THE IMPACT OF INWARD FDI STOCK ON GDP GROWTH: AN EMPIRICAL EVIDENCE FROM CENTRAL AND EASTERN EUROPE

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ABSTRACT

This article analyses the post communist era in the Central and Eastern Europe (CEE) and tests the hypothesis that the foreign direct investment (FDI) contributes to the economic growth of the CEE countries. The first part of this research reflects macroeconomic changes in the post communist CEE and examines GDP per capita and economic growth rate. The second section discusses an inward FDI flow and inward FDI stock as a percentage of GDP and the third section estimates the impact of the FDI stock on economic growth in the CEE using regression growth model based on the production function. This study found a positive association between FDI and economic growth in the CEE and proved tremendous impact of FDI stock on GDP growth.

Keywords: Foreign Direct Investment, Economic Growth, Central and Eastern Europe

Introduction

The FDI inflows in the CEE economies has been a vital factor in the first stage of the privatization process during the transition period. As the privatization and restructuring process has come to an end, the main reasons to pursue FDI are to boost productivity, encourage employment, stimulate innovation and technology transfer, and to enhance sustained economic growth (Mueller & Goic, 2002). The CEE countries have identified the positive effects of FDI on the transformation process of the economy. FDI has increased in the past twenty years, to become the most common type of capital flow needed for the reconstruction and stabilization of the CEE economies.

This paper reviewed the experiences of CEE countries integrating into the global market and analyzed the basic economic growth trends, and the link between FDI stock and economic

growth. The following countries were examined in this article: Poland, the Czech Republic, Hungary, Slovakia and Slovenia. All these countries became members of the European Union (EU) on May 1, 2004 (www.eurunion.org). The EU membership has shaped major aspects of economic policies and legislation in CEE (Sohinger, 2005).

The largest economy among the analyzed countries is Poland, with the population of 38.601 million. This compares to 10.244 million in the Czech Republic, 10.063 million in Hungary, 5.392 million in Slovakia, and 2.004 million in Slovenia (UNCTAD *Handbook of Statistics*).

The research utilized 1960-2006 archival data from the following sources: United Nations Conference on Trade and Development (UNCAD), United Nations Economic Commission for Europe (UNECE), World Investment Reports, as well as other selected databases.

Literature Review

The CEE countries increased their participation in the world economy since the fall of communism; particularly over the last few years. They accepted the challenge of trade openness and attracted significant foreign direct investment. Going global has helped them to grow faster (Cernat & Vranceanu, 2002).

The available literature does not provide empirically tested evidence on the effects of FDI on economic growth in the CEE. This study examines the link between FDI stock and economic growth in CEE countries and focuses on the impact of inward FDI on economic growth using a production function model. The results showed that inward FDI stock contributes tremendously to economic growth in the CEE and constitutes an essential factor stimulating sustained economic growth.

FDI has been acknowledged as most crucial factor in enhancing economic development and the standard of living for emerging economies. Based on references, the consensus seems to be that there is a positive correlation between FDI inflows and economic growth, provided that the receiving countries have reached a minimum level of educational, technological and/or infrastructure development (Hansen & Rand, 2006).

South Korea, Singapore, and Taiwan are examples of nations outside the OECD countries that have greatly benefited from FDI and the integration in the global economy. In recent years,

China and India have made remarkable progress in attracting FDI and realizing technological and economic success.

The inflow of FDI increased rapidly during the last two decades in almost every region of the world. A number of empirical studies on the role of FDI in host countries suggest that FDI is an important source of capital, complements domestic private investment, and is usually associated with new job opportunities and enhancement of technology transfer, and boosts overall economic growth in host countries (Chowdhury & Mavrotas, 2006).

The relationship between growing FDI stock and economic growth has motivated a voluminous empirical literature in developed and developing countries. Salehizadeh, Asheghian and others confirm the existence of a positive and significant relationship between FDI and the economic growth in the United States (Asheghian, 2004).

A number of studies find that FDI inflows have a strong and positive effect on economic growth in China (Tian, Lin, & Lo, 2004). In Russia**,** FDI appears to have been an essential force in supporting the economy during the initial chaos of transition (Brock, 2005*)*. The CEE countries acknowledge FDI as an essential tool in the development and modernization of their economies.

Benefits of FDI to the recipient economy are widely recognized. Economists emphasize the importance of FDI in fueling economic growth in CEE countries. The available literature on FDI does not yet provide empirically testable propositions on the effects of FDI on economic growth in the CEE. Many authors agreed that national economies benefit from FDI from the macroeconomic point of view, as FDI bolsters domestic capital, increases productivity and employment, and results in the adoption of new technologies, management and marketing methods.

Research Methodology

Research methodology related to FDI and economic growth relationship in the literature has been based mostly on the production function model (Brock, 2005). The production function model investigates the relationship between labor (L), capital (K) and the economic growth, with the GDP shown as a function of labor and capital (Sawyer, 2006). The theoretical framework of this study is based upon the production function model with output determined by the L (labor force employed) and K (Gross Fixed Capital Formation). In the regression model authors

introduced FDI inward stock and export (X) as an additional factors influencing output and productivity in the economy.

GDP Per Capita and Economic Growth Rate in The CEE

There are a variety of indicators assessing transition outcomes in the CEE transforming economies. This paper will be limited to GDP per capita and economic growth rate. GDP per capita constitutes a very important economic index used in the international comparisons, which indicates standard of living. Growing GDP per capita during the transformation period (1990 – 2006), shows an increasing standard of living in the CEE countries (Figure 1).

Since 1992, GDP per capita in all analyzed CEE countries has been increasing dynamically. In 2005, the relatively high GDP per capita shows Slovenia (22.632 US Dollars) in comparison with the Czech Republic (20.417 US Dollars), Hungary (16.994 US Dollars), Slovakia (15.214 US Dollars) and Poland (13.791 US Dollars). The lowest GDP per capita in Poland relates to the highest population numbers among transforming CEE countries, while the highest GDP per capita in Slovenia relates to the lowest population numbers.

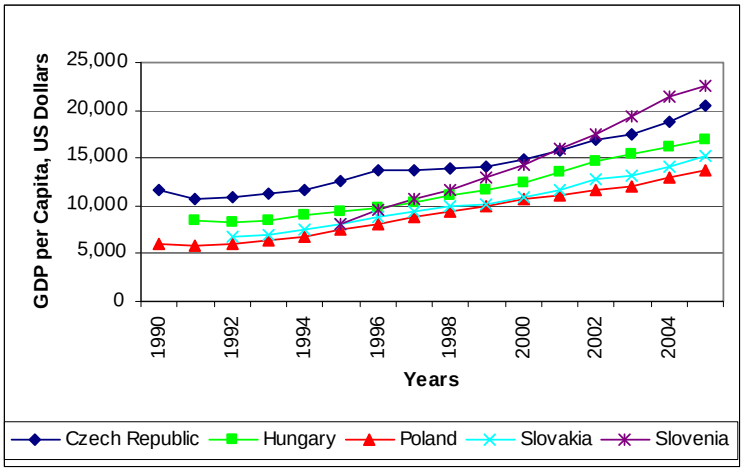
Table 1. GDP per Capita (US Dollars), CEE Countries, 1990-2005

Year / Country	Czech Republic	Hungary	Poland	Slovakia	Slovenia
1990	11,720		6,022		
1991	10,777	8,405	5,776		
1992	10,960	8,353	6,039	6,746	
1993	11,205	8,521	6,393	7,008	
1994	11,689	8,985	6,858	7,569	
1995	12,642	9,334	7,476	8,150	8,137
1996	13,669	9,703	8,114	8,827	9,524
1997	13,796	10,335	8,810	9,354	10,672
1998	13,879	11,034	9,374	9,870	11,679
1999	14,189	11,625	9,870	10,075	12,879
2000	14,812	12,434	10,680	10,836	14,321
2001	15,744	13,598	11,015	11,586	15,959
2002	16,907	14,754	11,570	12,747	17,503
2003	17,428	15,342	11,970	13,238	19,292
2004	18,733	16,181	12,966	14,062	21,484
2005	20,417	16,994	13,791	15,214	22,632

Source: UNECE Statistical Database, Economic Statistics:

http://w3.unece.org/pxweb/Dialog/statfile1_new.asp

Figure1. GDP per Capita in the CEE Countries



Source: UNECE Statistical Database, Economic Statistics:

http://w3.unece.org/pxweb/Dialog/statfile1_new.asp

There are different patterns of economic growth and differences in output performance during the transitioning of various CEE countries. However, all of the transitioning CEE countries have been building the new macroeconomic structure via deregulation of prices, liberalization of trade, privatization, external assistance and capital market development (Paliwoda, Thomas & Farfus, 1998).

The economic growth rate is a major indicator for judging successful transitioning (Table 2). The characteristic aspects of transition economies include an initial collapse of output followed by a slow recovery.

Table 2. Economic Growth Rate (%), CEE Countries, 1991-2005

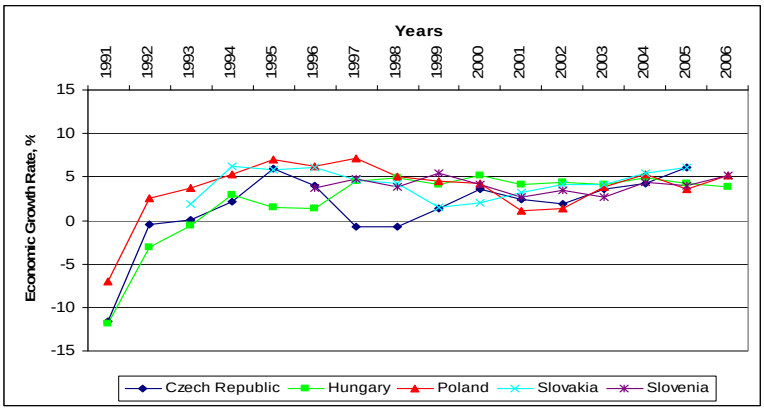
Year / Country	Czech Republic	Hungary	Poland	Slovakia	Slovenia
1990					
1991	-8.5		-3.8		
1992	1.8	-0.8	4.9		
1993	2.4	1.7	6.1	4.2	
1994	4.4	5.1	7.5	8.4	
1995	8.1	3.6	9.1	8.0	
1996	8.0	3.6	8.6	8.5	17.1
1997	0.8	6.1	8.7	6.1	11.8
1998	0.5	6.3	6.5	5.7	9.2
1999	2.1	4.9	5.3	2.2	10.4
2000	4.3	7.5	7.1	7.7	11.5
2001	5.8	10.1	3.1	7.0	11.6
2002	7.1	8.2	5.0	9.5	9.8
2003	3.1	3.7	3.4	3.9	10.3
2004	7.5	5.2	8.3	6.3	11.4
2005	9.3	4.8	6.3	8.3	5.6

Calculated on the base of GDP. Source: UNECE Statistical Database, Economic Statistics:

http://w3.unece.org/pxweb/Dialog/statfile1_new.asp

Figure 2. Economic Growth Rate (%)

CEEC Comparison, 1991-2006



Source: UNECE Statistical Database, Economic Statistics:

http://w3.unece.org/pxweb/Dialog/statfile1_new.as

During the early years of transition (1991-1993), the downslide of economic activity was significant. Between 1993 and 1995, all analyzed CEE economies started to show an increasing trend in economic growth with declining growth tendency between 1996-1997 in Hungary, 1998-1999 in The Czech Republic, 1999 – 2000 in Slovakia, and 2001- 2002 in Slovenia and Poland

The Inward FDI Flow As A Percentage Of GDP

Foreign direct investment has increased in the past twenty years to become the most common type of capital flow during transition period. The most important economic reason for attracting FDI at the beginning of the transformation process was to facilitate the privatization and restructuring of the central planning economies (Heimann, 2003). At present as the privatization and reconstructing process comes to an end, the main reason to pursue FDI is to enhance sustained economic growth (Gao, 2005).

The volume of FDI inflows has grown rapidly, as the Governments of the CEE countries have officially encouraged FDI and developed a formal FDI promotion programs providing substantial incentives for the foreign companies. The size and increasing FDI inflows to transitioning CEE countries were impressive. Poland, Hungary, and the Czech Republic have become the most attractive destination for foreign investments.

Important factor influencing business environment in the CEE countries is their membership in the EU. The EU policies and the national incentive based FDI policies are two driving forces influencing business environment in the CEE countries. Recent inflows can be attributed to the positive impact of the EU enlargement in May of 2004. New EU countries have improved the business environment and introduced policy measures aimed at liberalizing polish economy. The EU reshaped conditions of doing business in the new Member States and shaped major aspects of economic policy and legislation.

After the CEE countries' accession to the EU, FDI inflows increased dramatically. Between 2003 and 2004, the FDI inflows in the Czech Republic increased by 186.3% (from 1.863 to 3.596 million USD), in Hungary by 176.3% (from 1909 to 3365 million USD), in Poland by 133.7% (from 3660 to 4892 million USD), in Slovakia 142.1% (from 636 to 904 million USD) and in Slovenia by 141.1% (from 299 to 422 million USD (Kornecki, 2006.)

The EU countries hold the highest share of productive capacity owned by foreigners in CEE, while the USA and its many international corporations contribute a great deal of foreign stock to this region. For example, the EU members hold 74% of productive capacity owned by foreigners in Poland, while the USA and international corporations contribute respectively 13% and 6% to foreign stock (Kornecki, 2005).

The statistical data on inward FDI confirm the positive reaction of FDI flow to the EU membership (Kornecki, 2005). The implementation of the EU policies changed the following: trade policy, competition policy, consumer protection policy, environmental policy, public procurement policy, policy towards small and medium enterprises, social policy, transport policy and socio-economic cohesion policy (Witkowska, 2000). The EU policy towards enterprises aims to promote entrepreneurship, encourage innovation, improve competitiveness of firms, create a financial climate encouraging business activities, promotion of cooperation between enterprises. The firms can also receive assistance from the EU structural funds. Between 2007 and 2015 Poland will receive over 67 billion EUR from the EU's budget. Poland will be the largest recipient of EU funding in the coming years. The EU grants may be allocated to projects from virtually all sectors of the economy and intend to raise the economic competitiveness, among others, through transport infrastructure reform. The country's Eastern regions and the rural areas are the priority of the modernization policy for the near future. (Witkowska, 2007).

Table 3. Inward FDI flow as a % of GDP, 1990-2005

Year / Country	Czech Republic	Hungary	Poland	Slovakia	Slovenia
1990	0.20		0.14		
1991	2.01	9.04	0.36		
1992	3.31	8.12	0.76	0.80	
1993	1.84	12.98	1.90	1.33	
1994	2.08	5.64	1.80	1.75	
1995	4.62	11.12	2.63	1.32	0.74
1996	2.39	7.11	2.87	1.76	0.85
1997	2.31	8.87	3.12	1.08	1.69

1998	6.10	6.90	3.68	3.16	1.02
1999	10.73	6.71	4.33	2.08	0.49
2000	9.05	5.76	5.45	9.42	0.70
2001	9.42	7.40	3.00	7.51	1.87
2002	11.87	4.52	2.09	16.69	7.34
2003	2.31	2.54	2.12	2.25	1.19
2004	4.51	4.57	5.14	3.00	2.59
2005	8.49	6.01	2.65	4.21	1.44

Source: UNECE Statistical Database, Economic Statistics:

http://w3.unece.org/pxweb/Dialog/statfile1_new.asp

Calculated on the base of GDP and FDI inflow

Foreign investment inflow in transitioning CEE countries constitutes a relatively high percentage of GDP. The inward FDI inflow in 2005, in the Czech Republic and Hungary accounted for 8.5% and 6.1% of GDP in 2005. Poland is aiming for 5% FDI inflow as a percentage of GDP.

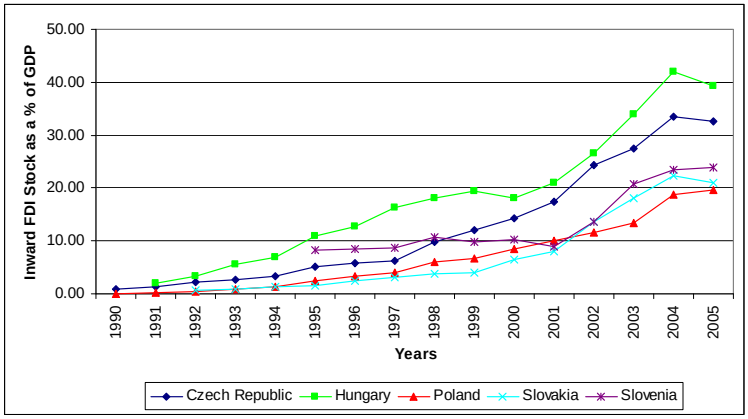
The Inward FDI Stock As A Percentage Of GDP

The collapse of communism and the advanced Economic Integration of Europe shaped the global development in the twenty-first century. Analyzed CEE economies have been integrating in the global market and this process has accelerated over the past few years (De la Dehesa, 2006).

This part of the paper focuses on the inward FDI stock as a percentage of GDP. Discussed previously inward FDI flow measures the amount of FDI entering a country during a one year period, while the FDI stock is the total amount of productive capacity owned by foreigners in the host country. FDI stock grows over time and includes all retained earnings of foreign-owned firms held in cash and investments.

Figure 3. Inward FDI stock as a % of GDP,

CEEC Comparison, 1990-2005



Source: UNECE Statistical Database and UNCTAD World Investment Report 2006

The share of foreign stock as a percentage of GDP has been very high in Hungary, the Czech Republic, Slovenia and Slovakia, and constitutes respectively 43%, 34%, 24%, and 22% of each country's GDP (2004). In Poland, the share of foreign stock as a percentage of GDP was much lower and amounted to 19% of GDP (See Figure 3).

The high percentage of foreign stock in GDP indicates that foreign capital plays a vital role in CEE economies and represents one of the most important indicators of the globalization process in CEEC.

Another important indicator of the globalization process relates to an increasing export of the CEE economies in the world market. An economic globalization is based on international exchange, which leads to increase in the international trade of goods and services, movement of labor and capital (Stuart, G., 2004). The FDI demonstrates as well in higher export from the CEE. The data shows an increase in export as a percentage of GDP in the CEE economies integrating in the global market (Kornecki, 2006).

The regression model analyzed in the next chapter includes inward FDI stock and export as an important components of economic growth in the CEE.

Regression Model

We use a modified Cobb-Douglas Production function (equation 1) approach based on a pooled cross section data for the sample countries for the period 1990-2006 to study the impact of inputs such as labor, capital and FDI (FDI inward stock) on economic growth. Our sample countries include Poland, the Czech Republic, Hungary, Slovakia and Slovenia. Our data is obtained from the United Nations Conference on Trade and Development (UNCTAD), United Nations Economic Commission for Europe (UNECE), World Investment Reports, as well as other selected databases. It is assumed in our model that inward FDI helps to increase capital stock which in turn increases productivity and hence the rate of economic growth. This assumption is based on the new theory of endogenous growth, which assumes that FDI has a positive impact on economic growth via its impact on transfer of foreign technology which improves overall productivity in the economy. Our production-function model is explained below.

$$Y = C\ K^a\ L^b\ e^{logR} \qquad (1)$$

Where:

Y = Real Gross Domestic Product (GDP)

C = Scale parameter

K = Gross Fixed Capital Formation (GFCF)

L = Labor Force (employed)

e^{logR} = The rate of productivity change over time.

Rewriting (1) in terms of the rate of change over time:

$$\dot{Y} = a\dot{K} + b\dot{L} + \dot{R} \qquad (2)$$

In our model, the productivity change (R) is assumed to be positively influenced by both the foreign direct investment stock (FDI) and the rate of export growth (X). The productivity change defined as X (export) growth plus FDI growth:

$$\bar{R} = c\,\bar{X} + d\,\bar{FDI} \qquad (3)$$

Substituting equation (3) into equation (2) we have

$$\bar{Y} = a\,\bar{K} + b\,\bar{L} + c\,\bar{X} + d\,\bar{FDI} \qquad (4)$$

Where:

$\bar{Y}$ = The average annual rate of growth of GDP

$\bar{K}$ = The average annual rate of growth of capital (GFCF)

$\bar{L}$ = The average annual rate of growth of labor force (employed)

$\bar{X}$ = The average annual rate of growth of export

$\bar{FDI}$ = The average annual rate of growth of inward FDI stock

Table 4. Results of Production Function Estimation (1993-2003)

Constant	Capital	Labor	Export	Inward Stock	$\overline{R}_A^{\,2}$
2.9722	0.1288*	0.6518*	0.0514	0.1711*	0.9999
	(2.760)	(15.234)	(1.170)	(8.257)	

* Denotes that variables are significant at the 5 percent level.

t-values are shown in brackets

* R_A denotes adjusted R^2 adjusted for degrees of freedom.

From Table 4 above all the examined variables except export growth are significant at the five percent level (where * over the variables denoted that they are significant at the five percent level). From the estimated coefficients we constructed the sources of economic growth decomposition table for our sample CEE countries in Table 5.

From Table 5 we can see that the FDI stock shows the highest rate of growth (5.18%) in comparison with labor (2.61%), domestic capital (1.03%) and export (0.67%). FDI stock contributes 55 % to GDP growth, while labor, domestic capital and export contribute respectively 27 %, 11 % and 7 %. This preliminary results show that the FDI as compared to other inputs such as labor, domestic capital and export has a significant influence on GDP growth in the examined CEE countries.

This results show that the FDI in comparison with remaining determinants of GDP such as: labor, domestic capital and export has a significant influence on GDP growth in the examined CEE countries. This study tested the hypothesis that the FDI contributes to the economic growth of CEE countries and constitutes crucial factor stimulating economic growth.

Table 5. Sources of Economic Growth in CEE (1993-2003)

	Growth Rate[a]	Share	Average Growth Rate[b]
Factors of Production			
Capital	1.03%	11%	8.00%
Labor	2.61%	27%	4.00%
Productivity Change			
Export	0.67%	7%	13.00%
FDI	5.18%	55%	30.25%
Total (GDP)	9.48%	100%	

[a] The numbers of this column is obtained by multiplying the estimated elasticities by the average rate of growth of the factors concerned.

[b] Average values of various variables (Mean values)

UNECE Statistical Database, and UNCTAD World Investment Report 2006

Implication for Future Research

When interpreting regression results and planning on the future research it is important to consider the effect of FDI on economic growth via technology. It is based on *the new theory of endogenous growth*, which examines the effect of FDI on economic growth via technology (Li & Liu, 2005). Technology transfer is not limited to the industries with FDI, since the new technology provided by the FDI can spread throughout the entire economy. New technology embodied in the FDI manifests itself in the form of new ideas, new products, advanced managerial skills, advanced production processes, advanced equipment and machinery, and has a positive effect on the economy (Tian, Lin,& Lo, 2004).

There are four effects of the new theory of endogenous growth discussed in the literature: the demonstration effect (domestic firms can learn superior production technologies and management skills from foreign firms), the employment effect (foreign firms train domestic workers, who may move to domestic firms later on and bring with them updated technology know-how and management skills), the competition effect (domestic firms are forced to update their technology and management skills due to increasing competition from foreign firms), the linkage effect (domestic firms may learn updated technology and management skills through linkage across firms or industrial sectors).

Conclusions

During the last 15 years of the CEE economies in transition became a part of the global market. The collapse of communism and the advanced Economic Integration of Europe shaped the global development in the twenty-first century. The inward FDI has increased in the CEE in the past twenty years to become the most common type of capital flow.

This research focused on the impact of inward FDI stock on economic growth. The analyzed aggregated model of the CEE economic growth based on the production function proved the strong impact of the FDI stock on output growth in the CEE economies and verified the hypothesis that FDI stock, in comparison with other factors such as: labor, capital and export, constitutes an essential factor of economic growth. The FDI contributes tremendously to the economic growth in CEE countries and constitutes a crucial factor stimulating sustained economic growth.

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