

FDI and economic growth in Central and Eastern Europe: Is there a link?

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Abstract: Economic literature on economic growth and FDI (foreign direct investment) implies that FDI can facilitate growth of recipient economy via capital inflow instantly and via positive spillovers and inclusion into international productive and innovative networks *ex post*. In this paper the role of FDI is examined by using bi-variate Granger causality test for growth, merchandise exports and imports, and by modeling growth equation with FDI as one of the explanatory variables in pool regression for 11 transition economies in CEE. Granger causality test is done additionally for each economy in the sample individually, which later enables better interpretation of pool regression results. The final results of the quantitative analysis imply that FDI cannot account for higher growth of the observed economies. FDI appears insignificant for growth. The finding can be explained by the fact that FDI have not contributed to the capital formation strongly because they have dominantly flown in as brownfield investments into services. Market-orientation of FDI coupled with the use of home country suppliers' or parent company's goods and services might have helped to annul the positive effects of FDI.

Keywords: Foreign direct investment, economic growth, Central and Eastern Europe, spillover, competitive effect, enterprise restructuring, industrial networks, absorptive capacity.

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1. Introduction

FDI inflows in CEEC have been given vast political and economic attention since the beginning of the 1990es. It has been argued that, among many benefits, foreign investors would transfer the newest technology and thus improve productivity, product quality and accelerate exports in the recipient economies, which would eventually spur growth. These attitudes have been described and put in benign concept of FDI in economic literature (Moran, 1998). However, the scientific evidence and research on the links between FDI and economic growth have shed some doubt on the validity of those arguments, at least in the Central and Eastern Europe (CEE). So far, not enough evidence has been given to support either benign or malign (Moran, 1998) concept of FDI. We find only a few studies researching the link and the possible effect that FDI might have had in CEE using quantitative approach from a macroeconomic perspective (Fabry, 2001, Mencinger, 2003). Perhaps that can be explained with the difficulties that researchers encounter with the consistency of the macroeconomic data in the observed region, as well as a limited availability of the uniform data for the whole region. Although more evidence is present from the results of microeconomic studies, they are mostly confined to case studies of a single recipient country or to case studies of a single foreign investing country. Microeconomists encounter the same problems with data as macroeconomists and that is why we find that their studies using quantitative approach have been based on their own data (collected through survey of firms). Those evidence and the results have been most helpful for interpretation of our own results and for better understand of the nature of foreign investment enterprises (FIE) in CEE.

Our approach to researching the connection between FDI and growth in CEE is embodied in two major parts of the paper. In the first part of the paper, we give an overview of a theoretical base to studying the link between FDI and growth and then move on to providing an empirical overview of the evidence and interpretations of the link in CEE given by different authors. The primary intention of the first part of the paper is to better explain the possible “dual” (benign vs. malign) nature of FDI as opposed to inclining to one concept. Secondly, an overview of both macroeconomic and microeconomic evidence from CEE has been written with the intention to encompass the multifaceted nature of FDI, as the main theory of FDI - the eclectic theory of FDI - is built on both branches of micro- and macroeconomic theory. Finally, the results of microeconomic studies and the case studies would help us better understand the results of our quantitative research.

The second part of the paper is concerned with quantitative examination of the link between FDI and growth. Bivariate Granger causality test is done for each of the countries in the samples of 11 CEE countries and used to find out whether changes in the FDI inflows precede changes in the level of quarterly GDP, merchandise exports and imports. When the test results show that changes in FDI precede the changes in other variables, we complement the result with cross correlation coefficient to establish the sign of the connection.

By having an overview of these possible connections, we are able to better interpret the results of a growth model. We then move on to testing a growth equation that was used on a sample of 8 countries in CEE by Mencinger (2003). Pool regression is used to test the equation, which is insignificantly altered with the omission of one of the explanatory variables (country dummy variable) used by Mencinger.

2. Starting points: links between economic growth and foreign direct investment in theories, models and empirical work

As a component of capital, FDI¹ can together with labour and technology compose the production function in the neoclassical growth model (Solow, 1956), but in the long run increase in FDI will result in decreasing returns. The neoclassical theory assumes there is no interdependence or relations between capital, labour and technology – all variables are exogenous. On the other hand, should FDI provoke technological progress (although there is no explanation how this may happen), they may indirectly affect long term economic growth.

The next group of models, known as endogenous growth models considered technological progress an endogenous variable (Romer, 1986, 1990). In those models technological progress stems from the activity of individuals or firms. Growth theorists also allowed for the possibility of increasing returns and the expansion of the definition of (financial) capital to human and physical capital. There are two ways – a direct and an indirect way - for capital to influence growth. Firstly, increase of capital per capita will result in the rising productivity, which will increase growth. And secondly, foreign investors may be creators of technological progress, on which impetus to growth is based. Externalities are additionally introduced in the model as a route to spilling over of technological progress (for example, from the foreign investment enterprise) unintentionally to other agents in the economy. Learning from others, training at work, knowledge and experience of others are freely available to all.

¹ The purist definition by which FDI is only considered in financial terms is not surprising as neoclassical growth model has arisen in 1950es. A new, expanded definition of FDI was proposed by Hymer (1976). His definition of what he referred to as “international operations”, besides capital also includes the transfer of knowledge, skills and technology.

Models based on research and development models of endogenous growth (also known as Neoschumpeterian models) are considered more realistic than previous models because of their assumption that markets are imperfect (Grossman and Helpman, 1990, 1991; Aghion and Howitt, 1992). This assumption implies that technology is no longer available freely and therefore firms with market power have an incentive to innovate and protect their innovations via patenting. Innovators-leaders can capture extra profits while their followers, to which innovators can sell their technology, earn lower profits. However, the knowledge that has resulted from innovating can be spilled over and thus is still available freely.

Indeed, in his theory of international business operations, Hymer (1976) recognizes that market power is at the heart of international businesses. Multinational organizations achieve their market power as a result of their specific advantage² embodied in their unique assets and not vice versa – their market power is not the cause of existence of their proprietary advantage over other firms because the inefficiency stemming from monopoly power would not make the maintenance of extra profits possible in the long run (Dunning, 1988). With extra profits earned by owning the proprietary advantage, new investments and breakthrough into foreign markets are possible.

Lastly, Akamatsu's "Flying geese" model of development explains how a less developed economy can catch-up with more developed economies through international trade (Dunning, 1988; Kojima, 2000). Import of more sophisticated goods than the less developed economy is producing, gradually gives an opportunity to the less developed economy to start the

² This advantage pertains to monopoly power and can be accomplished on final product markets or input markets or can be a result of economies of scale, diversification of risk or government support (Blough, 1970: 1258). Hymer (1976) outlines few routes through which proprietary advantages are realized: a. obtaining lower-priced inputs, b. knowing how to produce more efficiently and/or strict overseeing of production and c. successful distribution and/or differentiated product.

production of sophisticated products and, with time, to start exporting them. The levels of technological complexity of production as well as the levels of sophistication of the products increase with time. Kojima (2000) adds a new dimension to the model with the inclusion of FDI in the development process. For him, foreign investments must be oriented towards trade. In other words, foreign investor country will move its production to another country to strengthen its comparative advantage that has previously been deteriorating in the home country. As a consequence, the host country's economy will grow because it has received new technology and capital with the purpose to be employed in the growth of production and exports. The result of the foreign investment is beneficial for both home and host country because comparative advantages of both countries are enhanced.

Authors of empirical work in the area of growth and FDI mostly rely on endogenous growth models as a theoretical starting point and use cross country regression analysis to prove the link.

Some of the most prominent authors found the influence of FDI on host economy to be dependent on the country's internal conditions and setting³. Borensztein, De Georgio and Lee

³ Moran (1998: pp. 19-20) summarizes different perspectives of FDI into two dominant views. FDI not only brings in additional capital, but also brings along know-how, technology, managerial skills, new resources, all of which, *according to the benign concept of FDI*, can be spilled over to the host economy. Benign concept of FDI stipulates that due to foreign investment into capital-labor ratio, labor productivity can be enhanced, which can then lead to higher wages. That concept is relevant only if two conditions are satisfied: the industry that the foreign investors' activity belongs to, must have (almost perfect) competition on the global level and free competition in that industry must exist in the host economy. Highly developed economies have better chances of capturing all of the benefits coming from FDI because their markets are functioning efficiently – with developed systems of suppliers and subcontractors, modern telecommunication networks, national systems of innovation, specialized human resources and strong domestic competition. When these conditions of perfect and free competition are not satisfied, *the malign conception of FDI*, which criticizes behavior of multinational enterprises, emerges. The malign conception recognizes that FDI may have negative effects on host economy because foreign investor firm is a monopoly or oligopoly on the global level and/or market structure of the host economy is imperfect. The critique of multinational enterprises also asserts that these enterprises are able to achieve competitive advantages on the global scale because in some developing countries, due to their negotiating skills and economic strengths they are able to circumvent health and safety standards, environmental laws and legislated minimum wages. The institutional and innovative infrastructure that is either missing or is

(1998) show that foreign investments are more important for growth than domestic investments (due to the transfer of technology, productivity spillovers etc.) in developing economies but only if there is an adequate absorptive capacity within the country, which enables efficient reception, transmission and diffusion of new technologies. Absorptive capacity thus facilitates the absorption of technology and knowledge spilled over from the foreign investment by the domestic agents. It is determined by the accumulated human capital of the economically active population in the host country, i.e. on the levels and structure of knowledge and skills⁴.

On the contrary, De Melo (1999), using a sample of OECD members and non-members, finds the influence of FDI to be more significant in countries that are technological laggards i.e. developing economies. He asserts that the existing domestic technology and foreign technology that is introduced are complementary, which occurs because: a. new technology is used less efficiently in countries that are technological laggards and/or b. foreign technology and knowledge are not more productive or modern than those existing in the host economy.

There have not been many studies focusing specifically on the links between economic growth and FDI for CEE, but many researchers did try to identify the factors, amongst them FDI, that explain economic growth in the region. Havrylyshyn, Izvorski and van Rooden

being built in some developing economies, make the potential spillovers improbable. Due to their cost advantages over local firms, multinational enterprises are able to keep market concentration in the host economy high.

⁴ The term “absorptive capacity“ may be expanded from human capital to social capital, but not without methodological difficulties. Putnam (1995: p. 67) defines social capital as “features of social organization such as networks, norms and social trust that facilitate co-ordination and co-operation for mutual benefit”. The inclusion of social capital is intuitively plausible, because knowledge diffusion and technology transfer crucially depend on networks of individuals and institutions that create and reproduce social capital. However, modeling social capital in growth equation using cross-country regression is yet impossible because of measurement problems and the lack of consistent and/or comparable data, especially on regional and global levels.

(1998) conclude on their sample of 25 transition economies, including those in Central and Eastern Europe (CEE), that the key determinants of growth in the transition period were macroeconomic stabilization, structural reforms and lowering public expenditures. FDI has influence on growth only when reforms index is excluded from the model, but that influence is less significant than that of reforms. Havrylyshyn et al. (1999) make another attempt to find the reasons behind different growth patterns across transition economies, again including CEE. The main finding is that initial conditions, economic policies along with the institutional, legal and political framework are significant factors of growth in the region. By employing qualitative approach authors estimate that FDI accounted for economic growth of Estonia, Hungary, Poland and Slovenia – countries that attracted the highest portion of FDI in CEE and economies of which were on average growing by 4 percent or more. In their conclusion, authors speculate that FDI may have an effect on growth after conditions pertaining to growth have been achieved (after implementing economic stabilization and reforms).

Papers focusing specifically on the link between FDI and growth in CEE have started to emerge since the early 2000. Fabry (2001) tries to identify the existence of a link between FDI, growth and exports by using bi-variate Granger causality testing for ten host countries. She detects Granger causality from FDI to economic growth in the case of Albania and Russian Federation, while the opposite direction i.e. causality from economic growth to FDI is found in the case of Hungary, Poland and Romania. However, Fabry's conclusion is that exports seem to boost growth more than FDI, and in her research it appears that Granger causality from FDI to exports simply does not exist. Mencinger (2003) writes a paper with the same objective for a sample of eight CEE countries, which joined the EU in 2004. He also uses Granger causality test to prove the connection between FDI, economic growth and trade

deficit, but with the purpose to use them as a complement to the results of cross-country regression growth model based on the Solow's approach. It appears that the relationship between FDI and growth indeed does exist, but it is negative, implying that FDI retards economic growth. The author explains that this is caused by takeovers as the main mode of entry of foreign investors, as well as the fact that the capital used for buying the firms was later directed into consumption and imports, thus failing to raise efficiency. Additionally, the negative "competitive" effect, seen as elimination of local competitors because of their inability to compete with foreign investment enterprise, might have prevailed. Mencinger also regards the sectoral breakdown of FDI as unfavourable – FDI in CEE predominantly flowed into (local market oriented) services sector, mostly retail and banking, which might have hindered productivity spillovers in smaller economies. Lastly, he attributes the widening of current account deficit in the countries to FDI.

3. Stylised facts and findings related to FDI in Central and Eastern Europe during the period of transition

It is not surprising that most of the CEE countries attempt to attract FDI (over other forms of complementing insufficient domestic savings such as foreign debt). Apart from representing new capital with a package of management skills, know-how and technology, it has been proven that FDI is more stable during economic shocks than other forms of capital such as portfolio investment (Ahec-Šonje et al., 2002). Additional benefits from FDI may include increase of employment, human resources training, transfer of technology and higher exports. Thus, the effects of FDI may substitute some economic and social policy interventions. Additionally, foreign investor can help CEE firms raise their competitiveness and integrate into the single European market by including local firms into their industrial networks. At the moment, many researchers consider that the process of economic integration is not developing in the desired direction i.e. that the process of divergence (and not convergence) of CEE with the EU is underway (Gristock et al., 2003).

Inflows of FDI have been uneven across the countries in the region with the bulk of the value flowing towards the former EU candidates – mostly the Czech Republic, Hungary and Poland. The main reason behind the uneven distribution of flows may be modes of privatization in those countries that allowed foreign capital to enter in early stages of transition (Hunya, 2002), which stimulated mergers and acquisitions as the dominant mode of entry into CEE. Hungary's model of privatisation has attracted foreign investors more than privatization models in other countries because of its effort to attract strategic investors.

Since the late 1990s numerous studies, which attempt to reveal the factors determining why foreign investors have invested in a certain location/country in the CEE region by using cross-country regression analysis, have appeared (Resmini, 2000; Babić and Stučka, 2001; Campos and Kinoshita, 2003; Bačić, 2004). What most of them had in common is the finding that agglomeration⁵ is important for new investments. New foreign investors seem to have been realizing their projects in locations where favourable conditions⁶ have been made by the presence of their counterparts. Bačić (2004), by using a regression analysis, finds that FDI in CEE was also motivated by the positive rates of economic growth and by the international trade openness of the countries. That is not surprising: it indicates that foreign investors' interests are twofold. On the one hand, they want to maximize profits and they base their expectations on the potential of the prospective markets (usually approximated by purchasing power or the size of population in models), and on the other hand, the foregoing exports to the host country must be large enough to validate the investment (thereby regarding the cost aspect). The finding that the growth rate may influence the flow of investment has an implication for the analysis of influence of FDI on economic growth. It indicates the potential presence of endogenous determination of variables, suggesting that both the dependent (rate of economic growth) and independent variable (FDI) may influence each other or may be influenced by the same factors, may be present. That is why the results of the forthcoming analysis must be interpreted with reasonable caution.

Another conclusion stemming from these results is that two types of foreign investors dominate the region – the market-oriented investors and efficiency-oriented (i.e. cost-oriented) investors. Identification of the two types of investors makes it possible to tackle the

⁵ The stock of FDI already accumulated or number of foreign investors already present in a location. These locations are, in principle, concentrated in the capitals or big urban centers in the observed economies.

⁶ These may be pools of educated human resources, accesses to certain markets, sharing of information etc.

assumptions about the possible effects of FDI on growth and the economies. The market-oriented investors may develop links with the local suppliers so to minimize costs and familiarize themselves with the new market. It is characteristic for this type of investors that they prefer to settle in locations where foreign investors are already present because of the security that they have created.

The market-oriented investors' presence may enhance the level of local competition by raising the standards of quality and likewise by empowering consumers' expectations about product quality. On the contrary, should the local competition be too weak in terms of catching-up with the foreign investor's enterprise (FIE), it could get completely eliminated from the market.

Hunya (2002) stresses the fact that some evidence from the region suggests that local entrepreneurs are facing difficulties in obtaining bank loans, so financing of the catching-up with FIE in reality might have proven cumbersome. Bačić's analysis (2004) dismisses the geographic diversification of risk (approximated by home country growth rates) as motivation for investment into the observed region. In theory, foreign firms may decide to invest abroad to overcome the economic troughs that they may be facing at home – but in CEE, economic growth is highly dependent on the economic developments in the EU-15 as their key export market.

Technological upgrading, considered one of the main advantages of FDI, might have occurred in lesser intensity than thought – although this cannot be confirmed because data on transfer of technology throughout the region has so far not been collected. If high economic growth in the host economies allowed foreign investors to orientate on local markets exclusively,

technological upgrading might have been overlooked because of the low levels of technological capability of local competitors, at least at the beginning of transition. Requirements for higher quality of products were probably more important to foreign investors who were export-oriented (Hunya, 2002). In literature, export-oriented investors are those who started their business as greenfield projects, while in CEE most of investment fall into the (privatization-related) brownfield category. Regardless of the type of investment, FIEs are more prone to importing or exporting goods and services than local firms because of the nature and structure of multinational enterprises.

Evidence from Hungary shows that FIEs' contribution to the Hungarian current account deficit has been decreasing due to the increasing merchandise exports. Quite the opposite happened in Poland, where current account deficit has been widening together with the rising share of FIEs in exports and imports (Hunya, 2002).

Breakdown of FDI by activity illustrates a very similar structure in both countries – most of FDI flowed into the manufacturing industry, wholesale and retail, transportation, telecommunication and financial intermediation - and therefore cannot explain the difference in international trade patterns of FIE in Hungary and Poland. Perhaps the difference lies in the fact that Hungary attracted more investments that were greenfield, and by definition more export-oriented than those in Poland.

Table 1: FDI stock breakdown by activities, December 2002, shares in percent

	Bulgaria	Croatia	Czech R.	Hungary	Poland	Romania	Slovak R.	Slovenia	Average
National classification of activities									
Agriculture, forestry and fishing	0,3	0,3	0,2	1,1	0,4	0,8	0,3	0,0	0,4
Industry, total	38,8	37,3	45,4	51,8	38,7	53,7	50,3	44,3	45,0
<i>Mining and quarrying</i>	1,2	3,0	1,7	0,3	0,3	.	0,5	0,0	1,0
<i>Manufacturing</i>	36,7	33,0	37,6	46,1	35,8	.	37,1	43,3	38,5
<i>Electricity, gas and water supply</i>	0,9	1,2	6,1	5,4	2,6	.	12,7	1,0	4,3
Construction	2,8	1,1	1,5	1,4	2,6	2,7	0,6	0,1	1,6
Wholesale, retail trade, repair of motor vehicles	15,0	5,7	15,1	10,6	17,1	16,1	10,7	14,5	13,1
Hotels and restaurants	1,8	4,2	0,7	1,2	0,6	2,1	0,5	0,4	1,4
Transportation and telecommunications	13,5	26,3	10,4	11,8	10,4	8,5	10,0	4,4	11,9
Financial intermediation	19,4	22,9	14,8	10,6	21,3	.	24,2	18,8	18,9
Real estate, renting & business activities	4,1	1,8	11,4	10,6	7,5	.	2,9	15,2	7,6
Public admin., defence, compul. soc. sec.	.	0,2	.	.	.	.	.	.	.
Education	0,3	0,0	0,0	0,0	.	.	.	0,0	0,1
Health and social work	0,0	.	0,2	0,1	.	.	0,0	0,1	0,1
Oth. community, social & personal serv.	0,9	0,2	0,4	0,8	.	.	0,4	0,5	0,5
Oth. not elsewhere class. activities	2,9	0,0	.	.	1,4	16,1	0,0	1,7	3,7
Total	100,0	100,0	100,0	100,0	100,0	100,0	100,0	100,0	
Total, USD mn	4.454	5.256	27.092	22.203	41.247	8.939	7.580	4.081	120.852

Source: WIIW, 2003.

Škudar (2002) finds that shares of FIEs in both exports and imports of goods in Croatia are about the same, but below the CEE average. However, considering that Croatia's merchandise import is twice the size of its exports, he postulates that FIE by performing their international trade activities, contribute to the widening of current account gap. Moreover, FIEs in Croatia have recorded rising revenues from exports, while revenues from exports of local firms seem to falling. Peculiarity of FDI that has flown into Croatia is that almost 50 percent of total FDI has gone into the service sector – transportation and telecommunication, and financial intermediation. In other observed economies, this share on average stands at 31 percent. In the

Croatian case, it seems that FDI into services have prompted intense links with suppliers and subcontractors from the country of investment's origin more than from the local firms. That has possibly hindered productivity spillovers as well as raising the abilities and quality of local firms. The other explanation is that FIE in Croatia might have manipulated transfer pricing in order to repatriate profits to a larger extent than in other countries. Profit may instead of "outflow of income" be transferred abroad as loan repayment (to parent company), payment of services and goods (to home country suppliers or parent company), etc. By doing this, FIE will be charged with less tax, which gives FIE cost advantage over local firms. Šonje and Vujčić (2001) demonstrate in their model that the welfare of the host country will increase even if profit is 100 percent repatriated only if the value of exports created from FDI is greater than the repatriated profit.

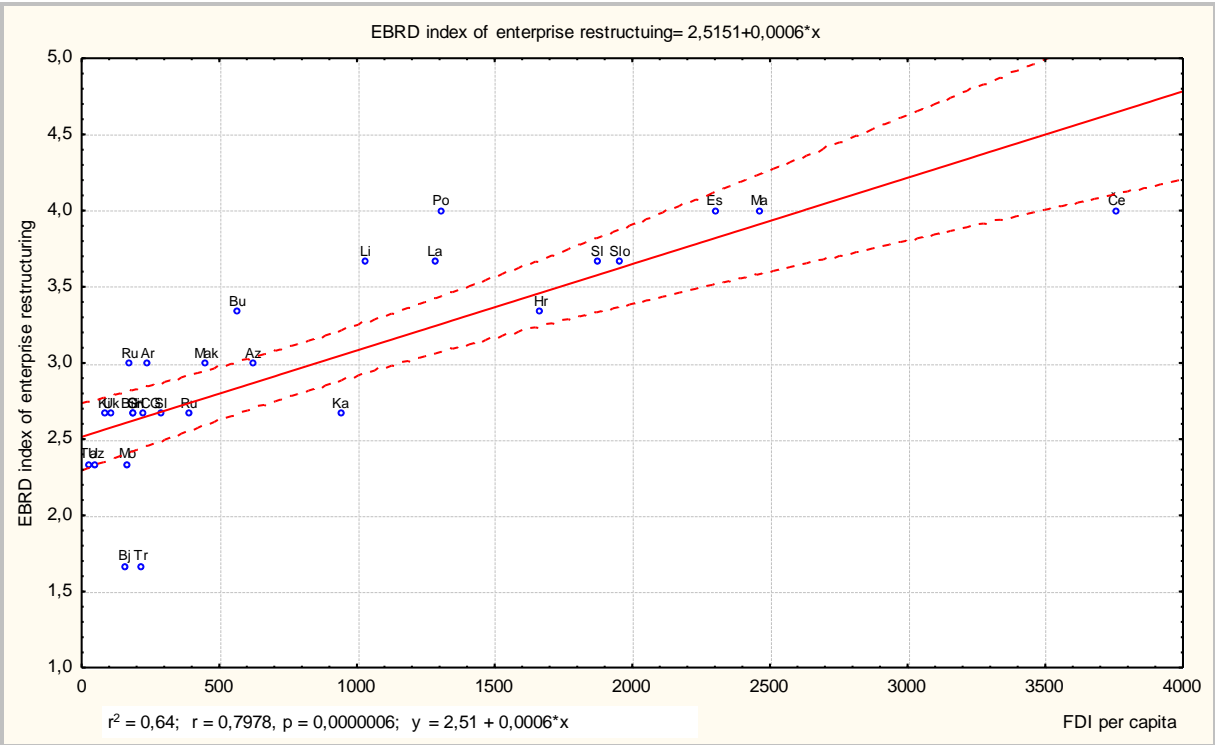
Market structure and strength, as well as and activity breakdown of FDI are important for determinants of competing between local firms and FIEs. According to the data on FDI stock in CEE in December 2002, on average 38.5 percent of the stock is invested in the manufacturing industry. Financial intermediation, falling into the category of services, attracted by far the most of FDI with almost 19 percent share in total, followed by whole- and retail-sales (13.1 percent) and transportation and telecommunication (11.9 percent). It is exactly these activities that have been growing most strongly during the transition period. Possible explanation for that situation may be that foreign investors have entered prospective firms and activities. Alternatively, foreign investors might have spurred growth of the activities they entered or propulsive sectors underwent expansion and were targeted by foreign investors simultaneously. Apart from noticing the progressiveness of FIE activities, it is noticeably that foreign investors have entered some bigger monopolistic or oligopolistic firms-in particularly the telecommunication (in some of its segments) and the banking sector.

Some capital-demanding privatisations have been planned and carried out separately from the ongoing privatisation processes. Apart from thereby trying to maintain social consensus (with the goal to keep the employment high), many governments also decided to sell off big firms to help cover budget deficit with the revenues from the sales. Often in those separate processes with government acting as the seller, the highest offer was the main criterion, while the future business plans made by prospective buyer came secondary. The result of those sales may be delay of restructuring or lower capital investments in general. Hunya (2002) might have referred to those sales or sales of monopolistic firms when he wrote about the «hot» opportunities that foreign investors seized. When firms that had previously not been restructured were being sold, their price might have been underestimated. Those are, in particular, firms with often obsolete technology and managerial issues usually facing problems of illiquidity or insolvency that require immediate investments. The potential of those firms normally lies in their access to certain market or markets.

Generally, automobile and electronics industry received by far the most of FDI across the region (except in Croatia and Bulgaria) – UNCTAD in 2003 reports that these investments continue to grow mostly contributing to the restructuring of activities toward higher value added. Products of these industries are launched globally. The FDI into the automobile industry in the Czech Republic has created a web of subcontractors and spinning off in local firms. Locating of these industries in CEE is vitally important for receiving countries because of the possibility of FIE helping integrate local firms into international industrial networks. Additionally, those industries are by definition more export-oriented than other types of FDI.

Krkoska (2001) reports that restructuring of firms taken over by foreign owners has been more frequent than in firms owned by residents. In more than 70 percent of cases, FIE upgraded their technology, which must have improved firm's efficiency. In comparison, local firms upgraded their technology on average in less than 55 percent of cases. That is why it is not surprising that indicators of firms' success such as profitability for FIEs are double to three times that of local firms (Konings, 2001; Hunya, 2002; Škudar, 2002). The only decision made both by FIE and local firms that is equally frequent is the decision about reducing the number of employees - a decision that is least demanding in respect to other business decisions such as upgrading of technology or managerial practices (Krkoska, 2001).

Figure 1: Cumulative USD value of FDI per capita (x) in the period 1993-2002 and firm restructuring in 2003 (EBRD index)



Source: Authors calculations made after figure from Krkoska (2001: p. 9). Data was taken from UNCTAD CD-ROM, 2003 and EBRD, 2003.

Data on employment in FIEs in several CEE in the years 1998 and 1999 reveals that FIEs' share in total employment was 2.5 and 2.7 percent, respectively. Interestingly, employment in FIEs between those years rose regardless of ongoing recessions in host economies (in the midst of the "Russian crisis") and the global economic turbulence coupled with the fact that total employment in half of those economies fell. That situation must have been a result of FIEs' strong competitive position in the host country market or exporting markets. If that was the case, it might support the idea of the existence of enclaves i.e. a group of progressive firms, more successful than the rest of the economy, and in this case, composed of FIEs⁷.

Halpern and Körösi (2001) present evidence from Hungarian manufacturing industry asserting that FIE are in a better position to exploit market imperfections and earn extra profit. They see differences in corporate efficiency as an explanation because it can influence the ability to exploit market imperfections. Zukowska-Gagelman (2000) tackles the issue of rising of two-tier economy in Poland, where FIE are dominating the economy while domestic enterprises are only trying to catch-up. Similar occurrence is marked in Hungary by Hamar (2001) who reports of the signals of dual economic development first noted in 1996. Since then local firms have improved their exporting capabilities and productivity, but the gap between local firms and FIEs' performance in 1999, Hamar writes, has not vanished but, in fact, has widened.

The arrival of multinational enterprises into transition countries has led to some integration of local firms into global production networks (Linden, 1998; Van Tulder and Ruigrok, 1998; Kaminski and Smarzynska, 2001). However, the benefits of multinationals-centred networks

⁷ An additional assumption about enclaves is that they do not interact with local firms, and restrict themselves to the use of local resources only where necessary.

accruing to domestic enterprises have often been narrow. The networks being built are often restricted to the multinational firms' subsidiaries with limited local subcontracting (cf. Radosevic, 2002). Integration into international networks, upgrading of quality and efficiency are perceived as main goals of local firms when cooperating with FIEs. The integration of local suppliers into the multinational enterprises' global production networks has so far been mostly limited to low-value added activities (Linden, 1998; Van Tulder and Ruigrok, 1998; Dunin-Wasowitz, Gorzynsky and Woodward, 2002). Capability enhancements and technology transfer benefits accruing to domestic companies partnering with multinational enterprises on innovative projects is limited (Sadowski, 2001), and usually restricted to FIE (cf. Biegelbauer, Griebler, and Leuthold, 2001).

Hungary - as a small open economy with high inflows of FDI since the onset of transition is a good example for identifying various types of cooperation between local firms and FIEs. Szanyi (2002) writes that in the Hungarian case, cooperation between local firms and FIEs began in the early stage of transition and that its nature and intensity depended on FIEs' parent company global strategy. An estimate was made that FIEs cooperated with 10-20 percent of local medium sized firms with the purpose to service local and foreign markets. It is due to this cooperation that local value-added increased. Local firms were mostly confined to the production of intermediary products (components production and subcontracting). Szanyi also provides an extensive overview of different authors' points of view according to which the cooperation between local firms and FIEs has negative consequences for those local firms. According to those views, subcontractors become isolated from the rest of the national economy and FIE and/or do not transfer enough technology. There is also the possibility that subcontractors may lose their R&D functions and thereby neglect their own product

development. This is not the case with local firms that act as suppliers and manufacture their own products.

Effects of FDI on productivity spillovers in Bulgaria, Poland and Romania for 5000 firms in the period of 1993-1997 were explored by Konings (2001). He finds that FIE are more successful than local firms only in Poland, while he explains the lack of success over local firms in Bulgaria and Romania by the fact that FIE devoted that period to restructuring. The author did not find evidence of positive spillovers in any of the economies. However, he did find negative spillovers in Bulgaria and Romania due to the prevalence of competitive effect⁸ over positive technological or productivity spillover. Spillovers from FIEs to local firms are also researched by Smarzynska (2002), but for Lithuania. While she finds that there were positive productivity spillovers in downstream production (suppliers, contractors), she finds none horizontally-in the industry that FIE belonged to. Productivity spillovers were associated with (host country) market-oriented FIEs and not with export-oriented FIEs. Zukowska-Gagelman (2000) finds that in Poland, FIEs' share in employment, ownership structure and invested capital have strengthened in nearly all industries. Rise in labor productivity in FIE was higher than the rise in overall productivity. Zukowska-Gagelman estimates that FIEs are twice more productive than local firms, and explains that there is trend of shrinking that gap in productivity because of laying off in local firms. In cases where competing with FIEs has provoked restructuring of local firms, that restructuring was mostly defensive and short-term. Overall, higher presence of FIE in an industry seems to affect local firms negatively. The author detected a negative impact of FIEs on local firms' performance in highly competitive

⁸ FIEs' effort to crowd out local competition. The attempt may prove possible because of local firms' inability to compete with FIEs-technologically, in financing, in efficiency or managerial practices.

industries, while in the least productive state firms in low competition industries, the effects on productivity is positive.

It seems that, at the level of stylized facts, the extent of spillovers from FIE onto local firms that would spur economic growth in CEE has been limited. That may have occurred due to competitive advantages and strategic behaviour of FIE, as well as to the limited capacity of host countries to utilize the opportunities provided and spread them throughout the domestic economy. For example, problems with transmission and application of knowledge remain widespread even in the most advanced CEE countries (cf. Mickiewicz and Radosevic, 2002). In the next section, we undertake a quantitative analysis to explore the relationship between FDI and growth in CEE.

4. Quantitative Analysis of Effects of FDI on Economic Growth in CEE

4.1. Data, sample and statistical indicators

The sample of countries for analysis of importance of FDI for growth consists of 11 transition economies in CEE: eight countries that have integrated into the EU in May 2004 (the Czech Republic, Poland, Hungary, Latvia, Lithuania, Estonia, Slovenia and Slovakia) and three countries of the second wave of accession to the EU (Bulgaria, Croatia and Romania). Period under observation is 1994-2002 because between those years all of the economies have started to recover from the “transition shock” and have started to record positive rates of economic growth. That, along with simultaneous inflow of FDI into the region and similar economic structures, makes the sample homogenous⁹.

Slovenia, among the countries in the sample, exhibits the most persistently high growth rate of 4.1 percent with only 0.9 percent of deviation from its average value. That is not case with average FDI inflows into Slovenia –they are not above the sample’s average, and their deviation from the average inflow is significant. Nonpersistent FDI inflows into Slovenia may be the first sign that in the course of the observed period high and robust rates of economic growth cannot directly be credited to FDI inflows. Low correlation coefficient for economic growth and FDI confirms that doubt. Bulgaria, on the other hand, stands out as the country with the least persistent growth rate (on average 0.9 percent) with high deviation from its average value. Bulgaria has on average received more FDI inflows than Slovenia, which were also more stable than the ones flowing into Slovenia. The most obvious outstanding candidate

⁹ Some differences in the level of development among countries are more obvious when the level of GDP per capita is taken into consideration. Majority of those countries (8 of them) belong to medium income range (2000-4999 USD per capita), while Slovenia (upper higher income 5.000-19.999), and Romania and Bulgaria (lower income 500 1.999 USD) do not fall into that category.

for determining the existence of relationship between growth and FDI is Latvia because of its positive rates of growth and persistent inflows of FDI. That is why its correlation coefficient for economic growth and FDI is high (0.9). However, the high value of correlation coefficient may point to the problem of endogenous determination of variables. FDI itself may be influenced by innovations and other factors characteristic for processes that provoke economic growth (USITC, 1997).

Table 2: Time series with annual data for real rate of economic growth (rGDP) and FDI inflows (FDI, USD millions)

1994-2002	Est	Slo	Lit	Lat	Cro	Slk	Bul	Hun	Czk	Rom	Pol
Average FDI inflow	236	201	114	139	182	199	61	212	391	42	137
Standard deviation	107	283	85	51	119	235	42	104	273	25	56
Average growth	4.2	4.1	2.2	4.0	4.3	4.3	0.6	3.6	2.1	1.2	4.5
Standard deviation	3.7	0.9	5.5	3.3	2.3	1.8	5.6	1.4	2.8	4.8	2.1
Value of correlation coefficient 1992-2002											
Growth, FDI	0.4	0.2	0.6	0.9	0.3	0.1	0.6	-0.3	0.1	-0.2	-0.4
Growth, FDI (t-1)	0.0	-0.1	0.2	0.8	0.1	0.0	0.7	-0.2	0.3	-0.4	-0.8
Growth (t-1), FDI	0.5	0.3	0.8	0.7	0.4	0.1	0.4	-0.1	-0.2	-0.1	-0.2

Source: Authors' calculations, data taken from EBRD Transition Report 2003 and World Investment Report 2003 – Statistical Annex (UNCTAD).

In the table 1 countries are positioned by the size of its population. Within the observed sample, in smaller countries, correlation coefficients for economic growth and FDI are positive, while it is opposite for larger countries (Hungary, Romania and Poland) – with the exception of the Czech Republic where correlation is weak.

Table 3: Main statistical indicators of FDI (million, USD per capita) and countries' GDP growth rates in cross section

	Average FDI inflow	Standard deviation	Average real rate of GDP	Standard deviation	Correlation coefficient
1994	60,2	46,6	1,9	4,5	-0,02
1995	111,3	132,7	4,4	2,6	-0,25
1996	98,1	65,3	3,0	4,8	0,27
1997	129,7	63,3	3,7	5,8	0,57
1998	196,6	111,6	2,7	3,4	0,08
1999	191,6	163,1	0,9	3,0	-0,16
2000	208,2	131,4	4,3	1,7	-0,18
2001	234,2	154,4	4,3	1,7	-0,30
2002	337,0	346,5	3,5	0,8	-0,10
1994 – 02	174,1	135,0	3,2	3,2	-0,01

Source: Authors' calculations, data taken from EBRD Transition Report 2003 and World Investment Report 2003 – Statistical Annex (UNCTAD).

Cross section data (table 2) do not provide a clearer picture of the observed relationship. After the recovery from the transition shock, positive rates of economic growth begin to slowdown towards 1999, when most of the economies from the sample are hit by the Russian financial crisis. Since then, rates of economic growth have stabilized at precrisis level and their nonpersistence weakens. The year 1999 marks a turning point in the relationship between FDI and economic growth. In the period 1996-1998, countries with higher growth rates were at the same time countries that attracted higher inflows of FDI, suggesting that foreign investors were more attracted to countries that grew progressively. On the other hand, those countries' growth can be a result of effects of FDI.

Figure 2: Regression line within 95% confidence bands for real growth rate and average annual FDI inflow per capita in the period 1994-2002 for 27 transition economies

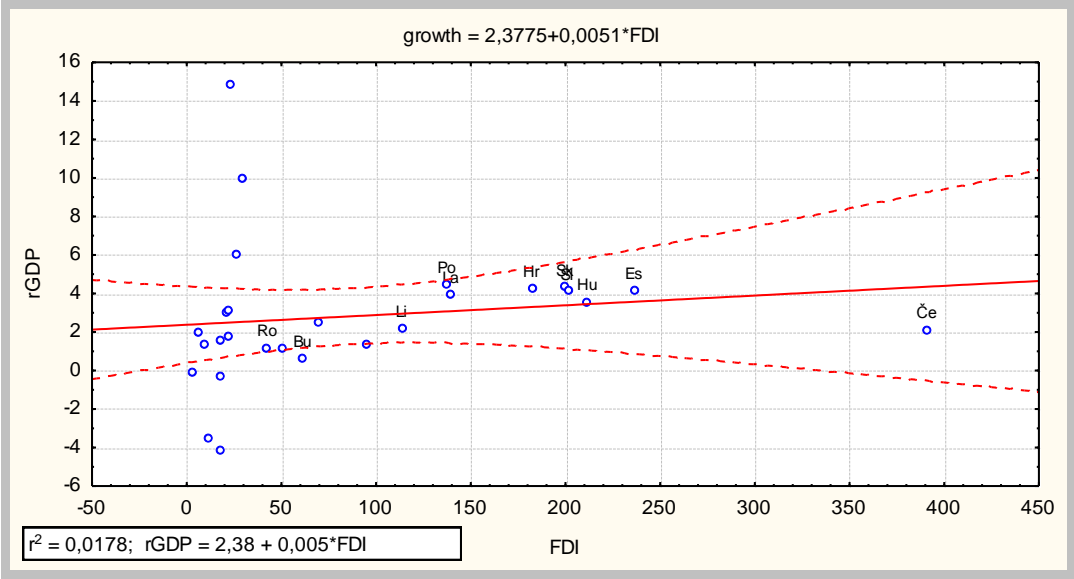
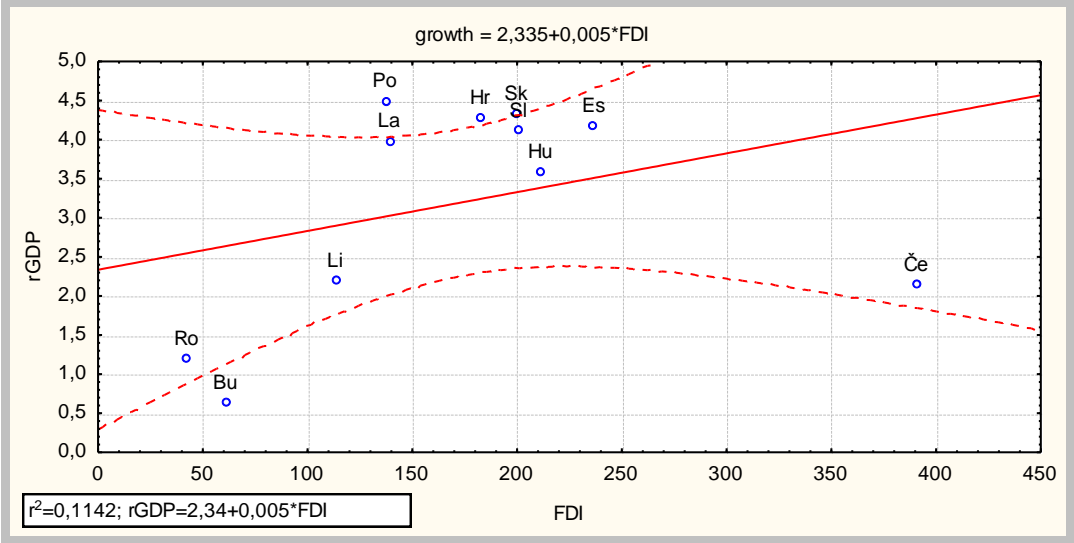


Figure 3: Regression line within 95% confidence bands for real growth rate and average annual FDI inflow per capita in the period 1994-2002 for 11 transition economies



Source: Authors calculations, data taken from IFS IMF-CDROM and different editions of EBRD Transition Report.

Result of a simple regression with average growth rates (of 27 transition economies) as dependent variable and average FDI inflows (in USD) as explanatory variable, shows that that on average countries grew by 2.4 percent (the constant) and that nearly 2 percent of variation in growth can be explained by the difference in FDI flows. Dollar value of FDI increases

growth, but not strongly since its coefficient is close to zero. If the sample is narrowed to the 11 economies under observation plus Macedonia, almost identical result is obtained, but only with higher percentage in variation of growth attributed to changes in FDI – 11.4 percent.

4.2. Testing of causality

Although the question “does a change in one variable cause a change in another variable in a relationship founded in economic theory?” has implicitly been posed, the answer has yet not been given because it must be found in determining existence of causality. Additionally, strength of the relationship may be examined with correlation coefficient. Fabry (2001) and Mencinger (2003) try to find the answer to the relevant question for FDI and rate of economic growth by using Granger causality test. They use annual data for the transition period with lagged FDI. Fabry (2001) uses annual data with lagged FDI for countries individually, while Mencinger (2003) uses cross section data for 8 countries that have integrated into the EU in May 2004 and tests the causality for the whole sample. Although Fabry produces results for individual countries, a low number of her observations may be problematic. Mencinger’s approach assumes the same pattern of causality for the whole sample, but his test results appear more reliable.

The general weakness of Granger causality test is that it does not produce the sign (positive vs. negative) of the relationship between variables, and Fabry (2001) solves this problem by introducing correlation coefficient to complement the findings of the test. Granger causality is tested for two variables, where if the second variable provides information about the first variable in the presence of lagged first variable, then “the second variable Granger causes the first variable”. Causality is tested in both directions, from first to the second variable direction and in the opposite direction.

In order to Granger test the countries from the sample, quarterly FDI, merchandise exports (MG) and imports (XG) and nominal GDP (all in USD) data for the period 1993-2002 is used, thus making series of 35-38 observations on average. Bivariate causality is tested for each country individually, with lags (signified by “p”) varying from 2-8 (i.e. from 6 to 24 months). The wide range of lags allows for the possibility that the effects of FDI in various economies may disperse unequally fast/slow, as well as the possibility to capture the effects of FDI might have not been registered promptly in the official statistics. The dependant variable is also included in the equation as a lagged variable in order to capture the systematic changes in the series. Of the hypothesis H_0 is rejected, then Granger causality is present.

Equation specifications:

$$GDP_t = c_1 + \sum_{i=1}^p \alpha_i GDP_{t-1} + \sum_{i=1}^p \beta_i FDI_{t-1} + u_t$$

$$H_0 : \beta_1 = \beta_2 = \dots = \beta_p = 0$$

$$MG_t = c_1 + \sum_{i=1}^p \alpha_i MG_{t-1} + \sum_{i=1}^p \beta_i FDI_{t-1} + u_t$$

$$H_0 : \beta_1 = \beta_2 = \dots = \beta_p = 0$$

$$XG_t = c_1 + \sum_{i=1}^p \alpha_i XG_{t-1} + \sum_{i=1}^p \beta_i FDI_{t-1} + u_t$$

$$H_0 : \beta_1 = \beta_2 = \dots = \beta_p = 0$$

The goal of the testing is to explain whether changes in FDI inflows cause changes in level of GDP, merchandise exports and imports. FDI directly complements fixed capital formation if it comes in the form of greenfield investment, and may indirectly affect growth if it changes

exports and imports-and it should as theory and empirical evidence suggest that. Reverse causality in the test will help to find out whether the problem of endogenous determination of variables is present. That problem is in regression (that is to follow) normally solved by using lagged FDI values, logarithmic values of GDP and by introducing more explanatory variables in the equation (USITC, 1997).

Table 4: Granger bivariate causality test results for FDI as an explanatory variable

Variable lagged at t-2, ... , t-8 → (explanatory variable)	FDI					
	GDP		Merchandise exports		Merchandise imports	
Variable at t → (dependant variable)						
Countries	Presence of causality (\exists) and the sign of cross correlation coefficient	Lags at which causality is present	Presence of causality (\exists) and the sign of cross correlation coefficient	Lags at which causality is present	Presence of causality (\exists) and the sign of cross correlation coefficient	Lags at which causality is present
Croatia						
The Czech R.					$\exists+$	2
Bulgaria					$\exists+$	2-3
Slovenia	$\exists+$	3-6	$\exists+$	2-5	$\exists+$	2-7
Slovakia	$\exists-, \exists+$	5-7				
Estonia			$\exists+$	2-6, 8	$\exists+$	2-5
Lithuania	$\exists+$	3			$\exists+$	2-8
Latvia			$\exists+$	2-4	$\exists+$	4
Hungary			$\exists+$	5		
Poland						
Romania	n.a.				$\exists+$	2-3
No. of countries with established presence of causality	3		4		8	

Table 5: Granger bivariate causality test results for GDP, merchandise exports and imports as explanatory variables

Variable lagged at t-2, ... , t-8 → (explanatory variable)	GDP		Merchandise exports		Merchandise imports	
Variable at t → (dependant variable)	FDI					
Countries	Presence of causality (∃) and the sign of cross correlation coefficient	Lags at which causality is present	Presence of causality (∃) and the sign of cross correlation coefficient	Lags at which causality is present	Presence of causality (∃) and the sign of cross correlation coefficient	Lags at which causality is present
Croatia					∃+	2-4
The Czech R.	∃+	3	∃+	2		
Bulgaria						
Slovenia	∃+	2-3			∃+	2
Slovakia						
Estonia			∃+	2-8	∃+	2-8
Lithuania	∃+	2-5	∃+	2-8	∃+	2-8
Latvia	∃+	4, 6-8			∃+	4
Hungary						
Poland			∃+	2-3	∃+	2-4
Romania	n.a.		∃+	2	∃+	2-5
No. of countries with established presence of causality	4		5		7	

Source: Quarterly data from IFS IMF-CDROM, web-sites of central banks and national statistical offices.

Remark: data for Polish exports and imports include services.

The test results presented in table 3 show that lagged FDI (by 9-15 months) Granger caused changes in GDP levels of Slovenia, Slovakia and Lithuania. The established link is most robust in Lithuania because of positive and high correlation coefficient, whereas in Slovenia it is positive, but at the same time low. Slovakia's results are inconclusive because the established relationship on lags 5-7 carries both negative and positive signs, and coupled with that, the link is not strong. The results in table 4 point to the possible existence of the problem of endogenous determination of variables because apart from "FDI Granger causing GDP", results show that "GDP Granger causes FDI". All the economies with the established relationships are opened and rather small which opens the possibility that the effects of FDI

may be stronger in smaller economies with possibly less diversified or complex economic structure.

FDI Granger causes changes in international trade flows in Slovenia, Estonia, Latvia and Hungary, and in all cases the relationship is positive. The problem of endogenous determination of variable emerges in the Estonian case. However, Granger causality stemming from FDI to merchandise imports is most strongly present, having been established in eight countries, implying that FIE have been strongly using their parent companies' or home country suppliers services or products and were probably strongly contributing to the widening of current account deficit.

No causality stemming from FDI was found in Croatia and Poland's case, but there was the opposite causality – coming from international merchandise flows to FDI. Merchandise imports (which strongly correlate with merchandise exports) have Granger caused FDI in 7 countries and those high imports may be interpreted as a cost argument for market-oriented investors to invest in the observed countries.

4.3. Production function

Results of the Granger causality test will supplement the results of production function of similar to the one used by Mencinger (2003) in his research with general specification:

$$\mathbf{rGDP = f (pcGDP, rINV, rEMP, FDI, rEU),}$$

where rGDP signifies rates of economic growth, pcGDP initial conditions, rINV rate of domestic investments, rEMP rate of employment, and rEU rate of growth of EU-15. The difference between Mencinger's model and the one used in this paper is that there are no

country dummy variables in the outlined model. Method used to test the equation is pool regression with cross section weights (CSW). CSW should allow for a better fit of the regression.

Table 6: Results of regression of production function for the period 1994-2002

	Basic model	Model-1	Model-2	Model-3	Model-4	Model-5	Model-6*
Const.	1.8 (3.17)	0.9 (1.05)	1.79 (3.21)	0.93 (1.14)	1.79 (3.34)	0.71 (0.90)	3.77 (3.37)
pcGDP	6.64E-05 (0.85)	9.17E-05 (1.05)	6.89E-05 (0.87)	8.71E-05 (1.12)	-3.58E-06 (-0.05)	2.25E-05 (0.31)	-0.0001 (-1.54)
rINV	0.16 (8.83)	0.16 (8.94)	0.16 (8.81)	0.16 (8.85)	0.14 (7.2)	0.13 (7.27)	0.09 (3.87)
rEMP	0.25 (2.64)	0.25 (2.77)	0.25 (2.67)	0.26 (2.81)	0.21 (2.29)	0.22 (2.40)	0.34 (2.67)
EUgrowth	.	0.33 (1.49)	.	0.32 (1.45)	.	0.37 (1.80)	0.32 (1.32)
FDI (-1)	0.0001 (1.22)	0.0001 (1.3')	.	.	3.02E-05 (0.39)	1.19E-05 (0.09)	-0.0005 (-2.34)
FDI	.	.	0.0001 (1.37)	0.0001 (1.45)	.	3.73E-05 (0.31)	.
rGDP(-1)	.	.	.	.	0.22 (3.27)	0.22 (3.34)	.
R²	0.72	0.74	0.73	0.74	0.77	0.79	0.82
R², adj.	0.71	0.72	0.71	0.73	0.76	0.77	0.87

* Sample composed of countries in which «FDI Granger cause GDP or merchandise exports»: Lithuania, the Slovak Republic, Slovenia, Estonia and Hungary.
Remark: T-statistics are within brackets.

In the basic model, the constant equals long-term average growth rate of 11 economies in the sample – and is significant in the specifications where its value is above 1. The main result of the analysis is that changes growth can be explained by the rise in domestic investments and employment, and these variables are robust in all specifications of the equation. Lagged FDI, initial conditions and growth in EU-15 turn out insignificant. When the sample is reduced to the economies identified as those where FDI has Granger caused either growth or exports or both (Model 6*), lagged FDI becomes significant and has negative influence on growth, but

its strength is negligible (because its coefficient is close to zero). Though the sample is too small for the results to be reliable, the results are consistent with the results of the basic model – with the constant, domestic investments and employment remaining the significant explanatory variables.

5. Conclusion

Overview of the recent empirical evidence together with pool regression results strongly suggests that the role of FDI in capital formation was negligible. Had FDI complemented host countries' fixed investments more strongly, the results would have reflected in higher rate of economic growth (see regression models 2, 3 and 5). That finding supports the fact that most of FDI has flown in the region in the form of brownfield investments. If those FDI inflows had come in the form of greenfield investments, the results on the economy would have automatically been visible in higher growth rate. More importantly, presence of positive indirect effects of FDI after the initial year of investment is not confirmed for the whole sample (see basic model and models 4 and 5). However, the results of Granger causality test, which enable individual approach to economies, imply that the growth rates of three open and small economies - the Slovak Republic, Slovenia and Lithuania – have been positively influenced by FDI. Perhaps the explanation to this influence lies in their economic structures that are probably less complex and less diversified than those in big economies simultaneously more receptive to spillovers. When the sample (see regression model 6) is restricted to five economies in which presence of FDI influence on growth and exports was established, influence of lagged FDI on growth appears, and is negative. Although the restricted sample is too small to provide any conclusive results, a cautious conclusion may still be made. The indirect negative effects of FDI achieved through trade and competing with

local firms seems to overweight the positive direct effect on capital formation in those countries.

Furthermore, influence of FDI is strong in international trade of the observed economies, and mostly so in rising merchandise import levels. Evidence of FIEs' activity contributing to the goods exports is less present in the sample. That is why these results confirm the notion that FIEs are contributing to the widening of current account deficit widening in several of the observed economies. High shares non-export oriented FDI, mostly flown into the services sector, can account for that development. Those results also imply that FIEs were probably extensively using their home country suppliers' and/or parent company' services or goods. By doing so, apart from limiting cooperation with local firms, transfer-pricing manipulation as a mechanism of retrieving pre-taxed profits was more likely to occur. Positive spillovers in the form of productivity enhancement on the level of FIEs' activity, in downstream and upstream production were more likely to occur in larger economies, economic structure of which probably had more local competition and a wider choice of local suppliers and subcontractors. However, those effects are probably less significant on the level of the whole economy, with no consequences on the growth rate. Empirical literature suggests that productivity enhancements were narrowed to FIEs mostly. Likewise, technological upgrading of both FIEs and local suppliers and subcontractors might have only occurred in the economies that received the high shares of FDI in export-oriented international activities such as electronics or automobile production. In other dominant FDI shares such as retail trade or finance, competing with local firms was more pronounced. The available findings that confirm that FIEs in few of the observed economies were more successful than local firms imply that those host economies have already become two-tier economies.

a. Data sources

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Appendix 1.

Table 7: Results of Granger causality test

Hungary

FDI and merchandise exports (XG), hypothesis:	Lag	F-Statistic	Probability	Results
FDI does not Granger Cause XG	2	1.83551	0.17415	Accept
XG does not Granger Cause FDI		0.07980	0.92347	Accept
FDI does not Granger Cause XG	3	1.54176	0.22207	Accept
XG does not Granger Cause FDI		0.13084	0.94106	Accept
FDI does not Granger Cause XG	4	1.61139	0.19714	Accept
XG does not Granger Cause FDI		0.11275	0.97706	Accept
FDI does not Granger Cause XG	5	2.77562	0.03783	Reject
XG does not Granger Cause FDI		0.89161	0.50051	Accept
FDI does not Granger Cause XG	6	2.01868	0.10246	Accept
XG does not Granger Cause FDI		1.04152	0.42365	Accept
FDI does not Granger Cause XG	7	1.66925	0.17115	Accept
XG does not Granger Cause FDI		1.04754	0.42935	Accept
FDI does not Granger Cause XG	8	1.45404	0.24152	Accept
		0.60855	0.75928	Accept
XG does not Granger Cause FDI				
FDI and merchandise imports (MG), hypothesis:				
FDI does not Granger Cause MG	2	1.30011	0.28499	Accept
MG does not Granger Cause FDI		0.00296	0.99704	Accept
FDI does not Granger Cause MG	3	0.91305	0.44527	Accept
MG does not Granger Cause FDI		0.00340	0.99972	Accept
FDI does not Granger Cause MG	4	0.73469	0.57558	Accept
MG does not Granger Cause FDI		0.14566	0.96351	Accept
FDI does not Granger Cause MG	5	0.93529	0.47396	Accept
MG does not Granger Cause FDI		0.51404	0.76323	Accept
FDI does not Granger Cause MG	6	0.89171	0.51651	Accept
MG does not Granger Cause FDI		0.74764	0.61716	Accept
FDI does not Granger Cause MG	7	0.64991	0.71053	Accept
MG does not Granger Cause FDI		1.41955	0.24963	Accept
FDI does not Granger Cause MG	8	0.86081	0.56515	Accept
		1.38211	0.26912	Accept
MG does not Granger Cause FDI				
FDI and GDP, hypothesis:				
GDP does not Granger Cause FDI	2	2.05056	0.15486	Accept
FDI does not Granger Cause GDP		0.31244	0.73517	Accept
GDP does not Granger Cause FDI	3	1.97785	0.15558	Accept
FDI does not Granger Cause GDP		0.80709	0.50720	Accept
GDP does not Granger Cause FDI	4	0.52923	0.71630	Accept
FDI does not Granger Cause GDP		0.51915	0.72318	Accept
GDP does not Granger Cause FDI	5	0.61734	0.68971	Accept
FDI does not Granger Cause GDP		0.78048	0.58409	Accept
GDP does not Granger Cause FDI	6	0.56788	0.74672	Accept
FDI does not Granger Cause GDP		0.85090	0.56595	Accept
GDP does not Granger Cause FDI	7	0.31181	0.91974	Accept
FDI does not Granger Cause GDP		2.56852	0.15818	Accept
GDP does not Granger Cause FDI	8	1.70157	0.42209	Accept
FDI does not Granger Cause GDP		1.08618	0.56334	Accept

Bulgaria

FDI and merchandise exports (XG), hypothesis:	Lag	F-Statistic	Probability	Results
XG does not Granger Cause FDI	2	0.00263	0.99738	Accept
FDI does not Granger Cause XG		0.32278	0.72627	Accept
XG does not Granger Cause FDI	3	0.05239	0.98389	Accept
FDI does not Granger Cause XG		0.19980	0.89575	Accept
XG does not Granger Cause FDI	4	0.26215	0.89980	Accept
FDI does not Granger Cause XG		0.36050	0.83461	Accept
XG does not Granger Cause FDI	5	0.20223	0.95862	Accept
FDI does not Granger Cause XG		0.76640	0.58238	Accept
XG does not Granger Cause FDI	6	0.57067	0.74944	Accept
FDI does not Granger Cause XG		0.74850	0.61678	Accept
XG does not Granger Cause FDI	7	0.65959	0.70293	Accept
FDI does not Granger Cause XG		0.76147	0.62527	Accept
XG does not Granger Cause FDI	8	0.45145	0.87305	Accept
FDI does not Granger Cause XG		0.73934	0.65715	Accept
FDI and merchandise imports (MG), hypothesis:				
MG does not Granger Cause FDI	2	0.06364	0.93845	Accept
FDI does not Granger Cause MG		4.28295	0.02168	Reject
MG does not Granger Cause FDI	3	0.13628	0.93765	Accept
FDI does not Granger Cause MG		4.09562	0.01440	Reject

MG does not Granger Cause FDI	4	0.53649	0.71002	Accept
FDI does not Granger Cause MG		1.84870	0.14651	Accept
MG does not Granger Cause FDI	5	0.64641	0.66662	Accept
FDI does not Granger Cause MG		1.30475	0.29254	Accept
MG does not Granger Cause FDI	6	1.11660	0.38342	Accept
FDI does not Granger Cause MG		1.12047	0.38138	Accept
MG does not Granger Cause FDI	7	1.03502	0.43831	Accept
FDI does not Granger Cause MG		1.07137	0.41678	Accept
MG does not Granger Cause FDI	8	0.91625	0.52666	Accept
FDI does not Granger Cause MG		0.48748	0.84855	Accept
FDI and GDP, hypothesis:				
GDP does not Granger Cause FDI	27	0.25709	0.77559	Accept
FDI does not Granger Cause GDP		1.12896	0.34140	Accept
GDP does not Granger Cause FDI	26	0.30997	0.81791	Accept
FDI does not Granger Cause GDP		1.16730	0.34825	Accept
GDP does not Granger Cause FDI	25	1.63972	0.21298	Accept
FDI does not Granger Cause GDP		0.87397	0.50099	Accept
GDP does not Granger Cause FDI	24	1.96187	0.15194	Accept
FDI does not Granger Cause GDP		0.50952	0.76440	Accept
GDP does not Granger Cause FDI	23	1.81337	0.19346	Accept
FDI does not Granger Cause GDP		0.91407	0.52267	Accept
GDP does not Granger Cause FDI	22	1.01829	0.49077	Accept
FDI does not Granger Cause GDP		0.59713	0.74370	Accept
GDP does not Granger Cause FDI	21	1.49614	0.36821	Accept
FDI does not Granger Cause GDP		1.04507	0.51975	Accept

The Czech Republic

FDI and merchandise exports (XG), hypothesis:	Lag	F-Statistic	Probability	Results
XG does not Granger Cause FDI	2	2.57834	0.09380	Reject
FDI does not Granger Cause XG		1.48282	0.24428	Accept
XG does not Granger Cause FDI	3	1.54893	0.22658	Accept
FDI does not Granger Cause XG		0.96536	0.42454	Accept
XG does not Granger Cause FDI	4	1.14557	0.36138	Accept
FDI does not Granger Cause XG		0.76699	0.55810	Accept
XG does not Granger Cause FDI	5	0.84331	0.53580	Accept
FDI does not Granger Cause XG		1.54312	0.22382	Accept
XG does not Granger Cause FDI	6	0.80032	0.58372	Accept
FDI does not Granger Cause XG		1.40105	0.27382	Accept
XG does not Granger Cause FDI	7	0.73902	0.64432	Accept
FDI does not Granger Cause XG		1.13185	0.40118	Accept
XG does not Granger Cause FDI	8	0.91258	0.54268	Accept
FDI does not Granger Cause XG		1.40051	0.30313	Accept
FDI and merchandise imports (MG), hypothesis:				
MG does not Granger Cause FDI	2	0.78849	0.46436	Accept
FDI does not Granger Cause MG		3.14266	0.05871	Reject
MG does not Granger Cause FDI	3	0.84667	0.48141	Accept
FDI does not Granger Cause MG		1.93334	0.15002	Accept
MG does not Granger Cause FDI	4	0.79716	0.53982	Accept
FDI does not Granger Cause MG		1.40646	0.26469	Accept
MG does not Granger Cause FDI	5	0.55451	0.73322	Accept
FDI does not Granger Cause MG		2.11857	0.10748	Accept
MG does not Granger Cause FDI	6	0.68085	0.66754	Accept
FDI does not Granger Cause MG		1.80871	0.16070	Accept
MG does not Granger Cause FDI	7	0.62615	0.72667	Accept
FDI does not Granger Cause MG		1.67813	0.19937	Accept
MG does not Granger Cause FDI	8	0.76453	0.64118	Accept
FDI does not Granger Cause MG		2.03209	0.14546	Accept
FDI and GDP, hypothesis:				
FDI does not Granger Cause GDP	2	0.44720	0.64390	Accept
GDP does not Granger Cause FDI		0.57054	0.57166	Accept
FDI does not Granger Cause GDP	3	1.13421	0.35435	Accept
GDP does not Granger Cause FDI		2.50330	0.08235	Reject
FDI does not Granger Cause GDP	4	1.12703	0.36938	Accept
GDP does not Granger Cause FDI		1.46283	0.24735	Accept
FDI does not Granger Cause GDP	5	0.31158	0.89987	Accept
GDP does not Granger Cause FDI		1.32011	0.29768	Accept
FDI does not Granger Cause GDP	5	0.10241	0.99501	Accept
GDP does not Granger Cause FDI		1.09115	0.40888	Accept
FDI does not Granger Cause GDP	7	0.15031	0.99103	Accept
GDP does not Granger Cause FDI		1.73046	0.18655	Accept
FDI does not Granger Cause GDP	8	0.45048	0.86452	Accept
GDP does not Granger Cause FDI		1.86069	0.17653	Accept

Estonia

FDI and merchandise exports (XG), hypothesis:				
	Lag	F-Statistic	Probability	Results
XG does not Granger Cause FDI	2	3.30038	0.05018	Reject
FDI does not Granger Cause XG		10.3582	0.00036	Reject
XG does not Granger Cause FDI	3	4.42391	0.01147	Reject
FDI does not Granger Cause XG		7.61046	0.00071	Reject
XG does not Granger Cause FDI	4	2.90768	0.04192	Reject
FDI does not Granger Cause XG		5.80398	0.00191	Reject
XG does not Granger Cause FDI	5	3.56121	0.01646	Reject
FDI does not Granger Cause XG		4.65562	0.00475	Reject
XG does not Granger Cause FDI	6	2.61704	0.05074	Reject
FDI does not Granger Cause XG		3.65194	0.01397	Reject
XG does not Granger Cause FDI	7	2.28088	0.08154	Accept
FDI does not Granger Cause XG		2.11161	0.10223	Accept
XG does not Granger Cause FDI	8	2.37503	0.07996	Reject
FDI does not Granger Cause XG		2.46217	0.07188	Reject
FDI and merchandise imports (MG), hypothesis:				
MG does not Granger Cause FDI	2	4.12588	0.02578	Reject
FDI does not Granger Cause MG		7.67935	0.00195	Reject
MG does not Granger Cause FDI	3	5.00995	0.00662	Reject
FDI does not Granger Cause MG		4.85793	0.00762	Reject
MG does not Granger Cause FDI	4	3.43412	0.02279	Reject
FDI does not Granger Cause MG		4.97400	0.00434	Reject
MG does not Granger Cause FDI	5	4.20260	0.00784	Reject
FDI does not Granger Cause MG		3.09108	0.02912	Reject
MG does not Granger Cause FDI	6	3.16061	0.02535	Reject
FDI does not Granger Cause MG		2.02775	0.11177	Accept
MG does not Granger Cause FDI	7	3.01236	0.03210	Reject
FDI does not Granger Cause MG		1.36531	0.28495	Accept
MG does not Granger Cause FDI	8	2.72101	0.05276	Reject
FDI does not Granger Cause MG		2.08824	0.11453	Accept
FDI and GDP, hypothesis:				
GDP does not Granger Cause FDI	2	2.46947	0.10287	Accept
FDI does not Granger Cause GDP		0.22930	0.79657	Accept
GDP does not Granger Cause FDI	3	1.84209	0.16537	Accept
FDI does not Granger Cause GDP		0.83419	0.48777	Accept
GDP does not Granger Cause FDI	4	1.59817	0.21016	Accept
FDI does not Granger Cause GDP		0.23639	0.91478	Accept
GDP does not Granger Cause FDI	5	1.23587	0.33125	Accept
FDI does not Granger Cause GDP		0.05503	0.99775	Accept
GDP does not Granger Cause FDI	6	1.15851	0.37518	Accept
FDI does not Granger Cause GDP		0.29601	0.92996	Accept
GDP does not Granger Cause FDI	7	1.36385	0.29823	Accept
FDI does not Granger Cause GDP		0.36488	0.90698	Accept
GDP does not Granger Cause FDI	8	1.88629	0.17145	Accept
FDI does not Granger Cause GDP		0.93138	0.53097	Accept

Lithuania

FDI and merchandise exports (XG), hypothesis:				
	Lag	F-Statistic	Probability	Results
XG does not Granger Cause FDI	2	3.67471	0.03827	Reject
FDI does not Granger Cause XG		1.79159	0.18528	Accept
XG does not Granger Cause FDI	3	5.98441	0.00321	Reject
FDI does not Granger Cause XG		1.85839	0.16251	Accept
XG does not Granger Cause FDI	4	3.88121	0.01561	Reject
FDI does not Granger Cause XG		1.25992	0.31547	Accept
XG does not Granger Cause FDI	5	4.74977	0.00554	Reject
FDI does not Granger Cause XG		0.68618	0.63972	Accept
XG does not Granger Cause FDI	6	3.31267	0.02579	Reject
FDI does not Granger Cause XG		2.15210	0.10338	Accept
XG does not Granger Cause FDI	7	3.86845	0.01705	Reject
FDI does not Granger Cause XG		0.82744	0.58255	Accept
XG does not Granger Cause FDI	8	2.82620	0.06330	Reject
FDI does not Granger Cause XG		0.93418	0.52925	Accept
FDI and merchandise imports (MG), hypothesis:				
MG does not Granger Cause FDI	2	4.50955	0.02006	Reject
FDI does not Granger Cause MG		6.75706	0.00403	Reject
MG does not Granger Cause FDI	3	5.57807	0.00452	Reject
FDI does not Granger Cause MG		4.04373	0.01792	Reject
MG does not Granger Cause FDI	4	3.70494	0.01881	Reject
FDI does not Granger Cause MG		4.86440	0.00579	Reject
MG does not Granger Cause FDI	5	3.00401	0.03655	Reject
FDI does not Granger Cause MG		2.38837	0.07676	Reject
MG does not Granger Cause FDI	6	2.81737	0.04567	Reject
FDI does not Granger Cause MG		1.59142	0.21339	Accept
MG does not Granger Cause FDI	7	2.10612	0.11680	Accept
FDI does not Granger Cause MG		2.49747	0.07320	Reject
MG does not Granger Cause FDI	8	2.43334	0.09426	Reject

FDI does not Granger Cause MG		3.20205	0.04428	Reject
FDI and GDP, hypothesis:				
GDP does not Granger Cause FDI	2	3.09845	0.06087	Reject
FDI does not Granger Cause GDP		2.32224	0.11665	Accept
GDP does not Granger Cause FDI	3	3.25804	0.03830	Reject
FDI does not Granger Cause GDP		2.68211	0.06848	Reject
GDP does not Granger Cause FDI	4	1.87924	0.14990	Accept
FDI does not Granger Cause GDP		4.40291	0.00914	Reject
GDP does not Granger Cause FDI	5	1.93467	0.13564	Accept
FDI does not Granger Cause GDP		2.62622	0.05736	Reject
GDP does not Granger Cause FDI	6	1.45150	0.25632	Accept
FDI does not Granger Cause GDP		1.75108	0.17321	Accept
GDP does not Granger Cause FDI	7	1.27555	0.33403	Accept
FDI does not Granger Cause GDP		1.57877	0.22632	Accept
GDP does not Granger Cause FDI	8	0.92380	0.53567	Accept
FDI does not Granger Cause GDP		1.06010	0.45625	Accept

Latvia

FDI and merchandise exports (XG), hypothesis:	Lag	F-Statistic	Probability	Results
XG does not Granger Cause FDI	2	2.03869	0.14908	Accept
FDI does not Granger Cause XG		6.18497	0.00596	Reject
XG does not Granger Cause FDI	3	1.01263	0.40367	Accept
FDI does not Granger Cause XG		3.17690	0.04151	Reject
XG does not Granger Cause FDI	4	1.55224	0.22211	Accept
FDI does not Granger Cause XG		2.22578	0.09924	Reject
XG does not Granger Cause FDI	5	1.24208	0.32866	Accept
FDI does not Granger Cause XG		1.54320	0.22380	Accept
XG does not Granger Cause FDI	6	1.06243	0.42404	Accept
FDI does not Granger Cause XG		0.89318	0.52288	Accept
XG does not Granger Cause FDI	7	0.93414	0.51299	Accept
FDI does not Granger Cause XG		2.61310	0.06404	Reject
XG does not Granger Cause FDI	8	1.74901	0.20077	Accept
FDI does not Granger Cause XG		2.30739	0.10769	Accept
FDI and merchandise imports (MG), hypothesis:				
MG does not Granger Cause FDI	2	1.84341	0.17697	Accept
FDI does not Granger Cause MG		1.55607	0.22866	Accept
MG does not Granger Cause FDI	3	1.19249	0.33281	Accept
FDI does not Granger Cause MG		1.53312	0.23047	Accept
MG does not Granger Cause FDI	4	2.55487	0.06753	Reject
FDI does not Granger Cause MG		2.63908	0.06127	Reject
MG does not Granger Cause FDI	5	1.77001	0.16734	Accept
FDI does not Granger Cause MG		0.99315	0.44802	Accept
MG does not Granger Cause FDI	6	1.51658	0.23537	Accept
FDI does not Granger Cause MG		2.61477	0.05823	Reject
MG does not Granger Cause FDI	7	1.09604	0.41974	Accept
FDI does not Granger Cause MG		2.15847	0.10958	Accept
MG does not Granger Cause FDI	8	0.76137	0.64338	Accept
FDI does not Granger Cause MG		1.93869	0.16155	Accept
FDI and GDP, hypothesis:				
GDP does not Granger Cause FDI	2	1.81872	0.18088	Accept
FDI does not Granger Cause GDP		1.35823	0.27354	Accept
GDP does not Granger Cause FDI	3	0.52221	0.67095	Accept
FDI does not Granger Cause GDP		0.92844	0.44154	Accept
GDP does not Granger Cause FDI	4	2.47625	0.07398	Reject
FDI does not Granger Cause GDP		0.98845	0.43439	Accept
GDP does not Granger Cause FDI	5	1.96656	0.13025	Accept
FDI does not Granger Cause GDP		1.15866	0.36507	Accept
GDP does not Granger Cause FDI	6	2.47408	0.06914	Reject
FDI does not Granger Cause GDP		0.82143	0.56951	Accept
GDP does not Granger Cause FDI	7	2.69830	0.05811	Reject
FDI does not Granger Cause GDP		0.96547	0.49376	Accept
GDP does not Granger Cause FDI	8	5.30191	0.00845	Reject
FDI does not Granger Cause GDP		0.77753	0.63212	Accept

Poland

FDI and total exports (EX), hypothesis:	Lag	F-Statistic	Probability	Results
EX does not Granger Cause FDI	2	5.16106	0.01054	Reject
FDI does not Granger Cause EX		2.06205	0.14156	Accept
EX does not Granger Cause FDI	3	3.35523	0.03007	Reject
FDI does not Granger Cause EX		1.28093	0.29656	Accept
EX does not Granger Cause FDI	4	1.69838	0.17552	Accept
FDI does not Granger Cause EX		0.74244	0.57040	Accept
EX does not Granger Cause FDI	5	1.57062	0.20076	Accept
FDI does not Granger Cause EX		1.36768	0.26627	Accept
EX does not Granger Cause FDI	6	0.92055	0.49692	Accept
FDI does not Granger Cause EX		1.68225	0.16689	Accept
EX does not Granger Cause FDI	7	0.73400	0.64568	Accept
FDI does not Granger Cause EX		1.48983	0.22226	Accept
EX does not Granger Cause FDI	8	0.78049	0.62500	Accept

FDI does not Granger Cause EX		1.15048	0.37658	Accept
FDI and total imports (IM), hypothesis:				
IM does not Granger Cause FDI	2	6.96359	0.00271	Reject
FDI does not Granger Cause IM		0.83316	0.44266	Accept
IM does not Granger Cause FDI	3	3.83526	0.01814	Reject
FDI does not Granger Cause IM		0.96377	0.42104	Accept
IM does not Granger Cause FDI	4	2.43688	0.06798	Reject
FDI does not Granger Cause IM		1.03509	0.40488	Accept
IM does not Granger Cause FDI	5	1.37847	0.26233	Accept
FDI does not Granger Cause IM		1.15421	0.35594	Accept
IM does not Granger Cause FDI	6	0.79649	0.58161	Accept
FDI does not Granger Cause IM		1.09873	0.39061	Accept
IM does not Granger Cause FDI	7	0.64015	0.71824	Accept
FDI does not Granger Cause IM		1.30053	0.29601	Accept
IM does not Granger Cause FDI	8	0.56393	0.79411	Accept
FDI does not Granger Cause IM		1.13029	0.38788	Accept
FDI and GDP, hypothesis:				
GDP does not Granger Cause FDI	2	1.24616	0.30802	Accept
FDI does not Granger Cause GDP		0.53893	0.59123	Accept
GDP does not Granger Cause FDI	3	0.91649	0.45272	Accept
FDI does not Granger Cause GDP		0.34524	0.79297	Accept
GDP does not Granger Cause FDI	4	1.20177	0.35060	Accept
FDI does not Granger Cause GDP		1.97146	0.15078	Accept
GDP does not Granger Cause FDI	5	0.37497	0.85633	Accept
FDI does not Granger Cause GDP		1.79660	0.18805	Accept

Romania

FDI and merchandise exports (XG), hypothesis:				
	Lag	F-Statistic	Probability	Results
FDI does not Granger Cause XG	2	1.76134	0.18759	Accept
XG does not Granger Cause FDI		2.62098	0.08781	Reject
FDI does not Granger Cause XG	3	1.96596	0.14035	Accept
XG does not Granger Cause FDI		1.48559	0.23839	Accept
FDI does not Granger Cause XG	4	1.37945	0.26734	Accept
XG does not Granger Cause FDI		0.81778	0.52512	Accept
FDI does not Granger Cause XG	5	1.93872	0.12499	Accept
XG does not Granger Cause FDI		1.39714	0.26076	Accept
FDI does not Granger Cause XG	6	1.43812	0.24723	Accept
XG does not Granger Cause FDI		1.11492	0.38710	Accept
FDI does not Granger Cause XG	7	1.29942	0.30585	Accept
XG does not Granger Cause FDI		0.99248	0.46741	Accept
FDI does not Granger Cause XG	8	1.11451	0.40685	Accept
XG does not Granger Cause FDI		1.02874	0.45685	Accept
FDI and merchandise imports (MG), hypothesis:				
MG does not Granger Cause FDI	2	4.51322	0.01851	Reject
FDI does not Granger Cause MG		3.53608	0.04060	Reject
MG does not Granger Cause FDI	3	3.76341	0.02095	Reject
FDI does not Granger Cause MG		2.39895	0.08752	Reject
MG does not Granger Cause FDI	4	3.16774	0.02946	Reject
FDI does not Granger Cause MG		1.48098	0.23560	Accept
MG does not Granger Cause FDI	5	2.24031	0.08307	Reject
FDI does not Granger Cause MG		1.30565	0.29474	Accept
MG does not Granger Cause FDI	6	1.61867	0.19136	Accept
FDI does not Granger Cause MG		0.99695	0.45298	Accept
MG does not Granger Cause FDI	7	1.17041	0.36671	Accept
FDI does not Granger Cause MG		0.91022	0.52057	Accept
MG does not Granger Cause FDI	8	1.97599	0.12164	Accept
FDI does not Granger Cause MG		1.01749	0.46376	Accept

The Slovak Republic

FDI and merchandise exports (XG), hypothesis:				
	Lag	F-Statistic	Probability	Results
XG does not Granger Cause FDI	2	2.02288	0.15336	Accept
FDI does not Granger Cause XG		0.19618	0.82311	Accept
XG does not Granger Cause FDI	3	0.90777	0.45326	Accept
FDI does not Granger Cause XG		0.25560	0.85651	Accept
XG does not Granger Cause FDI	4	0.58716	0.67587	Accept
FDI does not Granger Cause XG		0.28332	0.88513	Accept
XG does not Granger Cause FDI	5	1.06976	0.41317	Accept
FDI does not Granger Cause XG		0.31690	0.89555	Accept
XG does not Granger Cause FDI	6	0.93223	0.50415	Accept
FDI does not Granger Cause XG		0.42327	0.85069	Accept
XG does not Granger Cause FDI	7	1.30852	0.33778	Accept
FDI does not Granger Cause XG		1.68351	0.21940	Accept
XG does not Granger Cause FDI	8	1.12568	0.44446	Accept
FDI does not Granger Cause GX		1.91711	0.20312	Accept
FDI and merchandise imports (MG), hypothesis:				
FDI does not Granger Cause MG	2	1.42380	0.25966	Accept
MG does not Granger Cause FDI		1.74558	0.19515	Accept
FDI does not Granger Cause MG	3	2.13126	0.12522	Accept
MG does not Granger Cause FDI		0.90456	0.45479	Accept

FDI does not Granger Cause MG	4	0.89028	0.48875	Accept
MG does not Granger Cause FDI		0.61792	0.65512	Accept
FDI does not Granger Cause MG	5	0.82905	0.54747	Accept
MG does not Granger Cause FDI		0.43490	0.81771	Accept
FDI does not Granger Cause MG	6	1.80987	0.17397	Accept
MG does not Granger Cause FDI		0.50532	0.79385	Accept
FDI does not Granger Cause MG	7	1.68283	0.21957	Accept
MG does not Granger Cause FDI		1.65282	0.22716	Accept
FDI does not Granger Cause MG	8	2.44239	0.12823	Accept
MG does not Granger Cause FDI		2.14235	0.16576	Accept
FDI and GDP, hypothesis:				
GDP does not Granger Cause FDI	2	0.84324	0.44219	Accept
FDI does not Granger Cause GDP		2.18117	0.13393	Accept
GDP does not Granger Cause FDI	3	0.40237	0.75270	Accept
FDI does not Granger Cause GDP		1.24503	0.31743	Accept
GDP does not Granger Cause FDI	4	0.39354	0.81069	Accept
FDI does not Granger Cause GDP		1.24260	0.32658	Accept
GDP does not Granger Cause FDI	5	0.34551	0.87765	Accept
FDI does not Granger Cause GDP		2.91863	0.04649	Reject
GDP does not Granger Cause FDI	6	1.02443	0.45199	Accept
FDI does not Granger Cause GDP		2.71091	0.06218	Reject
GDP does not Granger Cause FDI	7	0.81669	0.59428	Accept
FDI does not Granger Cause GDP		2.54321	0.08780	Reject
GDP does not Granger Cause FDI	8	1.06048	0.47567	Accept
FDI does not Granger Cause GDP		1.94588	0.19781	Accept

Slovenia

FDI and merchandise exports (XG), hypothesis:				
	Lag	F-Statistic	Probability	Results
XG does not Granger Cause FDI	2	1.04899	0.36240	Accept
FDI does not Granger Cause XG		3.99627	0.02857	Reject
XG does not Granger Cause FDI	3	1.43184	0.25445	Accept
FDI does not Granger Cause XG		4.42395	0.01147	Reject
XG does not Granger Cause FDI	4	0.72253	0.58474	Accept
FDI does not Granger Cause XG		2.68667	0.05448	Reject
XG does not Granger Cause FDI	5	0.44662	0.81108	Accept
FDI does not Granger Cause XG		2.25943	0.08413	Reject
XG does not Granger Cause FDI	6	0.56366	0.75389	Accept
FDI does not Granger Cause XG		1.90514	0.13224	Accept
XG does not Granger Cause FDI	7	0.80458	0.59560	Accept
FDI does not Granger Cause XG		1.59069	0.20864	Accept
XG does not Granger Cause FDI	8	0.49564	0.83868	Accept
FDI does not Granger Cause XG		0.95061	0.51059	Accept
FDI and merchandise imports (MG), hypothesis:				
MG does not Granger Cause FDI	2	2.55058	0.09430	Reject
FDI does not Granger Cause MG		4.72243	0.01621	Reject
MG does not Granger Cause FDI	3	1.83716	0.16334	Accept
FDI does not Granger Cause MG		4.31159	0.01277	Reject
MG does not Granger Cause FDI	4	1.13441	0.36306	Accept
FDI does not Granger Cause MG		3.93067	0.01308	Reject
MG does not Granger Cause FDI	5	1.24586	0.32191	Accept
FDI does not Granger Cause MG		2.73322	0.04562	Reject
MG does not Granger Cause FDI	6	1.58977	0.20437	Accept
FDI does not Granger Cause MG		2.20761	0.08752	Reject
MG does not Granger Cause FDI	7	1.98702	0.12099	Accept
FDI does not Granger Cause MG		3.00779	0.03228	Reject
MG does not Granger Cause FDI	8	1.75627	0.17621	Accept
FDI does not Granger Cause MG		1.97213	0.13294	Accept
FDI and GDP, hypothesis:				
GDP does not Granger Cause FDI	2	4.04214	0.02755	Reject
FDI does not Granger Cause GDP		1.99519	0.15307	Accept
GDP does not Granger Cause FDI	3	2.60377	0.07163	Reject
FDI does not Granger Cause GDP		2.62596	0.06997	Reject
GDP does not Granger Cause FDI	4	2.13271	0.10651	Accept
FDI does not Granger Cause GDP		2.98694	0.03820	Reject
GDP does not Granger Cause FDI	5	2.12552	0.10032	Accept
FDI does not Granger Cause GDP		2.45571	0.06514	Reject
GDP does not Granger Cause FDI	6	2.23365	0.08450	Reject
FDI does not Granger Cause GDP		1.93959	0.12612	Accept
GDP does not Granger Cause FDI	7	1.78062	0.16049	Accept
FDI does not Granger Cause GDP		2.00137	0.11866	Accept
GDP does not Granger Cause FDI	8	1.84703	0.15641	Accept
FDI does not Granger Cause GDP		1.72754	0.18302	Accept

Croatia

FDI and merchandise exports (XG), hypothesis:				
	Lag	F-Statistic	Probability	Results
XG does not Granger Cause FDI	2	2.04843	0.14411	Accept
FDI does not Granger Cause XG		0.20237	0.81774	Accept
XG does not Granger Cause FDI	3	1.47276	0.24048	Accept

FDI does not Granger Cause XG		0.05282	0.98370	Accept
XG does not Granger Cause FDI	4	1.42474	0.25078	Accept
FDI does not Granger Cause XG		0.04474	0.99600	Accept
XG does not Granger Cause FDI	5	1.06691	0.40119	Accept
FDI does not Granger Cause XG		0.40339	0.84197	Accept
XG does not Granger Cause FDI	6	0.97901	0.46168	Accept
FDI does not Granger Cause XG		0.54063	0.77187	Accept
XG does not Granger Cause FDI	7	0.66771	0.69669	Accept
FDI does not Granger Cause XG		0.39832	0.89212	Accept
XG does not Granger Cause FDI	8	0.73596	0.65976	Accept
FDI does not Granger Cause XG		0.37415	0.92004	Accept
FDI and merchandise imports (MG), hypothesis:				
MG does not Granger Cause FDI	2	4.78705	0.01453	Reject
FDI does not Granger Cause MG		0.59106	0.55917	Accept
MG does not Granger Cause FDI	3	3.14610	0.03850	Reject
FDI does not Granger Cause MG		0.38528	0.76432	Accept
MG does not Granger Cause FDI	4	2.76578	0.04616	Reject
FDI does not Granger Cause MG		0.16658	0.95364	Accept
MG does not Granger Cause FDI	5	2.01258	0.11013	Accept
FDI does not Granger Cause MG		0.64417	0.66823	Accept
MG does not Granger Cause FDI	6	1.36083	0.27186	Accept
FDI does not Granger Cause MG		0.75420	0.61265	Accept
MG does not Granger Cause FDI	7	1.23138	0.33202	Accept
FDI does not Granger Cause MG		0.73628	0.64425	Accept
MG does not Granger Cause FDI	8	2.49037	0.05418	Reject
FDI does not Granger Cause MG		0.62700	0.74447	Accept
FDI and GDP, hypothesis:				
GDP does not Granger Cause FDI	2	1.55316	0.22760	Accept
FDI does not Granger Cause GDP		0.09793	0.90699	Accept
GDP does not Granger Cause FDI	3	1.19758	0.32875	Accept
FDI does not Granger Cause GDP		0.11482	0.95069	Accept
GDP does not Granger Cause FDI	4	1.45612	0.24527	Accept
FDI does not Granger Cause GDP		0.13876	0.96629	Accept
GDP does not Granger Cause FDI	5	0.98862	0.44709	Accept
FDI does not Granger Cause GDP		0.85682	0.52513	Accept
GDP does not Granger Cause FDI	6	0.97481	0.46865	Accept
FDI does not Granger Cause GDP		0.92631	0.49839	Accept
GDP does not Granger Cause FDI	7	0.73455	0.64645	Accept
FDI does not Granger Cause GDP		0.61378	0.73699	Accept
GDP does not Granger Cause FDI	8	0.74350	0.65473	Accept
FDI does not Granger Cause GDP		0.47268	0.85454	Accept

Table 8: Cross correlation coefficients for established Granger causality

	Lag	Correlation coefficient
Hungary		
FDI Granger causes merchandise exports	5	0.13
Bulgaria		
FDI Granger causes merchandise imports	2	0.43
FDI Granger causes merchandise imports	3	0.50
The Czech Republic		
Merchandise exports Granger causes FDI	2	0.67
FDI Granger causes merchandise imports	2	0.57
GDP Granger causes FDI	3	0.45
Estonia		
Merchandise exports Granger causes FDI	2	0.63
FDI Granger causes merchandise exports	2	0.48
Merchandise exports Granger causes FDI	3	0.63
FDI Granger causes merchandise exports	3	0.44
Merchandise exports Granger causes FDI	4	0.57
FDI Granger causes merchandise exports	4	0.40
Merchandise exports Granger causes FDI	5	0.50
FDI Granger causes merchandise exports	5	0.46
Merchandise exports Granger causes FDI	6	0.47
FDI Granger causes merchandise exports	6	0.50
Merchandise exports Granger causes FDI	7	0.47
Merchandise exports Granger causes FDI	8	0.46
FDI Granger causes merchandise exports	8	0.61
Merchandise imports Granger causes FDI		
Merchandise imports Granger causes FDI	2	0.59
FDI Granger causes merchandise imports	2	0.42
Merchandise imports Granger causes FDI	3	0.63
FDI Granger causes merchandise imports	3	0.41

	Lag	Correlation coefficient
Merchandise imports Granger causes FDI	4	0.56
FDI Granger causes merchandise imports	4	0.40
Merchandise imports Granger causes FDI	5	0.51
FDI Granger causes merchandise imports	5	0.43
Merchandise imports Granger causes FDI	6	0.45
Merchandise imports Granger causes FDI	7	0.47
Merchandise imports Granger causes FDI	8	0.47
Lithuania		
GDP Granger causes FDI	2	0.51
GDP Granger causes FDI	3	0.58
FDI Granger causes GDP	3	0.49
GDP Granger causes FDI	4	0.52
GDP Granger causes FDI	5	0.48
Merchandise exports Granger causes FDI	2	0.55
Merchandise exports Granger causes FDI	3	0.67
Merchandise exports Granger causes FDI	4	0.60
Merchandise exports Granger causes FDI	5	0.57
Merchandise exports Granger causes FDI	6	0.64
Merchandise exports Granger causes FDI	7	0.47
Merchandise exports Granger causes FDI	8	0.40
Merchandise imports Granger causes FDI	2	0.57
FDI Granger causes merchandise imports	2	0.31
Merchandise imports Granger causes FDI	3	0.67
FDI Granger causes merchandise imports	3	0.35
Merchandise imports Granger causes FDI	4	0.55
FDI Granger causes merchandise imports	4	0.30
Merchandise imports Granger causes FDI	5	0.54
FDI Granger causes merchandise imports	5	0.33
Merchandise imports Granger causes FDI	6	0.50
FDI Granger causes merchandise imports	6	0.24
FDI Granger causes merchandise imports	7	0.26
Merchandise imports Granger causes FDI	8	0.36
FDI Granger causes merchandise imports	8	0.24
Latvia		
FDI Granger causes merchandise exports	2	0.64
FDI Granger causes merchandise exports	3	0.67
FDI Granger causes merchandise exports	4	0.64
FDI Granger causes merchandise exports	7	0.26
GDP Granger causes FDI	4	0.40
GDP Granger causes FDI	6	0.31
GDP Granger causes FDI	7	0.24
GDP Granger causes FDI	8	0.33
Merchandise imports Granger causes FDI	4	0.43
FDI Granger causes merchandise imports	4	0.68
Poland		
Merchandise exports Granger causes FDI	2	0.70
Merchandise exports Granger causes FDI	3	0.74
Merchandise imports Granger causes FDI	2	0.73
Merchandise imports Granger causes FDI	3	0.74
Merchandise imports Granger causes FDI	4	0.79
Romania		
Merchandise exports Granger causes FDI	2	0.50
Merchandise imports Granger causes FDI	2	0.57
FDI Granger causes merchandise imports	2	0.36
Merchandise imports Granger causes FDI	3	0.38
FDI Granger causes merchandise imports	3	0.31
Merchandise imports Granger causes FDI	4	0.58
Merchandise imports Granger causes FDI	5	0.47
The Slovak Republic		
FDI Granger causes GDP	5	-0.0796
FDI Granger causes GDP	6	0.08
FDI Granger causes GDP	7	0.22
Slovenia		
GDP Granger causes FDI	2	0.25
GDP Granger causes FDI	3	0.24

	Lag	Correlation coefficient
FDI Granger causes GDP	3	0.27
FDI Granger causes GDP	4	0.18
FDI Granger causes GDP	5	0.22
FDI Granger causes GDP	6	0.27
FDI Granger causes merchandise exports	2	0.36
FDI Granger causes merchandise exports	3	0.24
FDI Granger causes merchandise exports	4	0.13
FDI Granger causes merchandise exports	5	0.29
Merchandise imports Granger causes FDI	2	0.22
FDI Granger causes merchandise imports	2	0.36
FDI Granger causes merchandise imports	3	0.24
FDI Granger causes merchandise imports	4	0.13
FDI Granger causes merchandise imports	5	0.29
FDI Granger causes merchandise imports	6	0.36
FDI Granger causes merchandise imports	7	0.10
Croatia		
Merchandise imports Granger causes FDI	2	0.52
Merchandise imports Granger causes FDI	3	0.31
Merchandise imports Granger causes FDI	4	0.48
Merchandise imports Granger causes FDI	8	0.03

Appendix 2.

Table 9: Basic model results				
Dependent Variable: (?RGDP)				
Method: GLS (Cross Section Weights)				
Date: 02/01/04 Time: 20:48				
Sample: 1994 2002				
Included observations: 9				
Number of cross-sections used: 11				
Total panel (unbalanced) observations: 87				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.801029	0.566724	3.177963	0.0021
(?PCGDP)	6.61E-05	7.75E-05	0.852766	0.3963
(?RINV)	0.161909	0.018329	8.833285	0.0000
(?REMP)	0.248286	0.094035	2.640358	0.0099
(?FDI(-1))	0.000100	8.19E-05	1.224506	0.2243
Weighted Statistics				
R-squared	0.720596	Mean dependent var	4.761940	
Adjusted R-squared	0.706966	S.D. dependent var	4.510357	
S.E. of regression	2.441572	Sum squared resid	488.8244	
F-statistic	52.87045	Durbin-Watson stat	1.838022	
Prob(F-statistic)	0.000000			
Unweighted Statistics				
R-squared	0.415783	Mean dependent var	3.150575	
Adjusted R-squared	0.387285	S.D. dependent var	3.358948	
S.E. of regression	2.629254	Sum squared resid	566.8641	
Durbin-Watson stat	1.664576			

Table 10.: Model 1 results					
Dependent Variable: (?RGDP)					
Method: GLS (Cross Section Weights)					
Date: 02/01/04 Time: 20:52					
Sample: 1994 2002					
Included observations: 9					
Number of cross-sections used: 11					
Total panel (unbalanced) observations: 87					
Variable	Coefficient	Std. Error	t-Statistic	Prob.	
C	0.896176	0.851752	1.052156	0.2959	
(?PCGDP)	8.50E-05	7.81E-05	1.088441	0.2796	
(?RINV)	0.161356	0.018047	8.940868	0.0000	
(?REMP)	0.254493	0.091843	2.770969	0.0069	
(?FDI(-1))	0.000112	8.09E-05	1.381857	0.1708	
REU-15	0.338356	0.226251	1.495486	0.1387	
Weighted Statistics					
R-squared	0.740226	Mean dependent va	4.863857		
Adjusted R-squared	0.724191	S.D. dependent var	4.647127		
S.E. of regression	2.440557	Sum squared resid	482.4618		
F-statistic	46.16195	Durbin-Watson stat	1.765626		
Prob(F-statistic)	0.000000				
Unweighted Statistics					
R-squared	0.421593	Mean dependent va	3.150575		
Adjusted R-squared	0.385889	S.D. dependent var	3.358948		
S.E. of regression	2.632247	Sum squared resid	561.2267		
Durbin-Watson stat	1.627804				

Table 11: Model 2 results				
Dependent Variable: (?RGDP)				
Method: GLS (Cross Section Weights)				
Date: 02/01/04 Time: 20:53				
Sample: 1994 2002				
Included observations: 9				
Number of cross-sections used: 11				
Total panel (unbalanced) observations: 87				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.798447	0.559154	3.216371	0.0019
(?PCGDP)	6.71E-05	7.75E-05	0.866682	0.3886
(?RINV)	0.159613	0.018116	8.810409	0.0000
(?REMP)	0.249759	0.093372	2.674867	0.0090
(?FDI)	0.000106	7.71E-05	1.372006	0.1738
Weighted Statistics				
R-squared	0.725106	Mean dependent var	4.789201	
Adjusted R-squared	0.711697	S.D. dependent var	4.529781	
S.E. of regression	2.432214	Sum squared resid	485.0845	
F-statistic	54.07433	Durbin-Watson stat	1.802138	
Prob(F-statistic)	0.000000			
Unweighted Statistics				
R-squared	0.413186	Mean dependent var	3.150575	
Adjusted R-squared	0.384561	S.D. dependent var	3.358948	
S.E. of regression	2.635092	Sum squared resid	569.3842	
Durbin-Watson stat	1.647180			

Table 12.: Model 3 results				
Method: GLS (Cross Section Weights)				
Date: 02/01/04 Time: 20:53				
Sample: 1994 2002				
Included observations: 9				
Number of cross-sections used: 11				
Total panel (unbalanced) observations: 87				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.930587	0.814002	1.143224	0.2563
(?PCGDP)	8.71E-05	7.79E-05	1.118404	0.2667
(?RINV)	0.158651	0.017935	8.845814	0.0000
(?REMP)	0.256959	0.091556	2.806578	0.0063
(?FDI)	0.000113	7.71E-05	1.461511	0.1477
REU-15	0.323417	0.222383	1.454324	0.1497
Weighted Statistics				
R-squared	0.741812	Mean dependent var	4.879230	
Adjusted R-squared	0.725875	S.D. dependent var	4.643840	
S.E. of regression	2.431374	Sum squared resid	478.8381	
F-statistic	46.54502	Durbin-Watson stat	1.724521	
Prob(F-statistic)	0.000000			
Unweighted Statistics				
R-squared	0.418405	Mean dependent var	3.150575	
Adjusted R-squared	0.382504	S.D. dependent var	3.358948	
S.E. of regression	2.639492	Sum squared resid	564.3205	
Durbin-Watson stat	1.612056			

Table 13: Model 4 results				
Dependent Variable: (?RGDP)				
Method: GLS (Cross Section Weights)				
Date: 02/01/04 Time: 20:54				
Sample: 1994 2002				
Included observations: 9				
Number of cross-sections used: 11				
Total panel (unbalanced) observations: 87				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.787608	0.535064	3.340922	0.0013
(?PCGDP)	-3.58E-06	7.12E-05	-0.050335	0.9600
(?RINV)	0.135128	0.018762	7.202323	0.0000
(?REMP)	0.210516	0.091591	2.298428	0.0241
(?FDI(-1))	3.02E-05	7.62E-05	0.396218	0.6930
(?RGDP(-1))	0.221257	0.067679	3.269226	0.0016
Weighted Statistics				
R-squared	0.775338	Mean dependent var	5.123191	
Adjusted R-squared	0.761470	S.D. dependent var	4.893138	
S.E. of regression	2.389785	Sum squared resid	462.5968	
F-statistic	55.90840	Durbin-Watson stat	2.178790	
Prob(F-statistic)	0.000000			
Unweighted Statistics				
R-squared	0.460616	Mean dependent var	3.150575	
Adjusted R-squared	0.427321	S.D. dependent var	3.358948	
S.E. of regression	2.541903	Sum squared resid	523.3628	
Durbin-Watson stat	2.064781			

Table 14: Model 5 results				
Dependent Variable: (?RGDP)				
Method: GLS (Cross Section Weights)				
Date: 02/01/04 Time: 20:55				
Sample: 1994 2002				
Included observations: 9				
Number of cross-sections used: 11				
Total panel (unbalanced) observations: 87				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.708706	0.786609	0.900963	0.3703
(?PCGDP)	2.25E-05	7.29E-05	0.308771	0.7583
(?RINV)	0.134677	0.018519	7.272241	0.0000
(?REMP)	0.216679	0.090155	2.403411	0.0186
(?FDI)	3.73E-05	0.000119	0.312531	0.7555
(?FDI(-1))	1.19E-05	0.000126	0.094306	0.9251
REU-15	0.373665	0.207127	1.804036	0.0750
(?RGDP(-1))	0.224340	0.067156	3.340586	0.0013
Weighted Statistics				
R-squared	0.791387	Mean dependent var	5.194385	
Adjusted R-squared	0.772902	S.D. dependent var	5.002404	
S.E. of regression	2.383886	Sum squared resid	448.9502	
F-statistic	42.81299	Durbin-Watson stat	2.070011	
Prob(F-statistic)	0.000000			
Unweighted Statistics				
R-squared	0.473609	Mean dependent var	3.150575	
Adjusted R-squared	0.426967	S.D. dependent var	3.358948	
S.E. of regression	2.542689	Sum squared resid	510.7560	
Durbin-Watson stat	2.029312			

Table 15: Model 6 results				
Dependent Variable: (?RGDP)				
Method: GLS (Cross Section Weights)				
Date: 02/01/04 Time: 20:56				
Sample: 1994 2002				
Included observations: 9				
Number of cross-sections used: 5				
Total panel (unbalanced) observations: 38				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	3.312630	1.441939	2.297344	0.0288
(?PCGDP)	-0.000130	9.61E-05	-1.353335	0.1861
(?RINV)	0.090600	0.027469	3.298239	0.0025
(?REMP)	0.263817	0.164289	1.605814	0.1188
(?FDI)	-4.40E-05	0.000222	-0.197942	0.8444
(?FDI(-1))	-0.000369	0.000234	-1.576303	0.1254
REU-15	0.325410	0.263148	1.236603	0.2258
(?RGDP(-1))	0.101887	0.120187	0.847737	0.4033
Weighted Statistics				
R-squared	0.803789	Mean dependent var	5.881190	
Adjusted R-squared	0.758006	S.D. dependent var	3.764259	
S.E. of regression	1.851748	Sum squared resid	102.8691	
Log likelihood	-60.17333	F-statistic	17.55662	
Durbin-Watson stat	2.445368	Prob(F-statistic)	0.000000	
Unweighted Statistics				
R-squared	0.346919	Mean dependent var	3.886842	
Adjusted R-squared	0.194534	S.D. dependent var	2.506982	
S.E. of regression	2.249960	Sum squared resid	151.8697	
Durbin-Watson stat	2.520946			