

FINANCIAL AND TRADE INTEGRATION IN THE EU COUNTRIES

Zuzana Kučerová

Received: November 29, 2012

Abstract

KUČEROVÁ ZUZANA: *Financial and trade integration in the EU countries*. Acta Universitatis Agriculturae et Silviculturae Mendelianae Brunensis, 2013, LXI, No. 4, pp. 981–993

Because of the creation and enlargement of the Eurozone, the importance of monetary integration is increasing and is the subject of a number of theoretical and empirical studies. The adoption of a common currency has to be accompanied by financial market integration. The aim of the paper is to assess the relationship between financial and trade integration in the EU member countries (divided into three subsamples: EU27, EU10, and EU17) over the period 1993–2012 (and two subperiods 1993–2007 and 2008–2012). We use quantity-based measures of financial integration derived from the countries' international investment positions with a view to the foreign trade and the method of correlation analysis (including the moving correlation method). We conclude that the progress in financial integration was smaller in the EU10 countries compared to the EU16 countries, i.e. the pace of financial integration was higher in the EU16 countries than in the EU10 countries. The process of trade integration in all EU countries was not as fast as the process of financial integration. We also conclude that there is a linear association between financial and trade integration in the pre-crisis period (1993–2007), especially in the EU10 countries (compared to the EU16 countries). However, this relationship was seriously weakened by the financial crisis. Financial and trade integration are interconnected processes and should not be assessed separately. 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 (e.g. by the implementation of the Basel III capital framework).

financial integration, foreign trade, international investment position

1 INTRODUCTION

Economic theory and empirical studies confirm that the integration of financial markets allows the capital to be allocated more efficiently (Baele *et al.*, 2004). 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.¹ The importance of international capital mobility and international risk diversification was firstly emphasised by Mundell (1973), the author

of the Optimum Currency Area Theory. Mundell began to advocate capital mobility as one of the main criteria for sustainable fixed exchange rate arrangements (in contrast to labour mobility in his earlier work²). Financial integration and international diversification of assets can reduce the risk of economic recession (i.e. a decline of output, an increase of the unemployment rate, exchange rate depreciation etc.) in the case of negative macroeconomic shocks.

1 There are many different factors as the institutional environment, taxation and government expenditures. Very interesting is the paper which approximates taxation using the alternative WTI index (Kotlán and Machová, 2012).

2 The role of labour mobility as the most important criterion for exchange rate arrangements was mentioned in Mundell (1961).

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. Now, we are facing the world financial crisis. By providing better opportunities for risk diversification and better access to funding, financial integration can contribute to financial stability. However, while the expected efficiency gains have materialised, the process of financial integration of the past decade was also associated with an unprecedented accumulation of risks. Investors tried to seek higher yields in riskier market segments and the national and supranational financial regulation and supervisory practices lagged behind the highly integrated, fast expanding and sophisticated financial sector. Thus, the crisis has not only undermined economic and financial stability, but has also led to cross-border financial disintermediation during the crisis (European Commission, 2011).

However, foreign trade (i.e. trade integration) is an important factor influencing financial integration. Lane and Milesi-Ferretti (2003, 2000) mention several important linkages between foreign trade and trade with foreign assets and liabilities. Firstly, a high volume of trade with goods and services evokes the corresponding financial transactions (the financing of exports, providing loans, export insurance, etc.). Foreign direct investments had a great impact on the external balance of the “new” EU member countries from Central and Eastern Europe; large trade deficits originating from the transformation process (the 90s of the 20th century) were compensated by investment inflows (i.e. by increasing financial integration). International trade and international financial flows are thus able to equilibrate the balance of payment (current and financial accounts are interconnected). Secondly, a high share of bilateral trade linkages between countries leads to a willingness of economic agents to increase the number of financial transactions with these countries. Investors have a better knowledge of foreign companies from these countries and are thus more prone to buying the shares of these companies (the “familiarity effect”). Thirdly, a high degree of trade openness of a country reflects the liberal approach of macroeconomic policy authorities not only in the area of foreign trade, but also in the area of cross-border capital flows.

The aim of the paper is to assess the relationship between financial and trade integration in the EU member countries over the period 1993–2012. We use quantity-based measures of financial integration derived from the countries’ international investment positions with a view to the foreign trade and the method of correlation analysis (including the moving correlation method). The text is structured as follows. First chapter is introduction. In chapter two, some remarks on the

previous empirical research concerning the analysis 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 describe the process of financial and trade integration in EU10, EU16 and EU26 countries by using various indicators of financial and trade integration. Chapter five contains graphical analysis of financial and trade integration processes. The empirical analysis of financial and trade integration is presented in chapter six. Chapter seven summarises the results and brings conclusions.

2 PREVIOUS EMPIRICAL RESEARCH

The paper focuses on changes in a country’s international investment position, especially in foreign assets and liabilities, with respect to foreign trade. Other authors have been interested in related questions.

Lane and Milesi-Ferretti (1999) 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 the behaviour of net foreign assets in a more complex way. Thus it is one of the first attempts to study the foreign assets and liabilities.

In another paper, Lane and Milesi-Ferretti (2003) examine the cross-country and time-series variation in the size of international balance sheets. They study the relation between foreign assets and liabilities on one side and a set of various regressors (GDP per capita, trade openness, external liberalisation, financial depth, stock market capitalisation, privatisation revenues etc.) on the other side. They find that international trade and stock market capitalisation are the two most important variables influencing international balance sheets. This study was updated in Lane and Milesi-Ferretti (2008).

Kose *et al.* (2006) focus on cross-country trade and financial linkages and produce a comprehensive analysis of the roles of both trade and financial integration in driving the growth-volatility relationship. They conclude that both trade and financial integration significantly weaken the negative association between output volatility and growth.

Kose *et al.* (2011) 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 nominal GDP). They conclude that foreign direct investments and cross-border flows of equity securities are safer for the economy than cross-border flows of debt securities especially in the case of a low level of a country’s financial openness and quality of institutions.

According to Rusek (2005) and Spiegel (2009), a common currency fosters the foreign trade of the euro area countries (the “euro effect”). Whereas foreign trade requires external financing, trade integration intensifies financial integration.

Aviat and Coeurdacier (2007) explore the complementarity between bilateral trade in goods and bilateral asset holdings in a simultaneous gravity equations framework. According to the results, trade in goods and trade in assets are closely related. They find a very robust and significant effect of trade on financial asset holdings and this causality runs in both ways; however, the impact of asset holdings on trade in goods is smaller. Kucerova (2009) confirms the same results by using the simultaneous equations model.

Aizenman and Noy (2009) study the endogenous determination of financial and trade openness. They construct a theoretical framework leading to two-way feedbacks between financial and trade openness and then identify these feedbacks empirically. They find that countries cannot choose the degree of financial openness independently of their degree of trade openness.

Sebnem *et al.* (2010) investigate the underlying channels of the “euro effect” on financial integration, i.e. the elimination of the currency risk among euro area countries, various financial sector legislative-regulatory reforms or increased goods trade. They find that the impact of this effect on financial integration is primarily driven by eliminating the currency risk. While financial and trade integration are highly correlated processes, trade in goods does not play a key role in explaining the positive effect of euro on financial integration.

3 DATA, PERIOD AND COUNTRIES, 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).

An economy's IIP is a balance sheet of the stock of external financial assets and liabilities. In other words, these data summarise the total holdings of financial claims by domestic residents on the rest of the world (financial account total assets) and nonresidents' claims on the domestic economy (financial account total liabilities).³

Foreign assets and liabilities include six categories: foreign assets, foreign direct investment abroad, portfolio investment equity securities, portfolio

investment debt securities, financial derivatives, other investment/sectors, reserve assets. Foreign liabilities are divided into five categories: foreign direct investment in the economy, portfolio investment equity securities, portfolio investment debt securities, financial derivatives, other investment/sectors.

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, 2007). This database contains data for the period 1970–2007 for 178 economies and for the euro area. The data are extracted by the authors from the International Monetary Fund, the World Bank, the Bank for International Settlements, and from databases published by individual countries.

Data concerning nominal exports and imports (in USD) are extracted from the on-line database IMF IFS. Data concerning nominal GDP (in USD) are extracted from the on-line database IMF World Economic Outlook (WEO) Database (version April 2013).

3.2 Period and countries

This paper contains an analysis of 26 EU member countries (EU26) 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 EU16 (the “old” member countries, i.e. Austria, Belgium, Cyprus, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Malta, the Netherlands, Portugal, Spain, Sweden, and the United Kingdom). Luxembourg was dropped from the sample by reason of an extremely high level of financial integration measured by our indicator. The analysed time period is from 1993 to 2012.

The reason of dividing countries into these two subsamples is to separate and compare the processes of financial and trade integration in the developed countries (EU16) and formerly central-planned economies, which underwent the process of the transformation of central planned economies to market economies after 1989. Therefore, the initial levels and the pace of financial and trade integration within the analysed time period were quite different in these two subsamples.

3.3 Methods

We employ the method of correlation analysis in our empirical analysis. The primary objective of the correlation analysis is to measure the strength or degree of linear association between two variables. Correlation coefficient thus measures the strength

3 The coverage of the various components of IIP is similar to that of the corresponding components under the balance of payments. But the data are not the same. The IIP at the end of a period reflects not only the sum of balance of payments transactions over time, but also price changes, exchange rate changes, and other adjustments.

of this association and there are neither dependent nor explanatory variables (unlike the regression analysis), we treat two variables symmetrically (see Gujarati and Porter, 2009).

The correlation coefficient used in our analysis is defined as the Pearson's correlation coefficient:

$$\rho_{x,y} = \frac{\text{cov}(X, Y)}{\sigma_x \sigma_y}, \quad (1)$$

where $\text{cov}(X, Y)$ is a covariance between the two variables X and Y , σ_x and σ_y are standard deviations of X and Y variables. The value of the correlation coefficient lies between -1 and $+1$, -1 indicating perfect negative association and $+1$ indicating perfect positive association. However, this coefficient is computed for a given period of time. We do not know if the degree of linear association remains the same during the period.

In the next step, we use the moving (rolling) correlation method to gain a dynamic Pearson's correlation coefficient between the variables over a moving window. The moving window is 10 years.

4 DESCRIPTION OF FINANCIAL AND TRADE INTEGRATION

4.1 Financial integration

The indicators of financial integration used in our article were drawn from Lane and Milesi-Ferretti (2003) and partly adjusted. The variable $IFIGDP_{it}$ is an indicator of financial integration. It is a *quantity-based measure* of financial integration. This indicator is constructed as follows:

$$IFIGDP_{it} = \frac{(FA_{it} + FL_{it})}{GDP_{it}}, \quad (2)$$

where FA_{it} is the stock of total foreign assets of country i in time t , FL_{it} is the stock of total financial liabilities

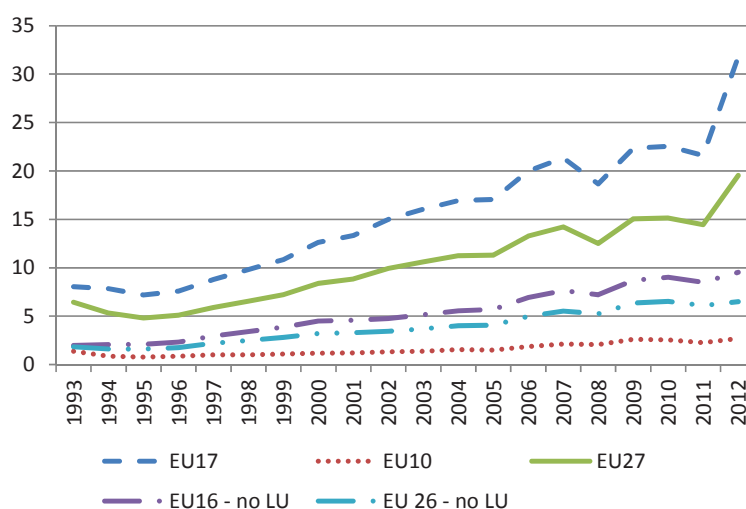
of country i in time t and GDP_{it} is the nominal GDP of country i in time t . Absolute levels of any variable do not reflect the size of the economy properly, can be misleading and are thus not convenient for direct comparisons of different countries. Therefore, it is better to adjust the *IFI* indicator by including the nominal GDP of countries in order to take into account the size of the economy and reveal the true differences in the level of financial integration. In our empirical analysis we use also separated indicators *FAGDP* and *FLGDP*.

The values of this indicator in the case of the EU10, EU16/17 and EU26/27 countries from 1993 to 2012 are illustrated in Fig. 1.

It is apparent that financial integration has been deepening (i.e. increasing) since the beginning of the analysed time period with the exemption of the last years in all EU countries (and also 1994 in the EU10 countries). Growth rates were extremely high several years before 2007, i.e. before the beginning of the financial crisis. However, the growth rates were slightly higher in 2012 compared to 2011. Fig. 1 contains levels of the *IFIGDP* indicator with Luxembourg and also without Luxembourg ("no LU"). The reason is that the level of financial integration measured by this indicator is extremely high and distorts the illustrative value of this indicator. Therefore, this country was dropped from our sample. The level of the *IFIGDP* indicator is quite different when we compare the average values for the EU10 and EU16 countries. According to these results, it is useful to distinguish between these two subsamples in our analysis.

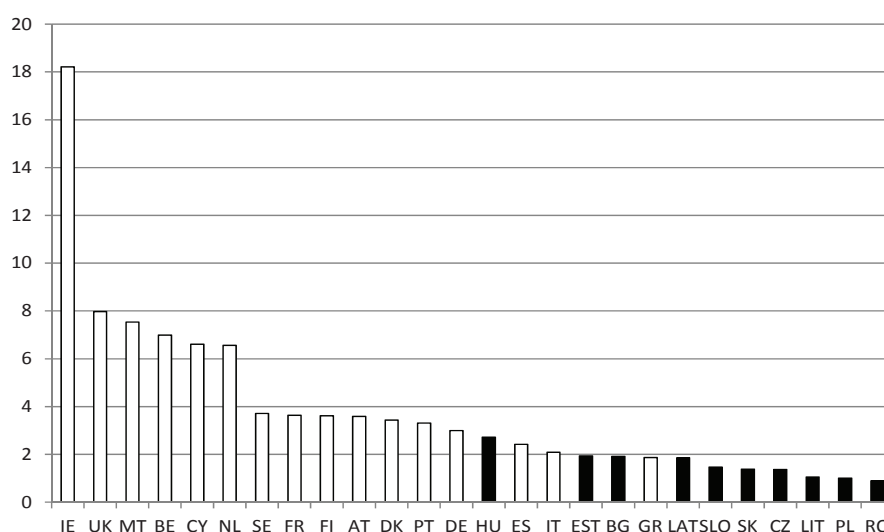
Fig. 2 presents individual country averages of the *IFIGDP* indicator for the period 1993–2012.

The highest level of the *IFIGDP* indicator is in Luxembourg. However, this country is excluded from Fig. 2 again, because its level of this adjusted indicator is disproportionate (170.5) and does not allow a transparent comparison of countries. The



1: The *IFIGDP* indicator in EU10, EU16/17 and EU26/27, 1993–2012

Source: International Monetary Fund



2: The IFIGDP indicator in EU26 – individual country averages, 1993–2012
Source: International Monetary Fund

second highest level of the IFIGDP indicator is in Ireland (18.2); it is more than twice as high as in the United Kingdom (8.0), Malta (7.5), Belgium (7.0), Cyprus (6.6), and the Netherlands (6.5). The average level of the IFIGDP indicator of the EU10 countries in this period (1.6) is much lower than the average level of this indicator of the EU16 countries (5.3 without Luxembourg, 15.5 with Luxembourg).

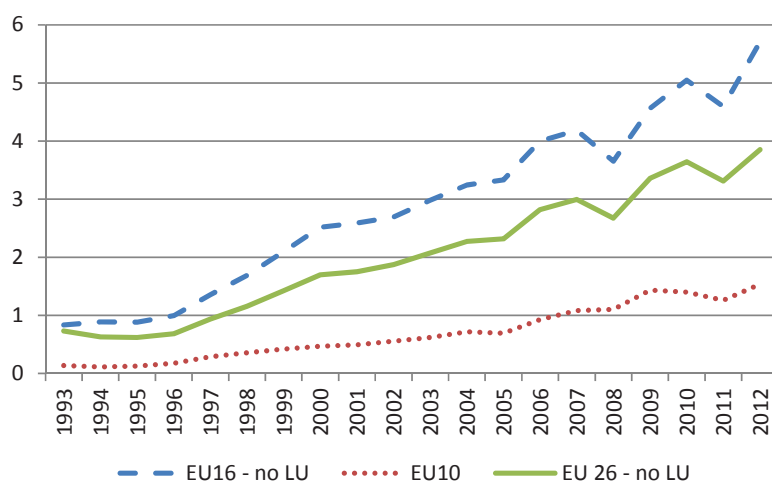
The second measure is the investment-based measure of financial integration (GIGDP): it contains only foreign direct investments and portfolio investments (equity and debt securities). The other categories were dropped from this measure because they are either volatile (other investments) or time series are not long enough (financial derivatives). The construction of this adjusted measure is as follows:

$$GIGDP_i = \frac{(FDIA_i + FDIL_i + PEQA_i + PEQL_i + PDEA_i + PDEL_i)}{GDP_i} \quad (3)$$

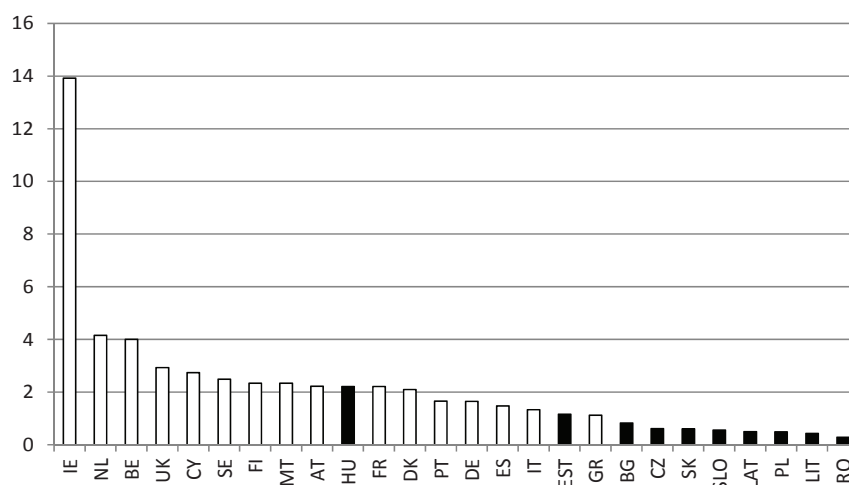
where $FDIA_i$ is the stock of foreign direct investment assets of country i abroad, $FDIL_i$ is the stock of foreign direct investment liabilities of the rest of the world in country i , $PEQA_i$ is the stock of portfolio equity assets of country i abroad, $PEQL_i$ the stock of portfolio equity liabilities in country i , $PDEA_i$ the stock of portfolio debt assets of country i abroad, and $PDEL_i$ is the stock of portfolio debt liabilities in a country i .

The values of the GIGDP indicator in the case of the EU10, EU16 and EU26 countries from 1993 to 2012 are illustrated in Fig. 3.

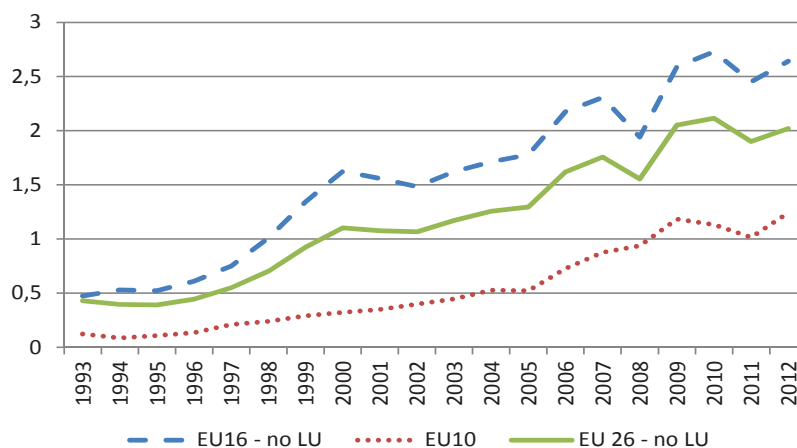
The pattern of financial integration measured by the GIGDP indicator is similar to the pattern measured by the IFIGDP indicator. It is obvious,



3: The GIGDP indicator in EU10, EU16 and EU26, 1993–2012
Source: International Monetary Fund



4: The GIGDP indicator in EU26 – individual country averages, 1993–2012
Source: International Monetary Fund



5: The GEQGDPI indicator in EU10, EU16 and EU26, 1993–2012
Source: International Monetary Fund

because the *IFIGDP* indicator also contains financial derivatives and other investments and the value of these two items is not too high. Again, we can see a recovery in 2012. The level of financial integration in the EU16 countries is much higher than in the EU10 countries as in the case of the *IFIGDP* indicator.

Fig. 4 displays individual country averages of the *GIGDP* indicator for the period 1993–2012.

The highest level of the *GIGDP* indicator is in Luxembourg (157.6). Again, this country is excluded from Fig. 4 because of the extraordinary values of the indicator. The second highest level of the *GIGDP* indicator is in Ireland (13.9); it is three times as high as in the Netherlands (4.2) and Belgium (4.0). The average level of the *GIGDP* indicator of the EU10 countries (0.7) is lower than the average level of this indicator of the EU16 countries (2.9 without Luxembourg).

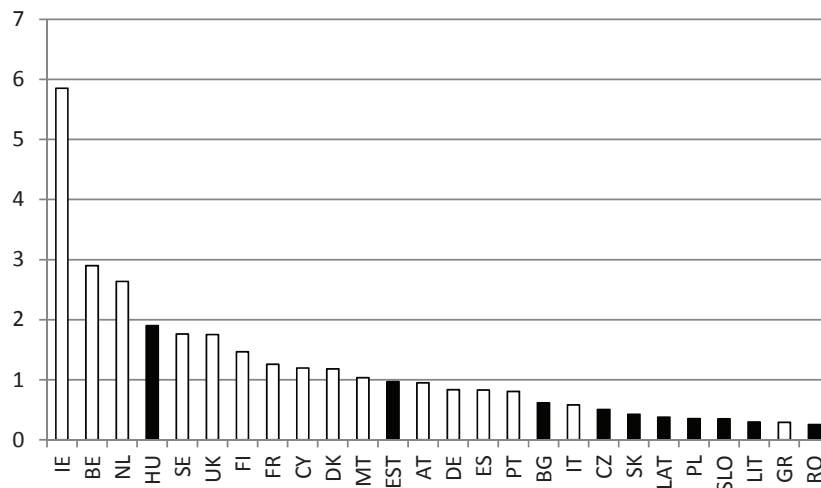
A third possible measure of financial market integration – the equity-based measure of financial integration (*GEQGDPI*) – is based solely on the equity

cross-holdings – that is, flows of portfolio equity and foreign direct investments. As international trade in debt instruments can be sometimes influenced by special factors, it was omitted in this indicator:

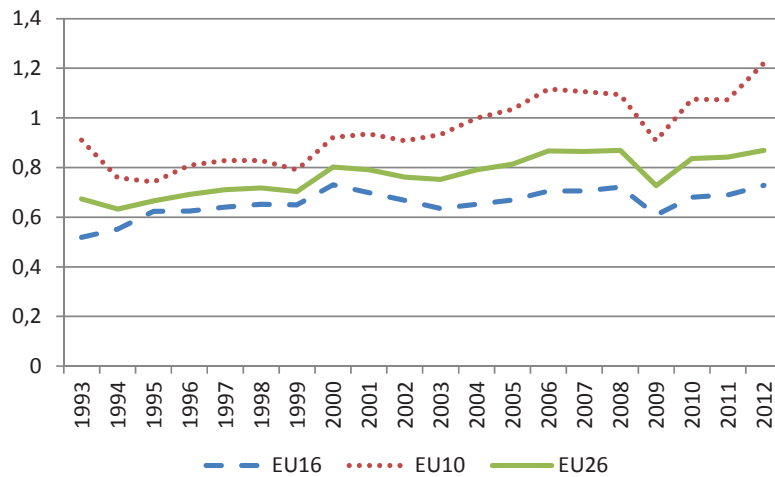
$$GEQGDPI_{it} = \frac{(FDIA_{it} + FDIL_{it} + PEQA_{it} + PEQL_{it})}{GDP_{it}} \quad (4)$$

The values of the *GEQGDPI* indicator in the case of the EU10, EU16 and EU26 countries from 1993 to 2012 are illustrated in Fig. 5.

The picture is slightly different compared to the previous two indicators. The average level of financial integration measured by the *GEQGDPI* indicator has been increasing since 1993 until now. However, we can see a drop in 2001 and 2002 in the EU26 and EU16 countries (not in the EU10 countries). As this indicator contains only foreign direct investments and portfolio equity assets and liabilities (and does not contain portfolio debt assets and liabilities), the decrease of the indicator (and increase of the *GIGDP* indicator) may reflect



6: The GEQGDP indicator in EU26 – individual country averages, 1993–2012
Source: International Monetary Fund



7: The TRADEGDP indicator in EU10, EU16 and EU26, 1993–2012
Source: International Monetary Fund

the fact that investors from the EU16 countries transferred their assets and liabilities from equity to debt instruments as a result of the collapse of the Internet bubble (the so-called dot-com bubble) and the subsequent crisis in this period. There was also a short recovery in 2012.

Fig. 6 presents individual country averages of the GEQGDP indicator for the period 1993–2012. As in the previous two cases, the highest level of the GEQGDP indicator is in Luxembourg (93.9). The second highest level is in Ireland (5.9); it is twice as high as in Belgium (2.9) and the Netherlands (2.6). The average level of the GEQGDP indicator of the EU10 countries (0.5) is lower than the average level of this indicator of the EU16 countries (1.6 without Luxembourg).

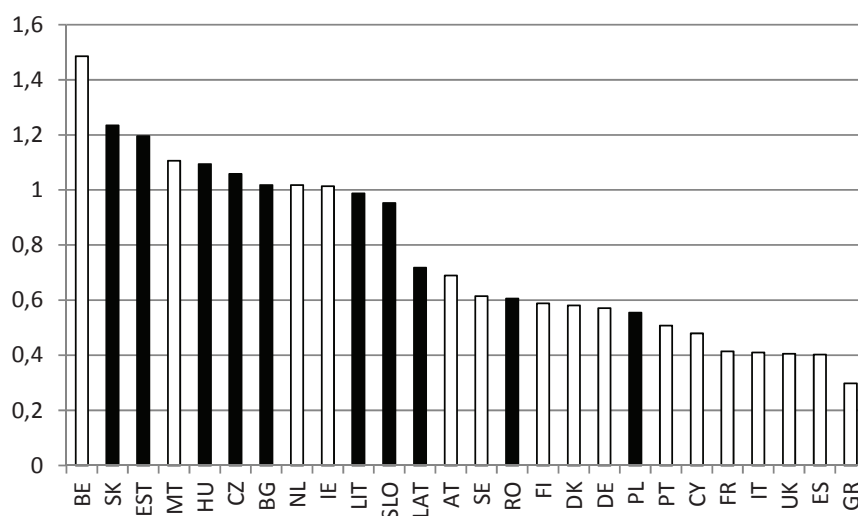
4.2. Trade integration

Trade openness is expressed by using the TRADEGDP indicator and this indicator of trade integration is constructed as follows:

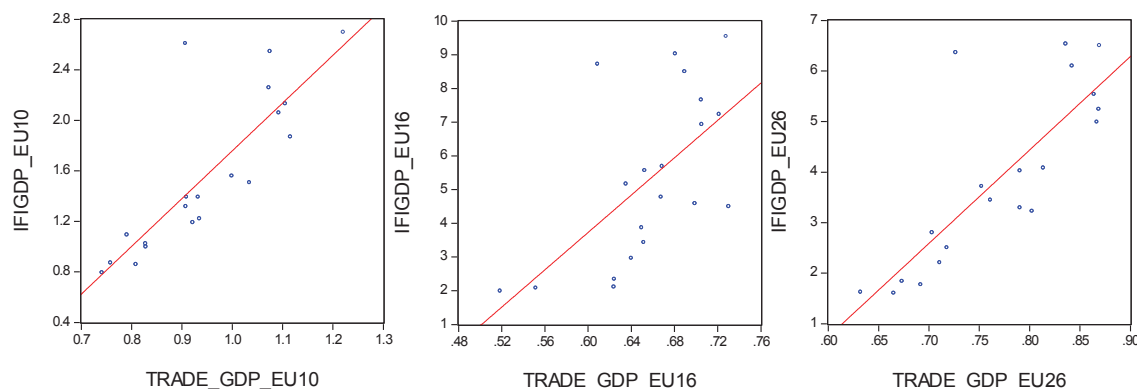
$$\text{TRADEGDP}_i = \frac{(EX_i + IM_i)}{GDP_i}, \quad (5)$$

where EX_i is the total sum of exports of country i in time t , IM_i is the total sum of imports of country i in time t and GDP_i is the nominal GDP of country i in time t . The higher the value of this indicator, the higher the country's trade openness is. The values of this indicator for the EU10, EU16 and EU26 countries from 1993 to 2012 are illustrated in Fig. 7.

As well as financial openness, the average trade openness of the EU countries has been increasing since 1993 (except for 1994–1995 in the EU10 countries). The drop of the trade indicator in 2001–2003 in the EU16 countries was not caused by the drop of the overall level of trade in the EU16 countries (as during the financial crisis) but only by the higher rise of nominal GDP in these countries. The average value of trade openness of the EU10 countries (0.95) measured by our indicator is higher



8: The TRADEGDP indicator in EU26 – individual country averages, 1993–2012
Source: International Monetary Fund



9: The relationship between the IFIGDP and TRADEGDP indicators in EU10, EU16 and EU26, 1993–2012
Source: International Monetary Fund, author's calculations

than the trade openness of the EU16 countries (0.66).

Fig. 8 presents averages over the individual EU countries for the period 1993–2012.

The highest rate of trade openness for the period 1993–2012 was in Belgium (1.5), Slovakia (1.2), and Estonia (1.2). On the other hand, the lowest rate of trade openness was measured in Greece (0.3), Spain (0.4) and the United Kingdom (0.4). According to the data, the average rate of trade openness in the EU10 countries (0.95) is higher than in the EU16 countries (0.66), i.e. these countries are highly dependent on foreign trade.

5 Graphical analysis of financial and trade integration

This chapter contains a graphical analysis of the relationship between the financial and trade integration of the EU countries, i.e. between the IFIGDP and TRADEGDP indicators. According to results of our empirical studies, there exists a high and significant relationship between financial and

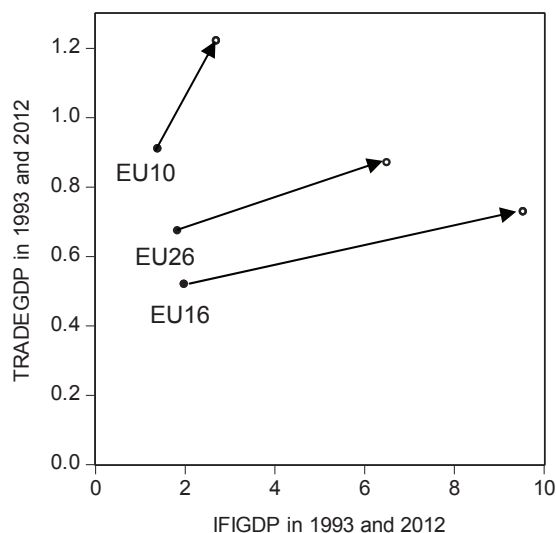
trade integration; for a more detailed empirical analysis see Kučerová (2009) or Kučerová (2011).

Fig. 9 is an illustration of this relationship in period 1993–2012 in the EU10, EU16 and EU26 countries.

It is evident that there is a positive relationship between these two indicators, i.e. between financial and trade integration, in analysed country groups. However, the fitted regression line is steeper in the case of the EU10 countries compared to the EU16 countries.

The progress in financial integration was slower in the EU10 countries than in the EU16 countries (see also Fig. 10). It can be explained by 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 trading opportunities in developed European countries instead of former the Soviet Union countries. Financial integration started later than trade integration in these countries, only after the necessary transformation reforms. At the same

time, the EU16 countries were preparing for the euro area launch (from 1999) and were pushing the process of financial integration forward (especially since 1996, see Fig. 1). In 2009, the process of trade integration was broken as a result of the crisis but in 2010 was restored again.



10: The IFIGDP and TRADEGDP indicators in EU10, EU16 and EU26, 1993 and 2012

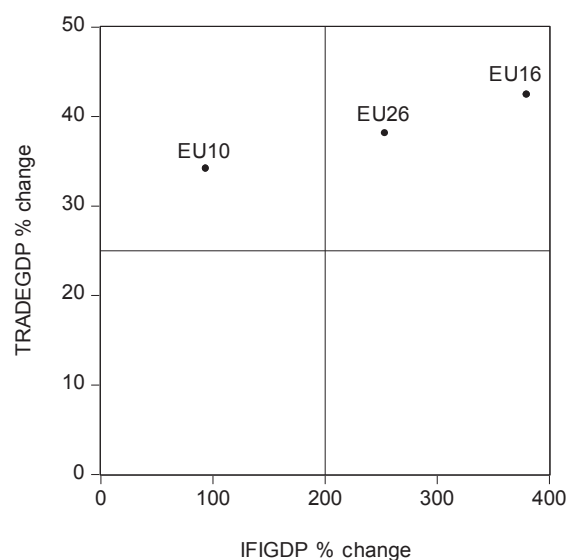
Source: International Monetary Fund, author's calculations

Fig. 10 demonstrates the direction of financial and trade integration between 1993 and 2012 and confirms this hypothesis.

Again, the direction of the change of the two types of integration is steeper and the length of the arrow indicator is much shorter in the EU10 countries, i.e. the pace of financial integration was higher in the EU16 countries than in the EU10 countries. In 1993, the value of the IFIGDP indicator was 1.39 in the EU10 countries, 1.84 in the EU26 countries and 1.99 in the EU16 countries. In 2012, the values were even more distant: only 2.69 in EU10, but 6.49 in EU26 and 9.53 in EU16 (see also Fig. 1). As far as the TRADEGDP indicator is concerned, the numbers are different. The average value of this indicator was 0.91 in EU10, 0.52 in EU16 and 0.67 in EU26 in 1993. In 2012, the picture was quite similar: 1.22 in EU10, 0.73 in EU16 and 0.87 in EU26 (see also Fig. 7).

Fig. 11 represents the average percentage change in the process of financial and trade integration in all three country groups in the period 1993–2012.

The average percentage change of financial integration measured by the IFI indicator was only 94.0% in the EU10 countries (the EU10 countries are in the left half of Fig. 11), 380.1% in the EU16 countries and 253.6% in the EU26 countries over the period 1993–2012 (these two country groups are in the right half of Fig. 11). The level of the TRADEGDP indicator increased by 34.1% in the EU10 countries, 42.4% in the EU16 countries and 38.1% in the



11: The IFIGDP and TRADEGDP indicators in EU10, EU16 and EU26, 1993–2012, % change

Source: International Monetary Fund, author's calculations

EU26 countries over the period 1993–2012. It is evident that the process of financial integration was incredible in the EU16 countries compared to the EU10 countries and that the process of trade integration in all EU countries was not as fast as the process of financial integration. In the EU16 countries, the process of both types of integration was more unequal (strong financial integration compared to trade integration).

We can conclude that the pace of financial integration was much faster in the EU16 countries than in the EU10 countries. It can be explained by the effort of the EU16 countries to finish the process of financial integration before the euro area creation. On the other hand, the EU10 countries experienced higher level of trade integration than EU16 countries as a result of transformation to developed market economies. Moreover, “new” EU member countries are small and open economies and are heavily dependent on foreign trade (except for Poland).

6 Correlation analysis of financial and trade integration

In order to identify the interdependence between the financial and trade integration processes, we run the correlation analysis between the TRADEGDP indicator and selected indicators of financial integration (IFIGDP, GIGDP, GEQGD, FAGDP, and FLGDP) in period 1993–2012. So as to cope with the nonstationarity of the time series, we used first differences of these time series.

Tab. I presents results for period 1993–2012. We find that there is not strong partial correlation between the financial and trade integration; the correlation coefficient between the two main indicators in the period 1993–2012 is –0.24 in the

EU16 countries, 0.17 in the EU10 countries and -0.20 in the EU26 countries, i.e. the degree of linear association is positive only in the EU10 countries. As far as the other indicators of financial integration are concerned, the picture is very similar, i.e. the negative correlation between the trade and financial integration in the EU16 and EU26 countries and positive correlation in the EU10 countries (except for *GIGDP* and *GEQGDP* indicators). In the group of the EU16 and EU26 countries, the highest correlation coefficients are measured in the case of the *GIGDP* indicator of financial integration, i.e. debt instruments contributes to the tighter relationship of financial integration with trade integration. In the EU10 countries, the correlation is the strongest in the case of financial liabilities. The EU10 countries thus exhibit opposite results compared to the other two country groups: financial liabilities (i.e. nonresidents' claims on the domestic economy) are slightly associated with foreign trade of these formerly central planned economies. In other words, the increase of foreign trade of these economies during and after the transformation period has been connected more with financial inflows from abroad than with financial outflows abroad.

In order to identify possible different trends in financial and trade integration in these country groups, the time period was divided into two sub periods: a pre-crisis period 1993–2007 and a crisis period 2007–2012. Tab. II presents new correlation

coefficients for the two subperiods. It is evident that the results are positive in the pre-crisis period and the level of all coefficients is much higher. On the other hand, there is an apparent negative correlation between financial and trade integration in the crisis period. The crisis thus has destroyed the interdependence between these two integration processes so far. Equity securities played important role in the process of financial and trade integration in the EU16 countries in the pre-crisis period (the value of the coefficient is 0.33), while in the crisis period it was the main factor of destabilisation. However, the results are not significant in some cases, especially in the EU16 countries and also in the case of coefficients in the crisis period thanks to a short time period.

In the next step, we decompose the *IFIGDP* indicator into its three main categories: foreign direct investments, portfolio investment equity securities⁴ and portfolio investment debt securities (see Tab. III). We do not analyse the other two components of this indicator (financial derivatives and other investments), their levels are rather small and the data set is incomplete.

The results are negative all country groups. The association between foreign trade and foreign direct investments is negative according to these results in all country groups. Results concerning the portfolio investment debt securities (*PDEGDP*) and foreign direct investments (*FDIGDP*) are quite inconsistent: there is a low correlation in the EU16 and EU26

I: Correlation coefficients between trade and financial indicators, 1993–2012 (Source: International Monetary Fund, author's calculations)

| | TRADE | | |
|---------------|--------------|-------------|--------------|
| | EU16 | EU10 | EU26 |
| <i>IFIGDP</i> | -0.24 | 0.17 | -0.20 |
| <i>GIGDP</i> | -0.10 | -0.07 | -0.10 |
| <i>GEQGDP</i> | -0.23 | -0.06 | -0.24 |
| <i>FAGDP</i> | -0.25 | 0.15 | -0.19 |
| <i>FLGDP</i> | -0.23 | 0.18 | -0.20 |

Note: *, **, *** indicate statistical significance at the 10 percent, 5 percent, and 1 percent confidence levels.

II: Correlation coefficients between trade and financial indicators, 1993–2007 and 2008–2012 (Source: International Monetary Fund, author's calculations)

| | TRADE | | | | | |
|---------------|-------------|----------------|---------------|--------------|--------------|--------------|
| | 1993–2007 | | | 2008–2012 | | |
| | EU16 | EU10 | EU26 | EU16 | EU10 | EU26 |
| <i>IFIGDP</i> | 0.19 | 0.71*** | 0.49* | -0.50 | -0.29 | -0.60 |
| <i>GIGDP</i> | 0.18 | 0.39 | 0.47* | -0.21 | -0.31 | -0.33 |
| <i>GEQGDP</i> | 0.33 | 0.39 | 0.47* | -0.58 | -0.33 | -0.60 |
| <i>FAGDP</i> | 0.19 | 0.66** | 0.50** | -0.53 | -0.23 | -0.61 |
| <i>FLGDP</i> | 0.19 | 0.72*** | 0.47* | -0.48 | -0.31 | -0.59 |

Note: *, **, *** indicate statistical significance at the 10 percent, 5 percent, and 1 percent confidence levels.

4 Portfolio investment equity securities include flows from equity securities other than those recorded as direct investment and including shares, stocks and depository receipts.

III: Correlation coefficients between trade and selected categories of International Investment Position, 1993–2012 (Source: International Monetary Fund, author's calculations)

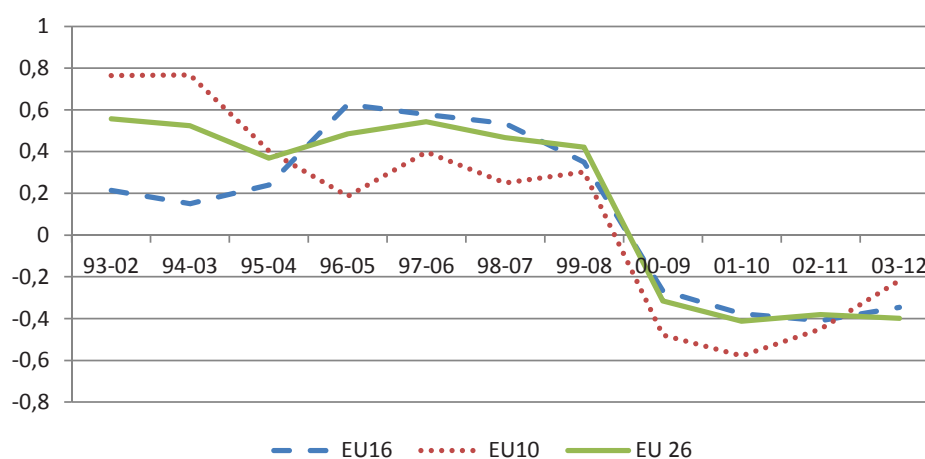
| | TRADE | | |
|--------|--------|--------|--------|
| | EU16 | EU10 | EU26 |
| FDIGDP | –0.43* | –0.12 | –0.42* |
| PEQGDP | –0.18 | –0.33* | –0.15 |
| PDEGDP | –0.37* | –0.07 | –0.29 |

Note: *, **, *** indicate statistical significance at the 10 percent, 5 percent, and 1 percent confidence levels.

IV: Correlation coefficients between trade and selected categories of International Investment Position, 1993–2007 and 2008–2012 (Source: International Monetary Fund, author's calculations)

| | TRADE | | | | | |
|--------|-------------|--------------|-------------|-----------|--------|-------|
| | 1993–2007 | | | 2008–2012 | | |
| | EU16 | EU10 | EU26 | EU16 | EU10 | EU26 |
| FDIGDP | 0.29 | 0.31 | 0.43 | –0.77 | –0.97* | –0.79 |
| PEQGDP | 0.16 | 0.52* | 0.29 | –0.44 | –0.20 | –0.28 |
| PDEGDP | –0.23 | 0.17 | 0.37 | –0.93 | –0.49 | –0.83 |

Note: *, **, *** indicate statistical significance at the 10 percent, 5 percent, and 1 percent confidence levels.



12: Moving correlation coefficient between trade and financial indicator (IFIGDP), 1993–2012, moving window = 10 years

Source: International Monetary Fund, author's calculations

countries and a higher correlation in the EU10 countries. As far as portfolio investment equity securities are concerned, the picture is opposite.

Tab. IV presents results of these correlation coefficients for the two sub-periods. The results are similar to the results depicted in Tab. II; there is a positive correlation in the pre-crisis period and strongly negative correlation in the crisis period.

We can conclude that there is a relationship between the financial and trade integration in the EU countries in the period 1993–2007 (i.e. in the pre-crisis period). At the same time, there is also an apparent negative relationship between these two integration processes especially in the crisis period 2008–2012 in all country groups.

Fig. 12 illustrates moving correlation coefficient in the three country groups in the period 1993–2012.

The volatile moving correlation coefficient in the EU16 countries can be ascribed to the volatility

of the trade indicator and the rise of the financial indicator during this period in this country group. According to our results, financial crisis destroyed the positive relationship between the processes of financial and trade integration in all three analysed country groups which is quite worrisome. It may partly reflect the fact that banks increased short-term interest rates and restricted financing of foreign trade activities. Higher interest rates may distort foreign trade, 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 (on account of the higher risk premiums) may seriously damage foreign trade by restricting trade finance products.

7 Conclusion

The process of monetary integration in Europe has to a great extent influenced the European

financial markets because a single currency requires well-integrated financial markets. Financial integration is a substantial condition for introducing a single currency. However, foreign trade (i.e. trade integration) is an important factor influencing financial integration. This paper analysed the relationship between financial and trade integration in the EU member countries over the period 1993–2012. We used quantity-based measures of financial integration derived from the countries' international investment positions with a view to foreign trade.

We concluded that financial and trade integration has been deepening since 1993. Both integration processes were only temporarily broken by the world financial crises (the process of financial integration in 2008 and the process of trade integration in 2009). The deepening integration trend was restored one year later in both cases. The progress in financial integration was smaller in the EU10 countries compared to the EU16 countries, i.e. the pace of financial integration was higher in the EU16 countries than in the EU10 countries. On the other hand, the EU10 countries are more open as far as foreign trade (or trade integration) is concerned. The process of trade integration in all EU countries

was not as fast as the process of financial integration. We also conclude that there is a linear association between financial and trade integration in the pre-crisis period (1993–2007), especially in the EU10 countries (compared to the EU16 countries). However, this relationship was seriously weakened by the financial crisis. These integration processes are interconnected, i.e. the more the countries trade the more financially integrated they are. It confirms a strong relationship between the two main balance-of-payment components: the current account and the financial account.

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). Stronger regulatory framework may hinder the world economic growth by limiting trade finance and thus by limiting world trade. And it can negatively influence the process of financial integration not only in the EU. Therefore, tightening the financial regulation and supervision at any rate can be extremely harmful and can put the economic recovery behind.

SUMMARY

Because of the creation and enlargement of the Eurozone, the importance of monetary integration is increasing and is the subject of a number of theoretical and empirical studies. The adoption of a common currency has to be accompanied by financial market integration. The aim of the paper is to assess the relationship between financial and trade integration in the EU member countries (divided into three subsamples: EU27, EU10, and EU17) over the period 1993–2012 (and two subperiods 1993–2007 and 2008–2012). We use quantity-based measures of financial integration derived from the countries' international investment positions with a view to the foreign trade and the method of correlation analysis (including the moving correlation method). The text is structured as follows. First chapter is introduction. In chapter two, some remarks on the previous empirical research concerning the analysis 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 describe the process of financial and trade integration in EU10, EU16 and EU26 countries by using various indicators of financial and trade integration. Chapter five contains graphical analysis of financial and trade integration processes. The empirical analysis of financial and trade integration is presented in chapter six. Chapter seven summarises the results and brings conclusions. We conclude that the progress in financial integration was smaller in the EU10 countries compared to the EU16 countries, i.e. the pace of financial integration was higher in the EU16 countries than in the EU10 countries. The financial and trade integration has been deepening since 1993. Both integration processes were only temporarily broken by the world financial crises (the process of financial integration in 2008 and the process of trade integration in 2009). The deepening integration trend was restored one year later in both cases. On the other hand, the EU10 countries are more open as far as foreign trade (or trade integration) is concerned. The process of trade integration in all EU countries was not as fast as the process of financial integration. We also conclude that there is a linear association between financial and trade integration in the pre-crisis period (1993–2007), especially in the EU10 countries (compared to the EU16 countries). However, this relationship was seriously weakened by the financial crisis. Financial and trade integration are interconnected processes and should not be assessed separately. 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 (e.g. by the implementation of the Basel III capital framework).

Acknowledgement

The research behind this paper is supported by the Grant Agency of the Czech Republic within Project No. 403/11/2073.

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Address

doc. Ing. Zuzana Kučerová, Ph.D., Department of Economic Policy, Faculty of Economics VŠB-Technical University of Ostrava, Sokolská tř. 33, 701 21 Ostrava 1, Czech Republic, e-mail: zuzana.kuceroval@vsb.cz