

Does market structure of the banking sector affect the growth of different types of bank loans in the EU?

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Abstract

The aim of this research is to investigate the issue of asymmetry of the credit market determinants of bank loans (corporate, consumer, and residential mortgage loans) between the CEE-11 countries (the Czech Republic, Estonia, Lithuania, Latvia, Poland, Slovakia, Slovenia, Hungary, Bulgaria, Rumania, Croatia) and the EU-17 countries (Austria, Belgium, Denmark, Finland, France, Greece, Spain, the Netherlands, Ireland, Luxembourg, Germany, Portugal, Sweden, United Kingdom, Italy, Malta and Cyprus) after the Global Financial Crisis (GFC) of 2007–09.

For the analysis, we used the matching data over the period 2010-2016: annual bank-level data which are collected from the Bankscope-Orbis database and macroeconomic data on the GDP growth and interest rates for different loans from ECB data warehouse. Panel data include commercial banks, savings banks and cooperative banks that were operating in the EU-28 countries. Using the methodology of panel regression - GMM estimator, this study finds the asymmetry of the credit market determinants between the CEE-11 and the EU-17 countries after the Global Financial Crisis. Panel data analysis of the credit market of the CEE countries against all EU-28 and EU-17 also find the differences between determinants of different type of bank loans.

Keywords: banks, credit growth, concentration, foreign ownership, EU-28, CEE-11.

JEL: F36; G2; G21; G34; L1.

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Introduction

The experience of the Global Financial Crisis (GFC) of 2007–09 and its aftermath, reinstated the importance of the macro-prudential policy to keep economies of EU countries on the path of sustainable long-term economic growth. Moreover, the global crisis revealed the importance of examination of the links between the financial sector and other elements of the economic policy, in particular the links between the financial sector and the real sector of the economy, and examination of the channels and directions of their inter-dependencies. Policymakers have increasingly focused on the need to strengthen macroprudential frameworks to ensure the stability of the financial system, both nationally and globally (cf. Borio et al. (2015)).

To date, banks' potential contribution to sustainable development has been underplayed. The banking sector is one of the main drives of the economic growth in the majority of EU countries. The size and condition of the banking sector affect the systemic risk (Laeven et al., 2016). Therefore, a number of questions need to be addressed to develop the banking sector's potential contribution and attention to sustainability with benefits for the sector and the economy. However, it should be noted that the banking sectors of EU-27 countries are not homogeneous (see Pawłowska 2016). We can see a clear difference in the value of assets of the so-called old and new EU member states EU-12 (i.e., Cyprus, Czech Republic, Estonia, Lithuania, Latvia, Malta, Poland, Slovakia, Slovenia, Hungary, Bulgaria, Rumania) and the countries of the so-called old union, EU-15 (Austria, Belgium, Denmark, Finland, France, Greece, Spain, the Netherlands, Ireland, Luxembourg, Germany, Portugal, Sweden, United Kingdom, and Italy) (see. Fig. 2 in the Appendix A). The assets of the banking sector are mainly the loans. In principle, the availability of loans depends on the supply, namely the capacity and readiness of banks to grant them. Bank loans in the EU are the most important source of external funding not only for households but also for businesses, and they play a significant role in shaping the changes in business activity and in transmitting monetary policy impulses to the real economy. The global financial crisis has shown that credit growth caused deepening of the imbalances present between development of the financial market and economic development, thus showing that countries where home-loan booms occurred the consequences of the crisis were more pronounced.

Before the financial crisis there was a robust growth of credit to the private sector within EU countries. However, the structure and growth of the credit to the private sector also varies between the EU countries. The creation of the euro area, was saw an increase in cross-border credit and credit booms in the property market (e.g., the rapid increase of housing loans in Spain

and Ireland led to the bursting of the speculative bubble in that market and a banking crisis in those country). Before the financial crisis a robust growth of credit to the private sector, associated with the so-called catching-up process, was also observed in EU-12 countries. This increase was seen both in loans to households and to businesses. This growth was particularly strong in the Baltic states (i.e., Lithuania, Latvia and Estonia) whereas this growth was significantly weaker in Poland, especially in terms of corporate credit. It should be noted that the most of EU-12 member states (except of Malta and Cyprus) are post-communist countries which have been playing the role of a host country for banks from a number of countries in Europe. Parent financial institutions of those banks were located mostly in Western Europe (Austria, Belgium, Greece, Germany, France, Italy, Netherlands, Portugal, Spain) (i.e., Pawłowska 2016).

Loan is the main banking product which is used to finance real economy as well as the determinants of stability of the financial sector because potential problems with servicing bank loans by enterprises and households often underlay systemic crisis (Cecchetti et al., 2011). Furthermore, finance by loans plays an important role in economic development. Research concerning the determinants of credit demand and supply has become a key issue of many economic publications, but the operational goals of researchers can vary. Some authors aim at receiving very general information about influence of demand-side and supply-side variables on credit growth. Others investigated the monetary transmission channel (for example, in Poland (i.e. Hurlin and Kierzenkowski 2007).

The aim of this research is to investigate the issue of asymmetry of the credit market determinants of various bank loans between the CEE-11 countries (the Czech Republic, Estonia, Lithuania, Latvia, Poland, Slovakia, Slovenia, Hungary, Bulgaria, Rumania, Croatia) and the EU-17 countries (Austria, Belgium, Denmark, Finland, France, Greece, Spain, the Netherlands, Ireland, Luxembourg, Germany, Portugal, Sweden, United Kingdom, Italy, Malta and Cyprus) after the Global Financial Crisis (GFC). Besides the empirical analysis of determinants of various bank loans, both household loans (mortgage loans and consumer loans), and corporate loans and finally total loans, the purpose of the paper is to carry out a comparative analysis of the credit market of the CEE-11 countries against all EU-28 states, on the basis of the experience of the financial crisis and the ongoing European debt crisis. Given the feedback between the real sector and the financial sector, this paper also analyse the impact of the determinants of the results of the CEE countries' banks against all EU states on the basis of micro data concerning banks performance. The determinates of banks performance include the banking sector profitability, liquidity, capitalization, concentration in the banking sector

(indicators CR5 and HHI) and ownership forms of banks. The major contribution of this study to the literature is to find the asymmetry of the credit market determinants for different types of loans (corporate, consumer, and residential mortgage loans) between the CEE-11 countries and the EU-17 countries after the Global Financial Crisis of 2007–09.

This study consists of three parts and a summary. The first part is a broad literature review concerning the link between concentration and stability. The second part presents data and empirical models. The third part presents the results of the analysis based on the panel data. The summary provides an overview of the empirical results and the conclusions that we made.

1. Motivation, Existing Literature and Hypothesis

The years before the global financial crises were a period of rapid change within the EU banking sector; the ownership structure changed and consolidation processes intensified. Since the late 1990s, CEE countries have been playing the role of a host countries for banks from a number of countries in West Europe. However, it should be noted that consolidation processes in the CEE banking sector were to a greater extent a natural consequence of earlier privatisation of domestic banks and attraction of strategic investors for those banks as well as the fact that an increasing number of mergers took place within euro zone countries. Since January 1st, 1999, the third stage of EMU began and the international banks became involved in mergers and acquisitions, of a cross-border character. M&As have been often initiated by foreign owners that merge in-a-country banking businesses in the aftermath of mergers of their parent companies abroad. The consolidation in the Central and Eastern European countries banking sectors led to changes in concentration measured with CR5 ratios. Therefore, important feature of the banking sectors of Central and Eastern Europe countries was high level of concentration and foreign presence (i.e. Arena et al., 2006) as opposed to highly developed banking sectors in US and West Europe. CEE banking sectors are relatively small in comparison to the other EU and have relatively simple traditional business models. Banks concentrate their activities on lending to local companies and households.

Following the collapse of Lehman Brothers, governments bailed out many banks with capital injections while other banks were nationalized. The crisis also showed that foreign ownership could amplify the effect of the global shock on transition countries. These concerns led to a joint action plan, the Vienna Initiative (VI) which was adopted in January 2009. It should be noted that after the global financial crisis despite the process of mergers and acquisitions did not cause significant changes in the level of concentration and share of foreign

capital (with exceptions e.g. Greece and Ireland). Following the global financial crisis to the present (i.e. 2010-2016), the CEE banking sector continues to be highly concentrated and characterizes by high levels of foreign capital, while in the banking sector in Western European countries the level of foreign capital is relatively low and the concentration is more diversified. Parent financial institutions of CEE banks were located mostly in euro zone (Austria, Belgium, Greece, Germany, France, Italy, Netherlands, Portugal, Spain) and in the United States.

The impact of foreign bank is unambiguous. On the one hand, the pre-global financial crisis evidence suggests that foreign bank participation brought many benefits to developing countries including financial stability (Bonin, et al., 2005). On the other hand, the recent Global Financial Crisis highlights the role of multinational banks in the transmission of shocks across countries. In addition, foreign banks can be a channel through which shocks in one country are transmitted and affect the supply of credit in another country. Furthermore, foreign banks' legal structure (branch versus subsidiary) along with the nature of the banking crisis (systemic versus non-systemic) could also determine their stabilizing or destabilizing role (Adler and Cerutti, 2015).

Claessens and Van Horen (2013), found that during the global financial crisis (GFC), foreign banks reduced credit more sharply when compared to domestic banks, except when they dominated the host banking systems. Popov and Udell (2012) found the evidence of the international transmission of the crisis shock to the transition countries and showed that transition country firm's access to credit during the crisis was affected by the balance sheet conditions of foreign parent banks. Cull and Soledad Martinez Peria (2013) found that in CEE countries during GFC 2008-2009 foreign loan growth fell more than that of private domestic banks and also state-owned banks increased their loans during the crisis. Furthermore, Cull et al. (2017) found that foreign-owned banks are more efficient than domestic banks, promote competition in host banking sectors and stabilize credit in case of idiosyncratic shocks but also foreign-owned banks transmission external shocks and might not always expand credit. De Haas and van Lelyveld (2014), using worldwide data, find that parent banks were not significant sources of strength for their subsidiaries during the global crisis. Furthermore, De Haas and van Lelyveld (2014), found evidence that government-owned banks reduced credit growth in CEE emerging economies to a lesser extent than privately-owned banks in 2009. Finally, Allen, et al. (2017), examined the interactions of bank lending dynamics, domestic, foreign and global crisis along with changes in ownership in CEE. This paper found the impact of ownership structure on bank's lending activities in CEECs was conditional upon the type of crisis.

Furthermore, they argue that deposit growth and profitability ratios significant for credit growth during both normal economic times and crisis periods, regardless of the crisis type.

Pawłowska (2016) describes the important role of size and market structure between EU banks. The empirical results that are based on panel data covering the period of 2004–2012 find that the banking sectors within EU are not homogeneous and also that there is asymmetry between the performance of EU-15 and EU-12 banking sectors. The effect of size and competition on financial stability for EU-15 banks (i.e., large banking sectors) differs from EU-12 banks (i.e., small banking sectors). Generally, size had a negative impact on financial stability within the EU banking sectors. However, those effects are significant within EU-12 banking sectors.

Also, the most of empirical studies in this area focused on increased participation the foreign banks and increased concentration in emerging markets, raising questions about their potentially stabilizing or destabilizing role during times of financial distress and also has produced ambiguous results. Therefore, we divided the sample of all EU-28 countries into two groups (CEE-11 countries and the EU-17 countries) and examined the following hypothesis based on the literature studies:

H1: The relation between the bank concentration and the growth of mortgage loans is positive mainly for EU-17 countries.

H2: The foreign banks presence have positive impact on the growth of mortgage loans for EU-17 transitions countries.

H3: The foreign banks presence have positive impact on the growth of consumer loans for CEE-11 transitions countries.

H4: The size of banks have negative impact on growth corporate loans for EU-17 countries.

H5: The relation between the growth of GDP and the growth of consumer loans is positive mainly for CEE-11 transitions countries. The relation between the growth of GDP and the growth of corporate loans is negative mainly for EU-17.

2. Data and Model Specification

In case to estimate the credit market determinants of various bank loans in EU countries (corporate, consumer, residential mortgage loans and total loans), we take annual bank-level data which are collected from the Bankscope-Orbis database and macroeconomic data on the growth of GDP from ECB. The (unbalanced) panel includes commercial banks, savings banks and cooperative banks that were operating in the EU-17 countries and CEE-11 countries over the period 2010-2016. The countries EU-17 (Austria, Belgium, Denmark, Finland, France, Greece, Spain, the Netherlands, Ireland, Luxembourg, Germany, Portugal, Sweden, United Kingdom, Italy, Malta and Cyprus) i.e. EU-15 extended by Cyprus and Malta. The countries CEE-11 are (the Czech Republic, Estonia, Lithuania, Latvia, Poland, Slovakia, Slovenia, Hungary, Bulgaria, Rumania, Croatia), i.e. EU-12 decreased by Cyprus and Malta and extended by Croatia. After reviewing the data for errors, we are left with 16,234 bank-year observations the period 2010-2016.

Because the share of foreign capital and concentration are strongly correlated, they are included in the separate models. Therefore, we estimated two models: the *first model* examines the impact of *market structure* measures on credit growth and the *second model* examines the impact of *foreign presence* on credit growth. Foreign-owned banks are identified as those with 50% of their shares owned by foreigners.

Firstly, we investigated the impact of *market structure* measures on credit growth based on tree panel data sets: Panel A: includes the EU-17 banks, Panel B: includes the CEE-11 banks and Panel C: includes all EU-28 banks.

The first model was calculated as follows based on equation (1):

$$\Delta Loans_{itc} = \alpha + \varphi * \Delta Lonas_{i,c,t-1} + \mu * market\ structure_{t-1,c} + \sum_{j=1}^N \beta_j * Bank-Specific\ Variables_{itc} + \lambda_1 * macro\ variables_{t-1c} + \lambda_2 \Delta i_{t-1c} + \varepsilon_{itc} \quad (1)$$

where the dependent variable $Loans_{itc}$ is the annual change in the stock of total gross loans (in logs) to particular sector (residential mortgage loans, corporate, consumer, and total loans) for each bank i and for each year t . Loans are express in euro.

Market structure and the development of the banking sector have an impact on the credit growth. There are two opposite hypothesis. According to the ESH, concentrated markets are

those where highly effective banks operate. According to the ESH theory, more efficient banks have lower operating costs and therefore achieve higher profits. In addition, the ESH theory assumes that if a bank is more efficient than other competitors, it must choose between two mutually exclusive strategies. The first strategy concerns the maximisation of profit for shareholders by maintaining existing prices and the bank's size. According to the other strategy, profit maximisation consists in price reduction, thus in increasing the banks' market share by M&As leads to an increase in credit. Hicks (1935) developed a theory opposite to the ESH, and it is known in literature as the quiet life hypothesis (QLH). According to the QLH, firms with superior market strength and thus a privileged position suffer a lower cost efficiency due to the quiet life of their managers. Consider the above justification *market structure* is defined as follows:

As *market structure* measures we use:

- the concentration of the banking sector which was defined as a share of the 5 largest credit institutions in total assets as the concentration ratio $CR5_{itc}$ and the Herfindahl-Hirschman index for assets (the sum of the squares of the market share of individual banks HHI_{itc}) for each year t in country c ².

In regressions, we also used control variables denote the bank performance as *Bank-Specific Variables*_{itc}:

- the ratio of total net loans to total deposit ($netloanstodepfund_{itc}$) for each bank i for each year t in country c .
- the *tier1* ratio (core-capital to risk-weighted assets, $tier1_{itc}$) as an indicator of a bank's risk behavior (the higher the capital ratio, the greater the risk aversion) for each bank i for each year t in country c .
- the bank profitability ratio denotes: the return on assets ratio ROA_{itc} , and also the return on equity (ROE) for each bank i and for each year t in country c ³.

As the *Bank-Specific Variables* we also use the “size” of each banks, which was defined as follows:

- The log of total assets (la_{itc}) for each bank i for each year t in country c .

Also, as the “size” of each banks we use measure of relative market power which was defined as follows:

² For robustness check in the regressions, also the HHI index was estimated.

³ To determine the robustness, additional estimations were calculated with the return on equity (ROE) for each banking sector i for each year t in country c , as a dependent variable without core capital ratio due to correlation (see also, Pawłowska, 2016).

- The share of bank assets in the total assets (mp_{itc}) for each bank i and each year t in country c .

Cyclical factors significantly influence the growth of credit. Also, interest rates are one of the main factors influencing cost of credit, as well as they have an impact on creditworthiness of households and businesses, and their credit availability. The interest rate cycle is closely positively correlated with the economic cycle. Also, supply and demand for the consumer credit increase during the period of decreasing in unemployment rate which is conducive to higher creditworthiness of households (lower credit margins) and higher expectations regarding future income (see e.g. Leamer (2007)). Therefore, the model also tests the effect of the macroeconomic situations on bank loans (corporate, consumer, residential mortgage loans and total loans). The macro variables is defined as follows:

- GDP_{itc} growth (yoy) for each year t in country c , as the effect of the business cycle on bank loans.
- Δi_{itc} - the annual changes in interest rates ($irhome_{itc}$, $ircons_{itc}$, $ircorpo_{itc}$, $igross_{itc}$) for different types of loans (mortgage loans, consumer loans, corporate loans and for total loans⁴) for each year t in country c , as the effect of the price of the credit.

The variable α is a constant term, ε_{itc} denotes the error in the model, and φ , μ , λ , a_3 , and b_j are the regression coefficients.

Secondly, we investigated the impact of foreign presence on credit growth but we also control for size market power and other *Bank-Specific Variables* based on tree panel data sets: Panel A: includes the EU-17 banks, Panel B: includes the CEE-11 banks and Panel C: includes all EU-28 banks.

The second model examines the impact of *foreign presence* on credit growth follows equation (2):

$$Loans_{itc} = \alpha + \varphi * Loans_{i,c,t-1} + \mu * foreign\ presence_{t-1,c} + \sum_{j=1}^N \beta_j * Bank-Specific\ Variables_{itc} + \lambda_1 * macro\ variables_{t-1c} + \lambda_2 \Delta i_{t-1c} + \varepsilon_{itc} \quad (2)$$

where the dependent variable $Loans_{itc}$ is the annual change in the stock of total gross loans (in logs) to particular sector (residential mortgage loans, corporate, consumer, and total loans) for each bank i and for each year t . Loans are express in euro.

⁴ Weighted average interest rates for particular types of loans: mortgage loans, consumer loans, corporate loans.

In the second model, all explanatory variables are defined in the same way as in the first model. Only, instead of variables denote concentration there have been defined variables constituting the presence of foreign banks (*foreign presence* $_{t-1,c}$). The literature concerning foreign banks can be divided into two groups: concerning industrial and emerging markets. When studying foreign banks in transition and developing countries, many studies find that foreign banks perform better than domestic banks (Degryse and Ongena (2008), Havrylchyk and Jurzyk (2011)). However, in the transition period began in the mid-1990s, foreign bank entry was a catalyst for change. In this view, the rapid transition of the banking sector can be attributed to foreign owners who brought modern technology, market oriented decision making, independence from vested interests and competition (Bonin et. al., 2005; Bonin and Wachtel, 1999, Haselmann et. al. 2016). Furthermore, foreign banks' legal structure (branch versus subsidiary) along with the nature of the banking crisis (systemic versus non-systemic) could also determine their stabilizing or destabilizing role. Claessens and Van Horen (2013), found that during the global financial crisis of 2008, foreign banks reduced credit more sharply when compared to domestic banks, except when they dominated the host banking systems.

The presence of foreign banks is defined following Claessens and Van Horen (2014) who constructs two indices. The first index is defined as the percentage of foreign bank assets among total bank assets (as the percentage of foreign banks among total banks) in a country (*foreign presence 1*) :

sfb_{tc} - is defined as the percentage of foreign banks among total banks in each year t in country c .

The second is defined as the percentage of foreign banks among total banks in a country (*foreign presence 2*) :

$numfb_{tc}$ - is defined as the percentage of foreign banks among total banks in each year t in country c .

These variables are strongly correlated in two groups of countries (see cf., Figure 2 in the Appendix). Therefore, the separate regressions for these two variables were performed based on the second model.

3. Results of Panel Data Analysis

In order to carry out the investigation of the issue of asymmetry of the credit market determinants of various bank loans between the CEE-11 countries and the EU-17 countries, after the global financial crisis we provided panel data estimations. Tables A1, A2, A3 of the

statistical Appendix present the summary statistics of key selected variables. Tables A9, A10, A11 present the correlation coefficients between of key selected variables. The correlation coefficients are estimated for a sample of the EU-17 countries and CEE-11 and for all EU-28 across the period 2010–2016.

For estimations of two models we used a system GMM, *two-step robust* estimator (xtabond2) that can fit the two dynamic panel data models (the Arellano-Bond (1991) estimator and the Arellano and Bover (1995) estimator, as it was fully developed in Blundell and Bond (1998). Furthermore, the xtabond2 procedure allows for a finite-sample correction to the two-step covariance matrix derived by Windmeijer (2005) because using the two-step GMM estimator may impose a downward (or upward) bias in standard errors (*t*-statistics) due to its dependence on the estimated residuals. Also, the consistency of the GMM estimator depends on the assumption that the error term does not exhibit serial correlation and also on the assumed validity of the instruments. Therefore, we used several tests proposed by Arellano and Bond (1991) and Arellano and Bover (1995) to evaluate these assumptions. We used also the Hansen of over-identifying restrictions, which tests the overall strength of the instruments for a two-step estimator (Arellano & Bond, 1991; Arellano & Bover, 1995; Blundell & Bond, 1998).

In case to investigate the asymmetry of the credit market determinants between the CEE-11 countries and the EU-17, we performed two estimations for two models separately to avoid any alignment of variables: market structure (*CR5* and *HHI*) and foreign presence (*sfb*, *numfb*). A total of 25 regressions analyzes were performed for each group of countries based on two models: based on equation (1) and based on equation (2).

Tables A4-A8 of the statistical Appendix present the results of regressions using a two-step robust GMM estimator for three groups of countries. For each of the estimations, we also reported the Hansen test results at the bottom of the table as well as the Arellano-Bond tests (AR(1) and AR(2)). The model seemed to fit the panel data reasonably well, as the Hansen-test showed no evidence of over-identifying restrictions. Tables A4-A7 present the results of regressions for three groups of countries respectively for: mortgage loans, consumers loans, corporate loans and total loans. Table A8 presents the results of regressions for the second model for variable (*numfb*): *foreign presence 2*.

In Table A4 of the Appendix a positive and significant coefficient (μ_2) was found for the first model for EU – 17. It means that concertation — measured in terms of the share of the five largest banks' total assets (*CR5*)—had a positive and significant influence on the grow of mortgage loans in EU 17countries. Also, in Table A4 of the Appendix a positive and significant

coefficient (μ_2) was found for the second model for CEE – 11. It means that *foreign presence* (1)—measured in terms of the percentage of foreign banks among total banks (*sfb*)—had a positive and significant influence on the grow of mortgage loans in 11 CEE countries. Furthermore, in Table A8 of the Appendix a positive and significant coefficient (μ_2) was found for the second model for CEE – 11. It means that *foreign presence* (2)—measured in terms of as the percentage of foreign banks among total banks in a country (*numbf*)—had a positive and significant influence on the grow of consumer loans in 11 CEE countries. In Table A7 of the Appendix a positive and significant coefficient (μ_2) was found for the first model for EU – 17. It means that concertation—measured by Herfindahl index (*HHI*)—had a positive and significant influence on the growth of total loans in EU – 17.

In the next step we measured, whether the economic growth has impact on the credit growth of different type of loans. In Table A5 of the Appendix a positive and significant coefficient λ_1 was found for the first and second model for EU – 17 for the GDP growth (*GDP*). It means that consumer loans are strongly pro-cyclical. Also, in Table A7 of the Appendix a positive and significant coefficient λ_1 was found for the first and second model for the growth of total gross loans for EU – 28. On the other hand, in Table A6 of the Appendix a negative and significant coefficient λ_1 was found for the first and second model for EU – 17 for the GDP growth (*GDP*) for corporate loans.

Finally, the bank “size” — measured in terms of the individual institution’s the log of total assets (*la*) — influenced negatively on the growth of corporate loans for EU-17 countries. This results may confirm the size of individual banks is important for growth of corporate loans. Also, capitalization had positive impact on the growth of mortgage loans and total loans in EU-17 (see: table A4 and A7 of the Appendix).

The all above results gave a positive verification of hypothesizes: *H1, H2, H3 H4, H5*.

Conclusions

This paper investigates the issue of asymmetry of the credit market determinants of bank loans (corporate, consumer, and residential mortgage loans) between the CEE-11 countries (the Czech Republic, Estonia, Lithuania, Latvia, Poland, Slovakia, Slovenia, Hungary, Bulgaria, Rumania, Croatia) and the EU-17 countries (Austria, Belgium, Denmark, Finland, France, Greece, Spain, the Netherlands, Ireland, Luxembourg, Germany, Portugal, Sweden, United Kingdom, Italy, Malta and Cyprus) after the Global Financial Crisis (GFC).

The determinates of banks loans included concentration indicators and foreign ownership presence. Comparative analysis of the credit market of the CEE countries against all EU-28 and EU-17 also find the differences between determinants of different type of loans.

The foreign banks presence have positive impact on the growth of mortgage loans and consumer loans for CEE -11 transitions. The relation between the bank concentration and the growth of mortgage loans is positive mainly for EU-17 countries. The size of banks has negative impact on the growth of corporate loans for EU-17 countries. On the one hand, the cyclical factor has positive impact on the growth of consumer loans for CEE-11 transitions countries. On the other hand, the cyclical factor has negative impact on the growth of corporate loans for EU-17 countries. Finally, the relation between the bank concentration and the growth of total loans is positive mainly for EU-17 countries.

This paper provides valuable insights for banking supervisors about the impact of market structure and foreign presence on the credit grow. Creating the policy of international openness, decision makers should take into account the possible influence of foreign bank presence on the banking sector in the host economies.

References

- Allen F., Jackowicz K., Kowalewski O., Kozłowski Ł., (2017), Bank lending, crises, and changing ownership structure in Central and Eastern European countries, *Journal of Corporate Finance*, 42 (2017) 494–515.
- Arellano M., Bond S.R. (1991), Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations, *Review of Economic Studies* 58, 277–297.
- Adler G., Cerutti E. (2015), Are Foreign Banks a ‘Safe Haven’? Evidence from Past Banking Crises, *IMF Working Paper*, WP/15/43.
- Anginer D., Cerutti E., Soledad Martinez Peria M., Foreign Bank Subsidiaries’ Default Risk during the Global Crisis: What Factors Help Insulate Affiliates from their Parents? *IMF Working*, WP/16/109.
- Agnello L., Schuknecht L. (2011), Booms and busts in housing markets: Determinants and implications, *Journal of Housing Economics* 20, issue 3, 171-190.
- Aiyar S., Calomiris C. W., Wieladek T. (2014), Does Macro-Prudential Regulation Leak? Evidence from a UK Policy Experiment, *Journal of Money, Credit and Banking* 46 (s1), 181–214.
- Akinci O., Olmstead-Rumsey J. (2015), How Effective are Macroprudential Policies? An Empirical Investigation, *Federal Reserve Board International Finance Discussion Papers* No. 1136.
- Arellano M., Bover O. (1995), Another look at the instrumental variable estimation of error-component models, *Journal of Econometrics* 68(1), 29–51.
- Arena, M., Reinhart, C., Vázquez, F.F., 2007. The lending channel in emerging economies: are foreign banks different? *IMF Working Papers*
- Bonin, J. P., Hasan, I., Wachtel, P. (2005). Privatization matters: Bank efficiency in transition countries. *Journal of Banking and Finance*, 29(8-9), 2155–2178.
- Borio C., Gambacorta L., Hofmann B. (2015), The influence of monetary policy on bank profitability, *BIS Working Papers* No. 514.
- Cecchetti S., Mohanty M., Zampolli F. (2011), The real effects of debt, *BIS Working Papers* No. 352.
- Cizel J., Frost J., Hauben A., Wierts P. (2016), Effective macroprudential policy: cross-sector substitution from price and quantity measures, *DNB Working Paper* NO. 498.

- Claessens S., Van Horen N. (2013), Impact of Foreign Banks, *DNB Working Paper* NO 370.
- Cubillas E., González F., (2014), Financial liberalization and bank risk-taking: international evidence, *Journal of Financial Stability* 11, 32–48.
- Cull R., M. S. Martinez Pería (2013), Bank Ownership and Lending Patterns during the 2008–2009. Financial Crisis Evidence from Latin America and Eastern Europe, *Journal of Banking and Finance* 2013, vol. 37 (12), 4861–4878.
- Cull R., M. S. Martinez Pería., Verrier J. (2017), Bank Ownership: Trends and Implications, *IMF Working Paper* No. 17/60.
- De Haas R., van Lelyveld I. (2012), Foreign banks and credit stability in Central and Eastern Europe. A panel data analysis, *Journal of Banking and Finance*, 2006, vol. 30 (7), 1927–1952.
- De Haas R., Van Horen N. (2012), International shock transmission after the Lehman Brothers collapse: evidence from syndicated lending, *American Economic Review: Papers & Proceedings* 102(3), 231–237.
- Demetriades P. O, Hussein K. A. (1996), Does Financial Development cause economic growth, time series evidence from 16 countries, *Journal of Development Economics* 51 (2), 387–411.
- Demirgüç-Kunt A., Huizinga H. (2000), Financial structure and bank profitability, *World Bank Policy Research Working Paper* 2430.
- Degryse, H., Ongena, S., (2008). Competition and regulation in the banking sector: A review of the empirical evidence on the sources of bank rents. In Thakor, A. V., Boot, A. (Eds.), *Handbook of Financial Intermediation and Banking* Elsevier Science, (pp. 483–554).
- Goddard J., Molyneux P., Wilson J. O. S. (2004), The profitability of European banks. A cross-sectional and dynamic panel analysis, *The Manchester School* 72(3), 363–381.
- Guo K., Stepanyan V. (2011), Determinants of Bank Credit in Emerging Market Economies, *IMF Working Paper European Department* No. WP/11/51.
- Hurlin, Ch. Kierzenkowski, R. (2007), Credit market disequilibrium in Poland: Can we find what we expect?: Non-stationarity and the short-side rule, *Economic Systems*, Elsevier, vol. 31(2), 157–183, June.
- Haselmann R., Wachtel P., Sabott J. (2016), Credit Institutions, Ownership and Bank Lending in Transition Countries, *The Palgrave Handbook of European Banking*.

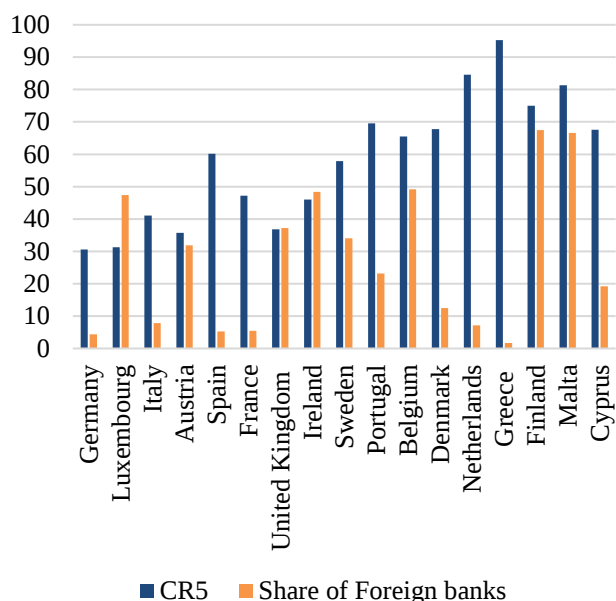
- Havrylchyk O., Jurzyk E. (2011), Profitability of foreign banks in Central and Eastern Europe: Does the entry mode matter?, *Economics of Transition* Vol. 19, Issue 3, 443–472.
- Hicks J. (1935), The theory of monopoly, *Econometrica*, 3(1), 1–20.
- Kouretas G. P., Tsoumas Ch. (2016), Foreign bank ownership and business regulations, *Journal of Financial Stability* 24, 104-116.
- Kouretas G. P., Delis M.D., Ch. Tsoumas (2014), Anxious periods and bank lending, *Journal of Banking and Finance* 38, 1-13.
- Kouretas G. P., Tsoumas Ch. (2013), Bank risk-taking in Central and Eastern European countries, *Central European Journal of Economic Modelling and Econometrics* 5, 103-123.
- Kouretas G. P., Delis M.D. (2011), Interest rates and bank risk-taking, *Journal of Banking and Finance* 35, 840-855.
- Kouretas G. P., Drakos A.A., Tsoumas Ch. (2016), Ownership, interest rates and bank risk-taking in the Central and Eastern European countries, *International Review of Financial Analysis* 45, 308-319.
- Laeven L., Ratnovski L., Tong H. (2016), Bank size, capital, and systemic risk: Some international evidence, *Journal of Banking & Finance* No. 69, 25-34.
- Leamer E. (2007), Housing is the Business Cycle, *NBER Working Paper Series* No. 13428.
- Levine R. (2004), Finance and Growth: Theory and Evidence, *NBER Working Papers* No. 10766.
- Mendoza E., Terrones M. (2012), An anatomy of credit booms and their demise, *NBER Working Paper* No. 18379.
- Pawłowska M. (2016), Does the Size and Market Structure of the Banking Sector have an Effect on the Financial Stability of the European Union? *The Journal of Economic Asymmetries* (4), 112-127.
- Popov A., Udell G.F. (2012), Cross-border banking, credit access, and the financial crisis, *Journal of International Economics*, 87,1, 147-161.
- Reinhart C., Rogoff K. (2009), *This Time is Different Eight Centuries of Financial Folly*, Princeton University Press Princeton and Oxford.
- Reinhart C., Rogoff K. (2010), From Financial Crash to Debt Crisis, *NBER Working Paper* No. 15795.

- Schularick M., Taylor A. (2012), Credit booms gone bust: monetary policy, leverage cycles, and financial crises, 1870–2008, *American Economic Review* No. 102, 1029–1061.
- Windmeijer, F. (2005). A finite sample correction for the variance of linear efficient two-step GMM estimators. *Journal of Econometrics*, 126, 25–51.

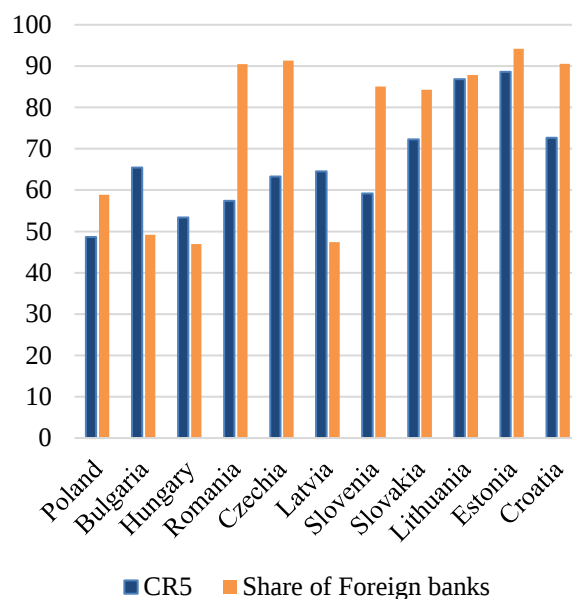
Appendix 1

Figure 1. Banking Concentration and Foreign presence for EU-28 in 2015 (%)

A: EU-17



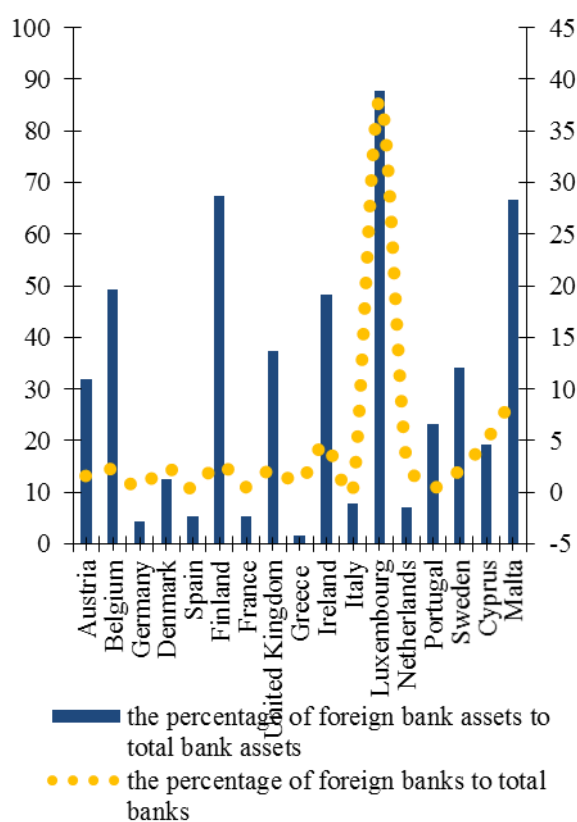
B: CEE-11



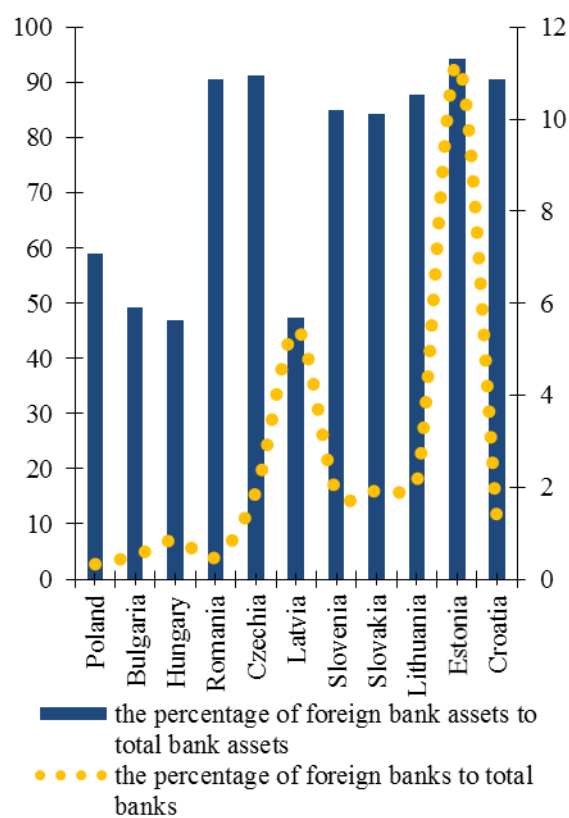
Source: own calculations on the basis of ECB data.

Figure 2. Foreign bank presence variables in EU- (2015)

A: EU-17



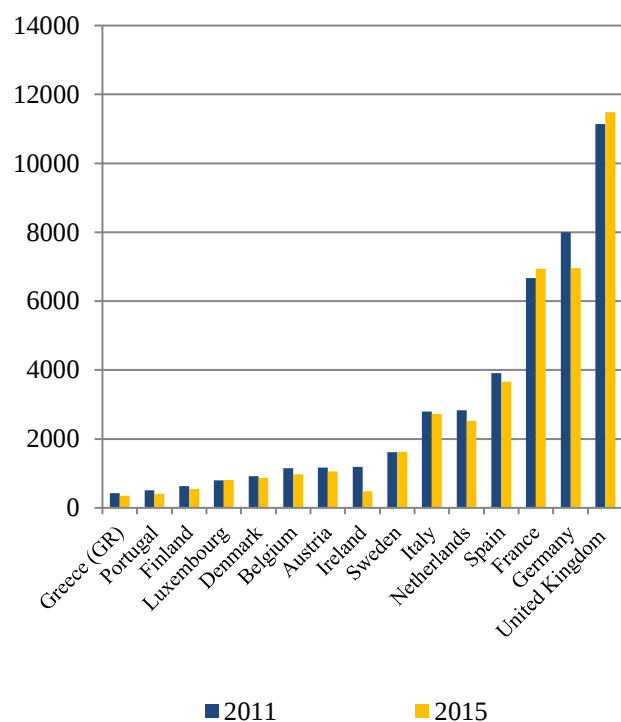
B: CEE-11



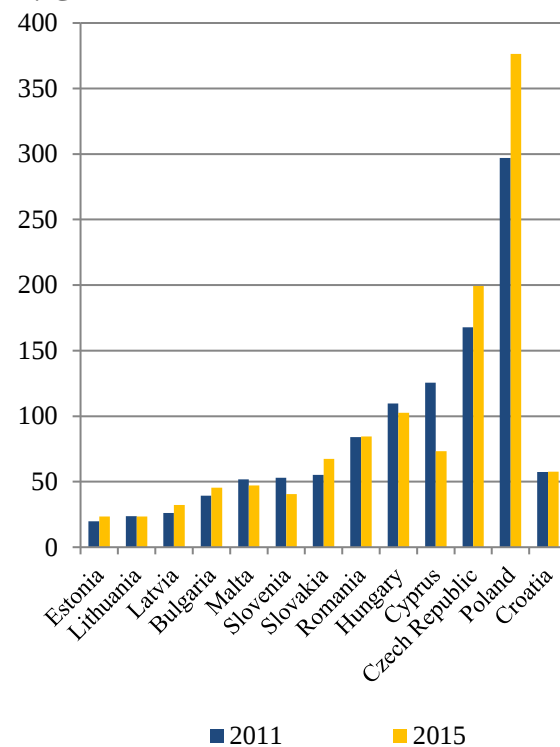
Source: ECB and own calculation.

Figure 3. Assets of the banking sectors in the years 2011, 2015 (in EUR billion)

A: EU-17



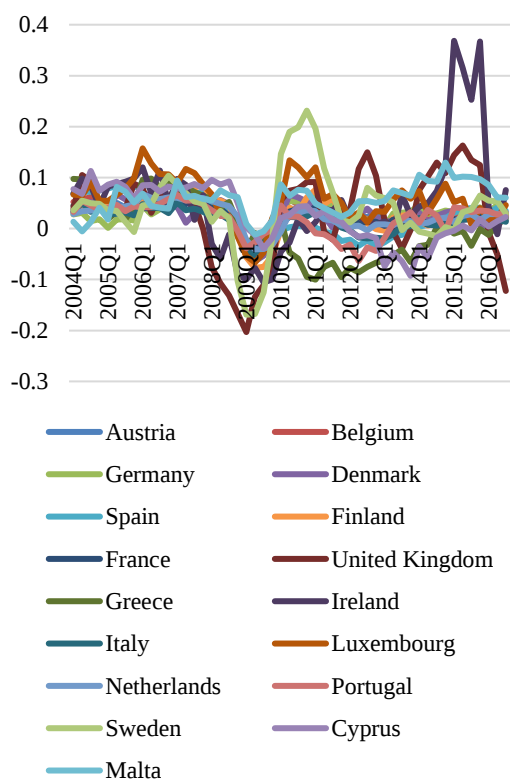
B: CEE-11



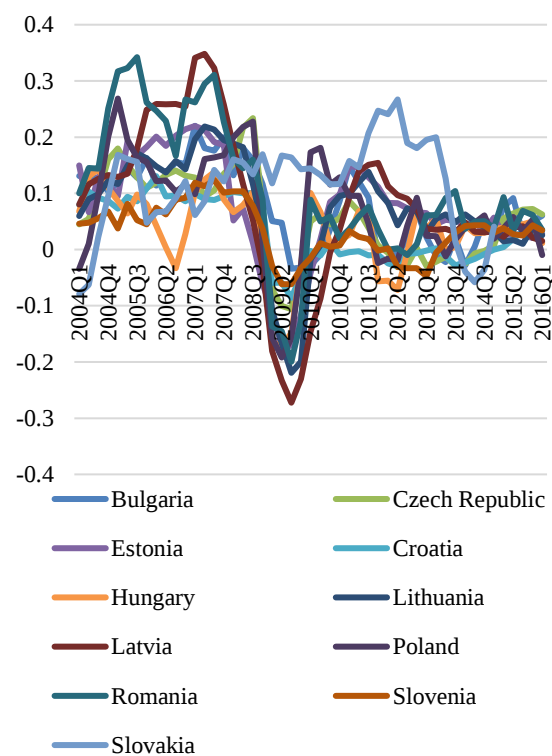
Source: ECB.

Figure 4. GDP growth (yoy) in EU-28

A: EU-17



B: CEE-11



Source: ECB, Eurostat and own calculation.

Figure 5. Credit growth for the non-financial sector in Germany [%]

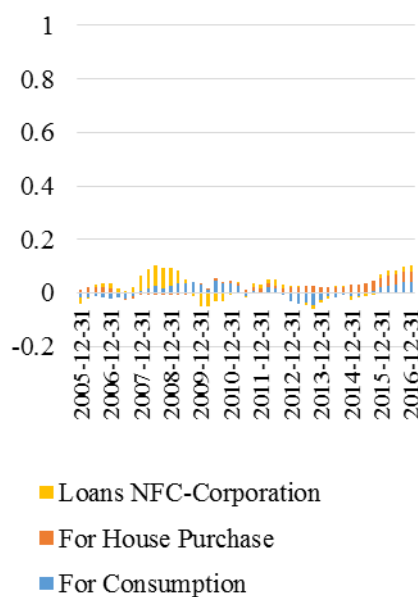


Figure 6. Credit growth for the non-financial sector in Ireland [%]

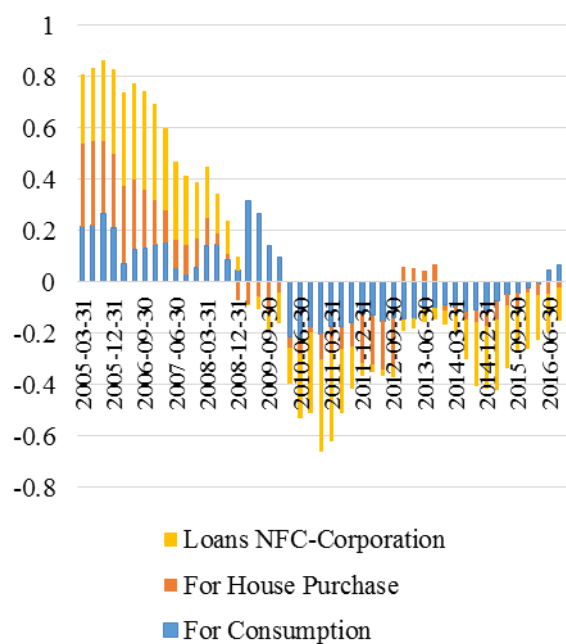


Figure 7. Credit growth for the non-financial sector in Poland [%]

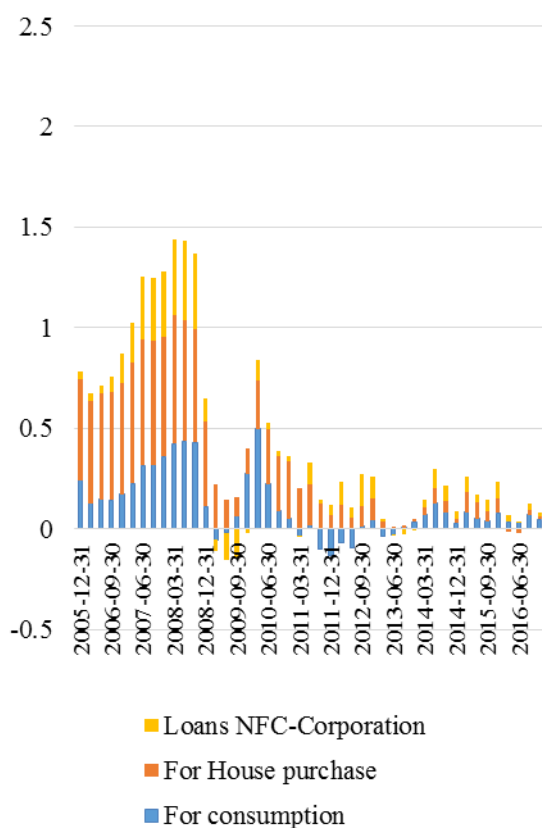
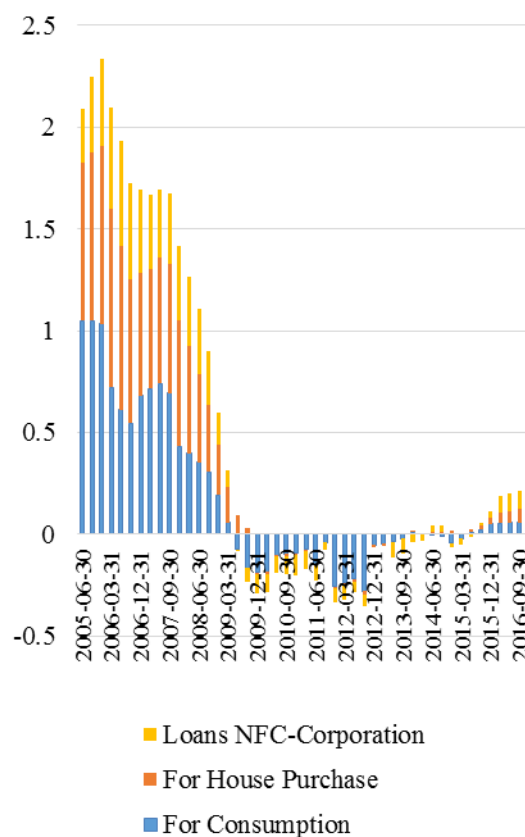


Figure 8. Credit growth for the non-financial sector in Lithuania [%]



Source: ECB and own calculation.

Appendix 2

Table A1: Summary Statistics on the Characteristics of EU-28 banking sectors structure and balance sheet data

This table provides summary statistics (mean and standard deviation (SD)) for all variables in the model. Data are observed yearly from 2010-2016.

Variable	Obs	Mean	SD	Min	Max
grossloans	16,225	12.8496	2.561438	0	20.8997
mortgloans	6,498	12.37496	2.525792	.6931472	19.8758
consumerloans	3,069	11.96608	3.501184	0	19.13684
corporatloans	2,741	12.73196	3.126945	0	19.92912
tier1ratio	9,769	18.15445	22.6633	-6.7	729.15
roa	16,224	.4541081	4.204196	-316.32	181.28
roe	16,187	3.795346	26.14891	-977.88	979.76
Netloanstodep	15,854	79.34044	67.3338	0	991.15
mp	16,234	.0202471	.3513282	4.35e-10	26.31394
la	16,234	13.59864	2.342427	1.609438	21.54054
numbf	16,234	1.660833	5.01035	.3059648	39.11846
sfb	16,234	19.26161	20.73132	1.7348	96.4045
HHI	16,234	.0535099	.0416644	.026	.37
CR5	16,234	42.01305	13.16924	30.5627	95.23
irhome	17,652	3.275844	.9535175	1.069417	11.06207
ircorpol	16,234	3.05943	1.050786	1.2805	10.2483
ircons	16,234	5.253842	1.72753	2.7528	17.2628
igross	16,234	4.191992	1.125719	2.223515	11.93803
GDP	16,234	.5619793	1.554387	-.0927487	25.67

Source: own calculations on the basis of ECB, IMF, World Bank, Eurostat data.

Table A2: Summary Statistics on the Characteristics of CEE-11 banking sectors structure and balance sheet data

This table provides summary statistics (mean and standard deviation (SD)) for all variables in the model. Data are observed yearly from 2010-2016.

Variable	Obs	Mean	SD	Min	Max
grossloans	951	13.41871	2.217973	2.079442	17.6667
mortgloans	325	12.25133	2.743298	2.197225	16.95164
consumerloans	654	12.07967	2.690688	1.791759	16.81808
corporateloans	650	12.73285	2.054634	3.295837	16.72919
tier1ratio	441	18.9059	11.87794	.43	79.19
roa	990	-.2573131	10.98651	-316.32	30.29
roe	988	-1.083684	59.88962	-924.94	423.08
Netloanstodep	905	78.75548	62.43695	0	766.03
mp	990	.0586767	.1377932	3.36e-06	2.062883
la	990	14.1481	1.869408	6.80017	18.94501
numbf	951	1.608761	1.895571	.3274349	10.81081
sfb	951	74.87881	19.65263	6.9153	96.4045
HHI	951	.1033602	.0406386	.0563	.2613
CR5	951	60.76228	11.3824	43.6871	90.635
irhome	870	4.818545	2.217799	1.649271	11.06207
ircorpo	951	4.584301	1.765333	2.1822	10.2483
ircons	951	9.711409	4.104202	2.7528	17.2628
igross	870	7.40698	2.233889	3.369932	11.93803
GDP	951	.1344013	.3118919	-.0285489	1.47

Source: own calculations on the basis of ECB, IMF, World Bank, Eurostat data.

Table A3: Summary Statistics on the Characteristics of EU-17 banking sectors structure and balance sheet data

This table provides summary statistics (mean and standard deviation (SD)) for all variables in the model. Data are observed yearly from 2010-2016.

Variable	Obs	Mean	SD	Min	Max
grossloans	15,008	12.81402	2.568627	0	20.8997
mortgloans	6,151	12.3862	2.509513	.6931472	19.8758
consumerloans	2,369	11.9493	3.68426	0	19.13684
corporalonas	2,068	12.75316	3.377958	0	19.92912
tier1ratio	9,273	18.10758	23.1009	-6.7	729.15
roa	15,008	.7155309	5.894054	-161.03	181.28
roe	15,008	4.299137	27.39196	-977.88	979.76
Netloanstodep	14,701	80.12099	67.80584	0	991.15
mp	15,008	.0074907	.0355989	4.35e-10	.537813
la	15,008	13.54371	2.363692	1.609438	21.54054
numbf	15,840	.9766168	1.033373	.3059648	13.00813
sfb	15,008	15.16516	14.36261	1.7348	79.8522
HHI	15,008	.0509007	.0401236	.0266	.37
CR5	15,008	40.7131	12.25161	30.5627	95.23
irhome	15,008	3.214757	.7457222	1.069417	5.240008
ircorpo	15,008	2.987469	.905433	1.2805	7.596
ircons	15,008	5.011	.9057738	3.04192	10.21875
igross	15,008	4.048508	.6914173	2.223515	7.949267
GDP	15,008	.5589049	1.273993	-.0927487	8.4

Source: own calculations on the basis of ECB, IMF, World Bank, Eurostat data.

Table A4: Empirical Results: Mortgage loans

	EU-17	CEE – 11	EU-28
VARIABLES	D.lmortglons	D.lmortglons	D.lmortglons
LD.lmortglons	-0.23** (1.02214e-01)	-0.46** (2.26588e-01)	-0.25** (1.06432e-01)
ROE	0.03* (1.79358e-02)	0.00 (4.74865e-03)	0.03 (2.44450e-02)
netloanstodepfund	-0.06** (2.45126e-02)	0.02 (1.60691e-02)	-0.00 (2.13959e-02)
L.GDP	0.07** (3.31567e-02)	0.41 (3.38908e-01)	0.09 (6.77923e-02)
L.sfb	0.06*** (2.21229e-02)	0.01 (2.42930e-03)	0.01 (1.05068e-02)
L.la	-0.72 (1.01372e+00)	-0.68 (1.45741e+00)	-1.74*** (6.21643e-01)
LD.irhome	0.03 (7.48428e-01)	0.09 (8.94404e-02)	0.58* (3.19563e-01)
Observations	308	53	361
Number of id	162	25	187
Hansen test	0.183	0.509	0.073
AR(1)	0.336	0.447	0.374
AR(2)	0.314	0.349	0.818
	EU-17	CEE – 11	EU-28
VARIABLES	D.lmortglons	D.lmortglons	D.lmortglons
LD.lmortglons	0.02 (1.63880e-01)	-0.47** (2.02140e-01)	-0.16 (1.14168e-01)
ROA	-0.28 (5.87130e-01)	-0.02 (7.81597e-02)	0.41 (5.09159e-01)
tier1ratio	0.23** (1.17929e-01)	-0.52 (3.27615e-01)	0.06 (2.07742e-01)
netloanstodepfund	-0.06*** (1.61890e-02)	-0.00 (1.14453e-02)	-0.04 (4.57431e-02)
L.GDP	0.08 (5.15469e-02)	0.41 (2.47603e-01)	0.09 (8.65358e-02)
L.HHI	-3.00 (1.61154e+01)	35.00 (7.06800e+01)	-0.02 (2.52200e+01)
LD.irhome	2.54 (1.81244e+00)	-0.03 (5.21651e-01)	0.58 (1.17672e+00)
Observations	240	28	268
Number of id	121	18	139
Hansen test	0.899	0.649	0.715
AR(1)	0.315	0.141	0.980
AR(2)	0.942	0.388	0.659
	EU-17	CEE – 11	EU-28
VARIABLES	D.lmortglons	D.lmortglons	D.lmortglons
LD.lmortglons	0.01 (2.41429e-01)	-0.65*** (9.87819e-02)	-0.16 (1.40887e-01)
ROA	-0.03 (1.70904e+00)	0.01 (7.34200e-02)	0.41 (5.90725e-01)
tier1ratio	0.21 (1.36910e-01)	-0.36 (3.52457e-01)	0.06 (1.97151e-01)
netloanstodepfund	-0.06 (3.69875e-02)	0.00 (3.05344e-02)	-0.04 (4.86631e-02)
L.GDP	0.05 (8.71938e-02)	0.21 (2.65388e-01)	0.09 (1.07423e-01)
L.CR5	0.08*** (2.31173e-02)	-0.20 (5.92738e-01)	0.07** (2.99108e-02)
LD.irhome	1.18 (3.96822e+00)	0.25 (5.42456e-01)	0.58 (1.33567e+00)
Observations	240	28	268
Number of id	121	18	139
Hansen test	0.616	0.616	0.961
AR(1)	0.500	0.119	0.732
AR(2)	0.561	0.279	0.714

Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1. Source: own calculations.

Table A5: Empirical Results: Consumer loans

	EU-17	CEE – 11	EU-28
VARIABLES	D.lconsumerloans	D.lconsumerloans	D.lconsumerloans
LD.lconsumerloans	-0.06 (3.93394e-01)	-0.18 (3.04343e-01)	-0.29 (3.17357e-01)
ROE	0.14 (1.60940e-01)	0.04* (2.29355e-02)	0.05 (6.30720e-02)
netloanstodepfund	-0.08 (1.59522e-01)	-0.03 (1.35232e-01)	0.09 (9.47725e-02)
L.GDP	0.21 (3.01007e-01)	2.96*** (8.88906e-01)	0.12 (2.03781e-01)
L.sfb	0.67 (6.78809e-01)	-0.02 (5.34150e-02)	0.06 (2.51903e-01)
L.la	-11.63 (9.08374e+00)	3.70 (3.87882e+00)	-1.75 (4.12027e+00)
LD.ircons	-4.98 (6.41734e+00)	-1.11 (7.57268e-01)	-0.75 (1.32414e+00)
Observations	360	139	499
Number of id	179	67	246
Hansen test	0.940	530	0.222
AR(1)	0.534	0.020	0.392
AR(2)	0.827	0.530	0.438
	EU-17	CEE – 11	EU-28
VARIABLES	D.lconsumerloans	D.lconsumerloans	D.lconsumerloans
LD.lconsumerloans	-0.54** (2.57678e-01)	-0.02 (2.97935e-01)	-0.55** (2.53084e-01)
ROA	-0.43 (2.73546e-01)	2.24 (1.87547e+00)	-0.22 (5.40807e-01)
netloanstodepfund	0.02 (4.94880e-02)	0.12 (9.98504e-02)	0.16 (2.02007e-01)
L.GDP	-0.06 (8.36457e-02)	3.19** (1.57543e+00)	-0.50 (4.08729e-01)
L.CR5	-0.05 (1.09140e-01)	-0.08 (3.87710e-01)	-0.87 (7.37051e-01)
D.ircons	-0.29 (9.53567e-01)	0.17 (6.99459e-01)	0.15 (2.37431e+00)
Observations	360	139	499
Number of id	179	67	246
Hansen test	0.357	0.502	0.129
AR(1)	0.746	0.953	0.938
AR(2)	0.365	0.955	0.925
	EU-17	CEE – 11	EU-28
VARIABLES	D.lconsumerloans	D.lconsumerloans	D.lconsumerloans
LD.lconsumerloans	-0.75** (3.07682e-01)	-0.06 (3.76406e-01)	-0.68* (3.70997e-01)
ROA	-0.40 (6.86296e-01)	2.49 (2.41038e+00)	-0.74 (9.89826e-01)
netloanstodepfund	0.22 (2.82448e-01)	0.12 (1.15004e-01)	0.31 (3.06207e-01)
L.GDP	-0.60 (5.90073e-01)	2.51** (1.05672e+00)	-0.50 (4.56786e-01)
L.HHI	-283.09 (2.68411e+02)	-59.72 (2.18336e+02)	-274.36 (2.92636e+02)
D.ircons	-2.36 (6.22548e+00)	0.38 (9.90283e-01)	1.96 (2.98779e+00)
Observations	360	120	480
Number of id	179	67	246
Hansen test	0.344	0.429	0.594
AR(1)	0.390	0.707	0.635
AR(2)	0.852	0.735	0.828

Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1. Source: own calculations.

Table A6: Empirical Results: Corporate loans

	EU-17	CEE – 11	EU-28
VARIABLES	D.lcorporateloans	D.lcorporateloans	D.lcorporateloans
LD.lcorporateloans	-0.62* (3.19966e-01)	0.07 (3.67630e-01)	-0.31 (2.63924e-01)
ROE	0.00 (1.60679e-02)	-0.01 (7.07260e-03)	-0.04 (3.52314e-02)
netloanstodepfund	0.05* (2.54954e-02)	0.03 (1.95692e-01)	-0.01 (7.05653e-02)
L.GDP	0.09 (1.08317e-01)	-1.33 (9.12498e-01)	-0.03 (1.55964e-01)
L.sfb	0.01 (2.79111e-02)	0.07 (5.86197e-02)	0.27 (4.05706e-01)
L.la	-2.99*** (1.09416e+00)	-0.49 (2.49203e+00)	-5.80 (3.85112e+00)
LD.ircorpo	0.91 (9.95409e-01)	1.43** (6.67182e-01)	1.89 (1.68582e+00)
Observations	351	136	487
Number of id	175	66	241
Hansen test	0.344	0.429	0.594
AR(1)	0.390	0.707	0.635
AR(2)	0.852	0.735	0.828
	EU-17	CEE – 11	EU-28
VARIABLES	D.lcorporateloans	D.lcorporateloans	D.lcorporateloans
LD.lcorporateloans	-0.23 (2.84264e-01)	-0.54*** (8.70331e-02)	-0.26 (2.87121e-01)
tier1ratio	-0.20* (1.18986e-01)	-0.05 (4.10116e-02)	-0.14 (1.27336e-01)
ROA	0.24 (2.36893e-01)	0.05 (9.53069e-02)	0.40 (2.55986e-01)
netloanstodepstfund	0.02 (2.93113e-02)	0.03 (3.83076e-02)	0.05 (3.32648e-02)
L.GDP	-0.10 (1.06049e-01)	-0.11 (2.82290e-01)	-0.26* (1.52215e-01)
L.CR5	-0.18 (2.88757e-01)	-0.11 (1.53148e-01)	-0.39* (2.28522e-01)
LD.ircorpo	0.50 (8.51780e-01)	0.29 (2.56049e-01)	0.22 (7.60754e-01)
Observations	229	71	300
Number of id	109	42	151
Hansen test	0.357	0.502	0.129
AR(1)	0.746	0.953	0.938
AR(2)	0.365	0.955	0.925
	EU-17	CEE – 11	EU-28
VARIABLES	D.lcorporateloans	D.lcorporateloans	D.lcorporateloans
LD.lcorporateloans	-0.19 (2.49210e-01)	-0.53*** (5.15278e-02)	-0.16 (2.31561e-01)
tier1ratio	-0.19** (8.75232e-02)	-0.04 (3.62208e-02)	-0.16** (7.87977e-02)
ROA	0.44 (6.03147e-01)	0.08 (7.68405e-02)	0.96 (6.32247e-01)
netloanstodepstfund	0.03 (2.67117e-02)	0.05 (3.53174e-02)	0.02 (4.99490e-02)
L.GDP	-0.20** (8.81699e-02)	-0.15 (1.24274e-01)	-0.05 (1.77427e-01)
L.HHI	-4.62 (1.21698e+01)	-8.72 (1.62958e+01)	4.51 (1.85869e+01)
LD.ircorpo	-1.25** (6.25619e-01)	0.11 (1.05390e-01)	-0.89 (5.77086e-01)
Observations	229	68	297
Number of id	109	42	151
Hansen test	0.940	530	0.222
AR(1)	0.534	0.020	0.392
AR(2)	0.827	0.530	0.438

Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1. Source: own calculations.

Table A7: Empirical Results: Total loans

	EU-17	CEE – 11	EU-28
VARIABLES	D.lgrossloans	D.lgrossloans	D.lgrossloans
LD.lgrossloans	-0.51* (2.79950e-01)	0.07 (3.25204e-01)	-0.61** (2.58678e-01)
ROE	0.04 (4.80083e-02)	0.00 (1.95914e-03)	0.06 (3.99167e-02)
netloanstodepfund	0.00 (1.36766e-02)	0.01 (1.89840e-02)	-0.00 (9.40971e-03)
L.GDP	-0.03 (1.32900e-01)	0.03 (7.44755e-02)	-0.06 (7.94682e-02)
L.sfb	0.10** (4.20071e-02)	0.00 (6.38930e-03)	0.09* (4.95354e-02)
L.la	-2.18*** (6.15799e-01)	-0.26 (5.50173e-01)	-1.77*** (6.37274e-01)
LD.igross	-0.13 (1.48882e+00)	0.03 (4.86746e-02)	-0.80 (1.02248e+00)
Observations	2,401	129	2,530
Number of id	1,254	67	1,321
Hansen test	0.183	0.509	0.073
AR(1)	0.336	0.447	0.374
AR(2)	0.314	0.349	0.818
	EU-17	CEE – 11	EU-28
VARIABLES	D.lgrossloans	D.lgrossloans	D.lgrossloans
LD.lgrossloans	-0.47*** (1.62405e-01)	-0.58 (6.08806e-01)	-0.50*** (1.38929e-01)
tier1ratio	0.13** (5.69618e-02)	-0.02 (4.66995e-02)	0.13** (5.95946e-02)
ROA	0.86*** (2.99752e-01)	-0.01 (1.69275e-02)	0.68** (2.65909e-01)
netloanstodepfund	0.01 (1.64458e-02)	-0.00 (2.71630e-03)	-0.01 (1.61698e-02)
L.GDP	0.12*** (4.50476e-02)	-0.05 (1.14965e-01)	0.16*** (5.22925e-02)
L.HHI	61.79*** (1.54750e+01)	-18.71 (1.97821e+01)	47.91 (3.06580e+01)
LD.igross	1.30** (5.76716e-01)	0.08 (9.72535e-02)	1.42* (7.78105e-01)
Observations	1,387	76	1,463
Number of id	726	48	774
Hansen test	0.183	0.509	0.073
AR(1)	0.336	0.447	0.374
AR(2)	0.314	0.349	0.818
	EU-17	CEE – 11	EU-28
VARIABLES	D.lgrossloans	D.lgrossloans	D.lgrossloans
LD.lgrossloans	-0.37 (5.69517e-01)	-0.65 (7.87218e-01)	-0.26 (2.11948e-01)
tier1ratio	0.08 (6.92307e-02)	-0.03 (4.71329e-02)	0.05 (3.82798e-02)
ROA	0.60 (1.46236e+00)	0.00 (2.02063e-02)	0.22 (2.22895e-01)
netloanstodepfund	-0.01 (5.30211e-02)	-0.00 (2.93222e-03)	-0.02 (1.39352e-02)
L.GDP	0.04 (1.57202e-01)	-0.03 (8.72015e-02)	0.07* (4.11462e-02)
L.CR5	0.12 (6.43598e-01)	-0.05 (5.19892e-02)	-0.07 (1.00465e-01)
D.igross	1.52 (5.94620e+00)	0.18 (2.32632e-01)	-0.62 (1.58725e+00)
Observations	1,387	76	1,463
Number of id	726	48	774
Hansen test	0.183	0.509	0.073
AR(1)	0.336	0.447	0.374
AR(2)	0.314	0.349	0.818

Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1. Source: own calculations.

Table A8: Empirical Results: for Foreign presence (2)

VARIABLES	EU-17 lcorporateloans	CEE – 11 lcorporateloans	EU-28 lcorporateloans
LD.lcorporateloans	-0.76*** (2.60911e-01)	-0.68*** (1.71835e-01)	-0.77*** (2.39830e-01)
ROE	0.01 (1.44921e-02)	0.00 (1.19666e-03)	0.02 (1.90014e-02)
netloanstodepfund	0.06 (5.07235e-02)	0.01 (1.66170e-02)	0.03 (3.51255e-02)
L.GDP	0.08 (8.60213e-02)	0.01 (1.80881e-01)	-0.07 (7.84317e-02)
L.numbf	-1.07 (1.18337e+00)	-0.06 (6.32765e-01)	0.70 (1.29899e+00)
L.mp	19.15 (2.19973e+01)	-5.67 (1.18287e+01)	-19.26 (3.25106e+01)
LD.ircorpo	0.91 (8.84040e-01)	0.05 (1.08074e-01)	-1.06 (1.35684e+00)
Observations	327	136	463
Number of id	167	66	233
VARIABLES	lconsumerloans	lconsumerloans	lconsumerloans
LD.lconsumerloans	-0.53 (4.27385e-01)	-0.53 (4.47341e-01)	-0.47* (2.76689e-01)
ROE	-0.02 (1.06232e-01)	0.03 (2.13831e-02)	0.07 (5.09810e-02)
netloanstodepfund	0.05 (1.12295e-01)	0.07 (6.31432e-02)	0.11 (1.13275e-01)
L.GDP	-0.24 (3.42005e-01)	1.49 (9.61531e-01)	-0.03 (1.22702e-01)
L.numbf	1.16 (5.26971e+00)	1.37*** (3.17144e-01)	-2.26 (3.31618e+00)
L.mp	-144.91 (9.91823e+01)	-21.61 (2.53326e+01)	-77.75 (5.96703e+01)
LD.ircons	-1.63 (1.67325e+00)	-0.51 (3.35324e-01)	-1.60* (9.42959e-01)
Observations	339	120	459
Number of id	172	67	239
VARIABLES	lmortglons	lmortglons	lmortglons
LD.lmortglons	-0.31** (1.50389e-01)	-0.47** (1.85058e-01)	-0.42** (1.90592e-01)
ROE	0.13** (6.20595e-02)	0.01 (9.78485e-03)	0.08 (5.27490e-02)
netloanstodepfund	-0.03 (2.30046e-02)	0.01 (2.29767e-02)	0.01 (2.46823e-02)
L.GDP	0.15** (6.25297e-02)	0.27 (1.71148e-01)	0.29*** (1.01348e-01)
L.numbf	-0.15 (1.20053e+00)	0.63 (5.18251e-01)	-1.21 (9.19296e-01)
L.mp	-25.28 (4.13568e+01)	-4.90 (1.29213e+01)	9.44 (3.68705e+01)
LD.irhome	-0.11 (1.47002e+00)	0.09* (4.52016e-02)	-0.38 (5.20078e-01)
Observations	275	53	328
Number of id	144	25	169
VARIABLES	lgrossloans	lgrossloans	lgrossloans
LD.lgrossloans	0.11 (7.55227e-02)	0.17 (1.43011e-01)	0.14** (6.32175e-02)
ROE	0.00 (1.00511e-02)	-0.00 (2.83920e-03)	0.00 (1.16190e-02)
netloanstodepfund	-0.00 (3.17855e-03)	0.00 (8.22564e-03)	-0.00 (4.91925e-03)
L.GDP	-0.00 (9.37387e-03)	-0.11 (1.14504e-01)	0.00 (1.26615e-02)
L.numbf	0.32 (3.92113e-01)	0.25 (1.76058e-01)	0.40 (3.87364e-01)
L.mp	-9.95* (5.82665e+00)	2.79 (9.75997e+00)	-8.57* (4.85127e+00)
LD.igross	-0.10*** (3.57207e-02)	0.07 (1.10371e-01)	-0.09** (3.81889e-02)
Observations	2,339	129	2,468
Number of id	1,221	67	1,288

Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1. Source: own calculations.

Table A9: Spearman's rank coefficients for all variables in the model for EU-28

	mortglons	irhome	consumer	ircons	corporate	ircorpo	grossloans	tierlratio	ROA	ROE	netloanstodep	CR5	HHI	sfb
mortglons	1.0000													
irhome	0.1144*	1.0000												
consumer	0.8206*	0.1327*	1.0000											
ircons	-0.4372*	0.1958*	-0.3077*	1.0000										
corporate	0.8118*	0.2259*	0.7954*	-0.2824*	1.0000									
ircorpo	-0.3658*	0.2796*	-0.2227*	0.6419*	-0.2036*	1.0000								
grossloans	0.9528*	0.1161*	0.8926*	-0.4343*	0.8764*	-0.3500*	1.0000							
tierlratio	-0.1512*	0.0085	-0.2165*	-0.0570	-0.2445*	-0.1285*	-0.2210*	1.0000						
ROA	-0.1828*	-0.0647	-0.1163*	-0.0045	-0.1312*	-0.1290*	-0.1735*	0.3550*	1.0000					
ROE	0.0222	-0.0387	0.0684	-0.0971*	0.0538	-0.2236*	0.0534	0.2063*	0.8418*	1.0000				
netloanstodep	0.2724*	-0.1121*	0.1611*	-0.2044*	0.1198*	-0.0993*	0.2219*	0.0585	0.0949*	0.0945*	1.0000			
CR5	-0.2958*	-0.3263*	-0.2618*	0.1735*	-0.2604*	0.0280	-0.3175*	0.1794*	0.1220*	0.0742	0.1976*	1.0000		
HHI	-0.3132*	-0.2755*	-0.2840*	0.1803*	-0.2551*	0.0729	-0.3353*	0.1953*	0.1056*	0.0463	0.1867*	0.9831*	1.0000	
sfb	-0.4588*	0.2498*	-0.3858*	0.4852*	-0.3694*	0.3989*	-0.5153*	0.2742*	0.1430*	-0.0389	-0.0660	0.2001*	0.2539*	1.0000
numbf	0.0773	0.0868	-0.0400	-0.1394*	0.0708	-0.2508*	0.0363	0.2857*	0.0414	0.0723	0.1078*	0.3162*	0.3696*	0.2917*
la	0.9303*	0.1081*	0.8854*	-0.4415*	0.8662*	-0.3717*	0.9893*	-0.2213*	-0.1795*	0.0535	0.1268*	-0.3425*	-0.3616*	-0.5338*
mp	0.6099*	0.2004*	0.6907*	-0.0263	0.7121*	0.0255	0.6671*	-0.0730	-0.0357	0.0778	0.1046*	0.0952*	0.1199*	-0.0504
GDP	0.1521*	0.2128*	0.1995*	0.1817*	0.2182*	0.1991*	0.1628*	-0.0895	-0.1067*	-0.0554	-0.0099	-0.1422*	-0.1098*	0.2040*
	numbf	la	mp	GDP										
numbf	1.0000													
la	0.0235	1.0000												
mp	0.1767*	0.6619*	1.0000											
GDP	0.0613	0.1605*	0.2141*	1.0000										

Source: own calculations.

Table A10: Spearman's rank coefficients for all variables in the model for EU-11

	mortglons	irhome	consumer	ircons	corporate	ircorpo	grossloans	tierlratio	ROA	ROE	netloanstodep	CR5	HHI	sfb	---
mortglons	1.0000														
irhome	0.1666	1.0000													
consumerl~s	0.8119*	0.2139*	1.0000												
ircons	-0.2743*	0.2884*	-0.1913*	1.0000											
corporate~s	0.8061*	0.2672*	0.8045*	-0.1793*	1.0000										
ircorpo	0.0605	0.8143*	0.0787	0.0569	0.1818*	1.0000									
grossloans	0.9240*	0.2219*	0.9079*	-0.2604*	0.9298*	0.1260	1.0000								
tierlratio	0.0358	-0.0271	-0.0863	0.2773*	0.0237	-0.1498	-0.0312	1.0000							
ROA	0.2871*	-0.0460	0.3830*	0.1374	0.4665*	-0.1422	0.4058*	0.3215*	1.0000						
ROE	0.2014*	-0.0524	0.3549*	0.1731*	0.3896*	-0.1523	0.3390*	0.2134*	0.9645*	1.0000					
netloanstodep	0.4732*	0.0078	0.3677*	-0.1782*	0.4760*	-0.0036	0.5134*	-0.0146	0.1967*	0.1017	1.0000				
CR5	-0.3726*	-0.5039*	-0.4634*	0.1534	-0.3562*	-0.5702*	-0.4310*	0.3879*	0.1230	0.0837	-0.1640	1.0000			
HHI	-0.3205*	-0.4810*	-0.4220*	0.0270	-0.2977*	-0.5833*	-0.3728*	0.3597*	0.1160	0.0684	-0.1340	0.9634*	1.0000		
sfb	-0.3396*	-0.3657*	-0.4005*	0.1261	-0.4069*	-0.2047*	-0.4076*	0.2629*	0.0179	0.0082	-0.2510*	0.5593*	0.4387*	1.0000	
numbf	-0.3537*	-0.3864*	-0.4455*	0.0171	-0.3307*	-0.4895*	-0.4063*	0.2406*	0.0720	0.0421	-0.1426	0.7951*	0.8485*	0.3901*	
la	0.9185*	0.2244*	0.9100*	-0.2311*	0.9111*	0.0981	0.9880*	-0.0109	0.3998*	0.3435*	0.4278*	-0.4255*	-0.3699*	-0.4143*	
mp	0.6742*	0.2358*	0.6121*	-0.0242	0.7903*	0.0393	0.7429*	0.2409*	0.5414*	0.4424*	0.2537*	-0.0048	0.0398	-0.1942*	
GDP	0.0796	-0.0503	0.0922	-0.2672*	0.0747	0.0438	0.1108	-0.1777*	-0.0475	-0.0269	0.0032	0.0634	0.0505	0.1005	
	numbf	la	mp	GDP											
numbf	1.0000														
la	-0.3913*	1.0000													
mp	0.0342	0.7631*	1.0000												
GDP	-0.0625	0.1100	0.0069	1.0000											

Source: own calculations.

Table A11: Spearman's rank coefficients for all variables in the model for EU-17

	mortglons	irhome	consumer	ircons	corporate	ircorpo	grossloans	tierlratio	ROA	ROE	netloanstodep	CR5	HHI	sfb
mortglons	1.0000													
irhome	0.4648*	1.0000												
consumerl~s	0.7890*	0.3520*	1.0000											
ircons	-0.1146*	-0.0270	-0.0268	1.0000										
corporate~s	0.8289*	0.4807*	0.7660*	-0.0678	1.0000									
ircorpo	-0.2007*	-0.0640	-0.0776	0.7080*	-0.1320*	1.0000								
grossloans	0.9477*	0.4641*	0.8734*	-0.0991	0.8959*	-0.1854*	1.0000							
tierlratio	-0.0902	-0.0044	-0.1806*	-0.2794*	-0.2287*	-0.2268*	-0.1754*	1.0000						
ROA	-0.1816*	-0.1544*	-0.1872*	-0.2655*	-0.2013*	-0.2867*	-0.2063*	0.3558*	1.0000					
ROE	-0.0195	-0.0100	-0.0302	-0.2350*	-0.0187	-0.2856*	-0.0202	0.2087*	0.8079*	1.0000				
netloanstodep	0.1620*	-0.1174*	0.0407	-0.1857*	0.0004	-0.0845	0.0632	0.0952	0.0957	0.0945	1.0000			
CR5	-0.1995*	-0.3588*	-0.1619*	0.0081	-0.1751*	-0.0342	-0.2253*	0.0896	0.0595	0.0568	0.2523*	1.0000		
HHI	-0.1961*	-0.3382*	-0.1722*	0.0146	-0.1621*	-0.0095	-0.2272*	0.1227*	0.0568	0.0414	0.2665*	0.9812*	1.0000	
sfb	-0.1016	0.0760	-0.1030	0.0293	-0.1307*	0.2027*	-0.1749*	0.2988*	0.0635	-0.0225	0.1188*	0.0133	0.0901	1.0000
numbf	0.1588*	0.4739*	0.0277	-0.1313*	0.1724*	-0.1153*	0.0913	0.3224*	0.0359	0.0658	0.1757*	0.2101*	0.3024*	0.6148*
la	0.8994*	0.4607*	0.8636*	-0.0967	0.8798*	-0.2028*	0.9798*	-0.1942*	-0.2244*	-0.0285	-0.0606	-0.2697*	-0.2743*	-0.2128*
mp	0.7322*	0.2227*	0.7726*	0.0076	0.7634*	0.0204	0.8064*	-0.1544*	-0.2258*	-0.0336	0.0709	0.1372*	0.1651*	-0.0600
GDP	0.2870*	0.2024*	0.3128*	0.1842*	0.3117*	0.1709*	0.3188*	-0.0856	-0.1672*	-0.0729	0.0089	-0.1922*	-0.1464*	0.1324*
	numbf	la	mp	GDP										
numbf	1.0000													
la	0.0464	1.0000												
mp	0.2173*	0.8017*	1.0000											
GDP	0.0678	0.3194*	0.2493*	1.0000										

Source: own calculations.