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Financial development, foreign direct investment and economic growth: panel causality approach³

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Abstract: *The examination considers the causality between banking sector depth, foreign direct investment, and economic growth in the sample of six Central and Eastern European countries in the period range between 2000 to 2018. Utilizing the Dumitrescu and Hurlin (2012) panel causality test, the results confirmed a supply-leading hypothesis, FDI-led growth hypothesis, and unidirectional causality from the banking sector depth to foreign direct investment. As the causality ranging from the depth of the banking sector to foreign direct investment and economic growth has been confirmed, the conclusion is that attention should be focused on policies that promote the development of the banking sector. In this way, a well-regulated banking sector will attract more FDI, which will lead to higher growth rates in the analyzed countries.*

Keywords: *banking sector depth, economic growth, foreign direct investment, panel analysis*

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Finansijski razvoj, strane direktne investicije i ekonomski rast: panel analiza uzročnosti

Apstrakt: *Istraživanje razmatra uzročnu vezu između dubine bankarskog sektora, stranih direktnih investicija i ekonomskog rasta na uzorku šest zemalja Centralne i Istočne Evrope u periodu od 2000. do 20118. godine. Dumitrescu i Hurlin (2012) panel test uzročnosti, potvrđuje jednosmerne uzročnosti koje se kreću od dubine bankarskog sektora i stranih direktnih investicija ka ekonomskom rastu, takođe i jednosmernu uzročnost između dubine bankarskog sektora i stranih direktnih investicija. Kako je potvrđena uzročnost koja se kreće od dubine bankarskog sektora do stranih direktnih investicija i ekonomskog rasta, zaključak je da pažnju treba usmeriti na politike koje promovišu razvoj bankarskog sektora. Na ovaj način će dobro regulisan bankarski sektor privući više SDI, što će dovesti do viših stopa rasta u analiziranim zemljama.*

Ključne reči: *dubina bankarskog sektora, ekonomski rast, strane direktne investicije, panel analiza*

1. Introduction

Examination of the direction of the connection between financial development and economic growth, on the one hand, and foreign direct investment (FDI) and economic growth, on the other, has gained a great interest among researchers, with the appearance of endogenous growth theory. Attention is concerned with external determinants of economic growth, according to which the FDI are increasingly observed as a long-term indicator of economic growth (Acquah & Ibrahim, 2019). In addition, financial development becomes a significant basis for drawing all the benefits that FDI brings to the host country. More precisely, the interaction between financial development and FDI becomes grounds for fostering economic growth (Adeniyi, Omisakin, Egwaikhide, & Oyinlola, 2012). Therefore, observing the causality between financial development, FDI, and economic growth is a relevant research subject.

The lack of consensus on the association between the financial sector and economic growth has led to the development of diverse representations of the underlying connection. The initial attempt to evaluate the connection between financial development and economic growth was the research of Patric (1966), who established several pillars of the relationship. The first, which includes the argument that the development of the financial sector encourages economic growth by functioning as a productive figure, and can be characterized as a

supply-leading view. Theoretically, this view is bequeathed by Schumpeter (1911), which emphasizes the essential part of financial development in boosting economic growth through financial intermediation, which was then confirmed by various empirical studies (Calderón & Liu, 2003; Beck & Levine, 2004; Eller, Haiss, & Steiner, 2006; Bojanic, 2012; Asteriou & Spanos, 2019). Second, the demand-following view indicates that finance is naturally passive and moderate in the growth process (Patrick, 1966). The expanding requirement for financial services develops the financial sector as the economy grows. Within this view, economic maturity stimulates the development of the financial sector through increasing demand for financial services, and it is also proven by various empirical researches (Odhiambo, 2004; Odhiambo, 2010; Stolbov, 2016 Akıncı, 2018). The third view, marked as the feedback hypothesis, maintains the two-sided relationship between financial and economic progress. The supply-leading view is manifest at the initial stage of economic development, but the demand-following representation becomes more prevalent with an increasing degree of economic development (Patrick, 1966). The feedback hypothesis holds a stronghold in empirical investigations (Al-Yousif, 2002; Zagorchev, Vasconcellos, & Bae, 2011; Wolde-Rufae 2009). A precise inference regarding the causality betwixt the development of the financial sector and economic growth can not be established designated on the exhibited studies. Various examinations yield mixed results that are the consequence of the heterogeneity of the observed countries. For instance, Mukhopadhyay, Pradhan, and Feridun (2011), utilizing the Johansen cointegration test and vector error correction models (VECM), have come to different results in examining the link between financial development and economic growth in several Asian countries. By applying financial development indicators such as the ratio of total credit to the private sector to nominal GDP, the ratio of deposit liabilities of the banking sector to nominal GDP, and real per capita GDP as an indicator of economic development, the authors confirm supply-leading hypothesis in the instance of India, Singapore, China, the Philippines, and Indonesia. The feedback hypothesis is validated in the case of Thailand, and no causal relations in the example of Malaysia. No-causal connections describe an added variant of the link between financial and economic development and can be described as a neutrality hypothesis. In addition to analyses that reveal a positive nexus between the countries' financial and economic development, some studies confirm the negative influence finance has on economic growth. Using two pointers of financial development, such as liquid liabilities of the banking system and the volume of credit to the private sector by banks and other financial institutions, Favara (2003) concluded that the measured effect of financial development on GDP is often negative, within the analyzed representation of 85 countries. The influence of financial development on economic growth is negative if an

accelerated increase in private credit is not followed by an increase in real output, as Ductor and Grechyna (2015) concluded by investigating 101 developed and developing countries.

In terms of causality between FDI and economic growth, several aspects can be singled out. One of the appearances of reviewing the relationship can be designated as FDI-led Growth Hypothesis, according to which causality originates from FDI to economic growth. By raising capital, generating new business opportunities, and significantly facilitating technology transfer, FDI inflows can boost growth in host countries (Yalta, 2013). Hsiao and Hsiao (2006), expose that FDI has unidirectional impacts on GDP directly and also indirectly through exports, for eight quickly growing East and Southeast Asian economies. Furthermore, Vojtovič, Klimaviciene, and Pilinkiene (2019), utilizing the Pairwise Granger-causality test, reveal that FDI Granger causes GDP in eleven Central and Eastern European countries, additionally pointing out that the growth of financial markets influences the outcome of FDI on economic growth. In contrast, empirical research has confirmed the reverse pattern of causality, which ranges from economic growth to FDI, within which FDIs are a byproduct of economic growth. Lean and Tan (2011), utilizing the Granger causality test based on the VECM, reveal that the growth-enhancing of FDI varies depending on host country characteristics. The authors confirm the argument that high economic growth is a significant generator in drawing FDI inflows in Malaysia. Another support of the argument comes from the research of Mah (2010), which showed that the strong economic growth of the Chinese economy was not caused by FDI inflows, but on the contrary, strong growth stimulated FDI inflows. As in the case of the link between financial and economic development, empirical research often produces mixed results in terms of causality between FDI and economic growth. Investigating the causal connections between economic growth and FDI, through the Toda-Yamamoto causality test, Chowdhury and Mavrotas (2006) confirm that in the case of Chile, GDP causes FDI inflows, while in the case of Malaysia and Thailand they identify bidirectional causality. The bidirectional causality originates from the basis in which raised FDI encourages growth in the host countries, whereas more favorable growth possibilities draw a risen flow of FDI (Basu, Chakraborty, & Reagle, 2003). Two-way causality was confirmed in the case of Europe and Latin America in the study of Abbes, Mostéf, Seghir, and Zakary (2015), who investigated the relationship between FDI and economic growth in 65 countries using co-integration and panel Granger causality tests in panel data. However, the authors point out that throughout the panel, causality runs from FDI to economic growth and that this direction of causality is stronger compared to the reverse situation.

Regarding causality and the impact between FDI and financial development, empirical studies expose a robust connection, emphasizing that a more stable

financial system is a crucial spur for FDI's economic contribution (Alfaro, Chanda, Kalemli-Ozcan, & Sayek, 2004; Choong & Lim, 2009; Choong, 2011; Acquah & Ibrahim, 2019). On the other hand, there is confirmation of a positive outcome of FDI on the development of the financial sector (Abzari, Zarei, & Esfahani, 2011; Gebrehiwot, Esfahani, & Sayim, 2016). Analyzing the connection between financial development and FDI, Sahin and Ege (2015) conclude the existence of one-way causality from FDI to financial development in Greece and Bulgaria, two-way causality in the case of Turkey, and the absence of causality in the case of Macedonia. Utilizing the Dumitrescu and Hurlin (2012) causality test, Bayar and Gavriletea (2018) have shown a one-way causality from financial development to FDI in CEEC, which means that a developed financial system aids countries to drag higher FDI inflows.

The presented lack of formal clarity on the connection between financial development, foreign direct investment, and economic growth is the central motivation for conducting research. The article discusses the financial development construct on bank-based indicators, which mirror the depth of the banking sector. The reason for this form of determining financial development is that capital markets in the considered countries are not sufficiently developed, as well as the fact that financial systems are bank-based because approximately 85% of the assets of the financial sector are bank assets (Égert, Backé, & Zumer, 2016). Besides, the quantity of accessible measurements for capital market indicators is inadequate to form a sufficiently long time series. Thus, the main goal of the research is to study the causal relations between banking sector depth, foreign direct investment, and economic growth in six Central and Eastern European countries in the period range between 2000-2018. A step forward in the literature so far is reflected in the fact of using a composite index of financial development based on banks consisting of four indicators (CIBSD), especially bearing in mind the shortcomings and inappropriateness of the use of one component as a representative of the development of the whole financial sector. The foremost contribution of the research is to empirically expose the causality between the banking sector depth, foreign direct investment, and economic growth in selected European Union new member states in a direction that could complement the existing literature in an informative form. To examine the causality between variables, as the stated main goal of the research, the paper uses the Dumitrescu and Hurlin (2012) panel Granger causality test, which is suitable in the circumstances of cross-sectional dependence.

The rest of the article is designed as follows. The subsequent section details methodology and the data indicators of banking sector depth, foreign direct investment, and economic growth. The principal statistical outcomes are stated

in the third section. In the final section, the relevant conclusions and proposals obtained from the examination are noted.

2. Research methodology

The analysis incorporates annual data ranging between 2000-2018 and involves the sample of six European Union (EU) new member states, i.e., Bulgaria, Croatia, the Czech Republic, Hungary, Poland, and Romania. One of the reasons for selecting these former transition countries is that by enrolling the European Union, the countries become more engaging areas for foreign investment since countries have had to adopt various regulations of the EU, which provided them with greater credibility among investors. The selection of these countries was additionally conditioned by data availability. Since the main aim is to examine the causal relations among economic growth, banking sector depth, and FDI, the necessity is to select relevant indicators for these macroeconomic categories. Table 1. contains a description and the source of the data.

The standard measure of economic growth in finance-growth researches is gross domestic product per capita (GDPPC) (Stolbov, 2016). Accordingly, economic growth is measured utilizing the annual percentage growth rate of gross domestic product per capita based on constant local currency. The general appearance of estimating gross domestic product per capita, not in expressions of the total population, but of the working-age population, originates from the theory of economic growth, which denotes that the working-age population is nearer to the labor input of the production function than the total population (Neuhaus, 2006).

The FDI is measured by FDI net inflows, which are commonly used in researches of the association between FDI and economic growth, as well as between the indicators of financial development and FDI (Lee & Chang, 2009; Amoh, Abdallah, & Fosu, 2019; Acquah & Ibrahim, 2019; Jimborean & Kelber, 2017; Dellis, 2019). The composite index of banking sector depth is created from several indicators by utilizing the Principal Component Analysis (PCA). The reason for utilizing the CIBSD is the impossibility of adequately betokening the depth by adopting a single variable, as shown in previous studies (Beck, Levine, & Loayza, 2000; Levine, Loayza, & Beck, 2000; Pradhan, Arvin, Hall, & Norman, 2017; Choong, 2011). As Aluko and Ajayi (2018) point out, PCA includes the conversion of several correlated assemblages of variables into a less number of uncorrelated variables. PCA moderate an assemblage of examined variables into principal components that utmost maintain information

from the initial set of variables. Procedural details are explained by Pradhan et al. (2017) and by Pradhan, Arvin, Hall, and Norman (2014).

Table 1. Data description and source

Variable	Description	Source
Gross Domestic Product Per Capita-GDPPC	The annual percentage growth rate of gross domestic product per capita based on constant local currency (aggregates are based on constant 2010 U.S. dollars).	World Bank Development Indicators
Foreign Direct Investment-FDI	The sum of equity capital, reinvestment of earnings, other long-term capital, and short-term capital. Variable FDI records net investment inflows divided by GDP	World Bank Development Indicators database
The composite index of banking sector depth-CIBSD	Domestic credit to the private sector by banks, domestic credit to the private sector by financial corporations, claims on the central government, and broad money supply are used to construct a CIBSD	World Bank Global Financial Development Indicators database

Source: Authors' calculations

Descriptive statistics of the variables and correlation matrix are exhibited in Table 2. Cross-sectional dependence frequently conducts to the scarcity of a normal distribution of data series, as demonstrated in Table 2 by the Jarque-Bera statistic. The sole series is CIBSD, where normal distribution is noted. The issue can be handled by using suitable panel tests. Furthermore, the variables are not highly correlated with each other, accordingly utilizing variables in one model will not lead to a problem of multicollinearity.

Table 2. Descriptive statistics and Correlation matrix of the variables

	GDPPC	FDI	CIBSD
Mean	3.540289	5.591200	-1.75E-08
Median	4.112087	3.701897	0.1331185
Maximum	11.14421	54.64873	1.750006
Minimum	-7.262149	-41.50820	-2.248833
St. Dev.	3.165445	10.17489	1.000011
Skewness	-0.820510	1.641444	-0.229355
Kurtosis	4.780328	15.68413	2.313535
Jarque-Bera	27.84695	815.4070	3.237834
Probability	0.000001	0.000000	0.198113
Obs.	114	114	114
GDPPC	1		
FDI	0.0730	1	
CIBSD	-0.4537	0.0460	1

Source: Authors' calculations

The initial step that has to be taken in panel data analysis is to examine whether cross-section units are cross-sectionally dependent. Hence, the examination of the cross-sectional dependency is performed utilizing the tests relevant for the panel dataset in our research (N=6 T=19). The first is the Breusch – Pagan LM test, which, as Baltagi, Feng, and Kao point out (2012, p.165), can be established as:

$$LM = \sum_{i=1}^{N-1} \sum_{j=i+1}^N T_{ij} \hat{\rho}_{ij}^2 \rightarrow X^2 \frac{N(N-1)}{2} \quad (1)$$

The subsequent is the Pesaran-scaled LM test which, according to Baltagi et al. (2012, p.165), can be demonstrated as:

$$LM_{pesaran} = \sqrt{\frac{1}{N(N-1)}} \sum_{i=1}^{N-1} \sum_{j=i+1}^N (T_{ij} \hat{\rho}_{ij}^2 - 1) \rightarrow N(0,1) \quad (2)$$

To perceive the causality between economic growth, foreign direct investment, and banking sector depth, the Dumitrescu and Hurlin panel Granger causality test is conducted (DH test henceforth). The DH test is suitable for generating substantial outcomes in large and small heterogeneous panels, which are stable within the perception of cross-sectional dependence and reduces cross-sectional dependence utilizing bootstrapping to increase the basic observational estimations of the panel-causality test (Aluko, Adeyeye, & Oladele, 2019). As in our study, the observation units are smaller than the time periods analyzed (N = 6 T = 19), the asymptotic distribution established by Dumitrescu and Hurlin (2012) will be applied. The null and alternative assumptions can be represented as (Dumitrescu & Hurlin, 2012):

$$H_0: \delta_i = 0 \quad \forall_i = 1, \dots, M \quad (4)$$

$$H_1: \delta_i = 0 \quad \forall_i = 1, \dots, M \quad (5)$$

$$\delta_i \neq 0 \quad \forall_i = M_1 + 1, M_1 + 2, \dots, M$$

Where M_1 meets the situation in which $0 \leq M_1/M \leq 1$. The circumstances in which $M_1 = M$, is equivalent to the null hypothesis of no causal relationship for any of the units of the panel, if M_1 is zero the causality for complete cross-sections in the model is affirmed. The ensuing section exposes the outcomes of the implemented analysis.

3. Results and discussion

The results of the cross-sectional dependence tests are manifested in Table 3. The presence of cross-sectional dependence can be corroborated based on

both tests applied. The results confirm the exceptionally incorporated economies of the examined countries, indicating that spatial spillover consequences become more possibly, therefore when a shock happens in one country, it will likewise influence the other countries. The appearance of a cross-sectional dependence among countries supports the utilization of the Dumitrescu and Hurlin (2012) panel causality test.

Table 3. Cross-sectional dependence tests results

Variable	GDPPC	FDI	CIBSD
Breusch–Pagan LM	120.8042 (0.0000)	64.40385 (0.0000)	162.3476 (0.0000)
Pesaran-scaled LM	19.31712 (0.0000)	9.019867 (0.0000)	26.90186 (0.0000)
Notes: Figures in the parenthesis are p-values			

Source: Authors' calculations

The most substantial step in the research is the application of the DH test which investigates the short-term dynamics of two-dimensional causality in the conditions of cross-sectional dependence. The proper lag length is formed on the Akaike information criterion. The purpose is to explore the direction of causality amongst the variables of interest.

It can be noticed from Table 4 that there is a unidirectional causality moving from foreign direct investment to economic growth. The results are in agreement with the findings of Silajdzic and Mehic (2015), who found that FDI Grangers cause growth but not the reverse causality in CEEC. The outcome is not surprising since inflows of foreign direct investment were regarded as an essential part of the catching-up process of Central and Eastern European countries with the old member states of the European Union due to technical progress through the efficiency of spillovers (Jimborean & Kelber, 2017). Thus, our result confirmed the FDI-led growth hypothesis in CEEC.

Kawa, Wajda-Lichy, Fijorek, and Denkowska (2020), reveal unidirectional Granger causality from financial development to economic growth in Bulgaria, Poland, and Romania, a bidirectional causality in Hungary, and no causality in Croatia and the Czech Republic. Our results are partially similar to these findings. Partly because in the case of the DH test, rejecting the null hypothesis implies the existence of causality in at least one panel. The results of our research show the absence of causality from GDPPC to CIBSD in any panel and the existence of one-way causality from CIBSD to GDPPC. The result implies that financial development boosts growth, thus, supporting the supply-leading hypothesis in CEEC.

The outcomes further confirm a unidirectional causality running from CIBSD to FDI. This one-way causality is inconsistent with the results of Vojtovič Klimaviciene, and Pilinkiene (2019), who reveal that FDI net inflows Granger cause domestic credits to the private sector in CEEC, but not the reverse effect. The authors point out that the results depend on whether financial development is represented by variables from the banking sector or the stock market since market capitalization causes FDI net inflows. Within our examination, financial development is represented by a composite index consisting of four variables from the banking sector and does not include only credit to the private sector, which might be the ground of disagreement. On the other hand, our result is in line with Bayar and Gavriletea's (2018) research, which reveals the existence of one-way causality from financial development to FDI inflows in CEEC.

Table 4. The Dumitrescu-Hurlin panel causality test results

Variables	GDPPC	FDI	CIBSD
GDPPC	-	5.7209*	13.0629**
FDI	0.4271	-	36.7047***
CIBSD	0.9903	3.2898	-

Notes: The values are the Z-bar statistics. * Indicate significance (* at 10%, ** at 5% and *** at 1%). P-values are computed using bootstrap replication

Source: Authors' calculations

Thus, an efficient and well-developed financial system encourages more efficient resource allocation and information flow (Božović, 2019) and identifies investment opportunities with the highest profits, thus increasing investment efficiency and economic growth (Nyasha & Odhiambo, 2014). From this aspect, finance is perceived as an initiator for growth, rather than as a profound determinant for growth (Sghaier & Abida, 2013).

4. Conclusion

The paper focused on six countries of Central and Eastern Europe, which can be classified as new members of the European Union, viz Bulgaria, Croatia, the Czech Republic, Hungary, Poland, and Romania. By implementing annual data in the period from 2000 to 2018, the article exposes the causality between the banking sector depth, foreign direct investment, and economic growth. The banking sector depth is formed by a composite index consisting of domestic credit to the private sector by banks, domestic credit to the private sector by financial corporations, claims on the central government, and a broad money supply. Foreign direct investment and economic growth are denoted by the net inflows of foreign direct investment and gross domestic product per capita,

respectively. The principal aim of the analysis is to scrutinize the causal relationships among variables. The causal relations between variables were considered by utilizing the DH test in the presence of cross-sectional dependence. The results confirmed a supply-leading hypothesis, FDI-led growth hypothesis, and unidirectional causality from the banking sector depth to foreign direct investment. As the causality ranging from the depth of the banking sector to foreign direct investment and economic growth has been confirmed, the conclusion is that attention should be focused on policies that promote the development of the banking sector. In this way, a well-regulated banking sector will attract more FDI, which will lead to higher growth rates in the analyzed countries. A lack of adequate data of capital markets outlines the possible imperfection of the examination but is likewise an important determinant for the advancement of future researches. Additionally, the application of the DH test revealed causality between variables, but not potential positive or negative impacts between FDI, the banking sector depth, and economic growth. Consequently, future research can eliminate the possible shortcoming of examination by applying adequate panel models.

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