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Article

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The Determinants Of European Union (EU) Foreign Direct Investments In The EU Countries From Central And Eastern Europe During 1994–2012

Abstract

This study examines whether the CEECs' financial market development can explain the EU FDI in the CEECs during 1994–2012. The higher bank credit flows had a positive effect on the FDI in 2005–2012. This can be attributed to the major banking sector reforms undertaken before the CEECs' EU accession. Second, the stock market size had a positive effect in 1997–2004. This is due to the fact that the EU membership announcement facilitated deeper stock market integration. Third, the higher country income, in interaction with a higher bank credit flow, had only a small positive effect in 2005–2012. The higher income CEECs have pursued much deeper bank liberalization through large-scale privatization of state-owned banks. Finally, the higher country income, in interaction with a larger stock market size, had a negative effect in 2005–2012. A possible reason for this is that the EU countries have started to divert their new FDI to the non-EU countries.

Keywords*: european integration, European Union, foreign direct investment, financial market*

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1. Introduction

Since their European Union (EU) accession in 2004, the Central and Eastern European Countries (CEECs) have experienced a steady increase in foreign direct investment (FDI) inflows from the developed EU countries. In fact, the very announcement of impending EU membership already boosted the FDI coming from the EU in these countries (Clausing and Dorobantu 2005, p. 94; Estrin and Uvalic 2014, p. 309). The large-scale privatization of state-owned enterprises has also facilitated the FDI inflows. Most of these enterprises have been sold to foreign investors following the shift by the CEECs to capitalist economies (Buch, Kokta, and Piazolo 2003, p. 95). This made their economies more appealing to the EU FDI in the following two decades. Their EU accession has further improved their quality of economic management and institutional development, which has contributed to their long-term macroeconomic stability (Bevan and Estrin 2004, p. 779). Moreover, this has also boosted their higher trade with the EU countries. All these changes have made the CEECs more ideal destinations for the EU's FDI. It is worth noting that their strong FDI and trade linkages have reinforced their economic interdependence. The EU accession has standardized the CEECs' FDI incentives so that they have strengthened their locational advantages with respect to the EU's FDI. But at the same time, their high reliance on the EU's FDI has made their economies very volatile to the economic shocks in Western Europe. Similarly, the EU FDI in the CEEC has boosted the EU's economic dependence on these countries (Medve-Balint 2014, p. 39). The analysis of the EU's FDI flows has crucial policy implications for the long-term economic relationship between the CEECs and EU countries.

This study identifies the main determinants of the EU's FDI in the CEECs during 1994–2012. Previous studies have identified a number of conventional FDI determinants, such as country income, population, and distance. In light of the deeper EU financial integration, this study focuses on whether the greater financial market development following EU accession can help explain the FDI levels. The more developed stock markets and banking sectors have played a major role in providing additional external financing. However, the EU companies have faced serious constraints in obtaining adequate financing in the aftermath of the eurozone debt crisis. The EU accession has deepened the CEECs' stock market integration with the EU stock markets, and EU companies have started to tap the growing capital at the larger stock markets to finance their FDI in these countries. Moreover, the CEECs' banks have provided another main source of financing for EU companies. The EU membership announcement has triggered large-scale bank mergers and acquisitions (M&As), initiated by EU banks. The substantial bank expansion among the CEECs has increased the bank capital supply for EU companies. Besides, their close relationship with major

banks has reduced the probability that they would be subject to credit rationing (De Bonis, Ferri, and Rotondi 2015, p. 61). As bank credit flows have always served as the main source of financing, they have financed the growing EU FDI in the CEECs (di Giovanni 2005, p. 131). The results of this study provide important implications for the long-term FDI policies of the CEECs. In order to maintain higher FDI inflows, the CEECs should further deepen their stock market and bank reforms so that more financing can be made available to foreign investors.

This study contributes to the literature on FDI. Firstly, this is a pioneer study assessing the financial market effect on the EU's FDI in the CEECs. While previous studies have identified a number of conventional FDI determinants, they have overlooked the crucial factors in explaining the FDI change before and after the CEECs' EU accession. This study explores whether the CEEC financial market development played a major role in attracting the EU's FDI inflows. The CEECs' EU accession has prepared them to comply with the euro adoption criteria. In addition, the deeper capital flow liberalization has promoted more EU capital inflows into the CEECs' stock markets, and their larger and more liquid markets have increased the stock market capital supply for EU investors. Meanwhile, the CEECs' banking sectors have launched massive privatization processes as a result of the large-scale M&As initiated by the EU banks. The substantial bank expansion before the EU accession boosted the bank capital supply for EU investors. Hence, the increased development of both the stock market and banks has led to higher EU FDI inflows. This study contributes to the literature on the effect of financial market development on the EU's FDI. Second, this study examines the motives underlying the EU's FDI in the CEECs. Most of the previous studies have concluded that the EU FDI inflows are primarily market-seeking and efficiency-seeking. The EU accession has facilitated greater access for the EU to the huge CEECs' markets and educated labor force. This is the first study to explore the issue of whether, and how, the developed EU countries have boosted their global competitiveness through FDI into the CEECs. The major EU countries, such as Germany and France, have located their production facilities in the CEECs for efficiency-seeking reasons. The educated labor force, combined with lower wages, enabled the foreign companies to maintain the competitiveness of their products in the world markets (Medve-Balint 2014, p. 43). The analysis of the motives underlying the EU's FDI helps us to better predict their long-term FDI trends. This study thus contributes to the FDI literature by analyzing the underlying EU's FDI motives in the CEECs.

The remainder of the paper is organized as follows: Section 2 reviews the literature on the relationship between financial market development and EU FDI. Section 3 explains the empirical model. Section 4 presents the results and discusses their significance. Section 5 assesses their implications for the CEECs' long-term policies to attract EU FDI inflows. Section 6 offers conclusions.

2. Literature Review

A number of studies have highlighted the role of stock market development in promoting FDI levels. Lane (2000, pp. 524–525) found a positive relationship between stock market development and FDI. The more developed stock markets facilitated the sale of domestic assets to foreign investors. However, stock market liquidity has no impact on FDI. As expected, di Giovanni (2005, p. 138) confirmed that a larger stock market size has a positive effect on FDI in the form of M&As. In particular, higher stock market capitalization was found to have contributed to higher M&A activities. Following the launch of the euro, Petroulas (2007, p. 1477) concluded that the euro facilitated the stock market effect on the inward FDI within the euro area.

A few recent studies have examined the relationship between bank development and FDI flows. De Bonis, Ferri, and Rotondi (2015, p. 75) found a positive bank credit effect on FDI. In particular, the firms with a closer relationship with banks were less likely to face credit rationing. This is especially important for larger firms, as they generally have a greater need for financing to invest abroad. The positive bank-firm linkage effect on the FDI appears to be even larger if the banks have subsidiaries abroad to serve the firms. In addition to bank credit, the more internationalized banks have provided consulting services to firms, which have exploited the valuable information attained to expand into the local markets. A similar result was reached by Poelhekke (2015, p. 41), as the better bank services were found to have strengthened the firms' abilities to invest abroad. The larger banks from developed countries have useful knowledge about the client firms' industries and their investment opportunities abroad. Given their expertise in financial and legal advice, these banks have become the main source of financing for FDI, especially in host countries with weak institutions such as the rule of law. A related strand of research has confirmed the two-way relationship between financial services and FDI flows (Cazzavillan and Olszewski 2012, p. 310). At the same time as the higher bank credit has attracted more FDI inflows into the CEECs, the FDI inflows have boosted more bank FDI inflows into these countries. Given their familiarity with the host countries, the foreign banks have also facilitated non-bank FDI in these countries. An earlier study by Klein, Peek, and Rosengren (2002, p. 674) yielded similar result. The Japanese banks' performance has had direct effect on the Japanese FDI in the United States. The major banks experienced a serious financial crisis during the 1990s. The massive bank collapse substantially diminished the bank credit flows to those firms which relied on them to finance their FDI. The deteriorating bank performance led to a drastic decline of Japanese FDI in the United States.

Finally, a small number of research studies have evaluated the impact of bank reforms on promoting bank flows, which in turn have boosted the FDI. Schmitz (2011, p. 588) found that the countries with more bank reforms have received more FDI inflows, especially in the CEECs. Bank reforms have brought about a substantial improvement in banking efficiency. This has created a more favorable FDI environment for the EU investors. To exploit the higher economic growth, the foreign banks have also facilitated other types of FDI in these countries. The banks have become the main financial institutions in channeling a large amount of funds for greenfield FDI. Another recent study by Buch et al. (2014, p. 412) highlighted the significance of financial sectors in providing crucial funds for large firms engaging in FDI. The large firms have faced serious financial constraints when considering whether to invest abroad. They have a greater demand for external finance to pay for the high costs of entering foreign markets. Compared to the service firms, the manufacturing firms with higher fixed costs are more likely to invest abroad. In sum, this study argues that the greater financial market development has played a crucial role in boosting the EU FDI in the CEECs. The EU accession has deepened both the stock market and bank integration. The more developed stock markets and banking sectors have increased the financing available for the EU FDI in the CEECs.

3. Econometric Specification

3.1. Analytical Framework

The empirical model tries to identify the main determinants of the EU's FDI in the CEECs during 1994–2012. The basic foundation of the model is based on the gravity model first developed by Linnemann (1966). It posits that bilateral trade flows are directly proportional to the product of the trading countries' GDP and inversely proportional to the distance between them. This study modifies the gravity model to include financial market development variables in order to examine their impact on FDI. Specifically, it assesses whether the higher CEECs' stock market and bank development arising from their EU accession can explain the increase in their EU FDI inflows.

As discussed above, a higher stock market development would increase the supply of capital to finance the EU FDI. The CEECs have also substantially improved their institutional qualities to meet the EU membership requirements. The FDI inflows, in turn, have triggered deeper financial market reforms to comply with the membership criteria (Estrin and Uvalic 2014, p. 284). The EU accession has further deepened their stock market integration with the EU countries. The stock market size has increased due to the opening of the stock market for foreign capital

inflows. This has boosted the supply of capital to companies seeking financing for their FDI (di Giovanni 2005, p. 138). The larger stock market size has had a positive effect on the FDI. To examine the stock market size effect, the modified model includes the two stock market size variables (*StkTrd* and *MktCap*). *StkTrd* measures the total value of stock traded as a percentage of the CEECs' GDP during the study period. *MktCap* is the stock market capitalization as a share of the CEECs' GDP. It refers to the share price multiplied by the number of domestic shares listed on the stock exchanges at the end of the year.

This study also postulates that the higher bank development would boost the availability of bank capital to finance the FDI. The EU membership announcement facilitated the EU banks' M&As in the CEECs, while bank privatization has triggered the deeper bank liberalization. The creation of larger banks has boosted the low-cost bank credit available to finance the FDI (Koetter and Wedow 2010, p. 1541). The banks have also provided more bank credit for the EU companies seeking external financing for their FDI. The closer company relationships with banks have consolidated their access to the bank credit (De Bonis, Ferri, and Rotondi 2015, p. 61). Hence, the higher bank credit flows have had a positive effect on FDI. To measure the bank credit effect, the modified model includes the two bank credit variables (*BankCred* and *FinCred*). *BankCred* refers to the bank credit to the private sector as a share of the CEECs' GDP. This is equal to the total amount of financial resources provided by depository corporations to the private sector. *FinCred* is the financial sector credits provided by monetary authorities and deposit money banks to various sectors, except government.

This study further explores the interaction effect between country income and stock market development on FDI. The increase in FDI due to the EU accession varies among the developed and developing EU countries, because of the different benefits of transaction cost reductions (Forbes 2010, p. 13; De Sousa and Lochard 2011, p. 554). This study argues that the deeper stock market integration results in substantial increases in FDI in the higher income CEECs. These countries have, relative to their lower income counterparts, accelerated their stock market development through deeper stock market reforms. The higher stock market capital supply has helped finance the FDI in the higher income CEECs. Hence, the higher income CEECs with larger stock markets have a larger positive effect on FDI. To measure the country income and stock market effect, the modified model includes the interaction variables between the GDP per capita and stock market development. The CEECs' income level is measured by the GDP per capita. As explained earlier, the stock market development is measured by the stock market size variables (*StkTrd* and *MktCap*). Hence, the interaction variables (*GDPpc*StkTrd* and *GDPpc*MtkCap*) examine the GDP per capita and the stock market size effect on FDI.

The deeper bank integration due to the EU accession leads to greater FDI in the higher income CEECs. These countries have engaged in massive bank M&As, as their richer consumer markets have a greater appeal to the EU banks. The higher bank credit flows have helped finance the FDI in the higher income CEECs. Hence, the higher income CEECs with larger banks have a larger positive effect on FDI. To measure the country income and bank effect, the modified model includes the interaction variables between the GDP per capita and bank development. As explained earlier, bank development is measured by the bank credit variables (*BankCred* and *FinCred*). Hence, the interaction variables (*GDPpc*BankCred* and *GDPpc* FinCred*) examine the GDP per capita and bank credit effect on FDI.

Finally, a more educated labor force contributes to the higher FDI in the higher income CEECs. These countries, with a richer consumer market, have a greater higher demand for foreign products. They have been considered as more profitable markets than the lower income CEECs (Resmini 2000, p. 676). In addition, they have a more educated and skilled labor force to conduct R&D activities (Carstensen and Toubal 2004, p. 9). Thus the higher income CEECs with larger consumer markets and an educated labor force have a larger positive effect on FDI. To measure the country income and labor force education effect, the modified model includes the interaction variable between the GDP per capita and labor education. The CEECs' market demand for foreign products is measured by the GDP per capita, and the labor force education is measured by the proportion of the labor force that has a secondary school education as a percentage of the total labor force. Hence, the interaction variable (*GDPpc*SecEdu*) examines the GDP per capita and labor education effect on FDI.

3.2. Estimation Model

The modified gravity model identifies the main determinants of the EU's FDI in the CEECs during 1994–2012. It focuses on whether the higher financial market development can explain the FDI flows in the CEECs during the EU period 2005–2012. The regression equations are given as follows:

$$\begin{aligned}\log(FDI_{ijt}) = {} & \alpha + \beta_1 \log(TrdOpen_{ijt}) + \beta_2 \log(LabCost_{ijt}) + \beta_3 \log(CapLab_{ijt}) + \\ & \beta_4 \log(LendRat_{it}) + \beta_5 \log(Inflat_{it}) + \beta_6 \log(Dist_{ij}) + \beta_7 \log(ProfTax_{it}) + \\ & \beta_8 \log(BankCred_{it}) + \beta_9 \log(StkTrd_{it}) + \beta_{10} \log(GDPpc_{it}) + \beta_{11} \log(SecEdu_{it}) + \\ & \beta_{12} \log(RshDev_{it}) + \varepsilon_{it}\end{aligned} \tag{1}$$

$$\log(FDI_{ijt}) = \alpha + \beta_1 \log(TrdOpen_{ijt}) + \beta_2 \log(LabCost_{ijt}) + \beta_3 \log(CapLab_{ijt}) +$$

$$\beta_4 \log(LendRat_{it}) + \beta_5 \log(Inflat_{it}) + \beta_6 \log(Dist_{ij}) + \beta_7 \log(ProfTax_{it}) + \quad (2)$$

$$\beta_8 \log(FinCred_{it}) + \beta_9 \log(Mkt\text{Cap}_{it}) + \beta_{10} \log(GDPpc_{it}) + \beta_{11} \log(SecEdu_{it}) +$$

$$\beta_{12} \log(RshDev_{it}) + \varepsilon_{it}$$

where FDI_{ijt} is the FDI stocks of host country *i* of the CEEC receiving FDI from home country *j* of the EU countries in year *t* (1994–2012). All variables are measured in U.S. dollars, adjusted for inflation to the base year 2005. The thirteen CEECs include Bulgaria, Croatia, Cyprus, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Romania, Slovakia, and Slovenia. The thirteen EU countries from Western and Southern Europe include Austria, Belgium, Denmark, Finland, France, Germany, Greece, Italy, the Netherlands, Portugal, Spain, Sweden, and the United Kingdom. All of the CEECs have joined the EU since 2004. Due to the Economic and Monetary Union (EMU) accession, Cyprus, Estonia, Latvia, Lithuania, Malta, Slovakia, and Slovenia have adopted the euro between 2008–2015. Both the eurozone and non-eurozone CEECs have deepened their stock market and bank integration with the EU countries. This study includes both country samples to obtain more accurate estimations.

The main explanatory variables are the stock market and bank development variables. To test for robustness, the two bank credit variables (*BankCred* and *FinCred*) are included in the regression equations (1) and (2), respectively. *BankCred* is the bank credit provided to the private sector as a share of the CEECs' GDP. This is equal to the financial resources provided to the private sector by the depository corporations. *FinCred* is the financial sector credits provided by the monetary authorities and deposit money banks to various sectors, except the government. Since the late 1990s, the EU membership announcement further opened up the CEECs' banking sectors through bank M&As. This has led to the creation of more competitive and efficient banking sectors (Bonin, Hasan, and Wachtel 2005, p. 2157). Adoption of the euro has eliminated the exchange rate volatility among the member countries, which has facilitated higher FDI (Schiavo 2007, p. 547). The growing bank expansion has provided more bank credit to the foreign firms, thereby boosting the EU's FDI in the CEECs.

For the stock market variables, the two stock market size variables (*StkTrd* and *MktCap*) are included in the regression equations (1) and (2), respectively. As explained earlier, *StkTrd* measures the total value of stocks traded in the stock markets as a share of the CEECs' GDP. *MktCap* is the stock market capitalization of the stock markets as a share of the CEECs' GDP. It is measured by the stock price multiplied by the number of domestic stocks listed on the stock exchanges at

the end of the year. Due to the EU and EMU accession, the CEECs' stock markets have become more liquid and more integrated with their EU counterparts, and the cost of capital for foreign firms has substantially decreased (De Sousa and Lochard 2011, p. 554). This has helped boost the EU's FDI in the CEECs.

The other explanatory variables of interest are *TrdOpen*, *LabCost*, *CapLab*, and *RshDev*. The trade openness variable (*TrdOpen*) is equal to the bilateral trade (exports and imports of goods and services) between the CEEC and EU countries as a share of the CEECs' GDP. It reflects the degree of integration between these countries (Buch, Kokta, and Piazolo 2003, p. 100). The EU countries have preferred to invest in the CEECs due to their trade and openness to foreign capital. Hence, the higher trade has helped boost the EU's FDI in the CEECs. Secondly, the labor cost variable (*LabCost*) refers to the labor wage difference between the CEECs and EU countries. A higher CEEC unit labor cost relative to the EU has discouraged the EU FDI because of the higher production costs incurred (Resmini 2000 p. 676). Thirdly, the relative factor endowment variable (*CapLab*) is measured by the difference in investment-labor ratios of the CEECs and EU countries. Investment is the amount of fixed capital formation, whereas labor is the size of the working population. A larger difference in relative factor endowment would indicate a larger difference in input prices. The EU investors have split the production processes in the CEECs according to the factor intensities of its different stages (Carstensen and Toubal 2004, p. 17). Hence, a larger relative factor endowment difference has attracted more EU FDI. Finally, the research and development spending variable (*RshDev*) refers to the amount of research and development (R&D) spending as a percentage of the CEECs' GDP. A higher R&D expenditure indicates the CEE country's determination to become a research-intensive location for EU investors (Hubert and Pain 2002, p. 356). This has helped attract more high-technology EU FDI in the CEECs.

The lending rate variable (*LendRat*) refers to the bank lending rate that can meet the short- and medium-term financing needs of the private sector. This rate is usually differentiated according to the creditworthiness of borrowers and objectives of financing. A lower (or higher) bank lending rate would reduce (or raise) the cost of borrowing for foreign investors. The lower bank lending rate generally in place has helped boost the EU's FDI in the CEECs because of the lower cost of bank capital available for investors. Second, the inflation rate variable (*Inflat*) is measured by the consumer price index. It reflects the annual percentage change in the cost of living of the average consumers, i.e. for buying goods and services that may be fixed or changed at a specified interval (yearly). The higher inflation rate has substantially affected the total production costs for the EU investors, as it has resulted in higher wage increases. Thus the higher inflation rate has deterred the EU's FDI. Third, the distance variable (*Dist*) refers

to the geographical distance between the capital cities of the CEECs and EU countries. The distance can have either a positive or negative effect on FDI. A longer distance, indicating a larger difference in culture and institutional qualities, has increased the investment costs for the EU investors. This has decreased the FDI. But at the same time the longer distances, which leading to incurring higher trade costs due to the higher transportation costs, have also made FDI a more profitable option for the EU countries (Bellak, Leibrecht, and Damijan 2009, p. 275). Finally, the tax variable (*ProfTax*) refers to the taxes on income, profits, and capital gains that are levied on the actual or presumptive net income of individuals, corporate profits, and capital gains on assets. This variable measures the taxes collected as a share of total CEEC taxes. The amount of taxes has represented a tax burden for EU investors (Clausing and Dorobantu 2005, p. 89). The higher tax has resulted in lower corporate profits for the EU investors, thereby discouraging FDI.

Several variables have an uncertain effect on FDI. Firstly, the country income variable (*GDPpc*) refers to the CEECs' GDP per capita level, measured by their GDP divided by population size. This reflects the market size and potential consumer demand for EU products (Piteli 2010, p. 121). A larger market size, reflecting a higher purchasing power, has a positive effect on FDI. But at the same time it also entails a negative effect on FDI as the richer CEEC countries have higher production costs for the EU investors (Buch, Kokta, and Piazolo 2003, p. 106), which has made their exports less competitive. So in this sense a larger market size has discouraged FDI. Second, the labor force education variable (*SecEdu*) refers to the proportion of the labor force that has a secondary school education as a percentage of the total labor force. A more educated labor force certainly has a positive effect on FDI as educated workers have the ability to carry out highly research-intensive activities for the EU investors (Carstensen and Toubal 2004, p. 9). However, the educated labor force also has discouraged FDI in that it leads to higher labor costs (wages) for EU investors (Altomonte and Guagliano 2003, p. 231).

This study also investigates whether the FDI effects of higher financial market development vary among the higher and lower income CEECs. The modified model includes the GDP per capita-bank and GDP per capita-stock market variables to measure their interaction effects. The regression equations are given as:

$$\log(FDI_{ijt}) = \alpha + \beta_1 \log(TrdOpen_{ijt}) + \beta_2 \log(LabCost_{ijt}) + \beta_3 \log(CapLab_{ijt}) +$$

$$\beta_4 \log(LendRat_{it}) + \beta_5 \log(Inflat_{it}) + \beta_6 \log(Dist_{ij}) + \beta_7 \log(ProfTax_{it}) + \quad (3)$$

$$\beta_8 \log(GDPpc_{it}*BankCred_{it}) + \beta_9 \log(GDPpc_{it}*StkTrd_{it}) +$$

$$\beta_{10} \log(GDPpc_{it}*SecEdu_{it}) + \varepsilon_{it}$$

$$\log(FDI_{ijt}) = \alpha + \beta_1 \log(TrdOpen_{ijt}) + \beta_2 \log(LabCost_{ijt}) + \beta_3 \log(CapLab_{ijt}) +$$

$$\beta_4 \log(LendRat_{it}) + \beta_5 \log(Inflat_{it}) + \beta_6 \log(Dist_{ij}) + \beta_7 \log(ProfTax_{it}) + \quad (4)$$

$$\beta_8 \log(GDPpc_{it}*FinCred_{it}) + \beta_9 \log(GDPpc_{it}*Mkt\text{Cap}_{it}) +$$

$$\beta_{10} \log(GDPpc_{it}*SecEdu_{it}) + \varepsilon_{it}$$

The dependent and independent variables have already been explained in the description of equations (1) and (2). To test for their robustness, the two GDP per capita-bank interaction variables (*GDPpc***BankCred* and *GDPpc***FinCred*) are included in equations (3) and (4), respectively. The EU accession has facilitated more bank M&As in the CEECs, especially in the higher income CEECs. Their richer consumer markets have appeared more profitable to the EU banks than those in the lower income CEECs. Hence, the major EU banks have provided more bank capital and valuable consulting services to the EU investors in the higher income CEECs (De Bonis, Ferri, and Rotondi 2015, p. 61). This has led to more FDI in the CEECs.

For the stock market variables, the two GDP per capita-stock market interaction variables (*GDPpc***StkTrd* and *GDPpc***Mkt*Cap) are included in equations (3) and (4), respectively. The EU accession has accelerated the stock market development through the major stock market reforms carried out in the higher income CEECs. Their overall stock market sizes have substantially grown due to the growing number of new domestic firms (Cazzavillan and Olszewski 2012, p. 314). The more stock market capital provided to the EU investors has contributed to a higher FDI.

Finally, the GDP per capita-labor education interaction variable (*GDPpc***SecEdu*) is also included in equations (3) and (4), respectively. The higher income CEECs, with a more educated labor force, have become more appealing to EU investors. Their better R&D infrastructures have further facilitated the EU high-technology FDI inflows (Carstensen and Toubal 2004, pp. 6–7). These favorable investment environments have helped boost the FDI.

3.3. Two-Stage Least Squares and Generalized Method of Moments Estimations

There may be an endogeneity problem in the FDI and financial development variables. The higher financial market development would promote the FDI inflows due to the increased supply of financing, but the growing FDI inflows would facilitate the demand for financial services, which would accelerate the financial market development. To address this concern, this study

uses the two-stage least squares (2SLS) method to re-estimate the endogenous variables (*BankCred*, *FinCred*, *StkTrd*, and *MktCap*). The instrumental variables (IV) would replace these endogenous variables. First, the IV for *BankCred* and *FinCred* include *PrivCred* and *Saving*. *PrivCred* equals the credit value provided by financial intermediaries to the private sector, divided by the CEECs' GDP. It measures the total credit issued to the private sector, but excludes credit issued to governments and public agencies. *Saving* is the amount of GDP minus the final consumption expenditure. It refers to the amount of domestic saving available for bank credit and private credit flows.[1] Second, the IV for *StkTrd* and *MktCap* include *CapForm* and *Turnover*. *CapForm* is the gross capital formation as a percentage of the CEEC's GDP. It measures the potential demand for financial services by CEECs' companies. *Turnover* is the turnover ratio which measures the total value of shares traded during the period divided by the average market capitalization for the period. Average market capitalization is calculated as the average of the end-of-period values for the current period and the previous period.[2] In addition to the 2SLS method, equations (1) to (4) are also re-estimated by the dynamic generalized method of moments (GMM) method to control for biases related to endogeneity, omitted variables, and unobserved country fixed effects. It can also address the heteroskedasticity and serial correlation problem. The first difference procedure is chosen as the transformation method to remove the cross-section fixed effects. The stock market and bank IV used in the 2SLS method are included as the IV in the dynamic GMM method.

Almost all the data on the explanatory variables including the IV are obtained from the World Bank database. The FDI and bilateral trade data are obtained from the European Commission AMECO database.

[1] The Wald test is used to determine whether these IVs are appropriate. The results that show the large F-statistic value confirms their suitability for *BankCred* and *FinCred*. The results are available upon request.

[2] The Wald test is used to determine whether these IVs are appropriate. The results that show the large F-statistic value confirm their suitability for *StkTrd* and *MktCap*. The results are available upon request.

4. Estimation Results

4.1. Financial Development Effects on the FDI

The main aim of this study is to determine whether the CEECs' financial market development has promoted EU FDI inflows during 1994–2012. Specifically, it investigates whether the higher development of banks and stock markets arising from EU accession have further boosted the FDI during 2004–2012. Tables 1 and 2 present the 2SLS results for the equations (1) and (2), respectively. Their GMM results are presented in Tables 5 and 6. Both estimations show inconclusive results with respect to the financial market effects on FDI. The bank credit variables have mixed effects for the different subperiods. As reported in column (2) of Tables 1 and 5, the 2SLS and GMM coefficients on *BankCred* are negative and statistically significant for the period 1997–2004. Another bank credit variable (*FinCred*) also shows the same results in Tables 2 and 6. This is not in line with the argument that the announcement of EU membership triggered the bank credit effect on FDI. Even before the EU accession, the EU banks were engaged in massive M&As in the CEECs, so that most of their state-owned banks have become privatized. As the larger EU banks have thus been able to provide valuable knowledge about the local markets, this has reduced the investment costs for EU investors (Poelhekke 2015, p. 34). The higher bank credit flows should have a positive effect on the FDI before the EU accession. But the results provide no support for this argument.

In contrast to the negative effect in 1997–2004, the higher bank credit flows have boosted the FDI in 2005–2012. As seen in column (3) of Table 1, the 2SLS coefficient on *BankCred* becomes positive and significant in the 2005–2012 period. This can be attributed to the major bank restructuring undertaken during their preparation for EU membership. To meet the membership criteria, the CEEC banking sectors achieved a deeper liberalization to attract foreign capital inflows (Schmitz 2011, p. 589). The EU M&As with the CEEC banks have provided more financing for the EU investors. This can explain the positive bank credit effect on the FDI in 2005–2012. Another reason for this result is the closer relationship between the EU banks and investors. Under tight credit constraints, this has guaranteed their continued access to bank loan supply and valuable consulting services, thus making investors better able to exploit investment opportunities to consolidate their market shares (Bonis, Ferri and Rotondi 2015, p. 64). Hence the higher bank credit flows have facilitated the higher FDI after the EU accession.

Similar to the bank credit effect, the stock market size has had very mixed effects on the FDI over different subperiods. It had a positive effect over

1997–2004, but a negative effect over 2005–2012. As shown in column (2) of Tables 5 and 6, the positive GMM coefficients on *StkTrd* and *MktCap* are highly significant for the period 1997–2004. However, as indicated in column (3) of Tables 1, 5, and 6, the 2SLS and GMM coefficients become negative in the 2005–2012 period. The result of the positive stock market effect in 1997–2004 confirms that the EU membership announcement facilitated the higher stock market effect on FDI. Due to the EU stock market integration, the CEECs' stock markets have become more liquid and larger since the early 2000s. The larger stock markets have provided more and lower cost bank capital for foreign investors (De Sousa and Lochard 2011, p. 575). This can explain the positive stock market effect on the FDI during 1997–2004.

The negative stock market effect in the 2005–2012 period can be explained by the exhaustion of the anticipated EU effect. The EU membership announcement has facilitated the CEECs' stock market liberalization. This, combined with their close trade ties, have made these countries adopt more friendly business and legal environments for the EU countries (Clausing and Dorobantu 2005, p. 81). This made their FDI environment more appealing to EU investors, as evidenced by the positive stock market effect on the FDI in 1997–2004. But this effect no longer existed after the EU accession in the period 2005–2012. As a result of their market-seeking motive, the EU countries had already consolidated their market shares through FDI (Medve-Balint 2014, p. 47). Therefore, the EU accession has not substantially boosted the EU's FDI in the CEECs. This can explain the lack of the stock market effect on the FDI in 2005–2012. The reason for the negative stock market effect can be attributed to the 2008 financial crisis, which has diminished the EU capital inflows into the CEECs (Stoddard and Noy 2015, p. 396). The massive capital withdrawal has drastically reduced the stock market liquidity. This may explain the negative stock market effect on the FDI during 2005–2012.

4.2. Country Income-Financial Development Interaction Effects on the FDI

This study further examines whether the country income, in interaction with the financial development, had different effects on the EU's FDI inflows. Both the 2SLS and GMM estimations yield mixed results for the country income-bank interaction effect on the FDI. The country income-bank interaction variable had a positive effect on the FDI over the 2005–2012 period. As noted in column (3) of Table 3, the positive 2SLS coefficient on *GDPpc*BankCred* is highly significant over 2005–2012. But this result should be interpreted with caution as the size of the coefficient is quite small and only significant at the

10% level. The GMM coefficient is not even significant in Table 7. Another country income-bank interaction variable (*GDPpc*FinCred*) had the opposite sign. As noted in column (2) of Table 8, the GMM coefficient turns out to be negative and significant over 1997–2004. The 2SLS coefficient is not significant in Table 4. The overall results suggest that the country income, in interaction with the bank development, had only a small positive effect on the FDI after the EU accession. The higher income CEECs have pursued much deeper bank liberalization through the massive privatization of state-owned banks. The result confirms that the surge in foreign bank capital inflows has led to higher FDI. It is noteworthy that the small countries' income-bank credit interaction effect can be explained by the timing of the FDI increase. Even before the EU accession, the EU banks had already increased their ownership and expanded the holdings of assets and liabilities in the CEECs' banks (Jones 2013, p. 55). The EU accession no longer boosted the bank credit flows. This may explain the small country income-bank credit effect on the FDI in 2005–2012.

Contrary to expectations, the overall results show a negative country income-stock market interaction effect on the FDI for 2005–2012. As presented in column (3) of Tables 3 and 7, the 2SLS and GMM coefficients on *GDPpc*StkTrd* are both negative and highly significant over 2005–2012. The same result is found in another country income-stock market interaction variable (*GDPpc*MktCap*) in columns (2) and (3) of Tables 4 and 8. The results indicate that the higher country income, in interaction with larger stock market size, actually had a negative effect on the FDI after the EU accession. This is quite surprising as the more developed stock markets in the higher income CEECs should have boosted the stock market capital supply for financing FDI. But the results provide no support for this argument. A possible reason is the end of the FDI increase before the EU accession. The EU membership announcement had already contributed to the substantial EU FDI increase as the higher income CEECs improved the quality of their institutions to comply with the membership criteria (Estrin and Uvalic 2014, p. 284). This may explain for the lack of a country income-stock market interaction effect on the FDI. Another reason may be that, given the consolidation of their market shares in the CEEC, the EU countries began to divert their new FDI to non-EU countries (De Sousa and Lochard 2011, p. 566). This can explain the lack of a positive country income-stock market interaction effect on the FDI for 1997–2012.

Finally, both estimations show a positive country income-labor education interaction effect on FDI. As noted in columns (2) and (3) of Tables 3, 4, 7, and 8, the 2SLS and GMM coefficients on *GDPpc*SecEdu* are all positive and highly significant for both the 1997–2004 and 2005–2012 periods. The results confirm that the highly educated labor force has boosted the FDI in the higher income CEECs. The labor force has the ability to quickly learn the new technologies and

integrate them into productions (Carstensen and Toubal 2004, p. 9). Besides, the EU countries have boosted their FDI in the higher income CEECs owing to their greater demand for foreign products. This can explain the positive country income and labor education interaction effect on the FDI in 1997–2012.

5. Implications for the CEECs' Long-Term FDI Policies

The results provide important implications for the CEECs' FDI policies over the long run. They yield very valuable suggestions on how to attract more EU FDI inflows. First, the results indicate that the higher bank credit flows promoted the FDI in 2005–2012, especially among the higher income CEECs. To meet the EU membership criteria, the CEECs have launched major banking sector reforms since the early 2000s. In particular, the EU banks have engaged in massive M&As with the state-owned CEEC banks. Due to this bank expansion, the higher bank credit flows had a strong positive effect on the FDI during the EU accession period. To boost more FDI, the CEECs have to deepen the banking reforms which commenced a decade ago. The countries with deeper bank liberalization have always received more FDI, as their banking sectors have opened up for more foreign capital inflows. The increase in bank credit supply has also financed more greenfield FDI. This has led to the increasing number of new enterprises in the CEECs over the long run (Schmitz 2011, pp. 588–589). The higher income CEECs, such as the Czech Republic, Hungary, and Poland, have undertaken much deeper banking reforms than the lower income CEECs. The high availability of bank credits has helped these countries to attract more FDI in capital-intensive industries (Resmini 2000, p. 673). To build more efficient banking sectors, the lower income CEECs have to complete more comprehensive banking reforms. They have to introduce better legislation to protect foreign bank operations. The current stringent regulations have to be fully eliminated to facilitate the entry of foreign banks. A larger foreign bank presence can provide more capital for the FDI in these CEECs.

Second, the results suggest that the larger stock market size only attracted more FDI in 1997–2004. Beginning in the late 1990s, the large-scale privatization of the CEECs' state-owned firms triggered a greater need for external financing. This led to stock market expansion even before the EU accession (Cazzavillan and Olszewski 2012, p. 314). The larger stock market size allowed the local and foreign firms to obtain lower cost capital, thereby attracting more FDI. However, this effect no longer existed in the higher income CEECs after their EU accession, i.e. in 2005–2012. Despite the stock market reforms prior to the accession, most of their stock markets have remained not fully developed when compared to the

developed EU stock markets. The establishment of more developed stock markets has required huge fixed setup costs (Lane 2000, p. 532). Most of the CEECs have mainly relied on the larger EU stock markets for external financing. To build larger stock markets, the CEECs have to continue the stock market reforms that started before their EU accession. The stock market reform has to be deepened to become more integrated with the EU stock markets. In particular, less stringent regulations have to be implemented to allow the CEECs' stocks to be listed on the EU stock markets. Meanwhile, the CEECs have to introduce more government incentives to encourage the establishment of new firms. Higher firm activities increase the demand for stock market capital for financing, thereby boosting the stock market liquidity and size. As the stock markets become more developed, a more favorable financial market development becomes the major force in promoting the FDI inflows.

Third, the results suggest that the FDI flows have not been primarily for a market-seeking purpose. As the CEECs income has increased, the EU companies have started to locate more capital-intensive productions in these countries (Demekas et al., 2007, p. 378). Compared to other developing countries, the CEECs have a more educated and skilled labor force available for higher value-added FDI. To maintain sustainable high economic growth, the CEECs have to develop more long-term policies to attract capital-intensive FDI. To achieve this, specific incentive measures are needed to boost labor productivity. The governments should introduce favorable policies to promote technology diffusion and improve the quality of their skilled labor force (Bellak, Leibrecht, and Riedl 2008, p. 34). This has the potential to complement the CEECs' high-technology policy through outward FDI flows. Despite the technology diffusion through inward FDI, a substantial technology gap between the CEECs and the other EU countries continues to exist. To further narrow this technology gap, the larger CEECs' companies have established technology-intensive industries in the fifteen developed EU countries (Jundra et al., 2015, p. 1260). These FDI flows have allowed these companies to learn the new technologies through research collaborations with the EU companies. Meanwhile, the CEECs should implement additional measures to accelerate their technological progress. The improvement in research infrastructures has facilitated high-quality research and development projects. Equally important, special tax incentives and government subsidies have to be introduced to encourage more EU-CEEC research collaboration. Hence, all these measures would make the CEECs more appealing to high-technology FDI in the long run.

6. Conclusions

This study explores whether the CEECs' financial market development can explain their FDI level since the EU accession. The higher country income interacted with higher bank credit flow had a very small positive effect on the FDI in 2005–2012. The higher income CEECs have pursued much deeper bank liberalization through large-scale privatization of state-owned banks. The more open banking sectors have attracted more foreign capital inflows. The higher bank credit supply has boosted the FDI flows in the higher income CEECs after their EU accession. Finally, the higher country income, in interaction with larger stock market size, actually had a negative effect on the FDI in 2005–2012. A possible reason for this is that the developed EU countries, mostly eurozone countries, have started to divert their new FDI to the non-EU countries for market expansion. As the EU investors have already consolidated their market shares in the CEECs through FDI, they have shifted their FDI to regions outside the EU after the EU accession of the CEECs.

Table 1. 2SLS Estimates of the EU Integration Effect on Foreign Direct Investment

	(1)	(2)	(3)
	1994–2012	1997–2004	2005–2012
TrdOpen	-0.005	0.001	0.001
	(-1.144)	(0.056)	(0.226)
LabCost	0.086	-0.103	0.296
	(0.601)	(-0.356)	(1.119)
BankCred	-0.006	-0.126*	0.075*
	(-0.183)	(-1.657)	(1.697)
StkTrd	0.015	-0.062	-0.195***
	(0.677)	(-1.388)	(-5.620)
SecEdu	2.201***	1.318***	-0.033
	(10.980)	(4.201)	(-0.077)
Adj. R^2	0.881	0.917	0.923
Obs.	1981	60	1968

***, **, * indicate significance at 1%, 5%, & 10%.

For brevity, the results of other variables in equation (1) are not shown.

Source: Please see page 12 for data source of variables.

Table 2. 2SLS Estimates of the EU Integration Effect on Foreign Direct Investment

	(1)	(2)	(3)
	1994–2012	1997–2004	2005–2012
TrdOpen	-0.005	-0.001	-0.001
	(-1.257)	(-0.051)	(-0.042)
LabCost	0.021	0.129	-0.201
	(0.147)	(0.412)	(-0.676)
FinCred	0.004	-0.178*	-0.007
	(0.105)	(-1.822)	(-0.189)
MktCap	-0.110*	-0.379***	-0.650***
	(-1.601)	(-2.994)	(-6.037)
SecEdu	2.143***	1.043***	0.228
	(10.622)	(3.177)	(0.538)
Adj. R^2	0.879	0.916	0.919
Obs.	1981	60	1968

***, **, * indicate significance at 1%, 5%, & 10%.

For brevity, the results of other variables in equation (2) are not shown.

Source: Please see page 12 for data source of variables.

Table 3. 2SLS Estimates of the EU Integration Effect on Foreign Direct Investment

	(1)	(2)	(3)
	1994–2012	1997–2004	2005–2012
TrdOpen	-0.004	0.008	0.006
	(-1.020)	(0.796)	(0.892)
LabCost	0.934***	0.476*	0.946***
	(7.697)	(1.708)	(4.467)
*GDPpc*BankCred*	0.012**	-0.004	0.009*
	(2.292)	(-0.336)	(1.603)
*GDPpc*StkTrd*	-0.004	-0.020***	-0.030***
	(-1.099)	(-2.508)	(-5.718)
*GDPpc*SecEdu*	0.507***	0.383***	0.094
	(17.029)	(7.685)	(1.526)
Adj. R^2	0.872	0.909	0.922
Obs.	1981	60	1968

***, **, * indicate significance at 1%, 5%, & 10%.

For brevity, the results of other variables in equation (3) are not shown.

Source: Please see page 12 for data source of variables.

Table 4. 2SLS Estimates of the EU Integration Effect on Foreign Direct Investment

	(1)	(2)	(3)
	1994–2012	1997–2004	2005–2012
TrdOpen	-0.005	0.007	0.005
	(-1.198)	(0.670)	(0.858)
LabCost	0.951***	0.729***	0.801***
	(8.059)	(2.496)	(3.638)
*GDPpc*FinCred*	0.013***	-0.007	-0.003
	(2.379)	(-0.425)	(-0.517)
*GDPpc*MktCap*	-0.013	-0.058**	-0.074***
	(-1.237)	(-2.262)	(-5.494)
*GDPpc*SecEdu*	0.515***	0.368***	0.153***
	(17.129)	(7.133)	(2.491)
Adj. R^2	0.872	0.907	0.921
Obs.	1981	60	1968

***, **, * indicate significance at 1%, 5%, & 10%.

For brevity, the results of other variables in equation (4) are not shown.

Source: Please see page 12 for data source of variables.

Table 5. GMM Estimates of the EU Integration Effect on Foreign Direct Investment

	(1)	(2)	(3)
	1994–2012	1997–2004	2005–2012
TrdOpen	0.001	0.007	-0.002
	(0.062)	(0.610)	(-0.247)
LabCost	0.021	-0.306	0.642***
	(0.122)	(-1.054)	(2.407)
BankCred	-0.044	-0.146**	-0.008
	(-1.325)	(-1.907)	(-0.200)
StkTrd	0.001	0.080**	-0.085***
	(0.017)	(2.311)	(-2.344)
SecEdu	0.926***	0.843***	0.682
	(3.836)	(2.826)	(1.488)
J-statistic	16.963	14.387	2.735
Obs.	1981	60	1968

***, **, * indicate significance at 1%, 5%, & 10%.

For brevity, the results of other variables in equation (1) are not shown.

Source: Please see page 12 for data source of variables.

Table 6: GMM Estimates of the EU Integration Effect on Foreign Direct Investment

	(1)	(2)	(3)
	1994–2012	1997–2004	2005–2012
TrdOpen	-0.002	0.009	-0.007
	(-0.387)	(0.601)	(-1.005)
LabCost	-0.099	-1.208***	-0.128
	(-0.540)	(-2.423)	(-0.287)
FinCred	-0.044	-0.299***	-0.023
	(-1.275)	(-2.553)	(-0.586)
MktCap	-0.306*	1.168***	-0.557***
	(-1.827)	(2.762)	(-2.507)
SecEdu	0.908***	1.427***	1.262**
	(3.688)	(3.192)	(2.257)
J-statistic	12.870	4.083	0.438
Obs.	1981	60	1968

***, **, * indicate significance at 1%, 5%, & 10%.

For brevity, the results of other variables in equation (2) are not shown.

Source: Please see page 12 for data source of variables.

Table 7. GMM Estimates of the EU Integration Effect on Foreign Direct Investment

	(1)	(2)	(3)
	1994–2012	1997–2004	2005–2012
TrdOpen	0.007	0.013	0.001
	(1.216)	(1.065)	(0.188)
LabCost	0.649***	0.064	1.020***
	(4.466)	(0.224)	(5.299)
*GDPpc*BankCred*	-0.006	-0.017	-0.001
	(-1.086)	(-1.294)	(-0.224)
*GDPpc*StkTrd*	-0.003	0.007	-0.015***
	(-0.818)	(1.125)	(-2.495)
*GDPpc*SecEdu*	0.310***	0.297***	0.206***
	(8.788)	(6.696)	(3.172)
J-statistic	1.802	2.469	0.834
Obs.	1981	60	1968

***, **, * indicate significance at 1%, 5%, & 10%.

For brevity, the results of other variables in equation (3) are not shown.

Source: Please see page 12 for data source of variables.

Table 8. GMM Estimates of the EU Integration Effect on Foreign Direct Investment

	(1)	(2)	(3)
	1994–2012	1997–2004	2005–2012
TrdOpen	0.006	0.013	-0.001
	(0.974)	(1.005)	(-0.214)
LabCost	0.621***	-0.373	0.817***
	(4.158)	(-0.848)	(3.235)
*GDPpc*FinCred*	-0.008	-0.033**	-0.007
	(-1.337)	(-1.990)	(-1.254)
*GDPpc*MktCap*	-0.026	0.097	-0.050**
	(-1.049)	(1.324)	(-1.907)
*GDPpc*SecEdu*	0.319***	0.317***	0.271***
	(8.673)	(6.504)	(3.472)
J-statistic	1.094	1.049	2.532
Obs.	1981	60	1968

***, **, * indicate significance at 1%, 5%, & 10%.

For brevity, the results of other variables in equation (4) are not shown.

Source: Please see page 12 for data source of variables.

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Streszczenie

DETERMINANTY BEZPOŚREDNICH INWESTYCJI ZAGRANICZNYCH UNII EUROPEJSKIEJ (UE) W PAŃSTWACH UE Z EUROPY ŚRODKOWEJ I WSCHODNIEJ W LATACH 1994–2012

Niniejsze opracowanie służy odpowiedzi na pytanie czy rozwój rynku finansowego Europy Środkowej i Wschodniej może być wyjaśnieniem rozwoju BIZ Unii Europejskiej w państwach Europy Środkowej i Wschodniej w latach 1994–2012. Wyższe przepływy kredytu bankowego miały pozytywny wpływ na BIZ w latach 2005 2012. Może to być wynikiem zasadniczych reform sektora bankowego, podjętych przed przystąpieniem państw Europy Środkowej i Wschodniej do UE. Po drugie, zaobserwowano pozytywne oddziaływanie rozmiarów rynku akcji na BIZ w latach 1997–2004 r. Wynika to z faktu, że ogłoszenie członkostwa w UE ułatwiło głębszą integrację rynku akcji. Po trzecie, wyższy dochód państwa, w połączeniu z większym przepływem kredytu bankowego, miał tylko niewielki

pozytywny wpływ na BIZ w latach 2005–2012. Kraje Europy Środkowej i Wschodniej o wyższych dochodach dokonały dużo głębszej liberalizacji systemów bankowych poprzez szeroko zakrojoną prywatyzację dużych banków państwowych. Wreszcie, wyższy dochód państwa, w połączeniu z większymi rozmiarami rynku akcji, miały negatywny wpływ na BIZ w latach 2005–2012. Możliwym powodem jest to, że kraje UE zaczęły lokować BIZ w państwach poza UE.

***Słowa kluczowe**: integracja europejska, Unia Europejska, bezpośrednie inwestycje zagraniczne, rynek finansowy*