it features in. FDI's positive effect on economic growth is clearly visible in this model, but is probably overestimated due to weakness of other key variables. It is surprising that none of the core and other control variables gains significance at the 5% level in any model. In particular, gross fixed investment is very insignificant and institutional variables do not seem to exert much influence. Fixed effects estimation seems to have problems with picking up the influence of some of the slow-changing variables. Also, cross-sectional correlation, leading to bias in results, is detected, which points to using a GLS model with SUR assumptions in order to receive more efficient estimates.

The results of this estimation are presented in Table 4. Due to the necessity of a balanced panel, data for Macedonia, which were lacking human capital data, are not included. Modelling follows the steps taken in fixed effects estimation in adding variables to the basic specification. It is visible in column 1 and population growth, gross fixed investment, inflation and government expenditure are all significant at max. 1% level and have expected signs – investment exerts a positive influence, while the other two a negative one. Together with population growth, inflation and expenditure have consistently significantly negative coefficients across all the specifications. Initial GDP per capita is not significant in any model and neither is human capital, which in addition has negative coefficients. The FDI inflows variable included from model 2 is significant and positive in all models, which is an outcome similar to the one from fixed effects models and in accordance with the hypothesis. Openness variable added on its own has a significant, positive effect, but it does not hold significance when private credit or institutional variables are added as well. The amount of credit given to the private sector is not relevant for economic growth rate according to these models, but its effects will also be analysed separately with an addition of an interaction with FDI. Among the institutional variables, only the reforms index is significant and with positive coefficient, which shows the importance of reforming the economy and that this index catches the progress the countries made in doing it. It is interesting that inclusion of reforms variable seems to 'take away' significance from gross fixed investment, although their correlation is not high (0,25). Entering the EU, indicated by a dummy, does not prove significant

for economic growth, which may not be an expected outcome, but may be influenced by the financial crisis, which brought down growth rates five years after the EU entrance of 8 CEECs and only two years after the entrance of Bulgaria and Romania, while Croatia joined as late as 2013.

Lastly, the 'experimental' specification with OECD growth variable shows that this external environment factor has played a crucial role in how fast the CEE economies have been growing, perhaps reflecting the dependence of these economies on (mostly) Western European markets and a high degree of interconnectedness between the two areas.

GLS pooled model with SUR assumptions estimation

	(1) sur1 b/se	(2) sur2 b/se	(3) sur31 b/se	(4) sur3 b/se	(5) sur43 b/se	(6) sur4b b/se	(7) sur5b1 b/se
GDP pc	0.518	0.144	0.452	0.960	-0.564	-0.511	-0.377
	(0.485)	(0.504)	(0.469)	(0.503)	(0.473)	(0.468)	(0.537)
Population growth	-0.942***	-0.797***	-0.817***	-0.831***	-0.645***	-0.633***	-0.616***
	(0.165)	(0.176)	(0.164)	(0.187)	(0.150)	(0.148)	(0.163)
Gr. fixed inv	2.539**	1.785*	1.623*	2.466**	1.152	1.260	1.476
	(0.841)	(0.881)	(0.809)	(0.926)	(0.908)	(0.900)	(0.935)
Human capital	-0.786	-0.696	-2.245	-2.171	-1.371	-2.713	-3.073
	(1.216)	(1.114)	(1.233)	(1.745)	(1.226)	(1.495)	(1.608)
Inflation	-1.167***	-1.136***	-1.320***	-1.157***	-1.061***	-1.055***	-1.036***
	(0.230)	(0.246)	(0.224)	(0.255)	(0.234)	(0.231)	(0.242)
Gov expenditure	-0.236***	-0.265***	-0.267**	-0.299***	-0.345***	-0.357***	-0.376***
	(0.063)	(0.074)	(0.082)	(0.072)	(0.076)	(0.075)	(0.077)
FDI inflows		0.665***	0.593***	0.693***	0.392*	0.380*	0.402*
		(0.160)	(0.164)	(0.152)	(0.176)	(0.171)	(0.173)
Openness			0.0161*	0.00777		0.0155	0.0170
			(0.007)	(0.009)		(0.009)	(0.010)
Private credit				-0.0525			0.0769
				(0.193)			(0.271)
Reforms index					0.326***	0.336***	0.338***
					(0.076)	(0.074)	(0.080)
OECD growth							3.292**
							(1.137)
Constant	-1.800	3.548	5.485	-0.598	5.159	7.004*	-1.240
	(4.041)	(3.338)	(3.075)	(4.471)	(3.451)	(3.410)	(3.173)
Observations	294	294	294	294	294	294	294

dependent variable: GDP pc growth. Time fixed effects not reported.

Table 3. Pooled GLS with SUR model

Next, four estimations were conducted adding interaction terms of FDI inflows with openness, private credit, economic freedom and reforms. They are regarded as not only growth determinants, but also FDI absorptive capacities - the second hypothesis states that their interactions with FDI can indicate whether they indeed influence the FDI-growth nexus.

These results are presented in Table 5. The variables used in interactions are standardized to make their coefficients comparable to each other. Also, it is convenient that their means are set to zero is such case, since with interaction terms between two variables in the model, coefficients of the main effects of these variables represent their value for the situation in which the other variable has value

zero. As for the estimation, FDI inflows variable does not have a significant coefficient in any of the four specifications. In the first specification, neither openness interaction nor its main effect are significant. In the second one, private credit turns out to have a significant and negative coefficient and the interaction is insignificant.

Reforms index keeps its positive influence in its model, but the interaction term again does not have statistical significance at the 5% level. Finally, economic freedom variable has a significant and positive coefficient, which in general was expected but did not show in the main regressions. Its interaction with FDI inflows suggests that FDI's effect on economic growth is inversely related to economic freedom – it is weaker in the presence of more economic freedom, which is a results contrary to expectations based on literature, which emphasises the importance of institutional environment. An interpretation of this result could be that better business and economic environment and policies support domestic industries and enterprises relatively more, so that their higher contribution to economic growth weakens the effect of foreign capital inflows. In such case, countries with less economic freedom would rely more on foreign capital to supplement their investment and knowledge base.

The robustness of the results from the main regression models is checked by using two other indicators for FDI – lagged FDI inflows and FDI stock. Additionally, a simple cross-section OLS regression is run on the average values of the variables for seven 3-year periods to investigate how the effects of variables changed in time, as it is certain that their importance differed depending on the stage of transition.
Lagged FDI inflows do not turn out to be significant explanatory variable for the economic growth rate and in all specifications their coefficients are insignificant, as shown in the table in Appendix 3. Apart from that, the results are very similar to the main regression results from Table 4. The same goes for the results using FDI stock level variable, although it has a significant, small and negative coefficient in two specifications. This result, in contrast to significant inflows, suggests that the accumulation of FDI is not as important and knowledge spillovers and learning associated with more up-to-date technologically inflows (second-round transmission) is the key channel of FDI influence. These results are also shown in Appendix 3.

GLS pooled model with SUR assumptions estimation - with FDI interactions

	(1) int1 b/se	(2) int2 b/se	(3) int3 b/se	(4) int4 b/se
GDP pc	0.699	0.167	-1.277*	-0.442
	(0.494)	(0.495)	(0.513)	(0.468)
Population growth	-0.969***	-0.894***	-0.651***	-0.836***
	(0.165)	(0.170)	(0.159)	(0.159)
Gr. fixed inv	2.446**	2.082**	1.292	1.778*
	(0.874)	(0.778)	(0.862)	(0.827)
Human capital	-2.099	-0.703	-1.469	-1.302
	(1.583)	(1.074)	(1.301)	(1.333)
Inflation	-1.244***	-1.313***	-0.965***	-1.006***
	(0.235)	(0.242)	(0.241)	(0.231)
Gov expenditure	-0.267***	-0.263***	-0.271***	-0.257***
	(0.066)	(0.063)	(0.081)	(0.072)
FDI inflows	0.270	0.241	0.182	0.191
	(0.158)	(0.154)	(0.183)	(0.153)
Openness	0.367			
	(0.252)			
FDI*openness	-0.0380			
	(0.149)			
Private credit		-0.395*		
		(0.192)		
FDI*priv. credit		0.300		
		(0.157)		
Reforms index			1.707***	
			(0.403)	
FDI*reforms			-0.328	
			(0.215)	
Econ. freedom				0.688*
				(0.281)
FDI*econ. freed.				-0.358*
				(0.159)
Constant	2.234	3.039	21.80***	11.03*
	(4.581)	(3.029)	(5.452)	(4.550)
Observations	294	294	294	294

dependent variable: GDP pc growth. Time fixed effects not reported.

Table 4. Pooled GLS model with FDI interactions

The cross-sectional analysis of 3-year periods does not reveal much, but a few interesting observations can be made nonetheless. The highly significant and large influence of inflation is only evident in two periods in the first half of the sample – between 1997 and 2002. Afterwards the significance wanes, which suggests that inflation was usually kept under control and rarely became high enough to inhibit growth in a visible way across the sample. Similarly, government expenditure has a significant effect in the first period and then between 2000 and 2002. These were the times when bringing down excessive government consumption mattered most, especially in the first period which was still not long after transition started. Another variable with a high significance at the beginning, which goes down afterwards, is reforms index. It has a visibly positive effect on growth rates in the two periods

between 1994 and 1999. It was expected that introduction of reforms such as liberalisation and privatization was most important in the first half of the transition.

Coming back to the main estimation results, an additional check has to be done concerning the sensitivity of the results. Namely, the FDI variable may be endogenous and then the estimated least squares coefficients would be inconsistent. A widely used solution is to instrument the endogenous variable. In the literature, there are mentioned a number of variables which can be used as instruments for FDI. A commonly used one is its lagged value, but two other which are argued as suitable are two important determinants of FDI inflows: quality of infrastructure, proxied by the number of telephone subscriptions, and real effective exchange rate. Both of them were available in the WDI database, but they are very weakly correlated with FDI inflows in the sample (0.05 and -0.12, respectively). Therefore, I decided that the best instrument to use would be lagged FDI, which has a correlation of 0.55 and was insignificant in growth regressions.

To test whether FDI is endogenous, and correlated with the regression error term, the regression based Hausman test is used. The first stage equation for FDI is estimated using least squares, including all exogenous variables and the instrumental variable - lagged FDI. The residuals are then added to the GLS equation and have an insignificant coefficient, indicating a lack of endogeneity. Consequently, GLS estimates can be considered consistent.

To sum up the results section, the first estimation using fixed effects method shows evidence for a positive influence of FDI inflows on GDP per capita growth rates of 15 CEE countries between 1994 and 2014. However, the presence of cross-sectional correlation required using a method which accounts for it, namely GLS model with seemingly unrelated regressions assumptions. This model also supports the first hypothesis of a positive, direct effect of FDI inflows on economic growth in all its specifications, also showing the expected significant effects of other common growth determinants, such as population growth, investment, government expenditure and inflation. Out of the institutional indicators tested, structural reforms index shows significant, positive impact. External environment, proxied by the average OECD growth rate, seems to be beneficial for the economic growth of the CEE countries as well. Another model testing the effects of interactions of FDI inflows with selected absorptive capacities does not provide evidence for significance of dependence of FDI growth effect on openness and private credit amount and shows an unexpected negative relation with economic freedom indicator. The robustness of these outcomes is checked by using alternative FDI variables. Neither FDI stock level nor lagged FDI inflows show significance, while the rest of results are quite similar to the main model. This evident insignificance of FDI stock indicates that accumulation of FDI

and capital with it is not as important as 'deliveries' of new technologies through FDI inflows and their spillovers. An additional cross-sectional analysis provides some insight into the relatively higher significance of some key transition growth determinants (inflation, government expenditure, reforms) in the first half of the analysed period.

The next chapter discusses some implications of the obtained results, outlines limitations of this study and points to further research directions.

5. Discussion and conclusion

The significant, positive, direct effect of FDI inflows on economic growth of CEE economies found in this study was in accordance with the hypothesis and a large part of the literature. Conditionality of FDI on some of the most important absorptive capacities does not find support, but the negative interaction with the development of market institutions is an interesting result, which goes against the assumptions in the literature. Nevertheless, these arguments about a crucial role of manifold absorptive capacities and other factors are convincing and further research is needed to examine how exactly their interplay affects economic growth, FDI and FDI-growth nexus.

Foreign direct investment is treated in this study in an aggregate form, but breaking it down by various criteria helps understand an uneven impact that flows of the same magnitude and even in the same environment have. It was mentioned that greenfield investment is likely to have a higher impact than brownfield due to potential larger and longer engagement of an investor. Efficiency-seeking investments based on cost and other advantages are in turn more likely to underpin growth than market-seeking one – an example of evidence could be that the former type of FDI declined less in the post-economic-crisis period of slowdown. Benefits of higher added-value investments are also recognized and authorities of the more advanced CEE states already have been focused on attracting activities such as ICT, shared service centres and R&D projects and targeting specific, usually high-tech, industries (Hunya & Schwarzhappel, 2015). Active and conscious FDI policies have proven effective and the countries and regions being able to receive the investments they need have reaped advantages from FDI more than those which do not manage to achieve it. All these factors play their roles 'behind the scenes' of aggregate data and are likely to cause further variation in FDI-growth nexus.

The limitation of this analysis is a relatively narrow and short panel of countries – it is common in the reviewed studies that the number of countries analysed is above 20-30 (about 20 in case of transition analyses) and the timespan is usually longer for global studies. It could not feasibly be longer in this study, while the panel was limited by data availability, but different selection of variables allows for

including in the sample former Soviet Union states. Another issue is the quality of this data, which in case of macroeconomic variables is not always reliable, especially at the beginning of the transformation, as the statistical standards in the region were not very high and the existence of grey economy perhaps overestimates the GDP declines and underestimates subsequent recoveries. As for the FDI inflows and stocks data, they come from balance of payments and national accounts data and are rather 'rough' measures of productive use of FDI and sometimes reported in different methodologies, which hinders comparability (Lipsey, 2006). Furthermore, an alternative econometric method, the generalized method of moments (GMM) is used in a few studies and it is supposed to better exploit the time-series variation in the data, account for unobserved country-specific effects and control for endogeneity of all the explanatory variables (Carkovic & Levine, 2002). Further research in this topic should make use of the more accurate data as they appear and exploit new techniques of estimation to obtain consistent and efficient estimates.

In conclusion, this study set out to investigate the problem of growth effects of FDI in the specific setting of transition countries. The literature provides mixed predictions and evidence on what such effect could be, but a number of factors pointed to a positive role of FDI in these countries as they developed their economies, while conditionality of this role was also taken into account. Relevant growth determinants were established and a theoretical cross-country regression model was developed. Empirical estimations were made using collected panel data, initially by fixed effects method, which was modified to suit the data at hand. The results provided evidence supporting one of the two hypotheses. There are certain limitations of this analysis and this topic is worth further investigations on various level, taking into account new data and establishing more long-term relationship between FDI and growth in the transition countries as they finish transformations and become fully-fledged market economies.

Appendix 1

	GDP pc growth	*Initial GDP pc*	*Pop. growth*	*Gr. Fix. Inv.*	*Human cap.*	*FDI infl.*	*Lag. FDI infl.*	*FDI stock*	*Inflation*	*Gov. Exp.*	*Open.*	*Priv. credit*	*Econ. Free.*	*Reforms*
GDP pc growth	1,00													
Initial GDP pc	-0,10	1,00												
Population growth	**-0,21**	0,42	1,00											
Gr. Fix. Investm.	**0,25**	0,15	0,08	1,00										
Human capital	-0,08	**0,56**	0,27	**0,35**	1,00									
FDI inflows	**0,22**	-0,13	-0,01	0,30	0,01	1,00								
Lagged FDI inflows	0,09	-0,12	0,00	0,32	0,05	**0,63**	1,00							
FDI stock	-0,11	0,10	0,13	0,12	**0,40**	0,32	0,43	1,00						
Inflation	-0,15	-0,11	-0,04	-0,21	-0,12	-0,02	-0,10	-0,17	1,00					
Gov. Expenditure	-0,15	0,30	0,02	-0,20	0,07	-0,05	-0,01	0,05	-0,13	1,00				
Openness	-0,02	0,26	0,13	0,04	**0,57**	0,09	0,12	**0,59**	-0,08	**0,25**	1,00			
Private credit	**-0,20**	0,27	0,10	0,08	0,19	-0,05	0,00	0,31	-0,14	0,08	0,16	1,00		
Economic freedom	0,07	0,31	0,01	**0,37**	**0,54**	0,15	0,21	0,60	-0,22	-0,02	**0,50**	0,18	1,00	
Reforms index	0,01	**0,50**	0,13	0,25	0,51	0,16	0,22	**0,67**	**-0,24**	0,18	0,45	0,33	**0,81**	1,00
Democracy score	-0,04	**0,63**	0,14	0,10	0,46	0,05	0,07	0,41	-0,11	**0,24**	0,35	0,23	**0,65**	**0,78**

Appendix 2

Fixed effects estimation

	(1) fe1 b/se	(2) fe2 b/se	(3) fe3 b/se	(4) fe4a b/se	(5) fe4c b/se	(6) fe5 b/se
Population growth	-1.044**	-0.959*	-0.870*	-0.759	-0.796	-0.870*
	(0.299)	(0.321)	(0.399)	(0.421)	(0.424)	(0.399)
Gr. fixed inv	0.404	-0.566	-0.915	-1.507	-0.705	-0.915
	(2.489)	(2.452)	(2.684)	(2.762)	(2.499)	(2.684)
Human capital	4.220	9.957	8.642	10.02	4.926	8.642
	(6.189)	(5.915)	(5.952)	(5.123)	(6.368)	(5.952)
Inflation	-1.141	-1.176	-1.207	-1.154	-1.016	-1.207
	(0.640)	(0.609)	(0.596)	(0.627)	(0.580)	(0.596)
Gov expenditure	-0.136	-0.123	-0.0824	-0.0148	-0.130	-0.0824
	(0.128)	(0.135)	(0.149)	(0.186)	(0.117)	(0.149)
FDI inflows		1.412*	1.416**	1.394**	1.493**	1.416**
		(0.531)	(0.441)	(0.440)	(0.457)	(0.441)
Openness			0.0430	0.0380	0.0375	0.0430
			(0.021)	(0.025)	(0.023)	(0.021)
Private credit			0.992	0.905	0.888	0.992
			(0.784)	(0.760)	(0.720)	(0.784)
Econ. freedom				0.142		
				(0.118)		
freedom					-1.642	
					(0.997)	
OECD gr						1.917**
						(0.619)
Constant	-7.924	-21.94	-23.68	-33.80	-3.860	-28.04
	(17.021)	(17.436)	(18.238)	(19.138)	(21.982)	(18.265)
Observations	283	279	279	279	279	279
Adjusted R-squa~d	0.343	0.324	0.345	0.352	0.356	0.345

dependent variable: GDP pc growth. Time fixed effects not reported.

Fixed effects estimation of GDP pc growth

Breusch-Pagan LM test of independence: chi2(91) = 314.380, Pr = 0.0000
Based on 21 complete observations over panel units

H_0 = no cross-sectional correlation of residuals

Appendix 3

GLS pooled model with SUR assumptions estimation - lagged FDI

	(1) sur2b b/se	(2) sur3b b/se	(3) sur3c b/se	(4) sur4a2 b/se	(5) sur4b2 b/se	(6) sur5a3 b/se	(7) sur5b3 b/se
GDP pc	-0.482	-0.400	-0.453	-0.513	-0.943**	-0.721*	-0.943**
	(0.324)	(0.329)	(0.324)	(0.330)	(0.349)	(0.351)	(0.349)
Population growth	-0.862***	-0.906***	-0.857***	-0.924***	-0.828***	-0.851***	-0.828***
	(0.163)	(0.167)	(0.164)	(0.170)	(0.161)	(0.176)	(0.161)
Gr. fixed inv	3.459***	3.435***	3.847***	3.706***	3.105***	3.541***	3.105***
	(0.802)	(0.844)	(0.846)	(0.831)	(0.794)	(0.903)	(0.794)
Human capital	-0.347	-1.452	-0.532	-1.001	-2.029	-1.814	-2.029
	(1.197)	(1.523)	(1.221)	(1.480)	(1.373)	(1.619)	(1.373)
Inflation	-1.053***	-1.081***	-1.047***	-1.131***	-1.106***	-1.050***	-1.106***
	(0.225)	(0.244)	(0.229)	(0.247)	(0.242)	(0.251)	(0.242)
Gov expenditure	-0.188**	-0.212**	-0.183**	-0.228***	-0.260***	-0.243**	-0.260***
	(0.068)	(0.069)	(0.069)	(0.063)	(0.070)	(0.075)	(0.070)
Lagged FDI infl~s	-0.167	-0.130	-0.205	-0.109	-0.207	-0.262	-0.207
	(0.142)	(0.149)	(0.144)	(0.145)	(0.149)	(0.164)	(0.149)
Openness		0.0142		0.0196*	0.0184*	0.0102	0.0184*
		(0.008)		(0.009)	(0.009)	(0.009)	(0.009)
Private credit			-0.103	0.0531	0.0509	-0.113	0.0509
			(0.152)	(0.256)	(0.255)	(0.177)	(0.255)
Econ. freedom				-0.0360			
				(0.035)			
Reforms index					0.190*	0.192*	0.190*
					(0.086)	(0.085)	(0.086)
EU membership						-0.240	
						(0.574)	
OECD growth							8.472***
							(1.503)
Constant	5.094	7.001	4.368	7.471*	8.824**	5.657	-7.467**
	(3.055)	(3.634)	(3.099)	(3.070)	(2.996)	(3.669)	(2.849)
Observations	280	280	280	280	280	280	280

dependent variable: GDP pc growth. Time fixed effects not reported.

GLS pooled model with SUR assumptions estimation - FDI stock

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	sur2a	sur31a	sur32a	sur3a	sur4b1	sur5a2	sur5b2
	b/se	b/se	b/se	b/se	b/se	b/se	b/se
GDP pc	-0.134	0.739	-0.0630	-0.0155	-0.635	-0.992	-1.274*
	(0.505)	(0.513)	(0.516)	(0.499)	(0.533)	(0.558)	(0.543)
Population growth	-1.017***	-0.994***	-1.006***	-1.013***	-0.721***	-0.685***	-0.676***
	(0.172)	(0.168)	(0.178)	(0.171)	(0.152)	(0.202)	(0.163)
Gr. fixed inv	1.826*	2.571**	1.985*	2.227**	1.540	1.968*	1.649
	(0.760)	(0.855)	(0.815)	(0.789)	(0.856)	(0.947)	(0.871)
Human capital	0.134	-2.363	0.0922	-1.345	-1.531	-2.718	-1.829
	(1.272)	(1.552)	(1.332)	(1.471)	(1.520)	(1.740)	(1.510)
Inflation	-1.147***	-1.234***	-1.179***	-1.174***	-1.054***	-0.877***	-0.886***
	(0.238)	(0.239)	(0.244)	(0.236)	(0.240)	(0.260)	(0.243)
Gov expenditure	-0.236***	-0.285***	-0.234**	-0.257***	-0.318***	-0.381***	-0.355***
	(0.071)	(0.068)	(0.072)	(0.069)	(0.074)	(0.081)	(0.073)
FDI stock	-0.00622	0.00149	-0.00586	-0.0166	-0.0314*	-0.0310	-0.0401**
	(0.012)	(0.012)	(0.012)	(0.012)	(0.014)	(0.016)	(0.014)
Openness		0.0134		0.0210*	0.0141	0.0222*	0.0214*
		(0.008)		(0.009)	(0.009)	(0.011)	(0.010)
Private credit			-0.0823	0.0785		0.232	0.194
			(0.272)	(0.263)		(0.272)	(0.256)
Reforms index					0.413***	0.492***	0.488***
					(0.085)	(0.097)	(0.088)
EU membership						-0.228	
						(0.583)	
OECD growth							2.719*
							(1.131)
Constant	2.838	1.036	2.214	3.765	1.096	3.221	-2.404
	(3.266)	(4.201)	(3.421)	(3.213)	(4.259)	(3.865)	(2.991)
Observations	294	294	294	294	294	294	294

dependent variable: GDP pc growth. Time fixed effects not reported.

Appendix 4

Av. GDP per capita growth estimations by period averages

	(1) 1994-1996 b/se	(2) 1997-1999 b/se	(3) 2000-2002 b/se	(4) 2003-2005 b/se	(5) 2006-2008 b/se	(6) 2009-2011 b/se	(7) 2012-2014 b/se
Population growth	-4.751	-5.304**	-4.172**	-4.645***	-2.254	1.009	-3.178*
	(2.058)	(1.444)	(0.909)	(0.516)	(1.681)	(1.217)	(1.092)
Gr. fixed inv	-0.201	-0.364	-0.0150	0.0197	-0.0753	-0.0376	0.360
	(0.231)	(0.212)	(0.068)	(0.061)	(0.155)	(0.333)	(0.166)
Inflation	-2.450	-1.767**	-1.059*	-0.166	-0.415	-0.215	1.348
	(1.670)	(0.493)	(0.353)	(0.334)	(2.157)	(1.566)	(1.096)
Gov expenditure	-1.268**	-0.217	-0.592*	-0.00175	-0.270	-0.146	-0.0807
	(0.337)	(0.180)	(0.197)	(0.161)	(0.409)	(0.363)	(0.201)
FDI inflows	-1.041	-2.391	-1.636*	0.376	0.660	1.372	-1.261
	(1.651)	(1.464)	(0.619)	(0.440)	(1.108)	(1.192)	(0.785)
Reforms index	1.151*	1.225*	0.218	-0.119	-0.0748	-0.0441	-0.0363
	(0.421)	(0.389)	(0.199)	(0.121)	(0.287)	(0.316)	(0.208)
Openness	-0.0352	-0.0129	0.0857**	0.0234	0.0107	-0.00320	0.0130
	(0.051)	(0.024)	(0.019)	(0.011)	(0.026)	(0.032)	(0.014)
Constant	5.972	-19.10	2.844	5.748	13.34	4.783	-5.369
	(14.630)	(8.142)	(5.071)	(3.019)	(10.559)	(18.019)	(7.759)
Observations	15	15	14	15	15	15	15
Adjusted R-squa~d	0.709	0.589	0.750	0.865	0.035	-0.371	0.347

dependent variable: GDP pc growth

Bibliography

Abiad, A., & Leigh, D. (2006). *Growth in the Central and Eastern European countries of the European Union* (Vol. 252). International Monetary Fund.

Agosin, M. R. Mayer (2000). Foreign Investment in Developing Countries–Does it Crowd in Domestic Investment. In *United Nations (UN) Conference on Trade and Development (UNCTAD), http://www. unctad. org/en/docs/dp_146. en. pdf*.

Alfaro, L., Chanda, A., Kalemli-Ozcan, S., & Sayek, S. (2004). FDI and economic growth: the role of local financial markets. *Journal of international economics*, *64*(1), 89-112.

Alguacil, M., Cuadros, A., & Orts, V. (2011). Inward FDI and growth: The role of macroeconomic and institutional environment. *Journal of Policy Modeling*, *33*(3), 481-496.

Amsden, A. (2009). Nationality of firm ownership in developing countries: who should crowd out whom in imperfect markets?, in G. Dossi and J. Stiglitz (eds.), Industrial Policy and Development, Oxford, Oxford University Press.

Åslund, Anders. (undated). Transition economies. In: The Concise Encyclopedia of Economics. Available at: http://www.econlib.org/library/Enc/TransitionEconomies.html

Bačić, K., Račić, D., & Ahec-Šonje, A. (2005). The effects of FDI on recipient countries in Central and Eastern Europe. Privredna kretanja i ekonomska politika, 14(100), 58-96.

Balasubramanyam, V. N., Salisu, M., & Sapsford, D. (1999). Foreign direct investment as an engine of growth. *Journal of International Trade & Economic Development*, *8*(1), 27-40.

Barro, R. J., & Lee, J. W. (1996). International measures of schooling years and schooling quality. *The American Economic Review*, *86*(2), 218-223.

Barro, R. J., Sala-I-Martin X. (2004). Economic growth. *Second Editions, Mc-Grow-Hill, New York*.

Bengoa, M., & Sanchez-Robles, B. (2003). Foreign direct investment, economic freedom and growth: new evidence from Latin America. *European journal of political economy*, *19*(3), 529-545.

Bijsterbosch, M., & Kolasa, M. (2010). FDI and productivity convergence in Central and Eastern Europe: an industry-level investigation. Review of World Economics, 145(4), 689-712.

Blomström, M., & Kokko, A. (1998). Multinational corporations and spillovers. *Journal of Economic surveys*, *12*(3), 247-277.

Blomström, M., Kokko, A., & Globerman, S. (2001). *The determinants of host country spillovers from foreign direct investment: a review and synthesis of the literature* (pp. 34-65). Palgrave Macmillan UK.

Borensztein, E., De Gregorio, J., & Lee, J. W. (1998). How does foreign direct investment affect economic growth?. *Journal of international Economics*, *45*(1), 115-135.

Boudier-Bensebaa, F. (2008). FDI-assisted development in the light of the investment development path paradigm: Evidence from Central and Eastern European countries. *Transnational Corporations*, *17*(1), 37.

Broadman, H. G. (Ed.). (2006). From disintegration to reintegration: Eastern Europe and the former Soviet Union in international trade. World Bank Publications.

Carkovic, M. V., & Levine, R. (2002). Does foreign direct investment accelerate economic growth?. *U of Minnesota Department of Finance Working Paper*.

Campos, N. F., & Kinoshita, Y. (2002). Foreign direct investment as technology transferred: Some panel evidence from the transition economies. *The Manchester School*, *70*(3), 398-419.

Cerra, V., & Saxena, S. C. (2008). Growth dynamics: the myth of economic recovery. *The American Economic Review*, *98*(1), 439-457.

Damijan, J. P., Knell, M. S., Majcen, B., & Rojec, M. (2003). Technology transfer through FDI in top-10 transition countries: How important are direct effects, horizontal and vertical spillovers?. Economic systems.

De Mello, L. R. (1999). Foreign direct investment-led growth: evidence from time series and panel data. *Oxford economic papers*, *51*(1), 133-151.

De Melo, M, Denizer, C and Gelb, A. 1997: From plan to market: patterns of transition. (Chapter 1). In: Blejer, M. and Skreb, M. (eds). Macroeconomic stabilization in transition economies. Cambridge University Press: Cambridge, pp. 17–72.

Demekas, D. G., Horváth, B., Ribakova, E., & Wu, Y. (2007). Foreign direct investment in European transition economies—The role of policies. *Journal of Comparative Economics*, *35*(2), 369-386.

Djankov, S. and B. Hoekman. (2000) Foreign investment and productivity growth in Czech enterprises, World Bank Economic Review, vol. 14, no. 1, pp. 49-64.

Easterly, W. (2001). The lost decades: developing countries' stagnation in spite of policy reform 1980–1998. *Journal of Economic Growth*, *6*(2), 135-157.

EBRD. (2016). Transition indicators. Available at: http://www.ebrd.com/what-we-do/economic-research-and-data/data/forecasts-macro-data-transition-indicators.html

Eller, M., Haiss, P., & Steiner, K. (2006). Foreign direct investment in the financial sector and economic growth in Central and Eastern Europe: The crucial role of the efficiency channel. *emerging Markets review*, *7*(4), 300-319.

Estrin, S., Hanousek, J., Kočenda, E., & Svejnar, J. (2009). The effects of privatization and ownership in transition economies. *Journal of Economic Literature*, *47*(3), 699-728.

Fabrizio, S., Leigh, D., & Mody, A. (2010). *The second transition: Eastern Europe in perspective* (pp. 191-220). Springer Berlin Heidelberg.

Feenstra, R. C., Inklaar R., Timmer M. (2013). Penn World Table 8.1. Available at: http://www.rug.nl/research/ggdc/data/pwt/pwt-8.1

Freedom House. (2016). Freedom in the World. Available at: https://freedomhouse.org/report/freedom-world/freedom-world-2016

Gregory, M. N., Romer, D., & Weil, D. N. (1992). A contribution to the empirics of economic growth. *Quarterly Journal of Economics*, *107*(2), 407-437.

Glass, A. J., & Saggi, K. (1998). International technology transfer and the technology gap. Journal of development economics, 55(2), 369-398.

Görg, H., & Greenaway, D. (2004). Much ado about nothing? Do domestic firms really benefit from foreign direct investment?. *The World Bank Research Observer*, *19*(2), 171-197.

Hanousek, J., Kočenda, E., & Maurel, M. (2011). Direct and indirect effects of FDI in emerging European markets: A survey and meta-analysis. *Economic Systems*, *35*(3), 301-322.

Havrylyshyn, O, Izvorski, I and van Rooden, R. (1998): 'Recovery and growth in transition economies 1990–97 – a stylized regression analysis'. IMF Working Paper No. 98/141

Havrylyshyn, R. V. R. (2003). Institutions matter in transition, but so do policies. Comparative Economic Studies, 45(1), 2-24.

Heritage Foundation. (2016). Index of Economic Freedom. Available at http://www.heritage.org/index/download

Hoechle, D. (2007). Robust standard errors for panel regressions with cross-sectional dependence. *Stata Journal*, *7*(3), 281.

Hunya, G., & Schwarzhappel, M. (2015). *Recovery in the NMS, Decline in the CIS* (No. 2015-06). The Vienna Institute for International Economic Studies, wiiw.

Iradian, G. (2009). What explains the rapid growth in transition economies? *IMF Staff Papers*, 811-851.

Javorcik, B.S. and M. Spatareanu. (2005) Disentangling FDI spillover effects: what do firm perceptions tell us?, in T. H. Moran, E.M. Graham and M. Blomström (eds.), Does Foreign Direct Investment Promote Development, Washington D.C., Peterson Institute for International Economics.

Kokko, A. (1996). Productivity spillovers from competition between local firms and foreign affiliates, Journal of International Development, vol. 8, pp. 517-530.

Konings, J. (2001) The effects of Foreign Direct Investment on domestic firms: evidence from firm-level data in emerging economies, The Economics of Transition, no. 9, pp. 619-33.

Kose, M., Prasad, E., Rogoff, K., & Wei, S. (2006). Financial globalization: A reappraisal. IMF Working Paper 06/189

Krkoska, L. (2002). *Foreign direct investment financing of capital formation in central and eastern Europe*. UN.

Lipsey, R. E. (2006). *Measuring the impacts of FDI in Central and Eastern Europe* (No. w12808). National Bureau of Economic Research.

Mencinger, J. (2003). Does foreign direct investment always enhance economic growth?. Kyklos, 56(4), 491-508.

Nath, H. (2005). Trade of direct investment and growth: evidence from transition economies, Working Paper Sam Houston State University.

Neuhaus, M. (2006). The impact of FDI on economic growth: an analysis for the transition countries of Central and Eastern Europe. Springer Science & Business Media.

Muehlberger, M., Koerner, K. (2014). CEE: Fit for the next decade in the EU. EU Monitor – European Integration. Deutsche Bank Research

Pavlínek, P. (2004). Regional development implications of foreign direct investment in Central Europe. *European urban and regional studies*, *11*(1), 47-70.

Prüfer, P., & Tondl, G. (2008). The FDI-growth nexus in Latin America: The role of source countries and local conditions.

Psacharopoulos, G. (1994). Returns to investment in education: A global update. *World development*, *22*(9), 1325-1343.

Rodrik, D., Subramanian, A., & Trebbi, F. (2004). Institutions rule: the primacy of institutions over geography and integration in economic development. *Journal of economic growth*, *9*(2), 131-165.

Romer, P.M. (1986). Increasing returns and long run growth, Journal of Political Economy, vol. 94,.

Romer, P.M. (1990). Endogenous technological change, Journal of Political Economy, vol. 98,

Romer, P.M. (1993). Idea gaps and object gaps in economic development, Journal of Monetary Economics, vol. 32, no. 3,

Sala-i-Martin, X., Doppelhofer, G., & Miller, R. I. (2004). Determinants of long-term growth: A Bayesian averaging of classical estimates (BACE) approach. *American economic review*, 813-835.

Sapienza, E. (2010). Foreign direct investment and growth in Central, Eastern and Southern Europe. *investigación económica*, 99-138.

Thirlwall, A. P. (1989). *Growth and development: with special reference to developing economies*. Springer.

UNCTAD. (2016). Foreign direct investment flows and stocks. Available at: http://unctadstat.unctad.org/wds/ReportFolders/reportFolders.aspx?IF_ActivePath=P,5&sCS_ChosenLang=en

World Development Indicators (WDI). (2016). Available at: http://data.worldbank.org/data-catalog/world-development-indicators