

The key role of Foreign Direct Investment (FDI) in the Eastern Enlargement of EU.

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Abstract

This article studies the role of FDI's in the Eastern Enlargement of EU, focusing on the five countries (Czech Republic, Poland, Estonia, Slovenia and Hungary) that EU had promoted for entrance (under the suggestion of the EU committee in Agenda 2000) for the period between the fall of the Berlin wall (1989) and their entrance in EU (Copenhagen 2002).

From all the Copenhagen Criteria (1993), this paper chooses to focus on the Economic Criteria, which promoted as the vehicle for these countries to enter the EU according to the decisions of the European councils of Hessen 1994 and Madrid 1996 (Agenda 2000). The target of these economic criteria was the economic development of the countries through the growth of the private sector. FDI's had a key role in this growth process due to the lack of local private capital.

The relation between FDI, Economic Development & Economic Criteria is examined both with an extensive qualitative analysis and an econometric model that is based on the major shortages that these countries faced after the fall of Berlin Wall.

These shortages were:

- a. Scarcity of funds,*
- b. Non-extensive commercial relations,*
- c. Scarcity of advanced technology,*
- d. Undeveloped business structures*

The form of the model (that uses the method of pooled least squares, with no weighting), which is based on the neoclassical growth model of Solow, is:

Growth = $C_1 + C_2$ (FDI as percentage of Gross Capital Formation) + C_3 (the percentage of exports to production of the MNE's) + C_4 (the percentage of people that have finished tertiary education in these countries) + C_5 (the percentage of year to year inflation rate) + C_6 (the percentage of year to year unemployment rate in industry).

The results bring out the important role of FDI for: a) the transfer of technology, and b) the participation of these counties to the intra-industry trade that the MNE's create.

Keywords: *Enlargement Criteria, Economic Growth, FDI, Technology transfer, intra-industry trade.*

1. Introduction

The aim of this article is to explain the relation between FDI's, Economic Development & Economic Criteria (during the transition process) in the case of five Eastern European Countries (EEC's) (Czech Republic, Poland, Estonia, Slovenia and Hungary) that entered European Union (EU) in its last enlargement, with the use of an econometric model.

The relation between FDI's, Economic Development¹ & Economic Criteria highlights the key role of FDI's² in the enlargement process of the five EEC's, due to the fact that the economic criteria were emphasized by the European councils of Hesse 1994 and Madrid 1996 - Agenda 2000 (Tsoukalis, 1998, p.255-256).

The econometric model tries to verify some theoretical considerations (Markusen & Venables, 1999, p. 335-356; Dunning, 1996, p. 56-63; Borensztein & De Gregorio & Lee, 1995, p. 1-22; Blomstrom & Globerman & Kokko, 1999, 1-31; Meyer, 2004, p. 261), that FDI's had a key role in the development of Eastern European Countries.

Following the descriptive enumeration of the shortages that these countries faced during the collapse of state controlled economy and a short bibliographical review, a qualitative analysis is presented. Then, the econometric model is applied to the relations between FDI's and Economic Development, focusing on technology transfer and new forms of trade.

2. Shortages that EEC's faced after 1989

The change of the economic system from a state controlled economy to a capitalist economy in EEC's raised several problems in different sectors of the local economies, causing insecurity for the future to the citizens³, which was enforced by the declining national revenues due to the collapse of the taxation system (Fisher & Sahay, 2000, p. 8-9). The problems that were raised affected the development process in these countries; these problems are analyzed further in this chapter.

2.1 Scarcity of Funds

Investments are the most fundamental factor for the macro-development of a state, as they supply the economy with the necessary funds (Kornai, 1994, p. 39-63). In the case of the EEC's, after 1989, economies faced underinvestment as a result of the lack of funds. Merlevede (2000, p. 1-27) advocated that key role for this scarcity

¹ Todaro (1997, p. 18) provides the targets of economic development in the modern world, which are the growth of productivity, the enlargement of the living conditions and the enlargement of economic and social choices for people and states.

² Dunning (1996, p. 5) provides an explicit for what FDI means: "The investment is made outside the home country of the investing company, but inside the investing company. Control over the use of the resources transferred remains with the investor. It consists of a "package" of assets and intermediate products, such as capital, technology, management skills, access to markets and entrepreneurship".

³ Buckley & Ghauri (1993, p. 1) argued that the situation was compared with the one that existed in Europe after the Second World War

of funds had: a) the high inflation during the first years, which was an outcome of the state controlled market collapse (Fisher & Sahay, 2000, p. 6-10) that brought up the "covered black market" (Lavigne, 2000, p.477) and forced governments to follow tight economic policies during the first years after 1989, in order to control inflation (Fisher & Sahay, 2000, p. 6-10), caused the rage of the population that was reflected in their votes (Kornai, 1994, p. 39-63), b) the declining tax revenues which were the result of the weak financial institutions that were 100% state controlled (Portes, 1994, p. 1187-1188), c) the high loan interests, d) the declining exports and e) the declining production output due to declining public aid (Estrin, Hughes & Todd, 1997, p. 8-9). Foreign Direct Investments were an alternative source of funds for the productive sector, as they included both technology and management knowledge (Dunning, 1996, p. 5).

2.2 Non-extensive commercial relations

Until 1989 EEC's were members of COMECON and had limited commercial relations, which eliminated the benefits that could have gained from a participation in a free trade system (Kornai, 1994, p. 39-63). On the one hand, the collapse of COMECON was the major factor for the decrease in the exports of EEC's due to the specialization in production the countries had and the interdependence between them (Allsopp & Kierzkowski, 1997, p. 13-14). On the other hand, the liberalization of the trade system in EEC's caused an explosion of the figures of imports, due to the needs that the citizens in these countries began to have, influenced from marketing and advertisement. Under these facts one of the most common axioms in the economics which is that exports & imports are an index to measure the openness of an economy (Pantelidis & Kyrkilis, 2003, p. 831), seems not to operated well in the case of EEC's. In EEC's, as previously stated, imports were biased due to the fact that world known firms in producing consumer goods tried to gain new customers that previously could not buy all these products. Keeping that in mind it seems fair to think that exports was a better measure for the openness in these economies, as they emerge the ability of a country to make well known its comparative advantages. Foreign Direct Investments seemed to help the countries to enter dynamic in the world markets through the exporting facilities of Multinational Enterprises (MNE's)⁴.

2.3 Scarcity of Advanced Technology

Even though these countries had a very advanced heavy industrial production (weapons, steel etc.), the technology that used in most of productive sectors was of low quality. The sub-system of technology-production, including the structure of industries and mines, was undeveloped under the state-controlled economy (Jackson, 1991, p. 16-25). Kolodko (2001, p. 283-284) argued that EEC's met a growth tiredness in the last years of the socialist era despite of investments. The reason was the low labor productivity due to the low technology. "Ideas Gap" is a factor that first used by Romer (1993, p. 942-963) and describes best the situation of technology in EEC's. Enterprises did not have access to modern management systems (logistics, human resources, just-in-time etc) & marketing, so they could not reach high efficiency in their productive process. Industries that in Western Europe and in USA were capital intensive, in the EEC's were either labor intensive or low quality capital

⁴ Kyrkilis & Pantelidis (1995, p. 387-395) present a work that demonstrates the effects of FDI to the commercial standards of EEC's.

intensive (Czaban & Caslin, 1999, p. 78-82). Multinational Enterprises were a factor that could transfer new technology and management strategies in EEC's through FDI's, in order these countries to be able to take advantage of the high quality and cheap labor existing there.

2.4 Undeveloped Business Structures

The interrelation between the macroeconomic planning and the management of enterprises that existed in EEC's had many problems, mostly due to the concentration of power in a small number of people, that were away from the needs of the society (Estrin, Hughes & Todd, 1997, p. 8-9). The most important structural problems that arose in EEC's were the absence of legal framework for the operation of private enterprises (Merlevede, 2000, 20-22) and the privatization of state-owned enterprises and also the transition of the labor market to a more competitive and elastic market. All these problems were tried to be resolved with the use of 2 transition models, either the shock therapy (big bang) or the gradual transformation⁵. In conclusion, the major issue in the development process of EEC's was the lack of a previously well-organized private sector, the competitiveness and advanced technology that it could have brought and inexistence of rules, in order to build a well-organized private sector. The key role of FDI's and their agents MNE's will be examined both with a qualitative and quantitative analysis in following sections.

3. Bibliographical Review

The relations between Economic Development and FDI's attract many researchers from different fields and backgrounds. Many ideas have been introduced, but in this paper there will be reference only to the ones of primary importance for the analysis of this work.

One of the most well known works is that of Markusen and Venables (1999, p. 335-356), which refers to an economy without microeconomic imperfections, where small volume FDI's have important implications in the shortages of the local market. These implications are divided in three categories:

- FDI's create technological externalities in the economy, like the dispersion of knowledge.
- FDI's influence the existing market shortages, like the tax system, the labor market etc.
- FDI's influence the industrial production system by changing its structure from a semi competitive market to a competitive one.

Another known work is that of Borensztein, De Gregorio & Lee (1995, p. 1-22) that examine through an econometric model the influence of FDI's in developed and developing states between 1970 and 1990. They consider that an economy achieves technological progress through a process of capital deepening, which is set out by an increase of the variety of existing capital commodities. This increase requires the adoption of a new type of technology. FDI's are the main path for technology transfer, as the cost for them to produce technological advanced products is the lowest it can be (they do not have to pay rent to have access in technology). The imports from MNE's in the local market are replaced by their local production. The influence of FDI's increases if local economy has two characteristics, low local

⁵ Wei (1996, 32-34) presents a comparison between the two methods.

production of capital commodities and efficient human capital. In the first case, local enterprises have to make investments in order to be competitive against MNE's, so technology transfer increases. In the second case, efficient human capital can use technology in a better way and increase the output of production.

Blomstrom, Globerman & Kokko (1999, p. 1-31) present an analysis and categorization of the results of other empirical works. The categories of the impact of FDI's in local economies are:

- Access in modern technologies.
- Vertical relations with local enterprises help the transfer of technical and commercial information to local enterprises.
- A positive result from the transfer of technology from MNE's to local enterprises.
- Impact in the structure of local markets that operated in a monopolistic system.
- Positive impact in the working force and the educational system.

The common factor of all the above categories seems to be the technology and its transfer to the local market. Dunning (1996, p. 287) provides a definition of technology: "it embraces all forms of physical assets, knowledge and human learning and capabilities that enable the efficient organization and production of goods and services". The importance of FDI's in the research of economic development, as it is presented in the review, stems from their impact in the local economies, which are the technology transfer, the use of local production factors and the development of intra-industry and intra-firm trade, as it is presented in **Figure 1 (Appendix, p.12)**.

The bibliographical review raised some arguments, which emphasize the relationship between local economies and FDI's, focusing in technology transfer, local market imperfections and intra-industry trade. These arguments will be considered together with the above-mentioned shortages and the results of qualitative analysis in the quantitative examination which will follow.

4. Qualitative Analysis

From 1989 till today EEC's are an attractive investment destination for enterprises from EU-15⁶. The percentage of world FDI's that ended in EEC's changed from 0.1% in 1990 to 3,7% in 2001 due to the democratization process in these countries and the investment opportunities that appeared⁷. In 90's the deficit of state current account in EEC's was increased and the countries chose to finance this deficit through the increase of FDI's. UNECE (2002) calculated that the percentage of FDI's to current account deficit in Eastern Europe was 58% between 1993-1996 and 86% from 1997 to 1999 and in the countries of Baltic Sea 97% from 1993 to 1996 and 64% between 1997-1999. EEC's chose this financing because FDI's are more stable type of investments, they strengthen exports and they do not allow increases in the deficit.

The relation between FDI's and exports is uncovered by the figures that are presented in **Table 1 (Appendix, p. 12)**, where the percentage

⁶ Lovino & Passerini (2002, p. 7) said that the percentage of EU FDI's to total inbound FDI's in EEC's was from 60% to 95%.

⁷ The figures are from World Investment Report 2002 of UNCTAD.

of Foreign Investment Enterprises (FIE's) in exports in 1998 was from minimum 32,9% to maximum 85,9%. Exports increased due to the fact that industrial production in EEC's regained high rates in the mid 90's. The sectors that had a protagonist role were the capital-intensive sectors, where technology played a key role (UNECE, 2001, No 1, Table 5.6.1, p.210). In the same period a change in the ownership of industrial production happened and FIE's increased their shares. The biggest share in this increase was based in the privatization of public enterprises (UNECE, 2001, No 1, Table 5.6.2, p.210). The different shares in different countries were based to the different privatization policies that each country followed. Nevertheless, the real reason for the increase in the share of FIE's was the higher productivity their employees had. The productivity of employees in local enterprises was between the 1/3 and the 2/3 of that in FIE's (UNECE, 2001, No 1, Table 5.6.3, p.212). In terms of convergence between local enterprises employee productivity and that in FIE's, local enterprises seem to have better results because their productivity reached the 2/3 of FIE's (UNECE, 2001, No 1, Table 5.6.4, p.212). The difference between local enterprises and FIE's is best presented in **Table 2 (Appendix, p. 13)**, where FIE's seem to be 2 or 3 times more capital intensive. Through the analysis of the above figures, FIE's occupied large percentage of the industrial production in EEC's, without this to have impact in technology transfer as Djankov & Hoekman (1999, p. 1-21) argued. Another field that FDI's had significant impact was the vertical intra-industry trade between E.U.⁸ and EEC's, which accounted between 30% (Estonia) and 53% (Czech Republic)⁹. Aturupane et. al. (1999, p. 1-31) argued that vertical intra-industry trade was an element for the relation between FDI's - Trade - Economic Development. Kaitila (1999, p. 1-57) said that the majority of imports and exports of Hungary and Czech Republic was from Germany. The location¹⁰ of EEC's was a key factor according to Kyrkilis & Pantelidis (2002, p. 1-15) in order to attract higher amounts of EU FDI's.

The above analysis uncovered that the major impacts of FDI's in EEC's were in the industrial production, exports and intra-industry trade.

5. Quantitative Analysis

The analysis does not include separate studies for each of the 5 EEC's (Czech Republic, Poland, Estonia, Slovenia and Hungary) for the period between 1989 and 2002. It uses the method of pooled least squares, where the dependent variable is the Economic Development. Each of the observations has the same weight in the equation (no weighting). The data are collected from studies of international organizations such as United Nations Economic Commission for Europe, Economic Survey 2001 and 2002, UNESCO, Report 2001 and EBRD, Transition Report 2002. The statistical pack deleted the data of the two time ends in order the sample to produce more reliable results.

5.1. Analysis of the econometric model

⁸ EEC's were the most important recipients of FDI from E.U., in 1999 it was accounted for 73% of all E.U. FDI's (Pye, 1998, p. 378-389).

⁹ UNECE, 2002, p. 147.

¹⁰ Location is one of the three factors that Dunning (1996, p. 76-85) uses in his OLI paradigm.

The model tries to calculate the relation between economic development and FDI's, a relation that constituted an essential factor for the completion of economic criteria that EEC's should have completed before they entered EU (**Figure 2, Appendix, p. 14**). The variables of the model are extracted from the analysis of the shortages that EEC's faced after 1989, as the solution in these problems had a major role in the accomplishment of the transition and enlargement processes.

5.1.1 Scarcity of Funds

FDI's became a way through which funds could be transferred into EEC's and one of their most important characteristics was that their investment was stable. Their stability was based on their role in gross capital formation (or fixed capital formation) in the host countries. The capital that was transferred through FDI's, was invested either in the development of the existing fixed assets or to purchase new fixed assets (Blanchard, 1997, p. 41-43). FDI's impact in gross capital formation provides a better calculation of the role of foreign direct investments in the EEC's growth rates. On the other hand, the role of FDI's as a single money transfer in EEC's may not provide a general view of all effects.

5.1.2 Non-extensive commercial relations

Due to the limited trade relations that EEC's had in COMECON, the role of FDI's (and MNE's) as agents in order these countries to enter the world trade system was crucial. A country with developed commercial relations, especially exports, can save capital which then can be used as reinvesting capital. EEC's succeeded to develop their exporting facilities with the advanced technology that FDI's brought and help them produce competitive products for the world markets. As it has already been mentioned, exports could have been a correct measure in order to see the impact of FDI's in EEC's, but this would have not shown that the impact of FDI was based in technology transfer. For this reason, it would be important to use another measure, which will be more accurate for the relation between exports and technology transfer and will be presented below.

5.1.3 Scarcity of advanced technology

Under the rules of neo-classical theory of economic development (Solow, 1956, p. 65-94) technology is a key factor for the development of an economy. According to bibliographical review (in part 3) the most important impact of FDI's in host countries was technology transfer and productive capacity (through increased competitiveness). This impact enlightens the relation between technology and industrial production, which is based on both the change of the product production and the technology that is enclosed in it. So, the impact of FDI's on technology can be measured by the impact of FDI on industrial production in EEC's. In order to present more accurate results for the relation between FDI - Technology - Exports, the measure that will finally be used is the percentage of FIE's production which is exported.

5.1.4 Undeveloped business structures

One of the production factors is labor, which is also a business structure that faced a lot of problems during the transition period. Labor market was one of the business structures that faced tremendous change in EEC's, as it had direct impact in society. According to the arguments presented in part 3, one of the factors that can attract FDI's is a well-specialized, low-cost labor. On the other hand, FIE's provide education and knowledge to the labor in order to make them more competitive. Furthermore, the competitiveness that FDI's brought

in EEC's, changed the labor market to a more competitive and rational market. The result of all these was a boost in unemployment, especially in industries. This result contains both the attractiveness of low-cost labor and the change to a more rational labor market. Thus, industrial unemployment provides a measure for the impact of FDI's in EEC's.

5.2 Presentation of the model

The model that will be used is:

$$\text{Develop} = C_1 + C_2(\text{DFI}/\text{FCF}) + C_3(\text{FIEEXP}/\text{FIEIND}) + C_4(\text{WORKFORCE}) + C_5(\text{INFLATION}) + C_6(\text{TERTIARY EDU})$$

Where:

DFI = percentage change from year to year of Foreign Direct Investments as a percentage of GDP.

FCF = percentage change of Fixed Capital Formation from year to year.

FIEEXP = percentage change of FIE exports from year to year.

FIEIND = percentage change of FIE industrial production from year to year.

WORKFORCE = percentage change of unemployment in industrial sector from year to year.

The model consists of two more independent variables in order to provide more accurate results, which are:

INFLATION = percentage change of inflation from year to year.

TERTIARY EDU = percentage change of the people who finish the tertiary education from year to year.

5.3 Results

The results (Figure 3, Appendix, p. 14) outline that FDI's, as a percentage of FCF, have a crucial role in the economic development of EEC's. Even though some of the controls like R-squared and standard error are not sufficiently good, Probability (Prob) is encouraging. The quality of controls is influenced by the short-term period. Except the role of FDI, a positive evidence is also the role of FIEEXP/FIEIND on the development process on EEC's.

A more detailed analysis presents that the coefficient of DFI/FCF is high (5,63) and even if standard error is taken into account, the coefficient remains high. This demonstrates the need of EEC's for capital that is stable (Fixed Capital Formation) and has an accumulated positive effect in future. This result is in accordance with the definition of FDI's (Dunning, 1996, p. 69-70) that it is not a simple transfer of money but it has some more capacities. One of them is that it accompanies technological capabilities that MNE's have developed in their home countries, which is depicted in Table 2 with the capital intensity of FIE's. Another explanation of the above results is the fact that the entrance of MNE's in a market boosts the competitiveness, due to the fact that local enterprises invest in order to keep themselves in the market. The impact of technology transfer (FIEEXP/FIEIND) and intra-industry trade (FIE's exports) is high, with coefficient 0,58 and Prob. 0,48. FIEIND represents the productivity of FIE's both of "greenfield investments" and privatized enterprises. The increased productivity (UNECE, 2001, No 1, Table 5.6.2, p.210) is based largely on the technology and management knowledge that was transferred and increased the capital intensity of these enterprises (Table 2). The increased productivity of FIE's helped the increase of exports, through intra-industry trade, due to the better competitiveness of the exported products. FIE's used the trade mechanisms that MNE's had developed, which made easier the sale

of products abroad. The role of FDI's in the modification of labor market does not seem to have a particular impact in the development process. The reason is that in contrast to the developing world, in EEC's the capitalist turn of the economy boost unemployment due to a more rational administration of the market. High rates of unemployment cannot provide a direct positive impact to economic development. In EEC's high unemployment was a result of technology transfer and better labor management. This change increased productivity through a parallel path, that of technological competitiveness. The impact of education and inflation, which is close to zero, cannot provide substantial information for their role. In conclusion it can be derived that the major impacts of FDI's in EEC's were:

- Technology and management methodology transfer.
- Increase of competitiveness through investments in fixed capital investments.
- Positive relationship between FDI's and host countries exports.

MNE's from EU (Pye, 1998, p. 378-389) tried to take advantage of low labor cost in EEC's, with the transfer of advanced technology, in order to increase the productivity of FIE's and at the same time their earning from local sales and exports. This methodology is similar to the "Product Life Cycle" model of Vernon (1993:3-15) due to the fact that enterprises from EU tried to cut their cost by placing their production in a country with low labor cost. When MNE's invested in EEC's, local enterprises, in order to keep their market position, had to invest in fixed assets (technology etc.). This was the reason for the increase of competitiveness. MNE's invested in EEC's for one more reason and this is their location near EU area (Kyrkilis & Pantelidis, 2002, p. 1-15). This provided them with a definite trade partner (Pye, 1998, p. 378-389). The low production cost and the advanced technological products that were produced in EEC's were exported in EU with a minimum transfer cost and that increased the benefits for both local economies and MNE's.

6. Conclusions

This article analyzes the relation between FDI's and the enlargement process of EU towards EEC's (Figure 2). With the use of an econometric model this study attempts to test the theoretical considerations that reviewed in part 2 and 3 and compare the results with the outcome of the qualitative analysis. FDI's were a key factor for the development process in EEC's due to the fact that helped significantly to the creation of a competitive private sector that did not exist before, through either "Greenfield investments" or privatization. Their presence in the private sector had impact in technology transfer specifically to FIE's, which forced local enterprises to make investments in order to stay in the market. The increased productivity in EEC's, with the use of the trade paths that MNE's have developed in their home countries, was directed to world markets. The impact of FDI's in the development process had affected mainly the economic criteria of the enlargement process (Tsoukalis, 1998, 255-256), which had as their main target a successful transition process and a stable economy. This study was based in macroeconomic data that can reveal the general implications of FDI in EEC's economies. A study based on microeconomic and business factors may end with slightly different results, but both are in the same path and have similar conclusions.

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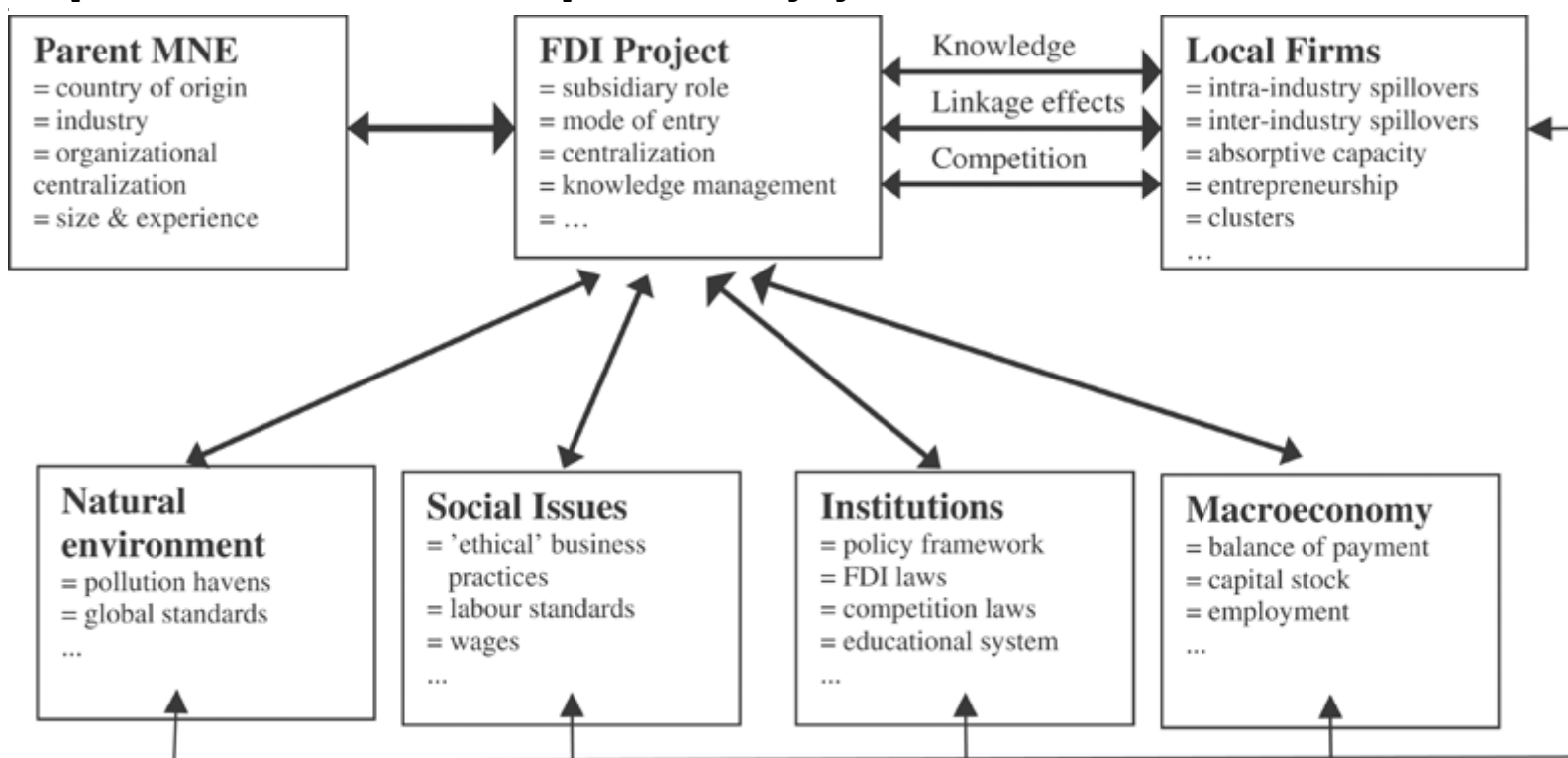
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Appendix

Figure 1
An organisational framework for FDI impact in emerging economies.

Perspectives on multinational enterprises in emerging economies



Source: Klaus E. Meyer, JIBS vol. 35, issue 4 (2004), p. 261.

Table 1
FDI penetration and exports in selected east European and Baltic economies, 1996-1998

Economic Survey of Europe, 2001, No 1, p. 202

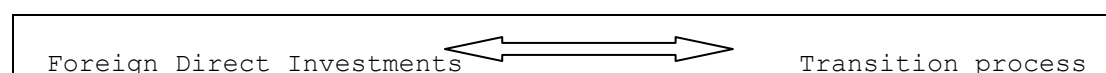
Country	Cumulative FDI/GDP	Share of FIEs in manufacturing				Total Exports Growth		Contribution of exports to real GDP growth			
		Investment 1998	Sales 1998	Exports				(1) Exports		(2) GDP	
				1996	1998			1996	1997	1998	1999
Czech Republic	12.3	41.6	31.5	15.9	47.0	185	(1)	5.0	4.5	6.6	4.6
							(2)	4.8	-1.0	-2.2	-0.2
Hungary	17.8	78.7	70.0	77.5	85.9	280	(1)	3.1	10.4	8.0	7.0
							(2)	1.3	4.6	4.9	4.5
Poland	10.0	51.0	40.6	26.3	52.4	192	(1)	3.0	3.0	3.7	-0.4
							(2)	6.0	6.8	4.8	4.1
Slovenia	5.3	24.3	24.4	25.8	32.9	140	(1)	2.0	6.4	4.0	1.1
							(2)	3.5	4.6	3.8	5.0
Estonia	16.9	32.9	28.2	32.5	35.2	366	(1)	1.6	21.6	10.5	-2.1
							(2)	3.9	10.6	4.7	-1.1

Table 2
Comparison of capital intensity (capital assets per employee) in DE's & FIE's in selected east European & Baltic economies 1993 & 1998

ISIC	Industry	Czech Republic		Hungary		Poland		Slovenia		Estonia	
		1993	1998	1993	1998	1993	1998	1995	1998	1996	1998
D	Total Manufacturing	0,67	0,70	0,56	0,31	0,84	0,70	0,66	0,60	0,24	0,41
15+16	Food, beverages & tobacco	0,90	0,53	0,42	0,28	0,74	0,53	0,94	0,71	0,21	0,25
17	Textiles	1,47	0,68	0,72	0,49	0,90	1,08	0,92	0,97	2,85	0,54
18	Wearing Apparel & Fur	3,92	1,13	0,63	0,39	0,90	0,99	0,45	0,46	1,58	1,82
19	Leather Products	3,39	2,06	0,51	0,83	2,56	1,64	-	0,92	0,14	0,28
20	Wood Products	0,83	0,81	0,64	0,24	0,84	0,29	0,89	0,61	0,35	0,45
21	Pulp & Paper products	0,74	0,97	0,91	0,52	0,45	0,23	0,23	0,30	0,31	0,26
22	Printing & Publishing	0,62	0,95	0,55	0,44	0,94	0,73	0,98	0,85	0,79	2,33
24	Chemicals & chemical products	0,37	0,74	0,95	0,48	1,30	1,21	1,01	0,87	0,12	0,17
25	Rubber & Plastics	0,91	0,52	0,31	0,48	1,24	0,63	1,66	0,87	0,21	0,27
26	Non-metallic mineral products	0,36	0,34	0,41	0,27	0,50	0,31	0,51	0,29	0,09	0,17
27	Basic metals	0,81	1,03	0,36	0,29	1,80	1,32	3,05	0,97	0,33	0,89
28	Fabricated metals	0,86	1,09	0,34	0,23	0,72	0,51	0,77	1,06	Ln 27	Ln 27
29	Machinery & equipment	1,08	0,98	0,56	0,47	2,10	0,72	0,83	0,86	0,39	0,70
30	Office machinery & computers	-	2,14	0,63	0,84	3,50	0,94	0,65	-	0,23	0,89
31	Electrical machinery	0,67	0,89	0,36	0,31	0,92	0,77	0,76	0,71	Ln 30	Ln 30
32	Radio, telephone & communication equipment	1,39	0,55	1,21	0,47	0,70	0,52	0,28	0,41	Ln 30	Ln 30
33	Precision instruments	0,71	0,82	1,27	0,82	0,72	0,85	1,19	1,07	Ln 30	Ln 30
34	Motor Vehicles	0,59	0,61	0,54	0,15	0,37	0,37	1,17	1,09	0,52	0,99
35	Other transport equipment	0,67	3,41	0,71	0,43	1,35	0,80	-	0,32	Ln 34	Ln 34
36	Furniture & miscellaneous manufacturing	0,66	0,75	0,62	0,48	1,33	0,84	0,65	0,55	0,47	0,49

Economic Survey of Europe, 2001, No 1, p. 213

Figure 2



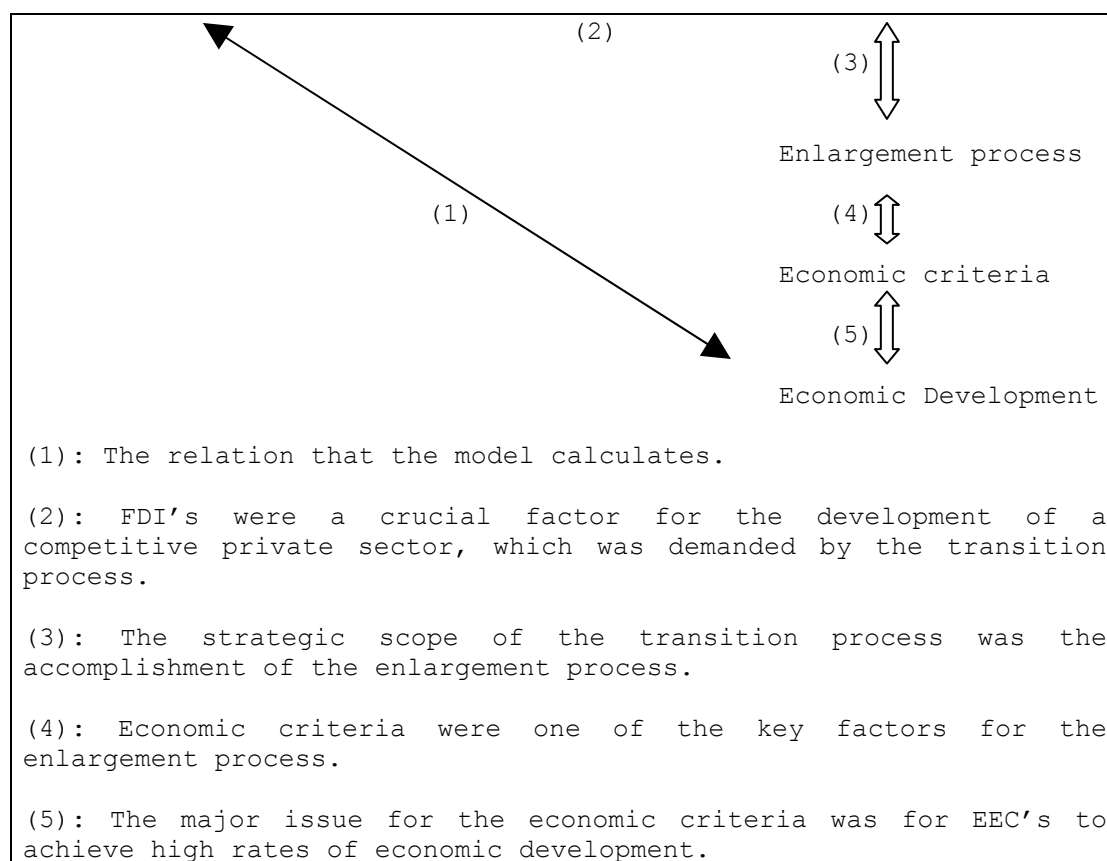


Figure 3

Dependent Variable: DEVELOP
 Method: Pooled Least Squares
 Sample(adjusted): 1990 2001
 Included observations: 12 after adjusting endpoints
 Total panel (unbalanced) observations 45

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	32.90917	8.735204	3.767418	0.0005
(FIEEXP/FIEIND)	0.582016	0.826955	0.703806	0.4857
(DFI/FCF)	5.636272	5.042974	1.117648	0.2706
WORKFORCE	0.042925	0.012116	3.542680	0.0010
INFLATION	-0.001760	0.000342	-5.151600	0.0000
TERTIARYEDU	0.000553	0.005444	0.101504	0.9197
R-squared	0.596583	Mean dependent var		9.200000
Adjusted R-squared	0.544863	S.D. dependent var		62.00645
S.E. of regression	41.83192	Sum squared resid		68246.46
Log likelihood	-230.6754	F-statistic		11.53485
Durbin-Watson stat	1.595506	Prob(F-statistic)		0.000001

Curriculum Vitae

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