

The role of foreign trade in the process of financial integration: The case of European Union countries

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Abstract. The importance of monetary integration is increasing and the adoption of a common currency has to be accompanied by financial market integration. Using a data sample of EU member countries over the period 1994-2008 we assess the impact of the individual factors which dominated the process of financial market integration in the selected region. The empirical model is estimated by using the econometric method of panel regression. Because of the existence of reverse causality, i.e. the existence of simultaneity between the dependent variable and one of the explanatory variables (foreign trade) of the "basic" model, another equation was added into the model and this simultaneous equations model was then estimated by using the instrumental variables method and the two stage least squares method (the "new" model). We conclude that foreign trade has a positive impact on the financial integration and that increasing financial integration leads to more intensive foreign trade among these countries. However, world trade (and thus financial integration) can be undermined by limiting trade finance as a result of tightening financial regulation and supervision after a decade of loose regulation and supervision.

Keywords: financial integration, foreign trade, international investment position.

JEL Classification: C23, C36, E44, F36, F42

AMS Classification: 62P20, 62M10, 91B84

1 Introduction

The integration of financial markets contributes to the overall integration and economic growth by removing the exchange rate risk and the barriers and frictions in cross-border capital movement.² This allows the capital to be allocated more efficiently (Baele *et al.* [1]). Financial integration is an important factor in increasing the efficiency of a financial system and lowering the costs for business as well as for consumers. However, some negative effects can be linked with this process. Some capital may hinder the economy without barriers for capital movement, especially the so-called "hot money", which can be transferred from one country to another very quickly and without restrictions and major expenses. The process of financial integration of the past decade was associated with an unprecedented accumulation of risks and the national and supranational financial regulation and supervisory practices lagged behind the highly integrated, fast expanding and sophisticated financial sector (European Commission [4]).

The aim of the paper is to analyse the degree of financial integration of the EU countries with the rest of the world by using quantity-based measures of financial integration derived from the countries' international investment positions with a view to the foreign trade. We investigate the relations between the country's foreign assets and liabilities (a dependent variable) and selected macroeconomic variables (explanatory variables). The paper is structured as follows. The first chapter is introduction. In chapter two, the measures of financial integration and some remarks on the previous empirical research concerning the analyses of international investment positions are presented. In chapter three, the data, periods and countries and methods used in this paper are described. In chapter four, we present and estimate the "basic" and "new" empirical model in order to analyse the degree of financial integration among the EU27, EU10, and EU17 countries and the rest of the world by using the panel regression method. Chapter five is a discussion concerning the role of trade finance in the process of financial integration. The last chapter summarises the results and brings conclusions.

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² See Kotlanova and Kotlan [9] for verification of other channels that growth variables, especially taxation, can influence economic growth by.

2 Financial integration

2.1 Measures of financial integration

Baele *et al.* [1] consider three categories of measures: price-based, news-based, and quantity-based measures. *Price-based measures* quantify discrepancies in prices or yields on assets, which result from the assets' geographic origins. This set of measures allows us to check the validity of the law of one price. *News-based measures* differentiate between information effects and frictions or barriers. News of a regional character is expected to have a smaller effect on asset prices than, for example, global news. *Quantity-based measures* are designated to measure the effects of frictions faced by the demand or supply on the financial markets. These measures are based on asset stocks and flows. An analysis of these data can give us information on, for example, the ease of market access or cross-border activities. This paper uses this type of measures.

2.2 Previous research

A shortage of data was the main obstacle to analyses of international investment positions several years ago. Thanks to the International Monetary Fund and its statistic databases we are now able perform these analyses. The paper focuses on changes in a country's international investment position, especially in foreign assets and liabilities.³ Our paper follows the line of this research, studying a set of factors affecting foreign assets and liabilities. Lane and Milesi-Ferretti [11] created a methodology to produce a unique data set containing an estimation of foreign assets and liabilities for a large set of industrial and developing countries for the last three decades. This data set has enabled to analyse net foreign assets in a more complex way. It is one of the first attempts to study the foreign assets and liabilities. Lane and Milesi-Ferretti [12] focused on variables influencing net foreign assets. They study the effects of changes in output, public debt, and demographic factors on net foreign assets. Lane and Milesi-Ferretti [13] examine the cross-country and time-series variation in the size of international balance sheets. They study the relation between foreign assets and liabilities and a set of various regressors (GDP per capita, trade openness, external liberalisation, financial depth, stock market capitalisation, privatisation revenues etc.). Lane and Milesi-Ferretti [14] explore net foreign assets in Central and Eastern European countries for the last ten years, taking into account the composition of their international investment positions. They concentrate especially on foreign direct investments, portfolio investments, and external debt financing. Goldberg [6] explores patterns in the international exposures of U.S. banks, regressing changes in foreign assets and liabilities and changes in domestic and foreign real interest rates and real GDP in the United States. Buch *et al.* [3] analyse whether foreign bank assets react to macroeconomic shocks as the economic theory predicts and how valuation effects influence changes in foreign banks assets. Kose *et al.* [8] analyse the impact of selected macroeconomic variables (the depth of financial markets, trade openness, real GDP per capita, macroeconomic policies stability, institutional quality, and the regulation of an economy) on a country's financial openness (the sum of financial assets and liabilities relative to the nominal GDP).

3 Data and methods

3.1 Data

The data used to calculate the measures of financial integration are from the International Monetary Fund (IMF) International Financial Statistics (IFS) online database, specifically a category called the international investment position (IIP). Incomplete data for some countries and some years have been completed from the on-line database External Wealth of Nations Mark II (Lane and Milesi-Ferretti [15]). This database contains data for the period 1970-2007 for 178 economies and for the Euro Area. Data concerning nominal exports and imports (in USD) and short-term money market interest rates (national interbank offered rates) are extracted from the on-line database IMF IFS. Data concerning real GDP per capita and nominal GDP (in USD) are extracted from the on-line database IMF World Economic Outlook (WEO) Database (September 2011).

3.2 Period and countries

This paper contains an analysis of 27 EU member countries (EU27) and selected subsamples named EU10 (the "new" member countries from Central and Eastern Europe, i.e. Bulgaria, the Czech Republic, Estonia, Hungary, Poland, Latvia, Lithuania, Romania, Slovakia, and Slovenia) and EU17 (the "old" member countries, i.e. Austria, Belgium, Cyprus, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Malta, the Netherlands, Portugal, Spain, Sweden, and the United Kingdom). The analysed time period is from 1993 to 2008. The

³ See also Kucerova [10] for our earlier research focused solely on Central and Eastern European countries

reason for shortening the time span is the structural break from 2008 by reason of the world financial crisis. The data for the period 2009-2010 do not conform to the trend of the previous years due to a severe deviation from it by reason of the world financial crisis. Therefore, it is better to remove these data from the data sample.

3.3 Methods

The panel regression method (with fixed effects) is used. Panel data enable to survey a number of entities over several time periods. According to Baltagi [2], using panel data, we can check for the individual heterogeneity of the data and study the dynamics of adjustment. Panel data produce more informative data, more variability, less collinearity among the variables, more degrees of freedom and more efficiency. Panel data are able to identify and measure effects that cannot be detected in cross-section or time-series data. Because of the existence of reverse causality, i.e. the existence of simultaneity⁴ (an important form of endogeneity) between the dependent variable and one of the explanatory variables of the "basic" model, the Instrumental Variables (IV) method and the Two Stage Least Squares Method (2SLS) is used (the "new" model). These methods are used for estimating the Simultaneous Equations Model (SEM). SEM applications with panel data are very powerful, because they allow us to check for unobserved heterogeneity while dealing with simultaneity (Wooldridge [16]).

4 Empirical model

4.1 The "basic" model

The basic specification of the empirical model is as follows:⁵

$$IFI_{it} = \beta_0 + \beta_1 TRADE_{it} + \beta_2 GDP_{it} + \beta_3 IBOR_{it} + \varepsilon_{it}, \quad (1)$$

where $TRADE_{it}$ is an explanatory variable which measures the trade openness of economy i and is defined as an arithmetic mean of exports and imports (i.e. the sum of exports plus imports divided by two) in country i in time t , GDP_{it} is the level of the real GDP per capita of country i in time t , and $IBOR_{it}$ is a short-term money market interest rate (the national interbank offered rate) of country i in time t . The dependent variable IFI_{it} is an indicator of financial integration. It is a *quantity-based measure* of financial integration and is constructed as an arithmetic mean of the stock of total foreign assets and the stock of total financial liabilities of country i in time t . Baltagi [2] states that by using panel data, one can also avoid the problem of spurious regression (in the case of non-stationary data). However, it is necessary to test for the stationarity. In the case of non-stationary data we have to transform the data to become stationary (by using the technique of first differencing). By using the ADF-Fisher Chi-square test we proved that the time series of the dependent variable (IFI) and some explanatory variables (GDP , $TRADE$) are non-stationary. Therefore, it is necessary to use the first differences of these variables:

$$\Delta(IFI_{it}) = \beta_0 + \beta_1 \Delta(TRADE_{it}) + \beta_2 \Delta(GDP_{it}) + \beta_3 IBOR_{it} + \varepsilon_{it} \quad (2)$$

	<i>IFI</i>		
	EU27	EU10	EU17
<i>TRADE</i>	2.66 (1.63)*	0.84 (2.21)***	4.05 (1.48)*
<i>GDP</i>	4.85 (2.10)**	1.59 (2.56)***	5.02 (1.23)
<i>IBOR</i>	234.36 (1.40)	-46.75 (-0.77)	-2975.78 (-1.79)*
c	86163.22 (4.85)***	3689.42 (1.99)***	127912.4 (3.89)***
No. of observations	375	129	246
Adjusted R-squared	0.43	0.53	0.39

Notes: Unstandardised coefficients. Heteroskedasticity-corrected t -statistics are shown in parentheses. *, **, *** indicate statistical significance at the 10 percent, 5 percent, and 1 percent confidence levels.

Table 1 Results of the model in equation (2) for EU27, EU10 and EU17, 1994-2008

⁴ One or more of the explanatory variables is jointly determined with the dependent variable.

⁵ See Lane and Milesi-Ferretti [13].

The results show that there is a positive relationship between the explained variable *IFI* and the explanatory variables *TRADE* and *GDP* in all analysed regions. The strongest impact of these variables can be found in the group of the EU17 countries. These results reflect the theoretical assumptions and empirical findings. The lower impact of the real GDP per capita on financial integration in the EU10 countries (compared to the EU17 countries) can be explained by an initial decrease of economic activity during the transformation process (from 1993 to 2000). However, results concerning the real GDP per capita in the EU17 countries are not statistically significant. The impact of the variable *IBOR* is ambiguous. There is a positive relationship between the *IFI* and *IBOR* variables, but only in the group of the EU27 countries and not in the two subsamples (EU10 and EU17). In these two subsamples, we can find a negative impact interest rates on the financial integration (especially in the EU17 countries, where these results are significant), which reflects the above mentioned theoretical assumptions.

4.2 The "new" model

Because of the existence of simultaneity between the dependent variable (*IFI*) and one of the explanatory variables (*TRADE*) of the "basic" model, the IV method and the 2SLS method are used in order to estimate the simultaneous equations model. The specification of the "new" model (the simultaneous equations model) is as follows:

$$\begin{aligned} \Delta(IFI_{it}) &= \beta_0 + \beta_1\Delta(TRADE_{it}) + \beta_2\Delta(GDP_{it}) + \beta_3IBOR_{it} + \varepsilon_{it}, \\ \Delta(TRADE_{it}) &= \beta_4 + \beta_5\Delta(IFI_{it}) + \beta_6\Delta(GDP_{it}) + \beta_7EXCH_RATE_{it} + \beta_8IBOR_{it} + \varepsilon_{it} \end{aligned} \quad (3)$$

where *EXCH_RATE_{it}* is the effective real exchange rate of country *i* in time *t*. The second equation (the trade function) satisfies the order condition because the *EXCH_RATE* variable is omitted from the first equation (the financial integration function), i.e. the *EXCH_RATE* variable appears only in the second equation. The rank condition for identifying the first equation is that the *EXCH_RATE* variable has a nonzero coefficient in the trade equation. The variables *GDP* and *IBOR* appear in both equations. The results of the estimation of the first stage (the trade function, i.e. the second equation in model (3)) of the simultaneous equations model are summarised in Table 2.

	<i>TRADE</i>		
	EU27	EU10	EU17
<i>IFI</i>	0.01 (2.09)**	0.11 (4.80)***	0.01 (2.39)***
<i>GDP</i>	1.97 (6.85)***	1.32 (6.13)***	2.02 (7.22)***
<i>EXCH_RATE</i>	43.29 (3.73)***	79.20 (10.88)***	-329.82 (-4.35)***
<i>IBOR</i>	-35.96 (-1.54)*	-34.08 (-2.38)***	-7.98 (-0.10)
c	3910.81 (2.86)***	-5272.11 (-6.65)***	44195.85 (5.61)***
No. of observations	375	129	246
Adjusted R-squared	0.69	0.84	0.63

Notes: Unstandardised coefficients. Heteroskedasticity-corrected *t*-statistics are shown in parentheses. *, **, *** indicate statistical significance at the 10 percent, 5 percent, and 1 percent confidence levels.

Table 2 Results of the the first stage of the simultaneous equations model in equation (3) for EU27, EU10 and EU17, 1994-2008

The results of the trade function confirm that financial integration and economic growth have a positive impact on foreign trade. These findings correspond to the theoretical assumptions. Results concerning the effective real exchange rates are rather miscellaneous. Exchange rate appreciation leads to more intensive foreign trade especially in the EU10 and also EU27 countries, but this result does not reflect the theoretical assumptions. It can be ascribed to the convergence process of the EU10 countries which these countries underwent especially in the first half of the analysed time period. This process was accompanied by rising foreign trade as a result of finding new trade opportunities in developed European countries instead of former Soviet Union countries. There is also a strong and negative impact of money market interest rates on financial integration in all EU countries, i.e. higher interest rates may distort the foreign trade of these countries, especially of the EU10 countries. This result is quite important at the time of world economic crises when any attempt of commercial banks to increase interest rates on loans may seriously damage foreign trade by restricting trade finance products.

The results of the estimation of the second stage (the financial integration function, i.e. the first equation in model (3)) of the simultaneous equations model are summarised in Table 3. A positive relationship between the explained variable *IFI* and the explanatory variables *TRADE* and *GDP* is confirmed. The results are slightly different in this "new" model. The impact of the *TRADE* variable on the *IFI* variable is stronger (approximately three times higher). The same holds for the *GDP* variable, all analysed groups experienced a stronger effect of economic growth (measured by the real GDP per capita) on financial integration in this "new" model. The EU10 countries experienced the greatest (and most significant) effect of the *GDP* variable on financial integration in this "new" model; this finding can reflect a high importance of economic growth in the former transformation countries. But the results are not as highly significant as the results concerning the *TRADE* variable in the case of the EU27 and EU17 countries. The results of the *IBOR* variable are also different from the results presented in Table 1. A negative impact of the *IBOR* variable is proved in all three groups of countries but they are significant only in the case of the EU17 countries. However, a negative impact of money market interest rates on financial integration was measured in all cases, i.e. it is fully consistent with the theoretical assumptions. In other words, the rising money market interest rates hindered the process of financial integration in these countries, especially in the EU17 countries where the coefficient is much higher than in the EU10 countries.

	<i>IFI</i>		
	EU27	EU10	EU17
<i>TRADE</i>	8.94 (2.24)**	1.83 (3.07)***	13.41 (2.42)***
<i>GDP</i>	4.92 (0.69)	3.23 (3.15)***	7.20 (0.66)
<i>IBOR</i>	-353.84 (-0.67)	-79.43 (-0.94)	-11125.03 (-2.20)**
c	126690.40 (13.09)***	6607.024 (6.04)***	229392.5 (6.91)***
No. of observations	348	119	229
Adjusted R-squared	0.46	0.49	0.47

Notes: Unstandardised coefficients. Heteroskedasticity-corrected *t*-statistics are shown in parentheses. *, **, *** indicate statistical significance at the 10 percent, 5 percent, and 1 percent confidence levels.

Table 3 Results of the second stage of the simultaneous equations model in equation (4) for EU27, EU10 and EU17, 1994-2008

According to the results presented above, we can conclude that there is a high and significant relationship between financial and trade integration. Foreign trade raises financial linkages and greater financial cooperation and integration helps foreign trade to become more intensive. The processes of financial integration and trade integration are thus interconnected. By using the simultaneous equations model the results are stronger and more significant. To develop and improve the Euro Area, it is necessary to intensify European foreign trade to foster financial market integration.

5 The role of foreign trade and trade finance in the process of financial integration

The world financial crisis provoked national, international or supranational authorities to suddenly tighten financial regulation and supervision after a decade of loose regulation and supervision. However, these activities can seriously distort world trade on the ground of limiting trade finance. In January 2012, the Banking Commission of the International Chamber of Commerce together with the International Monetary Fund jointly published the *ICC-IMF Market Snapshot* containing the trade finance outlook for the year 2012 (International Chamber of Commerce [7]). The results of the survey are rather miscellaneous. Some 16 – 19% of the banks from advanced markets expect an improvement of the demand for trade finance during 2012, whilst this share in the case of ASEAN countries, China and India is 59%. On the other hand, 48% of the Euro Area banks anticipate a deterioration of the demand for trade financing in 2012. It should be emphasised that a large share of trade finance (over a half of trade finance products offered by banks worldwide) comes from the Euro Area banks according to the survey results. These findings are really worrisome, especially in the light of the results presented in Chapter 4. Limiting trade finance can seriously damage the process of financial integration necessary for the successful functioning of the Euro Area (as an area with a single currency). Results also show, that some 74% of respondents stated that the preparation for the implementation of Basel III had affected the costs of funds and liquidity for trade finance. These findings seem to be quite worrisome, as it can decrease the available trade finance and thus hinder world trade. The European deleveraging process and limited fiscal possibilities of national govern-

ments could further undermine the economic recovery. Moreover, *integrated financial markets could cause another problem by the mutual dependence of integrated economies and thereby by the immediate transmission of a financial contagion from one country to another no matter how distant they are.*

6 Conclusion

This paper analysed the degree of financial integration of the EU countries with the rest of the world from 1993 to 2008 by using quantity-based measures of financial integration derived from the countries' international investment positions. The relations between the countries' foreign assets and liabilities and selected macroeconomic variables were investigated. Our results of the "basic" model confirmed a significant positive impact of foreign trade and the real GDP per capita on financial integration. The impact of money market interest rates on financial integration was ambiguous. Because of the existence of simultaneity between the dependent variable and one of the explanatory variables (foreign trade) of the "basic" model, the instrumental variables method and one of the two stage least squares method were used in order to estimate the simultaneous equations model with two functions (the financial integration function and the trade function). In the "new" model, the impact of trade was even stronger in all analysed regions (i.e. EU27, EU10 and EU17). The effect of economic growth was also a bit stronger in all three country groups (especially in the EU10 countries). The results concerning money market interest rates were more robust in the "new" model; a negative impact of money market interest rates on financial integration was measured in all cases. We also identified a positive impact of financial integration and the real GDP per capita on foreign trade in all regions. Real exchange rate appreciation led to more intensive foreign trade (especially in EU10), probably as a result of the transformation process in the EU10 countries associated with new trade opportunities. We concluded that foreign trade led to stronger financial linkages between countries and vice versa, i.e. that greater financial integration intensified the foreign trade linkages. However, world trade can be undermined by limiting trade finance as a result of tightening financial regulation and supervision after a decade of loose regulation and supervision (e.g. by the implementation of the Basel III capital framework). Thus, a stronger regulatory framework may hinder the world economic growth by limiting trade finance and thus by limiting world trade and financial integration. Therefore, tightening the financial regulation and supervision can be extremely harmful and can put the economic recovery behind.

References

- [1] Baele, L., Ferrando, A., Hördahl, P., Krylova, E., and Monnet, C.: Measuring Financial Integration in the Euro Area. *European Central Bank Occasional Paper* **14** (2004).
- [2] Baltagi, B. H.: *Econometric Analysis of Panel Data*. John Wiley & Sons Ltd., Chichester, 2005.
- [3] Buch, C. M., Carstensen, K., and Schertler, A.: Macroeconomic Shocks and Foreign Bank Assets. *Kiel Institute for World Economics Working Paper* **1254** (2005).
- [4] European Commission: European Financial Stability and Integration Report 2010. *Commission Staff Working Paper* **SEC(2011) 489** (2011).
- [5] Goldberg, L. S.: The International Exposure of U.S. Banks. *National Bureau of Economic Research Working Paper* **11365** (2005).
- [6] International Chamber of Commerce. ICC-IMF Market Snapshot. *A Market Intelligence Report of the ICC Banking Commission* **858E** (2012).
- [7] Kose, M. A., Prasad, E. S., and Taylor, A. D.: Thresholds in the Process of International Financial Integration. *Global Economy and Development Working Paper* **35** (2009).
- [8] Kotlanova, E., and Kotlan, I.: Vliv institucionálního prostředí na velikost korupce: empirická analýza. *Politická ekonomie* **2** (2011), 167-186.
- [9] Kucerova, Z. Measuring Financial Integration in Central Europe through International Investment Positions. *Eastern European Economics* **4** (2009), 25-41.
- [10] Lane, P. R., and Milesi-Ferretti, G. M.: The External Wealth of Nations: Measures of Foreign Assets and Liabilities for Industrial and Developing Countries. *Centre for Economic Policy Research Discussion Paper* **2231**(1999).
- [11] Lane, P. R., and Milesi-Ferretti, G. M.: Long-Term Capital Movements. *International Monetary Fund Working Paper* **WP/01/107** (2001).
- [12] Lane, P. R., and Milesi-Ferretti, G. M.: International Financial Integration. *International Monetary Fund Working Paper* **WP/03/86** (2003).
- [13] Lane, P. R., and Milesi-Ferretti, G. M.: Capital flows to Central and Eastern Europe. *International Monetary Fund Working Paper* **WP/06/188** (2006).
- [14] Lane, P. R., and Milesi-Ferretti, G. M.: The External Wealth of Nations Mark II. *Journal of International Economics* **73** (2007), 223-250.
- [15] Wooldridge, J. M.: *Introductory Econometrics: A Modern Approach*. South-Western Cengage Learning, Mason, 2009.