Review of studies on FDI: The case of Baltic States

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Abstract. The authors reviewed the foreign direct investment in Baltic countries. The theoretical part of the paper systemizes essential driving forces (elements) of FDI studies and the methods most common in FDI studies; the hierarchy of qualitative methods and models is presented. Three-tier methodology is suggested. The first tier (or level) represents a mathematical approach towards interconnections between FDI variables. The second tier of methodology is dedicated to sector analysis and benchmarking. The third tier targets revising economic variables and their links with variables representing FDI. The suggested approach could be applied for similar analysis. The authors have constructed a correlation matrix. The results of the analyzed variables via the dynamic regression approach show that the strongest links among variables appeared in several-year periods. The obtained results may have significant policy implication.

Keywords: FDI, driving forces (elements), three-tier methodology, quantitative methods, Baltic States

JEL Classification: E22, F21, O16

1. INTRODUCTION

Flows of foreign direct investment (FDI) into the Baltic States show signs of recovery. This increase in FDI flows primarily results from an economic transformation and a liberal environment favorable to FDI. In the Baltics, FDI mainly goes to the financial, telecommunications, and manufacturing sectors. In addition, FDI is an integrating factor for countries, more so with their western neighbors than with the closest neighbors. For example, Estonia serves as a bridgehead for the investment of transnational corporations from the Nordic countries more than other Baltic States. Estonia and Latvia have a high level of investment security and are among the countries that have strengthened their investment security positions. For these countries, macroeconomic stability and stable dynamics of socio-economic growth are the factors determining investment opportunities (Zakharova et al., 2020).

The literature analysis (i.e., review of papers published in journals hosted by Elsevier, Springer, M.E. Sharpe, Routledge, and other publishing houses) shows that they rarely discuss the topic of FDI in the Baltic countries.

The analysis presented in Table 1 shows that only 0.063 percent of the above publications include investigations in the research area. Only 0.001 percent of papers dedicate the complete study to the topic.

Table 1

Review of publications

Year	Publications on FDI	The topic of Baltic countries	
		Inside the publication on FDI	Stated in the title of the publication on FDI
1994-1998	1770	119	5
1999-2003	5670	487	9
2004-2008	10 100	821	17
2009-2013	13 900	792	22
2014-2018	15 700	910	29
2019-2021	10 200	477	16
Total	57 340	3 606	98
%	**100%**	0.063%	0.001%

Source: constructed by authors, according papers published by Elsevier, Springer, M.E. Sharpe, Routledge, and other publishers

Table 1 shows that the number of studies is growing. The number of studies doubled for the 2004-2008 period compared to previous years of 1999-2003. However, the peak of the studies of FDI in the Baltics was evident in both categories in the 2014-2018 period.

2. LITERATURE REVIEW

Some of the authors focus on FDI in Baltic countries. Durán (2019) investigates FDI and investment uncertainty in the Baltic countries. Runiewicz (2004) investigates FDI, technology flows and innovativeness in the Baltics. Burinskas et al. (2021) revise FDI, technology & knowledge transfer from Nordic to Baltic countries. Borsos et al. (1995) promote FDI and trade flows between the Nordic Countries and The Baltic States. Cornett et al. (2002) specify trade and FDI as measures of spatial integration in the Baltic Sea rim region. Kalotay (2019) reviews American investments and challenges in the Baltic Sea region. Raudonen et al. (2012) determine FDI inflows into the Baltic countries using the gravity model. Kilvits et al. (2003) focus on the outward FDI from the Baltic States. Kalotay (2017) analyzes both inward and outward FDI in the Baltic Sea countries. Hunya (2004) revises the specifics of FDI in small accession countries via Baltic countries example. Nakamura et al. (2012) highlight FDI in the countries post-EU accession Baltic Sea

region. Babić et al. (2001) focus on panel analysis of FDI determinants in European transition countries. Barkauskaitė et al. (2016) analyse the impact of FDI on economic indicators of the Baltic countries. Cieślik et al. (2021) analyze factor endowments, economic integration, round-tripping, and inward FDI in the Baltics. Nikula et al. (2013) revise FDI in the Baltic Sea region countries. Hintošová et al. (2020) try to answer whether FDI boosts innovation in the Baltic countries. Šimelytė et al. (2013) identify the effect of investment promotion on FDI flows in the Baltics. Šimelytė (2012) figures out the role of investment promotion in attracting FDI to the Baltics. Šimelytė et al. (2015) focus on the regulation and promotion of FDI in the Baltic States by identifying tendencies, advantages, and problems. Hazley et al. (2002) identify barriers to FDI in the Baltic Sea Region countries. Banaitienė et al. (2015) revise FDI and growth in the construction sector of the Baltic States.

Table 2

Essential elements discussed by authors under FDI literature in Baltic countries

	Elements	Authors
Essential elements of FDI	Investment uncertainty	Duran (2019)
	FDI-related challenges	Kalotay (2019)
	Barriers towards FDI	Hazley et al. (2002)
	Knowledge transfer	Burinskas et al. (2021)
	Inward FDI	Cieślik et al. (2021), Kalotay (2017)
	Outward FDI	Kalotay (2017), Kilvits et al. (2003)
	FDI flows	Nikula et al. (2013), Raudonen et al. (2012)
	Investments promotion	Simelyte et al. (2013, 2012)
	Innovativeness	Runiewicz (2004), Hintošová et al. (2020)
	Business environment	Barkauskaitė et al. (2016)
	Sector analysis	Banaitienė et al. (2015)
	Economic development	Lukoševičiūtė et al. (2016), Adekola et al. (2008), Tvaronavičienė et al. (2008)
	Trade flows	Borsos et al. (1995)
	Regulation	Šimelytė et al. (2015)
	Small country specifics	Hunya (2004)
	Region specifics	Nakamura et al. (2012) Khan et al. (2020)
	Regional integration	Cornett et al. (2002)
	EU transition countries case	Babić et al. (2001)
	Investing country	Cociu et al. (2007)
	Long-term prospects	Kalotay et al. (2013)

Source: own compilation

Přívara and Trnovský (2020) focus on savings in the Baltics which are dependent on demographic factors and FDI.

Lestar et al. (2022) argue that "financial development has a positive and significant effect on FDI, while corruption does not have a statistically significant impact; these results encourage policymakers to address issues regarding the joint impact of FDV and corruption on FDI in developing countries."

Table 3

Essential elements discussed by authors under FDI literature in Baltic countries (cont.)

Capital markets	Antras et al. (2009)
Market development	Jeffus (2005); Maâlej, (2022)
Regional disparities	Nistor (2012); Antonioli et al. (2022)
Location of FDI output	Lipsey (2007)
Export promotion	Zhang et al. (2001) Shmarlouskaya et al. (2021)
Risk related to FDI	Van Wyk et al. (2008)
FDI stock	Kornecki et al. (2011)
FDI implications	Nistor (2015) Milewicz (2020)
Policy fostering FDI	Adler et al (2008)
Role of FDI	Raza et al. (2012) Táncošová (2019)
The net value of FDI	Sultana et al. (2012) Musara & Nieuwenhuizen (2021)
Industries prompted by FDI	Leal et al. (2021)

Source: own compilation

Table 3 shows the trends that many authors in their scientific papers emphasize a bit different topics than the authors studying FDI aspects in the Baltic countries. Leal et al. (2021) investigate how FDI change industries. Lipsey (2007) measures the FDI output by location. Kornecki et al. (2011) researched inward FDI stock and growth in Central and Eastern Europe (CEE). Brenton et al. (1999) investigate the potential magnitude and impact of FDI flows to CEE countries. Nistor (2012) examines FDI and regional disparities growth in Romania. Van Wyk et al. (2008) identify the risk of FDI flows to developing countries. Nistor (2015) searches for FDI implications on BRIC (Brazil, Russia, India, and China) economy growth. Jeffus (2005) mentions FDI and stock market development in selected Latin American countries. Sultana et al. (2012) revise the impact of the flow of FDI on the Indian stock market. Raza et al. (2012) highlight the role of FDI on stock market development in the case of Pakistan. Zhang et al. (2001) promote exports towards inward FDI in China. Hu et al. (2002) investigate FDI impact and spillover in China's electronic and textile industries. Adler et al. (2008) focused on policy liberalization regarding FDI growth. Yeyati et al. (2007) show the cyclical nature of North-South FDI flows. Antras et al. (2009) highlight the role of multinational firms in FDI flows and imperfect capital markets.

Most of these studies highlight the most prominent countries, such as BRIC and CEE, and others. Also, the authors of the studies analyse the cyclicity of FDI, risks, policy liberalisation, impact on industries, trade and markets (such as the stock market).

The authors identify the research methods that are used to revise FDI aspects by the authors publishing papers under the topic. Some directions are identified in previous sections. The authors focus on such principles: (1) the classification of FDI by mode and success; (2) the improvement of decisions on FDI helping to select countries to invest in and variables (economic, political, and business) affecting such decisions; (3) the design of FDI network and distribution of investors; (4) the impact of FDI on country and region, the regulation and promotion of FDI by country and region; (5) differences between big and small countries in attracting FDI and other studies cited in Table 4.

Table 4

Hierarchy of qualitative methods and models for researching FDI aspects

Model type	Model technique	Solution method	Authors researching FDI
Mathematical programming method	Single objective	Linear programming	Barros et al. (2013), Yang et al. (2013), Zhu et al. (2018)
	Multiple objectives	Mixed-integer linear programming Mixed-integer programming Multiple regression Analysis of hierarchical regression Fuzzy-goal programming Stochastic dynamic programming Non-linear programming	Shahzad et al. (2013), Fadhil et al. (2015), Mehmood et al. (2021)
	Time series	Dynamic regression analysis	Kurul et al. (2017)
Causal models	Causality identification methods	Causal effect modeling Analytical redundancy relation	Nair-Reichert et al. (2001)
Heuristic methods	Simple heuristic	Simulated annealing heuristics	Yu et al. (2016)
	Artificial intelligence techniques	Markov chain Bayesian network modeling Bayesian probabilistic models Fuzzy logic	Bode et al. (2011), Wren et al. (2012), Alba et al. (2010) Casella (2019) Sitnicki et al. (2021), Blahun et al. (2020)
	Metaheuristic	Genetic Algorithm	Qi et al. (2006)
Analytical models	Multi-criteria decision making	Analytical hierarchy process DEMATEL	Cabrera et al. (2009)
Analytical models	Systematic models	Delphi method Network model	Arif et al. (2021)

Source: own compilation

A more detailed description will be presented below.

Table 4

Hierarchy of qualitative methods and models for researching FDI aspects (continue)

Authors researching FDI aspects	Description of study
Barros et al. (2013) Yang et al. (2013)	Linear regression investigates the differences in factors affecting FDI in various countries. More significant economies attract higher FDI than smaller.
Zhu et al. (2018) Fadhil et al. (2015) Shahzad et al. (2013)	Investigate the impact of outward FDI on the efficiency of companies Regression equation of green technology progress of outward FDI A multiple regression model is suggested to analyze the impact of FDI inflows on the economic growth of the FDI receiving country The hierarchical regression model is used to analyze interactions between economic, political, and business variables stimulating FDI inflows
Kurul et al. (2017)	Dynamic regression analysis revises the relationship between institutional factors and FDI
Nair-Reichert et al. (2001)	Causal effect modeling analysis of the impact of FDI on long-term economic growth
Yu et al. (2016)	Simulated annealing heuristics were applied to investigate the optimal mode of FDI
Bode et al. (2011) Wren et al. (2012) Alba et al. (2010) Casella (2019)	Markov chain is used to investigate regional development forced by FDI Markov chain is applied to determine the location pattern of FDI in a country and examine differences between North and South. Markov chain method is taken to revise the impact of exchange rate on FDI

	By using Bayesian probabilistic models, the authors revise the global FDI investors' network and determine the distribution of investors
Qi et al. (2006)	A genetic algorithm is used for the classification of FDI by their success rate.
Cabrera et al. (2009)	The analytical hierarchy process is applied in the selecting country for FDI decision-making.
Arif et al. (2021)	The network model is used to define relationships in the FDI network

Source: own compilation

In Table 4, the authors examined the type of qualitative methods and models dedicated to FDI studies. The most popular method for studies was the Markov chain method and various methods related to regression. Other methods were rarely used and applied for specific analysis under the topic.

3. METHODOLOGY TO RESEARCH FDI ACTIVITY IN BALTICS

FDI activity is a pretty complex phenomenon. This study aims to figure out the activation of FDI activity.

Various FDI variables could be analyzed, including the view per sector:

- net outward FDI for manufacturing,
- net outward FDI for services,
- FDI income for manufacturing,
- FDI income for services,
- return of FDI in percentage for manufacturing,
- return of FDI in percentage for services.

The authors divided the methodology into three layers, presenting the links between FDI and economic variables (see Table 5).

Table 5

Three-tier methodology highlighting the FDI activity

Level	Relationship to FDI	Description of research by stages	The application of methods	Links with the Baltics
1st level Use of FDI-related variables	The investigation of patterns of FDI variables	Selection of FDI variables having the inter-relationship	Review of literature, Covariance analysis.	The focus on the specifics of the Baltics
2nd level Review of economic FDI variables (for services and manufacturing)	The investigation of patterns of main FDI variables	Selection of FDI variables having the inter-relationship	Dynamic and logarithmic approach, Benchmarking.	The focus on the FDI specifics in the Baltics for services and manufacturing
3rd level Review of economic variables	The investigation of economic patterns	Identification of economic variables having links with FDI variables	Panel data analysis, Correlation matrix	The focus on the specifics of the Baltic countries and the economic situation

Source: own compilation

Table 5 provides a summary highlighting the link between the variables with the help of a three-tier methodology, providing descriptions, relationships, and methods specific to each level.

For the research, the authors used economic indicators, such as

- Gross operating surplus per person employed - thousand euros,
- Turnover per person employed - thousand euro,
- Apparent labor productivity (Gross value added per person employed) - thousand euros,

- Gross operating surplus/turnover (gross operating rate) – percentage,
- Investment per person employed - thousands of euros,
- Percentage of gross domestic product (GDP).

The yearly data was retrieved from Eurostat and UNESCO for 3 Baltic countries (Estonia, Latvia, and Lithuania) from 2003 to 2019. In total, it was 528 data sets with the values.

The authors revised the data, constructed a correlation matrix, and presented variables that have a probability lower than 0.1 (Table 6). The study's novelty is that the authors revised a dynamic of these variables in two years intervals by analyzing the impact in year *t* and year *t-2*. The authors of this work use the dynamic regression approach first applied by Petris et al. (2009). The first step in the matrix construction procedure was transforming time series into logarithmic values useful for comparing variables with different measures. Such an approach allows for identifying the links between the FDI and economic variables. The next step was revising links in year *t* and year *t-2* intervals, allowing us to identify the most robust links. The third step is the preparation of d the panel data, which is imported to eViews software to further analysis. During the fourth step, the authors applied the covariance analysis and constructed the correlation matrix showing the links between the pairs of variables. First, we describe the associations with FDI variables, after with FDI sectoral variables, and finally, macroeconomic variables.

Table 6

Correlation matrix of significant variables transformed into dlog

Correlation		FDI_FLOW_DL	FDI_FLOW_DL(-1)	FDI_FLOW_DL(-2)	FDI_STCK_DL	FDI_RETURN_MN_D	FDI_RETURN_MN_D(-2)	FDI_RETURN_SRV_D	FDI_RETURN_SRV_D(-2)	FDIINCOME_MN_DL	FDIINCOME_MN_DL(-2)	FDIINCOME_SRV_DL	FDIINCOME_SRV_DL(-1)	FDIINCOME_SRV_DL(-2)	NET_FDIOUTW_MN_DL	NET_FDIOUTW_MN_DL(-1)	NET_FDIOUTW_MN_DL(-2)	NET_FDIOUTW_SRV_DL	GERD_D	GOSE_DLP	GOSE_DLP(-1)	GVAE_DLP(-1)	MRGNE_D(-1)
FDI_STCK_DL	Corr. Coefficient								-0,88														
	Probability								0,01														
FDI_RETURN_MN_D	Corr. Coefficient		-0,86																				
	Probability		0,01																				
FDI_RETURN_SRV_D	Corr. Coefficient		0,79			-0,92	0,80																
	Probability		0,03			0,00	0,03																
FDIINCOME_MN_DL	Corr. Coefficient		-0,75			0,89		-0,81															
	Probability		0,05			0,01		0,03															
FDIINCOME_MN_DL(-2)	Corr. Coefficient									0,80													
	Probability									0,03													
FDIINCOME_SRV_DL	Corr. Coefficient		0,80							0,85													
	Probability		0,03							0,02													
NET_FDIOUTW_MN_DL	Corr. Coefficient		0,69	0,75						0,97	0,94									-0,89	-0,69	-0,68	
	Probability		0,09	0,05						0,00										0,01	0,09	0,09	
NET_FDIOUTW_MN_DL(-1)	Corr. Coefficient										0,85												
	Probability										0,02												
NET_FDIOUTW_MN_DL(-2)	Corr. Coefficient										0,70					-0,67							
	Probability										0,08					0,10							
NET_FDIOUTW_SRV_DL	Corr. Coefficient		0,80	0,74						0,96	0,95				0,98	0,68				-0,85	-0,73		
	Probability		0,03	0,06						0,00	0,00				0,00	0,09				0,02	0,06		
NET_FDIOUTW_SRV_DL(-1)	Corr. Coefficient		-0,89							-0,77						-0,73							0,71
	Probability		0,01							0,04						0,06							0,08
NET_FDIOUTW_SRV_DL(-2)	Corr. Coefficient											-0,70				0,76							
	Probability											0,08				0,05							
GERD_D	Corr. Coefficient									0,74													
	Probability									0,06													
GERD_D(-2)	Corr. Coefficient	-0,87																					
	Probability	0,01																					
GOSE_DLP	Corr. Coefficient			0,68				-0,77				-0,74			-0,77								
	Probability			0,09				0,04				0,06			0,04								
GOSE_DLP(-1)	Corr. Coefficient					-0,80		0,78		-0,91		-0,73											
	Probability					0,03		0,04		0,00		0,06											
GVAE_DLP	Corr. Coefficient					-0,68															0,87		
	Probability					0,09															0,01		
GVAE_DLP(-1)	Corr. Coefficient	-0,74				-0,75		0,71		-0,77													
	Probability	0,06				0,05		0,07		0,04													
MRGNE_D	Corr. Coefficient					-0,73	-0,74								-0,77			-0,76	0,81				
	Probability					0,06	0,06								0,04			0,05	0,03				
MRGNE_D(-1)	Corr. Coefficient	-0,78				-0,76				-0,75													
	Probability	0,04				0,05				0,05													
TURE_DLP	Corr. Coefficient														0,71	-0,67	-0,90						
	Probability														0,07	0,10	0,01						
TURE_DLP(-1)	Corr. Coefficient				-0,81							-0,68				-0,76							
	Probability				0,03							0,10				0,05							

Source: own compilation

Where GERD   - Percentage of gross domestic product (GDP); GOSE - Gross operating surplus per person employed - thousand euro; GVAE -   Apparent labor productivity (Gross value added per person employed) - thousand euro; MRGNE - Gross operating surplus/turnover (gross operating rate) – percentage; TURE - Turnover per person employed - thousand euro.

4. EMPIRICAL RESULTS AND DISCUSSION

The authors identified 65 pairs with a probability lower than 0.1. FDI stock has a negative link with FDI return in the service sector over two years. FDI return in service has a positive connection with FDI flow in two years. FDI returns in the industry have a negative link with FDI return in manufacturing in the same year and a positive association in 2 years. FDI return in manufacturing in two years has a negative relation with FDI flows.

The FDI income has a negative link to FDI flows in two years, but the connection between FDI income and FDI returns in the manufacturing sector is positive. But the cross-sector link between FDI income in manufacturing and FDI return in service is negative in various periods. FDI income in service positively affects FDI stock and FDI income in manufacturing. There are many links between net FDI outward. Net FDI outward in manufacturing has positive relations with FDI stock, FDI return in manufacturing, FDI income in manufacturing, and FDI income in service. And three negative links are Gross operating surplus per person employed, Gross value added per person employed, and Gross operating surplus/turnover in one year. Net FDI outwards in manufacturing in t-1 and t-2 years have positive links to FDI income in service and a negative impact on Gross domestic product. Net FDI outward in service has the same positive links as manufacturing, plus positive links with net FDI outward in manufacturing in several periods and two negative links with Gross operating surplus per person employed, Gross value added per person employed. Net FDI outward in service the following year hurts FDI stock, FDI income in service, and net FDI outward in manufacturing the second year but a positive link on apparent labor productivity. Net FDI outward in service in two years has a negative link with FDI income in service a year after and a positive link in net FDI outward in manufacturing in two years.

The increase in Gross domestic products has a positive link to FDI income in service the following year, and the increase in Gross domestic products in two years has a negative relation with FDI flows. Gross operating surplus per person employed has a positive link with FDI flow the next year and three negative links with FDI return in manufacturing in two years, FDI income in manufacturing in two years, FDI income in service the following year. The next year's Gross operating surplus per person employed has a positive link with FDI return in the service sector and three negative links with FDI return in manufacturing, FDI income in manufacturing, and FDI income in service. Apparent labor productivity negatively affects FDI return in manufacturing in two years. Next year, the labor productivity variable has three negative links with FDI flows, FDI return in manufacturing, FDI income in manufacturing, and one positive link with FDI return in service.

Gross operating surplus/turnover has three negative links with FDI variables: FDI return in manufacturing in two years, FDI return in service in two years, FDI income in service in two years. The following year's gross operating surplus/turnover has the same negative links as the apparent labor productivity variable. Turnover per person employed positively correlates with FDI income in service next year and two negative links with net FDI outward in manufacturing two years in the row - next year and in two years. Turnover per person employed next year has three negative links with FDI stock, FDI income in the service sector, and net FDI outward in service.

Table 6 summarizes the correlation analysis performed for this study, noting the level of correlation between the elements listed in the table. The constructed table shows the link between variables that demonstrate significant associations. Table 6 indicates that variables (with probability 0) strongly correlate.

The detailed presentation of the correlation matrix is presented in three Appendixes A-C.

The review of studies of FDI in the Baltics shows that the topic lacks attention. Among studies that are fully dedicated to the Baltic countries is lower than 1 percent among FDI publications.

The authors identify that the studies have some different directions based on periods. Topics identified three different periods. These topics represent the status of FDI in the Baltic countries.

Among the research methods, the most applicable are the regression method and Markov chain analysis. Other methods are used rarely. The authors applied the three-level methodology to revise the patterns of FDI in Baltics, including sectoral and economic views. The results show that the inter-relationship between variables is evident but could be more assertive at different timing.

The research has further research directions:

- The analysis could be expanded into the Baltic Sea countries' research direction.
- The authors could analyze and compare differences in periods.
- The analysis and benchmarking of countries in the Baltics.

The research has some limitations: the authors do not revise the effect of FDI in Baltics; they identify the relationships between the main FDI non-sector, sector describing, and economic variables.

5. CONCLUSION

Identifying relationships between FDI variables in the Baltics is a new research topic that other authors did not explore. This article reveals that FDI and economic variables are strongly interrelated. The paper also discusses essential elements announced in FDI studies dedicated to general and the Baltic countries' research thematic. The authors constructed the hierarchy of qualitative methods for researching FDI aspects and figured out that most often, authors apply various types of regression methods.

The authors identified opportunities to apply other research methods for analysis dedicated to FDI. The authors suggested a multi-level methodology that allowed to reveal connection points between FDI, sector, and economic variables. The authors identified three levels of connection points. The first level of methodology was researched in a mathematical way seeking to identify interconnections between FDI variables. The second level is dedicated to sector analysis and benchmarking. The third level includes revising economic variables and their links with variables representing FDI. The authors found out that the connection among the above-identified elements is evident in different periods. The suggested approach could be applied for similar analysis.

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APPENDIX A

The link between FDI variables:

MN – Manufacturing

SRV – Service

OUTW – Outward

STCK – Stock

Correlation matrix		FDI_FLOW_DL	FDI_FLOW_DL(-1)	FDI_FLOW_DL(-2)	FDI_STCK_DL	FDI_STCK_DL(-1)	FDI_STCK_DL(-2)
FDI_RETURN_MN_D	Corr. Coefficient	0,49	-0,06	-0,86			
	Probablity	0,27	0,90	0,01			
FDI_RETURN_MN_D(-1)	Corr. Coefficient	-0,61	0,81	0,05			
	Probablity	0,15	0,03	0,92			
FDI_RETURN_MN_D(-2)	Corr. Coefficient	-0,58	-0,16	0,71			
	Probablity	0,17	0,73	0,07			
FDI_RETURN_SRV_D	Corr. Coefficient	-0,32	-0,05	0,79			
	Probablity	0,48	0,91	0,03			
FDI_RETURN_SRV_D(-1)	Corr. Coefficient	-0,34	0,54	-0,23			
	Probablity	0,45	0,21	0,62			
FDI_RETURN_SRV_D(-2)	Corr. Coefficient	0,03	-0,41	0,36			
	Probablity	0,96	0,37	0,43			
FDIINCOME_MN_DL	Corr. Coefficient	0,45	-0,18	-0,75	0,64	-0,45	0,05
	Probablity	0,31	0,70	0,05	0,12	0,31	0,92
FDIINCOME_MN_DL(-1)	Corr. Coefficient	-0,47	0,78	-0,11	-0,25	0,31	-0,03
	Probablity	0,29	0,04	0,81	0,59	0,50	0,95
FDIINCOME_MN_DL(-2)	Corr. Coefficient	-0,43	-0,26	0,63	-0,28	0,32	-0,16
	Probablity	0,34	0,58	0,13	0,54	0,48	0,73
FDIINCOME_SRV_DL	Corr. Coefficient	0,37	-0,27	-0,42	0,80	-0,57	0,15
	Probablity	0,42	0,56	0,34	0,03	0,18	0,74
FDIINCOME_SRV_DL(-1)	Corr. Coefficient	-0,56	0,70	-0,22	-0,18	-0,05	0,56
	Probablity	0,19	0,08	0,64	0,70	0,92	0,19
FDIINCOME_SRV_DL(-2)	Corr. Coefficient	0,11	-0,57	0,50	-0,77	0,68	-0,68
	Probablity	0,82	0,18	0,26	0,04	0,09	0,09
NET_FDIOUTW_MN_DL	Corr. Coefficient	0,40	-0,21	-0,63	0,69	-0,43	0,00
	Probablity	0,38	0,65	0,13	0,09	0,33	0,99
NET_FDIOUTW_MN_DL(-1)	Corr. Coefficient	0,14	-0,16	-0,22	0,52	-0,26	-0,08
	Probablity	0,77	0,73	0,63	0,23	0,58	0,87
NET_FDIOUTW_MN_DL(-2)	Corr. Coefficient	-0,01	-0,34	0,16	0,53	-0,25	0,02
	Probablity	0,98	0,46	0,73	0,22	0,59	0,97
NET_FDIOUTW_SRV_DL	Corr. Coefficient	0,40	-0,19	-0,60	0,80	-0,58	0,17
	Probablity	0,37	0,69	0,15	0,03	0,17	0,72
NET_FDIOUTW_SRV_DL(-1)	Corr. Coefficient	-0,50	0,39	0,00	-0,89	0,77	-0,37
	Probablity	0,25	0,39	0,99	0,01	0,04	0,42
NET_FDIOUTW_SRV_DL(-2)	Corr. Coefficient	0,47	-0,66	0,40	0,61	-0,52	0,14
	Probablity	0,29	0,10	0,38	0,14	0,23	0,76

APPENDIX B

The link between sector related FDI variables:

MN – Manufacturing

SRV – Service

OUTW – Outward

Correlation matrix		FDI_RETURN_MN_D	FDI_RETURN_MN_D(-1)	FDI_RETURN_MN_D(-2)	FDI_RETURN_SRV_D	FDI_RETURN_SRV_D(-1)	FDI_RETURN_SRV_D(-2)	FDIINCOME_MN_DL	FDIINCOME_MN_DL(-1)	FDIINCOME_MN_DL(-2)	FDIINCOME_SRV_DL	FDIINCOME_SRV_DL(-1)	FDIINCOME_SRV_DL(-2)	NET_FDIOUTW_MN_DL	NET_FDIOUTW_MN_DL(-1)	NET_FDIOUTW_MN_DL(-2)	NET_FDIOUTW_SRV_DL	NET_FDIOUTW_SRV_DL(-1)	NET_FDIOUTW_SRV_DL(-2)
FDI_RETURN_MN_D	Corr. Coefficient	1,00																	
	Probablity	-----																	
FDI_RETURN_MN_D(-1)	Corr. Coefficient	-0,38	1,00																
	Probablity	0,40	-----																
FDI_RETURN_MN_D(-2)	Corr. Coefficient	-0,76	-0,01	1,00															
	Probablity	0,05	0,98	-----															
FDI_RETURN_SRV_D	Corr. Coefficient	-0,92	0,12	0,80	1,00														
	Probablity	0,00	0,81	0,03	-----														
FDI_RETURN_SRV_D(-1)	Corr. Coefficient	0,16	0,45	-0,15	-0,20	1,00													
	Probablity	0,74	0,31	0,75	0,67	-----													
FDI_RETURN_SRV_D(-2)	Corr. Coefficient	-0,28	-0,17	0,49	0,31	-0,57	1,00												
	Probablity	0,55	0,72	0,26	0,50	0,18	-----												
FDIINCOME_MN_DL	Corr. Coefficient	0,89	-0,55	-0,66	-0,81	-0,02	-0,43	1,00											
	Probablity	0,01	0,20	0,11	0,03	0,96	0,34	-----											
FDIINCOME_MN_DL(-1)	Corr. Coefficient	-0,25	0,92	-0,21	-0,04	0,18	-0,20	-0,33	1,00										
	Probablity	0,59	0,00	0,66	0,94	0,70	0,67	0,46	-----										
FDIINCOME_MN_DL(-2)	Corr. Coefficient	-0,68	-0,25	0,92	0,80	-0,31	0,33	-0,44	-0,34	1,00									
	Probablity	0,09	0,60	0,00	0,03	0,49	0,47	0,32	0,45	-----									
FDIINCOME_SRV_DL	Corr. Coefficient	0,54	-0,65	-0,38	-0,40	-0,11	-0,57	0,85	-0,45	-0,03	1,00								
	Probablity	0,21	0,12	0,40	0,37	0,82	0,18	0,02	0,31	0,94	-----								
FDIINCOME_SRV_DL(-1)	Corr. Coefficient	0,00	0,63	0,08	-0,05	0,83	-0,13	-0,30	0,35	-0,20	-0,51	1,00							
	Probablity	1,00	0,13	0,87	0,92	0,02	0,79	0,51	0,44	0,67	0,24	-----							
FDIINCOME_SRV_DL(-2)	Corr. Coefficient	-0,34	-0,32	0,57	0,42	-0,62	0,97	-0,43	-0,37	0,46	-0,47	-0,26	1,00						
	Probablity	0,45	0,49	0,18	0,35	0,14	0,00	0,34	0,42	0,30	0,29	0,57	-----						
NET_FDIOUTW_MN_DL	Corr. Coefficient	0,75	-0,58	-0,56	-0,67	-0,13	-0,48	0,97	-0,33	-0,27	0,94	-0,45	-0,45	1,00					
	Probablity	0,05	0,17	0,19	0,10	0,78	0,27	0,00	0,47	0,55	0,00	0,31	0,32	-----					
NET_FDIOUTW_MN_DL(-1)	Corr. Coefficient	0,16	-0,58	-0,02	0,03	-0,35	-0,36	0,53	-0,36	0,37	0,85	-0,57	-0,24	0,70	1,00				
	Probablity	0,73	0,18	0,97	0,94	0,44	0,43	0,22	0,42	0,42	0,02	0,19	0,60	0,08	-----				
NET_FDIOUTW_MN_DL(-2)	Corr. Coefficient	-0,01	-0,34	0,02	-0,08	-0,23	-0,44	0,40	-0,17	0,26	0,70	-0,61	-0,31	0,59	0,62	1,00			
	Probablity	0,98	0,45	0,97	0,87	0,61	0,33	0,37	0,71	0,57	0,08	0,14	0,50	0,17	0,13	-----			
NET_FDIOUTW_SRV_DL	Corr. Coefficient	0,74	-0,55	-0,58	-0,66	0,00	-0,60	0,96	-0,34	-0,30	0,95	-0,39	-0,54	0,98	0,68	0,60	1,00		
	Probablity	0,06	0,20	0,17	0,11	1,00	0,16	0,00	0,45	0,51	0,00	0,39	0,21	0,00	0,09	0,15	-----		
NET_FDIOUTW_SRV_DL(-1)	Corr. Coefficient	-0,27	0,45	0,41	0,23	-0,03	0,67	-0,54	0,34	0,15	-0,77	0,53	0,50	-0,63	-0,50	-0,73	-0,72	1,00	
	Probablity	0,56	0,32	0,36	0,61	0,95	0,10	0,21	0,45	0,75	0,04	0,22	0,25	0,13	0,25	0,06	0,07	-----	
NET_FDIOUTW_SRV_DL(-2)	Corr. Coefficient	-0,05	-0,54	-0,06	0,08	-0,23	-0,33	0,25	-0,47	0,17	0,58	-0,70	-0,12	0,39	0,43	0,76	0,46	-0,89	1,00
	Probablity	0,91	0,21	0,91	0,86	0,62	0,47	0,58	0,29	0,72	0,17	0,08	0,80	0,39	0,34	0,05	0,30	0,01	-----

APPENDIX C

The link between FDI flows, FDI stock and economic variables:

GERD Percentage of gross domestic product (GDP)

GOSE Gross operating surplus per person employed - thousand euro

GVAE Apparent labour productivity (Gross value added per person employed) - thousand euro

MRGNE Gross operating surplus/turnover (gross operating rate) - percentage

TURE Turnover per person employed - thousand euro

Correlation matrix		FDI_FLOW_DL	FDI_FLOW_DL(-1)	FDI_FLOW_DL(-2)	FDI_STCK_DL	FDI_STCK_DL(-1)	FDI_STCK_DL(-2)	GERD_D	GERD_D(-1)	GERD_D(-2)	GOSE_DLP	GOSE_DLP(-1)	GOSE_DLP(-2)	GVAE_DLP	GVAE_DLP(-1)	GVAE_DLP(-2)	MRGNE_D	MRGNE_D(-1)	MRGNE_D(-2)	TURE_DLP	TURE_DLP(-1)	TURE_DLP(-2)
FDI_FLOW_DL	Corr, Coefficient	1																				
	Probablity	-----																				
FDI_FLOW_DL(-1)	Corr, Coefficient	-0,59	1																			
	Probablity	0,16	-----																			
FDI_FLOW_DL(-2)	Corr, Coefficient	-0,16	-0,4	1																		
	Probablity	0,72	0,36	-----																		
FDI_STCK_DL	Corr, Coefficient	0,35	-0,03	-0,33	1																	
	Probablity	0,43	0,93	0,46	-----																	
FDI_STCK_DL(-1)	Corr, Coefficient	-0,39	0,03	0,22	-0,92	1																
	Probablity	0,38	0,94	0,62	0	-----																
FDI_STCK_DL(-2)	Corr, Coefficient	-0,16	0,34	-0,08	0,63	-0,79	1															
	Probablity	0,73	0,45	0,85	0,12	0,03	-----															
GERD_D	Corr, Coefficient	-0,23	0,1	0,03	-0,28	-0,02	0,39	1														
	Probablity	0,6	0,829	0,93	0,53	0,95	0,37	-----														
GERD_D(-1)	Corr, Coefficient	0,6	-0,28	-0,13	-0,37	0,15	-0,33	0,37	1													
	Probablity	0,14	0,53	0,77	0,41	0,73	0,46	0,4	-----													
GERD_D(-2)	Corr, Coefficient	-0,87	0,79	-0,25	-0,13	0,27	0,13	0	-0,61	1												
	Probablity	0,01	0,03	0,58	0,76	0,54	0,77	0,98	0,14	-----												
GOSE_DLP	Corr, Coefficient	0,1	0,68	-0,54	0,4	-0,38	0,34	-0,3	-0,08	0,23	1											
	Probablity	0,82	0,09	0,2	0,36	0,39	0,45	0,5	0,86	0,61	-----											
GOSE_DLP(-1)	Corr, Coefficient	-0,59	0,46	0,52	-0,47	0,26	0,21	0,44	-0,06	0,36	-0,04	1										
	Probablity	0,15	0,29	0,22	0,28	0,56	0,63	0,31	0,88	0,42	0,92	-----										
GOSE_DLP(-2)	Corr, Coefficient	0,63	-0,43	0,42	-0,01	-0,24	0,08	0,15	0,59	-0,83	0	0,09	1									
	Probablity	0,12	0,32	0,34	0,98	0,58	0,85	0,74	0,58	0,01	0,83	-----										
GVAE_DLP	Corr, Coefficient	0,33	0,51	-0,42	0,39	-0,51	0,41	-0,04	0,248	-0,05	0,87	0,09	0,31	1								
	Probablity	0,46	0,23	0,34	0,38	0,24	0,34	0,92	0,59	0,9	0,01	0,83	0,48	-----								
GVAE_DLP(-1)	Corr, Coefficient	-0,73	0,52	0,35	-0,64	0,6	-0,16	0,18	-0,17	0,63	-0,1	0,84	-0,31	-0,11	1							
	Probablity	0,05	0,22	0,43	0,12	0,14	0,71	0,68	0,7	0,12	0,81	0,01	0,48	0,8	-----							
GVAE_DLP(-2)	Corr, Coefficient	0,58	-0,47	0,41	0,36	-0,61	0,43	0,22	0,33	-0,77	-0,06	0,07	0,85	0,29	-0,4	1						
	Probablity	0,16	0,28	0,35	0,41	0,13	0,33	0,62	0,46	0,04	0,88	0,88	0,01	0,52	0,36	-----						
MRGNE_D	Corr, Coefficient	0,21	0,35	-0,41	0,61	-0,4	0,14	-0,76	-0,37	0,14	0,81	-0,36	-0,13	0,57	-0,29	-0,11	1					
	Probablity	0,64	0,44	0,35	0,14	0,36	0,75	0,04	0,75	0,02	0,41	0,77	0,17	0,52	0,79	-----						
MRGNE_D(-1)	Corr, Coefficient	-0,77	0,55	0,48	-0,2	0,08	0,44	0,3	-0,47	0,56	0,04	0,89	-0,12	0,02	0,75	-0,02	-0,15	1				
	Probablity	0,04	0,19	0,27	0,66	0,86	0,32	0,51	0,28	0,18	0,92	0	0,78	0,95	0,02	0,55	0,33	-----				
MRGNE_D(-2)	Corr, Coefficient	0,06	-0,07	0,44	-0,12	-0,21	0,44	0,56	0,3	-0,4	-0,01	0,42	0,75	0,18	-0,06	0,66	-0,36	0,33	1			
	Probablity	0,89	0,86	0,32	0,79	0,64	0,31	0,18	0,5	0,36	0,18	0,5	0,05	0,9	0,42	0,1	0,47	0,32	-----			
TURE_DLP	Corr, Coefficient	0,08	0,45	-0,25	-0,19	-0,1	0,32	0,61	0,6	-0,07	0,44	0,38	0,42	0,66	0,1	0,25	-0,14	0,16	0,59	1		
	Probablity	0,85	0,3	0,58	0,67	0,81	0,48	0,14	0,14	0,87	0,1	0,38	0,33	0,1	0,81	0,58	0,76	0,72	0,16	-----		
TURE_DLP(-1)	Corr, Coefficient	-0,25	0,25	0,26	-0,81	0,74	-0,54	0,12	0,36	0,2	-0,12	0,63	0	0	0,8	-0,27	-0,33	0,31	-0,06	0,27	1	
	Probablity	0,57	0,58	0,56	0,02	0,05	0,2	0,79	0,42	0,89	0,79	0,12	0,98	0,99	0,02	0,55	0,45	0,48	0,89	0,55	-----	
TURE_DLP(-2)	Corr, Coefficient	0,64	-0,55	0,11	0,47	-0,33	-0,2	-0,57	0,01	-0,49	-0,09	-0,41	0,18	0,05	-0,36	0,37	0,32	-0,43	-0,4	-0,51	-0,16	1
	Probablity	0,11	0,19	0,8	0,28	0,46	0,66	0,17	0,96	0,25	0,83	0,35	0,69	0,9	0,42	0,4	0,47	0,32	0,36	0,23	0,73	-----