# The Linkages between Economic Growth and FDI in CEE Countries

*Sergej VOJTOVIČ* – Asta KLIMAVICIENE** – Vaida PILINKIENE****

**Abstract**

*This paper examines linkages among foreign direct investment (FDI) and economic growth in 11 countries from Central and Eastern Europe (CEE) for the period of 1997 – 2014. Findings from panel data analysis suggest that the relative size of economic growth indicators affect FDI of CEE countries. This result holds for both contemporaneous and lagged relationships. FDI has an impact on economic growth, and this effect is strengthened by financial market development. The efforts of CEE countries increase the economic growth and beneficial spillover effects from FDI to local economies should be concentrated on the support of the development of local financial markets.*

**Keywords:** *foreign direct investment, economic growth, Central and Eastern Europe*

**JEL Classification**: F36, F43, O16, O40

## Introduction

Recent decades witnessed an exceptionally high growth of foreign direct investment (FDI). In this context European Union countries stand out as both investors and recipients. A region of Central and Eastern Europe (CEE) is experiencing high growth rates of FDI.[1]

* Sergej VOJTOVIČ, Alexander Dubček University of Trenčín, Faculty of Social and Economic Relations, Študentská 2, 911 50 Trenčín, Slovak Republic; e-mail: sergej.vojtovic@tnuni.sk

** Asta KLIMAVICIENE, ISM University of Management and Economics, Arkliu st. 18, 01305 Vilnius, Lithuania; e-mail: asta.klimaviciene@ism.lt

*** Vaida PILINKIENE, Kaunas University of Technology, School of Economics and Business, K. Donelaičio St. 73, 44249 Kaunas, Lithuania; e-mail: vaida.pilinkiene@ktu.lt

[1] The level of investment in 2014 reached USD 8.9 billion, a 27% increase compared to 2013. The leading country in CEE region is Poland (with a share of 41%), followed by the Czech Republic (25%), Romania (16%), and Slovakia (8%) (UNCTAD, 2015).

FDI is usually the main suppliers of capital to business companies and creators of working places for local employees, and these factors are linked to economic growth. Various linkages among FDI and economic growth are examined in academic literature. Most empirical research focus on three areas: 1. the impact of FDI on a target economy (Borensztein et al., 1998; Kok and Ersoy, 2009; Wang and Wong, 2009); 2. the link between financial development and economic growth, not considering FDI (Eller et al., 2006; Shen and Lee, 2006; Alfaro et al., 2009; Lee and Chang, 2009); and 3. research on economic growth from the financial development perspectives (Edison et al., 2002; Bordo and Meissner, 2006; Blejer 2006; Masoud and Hardaker, 2012). There is little comprehensive research exploring connections among economic growth and FDI including additional factors as financial development, especially in the context of CEE economies. Few exceptions include Eller et al. (2006), who focus on FDI in the financial sector, and Eren and Zhuang (2015), who explore differences between M&As and greenfield investments.

The aim of this paper is to examine the econometric linkages and their economic effects among FDI and economic growth in the light of financial development in Central and Eastern Europe. More specifically, into the analysis we include both banking sector and stock market development variables testing not only contemporaneous relationships, but also potential lagged effects.

The rest of this paper is organized as follows. Section 1 discusses theoretical and empirical background. Section 2 describes research methods. Data and descriptive statistics are provided in section 3. Results from econometric analysis are presented in section 4. Finally, the concluding comments are provided at the end of the article.

## 1. Theoretical and Empirical Background

The positive effect of FDI is usually connected with generating technological diffusion in the host country. It is explained by endogenous theory (Borensztein et al., 1998; Kok and Ersoy, 2009), acquisition and diffusion of managerial skills, employee training, alternative management practices and better organizational arrangement (De Mello, 1999; Li and Liu, 2005; Yao and Wei, 2007; Kottaridi and Stengos, 2010; Krajnakova, Navikaite and Navickas, 2015; Kljucnikov and Belas, 2016; Srovnalikova and Karbach, 2016), as well as the expansion of international production networks, and access to markets (Alfaro et al., 2004; Crespo and Fontoura, 2007). Moreover, FDI is employed as a means to expand an industry in a host country (Eller et al., 2006), to decrease the dependence of a country on one or several sectors, directing investment to less attractive economic activities

and diversifying economic basis (Lee and Chang, 2009). It stimulates a creation of new companies as well as an expansion of existing ones, job creation, and tax collection.

Such transfer of technological and managerial know-how provides opportunities for local companies to remain viable in conditions of increasing competition. For example, Balasubramanyam, Salisu and Sapsford (1999) claim that FDI has a positive effect only if a host country employs a strategy of export stimulation. Moreover, a country must have a sufficient level of human capital and well-developed financial markets (Wang and Wong, 2009). Johnson (2006) shows that FDI inflows boost economic growth in developing countries, but not in developed ones.

Negative effect of FDI is related with a potential decrease of economic growth rates of a country, when foreign investors operate in industries of high concentration, which have high market entry barriers (Glass and Saggi, 2002). This effect is specified by Graham (1995) who focuses on the market power of multinational companies, and the ability for domestic political interference. Another group of negative effects of FDI is related to human capital and qualifications. International companies conduct joint research projects using ideas and know--how of people from the host country, and may cause a „brain drain" (Kottaridi and Stengos, 2010; Reiter and Steensma, 2010).

However, the majority of empirical research suggests that the positive FDI effects outweigh the negative ones. Li and Liu (2005) examine 84 countries over the period of 1970 – 1999 and find that FDI promotes economic growth both directly and indirectly. Chaudhry et al. (2013) find that FDI has a positive effect on economic growth in China during 1985 – 2009. Ram and Zhang (2002) focus on 85 countries over the period of 1990 – 1997, and find support for a positive association between FDI and economic growth. Similar results are obtained by Borensztein et al. (1998), Balasubramanyam, Salisu and Sapsford (1999), Eller et al. (2006), Kottaridi and Stengos (2006), Wang and Wong (2009). Negative effect of FDI is more fragmented, and seems to be caused by market structure characteristics (Dutt, 1997). Ghosh (2003) argues that FDI inflows may induce unsustainable macroeconomic development and even create preconditions for financial crisis. Eren and Zhuang (2015) examine 12 new EU member states for the period of 1999 – 2010 and find that the effect on economic growth depends on the type of FDI: whether it is M&As or greenfield investments. Their results suggest that FDI has an impact only given a certain level of absorptive capacities of the target economy.

Some authors argue, that one of a driving forces for economic growth is financial development. Studies by Curley and Shaw (1955); Patrick (1966) (as cited in Masoud and Hardaker, 2012) find that financial sector provides more

space for economic growth. Edison et al. (2002) reveal that more developed financial markets are better able to absorb capital inflows effectively, especially if these flows are fungible. Some studies (Caporale, 2004; Padhan, 2007) find that the development of a stock market is positively correlated with economic growth. They argue that it is due to increased savings and efficient capital allocation enabled by a well-developed stock market.

Some researchers (Bordo and Meissner, 2006; Blejer, 2006) have argued that countries with efficient financial systems have less risk of financial crisis and experience faster economic growth. Empirical research in this area mainly focuses on evaluating the relationship between economic growth and either the stock market or the banking sector. Padhan (2007) documents the linkages between the stock market and economic growth in India for the period of 1991 – 2005.

The linkages between economic growth and FDI are analysed in the light of the financial development or financial market as well. The level of financial market development in a context of FDI seems to be one of the essential conditions for positive effect. It is connected with the role of financial markets as a contributor and an intermediary (Alfaro et al., 2004; Eller et al., 2006; Alfaro et al., 2009). Most authors agree that the lack of development of local financial markets may limit the ability of potential FDI spillovers. A more developed financial system provides a background for resource allocation, better monitoring of investment projects, fewer information asymmetries and economic growth (Shen and Lee, 2006). Moreover, restrictions on financial markets have a negative impact on potential entrepreneurs, and limit innovations which could increase the scope of technological spillovers (Sghaier and Abida, 2013). It shows that the spread of FDI is much more effective in countries with more developed financial markets, which enable investors to consolidate their activities better (Hermes and Lensink, 2003).

The economic growth and a level of financial market development are directly related to the country's absorptive capacity, which is determined by the level of human capital in a country, and infrastructure development. This is frequently documented in academic literature. Borensztein, et al. (1998) examine 69 developing countries, and report that FDI stimulates economic growth only with a sufficient level of human capital in a host country. These results are confirmed by Hermes and Lensink (2003) using 67 developing countries. Their findings suggest that the development of a financial sector is necessary for FDI to have a positive effect. Alfaro et al. (2009) examine 62 countries over 1975 – 1995, and find that countries with mature financial markets gain significantly from FDI via total factor productivity improvements. It seems that low levels of development of financial markets reduce the spillover effects from the technologies introduced by FDI as domestic firms are not able to absorb them.

Alfaro et al. (2004) examine various links between FDI and economic growth using cross-sectional averages from 1975 – 1995. They find that FDI has a significant impact on economic growth, especially for countries with well-developed financial markets. In a companion paper, Alfaro et al. (2010) create a model for the role of FDI and local financial markets in promoting economic growth via creation of backward linkages. Results show that at a certain level of financial market development, the recipient country gains benefits from backward linkages between local and foreign companies with a positive spillover effect to the rest of the economy.

Lee and Chang (2009) examine 37 countries over a period of 1970 – 2002, and document long-run relationships between FDI, financial markets, and economic growth. Furthermore, financial development indicators tend to have a larger effect on economic growth than FDI.

Some papers concentrate on a specific geographic region. For example, Sghaier and Abida (2013) examine four North African countries over 1980 – 2011, and find a positive relationship between economic growth and FDI. Moreover, well--developed local financial markets seem to be an important determinant for a positive effect of economic growth. Eller et al. (2006) focus on sectoral FDI in 11 CEE countries during 1996 – 2003. They document a non-linear effect of FDI in the financial sector on economic growth. Eren and Zhuang (2015) analyse how economic growth in new EU member states depends on the type of FDI. Using M2[2] as a proxy for financial sector development, they find that it is important in case of M&As but not greenfield investments.

## 2. Research Methods

### 2.1. Tests for Contemporaneous Effect

As a starting point, we follow a method employed by Alfaro et al. (2004) to test a contemporaneous effect of FDI on GDP, incorporating local financial markets as a potential channel for economic growth. It must be noted that Alfaro et al. (2004) conduct a cross-sectional analysis. Since this paper employs panel data, we make certain modifications to their model.

A basic model focuses on the relationship between GDP growth and FDI, and is specified as follows:

$$GDP_{ij} = \beta_0 + \beta_1 FDI_{ij} + \beta_2 CONTROLS_{ij} \quad (1)$$

[2] M2 is the sum of currency in circulation and overnight deposits (M1), deposits with an agreed maturity of up to two years and deposits redeemable at notice of up to three months (ECB, 2018).

The model is subsequently expanded to examine the impact of the development of local financial markets. The specification is provided below:

$$GDP_{ij} = \beta_0 + \beta_1 FDI_{ij} + \beta_2 CONTROLS_{ij} + \beta_5 FIN_{ij} + \beta_6 FDI_{ij} \times FIN_{ij} \quad (2)$$

where FIN is a proxy for financial market development, taken from either the banking sector or the stock market. In addition to a financial variable (FIN), equation (2) also includes an interaction term between FDI and FIN. As in Alfaro et al. (2004), this interaction term is included to test whether the development of local financial markets enhance the positive effect of FDI on economic growth.

### 2.2. Models for Delayed Effect: Granger-causality and VAR

The linkages among economic growth and FDI may be not only contemporaneous. For example, it may take time for FDI to affect the economic growth of a host country. In order to test potential delayed effects, we employ two techniques: Granger-causality and vector autoregressive (VAR) models. The effect of two previous years is examined.

Granger-causality model focuses on bivariate relationships. Since this paper uses panel data, we choose a Granger-causality testing specific to panel data. The bivariate regressions are specified as follows (two lags are included):

$$y_{i,t} = \alpha_{0,i} + \alpha_{1,i} y_{i,t-1} + \alpha_{2,i} y_{i,t-2} + \beta_{1,i} x_{i,t-1} + \beta_{2,i} x_{i,t-2} + \varepsilon_{i,t} \quad (3)$$

$$x_{i,t} = \alpha_{0,i} + \alpha_{1,i} x_{i,t-1} + \alpha_{2,i} x_{i,t-2} + \beta_{1,i} y_{i,t-1} + \beta_{2,i} y_{i,t-2} + \varepsilon_{i,t} \quad (4)$$

We employ Dumitrescu-Hurlin (2012) test which allows coefficients to differ across cross-sections. This test is suitable for heterogeneous panel data. First, Granger-causality tests are run for each cross-section separately. Then individual Wald statistics are averaged to get a test statistic which is subsequently standardized. Dumitrescu and Hurlin (2012) show that this test statistic is appropriate for unbalanced panel and has good small sample properties.

Equations (3) and (4) are run for the following ($y$, $x$) pairs: (GDP, FDI); (FIN, GDP); (FIN, FDI).

In addition, since the focus of this paper is to examine dynamics among three variables (GDP, FDI, and financial markets), the VAR model is employed. Canova and Ciccarelli (2014) note that panel VAR models not only capture both static and dynamic linkages, but also account for dynamic heterogeneities in cross-sectional dimension.

VAR model is specified as follows:

$$\boldsymbol{GDP}_t = \beta_{1,1} \boldsymbol{GDP}_{t-1} + \beta_{1,2} \boldsymbol{GDP}_{t-2} + \beta_{1,3} \boldsymbol{FDI}_{t-1} + \beta_{1,4} \boldsymbol{FDI}_{t-2} + \beta_{1,5} \boldsymbol{FIN}_{t-1} + \\ + \beta_{1,6} \boldsymbol{FIN}_{t-2} + \beta_{1,7} + \beta_{1,8} D$$

$$\boldsymbol{FDI}_t = \beta_{2,1}\boldsymbol{GDP}_{t-1} + \beta_{2,2}\boldsymbol{GDP}_{t-2} + \beta_{2,3}\boldsymbol{FDI}_{t-1} + \beta_{2,4}\boldsymbol{FDI}_{t-2} + \beta_{2,5}\boldsymbol{FIN}_{t-1} + \\ + \beta_{2,6}\boldsymbol{FIN}_{t-2} + \beta_{2,7} + \beta_{2,8}D$$

$$\boldsymbol{FIN}_t = \beta_{3,1}\boldsymbol{GDP}_{t-1} + \beta_{3,2}\boldsymbol{GDP}_{t-2} + \beta_{3,3}\boldsymbol{FDI}_{t-1} + \beta_{3,4}\boldsymbol{FDI}_{t-2} + \beta_{3,5}\boldsymbol{FIN}_{t-1} + \\ + \beta_{3,6}\boldsymbol{FIN}_{t-2} + \beta_{3,7} + \beta_{3,8}D$$

where **FIN** is a proxy for financial market development, and D is a crisis dummy, included as an exogenous variable.[3] Variables in bold indicate vectors. Two lags of each dependent variable are included. This allows capturing dynamic interdependencies.

## 3. Data Description

### 3.1. Data

This paper uses annual data for 11 CEE countries: Bulgaria, Croatia, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia and Slovenia. The data source is World Bank. The sample period is from 1997 to 2014. Note that it includes the global financial crisis which has a significant effect on many macroeconomic variables, most notably the GDP growth. The starting date of the sample is determined by the availability of the stock market data for CEE countries.

Specific variables representing macroeconomic factors are chosen following the literature, in order to allow an easier comparison of our results with those from previous studies. Economic growth is measured by annual GDP growth. FDI are net inflows as a percentage of GDP. Following Alfaro et al. (2004), we consider two types of financial variables: relating to the stock market, and relating to the banking sector. Two proxies for stock market development are used: market capitalization of listed companies as a percentage of GDP (henceforth, MCAP), and the total value of stocks traded as a percentage of GDP (henceforth, STOCK). Both of these variables represent the relative importance of a stock market in a particular CEE country. MCAP shows the relative size of equity markets, while STOCK is a proxy for trading activity and liquidity. The development of a banking sector is measured by domestic credit to private sector as a percentage of GDP (henceforth, PRIV).

Previous studies which examined both OECD and non-OECD countries tend to consider a long list of control variables due to large heterogeneity of their samples. For example, Alfaro et al. (2004) control for secondary school enrolment, rule of law, risk of expropriation, coups and revolutions.

[3] See section 4 for a detailed explanation.

However, our sample consists exclusively of CEE countries which are members of the European Union with similar historical and economic context. Since the sample is relatively homogenous, control variables are limited to two macroeconomic factors: government consumption (henceforth, GOV) and inflation. If government consumption comprises a significant part of country's economy, its changes will have a large effect on GDP growth. Inflation, measured by the annual growth rate of GDP deflator, is included as a proxy for macroeconomic stability (as in Alfaro et al., 2004).

### 3.2. Descriptive Statistics

Descriptive statistics are provided in Table 1 below. The average annual GDP growth across our sample countries during 1997 – 2014 was 3.3%.

T a b l e 1

**Descriptive Statistics, Pooled Sample of 11 CEE Countries**
(annual data for 1997 – 2014)

| | Mean | Median | Standard deviation | Minimum | Maximum |
|---|---|---|---|---|---|
| GDP growth (%) | 3.3 | 3.9 | 4.3 | –18.0 | 12.2 |
| FDI (% of GDP) | 5.3 | 4.0 | 6.5 | –16.4 | 51.9 |
| Government consumption (% of GDP) | 18.8 | 19.3 | 3.3 | 5.7 | 24.3 |
| Inflation (%) | 11.3 | 4.0 | 70.8 | –3.7 | 987.1 |
| MCAP | 18.8 | 15.6 | 14.0 | 0.02 | 111.2 |
| STOCK | 5.7 | 2.4 | 7.5 | 0.0 | 34.9 |
| PRIV | 46.8 | 45.6 | 22.3 | 7.2 | 106.4 |

*Source*: Authors' own calculations.

However, the variability over time is very large, since this period includes the global financial crisis. All countries except Poland experienced a recession in 2009. Statistics for FDI flows are more heterogeneous. While net inflows in CEE usually are below 10% of GDP, there are some outliers, most notably Hungary. In 2007 and 2008, FDI inflows in Hungary were around 50% of GDP. However, it experienced the highest capital outflows in 2010 (16% of GDP). The average government consumption in CEE countries during 1997 – 2014 was 19% of GDP. Romania is an exception, with government consumption usually not exceeding 10%. Mean inflation is 11%, while the median is only 4%. This is mostly affected by near-hyperinflation in Bulgaria in 1997 before the introduction of a currency board.

Descriptive statistics of financial variables show the relative importance of equity markets and banking sector in CEE countries. Market capitalization of listed companies is on average 18.8% of GDP. The peak for almost all countries is in 2007, indeed, market capitalization in Croatia even exceeded its GDP.

Statistics for stocks traded as percent of GDP reveal that equity markets in CEE countries are quite illiquid. The percentage of stocks traded is on average only 5.7. The minimum is almost zero, since the stock market of Bulgaria was officially established towards the end of 1997. The most active equity markets relative to the size of the economy are in the Czech Republic and Hungary, where stocks traded sometimes exceeded 20% of GDP. Domestic credit to private sector in CEE countries is on average nearly 50% of GDP. It reaches a peak in 2009, even exceeding 100% of GDP in some countries. Notably, this is affected by a significant contraction of GDP due to global economic crisis.

From the comparison of descriptive statistics of financial sector variables it is evident that the banking sector is more important to CEE economies than their stock markets. Therefore the linkages among GDP growth, FDI and financial development may differ depending on whether a chosen financial variable is from the stock market or from the banking sector.

## 4. Empirical Analysis

### 4.1. The Impact of FDI and Financial Development on Economic Growth

As a starting point, we examine the effect of both FDI and financial variables on GDP growth. Two control variables are included: government consumption and inflation, as well as a dummy variable to capture the effects of global financial crisis.[4]

Three financial variables are tested, resulting in three regression specifications. As described previously, these variables are domestic credit to private sector (PRIV), market capitalization relative to GDP (MCAP), and the value of stocks traded relative to GDP (STOCK). Moreover, we include an interaction term between FDI and a selected financial variable (see equation 2).

Results are presented in Table 2. In a basic model without financial variables (regression 1) FDI is statistically significant at 1% level. However, its economic impact is modest. Inflation is marginally significant and has a negative (albeit very small) impact on GDP growth. The crisis dummy is highly significant both statistically. This pattern tends to remain when we add financial variables to the regression.

When we proxy financial development using a banking sector variable (PRIV), FDI becomes statistically insignificant (regression 2a). The interaction term between FDI and PRIV is also insignificant. Therefore, the positive effect of FDI on GDP growth disappears once domestic credit from financial institutions

[4] Crisis dummy variable takes values of 1 in years 2008 and 2009, and zero otherwise.

is considered. Domestic credit to private sector is highly statistically significant, but it has a negative sign. This might seem counterintuitive, since it implies that larger financing from the banking sector has a negative effect on economic growth. Admittedly, the economic impact is small. The negative coefficient of PRIV is in line with Alfaro et al. (2004). They also find that non-stock market variables have negative signs.

When equity market variables are used to proxy for financial development, results are different (regressions 2b and 2c). Compared to the basic model (regression 1), FDI not only remains highly statistically significant, but its economic impact increases several times. It implies that the higher level of equity market development strengthens the positive effect of FDI on economic growth. Market capitalization has a statistically significant, but economically small effect on GDP growth. The impact of stocks traded on GDP growth is twice as large. This result suggests that in order to benefit from the positive effect, stock markets should be not only relatively large, but also liquid in terms of active trading. Interaction terms between FDI and each of stock market variables are statistically significant. However, their economic impact is modest and the signs of both coefficients are negative.

T a b l e 2

**The Effect of FDI and Financial Development on GDP Growth**

| **Dependent variable:** | **GDP growth** | | | |
|---|---|---|---|---|
| | (1) | (2a) | (2b) | (2c) |
| Constant | 4.613<br>(3.960) | 5.080<br>(3.598) | 4.957<br>(4.329) | 4.296<br>(4.261) |
| FDI | 0.136***<br>(0.042) | –0.073<br>(0.195) | 0.286***<br>(0.095) | 0.417***<br>(0.083) |
| GOV | –0.412<br>(1.355) | 0.478<br>(1.262) | –0.941<br>(1.489) | –0.826<br>(1.458) |
| Inflation | –0.007*<br>(0.004) | –0.009**<br>(0.004) | –0.007*<br>(0.004) | –0.007*<br>(0.004) |
| Crisis dummy | –6.942***<br>(0.840) | –5.950***<br>(0.864) | –7.323***<br>(0.857) | –7.227***<br>(0.803) |
| PRIV | | –0.062***<br>(0.020) | | |
| FDI*PRIV | | 0.003<br>(0.003) | | |
| MCAP | | | 0.078**<br>(0.032) | |
| FDI* MCAP | | | –0.007**<br>(0.003) | |
| STOCK | | | | 0.168***<br>(0.052) |
| FDI* STOCK | | | | –0.016***<br>(0.004) |

*Notes:* * $P < 0.10$, ** $P < 0.05$, *** $P < 0.01$. Standard errors are in parentheses. Based on results from panel diagnostic tests, random effects are used.

*Source*: Authors' own calculations.

Results suggest that higher market capitalization and larger proportion of stocks traded have a positive effect on GDP growth. These linkages were documented in the studies of Padhan (2007) and Wang and Wong (2009). On one hand, the stock market development does not seem to be very important in facilitating the growth effect of FDI. It may be explained by the fact that equity markets in CEE countries are relatively small and illiquid. On the other hand, adding stock market variables to the regression significantly increases the effect of FDI on GDP growth. This suggests the importance of both financial markets and FDI on economic growth in CEE countries.

### 4.2. Granger-causality Tests

In order to test potential delayed effects we turn to Granger-causality tests that investigate pairwise relationships. The following pairs are examined: GDP and FDI; GDP and a financial variable; FDI and a financial variable.

Results from the first pair reveal that GDP growth does not Granger-cause FDI inflows ($p$ value is 0.1918). However, FDI Granger-causes GDP ($p$ = 0.0038). Panel causality test results for pairs with financial variables are provided in Table 3. Relationship between GDP growth and financial market development is robust to a chosen proxy. GDP does not Granger-cause financial variables. However, the level of financial market development Granger-causes GDP growth. This suggests that financial market variables have a lasting effect on economic growth.

T a b l e 3

**Pairwise Granger-causality with Financial Variables**

| Financial variable (FIN): | PRIV | MCAP | STOCK |
|---|---|---|---|
| FIN on GDP | 0.0036*** | 0.0000*** | 0.0000*** |
| GDP on FIN | 0.3036 | 0.4858 | 0.2617 |
| FIN on FDI | 0.1127 | 0.0593* | 0.7007 |
| FDI on FIN | 0.0047*** | 0.3505 | 0.6340 |

*Notes:* The null hypothesis is that one variable does not homogeneously cause another one. Two lags are included. Reported numbers are p-values from pairwise Dumitrescu-Hurlin panel causality tests.

*Source*: Authors' own calculations.

Results examining the links between FDI and financial variables are not so homogeneous. Financial market development does not seem to have an impact on FDI inflows. The only exception is market capitalization, but the result is only marginally significant. FDI inflows do not Granger-cause market capitalization or stocks traded, but affect domestic credit to private sector ($p$ value is 0.0047). So results are different depending on whether a financial variable is taken from the banking sector or the stock market.

### 4.3. VAR Models

Examining results from VAR models, we notice patterns that emerge irrespective of a proxy for financial market development (see Table 4 for results with PRIV and MCAP, and Table 5 for results with STOCK).

T a b l e 4

**Dynamic Linkages: VAR Models**

| | **FIN variable: PRIV** | | | **FIN variable: MCAP** | | |
|---|---|---|---|---|---|---|
| | $GDP_t$ | $FDI_t$ | $PRIV_t$ | $GDP_t$ | $FDI_t$ | $MCAP_t$ |
| $GDP_{t-1}$ | 0.4531*** (0.0598) | 0.0973 (0.1080) | 0.2650*** (0.0852) | 0.4571*** (0.0596) | 0.0071 (0.1077) | –0.0417 (0.1880) |
| $GDP_{t-2}$ | –0.1498** (0.0609) | 0.0733 (0.1099) | 0.2995*** (0.0867) | –0.0526 (0.0590) | 0.1187 (0.1065) | 0.5959*** (0.1860) |
| $FDI_{t-1}$ | 0.0367 (0.0422) | 0.7454*** (0.0763) | –0.0215 (0.0601) | 0.0506 (0.0432) | 0.7500*** (0.0781) | 0.0220 (0.1364) |
| $FDI_{t-2}$ | 0.0115 (0.0417) | –0.2948*** (0.0753) | 0.0840 (0.0594) | 0.0069 (0.0428) | –0.3024*** (0.0773) | 0.0727 (0.1349) |
| $FIN_{t-1}$ | 0.1659*** (0.0427) | 0.1472* (0.0771) | 1.4754*** (0.0608) | 0.1251*** (0.0231) | 0.1196*** (0.0417) | 0.5240*** (0.0728) |
| $FIN_{t-2}$ | –0.1894*** (0.0415) | –0.1267* (0.0749) | –0.5242*** (0.0590) | –0.1120*** (0.0256) | –0.0477 (0.0462) | 0.3326*** (0.0807) |
| Crisis dummy | –7.8610*** (0.8081) | –3.7795*** (1.4597) | –0.1850 (1.1505) | –6.8561*** (0.8678) | –3.2387** (1.5682) | –17.7139*** (2.7383) |
| Constant | 3.7315*** (0.6964) | 1.5867 (1.2579) | 0.6955 (0.9915) | 2.3229*** (0.5060) | 1.7704* (0.9143) | 3.1274* (1.5966) |
| F-statistic | 31.2858 | 16.8982 | 634.4529 | 30.8735 | 16.7213 | 29.6804 |
| LogL | –425.3718 | –527.0696 | –486.1318 | –382.8928 | –474.0192 | –559.8658 |
| AIC | 5.0392 | 6.2217 | 5.7457 | 5.0765 | 6.2600 | 7.3749 |

*Notes:* * $P < 0.10$, ** $P < 0.05$, *** $P < 0.01$. Standard errors are in parentheses.

*Source*: Authors' own calculations.

Crisis dummy is highly statistically significant and has a large negative effect on all economic variables. The only exception is PRIV: crisis does not seem to have an additional impact on domestic credit to private sector.[5]

Lags of financial sector variables have a highly significant effect on GDP growth. However, while the coefficient for the first lag is positive, the second lag has a negative coefficient. This nullifies the net effect of lagged financial variables on GDP. Another result which is robust to a selection of a financial variable is that lagged values of net FDI inflows do not have a significant effect on GDP growth, and vice versa. In addition, FDI inflows from two preceding years have no impact on financial variables. The only exception is VAR model with STOCK, where the second lag of FDI has a statistically significant (but economically small) effect on stocks traded.

[5] Note that PRIV is a relative measure (percentage of GDP). Also, VAR model includes two lags of all variables. So the effect of global crisis is already captured in lags of GDP growth, and also in lags of variable PRIV itself.

While VAR models produce qualitatively similar results, there are two cases where they differ. Firstly, the impact of a lagged financial variable on FDI depends on a proxy for financial market development. Previous values of PRIV do not have an impact on FDI inflows. Results are different for stock market variables. The first lag of MCAP has a statistically significant effect on FDI. The same result holds for both lags of STOCK.

However, in this case the signs of coefficients are opposite. The first lag of STOCK has a coefficient of 0.31, while for the second lag it is –0.18. This makes the net effect of both lags of STOCK on FDI similar to the one of MCAP (a coefficient of 0.12). Another case where results are sensitive to a chosen proxy for financial market development is the effect of past economic growth on financial variables. Both lags of GDP have a highly significant and positive effect on domestic credit to private sector.

T a b l e 5

**VAR Model. Financial Variable: Stocks Traded (STOCK)**

| | **GDP** | **FDI** | **STOCK** |
|---|---|---|---|
| GDP(-1) | 0.4528*** | 0.0077 | 0.0515 |
| | (0.0644) | (0.1080) | (0.0707) |
| GDP(-2) | –0.0269 | 0.1380 | 0.0485 |
| | (0.0635) | (0.1066) | (0.0697) |
| FDI(-1) | 0.0445 | 0.7079*** | –0.0818 |
| | (0.0480) | (0.0805) | (0.0527) |
| FDI(-2) | 0.0291 | –0.2855*** | 0.1111** |
| | (0.0474) | (0.0795) | (0.0520) |
| STOCK(-1) | 0.1412** | 0.3078*** | 0.8941*** |
| | (0.0666) | (0.1118) | (0.0731) |
| STOCK(-2) | –0.1599** | –0.1830* | –0.0569 |
| | (0.0660) | (0.1108) | (0.0724) |
| Crisis dummy | –7.8751*** | –3.1531** | –3.0823*** |
| | (0.8349) | (1.4013) | (0.9164) |
| C | 2.6994*** | 2.5573*** | 0.5806 |
| | (0.4413) | (0.7406) | (0.4844) |
| F-statistic | 23.6127 | 16.5937 | 69.6034 |
| LogL | –394.5382 | –474.2812 | –408.8888 |
| AIC | 5.2278 | 6.2634 | 5.4141 |

*Notes:* * $P < 0.10$, ** $P < 0.05$, *** $P < 0.01$. Standard errors are in parentheses.

*Source*: Authors' own calculations.

Results also suggest a positive effect of a second lag of GDP growth on market capitalization. This relationship was not captured by Granger-causality tests. However, there is no effect of past economic growth on stocks traded. These results may be explained as follows: while GDP growth over the past two years may affect a provision of credit to private sector or relative market capitalization, previous GDP growth does not have an effect on stock market liquidity, which is influenced by current economic conditions.

## Conclusions

We find that FDI has a positive impact on economic growth. However, this result is sensitive to a choice of proxy for financial market development. The effect disappears when domestic credit from financial institutions is included in a model. In contrast, stock market development has a positive effect, suggesting that relatively larger and more liquid equity markets enhance the impact of FDI on GDP growth.

Pairwise Granger-causality tests confirm the effect of FDI on economic growth. Moreover, past values of financial variables also affect the GDP growth. This result holds for both banking sector and stock market variables. Findings for linkages among GDP growth, FDI and financial development somewhat differ depending on whether we focus on financial variables from a banking sector or a stock market. While FDI Granger-causes domestic credit to private sector, it does not affect stock market development. Results from VAR models show that past values of equity market variables have an impact on net FDI inflows. However, this effect is not found considering the influence of banking sector development on FDI.

Our main conclusion is that the development of financial markets affects the impact of FDI on economic growth in CEE countries. The effect seems stronger when we examine stock market variables as opposed to banking sector variables. This results in our policy recommendation. If CEE countries want to increase beneficial spillover effects from FDI to local economies, they should promote the development of local equity markets through supporting various stock exchange markets' initiatives and attracting additional capital for their development.

Further studies on this topic could examine changes of the relationship among economic growth, FDI, and financial markets over time, particularly after the global economic crisis. Also, it would be interesting to investigate whether the effect of financial market development depends on an economic sector of FDI.

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