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UDK: 336.1(4)
DOI: 10.2478/jcbtp-2021-0027

Journal of Central Banking Theory and Practice, 2021, 3, pp. 117-136
Received: 13 April 2020; accepted: 09 September 2020

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How Does International Financial Integration Really Affect Post-Transition Countries' Growth? Empirical evidence from the CEE-10 countries

Abstract: This paper seeks to empirically explore how an international financial integration influences a country's GDP growth. The long run relationship is tested by PMG estimator for the sample of ten EU countries from Central, Eastern and Southeastern Europe (CEE-10 countries) between 1995 and 2017. Prior to the conducting of dynamic panel analysis based on PMG estimators, several panel unit root tests were conducted, as well as panel co integration tests. The findings offer mixed impact financial integration on growth. Among the measures of financial integration, growth of the CEE-10 countries is mostly driven in the long run by FDI inflows as well as remittances and financial openness. On the contrary, the study suggests a reversal relationship between growth and financial integration measured by Gross Foreign Assets and Liabilities in percentages of GDP. It might be explained with a fact that CEE-10 countries have not yet reached a certain level of financial development in order to benefit from financial integration.

The study concludes that international financial integration does not per se enhance economic growth and country's growth in the CEE-10 countries can be reached at a higher level of financial integration, further increase their financial openness and financial development.

Keywords: International Financial Integration, Economic Growth, Pooled Mean Group (PMG) estimator, Central, Eastern and Southeastern Europe.

JEL classification: F32, F36.

1. Introduction

The nexus between financial integration and economic growth has become an important topic of many research studies. There are different models that can help understand the relationship between financial integration and a country's economic growth. Different econometric approaches are employed in numerous empirical studies such as time series analysis, cross-section analysis, and panel data analysis to explore the empirical assessment of financial integration – growth nexus. Compared with existing empirical research carried out on a sample of new EU member states, this research differs in methodological approach and contribution of different variables in examination of the existence of the long run relationship. Namely, Pooled Mean Group (PMG) is employed to examine the sample of CEE-10 countries in a new time period from 1995 to 2017. In addition, the paper examines the cointegration relationship between international financial integration and economic growth in short run and long run as well as speed of adjustment, thus overcoming the limitations of previous scientific research. The main motive for the research is the fact that previous research was conducted at a time of poorly developed financial integration with weak convincing argument. In addition, most of the previous studies were conducted in early 2000s and many of them failed to fully confirm the thesis that a country's growth is driven significantly by financial integration. In the meantime, the prospect of the EU membership might have given a new impetus to dynamics in building international financial integration. Overall, this study fills this gap in academic literature of European post-transition countries. To our knowledge this approach is different than the existing literature because this is the first study to use PMG estimator to examine the existence of the long run relationship between financial integration and growth for CEE-10 countries.

This study aims to investigate whether international financial integration boosts economic growth by employing recently developed panel cointegration techniques. More precisely, the study aims to offer an adequate model to accept or reject the hypothesis research about the relevance of depth of financial integration on economic growth in CEE-10 countries. In addition, the paper explores whether this relationship may be additionally examined by remittances and EU integration process.

This study serves as a way of documenting the linkages between financial integration and a country's economic growth in the CEE market, and provides the basis for further studies on this topic in future EU member countries. It will allow all similar future studies to observe the trends in international financial integration over time by comparing their results to the ones presented here.

2. Literature review

Although there exists extensive literature that explores the relationship between financial integration on growth, their review suggests conflicting predictions. Studies of financial integration are fairly similar in their form and execution but differ considerably in terms of the impact of financial integration on a country's economic growth effects of financial integration on economic growth. Curiously, there is a considerable body of literature today dedicated to financial integration and economic growth in developed countries but there is no clear consensus about the relationship in the long run. Financial integration received economists' attention in 1980s when one study done by Feldstein and Horioka (1980) found its place in different economic journals. The study argues that the high mobility of international capital and a positive link between investment and saving can contribute to high level of financial integration. The first theoretical link between financial development and economic growth may be found in the Solow's model. In this way, the dilemma about the impact of financial development on the real economy is placed in the context of the classical theory of economic growth and development.

The movement towards financial liberalization that started in mid-1980s opened a scientific debate about the linkages between financial integration and growth. Subsequently, the negative attitude toward the importance of finance for economic growth can be found in the research done by Krugman (1993). In Krugman´s eyes, an international financial integration could not easily generate economic growth. He thought that capital has a relatively unimportant role in economic development while removing the barriers to international portfolio flows had a dual positive effect. The first one, increased market liquidity, which resulted in increased economic growth and the second one, the removal of barriers and increased financial integration contributed to the entry of foreign banks which increased the efficiency of the banking system which again resulted in increased economic growth. Rodrik (1998) opposes the idea that opening up an economy to financial flows has beneficial effects as he has not found a correlation between liberalization of capital account and economic growth. On the other hand, a positive nexus between liberalization of capital account and economic growth found recently Quinn and Toyoda (2008).

Among findings of several studies, the literature found mixed findings and conflicting predictions of how much international financial integration contributes to economic growth. For example, a direct causal link was not proven, but this relationship can be indirect. The link that connects these two economic processes is the development of financial markets associated with the deepening of financial

integration. Note, however, that by enhancing the capital allocation capacity the development of the financial market has a direct impact on economic growth. Having in mind some of the above mentioned assumptions about this multiple impact Giannetti et al. (2002) conclude that there is a very strong link between the exogenous component of the development of financial intermediation and long run growth. Two other studies in European transition countries confirmed the impact of macroeconomic conditions on financial stability (Kozarić, Žunić-Dželihodžić, 2020, and Milović Jocović & Martinović, 2020) while Asanović (2019) concluded that there is still room for finance to contribute to economic growth.

On the contrary, Vo (2005) explored 79 countries across the word, between 1980 and 2003 and also revealed a weak and no robust relationship. Baele et al. (2004) suggest that macroeconomic benefits of financial integration may be explained by economic growth and adverse external shocks can be mitigated through diversification of risks into different investment opportunities. Giannetti et al. (2002) investigated potential benefits of financial integration on economic growth of the EU countries through the development of financial intermediation. The study revealed that if EU reaches the level of financial development measured by companies' access to financial market similar to that of the U.S., the growth of new added value in the EU's manufactory industry as a whole would be estimated to be 0.94% per year.

One more study done by Edwards (2001), examined the effects of financial integration on growth in the EU countries and found a negative relationship between liberalization and growth. He argues that some countries must reach good institutions and financial development before benefiting from international financial integration. Osada and Saito (2010) came to the same conclusion, while the study done by Ganić (2020) and Ganić (2021) confirmed that assumption in the case of European transition countries prioritize further financial market reforms, greater financial freedom and minimize government interference. Likewise, one more study done by Chen and Quang (2012) explored conditions of financial integration in 80 countries between 1984 and 2007 which every country must reach before growth may be enhanced. If income level is below the estimated threshold, a negative impact on growth can be expected and vice versa.

By improving the efficiency of all aspects of the country's financial system, a positive impact of international financial integration on the long run growth may be found. In line with the above mentioned studies by Edwards (2001), Quinn, Inclan & Toyoda (2001), Levine (2001), and another study done by Sum (2012) explored the impact of capital account openness using a cross section of developing and developed countries. The studies found that some selected countries with

greater financial openness experienced a greater financial depth as well as higher economic growth, especially in the case of developed countries. However, in the case of developing countries they found that capital account openness failed to produce a positive impact on growth. McLean and Shrestha (2002) employed a panel regression analysis to explore whether different types of capital inflows have a different impact on economic growth in the sample of 40 countries in Asia, Latin America and Africa between 1976 and 1995. The study finds a positive and statistically significant effect of net foreign investments and portfolio investments on growth. Similarly, the empirical assessment of financial integration – growth nexus in 83 countries between 1974 and 2007 was explored by Osada and Saito (2010). The study revealed a positive impact of FDI and equity liabilities on growth as well as the contribution of the development of local financial institutions and markets to growth. On the other hand, the study found that increasing debt liabilities slow down economic growth. Finally, the study revealed that financial integration is determined by the development of local financial institutions and markets.

For example, such countries with more developed institutions and markets (in West European, North American, and East Asian regions) experienced a greater degree of benefit from financial integration. Similar results are echoed by Mendoza, Quadrini, & Rios-Rull (2007) and Kaminsky and Schmukler (2008) who conclude that the positive impact of liberalization is primarily oriented in financially developed countries while developing and underdeveloped countries experience a net negative effect of international financial integration.

However, it is interesting that a robust impact financial integration on growth have not been found in many empirical studies (Kraay, 1998; Schularick and Steger, 2010; Kose, Prasad, Rogoff, & Wei, 2009; and Sum, 2012). Also, some other two studies have failed to produce evidence about any significant and positive association between financial liberalization and integration and growth (Edison, Levine, Ricci, & Sløk, 2002 and Sedik and Sun, 2012). For example, a study by Edison, Levine, Ricci, & Sløk (2002) used the sample of 57 countries between 1980 and 2000 to explore whether financial integration accelerates growth. However, the study also failed to provide any evidence that international financial integration per se enhances economic growth. By the contrary, Prasad, Rajan, & Subramanian (2007) found some evidence in terms of role that foreign capital played in determining growth in 65 developing non-transition countries between 1970 and 2004. The study found that countries had experienced faster growth in the long run if they relied less on foreign capital or vice versa. Friedrich, Schnabel, & Zettelmeye (2010) extended a research by Rajan and Zingales (1998) to examine whether economic growth in low and middle-income countries is

determined by financial integration in the period between 1998 and 2005. The study found that economic growth in the European transition region is positively influenced by international financial integration.

To summarize, while there is a lack of conclusive evidence on the link between financial integration and growth, there is a considerable consensus that the positive impact is mostly concentrated in developed countries. However, the impact is inconclusive, weak or even negative in developing countries. One possible conclusion for the different findings in recent conducted empirical studies is that the nexus between financial integration and growth varies with the degree of financial development and difference in rates of economic development among regions.

3. Methodology

The study is based on influential past studies by Edison, Levine, Ricci, & Sløk (2002) and Vo (2005) which explore whether a country's deeper financial integration promotes growth. Additionally, the empirical methodology used in this study is based on research done by Pesaran, Shin & Smith (1999) for estimating non-stationary dynamic panels by employing Mean Group (MG) estimator and the Pooled Mean Group (PMG) estimator. The PMG approach is based on estimating the error correction model as shown in equation (1).

$$\Delta Y_{i,t} = \phi_i(Y_{i,t-1} - \theta_i X_{i,t}) + \sum_{j=1}^{p-1} \lambda_{i,j} \Delta Y_{i,t-j} + \sum_{j=1}^{q} \delta_{i,j} \Delta X_{i,t-j} + \mu_i + \varepsilon_{i,t} \qquad (1)$$

$Y_{i,t}$ is the dependent variable, ϕ_i is the error correction term which measures the speed of adjustment towards the long run equilibrium, θ_i defines the long run equilibrium relationship between economic growth and the explanatory variables, $\lambda_{i,j}$ and $\delta_{i,j}$ express the vectors short run coefficients of economic growth and explanatory variables respectively, μ_i defines the fixed effects and $\varepsilon_{i,t}$ represents the error term.

Application of PMG estimator involves pooling imposed by the restriction on homogeneity of long-term coefficients and averaging through groups, for the purpose of obtaining an a mean of estimated error correction coefficients and other short run parameters in the model. The PMG estimator allows simultaneous correction of higher-order autocorrelation problems and solves the presence of endogenous explanatory variables that may occur during growth estimation, providing more reliable empirical estimates of the effects of financial integration on growth compared to those obtained by conventional panel methods.

Based on the above mentioned studies, an empirical model was developed by the previous researches of Vo (2005) and Mirdala (2011) to investigate whether financial integration accelerates growth in CEE-10 countries (Bulgaria, Romania, Slovakia, Czech R., Hungary, Poland, Slovenia, Estonia, Latvia, Lithuania). Panel data set for all variables is assembled on an annual basis between 1995 and 2017. As previously noted, this estimator allows constant members, short-term coefficients, and variations of relationship errors to vary by group while simultaneously long-term coefficients are equal to groups. An empirical model can be set up in the form of the following equation:

$$GDPG_{i,t} = \gamma_{0i} + \gamma_{1i}GFAL + \gamma_{2i}FDI + \gamma_{3i}KAOPEN + \gamma_{4i}REM + \gamma_{5i}INTG + \varepsilon_{i,t} \quad (2)$$

Country and Time are discrete with i = 1,2,..., and t = 1,2 ,..., respectively, while ($\varepsilon_{i,t}$) represents the effects of unpredictable shocks in the economic activity approximated by the growth of gross domestic product. The coefficients γ_{1i}, γ_{2i}, γ_{3i}, γ_{4i} and γ_{5i} refer to the effects of permanent changes in GDP growth and long-term sustainability, which have the characteristic of elasticity. Some deviations from the long run relationship shown by the equation (2) are possible in the short run as shown by equation (1). These deviations occur for variety reasons, so that GDP is adjusted for its determinants` changes.

Dependent variable for all specifications in the models is GDP growth ($GDPG_{it}$) as the most commonly used proxy variable to measure economic growth. This variable is supported by Vo (2005), Mirdala (2011), and others.

For the purposes of this research, the study utilizes three proxy variables to measure the impact of financial integration on economic growth. The first two proxy variables employed for the de facto measurement of financial integration are GFAL- Gross Foreign Assets and Liabilities in percentages of GDP and the variable FDI inflow that are detailed by Vo (2005) while a variable KAOPEN is de jure variable for measuring the financial integration.

The variable GFAL – Gross Foreign Assets and Liabilities in percentages of GDP is drawn from Lane and Milesi-Ferretti (2007) database and included as a proxy variable for de facto measuring the financial integration. It represents broader concept of financial integration of each country, calculated as a sum of total foreign assets and total foreign liabilities expressed in percentages of GDP. Following some earlier studies, the inclusion of a variable GFAL is supported by the findings of Bekaert, Harvey & Lundblad (2005), Vo (2005), Osada and Saito (2010), Friedrich, Schnabel and Zettelmeyer (2010).

The variable FDI inflow is proxied for de facto measuring of the financial integration. Some research studies conducted by McLean and Shrestha (2002), Klein and Olivei (2008), Osada and Saito (2010), Mirdala (2011) found a positive and statistically significant relationship of net FDI inflows and growth. Also, the inclusion of this variable is supported by studies of Haveman, Lei, & Netz (2001) Alfaro and Charlton (2006) in the case of countries with developed financial markets as well as in transition countries (Agayev, 2010; Borota and Kutan, 2008; and Teker, Tuzla, & Pala, 2014). In the case of this variable, a positive impact on growth is expected.

A country's capital account openness measured by the Chinn-Ito index (KAOPEN) is included based on the hypothesis that financial openness eliminates barriers and leads to more efficient allocation of capital, thus stimulating economic growth. Data for this variable is sourced from Chin and Ito (2006) database and de jure measure of capital account liberalization. Edwards (2001), Quinn, Inclan & Toyoda (2001), Sedik and Sun (2012), & Gehringer (2015) point out the positive effects of capital account liberalization, which mainly refer to high-income countries. According to Levine (2001), liberalization of the international portfolio of developments encourages the liquidity of the stock market, which thus accelerates economic growth through the growth of productivity. Further, Bonfiglioli and Mendicino (2004) found a positive relationship between liberalization of capital and growth but mainly through indirect channels. On the contrary, Alesina, Grili, & Milesi-Ferreti (1994), and Grilli and Milesi-Ferretti (1995) could not find a strong correlation between capital account restrictions and growth. However, the anticipated effects of financial openness on growth cannot be determined in advance in a completely unambiguous manner. Generally, countries with a greater level of financial deregulation have higher rates of growth than less open countries. But, more open economies are also more exposed to external shocks. The sign of the coefficient with the financial openness variable must therefore be empirically determined on the available sample.

The study next includes the effect of remittances (REM) on growth as a control variable. There are a number of positive effects of the inflow of remittances (REM) on economic growth found in numerous studies (Giuliano and Ruiz-Arranz; 2009, Mundaca; 2009; Calderon, Ajnzylber, & Lopez, 2007; Aggarwal, Demirguc-Kunt, & Peria, 2011; Kumar and Stauvermann, 2014). One of the reasons for the inclusion of this variable is the nexus between remittances and economic growth that works through financial development and financial integration. A positive link between remittance revenue and economic growth may be twofold. First, remittances increase the demand for financial services if recipients channelize money into savings and later on investments. Second, the remittances

provide an alternative option for entrepreneur finance if they have limited access to bank loans. On the other side, some studies revealed that remittance transfers have no impact on growth or investment (Barajas et al., 2009) while Guiliano and Ruiz-Arranz (2005) found that remittance promotes growth only in countries with undeveloped financial systems. In our case, remittances might be expected to be positively associated with growth. Inclusion of EU integration variable is supported by evidence of previous research done by Estrih and Uvalic (2014), and Friedrich, Schnabel, & Zettelmeye (2010). The above mentioned studies prove some evidence about strong relationship between financial integration and economic growth for countries that are politically closest to EU.

Further, economic integration with the EU and the entry of some CEE countries into European monetary union (EMU) can contribute to the growth of (equity) investments and other cross-border transactions of capital and thus lead to growth. The variable EU integration can be seen as a control variable and it was created as a categorical variable, ranging from 0 to 3. The value of 0 is assigned to period t in which county i had not started the integration process, value 1 is given for and after the period t in which county i had signed the association agreement. Value 2 was given for and after the period t in which county i had its candidate status officially accepted and finally value 3 is assigned for and after the period t in which county i had signed the EU accession treaty.

4. Empirical findings

At the beginning of the analysis, the stationarity of the variables and the order of integrity of each variable in the model need to be examined. To explore this issue, tests of the first and second generations of panel unit roots have been carried out to examine stationarity or no integrated property of each variable. The study utilizes several different types of panel unit root tests (Im, Pesaran and Shin W-stat, ADF Fisher Chi square, PP Fisher Chi square, Levin, Lin and Chu, Breitung and Pesaran CADF test) to determine the order of integration of each variable and whether all of them are found to be I(1).

The tests suggest that the observed variables are integrated and found to be mixed of both I(0) and I(1). Additionally, some selected panel cointegration tests are employed to test the long run relationship among the variables. Moreover, we examine the existence of cointegration or a stationarity of variables for individual units that have a unit root.

Table 1: Unit Root tests with Intercept

Test Variable	Unit Root Tests					
	Im, Pesaran and Shin W-stat	ADF Fisher Chi square	PP Fisher Chi square	Levin, Lin and Chu	Breitung t-stat	Pesaran CADF test t-bar
	First Difference					
GDPG	-12.1816***	146.729***	271.354***	-14.6401***	-9.90936***	-4.369 ***
GFAL	-8.57237***	112.116***	272.575***	-9.17064***	-2.65588***	-2.585 ***
FDI	-12.0986***	148.054***	215.489***	-14.0412***	-7.25673***	-4.360***
KAOPEN	-7.46759***	84.7148***	92.6413***	-8.49314***	-3.07471***	-2.186**
REM	-5.78145***	68.6176***	74.4730***	-5.77535***	-5.42168***	-3.198***
EUINT	-4.18513***	15.6378***	15.4706***	-4.53565***	-5.36728***	-5.991***

Notes: Im, Pesaran and Shin W-stat, ADF-Fisher Chi square, PP - Fisher Chi-square, Levin, Lin & Chu, Breitung t-stat, Pesaran CADF test null hypothesis is presence of unit root. Im, Pesaran and Shin W-stat, ADF-Fisher Chi square, PP - Fisher Chi-square, Levin, Lin & Chu, Pesaran CADF test unit root test with intercept, Breitung t-stat intercept and trend. *, **, *** indicates significant at 10%, 5%. 1% at first difference. The lag length selected based on Schwarz criterion.

Source: Authors' calculations

The cointegration analysis was carried out by employing three types of panel cointegration test (Pedroni Residual Cointegration Test, 1999; Kao Residual Cointegration Test, 1999; and Johansen Fisher Panel Cointegration Test, 1988) to verify the stationarity of the residuals and estimate the parameters of the long run relationship within the variables. In accordance with the results obtained (Table 2), the Null hypothesis is strongly rejected for all explanatory variables because the ADF-Statistic probability value is less than 5 percent level of significance. Thus, the research concludes that there is a long run relationship among the explanatory variables (financial integration, FDI inflows, financial openness, remittance and EU integration) and growth.

As it was explained in detail in the literature review section, there are various models applied in finding out an international financial integration and growth. To produce consistent estimations the study follows PMG estimator developed by Pesaran, Shin & Smith (1999) which assumes the homogenous long run coefficient and allows one to constrain the long run coefficients to be identical across the countries, but short run coefficient is allowed to be country-specific. The basic assumption about homogeneity restrictions among the sample's countries in both short run and long run heterogeneous dynamics is tested by Hausman's specification test. Hausman's test accepts long-run homogeneity restriction hypothesis and implies that PMG is more appropriate estimator than the MG estimator.

Table 2: Panel cointegration tests results: GDP growth and IFI

Test	Null hypothesis	Name of the statistics	Test Statistic
Pedroni Residual Cointegration Test	No cointegration	Panel ADF-Statistic	-2.742774***
		Group ADF statistics	-3.756329***
Kao Residual Cointegration Test	No cointegration	Panel ADF Statistics	-3.244482***
Johansen Fisher Panel Cointegration Test	No cointegration	Fisher Trace test	r = 0 (235.0)*** r ≤ 1 (147.1) *** r ≤ 2 (46.65) ***
		Fisher max eigen test	r = 0 (121.7)*** r ≤ 1 (229.2)** r ≤ 2 (51.31) ***

Source: Authors' calculations

Table 3 displays the findings for CEE-10 countries in short and long run.

Table 3 Pooled mean group (PMG) estimates

Long Run Equation	Coef.
GFAL	-4.169695*** [0.958860]
FDI	0.219983*** [0.035979]
KAOPEN	0.715625 [2.017126]
REM	0.455476 [0.186405]**
EUINT	1.344394 [1.030196]
Short Run Equation	
ECT	-0.748045*** [0.126211]
D1. GFAL	-5.046435*** [1.107776]
D1.FDI	0.378486** [0.168604]
D1.KAOPEN	13.44900** [5.786160]
D1.REM	1.297308 ** [0.581783]
D1.EUINT	-0.768377 [0.771925]
cons	3.269712*** [0.450688]
Hausman test	
chi2	2.36
Prob>chi2	0.7973

The standard errors are shown in parentheses [ ], *, ** and ***, indicate statistical significant at 10 %, 5% and 1% levels, respectively

Source: Authors' calculations

The PMG estimation findings show statistically significant all variables in the short run with the exception of variable EU integration and KAOPEN.

In the long run, all variables which describe the development of financial integration are statistically significant except a variable EU integration. Moreover, the empirical analysis confirmed the relevance of four out of five variables in explaining the variations in the rates of economic growth in the long run, but with some confronting results to previous studies (GFAL).

The selected variables: GFAL, FDI and KAOPEN, REM are the most robust determinants of growth at the one percent and five percent level of significance in the long run. However, the first variable of financial integration measured by GFAL has an inverse relationship with growth in both short run and long run. It is opposite to our expectations and studies conducted by Friedrich, Schnabel, & Zettelmeye (2010). A reversal relationship found between growth and GFAL can be explained with the lack of financial development in most of CEE 10 countries that have not reached it yet before to benefit from financial integration. Also, financial integration generates more important costs, including reducing capital inflow which leads to a decline in growth.

The second IFI variable in the form of FDI is highly significant and has a positive relationship with growth and contributes to boosting growth of CEE-10 countries in the long run and short run. One percentage increase in FDI leads to increase in growth of 0.22 percentages in the long run. Considering the fact that the largest share in the total cross-border movement of capital of the analysed sample of countries was achieved through the (incoming) FDI then a robust growth impact was expected. It is in line with some previous conducted studies done by Agayev, 2010; Borota and Kutan, 2008; and Teker, Tuzla, & Pala, 2014, and others. Further, the coefficients of financial openness appear to be an insignificant determinant of growth in the long run. Our findings are in line with several empirical studies done by Alesina, Grili, & Milesi-Ferreti (1994), and Grilli and Milesi-Ferretti (1995), Mendoza, Quadrini, & Rios-Rull (2007), and Kaminsky and Schmukler (2008), and others. Moreover, a variable KAOPEN in the long run has a positive relationship with economic growth. It is in the line with the empirical studies done by Sedik and Sun (2012), Gehringer (2015), Levine (2001), and Bonfiglioli and Mendicino (2004).

The findings point to an insignificant long run relation between a variable EU-INT and growth and fail to provide a positive link between EU integration and growth. It might be explained with the fact that majority countries from our sample joined the EU in 2004 and, consequently, already completed the process of EU integration.

Also, in both short run and long run, the study finds positive evidence at the five percent level of significance between remittances and economic growth. This suggests that remittance inflows lead to growth. It is in the line with the findings of some empirical researches of previous studies (Gillano and Ruiz-Arranz, 2009; Mundaca, 2009; Calderon, Ajnzylber, & Lopez, 2007), and others.

The average value of Error correction coefficient is negative (-0.7480429) and highly significant at one percent level. It reveals the existence of the long run's cointegration relationship among variables. In fact, it implies that approximately 74.8% of the disequilibrium in the short run in CEE-10 countries can be corrected annually. Also, for countries in the sample, Error correction coefficient lies between -0.104537 and -1.60626. The study finds similar speeds of adjustment to equilibrium in Slovenia (83%), Slovakia (82%), the Czech Republic (86%), Lithuania (87%), and slightly lower speed in Estonia (70%). On the contrary, the study finds very slow speed of adjustment to equilibrium in Latvia (47%), Poland (36%) and Hungary (10%).

Very important for all CEE -10 countries included in the panel is also the statistically significant coefficient speed of adjustment to equilibrium at the 1% level (Table 4). It varies across countries, taking the minimum value of 10.4% in Hungary (very slow speed of adjustment to equilibrium) and the maximum value of 160% in Bulgaria (very high speed of adjustment to equilibrium). This reveals the existence of a strong cointegration relationship between the variables and adjustment dynamic across CEE-10 countries because an error correction model serves at the same time as a test of cointegration.

Table 4: Speed of adjustment - Country-specific Results

Country	Error-correction term
All countries	-0.7480429***
Bulgaria	-1.60626***
Romania	-0.854322***
Estonia	-0.708058***
Latvia	-0.468407***
Lithuania	-0.871011***
Slovakia	-0.824783***
Czech Republic	-0.858884***
Hungary	-0.104537***
Poland	-0.357609***
Slovenia	-0.826581***

Source: Authors' calculations

Further, as shown in Table 4, most of the countries included in the panel share a similar speed of adjustment with certain exceptions (Hungary, Lithuania, and Latvia). For example, in Hungary with the lowest coefficient of the speed of adjustment (approximately 0.10 in the absolute value), it implies that speed of adjustment of output in Hungary converges to its long-run equilibrium with very slow speed of adjustment in comparison to other countries in the panel.

Conclusion

One of the issues examined in this study is whether the level of financial integration in CEE-10 countries is sufficient to encourage and stimulate economic growth. The existing research does not show a particularly strong link between finance integration and growth. One of the actual problems of the national financial markets in transition countries is that they are fragmented and organised on national lines. By the beginning of the transition, the economies of these countries had identical characteristics with zero or negative rates of economic growth during the 1980s. The study explored the effect of international financial integration on growth in the CEE-10 countries, taking into account three proxy variables of international financial integration.

The study reveals the following findings. First, among the measures of financial integration, growth of the CEE-10 countries is mostly driven by FDI inflows, as well as remittances and financial openness in the long run, while an effect of GFAL is also significant but inconsistent. Economic growth is statistically and positively influenced by remittances in short run and the long run because more explored countries have big Diasporas (Latvia, Lithuania, Estonia, Poland, Romania, and Bulgaria). Secondly, the financial openness policy in CEE-10 countries is more relevant for growth in the long run. It signifies that the countries with greater level of financial openness tend to have greater growth in the long run. An inverse and statistically significant relationship between GFAL and growth in the study in both short run and long run might be explained with CEE-10 countries not yet reaching a certain level of financial development before to benefit from financial integration.

Finally, it can be concluded that the results obtained in this paper are consistent with the economic theory and the previous researches (i.e. Edison, Levine, Ricci, & Sløk 2002; Prasad, Rajan, & Subramanian 2007; and others). Thus, international financial integration does not per se enhance growth whilst a country's growth can be reached at a higher level of financial integration.

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Appendix

Variables used in analysis

Variable	Explanation
GDPG	GDP growth (annual %) Data source: World Development Indicators (WDI), World Bank
GFAL	Sum of Total Assets and Total Liabilities Data source: Updated and extended version of database constructed by Lane and Milesi-Ferretti (2007)
FDI	Foreign direct investment, net inflows (% of GDP) Data source: World Development Indicators (WDI), World Bank
KAOPEN	Chinn-Ito index Data source: Chinn, M. D., & Ito, H. (2006). What Matters for Financial Development? Capital Controls, Institutions, and Interactions. Journal of Development Economics, 81, No. 1, pp. 163-192.
REM	Personal remittances, received (% of GDP) Data source: World Development Indicators (WDI), World Bank
INTG	EU integration Data source: European Commission – Regular report on progress towards accession and Comprehensive monitoring reports for each sample country