MODELING OF CAUSAL RELATIONSHIPS BETWEEN FOREIGN DIRECT INVESTEMENT, EXPORT AND ECONOMIC GROWTH FOR SLOVENIA[1]

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ABSTRACT

Foreign direct investment is generally considered to be an instrument how to stimulate economic growth of any country. Just because of this purpose governments of transition countries try to encourage the inflow of foreign direct investment by various measures. The aim of this paper is to analyse the relation between foreign direct investment, economic growth and export in Slovenia. For this purpose we apply cointegration analysis along with the vector error correction model. The results confirm the existence of a long-term relation between the variables analysed. We reveal a positive impact of GDP and impact of foreign direct investment on export.

JEL classification: E22, F21, O4

Key words: foreign direct investment, economic growth, export, cointegration, error correction model

1. INTRODUCTION

The positive effect of foreign direct investment (FDI) on economic growth of the country is a commonly accepted claim. The main purpose of this article is to

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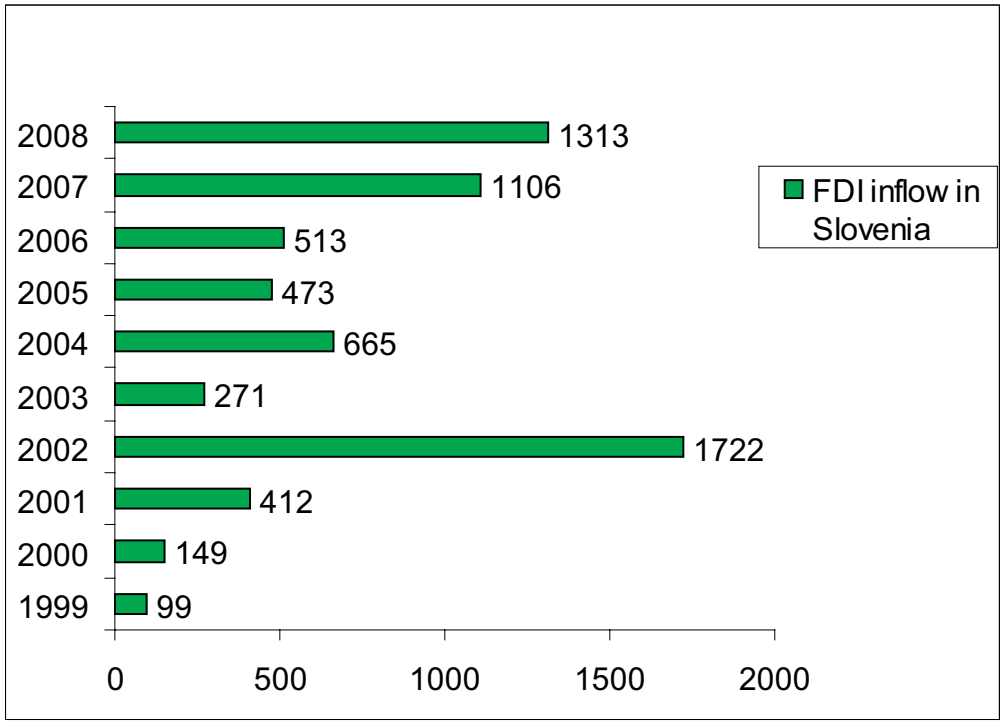
examine the relationship between export, FDI and economic growth in Slovenia. FDI, with other benefits, brings also many advantages such as new technologies, manufacturing processes, know-how and others. Despite this positive feedback, the theme of FDI and its impact on the economy is being discussed at many levels. There are several theories and approaches to this problem that, on the one hand, support the claims about the positive effects of FDI on the economy but on the other hand, they also counter these arguments. The topic that is addressed often is a causal relationship between economic growth and exports. Not only economic theory, but also empirical studies are trying to prove this relationship. As an example we may use studies (Dritsaki et al., 2004), (Pacheco—Lopez, 2004), or (Feridun and Sissoko 2006). Slovenia as a country with a small own market is heavily dependent on foreign trade and especially on export. Foreign direct investments have ability to contribute directly to the country‘s export capacity. Foreign companies are financially stronger, larger on scale and in particular are more export oriented than domestic firms. The aim of this article is to examine whether this causal relationship is true in terms of economy in Slovenia. This paper is divided into five parts. The first part deals with a brief overview of foreign direct investment in Slovenia, and the second part deals with specification of the data and models used. The various stages of research are divided in the third and sixth part of this article.

2. FOREIGN DIRECT INVESTMENTS IN SLOVENIA

Among the countries of former Yugoslavia, Slovenia is economically and politically the safest country for foreign investors. This state is indicated by the fact that Slovenia is a member of the European Union since May 1, 2004 and since January 2007 it is also a part of the euro zone. The Western Balkans is a strategic area and market penetration into Slovenia means to move closer to the other markets of former Yugoslavia. Other benefits that the country offers to foreign investors are skilled workforce, quality management, experience in the production of difficult markets, a large number of domestic export-oriented companies and others. In relation to highly skilled labor force as a positive aspect of the market, there occurs a negative on the other hand, in the form of relatively expensive work force compared with the countries of Central and Eastern Europe**.** There are also other disadvantages present for investors; the Slovenes under-investment in new production facilities, lack of technical experts, and legislation regulating the employment relationship (high sickness benefits, holidays, maternity leave), high taxes, com-

plicated administrative procedures (e.g. the obtaining of planning and building permission - which restricts FDI to start from scratch on the green land), a small internal market and ultimately not very good payment behavior. By 2001 inflow of foreign direct investment in Slovenia accounted only around 1% of GDP. Boom of FDI inflow occurred in 2002, when the flow of FDI increased to 7.9% of GDP (FDI inflow in each year from 1999 to 2008 is captured in Figure 1). This increase was due to the privatization of state enterprises and companies. Balance of the FDI at the end of 2008 represented 11 trillion EUR. In regards to the privatization process a crucial role is played by competent government authorities that decide who is given a national stake in companies. In most privatization cases, where there is a large amount of capital necessary and for strategically important enterprises, privatization is realized by foreign investors. In regards to the privatization of small businesses, dominant position goes to domestic investors. The privatization has opened the door to investors, mainly to European Union countries. They even have a chance to compete with the domestic players to get state assets. Most investments are made in finance and insurance sector (46%), retail sector (15%) and chemical industry (10%). The countries that invest the most are Austria, Slovenia (47%), Switzerland (11%) and the third place goes to the Netherlands with France (7%). The most important foreign investors are Sandoz Group (Novartis – Lek) - pharmaceutical company, Bosh – electronics (employing 562 workers in Slovenia), Renault (Revoz) – the automotive industry. With regards to financial services, the significant investments are made by SanPaolo IMI group, which became a majority holder in the Koper bank's shares in 2002. Raiffeisen Bank became the majority owner of Krekova Bank shares (97.05%) in 2002, which has been in 2007 renamed to Raiffeisen Bank. Another significant foreign investment in Slovenia was an entrance of major banking group Société Générale to the Slovenian banking market and the acquisition of SKB Bank. As for the other services the large investors include: Ernst & Young, DHL, Deloitte, KPMG, PricewaterhousCoopers, and others. In the field of telecommunications it is worth to mention companies as Microsoft, IBM, Mobilkom. Mobilkom Austria became the majority owner of the first provider of mobile telecommunications services in Slovenia in February 2001, in 2006 it gained 100% share in this company.

Figure 1: FDI inflow in Slovenia, in mil. EUR, 1998 - 2008



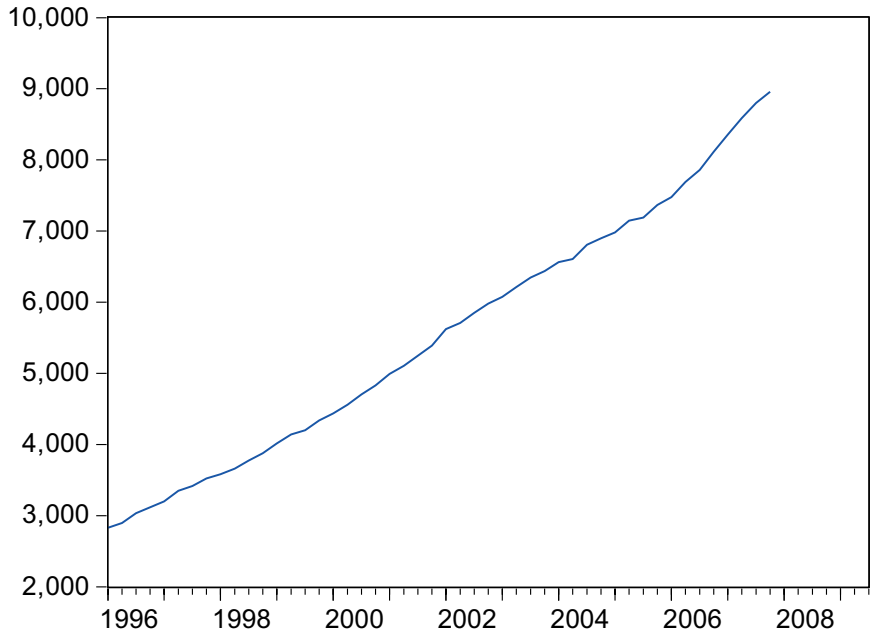
Source: Bank of Slovenia

3. Data and model specification

For the examination of relationship of the gross domestic product (GDP), exports (EXP) and foreign direct investment (FDI) the quarterly periodic data of 1996 – 2007 are used. GDP is expressed within the market prices, the FDI captures inflow of foreign direct investment in Slovenia, and exports of goods and services are expressed at the common prices. All data are drawn from the statistics of the Bank of Slovenia and are expressed in millions of EUR. Development of the variables is presented graphically in the three graphs below. Data export and GDP are seasonally adjusted. Subsequently, the individual data calculated the logarithm. Calculation of the logarithm was designed to achieve a reduction of variance of each time series and the subsequent protection of stationary. Logarithmic time series are marked with the letter L before the name of each series. To make a cointegration that helps to test the causal links between variables, it is necessary that calculated time series with the logarithm are stationary at the first differentiation I(1) and non-stationary at their values. A causal relationship between these variables is studied on the basis of a vector autoregressive model (VAR) in the following form:

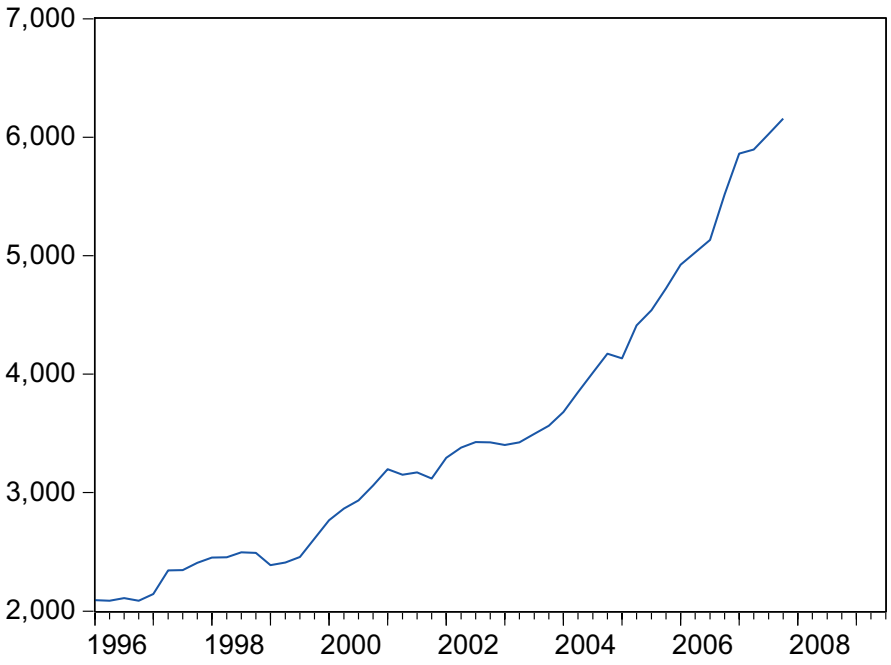
$$EXP = f(GDP, FDI) \quad (1)$$

Figure 2: Seasonally adjusted GDP in mil. EUR (1996 – 2007)



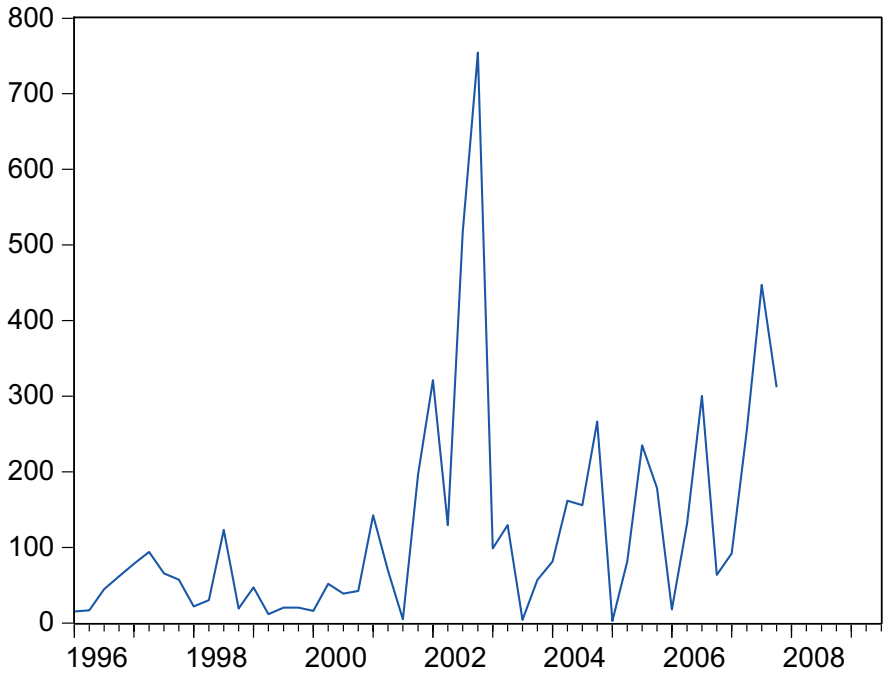
Source: authors´ calculations based on data from Bank of Slovenia

Figure 3: Seasonally adjusted export in mil. EUR (1996 – 2007)



Source: authors´ calculations based on data from Bank of Slovenia

Figure 4 Inflow FDI in Slovenia in mil. EUR (1996 - 2007)



Source: Bank of Slovenia

4. UNIT ROOT TEST

An important point of analysis is determination of a unit root by Augmented Dickey—Fuller test (ADF test). This test is used in order to show that individual variables are integrated at I (1) - that means stationary at the first difference. As a proof the following equation is formulated:

$$\Delta X_t = \delta_0 + \delta_1 t + \delta_2 X_{t-1} + \sum_{i=1}^{k} \alpha_i \Delta X_{t-i} + u_t \tag{2}$$

ADF test is used to determine a unit root at X_t at all logarithmic variables at time t. Variable ΔX_{t-i} expresses the first difference of delay and u_t finds error of autocorrelation. Coefficients δ_0, δ_1, δ_2 and α_i are estimated. Zero and the alternative hypothesis for the existence of a unit root in the variable X_t is (Dickey and Fuller, 1979):

$$H_0: \delta_2 = 0 \qquad H_\varepsilon: \delta_2 < 0 \tag{3}$$

The result of ADF test, which confirms the stationary of all three time series at the first differences, is given in Table 1. The first part of the table contains of data showing the value of tested non-stationary time series at their values, and the second part of the table records data indicating the stationary of time series at first differences. All test results are signifiant at 1 % level.

Table 1: ADF Unit Root Tests

	levels		1st differences	
Variables	Lagged	Test statistic ADF	Lagged	Test statistic ADF
LEXP_sa	1	-1,3880*	0	-5,6926*
LFDI_flows	1	-0,0282*	0	-7,7620*
LGDP_sa	0	-1,7744*	1	-3,3592*

Note: *, ** denote significance at 1 % and 5 % respectively
Source: authors´calculations

5. COINTEGRATION – JOHANSEN COINTEGRATION TEST

Stationarity of time series at the first differentiation is a met prerequisite for the realization of cointegration. Cointegration can be defined as a long-term equilibrium relationship between economic variables. Each time series, though non-stationary, have common long-term cointegration movement towards equilibrium, for example, due to various market forces. Even though it is possible that in short periods of time there is a tilt of such long-term balance (Cipra, 2008). When testing cointegration, it represents the determination of "r" cointegration relations in the particular VAR model. Cointegration is confirmed if it is true that r> 0. Most widely used for testing cointegration in practice nowadays is Johansen Cointegration Test, which was used in this study. In order to design Johansen Cointegration Test it is necessary to obtain an indication of optimal time delays, which in this case represents examination of one period. The optimal number of delays was chosen based on Akaike information criterion applied to estimate the undifferentiated VAR model. Then the cointegration link between these variables may be studied (Johansen, 1988, Johansen and Jeselius, 1990). Cointegration test results are shown in Table 2. We argue that the existence of long-term relationship was established between the variables and the cointegration link was found. Cointegration equation has the following form:

$$LEXP = 1{,}1735\ LGDP + 0{,}0066\ LFDI - 2{,}6763 \quad (4)$$
$$(0{,}0913) \qquad (0{,}0267) \quad (0{,}7680)$$

The above equation shows that if the country's GDP increases by 1%, there is an increase in exports of 1.17% and if FDI inflow increases by 1%, then there is a growth in exports of 0.006%.

Table 2: Johansen cointegration test Variables LEXP, LFDI and LGDP

Null	Trace Statistic	Critical Values 0,05
r = 0	75,8493	35,1928
r <= 1	26,1499	20,2618
r <= 2	4,9589	9,1646
Null	**Max-Eigen Statistic**	**Critical Values 0,05**
r = 0	49,6994	22,2996
r <= 1	21,1909	15,8921
r <= 2	4,9589	9,1646

Source: authors´calculations

6. ERROR CORECTION MODEL

Cointegration test demonstrated that there is long term dependence between those variables. However, cointegration is leaving aside the possibility of short-term fluctuations between the two examined variables. The error correction model is used for detection of these fluctuations during cointegration (Error correction model – ECM). Error correction model is an adequate tool to analyze short-term deviations, necessary to achieve long-term balance between the two variables (Cipra, 2008). Error correction model has the following form:

$$\Delta\ LEXP_t = lagged\ (\Delta\ LEXP; \Delta\ LGDP_t; \Delta LFDI_t) + \lambda\ u_{t-1} + V_t \quad (5)$$

where lagged represents a certain number of delays explaining variables. The optimal number of delays is determined by Akaike criteria. Δ means the first difference of the variable, u_{t-1} is the estimated residual components of the long-term relationship, determined from cointegration test $1 < \lambda < 0$ is the rate of return to long-term balance and V_t is a random component of white noise. Appropriate adjustment of the model was tested by several tests of residual components. Specifically, it was a test of autocorrelation (LM - test, which is based on Lagranger's multiplier) test of

normality and hetero-scedasticity test. Testing ruled out the existence of all three events and confirmed that the model is properly chosen. The result of an error correction model is depicted in Table 3:

Table 3: Error Correction Model

	Δ LEXP$_{t-1}$	Δ LGDP$_{t-1}$	ΔLFDI$_{t-1}$	Δ LEXP$_{t-2}$	Δ LGDP$_{t-2}$
Δ LEXP$_t$	0,146247	-0,839894	-0,009126	-0,117658	-0,250776
	(0,16247)	(0,48783)	(0,00443)	(0,16211)	(0,47039)
	ΔLFDI$_{t-2}$	u$_{t-1}$	V$_t$		
	-0.006076	0,009921	0,048941		
	(0,00331)	(0,00520)	(0,01734)		

Note: Values authoritative deviations are in parenthesis

Source: authors´calculations

Error correction model, in the investigation of the relationship between variables EXP, FDI, and GDP, explains about 1% rate of convergence to long-term equilibrium relationship in case of short-term shocks.

7. CONCLUSION

This paper examines the causal relationship between export, gross domestic product and foreign direct investment in Slovenia. The research used quarterly data of the years 1996 - 2007. First, the data were adjusted for the calculations. Gross domestic product and export were seasonally adjusted. Subsequently, they were used for initial testing and testing for stationarity. Test results showed that all three time series are stationary up to its first difference. This result enabled a continuance with further research and after finding the time lag the cointegration Johansen test was carried. The test has demonstrated positive long-term relationship between variables. Cointegration equation had shown a positive relationship between GDP and export as well as the inflow of foreign direct investment and export. This fact demonstrates the generally accepted argument that foreign direct investment is a positive force for the export of the country. After joining the European Union and euro zone, Slovenia gained an imaginary mark of the safe region in many ways. Despite the existing negatives (legislation, taxation and others) it is interesting territory for the entry of foreign investors into the country. As a last step of research

error correction model was carried out. This explains the approximate 1% rate of convergence to long-term equilibrium relation to formation of short-term shocks.

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