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A VECM approach to detangling growth, exports, imports and FDI knot in selected CEE countries

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Abstract. The authors analyze the relationship between GDP, imports-coverage ratio (NEX), FDI and gross fixed capital formation (GFC) in selected CEE countries by using an error correction model. The empirical results confirm a positive long-run influence of the imports-coverage ratio, FDI and GFC on GDP growth for all of the countries, except Croatia. In the case of Croatia, there is a significant negative feedback between FDI and GDP growth in the long run and a positive one in the short run. By using B. Horvat's research on this subject, a logical explanation of this sort of paradoxical behavior is suggested. The second uncommon result is the long-run positive relationship between GDP and the imports-coverage ratio. The obtained result speaks in favor of a conservative approach to running a national economy, where the current account and the imports-coverage ratio are taken into account and the economic growth is achieved through slower but stable, internally driven growth.

Key words: Error Correction Model, FDI, imports-coverage ratio, gross fixed capital, GDP, economic growth, CEE countries

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1. Introduction

In the current era of influential multinationals and world-wide trade agreements, the majority of the economies are very open to international trade. Trade volume as a share of GDP has grown sharply over the past decades, especially in transition economies that were largely closed prior to the 90's. There is extensive economic literature claiming that international trade has a positive impact on economic growth and such view is widely accepted. There has been a substantial shift by many transitional economies towards liberal trade regimes

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as part of the Washington consensus, World Bank and World Trade Organization rules [21]. Reduction of tariff and non-tariff minimization of barriers to facilitate trade has been at the heart of these programs. The usual assumption is that the country's size is relevant to economic growth, i.e., that larger countries grow faster in case of trade barriers as opposed to smaller countries. The majority of papers claim that FDI has a positive effect on the economy of the host country (technology transfers, new processes, managerial skills, productivity gains, know-how) and that it is a significant factor in modernizing the host economy. On the other hand, there is a strain of opposing research claiming that FDI boosts the economy only in the short term but actually reduces growth and prosperity in the long run since it mainly focuses on profit extraction from the most profitable industries such as banking, telecommunications and pharmaceuticals [19]. We analyze the impact of FDI and international trade on economic growth. The analysis is performed on four CEE countries - Slovenia, Croatia, Serbia and the Czech Republic. The main purpose of the paper is to determine the relationship between GDP, NEX, FDI and GFC using quarterly data in the period from 2001 to 2013. The rest of the paper is organized as follows: Section 2 describes a review of literature. An analytical framework, methodology and data are given in Section 3. Empirical results and discussion are described in Section 4 and Section 5. Section 6 outlines the concluding remarks.

2. Literature review on exports, imports, FDI and economic growth

International trade allows more efficient production of goods and services on the global scale, by shifting production to countries that have a comparative advantage in producing them. The trick is that globally optimizing the production does not necessarily contribute to local and regional well being and vice versa. FDI is often proclaimed as an important catalyst for economic growth. The empirical studies that analyze the impact of international trade and FDI on economic growth in developed countries are numerous, while for CEE/SEE such research is lacking. Studies dealing with developed countries usually show that trade openness can have a positive impact on economic growth, especially in the long run, through imports of high-tech products, spillover effects resulting from FDI [16], as well as through various reforms and programs that aim to create better conditions for participation in the international markets [33]. [27, 35] in their paper showed that international trade influences economic growth through investment, i.e., factor accumulation which helps expand productive capacity and increase potential output as well as employment creation and rise in the standard of living. Most of the empirical

studies find positive effects of FDI on long-run economic growth in host countries through multiple channels such as capital formation, technology transfer and spillover and human capital such as knowledge and skill enhancement [31, 3]. Interestingly, [7] find that FDI has a positive effect on economic growth when a country already has a high per capita income. [9] find that FDI has a positive impact on growth, but only in countries with a highly educated workforce that allows it to exploit FDI spillovers. [2] find that FDI promotes economic growth in countries with sufficiently developed financial markets. These results point to the conclusion that FDI is beneficial for the already highly developed economies but its effects on developing countries are not so straightforward.

The existing studies for CEE are focused on the effect of exports on GDP; [13] for Romania and Bulgaria, [24] for Hungary, and [4] for Bulgaria, the Czech Republic and Poland. [5] analyze FDI in transition countries with a special focus on Croatia in the period 1990-1999, when the majority of FDI inflow was generated by the process of privatization. In addition to a direct effect of exports on economic growth, [32] analyzed an indirect effect induced by imports for all CEE countries. [18] suggest that the rate of economic growth in developing countries is highly dependent on the extent to which these countries can adopt and implement new technologies available in developed countries. [1] claim that there is a long-run relationship and both long- and short-run causality between exports, FDI and GDP in 40% of the new EU countries. [10] examined the effects of FDI on growth for the period 1990-1998 for 25 CEE and CIS countries. They claim that FDI has a positive effect on economic growth in all of analyzed countries. [6] concluded that there is a positive impact of FDI on economic growth in small transition countries such as Slovenia, Slovakia and Lithuania. [23] concluded that the impact of FDI on economic growth in Croatia depends on the sectoral structure and the type of FDI attracted by the country. They advocate policy changes in order to attract FDI into sectors with higher value added.

The coverage of SEE countries in the empirical literature is scant, mainly owing to lack of relevant and uniform data. Methodology of data calculations varies by countries and even when data are available, the time period is too short. Most of the papers dealing with FDI in the SEE mainly refer to the theoretical analysis of FDI (e.g. [25]). [12] broadly confirm that various factors such as labor costs and institutional variables (index of economic freedom, progress in transition, political stability, privatization method and EU accession) play an important role in attracting FDI. [22] analyzes FDI in the Balkans in the early 2000s and find out that the impact of market size, labor costs, natural resources and distance from the core EU countries has a significant impact on FDI inflows. [8] shows that macroeconomic stability and

economic openness have a significant impact on economic growth and FDI inflow in the ex-socialist countries.

3. Methodology and data

Over the last two decades, the cointegration concept was brought to the forefront of macroeconomic research. Although still often found in various studies, it is common knowledge that a vector autoregressive (VAR) model specified in differences is valid only if the analyzed variables are not cointegrated. If the series are cointegrated, an ECM should be employed [17]. The VAR model can suggest only a short-run relationship between the variables since the long-run information is removed by first differencing, while the ECM avoids this. Furthermore, the ECM distinguishes between a long- and short-run relationship and can identify causation sources that cannot be detected by the usual causality test. The EC model used in this paper can be represented as:

$$\Delta LRGDP_t = \alpha_{12} + \sum_{i=1}^{n} \beta_{11i} \Delta LRGDP_{t-i} + \sum_{j=1}^{m} \beta_{12j} \Delta LNEX_{t-j} + \sum_{k=1}^{o} \beta_{13k} \Delta LFDISTOCK_{t-k} + \sum_{l=1}^{p} \beta_{14l} \Delta LGFC_{t-l} + \theta ECM_{t-1} + u_t \quad (1)$$

where ΔL - logged first difference, RGDP - real GDP, NEX - import coverage ratio, FDI stock - stock of foreign direct investments, GFC - gross fixed capital formation, ECM - error correction term, u - error term. In the case of the ECM, where causality comes from two sources, the EC term and lagged variables, causality can be confirmed by undertaking a joint *F*-test of the EC coefficient and the coefficients of lagged explanatory variables. The ML approach to cointegration makes it possible to test for the cointegration rank [20]. It allows for the estimation of these vectors and testing of linear restrictions using standard asymptotic inference. [20] shows that the small sample bias and normalization problems inherent in the LS approach do not arise in his method. In determining the number of cointegrating vectors both the Trace and the Max-eigenvalue test using the critical values of [28] were used. As in VAR analysis, innovation analysis can be used to obtain information concerning the interaction among the variables in the ECM. It is possible to analyze the dynamics of GDP in terms of the relative contribution of endogenous shocks and their transmission effects [11]. In determining the order of variables, the Cholesky factorization is used in which the largest variance is attributed to the variable ranked first.

We use data on real GDP, GFC, NEX and FDI stock for Croatia, Slovenia, the Czech Republic and Serbia. GFC is measured by the total value of producer's acquisitions, less disposals, of fixed assets during the accounting period plus additions to the value of non-produced assets (subsoil assets or

major improvements in the quantity, quality or productivity of land) realized by the productive activity of institutional units. Real GDP is an inflation-adjusted measure that reflects the value of all goods and services produced in a given year, expressed in base-year prices. In our case, 2010 is the base year. NEX is the share of country's own imports that is subject to particular non-tariff barriers. They are calculated by attaching actual values to bilateral trade flows between various exporters and the importing country. FDI stock refers to the value of the investment at a specific point in time. FDI is recorded in the internal investment position; outward FDI stock is listed as assets of the reporting economy and inward FDI stock as liabilities. We used only inward FDI stock data. All of the data was collected from national central banks and statistical offices. All variables are deflated and seasonally adjusted using X12ARIMA and expressed in natural logarithms. The series for Croatia, Slovenia and the Czech Republic consists of quarterly data in the period 1Q2001 - 3Q2013. Analysis of Serbia is performed separately on the original and the interpolated data. The original FDI series for Serbia consists of only 18 observations due to lack of official data (observations start from 4Q2008 and end at 3Q2013). Although lacking quarterly data, the yearly data is available and thus the interpolated FDI time series for Serbia was constructed by finding the quarterly, seasonal dynamics and applying that intra yearly dynamics to the period between Q1/2002 and Q3/2008.

4. Empirical results

To find the best model, we try to find a model which satisfies the expected signs of coefficients in accordance with economic theory. Different specifications are tested, including different combinations of explanatory variables and lags. Unit root tests were used to examine the presence of non-stationarity and identify the order of integration of variables. Since the analysis is done on a relatively small sample and the fact that unit root tests have low power in small samples, two tests are applied, ADF and Phillips-Perron test (PP). The tests are performed allowing for an intercept and a time trend. The [30] method was applied to choose the optimal lag length. Based on the obtained results from unit root tests, at the 5% significance level, we cannot reject the presence of a unit root in levels for all variables/countries, except for NEX when a constant and a trend are included (Croatia, Czech Republic, Serbia-original data). This indicates that dynamics of the underlying variables can be explained by including the simple time trend and intercept. The first-differences variables are found to be stationary for all variables except for GFC, where ADF does not reject non-stationarity while, the PP test does. We can conclude that series are integrated of order one I(1). Although macroeconomic data tends to be level non-

stationary, there can be a linear combination of non-stationary variables that is stationary. It can be assumed that there exists a cointegrated relationship or long-run equilibrium between variables [14]. Once proved that variables are integrated at the same order, we examine the existence of a cointegration relationship (long-run relationship) between economic growth and macroeconomic variables. In order to determine the number of cointegrating vectors, the Johansen multivariate cointegration procedure [20] is used. The procedure is based on the two test statistics in order to establish the number of cointegrating vectors, i.e., the trace (λ_{trace}) and the maximum eigenvalue statistics (λ_{max}). The small sample biases and normalization problems inherent in the OLS approach do not arise under the Johansen method. To examine the cointegration relationship between variables a model was set up with four variables (LRGDP, LNEX, LFDI_STOCK, LGFC). Table 1 reports the estimation results for the number of cointegrating vectors containing four lags for Croatia, Slovenia and the Czech Republic. The cointegration test for the original Serbian data is performed using one lag due to lack of observations, while the test for interpolated Serbian data is performed using three lags.[†]

Country	H_0: Rank<=r	Trace Stat.	5% Crit. Value	H_0: Rank=r	Max-Eigen St.	5% Crit. Value
Croatia	None *	65.113	54.079	None *	30.452	28.588
	At most 1	34.662	35.193	At most 1	15.951	22.300
	At most 2	18.711	20.262	At most 2	12.619	15.892
	At most 3	6.0915	9.1645	At most 3	6.0915	9.1645
Slovenia	None *	60.080	47.856	None *	35.885	27.584
	At most 1	24.195	29.797	At most 1	17.060	21.132
	At most 2	7.1350	15.495	At most 2	5.9786	14.265
	At most 3	1.1564	3.8415	At most 3	1.1564	3.8415
Czech Republic	None *	83.136	63.876	None *	51.701	32.118
	At most 1	31.435	42.915	At most 1	15.016	25.823
	At most 2	16.418	25.872	At most 2	9.6541	19.387
	At most 3	6.7641	12.518	At most 3	6.7641	12.518
Serbia (orig. d)	None *	81.071	63.876	None *	42.056	32.118
	At most 1	39.015	42.915	At most 1	19.422	25.823
	At most 2	19.593	25.872	At most 2	16.972	19.387
	At most 3	2.6215	12.518	At most 3	2.6215	12.518
Serbia (interp.d)	None *	73.898	63.876	None *	35.628	32.118
	At most 1	38.270	42.915	At most 1	20.202	25.823
	At most 2	18.068	25.872	At most 2	12.723	19.387
	At most 3	5.3448	12.518	At most 3	5.3448	12.518

* denotes rejection of the hypothesis at the 0.05 level

Table 1: *Trace and Maximum Eigenvalue Cointegration test*

[†]The optimal lag length is chosen by Akaike (AIC) and Schwartz Bayesian information criteria (SBC). The Wald test is performed to test the exclusion of insignificant lags.

LRGDP(-1)	Croatia	Slovenia	Czech Republic	Serbia (O)	Serbia (I)
Cointegrating Equation (Long-run dynamics)					
LNEX(-1)	0.801*** [4.221]	0.600*** [2.964]	1.579*** [8.889]	1.059*** [9.873]	0.657*** [4.361]
LFDI_STOCK(-1)	-0.101*** [-2.640]	0.369*** [37.229]	0.304*** [3.196]	3.268*** [9.238]	0.164 [1.039]
LGFC(-1)	0.809*** [6.594]	0.160*** [6.998]	0.216*** [3.276]	0.161*** [-2.289]	0.170*** [3.009]
Trend	-	-	-0.008*** [-8.397]	-0.039*** [-11.29]	-0.027*** [-6.937]
Constant	0.727 [0.554]	1.493	-4.339	-24.43	4.403
Vector Error Correction Estimates					
Speed of adjustment (EC term)	-0.387*** [-3.197]	-0.359*** [-2.610]	-0.791*** [-3.436]	-0.346*** [-3.019]	-0.453*** [-4.475]
∆LRGDP $_{t-1}$	-0.421*** [-2.028]	0.661*** [3.100]	0.109 [0.385]	1.052*** [4.288]	0.591*** [3.337]
∆LRGDP $_{t-2}$	0.033 [0.141]	0.288 [1.163]	1.350*** [4.726]		0.175 [0.883]
∆LRGDP $_{t-3}$	-0.190 [-0.793]	0.476*** [2.099]	0.996*** [3.018]		0.279 [1.359]
∆LRGDP $_{t-4}$	-0.250 [-1.116]	0.343 [1.472]	0.065 [0.222]		
∆LNEX $_{t-1}$	-0.258*** [-2.709]	0.030 [0.353]	-0.650*** [-2.235]	-0.046 [-0.971]	-0.296*** [-3.539]
∆LNEX $_{t-2}$	-0.264*** [-3.217]	0.196*** [2.528]	-0.155 [-0.594]		-0.266*** [-2.945]
∆LNEX $_{t-3}$	-0.171*** [-2.376]	0.115 [1.343]	-0.044 [-0.198]		-0.166*** [-2.37]
∆LNEX $_{t-4}$	-0.109*** [-2.016]	0.053 [0.646]	-0.664*** [-3.185]		
∆LFDI_STOCK $_{t-1}$	0.088*** [2.321]	-0.111*** [-2.299]	-3E-04 [-0.002]	-0.514* [-1.794]	0.010 [0.063]
∆LFDI_STOCK $_{t-2}$	0.026 [0.653]	-0.042 [-0.914]	-0.530*** [-3.049]		-0.312* [-1.954]
∆LFDI_STOCK $_{t-3}$	0.086*** [2.136]	-0.058 [-1.343]	-0.924*** [-4.93]		-0.114 [-0.757]
∆LFDI_STOCK $_{t-4}$	0.133*** [3.354]	-0.016 [-0.435]	-0.365* [-1.818]		
∆LGFC $_{t-1}$	0.013 [0.122]	0.016 [0.366]	-0.011 [-0.103]	-0.707*** [-4.231]	-0.189*** [-3.167]
∆LGFC $_{t-2}$	-0.127 [-1.133]	0.043 [0.681]	-0.134 [-1.279]		-0.117 [-1.606]
∆LGFC $_{t-3}$	-7E-04 [-0.006]	0.068 [1.158]	0.039 [0.376]		-0.140*** [-2.197]
∆LGFC $_{t-4}$	0.002 [0.018]	-0.025 [-0.424]	0.120 [1.101]		
Constant	-	-0.075 [-1.300]	0.024 [3.710]	0.005 [0.725]	0.033 [2.426]
Number of lags	4	4	4	1	3
Number of observations	46	46	46	18	43
R^2 (Adj R^2)	0.62 (0.41)	0.70 (0.52)	0.65 (0.43)	0.63 (0.47)	0.55 (0.35)

∆ - first-difference, L - lag operator

* significant at 10% level, ** significant at 5% level, *** significant at 1% level, t-statistics in brackets

Table 2: *Long-run coefficients and short-run adjustment factors (real GDP)*

Both the trace and the max-eigenvalue test indicate one cointegrating vector for all countries. It can be concluded that variables are bound together by a long-term equilibrium relationship. According to the cointegration rank test, specification for Croatia contains a constant term but no trend in the cointegration vector and no constant or trend in the ECM (model 2). Specification for Slovenia contains a constant term but no trend in the cointegration vector and the ECM (model 3), while specification for the Czech Republic and Serbia (both data sets) contains a constant and a trend in the cointegration vector and a constant without a trend in the ECM (model 4). Cointegration regression and ECM results are presented in Table 2. In assessing the robustness of the estimated ECM, the LM test was used and none of the test statistics could reject the null of no serial correlation and heteroskedasticity in the residuals, meaning that the estimates are unbiased and efficient. The Jarque–Berra residual normality test shows that ECM residuals are multivariate normal. Overall, diagnostic statistics indicate that the model is adequately specified.[‡]

a) Long run effects:

NEX is significant and has the expected positive sign. A long-run positive relationship between GDP and NEX means that there is a positive feedback between higher imports coverage, usually resulting in a lower current account deficit, or even a surplus and GDP. This relationship goes against the prevailing popular trend of promoting open, liberal economies, where the states should not be troubled by their imports/exports ratio since other factors, such as FDI, will balance out their balance of payments. It speaks in favor of a conservative approach to economy, where the states take care of their current account and their imports-exports ratio and try to achieve growth not through foreign lending or FDI, but through stable, internally driven growth. There are many studies that highlight the importance of the export-led growth hypothesis [15, 34]. They confirm that exports mitigate foreign-exchange restrictions and facilitate the imports of technology and production methods. According to them, export affects better utilization of capacity and economies of scale which results in an increase in factor productivity.

FDI is significant but the sign of the influence is not uniform. For Slovenia, Serbia, and the Czech Republic there is a positive relationship, meaning that in the long run there is a positive relationship between higher FDI and GDP growth. This finding is in line with the mainstream literature on FDI and its influence [2, 26]. In the case of Croatia, there is a significant negative sign in the long run which indicates that there is a negative feedback between FDI and

[‡]Specification tests are available from the author upon request.

GDP growth. At first, this sort of relationship may seem counterintuitive. The above mentioned literature indicates that FDI is positive for economic growth and that FDI will lead to higher GDP growth. [19] offers an in-depth explanation why a negative relationship is not counterintuitive but often very logical. [36] categorizes popular misconceptions about FDI:

1) **FDI has a stabilizing effect on economy cycles and is therefore preferable to loans**. The first part of this statement is partially correct, but since bond yields for Croatia and CEE countries are cca 4-6% and ROE is 10-20%, it turns out that loans are 2-3 times cheaper than capital. The resulting savings can easily be used to smooth out the economic cycles. Loan repayments can be flexibly arranged over long time periods and sometimes their repayments can be linked to the current account position of the country. Taking this into consideration results in FDI having no comparative advantage to loans while being several times more expensive.
2) **Equity capital/FDI can have a positive effect on country's balance of payments**. The cost of FDI/equity in the short run can be significantly less than costs connected to loans because dividend yields can be lower than bond yields. This is correct if the yields are absolutely freely determined by the market and the loan repayment period is short. If the interest rates are preferential, i.e., lower than the market, which is usual in case of interstate loans, structural loans, development loans, etc., or/and the repayment period is longer, the costs of loan can be lower than the cost of FDI even in the short term. An equity owner can easily recover lower dividends paid during some starting period by simply increasing dividend payouts in the following periods, reduction of capital, sale of company's assets, transfer pricing, etc. In real life situations, when there is an urgent need for capital, it is far easier, faster and cheaper to get a loan than to attract equity investments. Furthermore, loans can be refinanced, reprogrammed or even a loan moratorium can be approved.
3) **ROE reinvestment rate can be so high that an outflow of money from the host country can be lower than interests paid**. This sort of ideal situation is possible when a host is a developed country, but almost never happens in the developing markets. Since Croatia is not a developed country, it is clear why this claim does not hold and can be viewed as a fallacy. One should not forget that the final goal of any investor is profit, and in the case of investing abroad repatriation of it. This is especially pronounced in countries with a weak currency due to currency depreciation risk.
4) **Equity capital brings advanced know-how**. By moving to less developed countries companies bring advanced technologies and organizational structures, provide education and training for local employees

and stimulate local economy. The same positive effects attributed to FDI can also be achieved by joint ventures with foreign companies. The proclaimed positive effect of new technology is often very limited and foreign companies tend to become isolated, almost extraterritorial, islands. The greater the technological gap, the greater the chasm that separates foreign and domestic entities, steaming also from greater sociological and economic differences. Although the sociological differences between Croatia and developed EU countries are not significant, the economical and technological ones are. This gap contributes to a very low effect of technological and organizational transfers, which in turn means that this significant, positive effect never managed to fully materialize. Contrary to Croatia, a good example of a country that understands FDI is Japan, a country that allowed entry to foreign capital only in the form of joint ventures with majority voting rights in domestic hands and which eventually enabled the domestic companies to simultaneously acquire the necessary know-how and remain domestically owned.

5) **Foreign capital stimulates competition, entrepreneurship and maximizes profit**. Foreign capital is motivated by profit, but it is the maximization of the profit from the viewpoint of a foreign company not the host country. It often takes the form of profit extraction from the host country. Foreign management often suffers from sociological and cultural prejudice about the host country and thus often favors economic and political interest of their own country of origin without taking into account the legitimate interests of the host country.

All of the above stated misconceptions are especially pronounced if the FDI is entering a country in a form of Brownfield, not Greenfield, investments, as in the case of Croatia. A similar explanation is given by [29], who suggested that the negative relationship between FDI and growth in transition economies could be explained by the form of FDI, which had been predominantly through acquisitions (Brownfield) rather than Greenfield investments.

GFC has a positive sign signaling an expected positive relationship between investments in fixed assets that enlarge the infrastructural and production base of the country and its GDP. A negative sign for the GFC in relation to GDP would mean that such economy is oriented towards consumption as a means of generating GDP growth as opposed to basing its growth on investments in long-term, fixed assets.

EC – error correction term – There is a significant negative sign meaning that the series are cointegrated and move towards a long-term equilibrium. A negative sign signals that in each quarter a portion of the deviation from the long-term equilibrium is compensated. The highest speed of adjustment is recorded for the Czech Republic. (0.791) and the lowest for Serbia and Slovenia.

b) Short-run effects:

GDP – For all countries, except Croatia, the lagged values of GDP are significant and positive. Short-run positive feedback between past and current values of GDP represents a typical example of autocorrelation, in this case signaling that previous growth signals further future growth and vice versa, creating a virtuous/vicious economic circle. In case of Croatia, there is a negative relationship between previous and current values of GDP during the entire period. Even though the series were seasonally adjusted, graphical representation of Croatian GDP still shows significant negative autocorrelation and a clear sinusoidal pattern.

NEX - For all of the analyzed countries, except Slovenia, it is significant and negative. The short-term sign is opposite to the long-term sign. Although surprising at first, the difference between the signs in the short- and long-run can be explained. When talking about the long-run positive relationship between GDP and NEX, the advantages of the positive feedback, in form of the current account surplus and lower debt levels, were emphasized. All of the mentioned effects are positive and self-explanatory, so what could be the reason for their negative relationship? NEX can be improved either by increasing exports or decreasing imports. If the improvement in the NEX comes not from an increase in exports but a decrease in imports, in the short run, it is expected that the effect on GDP will be negative. Only when the positive effects of imports substitution start to diffuse throughout the economy can a positive effect on GDP start to appear. The opposite also holds, if the worsening of the ratio comes not from the fall in exports but an increase in imports; the short-term effects on GDP will be positive due to excess spending, taxes, custom duties, etc. The negative effects of increased imports will become obvious only after a certain time lag.

FDI shows behavior similar to NEX, i.e., its sign is opposite to the long run. It is positive for Croatia and negative for Slovenia, the Czech Republic and Serbia, meaning that in the short run FDI has an opposite effect on GDP compared to the one in the long run. Taking Croatia as an example where the short-term positive sign turns negative in the long run, a simple explanation can be given. The inflow of FDI, which came in the form of Brownfield investments, partly in the state enterprises, created excess money that went into social programs, employee privileges and infrastructure, which immediately resulted in increased GDP. In the long run, the negative effects of Brownfield FDI overtook the short-term positive ones.

GFC is significant and negative only for Serbia. An explanation is that in the short run, Serbia is oriented towards consumption as a means of generating GDP growth as opposed to basing its growth on investments in long-term, fixed assets. Since GDP effects of consumption are recorded by instantaneous, it is

not rare to see that countries often favor their short-term, unsustainable growth over a long-term, sustainable, investment-driven growth.

5. Variance decomposition and diagnostic testing

Further analysis of the relations between variables is performed by variance decomposition of GDP. Table 3 presents how GDP responds to macroeconomic shocks from NEX, FDI and GFC. Due to a small number of observations, Serbia (original data) is excluded from variance decomposition analysis. GDP is largely explained by its own lagged shocks in case of Czech Republic. Variations in NEX explain GDP better than other variables for Slovenia and Serbia, while GDP in Croatia is mostly explained by shocks in GFC. During the 10 quarters, the proportion of variance explained by NEX reaches almost 78% for Slovenia and 70% for Serbia. The variance explained by FDI and GFC should not be ignored since they account for 22% of variation for Slovenia and 14% and 10% for Czech Republic and Serbia, respectively.

CROATIA						SLOVENIA					
P	S.E.	LRGDP	LNEX	LFDI	LGFC	P	S.E.	LRGDP	LNEX	LFDI	LGFC
1	0.014	100.00	0.000	0.000	0.000	1	0.014	0.009	100.00	0.000	0.000
2	0.019	81.625	0.441	0.888	17.046	2	0.019	0.019	94.128	4.162	0.232
3	0.024	70.345	0.427	0.577	28.651	3	0.024	0.031	84.848	11.42	1.632
4	0.029	53.884	1.514	1.999	42.604	4	0.029	0.042	81.414	15.406	1.733
5	0.035	40.052	4.488	5.943	49.517	5	0.035	0.053	79.578	17.388	2.057
6	0.044	30.979	11.380	6.078	51.563	6	0.044	0.063	78.733	17.487	2.943
7	0.052	27.449	15.366	6.297	50.889	7	0.052	0.072	78.288	17.229	3.702
8	0.061	25.736	18.551	5.530	50.183	8	0.061	0.080	78.072	17.326	3.865
9	0.071	23.454	21.015	4.935	50.597	9	0.071	0.087	77.862	17.630	3.793
10	0.081	21.484	22.207	4.600	**51.709**	10	0.081	0.094	**77.696**	17.895	3.731
Ordering: LRGDP LNEX LFDI_STOCK LGFC						Ordering: LRGDP LNEX LFDI_STOCK LGFCF					
CZECH REPUBLIC						SERBIA interpolated data					
P	S.E.	LRGDP	LNEX	LFDI	LGFC	P	S.E.	LRGDP	LNEX	LFDI	LGFC
1	0.019	100.00	0.000	0.000	0.000	1	0.029	100.00	0.000	0.000	0.000
2	0.025	88.404	3.799	3.321	4.476	2	0.044	93.418	0.646	0.377	5.560
3	0.034	79.623	16.038	1.823	2.515	3	0.051	88.028	2.433	1.528	8.011
4	0.042	63.071	29.858	1.628	5.443	4	0.060	71.203	15.383	4.055	9.359
5	0.046	58.594	31.105	1.436	8.865	5	0.073	48.126	41.098	4.520	6.256
6	0.049	54.204	33.978	2.038	9.780	6	0.084	36.951	52.712	5.339	4.998
7	0.052	53.254	32.584	4.802	9.360	7	0.093	30.202	58.833	6.211	4.755
8	0.054	53.105	32.958	5.039	8.898	8	0.101	25.639	63.476	6.167	4.717
9	0.056	53.182	33.576	4.962	8.279	9	0.108	22.446	67.098	5.924	4.532
10	0.058	**52.878**	33.506	5.769	7.847	10	0.114	20.110	**69.733**	5.848	4.308
Ordering: LRGDP LNEX LFDI_STOCK LGFC						Ordering: LRGDP LNEX LFDI_STOCK LGFCF					

P – period, S.E. – standard error

Table 3: *Variance decomposition of real GDP*

6. Conclusion

We analyze the causal relations between GDP, NEX, GFC and FDI stock in selected CEE countries (Slovenia, Serbia, the Czech Republic and Croatia). We found a positive long-run influence of NEX, FDI and GFC on GDP for all countries, except Croatia. A negative relationship between FDI and GDP in the long run in Croatia is explained by referring to five FDI misconceptions. For all countries, there is a long-run positive relationship between GDP and NEX, which goes against the prevailing popular trend of completely open economies, where the states would not be troubled by their imports/exports ratio. The results speak in favor of a conservative approach to economy, accounting for the current account and imports/exports ratio, where growth is not achieved through foreign lending or FDI, but through stable, internally driven growth. In the long run, there is a positive relationship between GFC and GDP which means that development of the infrastructure and production base of a country also increases its GDP. These findings will be helpful in analyzing the nature of dynamic relationships between GDP, international trade and FDI in the case of CEE/SEE countries. The inclusion of other potential variables such as employment, education, tax incentives, foreign exchange rate, quality of infrastructure and market size leaves room for future research of economic growth drivers in CEE/SEE countries.

References

[1] Acaravci, A. and Ozturk, I. (2012). Foreign direct investment, export and economic growth: empirical evidence from new EU countries. Romanian Journal of Economic Forecasting, 2, 52–67.

[2] Alfaro, L., Chanda, A., Kalemli-Ozcan, S. and Sayek, S. (2004). FDI and economic growth: The role of local financial markets. Journal of International Economics, 64, 89–112.

[3] Alfaro, L., Chanda, A., Kalemli-Ozcan, S. and Sayek, S. (2010). Does foreign direct investment promote growth? Exploring the role of financial markets on linkages. Journal of Development Economics, 91(2), 242–256.

[4] Awokuse, O. T. (2007). Causality between exports, imports and economic growth: Evidence from transition countries. Economics Letters, 94, 389–395.

[5] Babić, A., Pufnik, A. and Stučka, T. (2001). Teorija i stvarnost inozemnih izravnih ulaganja u svijetu i u tranzicijskim zemljama s posebnim osvrtom na Hrvatsku (Theory and reality of foreign direct investments globally and in the transitional markets with emphasis on the Republic of Croatia). White Paper P-9, Hrvatska narodna banka (Croatian National Bank)

[6] Bačić, K., Račić, D. and Ahec-Šonje, A. (2004). The effects of FDI on recipient countries in Central and Eastern Europe. Economic Trends and Economic Policy, 14(100), 59–96.
[7] Blomström, M., Lipsey, R.E. and Zejan, M. (1994). What explains developing country growth. NBER Working Paper No. 4132, Cambridge.
[8] Bogdan, Ž. (2010). Istraživanje veze između inozemnih direktnih investicija i gospodarskog rasta europskih posttranzicijskih zemalja (Research into relationship between FDI and economic growth in Europe's posttransition countries). Zbornik Ekonomskog fakulteta u Zagrebu (Proceedings of Faculty of Economics in Zagreb), 8(2), 59–79.
[9] Borenztein, E., De Gregorio, J. and Lee, J. W. (1998). How does foreign direct investment affect economic growth. Journal of International Economics, 45, 115–135.
[10] Campos, N. F. and Kinoshita, Y. (2002). Foreign direct investment as technology transferred: some panel evidence from the transition economies. Centre for Economic Policy Research. Discussion paper No. 3417, London.
[11] Cooley, T.F. and Dwyer, M. (1998). Business cycle analysis without much theory: A look at structural VARs. Journal of Econometrics, 83(1), 57–88.
[12] Deichmann, J.I. (2001). Distribution of foreign direct investment among transition economies in Central and Eastern Europe. Post-Soviet Geography and Economics, 42, 142−52.
[13] Dristakis, N. (2004). Exports, investments and economic development of pre-accession countries of the European Union: an empirical investigation of Bulgaria and Romania. Applied Economics, 36 (16), 1831–1838.
[14] Engle, R. F. and Granger, C. W. (1987). Cointegration and error correction: representation, estimation and testing. Econometrica, 55(2), 251–276.
[15] Feder, G. (1982). On exports and economic growth, Journal of Development Economics, 12, 59–73.
[16] Grossman, G.M. and Helpman, E. (1990). Comparative advantage and long-run growth. American Economic Review, 80, 796–815.
[17] Hendry D.F. and Juselius K. (2000). Explaining cointegration analysis: Part 1. Energy Journal, 21(1), 1–42.
[18] Hermes, N. and Lensink, R. (2003). Foreign direct investment, financial development and economic growth. Journal of Development Studies, 40(1), 142–163.
[19] Horvat, B. (2007). Dynamic economic development. Zagreb: Hrvatska ekonomska misao, Dom i svijet.
[20] Johansen, S. (1991). Estimating and hypothesis testing of cointegration vectors in Gaussian vector autoregressive models. Econometrica, 59(6), 1551–1580.
[21] Jones, C., Morrissey, O. and Nelson, D. (2011). Did the World Bank drive tariff reforms in Eastern Africa? World Development, 39(3), 324–335.
[22] Kekić, L. (2005). Foreign direct investment in the Balkans: recent trends and prospects. Southeast European and Black Sea Studies, 5(2), 171–90.
[23] Kersan-Škabić, I. Zubin, C. (2009). Utjecaj izravnih inozemnih ulaganja na rast BDP, na zaposlenost i na izvoz u Hrvatskoj (The influence of foreign direct investment on the growth of GDP, on employment and on export in Croatia). Ekonomski pregled (Economic Review), 60(3-4), 119–151.

[24] Konya, L., (2004). Export-led growth, growth-driven export, both or none? Granger Causality Analysis on OECD Countries. Applied Econometrics and International Development, 4, 73–94.

[25] Lankes, H.P. and Venables, A.J. (1996). Foreign direct investment in economic transition: the changing pattern of investments. Economics of Transition, 4(2), 331–47.

[26] Lensink, R. and Morrissey, O. (2001). Foreign direct investment: flows, volatility and growth in developing countries. SOM Research School, Research report No. 01E16, Groningen.

[27] Levine R. and Renelt, D. (1992). A sensitivity analysis of cross-country growth. American Economic Review, 82, 942–963.

[28] MacKinnon, J. G., Haug, A. A., Michelis, L. (1999). Numerical distribution functions of likelihood Ratio tests for cointegration, Journal of Applied Econometrics, 14, 563–577.

[29] Mencinger, J. (2003). Does foreign direct investment always enhance economic growth?. Kyklos, International Review for Social Sciences, 56(4), 491–508.

[30] Newey, W., West, K. (1987). A simple positive semi-definite, heteroskedasticity and autocorrelation consistent covariance matrix, Econometrica, 55, 703–708.

[31] Ozturk, I. (2007). Foreign direct investment – growth nexus: A review of the recent literature. International Journal of Applied Econometrics and Quantitative Studies, 4(2), 79–98.

[32] Pop – Silaghi, M. I. (2009). Exports-economic growth causality: evidence from CEE countries. Romanian Journal of Economic Forecasting, 2, 105–117.

[33] Ram, R. (1987). Exports and economic growth in developing countries: evidence from time series and cross–section data. Economic Development and Cultural Change, 36, 51–72.

[34] Sachs, J.D. and Warner, A. (1995). Economic reform and the process of global integration. Brookings Papers on Economic Activity, 1, 1–118.

[35] Thornton, J. (1996). Cointegration, causality and export led growth in Mexico, 1895–1992. Economics Letters, 50, 413–416.

[36] Žiković, S. (2007). Foreign direct investments and the usual illusions. Dynamic economic development, Zagreb: Scientific Society of Economists.