

# PRACE NAUKOWE

Uniwersytetu Ekonomicznego we Wrocławiu

# RESEARCH PAPERS

of Wrocław University of Economics

Nr 428

## Wrocław Conference in Finance: Contemporary Trends and Challenges



Publishing House of Wrocław University of Economics  
Wrocław 2016

Copy-editing: Marta Karaś

Layout: Barbara Łopusiewicz

Proof-reading: Barbara Cibis

Typesetting: Małgorzata Czupryńska

Cover design: Beata Dębska

Information on submitting and reviewing papers is available on websites

[www.pracnaukowe.ue.wroc.pl](http://www.pracnaukowe.ue.wroc.pl)

[www.wydawnictwo.ue.wroc.pl](http://www.wydawnictwo.ue.wroc.pl)

The publication is distributed under the Creative Commons Attribution 3.0

Attribution-NonCommercial-NoDerivs CC BY-NC-ND



© Copyright by Wrocław University of Economics  
Wrocław 2016

**ISSN 1899-3192**

**e- ISSN 2392-0041**

**ISBN 978-83-7695-583-4**

The original version: printed

Publication may be ordered in Publishing House  
Wydawnictwo Uniwersytetu Ekonomicznego we Wrocławiu  
ul. Komandorska 118/120, 53-345 Wrocław

tel./fax 71 36-80-602; e-mail: [econbook@ue.wroc.pl](mailto:econbook@ue.wroc.pl)  
[www.ksiegarnia.ue.wroc.pl](http://www.ksiegarnia.ue.wroc.pl)

Printing: TOTEM

## Contents

|  |     |
|--|-----|
| <b>Introduction</b> .....  | 9   |
| <b>Andrzej Babiarez:</b> Methods of valuing investment projects used by Venture Capital funds, financed from public funds / Metody wyceny projektów inwestycyjnych stosowane przez fundusze Venture Capital finansowane ze środków publicznych .....   | 11  |
| <b>Magdalena Bywalec:</b> Updating the value of mortgage collateral in Polish banks / Aktualizacja wartości zabezpieczenia hipotecznego w polskich bankach .....   | 29  |
| <b>Maciej Ciolek:</b> Market fundamental efficiency: Do prices really track fundamental value? / Efektywność fundamentalna rynku: Czy ceny naprawdę podążają za wartością fundamentalną?.....  | 38  |
| <b>Ewa Dziwok:</b> The role of funds transfer pricing in liquidity management process of a commercial bank / Znaczenie cen transferowych w procesie zarządzania płynnością banku komercyjnego .....  | 55  |
| <b>Agata Gluzicka:</b> Risk parity portfolios for selected measures of investment risk / Portfele parytetu ryzyka dla wybranych miar ryzyka inwestycyjnego .....   | 63  |
| <b>Ján Gogola, Viera Pacáková:</b> Fitting frequency of claims by Generalized Linear Models / Dopasowanie częstotliwości roszczeń za pomocą uogólnionych modeli liniowych .....  | 72  |
| <b>Wojciech Grabowski, Ewa Stawasz:</b> Daily changes of the sovereign bond yields of southern euro area countries during the recent crisis / Dzielne zmiany rentowności obligacji skarbowych południowych krajów strefy euro podczas ostatniego kryzysu zadłużeniowego .....  | 83  |
| <b>Małgorzata Jaworek, Marcin Kuzel, Aneta Szóstek:</b> Risk measurement and methods of evaluating FDI effectiveness among Polish companies – foreign investors (evidence from a survey) / Pomiar ryzyka i metody oceny efektywności BIZ w praktyce polskich przedsiębiorstw – inwestorów zagranicznych (wyniki badania ankietowego) ..... | 93  |
| <b>Renata Karkowska:</b> Bank solvency and liquidity risk in different banking profiles – the study of European banking sectors / Ryzyko niewypłacalności i płynności w różnych profilach działalności banków – badanie dla europejskiego sektora bankowego .....  | 104 |
| <b>Mariusz Kicia:</b> Confidence in long-term financial decision making – case of pension system reform in Poland / Pewność w podejmowaniu długoterminowych decyzji finansowych na przykładzie reformy systemu emerytalnego w Polsce .....   | 117 |

|   |     |
|---|-----|
| <b>Tony Klein, Hien Pham Thu, Thomas Walther:</b> Evidence of long memory and asymmetry in the EUR/PLN exchange rate volatility / Empiryczna analiza długiej pamięci procesu i asymetrii zmienności kursu wymiany walut EUR/PLN.....  | 128 |
| <b>Zbigniew Krysiak:</b> Risk management model balancing financial priorities of the bank with safety of the enterprise / Model zarządzania ryzykiem równoważący cele finansowe banku z bezpieczeństwem przedsiębiorstwa.....   | 141 |
| <b>Agnieszka Kurdyś-Kujawska:</b> Factors affecting the possession of an insurance in farms of Middle Pomerania – empirical verification / Czynniki wpływające na posiadanie ochrony ubezpieczeniowej w gospodarstwach rolnych Pomorza Środkowego – weryfikacja empiryczna .....                | 152 |
| <b>Ewa Miklaszewska, Krzysztof Kil, Mateusz Folwaski:</b> Factors influencing bank lending policies in CEE countries / Czynniki wpływające na politykę kredytową banków w krajach Europy Środkowo-Wschodniej .....  | 162 |
| <b>Rafał Muda, Paweł Niszczota:</b> Self-control and financial decision-making: a test of a novel depleting task / Samokontrola a decyzje finansowe: test nowego narzędzia do wyczerpywania samokontroli .....  | 175 |
| <b>Sabina Nowak, Joanna Olbryś:</b> Direct evidence of non-trading on the Warsaw Stock Exchange / Problem braku transakcji na Giełdzie Papierów Wartościowych w Warszawie .....   | 184 |
| <b>Dariusz Porębski:</b> Managerial control of the hospital with special use of BSC and DEA methods / Kontrola menedżerska szpitali z wykorzystaniem ZKW i DEA .....  | 195 |
| <b>Agnieszka Przybylska-Mazur:</b> Fiscal rules as instrument of economic policy / Reguły fiskalne jako narzędzie prowadzenia polityki gospodarczej ...   | 207 |
| <b>Andrzej Rutkowski:</b> Capital structure and takeover decisions – analysis of acquirers listed on WSE / Struktura kapitału a decyzje o przejęciach – analiza spółek nabywców notowanych na GPW w Warszawie .....   | 217 |
| <b>Andrzej Sławiński:</b> The role of the ECB's QE in alleviating the Eurozone debt crisis / Rola QE EBC w łagodzeniu kryzysu zadłużeniowego w strefie euro .....   | 236 |
| <b>Anna Sroczyńska-Baron:</b> The unit root test for collectible coins' market as a preeliminary to the analysis of efficiency of on-line auctions in Poland / Test pierwiastka jednostkowego dla monet kolekcjonerskich jako wstęp do badania efektywności aukcji internetowych w Polsce ..... | 251 |
| <b>Michał Stachura, Barbara Wodecka:</b> Extreme value theory for detecting heavy tails of large claims / Rozpoznawanie grubości ogona rozkładów wielkich roszczeń z użyciem teorii wartości ekstremalnych.....   | 261 |
| <b>Tomaz Szkutnik:</b> The impact of data censoring on estimation of operational risk by LDA method / Wpływ cenzurowania obserwacji na szacowanie ryzyka operacyjnego metodą LDA .....  | 270 |

---

|   |     |
|---|-----|
| <b>Grzegorz Urbanek:</b> The impact of the brand value on profitability ratios – example of selected companies listed on the Warsaw Stock Exchange / Wpływ wartości marki na wskaźniki rentowności przedsiębiorstwa – na przykładzie wybranych spółek notowanych na GPW w Warszawie ..... | 282 |
| <b>Ewa Widz:</b> The day returns of WIG20 futures on the Warsaw Stock Exchange – the analysis of the day of the week effect / Dienne stopy zwrotu kontraktów futures na WIG20 na GPW w Warszawie – analiza efektu dnia tygodnia .....   | 298 |
| <b>Anna Wojewnik-Filipkowska:</b> The impact of financing strategies on efficiency of a municipal development project / Wpływ strategii finansowania na opłacalność gminnego projektu deweloperskiego .....   | 308 |
| <b>Katarzyna Wojtacka-Pawlak:</b> The analysis of supervisory regulations in the context of reputational risk in banking business in Poland / Analiza regulacji nadzorczych w kontekście ryzyka utraty reputacji w działalności bankowej w Polsce .....                                   | 325 |

## Introduction

One of the fastest growing areas in the economic sciences is broadly defined area of finance, with particular emphasis on the financial markets, financial institutions and risk management. Real world challenges stimulate the development of new theories and methods. A large part of the theoretical research concerns the analysis of the risk of not only economic entities, but also households.

The first Wrocław Conference in Finance WROFIN was held in Wrocław between 22nd and 24th of September 2015. The participants of the conference were the leading representatives of academia, practitioners at corporate finance, financial and insurance markets. The conference is a continuation of the two long-standing conferences: INVEST (Financial Investments and Insurance) and ZAFIN (Financial Management – Theory and Practice).

The Conference constitutes a vibrant forum for presenting scientific ideas and results of new research in the areas of investment theory, financial markets, banking, corporate finance, insurance and risk management. Much emphasis is put on practical issues within the fields of finance and insurance. The conference was organized by Finance Management Institute of the Wrocław University of Economics. Scientific Committee of the conference consisted of prof. Diarmuid Bradley, prof. dr hab. Jan Czekaj, prof. dr hab. Andrzej Gospodarowicz, prof. dr hab. Krzysztof Jajuga, prof. dr hab. Adam Kopiński, prof. dr. Hermann Locarek-Junge, prof. dr hab. Monika Marcinkowska, prof. dr hab. Paweł Miłobędzki, prof. dr hab. Jan Monkiewicz, prof. dr Lucjan T. Orłowski, prof. dr hab. Stanisław Owskiak, prof. dr hab. Wanda Ronka-Chmielowiec, prof. dr hab. Jerzy Różański, prof. dr hab. Andrzej Sławiński, dr hab. Tomasz Słoński, prof. Karsten Staehr, prof. dr hab. Jerzy Węclawski, prof. dr hab. Małgorzata Zaleska and prof. dr hab. Dariusz Zarzecki. The Committee on Financial Sciences of Polish Academy of Sciences held the patronage of content and the Rector of the University of Economics in Wrocław, Prof. Andrzej Gospodarowicz, held the honorary patronage.

The conference was attended by about 120 persons representing the academic, financial and insurance sector, including several people from abroad. During the conference 45 papers on finance and insurance, all in English, were presented. There were also 26 posters.

This publication contains 27 articles. They are listed in alphabetical order. The editors of the book on behalf of the authors and themselves express their deep gratitude to the reviewers of articles – Professors: Jacek Batóg, Joanna Bruzda, Katarzyna Byrka-Kita, Jerzy Dzieża, Teresa Famulska, Piotr Fiszeder, Jerzy Gajdka, Marek Gruszczyński, Magdalena Jerzemowska, Jarosław Kubiak, Tadeusz Kufel, Jacek Li-

sowski, Sebastian Majewski, Agnieszka Majewska, Monika Marcinkowska, Paweł Miłobędzki, Paweł Niedziółka, Tomasz Panek, Mateusz Pipień, Izabela Pruchnicka-Grabias, Wiesława Przybylska-Kapuścińska, Jan Sobiech, Jadwiga Suchecka, Włodzimierz Szkutnik, Mirosław Szreder, Małgorzata Tarczyńska-Łuniewska, Waldemar Tarczyński, Tadeusz Trzaskalik, Tomasz Wiśniewski, Ryszard Węgrzyn, Anna Zamojska, Piotr Zielonka – for comments, which helped to give the publication a better shape.

*Wanda Ronka-Chmielowiec, Krzysztof Jajuga*

---

**Ewa Miklaszewska, Krzysztof Kil, Mateusz Folwaski**

Cracow University of Economics

e-mails: uumiklas@cyf-kr.edu.pl; krzysztof.kil@uek.krakow.pl;

mateusz.folwarski@uek.krakow.pl

---

## **FACTORS INFLUENCING BANK LENDING POLICIES IN CEE COUNTRIES**

---

## **CZYNNIKI WPŁYWAJĄCE NA POLITYKĘ KREDYTOWĄ BANKÓW W KRAJACH EUROPY ŚRODKOWO-WSCHODNIEJ**

---

DOI: 10.15611/pn.2016.428.14

JEL classification: G01, G21, G32

**Abstract:** The aim of this paper is to analyse the trends in lending policies of eleven CEE countries in an attempt to determine the main factors influencing the ability of their banking systems to efficiently provide credit to the economy. The empirical part focuses on a question of what influences loan growth and composition in CEE countries, based on panel data estimations. From the empirical analysis it is evident that there are different factors influencing loans' growth, and corporate and consumer lending. For loan growth, macroeconomic variables were of the highest importance. For credit structure, universal banks had advantage in corporate lending, while smaller, traditional banks in granting consumer loans. Overall, the panel data analysis makes it possible to formulate a policy conclusion that the structural diversification of the banking market is important for efficient credit policies.

**Keywords:** CEE banks, lending policies, corporate lending, consumer lending.

**Streszczenie:** Okres pokryzysowy przyniósł nowe wyzwania dla rynku bankowego: koncentrację na stabilności banków i ich roli w stymulowaniu wzrostu gospodarczego. Dostęp do kredytu jest jednym z podstawowych czynników stymulujących wzrost. Celem artykułu jest analiza, jakie czynniki wpływały na dostępność kredytu w jedenastu krajach EŚW w okresie 2004-2014, w oparciu o badania panelowe. Badania empiryczne koncentrują się na pytaniu, co wpływa na wzrost kredytów i kompozycję portfela kredytowego. Uzyskane rezultaty wskazują, że inne czynniki wpływają na wzrost kredytów gospodarczych, a inne na wzrost kredytów konsumpcyjnych, zaś struktura rynkowa oparta na zdywersyfikowanym modelu biznesowym banków najlepiej stymuluje oba typy kredytów.

**Słowa kluczowe:** bankowość w EŚW, polityka kredytowa, kredyty korporacyjne, kredyty konsumpcyjne.



## 1. Introduction

Despite similar transition processes, Central and East European Countries (CEE) differ considerably in the structure and environmental features of their banking sectors. The extent of foreign penetration, the level of bank concentration, types of operational banks, the role of mutual banks and non-bank financial firms and the extent of regulatory safety net, directly influence the efficiency and stability of their banking sectors. In the pre-crisis period, in all CEE countries there was a lending boom, facilitated by rapidly developing banking markets. However, the global financial crisis of 2007-2009 brought the boom to a halt, and in the subsequent period bank strategic priorities have been reallocated, from expansion and risk-related profitability to stability and regulatory compliance. In most of the CEE countries the post-crisis collapse in lending policies was not as dramatic as in some well developed countries, but nevertheless constituted new strategic factor. Hence, the aim of the paper is to analyse to what extent lending policies were affected by macro and microeconomic variables in eleven CEE countries, and to what extent they have constituted stabilizing or destabilizing force in smooth functioning of their banking sectors.

The empirical analysis employs panel data models covering the period between 2004-2014, using the Bankscope database as a primary source of bank balance sheet data, supplemented for macroeconomic variables by data from other sources, such as The World Bank, the ECB and the IMF databases. The paper analyses both household and corporate loans. Households use debt to finance consumer spending and mortgages, while firms' smooth financing is essential to their investments and in the long run is of fundamental importance for the GDP growth. However, the data in the Bankscope database on consumer loans is more scarce than on corporate loans, hence the number of observations differs, when analysing both group of loans.

The structure of the paper is as follows: Section 2 presents a brief overview of loan-related issues in CEE banking, Section 3 analyses trends in lending policies in CEE, Section 4 presents the results of empirical analysis: variables, datasets and estimation results, and Section 5 concludes the paper.

## 2. Characteristics of the CEE banking sectors

In the pre-crisis period, the CEE economies were often analysed as part of a dynamically growing "emerging world", characterized by spectacular growth. European new economies were also given the historical label of "transition countries", reflecting their transformation from a state-controlled economy to one which was privately controlled. In the banking sector, this meant moving from state control to foreign control, in contrast to the emerging Asian economies, and comparable only to the Latin American countries. The term "Eastern Europe" is very broad and it encompasses a number of groups, in many cases heterogeneous. Hence,

the paper analyses eleven CEE countries, members of the EU: eight entering the block in 2004 (without the non-transition Malta and Cyprus), two in 2007 (Bulgaria and Romania) and one (Croatia) in 2013, assuming that the EU membership have resulted in common regulatory and infrastructural environment.

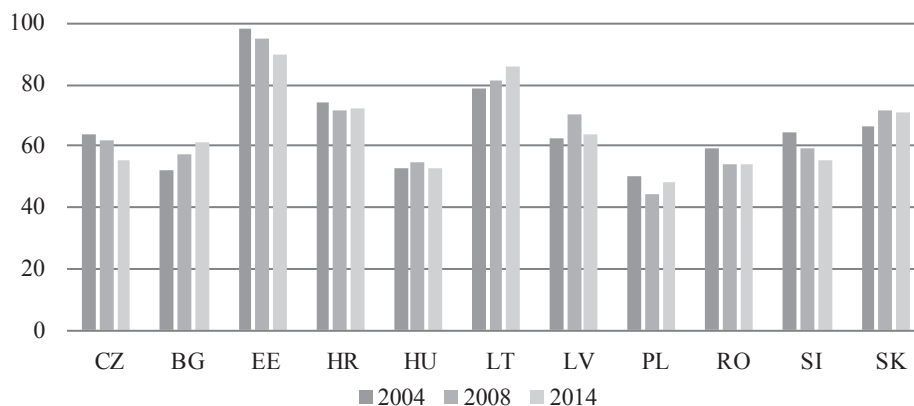
After the EU accession, CEE countries enjoyed rapid economic and banking sector growth. Foreign banks invested heavily in the CEE banking sector right from the beginning of the transition period and today approximately 70% of the CEE banking market is controlled by foreign capital. There are only a few large state-owned banks left, mostly in Poland and in Slovenia. However, investment in CEE also carried potential risks, mainly connected with macroeconomic imbalances, exchange rate volatility and credit risk. As a result, major global players, such as Citigroup or HSBC, had a much lower involvement in the region than banks from the neighbouring countries, such as Italian UniCredit or Austrian Raiffeisen.

The global crisis of 2007-2009 had a negative effect on the assessment of this region. However, bank capitalization and profitability remained high for most of CEE countries. For the latter, the most seriously affected country was Hungary and recently Romania; the long-term decline in profitability was most detrimental for Slovenia and Croatia, while the Czech Republic, Poland, Slovakia and the Baltic countries managed to keep satisfactory profitability in the post-crisis period (Table 1). On average, the Polish, Slovak and Czech banks were least affected by the crisis. In response to the crisis some foreign banks, active in CEE, scaled their activities down or withdrawn from the region, but bank concentration has not been dramatically affected (Figure 1), remaining differentiated throughout the region: very high for the Baltic countries and the lowest for Poland.

**Table 1.** CEE: bank profitability and capitalization (Basel III methodology), selected years (in %)

| Country        | Total Capital Requirements (TCR) |       |       |       | ROE   |       |        |        |
|----------------|----------------------------------|-------|-------|-------|-------|-------|--------|--------|
|                | 2004                             | 2007  | 2009  | 2014  | 2004  | 2007  | 2009   | 2014   |
| Bulgaria       | 16.60                            | 13.85 | 17.04 | 21.51 | 20.02 | 18.31 | 8.33   | 7.17   |
| Czech Republic | 12.55                            | 11.05 | 13.97 | 17.04 | 23.40 | 18.27 | 16.67  | 11.42  |
| Estonia        | 13.37                            | 13.16 | 15.76 | 41.85 | 20.00 | 33.44 | -41.30 | 9.69   |
| Croatia        | 15.40                            | 16.20 | 17.10 | 20.44 | 16.05 | 12.72 | 6.92   | 3.89   |
| Hungary        | 11.64                            | 12.90 | 14.37 | 17.03 | 22.98 | 15.03 | 22.68  | -21.89 |
| Lithuania      | 12.50                            | 9.67  | 12.90 | 21.29 | 13.52 | 19.87 | -56.07 | 7.73   |
| Latvia         | 11.70                            | 11.01 | 13.72 | 19.98 | 21.40 | 3.12  | -44.31 | 10.27  |
| Poland         | 15.40                            | 12.27 | 13.46 | 14.90 | 17.50 | 17.72 | 7.02   | 9.35   |
| Romania        | 18.80                            | 11.47 | 15.76 | 17.75 | 15.58 | 22.52 | 6.33   | -15.24 |
| Slovenia       | 11.80                            | 10.57 | 11.68 | 17.87 | 13.34 | 11.49 | 1.14   | -2.48  |
| Slovakia       | 18.68                            | 11.80 | 12.75 | 17.35 | 29.03 | 13.91 | 5.94   | 9.24   |

Source: Authors' own study based on EBC Consolidated banking data and BSCEE.



**Figure 1.** Banking market concentration in CEE-11 countries, CR5 (%)

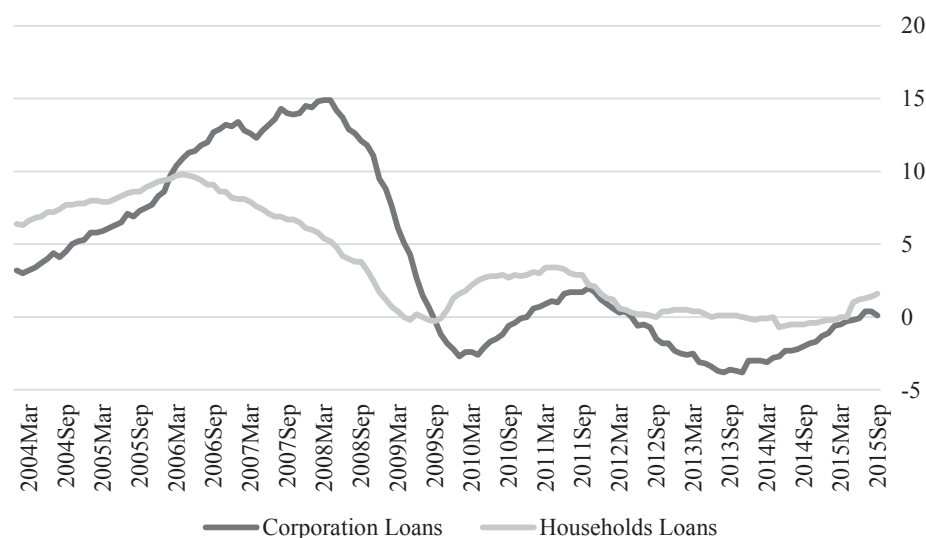
Source: Authors' own study based on ECB Banking Structural Financial Indicators, Trends in lending policies in CEE countries.

The global financial crisis of 2007-2009 had a strong effect on the economic growth and bank lending policies. Bank credit declined significantly in several regions, including CEE countries, which in the pre-crisis period experienced substantial credit boom. For long-term economic growth, the efficient bank lending policies are essential [Cappiello et al. 2010]. Thus a sharp decline in bank loans to households and non-financial corporations in highly advanced EU countries during the 2007-2009 crisis, and a lack of ability to reassume dynamic lending in post-crisis period, have been posing a serious policy concerns [Gambacorta et. al. 2014] (Figure 2).

For countries of the Monetary Union, bank credit is the main source of financing for households (80%), while businesses have more diverse sources of funding [Aisen, Franken 2010]. Lending to corporations may be less attractive to banks because the risk is higher and the return is often lower than in the case of the consumer loans, but from the point of view of the whole economy, it is important to provide both types of loans, and to maintain a stable structure of both consumer and corporate loans.

Analyzing corporate and consumer lending, it is worth noticing that banking markets in the CEE are dominated by foreign-owned, large global banks, which may discriminate against riskier activities, including business-oriented loans. In the post-crisis period, corporate loans share declined significantly in Poland, Bulgaria and Slovenia, whereas the ratio was stable for the Czech Republic, Slovakia, Estonia and increased for Romania and in 2013 for Hungary (Table 2).

However, the non-euro area countries seemed to be quicker in lending recovery, as indicated by Figure 3. From CEE countries, in 2008-2015 period only Hungary, Slovenia, Estonia and Romania had the corporate loans' growth rate below the EU average, while Poland, Slovakia and the Czech Republic were in the leading group.



**Figure 2.** The growth of bank loans to households (HH) and to non-financial corporations (NFC) in the Euro Area countries (in %)

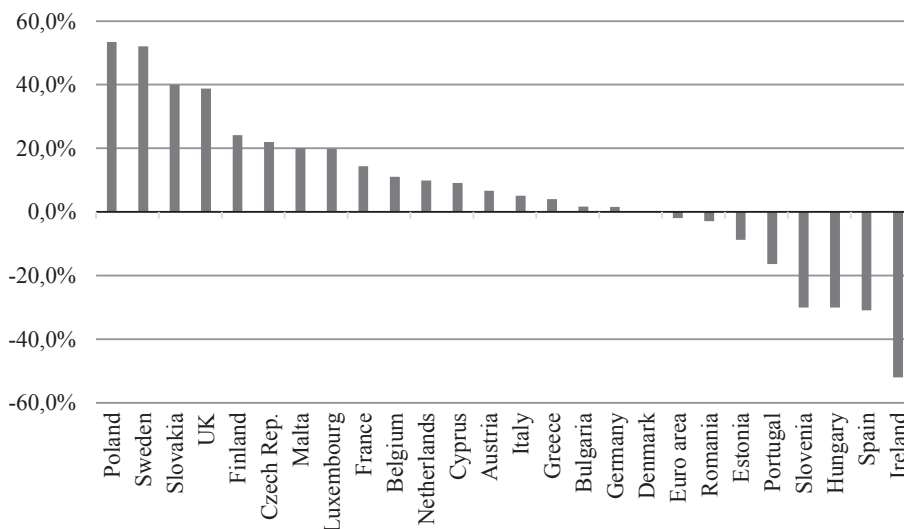
Source: Authors' own study based on ECB Banking Structural Financial Indicators.

**Table 2.** Corporate loans within total loans in CEE countries, 2004-2013

| Country    | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 |
|------------|------|------|------|------|------|------|------|------|------|------|
| Bulgaria   | 51.8 | 54.8 | 57.9 | 60.5 | 60.6 | 59.2 | 59.4 | 48.1 | 48.2 | 46.8 |
| Croatia    | 39.6 | 39.1 | 38.9 | 38.8 | 38.3 | 37.9 | 40.0 | 42.1 | 39.4 | 36.5 |
| Czech Rep. |      |      |      | 41.7 | 40.9 | 37.2 | 37.9 | 37.9 | 38.9 | 41.2 |
| Estonia    | 35.3 | 37.3 | 41.6 | 44.5 | 43.3 | 43.7 | 44.9 | 43.1 | 44.4 | 44.1 |
| Hungary    | 48.3 | 45.8 | 43.9 | 40.5 | 38.3 | 36.0 | 33.9 | 33.6 | 35.6 | 49.8 |
| Latvia     | 54.8 | 51.6 | 48.2 | 47.4 | 49.3 | 48.2 | 54.0 | 54.5 | 54.6 | 54.2 |
| Lithuania  | 65.1 | 60.1 | 56.3 | 51.0 | 52.3 | 50.5 | 47.4 | 46.5 | 46.5 | 44.4 |
| Poland     | 47.6 | 48.6 | 44.6 | 38.2 | 37.5 | 33.9 | 28.8 | 29.0 | 29.1 | 28.6 |
| Romania    | 21.4 | 21.2 | 20.8 | 20.6 | 19.0 | 15.9 | 38.6 | 34.7 | 37.7 | 36.4 |
| Slovakia   | 59.8 | 57.6 | 54.2 | 48.8 | 53.3 | 49.8 | 49.8 | 47.9 | 46.6 | 45.1 |
| Slovenia   | 63.1 | 62.2 | 61.7 | 60.2 | 60.4 | 59.5 | 57.4 | 55.3 | 53.1 | 47.4 |

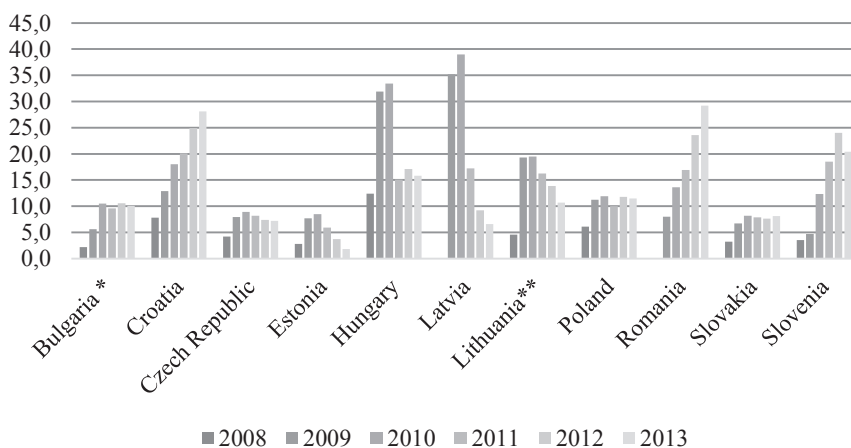
Source: Authors' own study, based on EBC Consolidated banking data and BSCEE.

Provision of loans carries a substantial risk. Many research papers point out that dynamic loan growth significantly affects the loan performance, however with a lag [Carbó-Valverde et al. 2011]. Consequently, many CEE countries which have experienced a credit boom, have also been burdened by growing non-performing



**Figure 3.** Growth of loans to non-financial sector in the EU, Dec. 2008-March 2015

Source: Authors' own study, based on [NBP 2015].



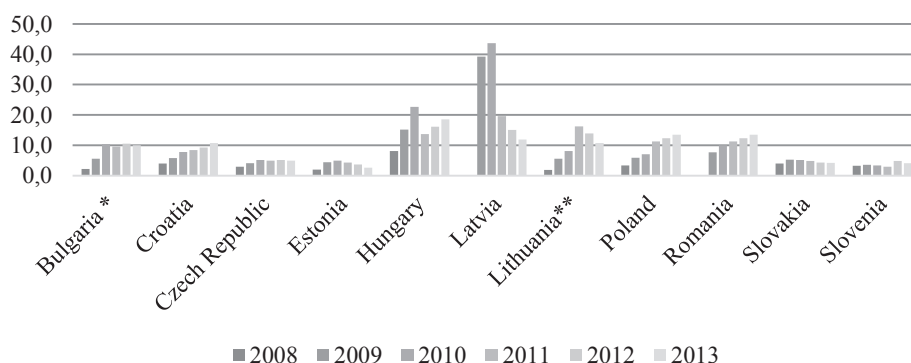
Note: \* summary data for households and non-financial corporations; \*\* summary data for households and non-financial corporations for 2011-2013.

**Figure 4.** NPL for non-financial corporations in CEE, 2008-2013

Source: Authors' own study based on data from Banking Supervisors from Central and Eastern European Countries (BSCEE) Reviews, 2008-2013, [www.bscee.org](http://www.bscee.org).

loan portfolio, as indicated in Figures 4. and 5. For both types of loans, Latvia and Hungary suffered the most during the crisis. For corporate loans, Romania, Croatia

and Slovenia have gradually build a large NPLs portfolio, while NPLs below 10% were in the Czech Rep, Estonia and Slovakia. For consumer loans, Estonia, the Czech Republic, Slovakia and Slovenia have the most satisfactory ratios. Overall, NPLs in corporate sectors seemed to be more of a problem in CEE, while NPLs in consumer sectors were smaller, but steadily growing in a number of countries. The safest position was that of Estonia, the Czech Republic and Slovakia.



Note: \* summary data for households and non-financial corporations; \*\* summary data for households and non-financial corporations for 2011-2013.

**Figure 5.** NPL for households in CEE, 2008-2013

Source: Authors' own study based on data from Banking Supervisors from Central and Eastern European Countries (BSCEE) Reviews, 2008-2013, [www.bscee.org](http://www.bscee.org).

**Table 3.** Credit information index (0 = low to 8 = high)

| Country    | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 |
|------------|------|------|------|------|------|------|------|------|------|------|------|
| Bulgaria   | 0    | 4    | 4    | 4    | 6    | 6    | 6    | 4    | 4    | 5    | 5    |
| Croatia    | 0    | 0    | 0    | 3    | 3    | 4    | 4    | 5    | 5    | 6    | 6    |
| Czech Rep. | 4    | 5    | 5    | 5    | 5    | 5    | 5    | 5    | 5    | 7    | 7    |
| Estonia    | 5    | 5    | 5    | 5    | 5    | 5    | 5    | 5    | 5    | 7    | 7    |
| Hungary    | 0    | 0    | 5    | 5    | 5    | 5    | 5    | 4    | 4    | 5    | 5    |
| Latvia     | 0    | 0    | 0    | 0    | 0    | 4    | 4    | 4    | 4    | 5    | 5    |
| Lithuania  | 0    | 4    | 4    | 6    | 6    | 6    | 6    | 6    | 6    | 8    | 8    |
| Poland     | 4    | 4    | 5    | 5    | 5    | 6    | 6    | 6    | 6    | 8    | 8    |
| Romania    | 0    | 0    | 4    | 4    | 4    | 5    | 5    | 5    | 5    | 7    | 7    |
| Slovakia   | 0    | 3    | 3    | 4    | 4    | 4    | 4    | 4    | 4    | 6    | 6    |
| Slovenia   | 0    | 0    | 0    | 0    | 0    | 0    | 0    | 2    | 3    | 4    | 4    |

Source: Authors' own study based on [The World Bank 2015].

Lending policies, particularly for the consumer loans, depend also on institutional and legal infrastructure. In particular, the availability and quality of information about the potential borrower has a significant impact on loan accessibility. The World Bank produces a Credit Information Index, which, in the scale from 0 (low) to 8 (high), assesses the quality of available credit-related information (Table 3). In 2014, the highest score among the analysed countries were those of Lithuania and Poland and the lowest of Slovenia, although most of CEE countries have well-developed credit-related databases.

Analysing mortgage loans, foreign currency borrowing constituted a significant risk in many CEE countries. Before the crisis, many foreign-owned CEE banks refinanced themselves abroad and then passed on the currency risk to their clients. Macroeconomic stability and expectation of currency appreciation after EU accession stimulated demand for such loans. However, FX exposure differed among CEE countries: in 2007, unhedged foreign currency borrowing constituted more than 70% of all private sector loans in Estonia, Latvia, and Serbia; it exceeded domestic borrowing in Bulgaria, Hungary, and Romania, but was relatively low in comparison to GDP in Poland, the Czech Republic and Slovakia. Bank lending to unhedged borrowers exposed CEE economies to systemic risk, but at the same time functioned as an engine for dynamic growth [De Haas et al. 2010].

### 3. Empirical analysis: variables, datasets and estimation results

The aim of this paper was to analyse the trends in lending policies of eleven CEE countries in an attempt to determine the main factors influencing the ability of the banking systems to provide efficiently credit to the economy. The empirical part of the paper focuses on the question of what influences the loan growth and composition in CEE countries, based on panel data estimations. A number of panel data models were employed, where the dependent variables were firstly the overall loans growth and loan to asset ratio, and then the corporate and consumer loans to total loans ratios and the ratio of mortgage loans to consumer loans. As explanatory variables, two groups of indicators were used: macroeconomic and banking sectors' variables, and bank-level data. The following model was used in estimations:

$$\text{dependent variable}_{ijt} = \alpha_0 + \alpha_1 X_{1ijt} + \alpha_2 X_{2ijt} + \varepsilon$$

where:  $X_1$  – a vector of macroeconomic variables;  $X_2$  – bank-level characteristics;  $\varepsilon$  – error term;  $i$  – the bank;  $j$  – the country;  $t$  – the year.

The analysis was conducted for the period 2004-2014 and bank-level data were extracted from the Bankscope database, with a number of adjustments. As a consequence of problems with data accessibility, the unbalanced panel was used, in which the number of time-series observations was different across banks. The fixed effects panel data methodology was employed, which holds individual differences constant and stresses the marginal effects of the explanatory variables.

**Table 4.** Description of explanatory variables

| Symbol   | Description   | Rationale/data source  |
|--|---|--|
| a. macroeconomic variables                       |   |  |
| $\Delta$ GDP                                     | Real GDP growth rate  | Impact of the business cycle. Eurostat   |
| LT_GBY   | Long-term government bond yield (10-year bonds)   | Interest rates approximation. Eurostat, for Estonia own estimations  |
| HICP   | Harmonized Index of Consumer Prices   | Inflation. Eurostat  |
| HHI  | Herfindahl-Hirschman Index for Credit Institutions  | Banking market concentration. ECB: Banking Structural Financial Indicators   |
| Coop   | Cooperative banks' market share: assets of cooperative banks in total banking assets of a given country   | Banking market structural diversification<br>For 2004-2013 calculations based on data from: <ul style="list-style-type: none"> <li>• European Association of Cooperative Banks (EACB);</li> <li>• Banking Supervisors from Central and Eastern European Countries (BSCEE) Reviews.</li> <li>• For 2014 approximated</li> </ul> |
| DebCardPC  | Debit Cards per Consumer  | Depth of the banking market. ECB: Payments Statistics  |
| b. bank-level variables (data source: Bankscope) |   |  |
| ln_TA  | Logarithm of Total Assets (in EUR)  | Bank size  |
| L/D  | Loans to Deposits ratio   | Bank profile   |
| D/A  | Deposits to Assets Ratio  | Bank financial strategy and risk   |
| C/I  | Cost to Income Ratio  | Cost efficiency  |
| ROE  | Return on Average Equity  | Profit efficiency  |
| NPL  | Nonperforming loans to total gross loans  | Loan portfolio risk  |
| Z-score  | The ratio of the return on assets (ROA) plus the capital asset ratio (CAR) for a given year divided by the standard deviation of the return on assets over the period 2004-2014 | Measure of bank insolvency risk (probability of default). A high level Z-score indicates low default risk. The value of the index crucially depends on the variability of returns and bank capitalization level, advantageous to well capitalized traditional banks with stable profit-base [Lown et al. 2000]                 |

Source: Authors' own study.



Dependent variables explained in the panel models were growth of gross loans (yoy), loans to total assets ratio (L/TA) and structure of loan portfolio: corporate loans to total loans ratio (CorpL/TL); consumer loans to total loans ratio (ConsL/TL); mortgage loans to consumer loans ratio (MgL/ConsL),

The explanatory variables are divided into two groups and presented in Table 4.

Analyzing estimation results (Table 5) for loans' growth and loans to assets ratio, factors which stimulate growth of gross loans were mostly of macroeconomic origin: dynamic GDP growth, growing consumer price index and high bank concentration ratio, loans' growth was negatively related to the size of bank and NPLs; for consumer loans size of bank assets was also a negative, but profitability a positive factor.

**Table 5.** Panel model estimations for Loans Growth and Loans to Assets Ratio, CEE 2004-2014

| Control variables:      | Loans' Growth |     | Consumer Loans' Growth |     | Loans to Assets Ratio |     |
|-------------------------|---------------|-----|------------------------|-----|-----------------------|-----|
| const                   | 312.843       | *** | 1255.130               | *** | -1.016                |     |
|                         | (44.935)      |     | (154.426)              |     | (16.550)              |     |
| LT_GBY                  | -0.404        |     | -0.712                 |     | 1.006                 | *** |
|                         | (0.906)       |     | (2.464)                |     | (0.338)               |     |
| COOP                    | 4.250         |     | 4.047                  |     | 1.563                 |     |
|                         | (3.143)       |     | (6.452)                |     | (1.176)               |     |
| $\Delta$ GDP            | 0.711         | **  | 0.998                  |     | -0.203                |     |
|                         | (0.332)       |     | (0.859)                |     | (0.124)               |     |
| HHI                     | 478.023       | *** | 104.376                |     | -9.735                |     |
|                         | (116.906)     |     | (367.968)              |     | (44.907)              |     |
| HICP                    | 1.998         | *** | -0.831                 |     | 4.241                 | *** |
|                         | (0.500)       |     | (1.178)                |     | (1.030)               |     |
| ln_TA                   | -25.343       | *** | -84.694                | *** | 0.013                 | *** |
|                         | (2.846)       |     | (10.306)               |     | (0.005)               |     |
| L/D                     | 0.027         | **  | 0.008                  |     | -0.063                | *   |
|                         | (0.013)       |     | (0.109)                |     | (0.036)               |     |
| D/A                     | 0.151         |     | 0.006                  |     | -0.007                |     |
|                         | (0.095)       |     | (0.418)                |     | (0.008)               |     |
| C/I                     | -0.014        |     | 0.132                  |     | -0.035                | *** |
|                         | (0.025)       |     | (0.094)                |     | (0.012)               |     |
| ROE                     | 0.044         |     | 0.513                  | **  | -1.016                |     |
|                         | (0.040)       |     | (0.210)                |     | (0.392)               |     |
| Z_score                 | -0.016        |     | -0.479                 |     | 0.058                 |     |
|                         | (0.197)       |     | (0.761)                |     | (0.075)               |     |
| NPL                     | -0.776        | *** | -0.240                 |     | 0.045                 |     |
|                         | (0.134)       |     | (0.659)                |     | (0.048)               |     |
| R <sup>2</sup>          | 0.438         |     | 0.714                  |     | 0.691                 |     |
| Adjusted R <sup>2</sup> | 0.305         |     | 0.603                  |     | 0.620                 |     |
| No. of obser.           | 1248          |     | 236                    |     | 1294                  |     |

Note: For all panel models in this section the least squares method with fixed effects was used. \*\*\*, \*\* and \* correspond to 1%, 5% and 10% significance level.

Source: Authors' own study.

For growing loans, the share in total assets, interest rate and consumer prices were important. Also growing size of a bank (lnTA) had a positive influence, opposite to L/D and C/I ratios. Overall, macroeconomic variables were of more significance, particularly for loans' growth.

Analyzing the structure of the loan portfolio (CorpL/TL; ConsL/TL and MgL/ConsL), Table 6 indicates that GDP and interest rate growth have a positive impact on the corporate loans share, similarly to the size of the bank. For consumer loans share, market structural diversification was important, while GDP and interest rates growth and large size of bank assets were negative controls.

**Table 6.** Panel model estimations for loan structure, CEE 2004-2014

| Control variables:      | CorpL/TL |     | ConsL/TL |     | MgL/ConsL |     |
|-------------------------|----------|-----|----------|-----|-----------|-----|
| const                   | -32.477  |     | 115.884  | *** | 40.311    |     |
|                         | (26.399) |     | (29.178) |     | (33.461)  |     |
| LT_GBY                  | 1.354    | *** | -1.313   | **  | -0.321    |     |
|                         | (0.432)  |     | (0.531)  |     | (0.596)   |     |
| COOP                    | -1.514   |     | 3.483    | **  | -         |     |
|                         | (1.614)  |     | (1.493)  |     | -         |     |
| Δ GDP                   | 0.534    | *** | -0.351   | *   | 0.079     |     |
|                         | (0.163)  |     | (0.186)  |     | (0.213)   |     |
| HHI                     | -34.212  |     | -23.722  |     | -241.157  | *** |
|                         | (70.484) |     | (75.145) |     | (88.567)  |     |
| ln_TA                   | 6.724    | *** | -7.223   | *** | 5.290     | *** |
|                         | (1.603)  |     | (1.857)  |     | (1.880)   |     |
| L/D                     | 0.012    | *   | 0.037    | *   | -0.072    | *** |
|                         | (0.007)  |     | (0.022)  |     | (0.026)   |     |
| D/A                     | -0.227   | *** | 0.292    | *** | -0.324    | *** |
|                         | (0.054)  |     | (0.092)  |     | (0.109)   |     |
| C/I                     | 0.016    |     | -0.012   |     | -0.005    |     |
|                         | (0.013)  |     | (0.022)  |     | (0.003)   |     |
| ROE                     | -0.011   |     | -0.023   |     | -0.014    |     |
|                         | (0.014)  |     | (0.039)  |     | (0.047)   |     |
| Z_score                 | 0.326    | *** | -0.294   | **  | -0.177    |     |
|                         | (0.093)  |     | (0.130)  |     | (0.148)   |     |
| NPL                     | 0.163    | **  | -0.531   | *** | 0.144     |     |
|                         | (0.065)  |     | (0.115)  |     | (0.133)   |     |
| DebCardPC               | -        |     | 17.177   | **  | -         |     |
|                         | -        |     | (7.757)  |     | -         |     |
| R <sup>2</sup>          | 0.787    |     | 0.899    |     | 0.895     |     |
| Adjusted R <sup>2</sup> | 0.721    |     | 0.868    |     | 0.863     |     |
| No. of obser.           | 869      |     | 286      |     | 286       |     |

Note: (-) indicates that the control variable was not employed in the specific model.

Source: Authors' own study.

Large deposit base (D/A) was negatively correlated with corporate loans share, but positively with the consumer loans share, indicating that safe, universal banks (with high Z-score) have advantage in corporate lending, while riskier traditional banks (high deposit base, but low Z-score) in consumer loans. The latter were also more sensitive to NPLs. For mortgage loans' share, high concentration, and growing L/D and D/A ratios were negative controls, while growing size of a bank – a positive one. To sum up, the market dominance of safe, large universal banks results in a better accessibility of corporate loans, while smaller, traditional banks taking a considerable risk (low Z-score) serve better consumer loans' expansion. Mortgage loans have many characteristics close to these of the corporate lending.

#### 4. Conclusions

From the empirical analysis presented in the paper it is evident that there are different factors influencing loan growth and credit structure, also corporate and consumer lending respond differently to the control variables. For loan growth, macroeconomic variables (such as GDP growth, growing consumer price index and high bank concentration ratio) were of the highest importance. Analysing bank credit structure, especially corporate and consumer loans' share, the trends are more complex and frequently adverse. Countries with banking markets dominated by safe, universal banks (with high Z-score), such as Estonia, had advantage in corporate lending, while markets dominated by riskier, traditional banks with visible presence of cooperative sector (high deposit base, low Z-score), such as Poland, have advantage in granting consumer loans. However, the latter were more sensitive to the NPLs.

To sum up, the panel data analysis makes it possible to formulate a policy conclusion that in order to conduct safe and stable credit policies, the structural diversification of the banking market is important, with a presence of both large universal banks (for corporate loans) and smaller, diversified, consumer-focusing banks. The Czech and Polish banking markets present a good illustration of this kind of environment. Good macroeconomic trends are important in particular for corporate loans' granting. In the future, it may be useful to broaden the analysis of fiscal factors, including the newly introduced (15.01.2016) tax on bank assets in Poland.

#### References

- Aisen A., Franken M., 2010, *Bank Credit During the 2008 Financial Crisis: A Cross-Country Comparison*, IMF Working Paper 10/47.
- Banking Supervisors from Central and Eastern European Countries (BSCEE), 2008-2014, Online reviews, [www.bscee.org](http://www.bscee.org). (13.10.2015)
- Cappiello L.A., Kadareja, Ch. Kok Sørensen, M. Protopapa, 2010, *Do bank loans and credit standards have an effect on output? A panel approach for the euro area*, ECB Working Paper 1150.

- Carbó-Valverde S., D. Marqués-Ibáñez, F. Rodríguez Fernández, 2011, *Securitization, bank lending and credit quality*, ECB Working Paper, no. 1329.
- ECB, 2015a, *Banking Structural Financial Indicators*, <https://sdw.ecb.europa.eu/browse.do?node=9484387> (15.10.2015).
- ECB, 2015b, *Payments Statistics*, [http://sdw.ecb.europa.eu/browseSelection.do?DATASET=0&REF\\_AREA=\\*EU&PSS\\_INSTRUMENT=I11&node=bbn1455](http://sdw.ecb.europa.eu/browseSelection.do?DATASET=0&REF_AREA=*EU&PSS_INSTRUMENT=I11&node=bbn1455) (23.10.2015).
- De Haas R., D. Ferreira, A. Taci, 2010, *What determines the composition of banks' loan portfolios? Evidence from transition countries*, *Journal of Banking & Finance*, no. 34, pp. 388-398.
- Gambacorta L., J. Yang, K. Tsatsaronis, 2014, *Financial structure and growth*, *BIS Quarterly Review*, March, pp. 21-35.
- Lown C., Osler C., Stragan P., Sufi A., 2000, *The changing landscape of the financial services industry: What lies ahead?*, *FRB NY Economic Policy Review*, no. 2000/11, pp.38-57.
- NBP, 2015, *Financial Stability Report*, July, <http://www.nbp.pl/en/systemfinansowy/fsr201507.pdf> (26.10.2015).
- The World Bank, 2015, *Doing Business*, <http://data.worldbank.org/indicator/IC.CRD.INFO.XQ> (21.10.2015).