

NATIONAL BANK OF POLAND WORKING PAPER

N^o. 131

The consequences of post-crisis regulatory architecture for banks in Central Eastern Europe

Ewa Miklaszewska, Katarzyna Mikołajczyk, Małgorzata Pawłowska

Ewa Miklaszewska – Cracow University of Economics, Dept. of Finance, Rakowicka 27, 31-510 Kraków,
e-mail: uumiklas@cyf-kr.edu.pl

Katarzyna Mikołajczyk – Cracow University of Economics, Dept. of Finance, Rakowicka 27, 31-510 Kraków,
e-mail: efmikola@cyf-kr.edu.pl

Małgorzata Pawłowska – National Bank of Poland, Economic Institute, Świętokrzyska 11/21, 00-919 Warszawa,
e-mail: Malgorzata.Pawlowska@nbp.pl

The views expressed in this paper are views of the authors and do not necessarily reflect those of the National
Bank of Poland

Design:

Oliwka s.c.

Layout and print:

NBP Printshop

Published by:

National Bank of Poland
Education and Publishing Department
00-919 Warszawa, 11/21 Świętokrzyska Street
phone: +48 22 653 23 35, fax +48 22 653 13 21

© Copyright by the National Bank of Poland, 2012

ISSN 2084-624X

<http://www.nbp.pl>

Abstract.....	2
1. Introduction	3
2. Building post-crisis regulatory architecture	5
2.1 Literature review	5
2.2 The foundations of new European supervisory framework	6
2.3 New European supervisory architecture and the CEE	10
3. Do safe banks create a safe system? CEE experience	13
3.1 Banking sector in CEE-5 countries: main characteristics	13
3.2 DEA results on bank efficiency in CEE-5 experience	17
3.3 Banking market competitive conditions in CEE-5	20
3.4 CEE-5 bank efficiency and soundness	22
4. New European supervisory architecture and CEE-5 banks: summary of results	25
5. Conclusions.....	27
Literature.....	28

Abstract

In response to the financial crisis of 2008, the global banking industry has been undergoing fundamental regulatory changes, imposed by the Basel III Agreement, the 2010 US Dodd-Frank Act and the introduction of a new European supervisory structure. This paper analyses the possible long-term impact of this new regulatory framework on the banking sectors of CEE-5 countries. The aim of this paper is to contribute to the discussion on the anticipated long-term impact of the new regulatory environment for bank stability and efficiency, with a focus on host countries from Central and Eastern Europe. The main research question is whether the post crisis regulatory and supervisory architecture, based on a new macro and micro institutional framework, will have a positive impact on banks in CEE. To answer these questions, we analyse the condition of CEE-5 banking sectors. In particular, we are looking how banks in CEE-5 reacted to two different periods: the pre-crisis period of a dynamic economic and credit market growth and the period of global economic and financial collapse (2008), using DEA methodology, measures of market competitive conditions and bank stability index Z-score.

Keywords: banking supervision, bank efficiency, bank competition, CEE banks.

JEL Classifications: G21, G28.

1. Introduction

Although the 2008 financial crisis affected the entire world, for the first time it was the leading industrialized nations which were more affected than the emerging countries, for whom the crisis was largely secondary in nature, in this respect making the crisis unique (IMF, 2010a). However, its long term consequences, both direct in terms of changing strategies of foreign owned banks, and indirect in the form of a necessary adaptation to new global and European regulations, are borne by all countries.

This paper concentrates on the long-term impact of new, post-crisis regulatory architecture, on a relatively homogeneous group of Central East European Countries (CEE-5): Poland, Hungary, Czech Republic, Slovakia and Slovenia. These countries have been EU members since 2004, with two of them, Slovenia (2007) and Slovakia (2009), also in the Eurozone. They are at a similar stage of institutional development, financial and macroeconomic reform, and banking sector depth (IMF, 2010b). Before the global crisis of 2008, they enjoyed rapid growth in the banking sector, largely due to the increased presence of foreign banks and the adaptation to the EU legal and institutional framework. However, the global financial crisis has hampered the dynamics of CEE banking sectors' growth. Thus the aim of the paper is to contribute to the discussion on the anticipated long-term impact of post-crisis regulatory and supervisory architecture, focusing on banks operating in CEE. We pose the following questions: what were the factors contributing to the efficiency of CEE banks before the crisis, and consequently, what will be the long-term impact of the post crisis architecture for bank stability and efficiency in CEE countries? In particular, we concentrate on the impact of current European supervisory structure, and the role played by European Banking Authority (EBA). The empirical part of the paper is based on the non - parametric Data Envelopment Analysis (DEA) technique, measures of market competition (the H-statistic) and bank stability index Z-score, using Bankscope Database.

The paper is organised as follows: the first part describes the foundation of post-crisis European regulatory and supervisory architecture. Following this, we discuss

its possible consequences on banks in CEE. Analyzing the impact of the financial crisis on CEE banks, we present an empirical analysis of CEE bank efficiency and competitiveness conduct of banks before and after the crisis, using DEA methodology, market competition measures and Z-score calculations.

In the concluding section we present the anticipated long-term consequences of the post-crisis regulatory and supervisory architecture on CEE banks.

2. Building post-crisis regulatory architecture

2.1 Literature review

Financial supervision should ensure systemic stability, safety and soundness of financial institutions, an efficient and transparent way of conducting transactions and financial consumer protection (Kuppens et al. 2003). To carry out these functions effectively, its organizational structure must evolve, so that just as in real life, form follows function (Acharya et al. 2009). Historically, banks have accepted tight regulations in exchange for market stability and strong protection, and as a result there were almost no OECD banking crises till the 1970s (Nier 2010). Banks were safe, but inefficient, and losing market share to non-banking firms. The period of liberalisation and deregulation from the 1980s aimed at restoring bank profitability and facilitating expansion and, in consequence, dramatically influenced the scale and complexity of banking firms. Table 1 demonstrates how dramatically the biggest banks' assets have expanded in the deregulation period.

Table 1. The largest global banks by assets, \$ billions, in selected years

1985		1995		2004		2009	
Top banks	Assets	Top banks	Assets	Top banks	Assets	Top banks	Assets
Citicorp	167	Deutsche Bank	503	UBS	1 533	BNP Paribas	2 965
Dai-Ichi Kangyo B.	158	Sanwa Bank	501	Citigroup	1 484	RBS	2 750
Fuji Bank	142	Sumitomo Bank	500	Mizuho FG	1 296	Credit Agricole	2 441
Sumitomo Bank	135	Dai-Ichi Kangyo B.	499	HSBC	1 277	HSBC	2 364
Mitsubishi Bank	133	Fuji Bank	487	Credit Agricole	1 243	Barclays	2 235
BNP	123	Sakura Bank	478	BNP Paribas	1 234	Bank of Am.	2 223
Sanwa Bank	123	Mitsubishi Bank	475	JP Morgan	1 157	Deutsche Bank	2 162
Credit Agricole	123	Norinchukin Bank	430	Deutsche Bank	1 144	JP Morgan	2 032
Bank of America	115	Credit Agricole	386	RBS	1 119	Mitsubishi FG	2 026
Credit Lyonnais	111	Ind. Comm. Bank of China	374	Bank of America	1 110	Citigroup	1 857

Source: Data for 1985-2004: The Economist, 2006; for 2009: The Banker, 2010.

In the pre-crisis period, the dominant source of bank efficiency stemmed from expansion into new markets, non depositary funding and non interest-based sources of profits (Demirguc-Kunt and Huizinga 2009), and the adoption of new models for conducting banking activities, based on product synergies, scale and scope benefits and global coverage (Acharya et al. 2011). The changes in bank scale and scope of activities were facilitated by new regulatory philosophy, exemplified by moving

from the Basel 1 to Basel 2 regulatory framework, where market discipline and bank self-regulation were to replace tight supervision. The increasing complexity of banks and the expansion of conglomerate structures generated synergies between banking (regulated) business and relatively unregulated investment activities and offered both new sources of income and new areas of risk (Allen et al. 2009).

The 2007-2009 crisis demonstrated that Basel 2 was built on many optimistic assumptions and incorrect trade-offs, namely that regulators do not understand the complexity of banking activities and that tight supervision should be replaced by market discipline. Moreover, Basel 2 facilitated bank cooperation with, and the growth of, the so called shadow banking system (Masera 2010). Consequently, Basel 2, which looked at isolated areas of risk and focused on partially recognized threats to financial stability, turned out to be an inadequate regulatory regime and was largely responsible for the subsequent bank systemic failures in major countries.

2.2 The foundations of new European supervisory framework

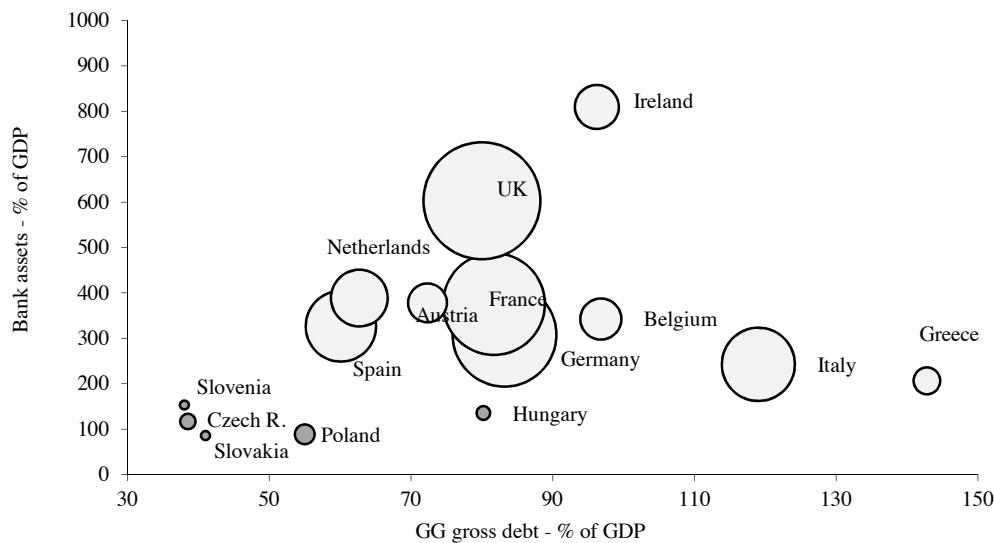
The global financial crisis of 2007–2009 forced banks and regulators to rethink strategic and competitive issues in banking. Banks, which for decades had been leaders in global efficiency or expansion, turned out to be most affected, requiring massive public stabilization funds and in some cases rescue by direct government intervention (Demirgüç-Kunt and Huizinga 2011). The most frequent restructuring pattern for global banks turned out to be partial or total nationalization (The World Economic Forum 2010). As a result, large global banks contributed to inflated budget deficits and dramatically growing public debts in major countries, posing the danger of systemic risk (Allen et al. 2011).

Figure 1 illustrates that in some countries (e.g. CEE) relatively small banks operate in relatively safe macroeconomic environment: moderately indebted governments. However, some European countries have inflated banking sectors' assets, and a limited possibility of further government stabilizing intervention, due to large budget deficits.

By raising new issues, such as systemic risk and the failure of market discipline, the 2008 crisis resulted in the adoption of a new regulatory philosophy: that of

strengthening and tightening regulatory supervision (Beck 2010). After numerous consultations, the Basel Committee on Banking Supervision prepared a new agreement, so called Basel 3, which was approved by political leaders attending the G-20 meeting in Seoul in October 2010. Basel 3 focused on strengthening prudential regulations; its measures included raising the minimum level of capital to 7% (equity) and 10.5% (total) of risk-weighted assets in the period 2013-2019, and a more restrictive definition of capital (BIS 2010). Macro-prudential regulations, particularly the question of how to deal with systemic risk and Systemically Important Financial Institutions (SIFIs), were left for further regulatory proposals by the Financial Stability Board. Into this vacuum stepped EU and US authorities, proposing far-sighted new regulatory acts and creating a complex regulatory infrastructure, based on a number of newly created institutions (Masciandaro et al. 2011). To deal with systemic risk, the European Systemic Risk Board (ESRB), chaired by the President of ECB, and in the US the Financial Stability Oversight Council (FSOC), chaired by the Secretary of the Treasury, were created.

Figure 1. The size of banking sector (2009) vs. general government debt (2010)
in selected EU and CEE countries



Source: Based on data from Eurostat and ECB, 2010.

The New European Supervisory Architecture was constructed upon three pillars (Masera 2010 and Masciandaro et al. 2009):

- Macro-prudential supervision, assured by the European Systemic Risk Board (ESRB), chaired by the President of the ECB. Its members were: the ECB Vice-President, Governors of the ESCB, Chairs of the EBA, EIOPA, ESMA, and Representatives of the European Commission. Observers were the representatives of national supervisors.
- Micro-prudential supervision, based on three sectional authorities: the European Banking Authority (EBA), European Insurance and Occupational Pension Authority (EIOPA) and European Securities and Market Authority (ESMA).
- National supervisors.

The ESRB is a macro-prudential regulator which focuses on the prevention of systemic risk. It has no legal personality and is operationally supported by the European Central Bank. The ESRB is designed to ensure that macro-prudential and macro-economic risks are detected and dealt with. Risks to the financial system can arise from the failure of one SIFI, but also from the common exposure of large financial institutions to the same risk factors. The ESRB also has a duty to identify any serious problems arising in a member state which could endanger EU financial stability. The main tasks of the ESRB are (Giovanini 2010, Beck et al. 2010):

- to establish adequate procedures to obtain information about macro-economic risks for financial stability;
- to identify macro-prudential risks in Europe;
- to decide on macro-prudential policy;
- to provide early risk warnings to EU supervisors and other relevant actors;
- to compare observations on macro-economic and prudential developments;
- to determine how to achieve effective follow-up to warnings/recommendations.

An even more challenging task was to establish a pan-European micro-prudential supervisory structure, as the convergence of supervisory architecture among European countries is very low (Masciandaro et al. 2009). The aim to harmonize the

supervisory activities in the EU had to reconcile with different national objectives and institutional arrangements (Masciandaro and Quintyn 2008). The European Banking Authority is the new micro-prudential bank regulator, with much stronger prerogatives than that of its predecessor CEBS (Committee of European Banking Supervisors), which operated in the period 2004-2010. The aim of EBA is to “*safeguard public values, such as the stability of the financial system, the transparency of markets and financial products and the protection of depositors and investors*” (CEBS 2010). The EBA has broad competencies, including preventing regulatory arbitrage, guaranteeing a level playing field, strengthening international supervisory coordination, promoting supervisory convergence and providing advice to the EU institutions in the areas of banking, payments and e-money regulation as well as on issues related to corporate governance, auditing and financial reporting.

The main tasks of the EBA are:

- to provide opinions and develop guidelines, recommendations, and draft regulatory standards,
- to contribute to a common supervisory culture, ensuring consistent and effective application of the EU Acts,
- to develop common reporting standards (COREP), including credit, market, operational, and equity capital adequacy ratios,
- to prevent regulatory arbitrage, mediating and settling disagreements between competent authorities and taking actions, in emergency situations,
- to improve the cooperation of supervisory authorities and to conduct peer review analyses,
- to cooperate with the ESRB,
- to foster depositor and investor protection, improve transparency and disclosure of information.

Before the crisis, there was a discussion as to whether banking supervision in the EU should be centralized in the ECB. After the crisis, one of the arguments for placing it within an independent external institution (EBA) was that national supervisors in the EU follow very diverse models: independent integrated institution, supervision centralized in the central bank, or the so called “twin peaks” model with partial

centralization in two independent authorities. The composition of the ECB supervisory board illustrates it well: out of a total of 27 EBA supervisory board members, 14 are national central banks and 13 are independent authorities (EBA 2011).

An even more complex regulatory reorganisation has been carried out in the US. The Dodd-Frank Act (2010) impacts all federal regulatory agencies and affects many aspects of the financial services industry. The Financial Stability Oversight Council (FSOC) is tasked with identifying risks to financial stability, promoting market discipline and information by eliminating expectations that financial and non-financial organizations will be shielded from losses in the event of failure, and responding to emerging systemic threats to financial stability. It is supplemented by a number of new regulatory institutions and redefinition of powers of the existing ones. The emerging complex regulatory structure in the US, based on a number of regulatory agencies, may or may not produce a more efficient and stable financial system, while being costly and opaque. It reflects the new regulatory philosophy of “holistic vision” and a diamond regulatory structure, rather than of the ladder (Masera 2009).

2.3 New European supervisory architecture and the CEE

The new European supervisory architecture, which took effect in 2011, has been the result of a negative assessment of pre-crisis supervisory structures in highly developed countries. The European System of Financial Supervisors has potentially far-reaching powers, which may be in conflict with national supervisory authorities, which is a source of apprehension both in old and new EU members. The emerging complex structure, based on a number of new regulatory agencies, may not produce the desired more efficient and stable European financial system. There may be some areas of confusion as to the degree of authority and overlapping areas of regulation, particularly between the EBA and national regulatory bodies.

CEE countries are host markets to global banks, hence regulators are afraid of further diminishing of their powers. As was noted by the member of the Czech NCB

Board, „*there is no one-size-fits-all solution available for all countries*”. In his view, the stability of the financial sector depends on the ability to establish independent, strong and respected supervision, which constitutes an important argument for carrying out banking supervision at a national level (Lizal 2011). Shifting decision-making powers to global or regional financial centres may mean further marginalization for CEE countries. As CEE countries are relatively new to EU decision-making processes, they tend to be rule-takers rather than rule-makers, and the new European financial architecture will only reinforce this.

Moreover, the EU and US new institutional regulatory structures were based on the perceived necessity to deal with systemic risk. There is lively discussion about the merits of the new micro-prudential regulations, while macro-prudential solutions being considered as non-controversial, which may not necessarily be the case for CEE countries. Macro-prudential regulations entail considerable costs and regulatory burdens, particularly for countries for which systemic risk is not a major priority, such as CEE. Moreover, strong macro-prudential regulations are needed if we do not believe that “strong banks create a strong system”, because of linkages and global interdependence. However, this view is not universally accepted, as crisis might be attributed rather to the problems with bank business models and lack of proper micro-prudential supervision of large banks (Nier 2010).

Before the crisis, many countries had carried out a reform of national supervisory systems, in many cases towards a supervisory integration, according to a notion that the structure of supervision should reflect the structure of the market (i.e. integrated, synergy-based). Many countries modelled their supervision on the British FSA. However, the UK was among countries which suffered most from the crisis and consequently has now been reforming the supervisory regime, featuring a tripartite model with two supervisory authorities under the authority of the Bank of England: the Prudential Regulation Authority (PRA) in charge of the prudential regulation of individual firms, the Consumer Protection and Markets Authority (CPMA) responsible for consumer protection and the conduct of financial markets; and the Financial Policy Committee (FPC) responsible for maintaining financial stability by monitoring and addressing systemic risk that threaten the financial sector as a whole.

The supervisory focus will be much more anticipatory and more judgment-based (Bank of England 2011).

All CEE-5 countries have adopted an integrated supervisory regime, although differently placed (Apinis et al. 2010). In the Czech Republic, financial market supervision has been integrated into the central bank (NCB), since 2006. While the NCB has traditionally been involved in banking supervision since its establishment in 1993, the supervision of other financial market sectors (capital markets, insurance and cooperative banking) was initially carried out by separate supervisors. In order to provide synergies, the Czech Government carried out a supervisory reform which resulted in the institutional integration of the financial market supervision authorities from 2006. Further internal reorganization of supervisory departments took effect on 1 January 2008, when sector supervision was abandoned and replaced with the functional model, with a Financial Market Committee (FMC) being established as a new advisory body in matters of financial market supervision. Also in Slovakia on the 1st January 2006 the Financial Market Authority was dissolved and its powers and responsibilities were transferred to the National Bank of Slovakia. The NBS thus conducts the entire financial market supervision covering banking, capital market, insurance and pension saving.

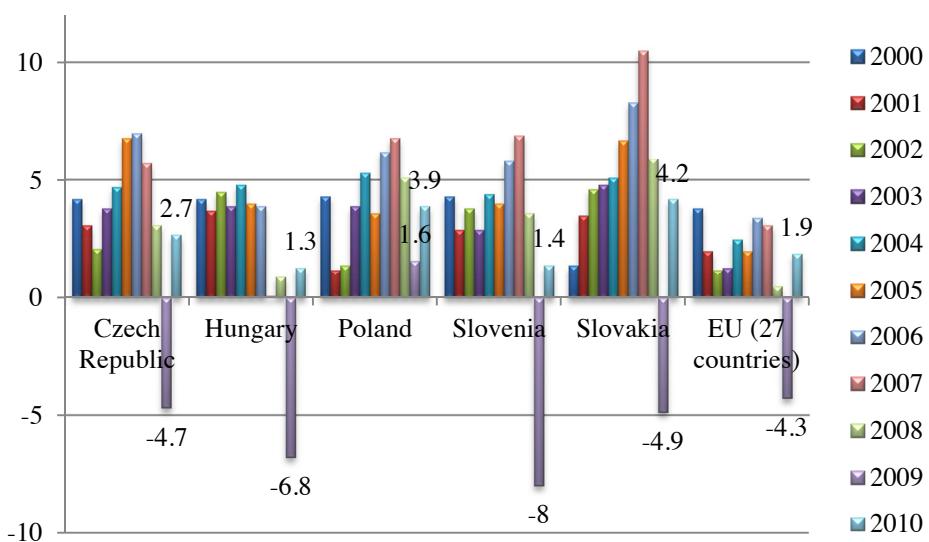
Integrated supervision took effect in Hungary in 2000, when the Hungarian Banking and Capital Market Supervisory Authority and the Supervisory Authority responsible for the Supervision of Insurance Companies were merged and the Hungarian Financial Supervisory Authority (HU-FSA) was created. Similarly, in Poland since 2006 the Polish FSA has been the single body responsible for matters related to the supervision of the financial market (pension funds, capital market, insurance institutions and electronic money institutions, as well as the supplementary supervision of financial conglomerates) and from 2008 also encompassed the banking market. The reasons for this trend towards building an integrated supervisory system in some CEE countries are unclear. The most frequent justification was to point out to the creation of synergies, but the financial markets in CEE are relatively small, without much scope for a synergy effect.

3 Do safe banks create a safe system? CEE experience

3.1 Banking sector in CEE-5 countries: main characteristics

CEE-5 countries are at a similar stage of institutional development, financial and macroeconomic reform, and banking sector depth. They share a number of common characteristics: they are open economies with exports contributing 60-80% of GDP (with the exception of Poland, which has the largest domestic market), they have already well established EU legal rules and standards, low wages and educated workforce and relatively fast economic growth, particularly in the pre-crisis period. The gap between these countries and developed European economies is narrowing. CEE countries were before the crisis among the top most attractive regions for foreign investment, with the share of foreign investors in the banking sector exceeding on average 80%, with the exception of Slovenia (Ernst & Young 2007). The process of fundamental bank reforms, economic restructuring and privatization has now largely been completed in these countries. After EU accession in 2004, CEE countries enjoyed rapid economic and banking sector growth. The global crisis of 2007-2009 had a negative effect on the assessment of this region as economic growth collapsed (fig.2).

Figure 2. Real GDP growth rate, percentage change on previous year



Source: Eurostat (data extraction 30.11.2011).

3

The first and the most seriously affected country was Hungary; the sharpest decline in output was in Slovenia and Slovakia, both of which had seen very dynamic growth before the crisis, while Poland managed to keep in positive GDP growth and credit growth throughout the crisis. Before the crisis, CEE countries enjoyed dynamic banking sector growth and high bank profitability (average ROE above 20% till 2007). Despite numerous gloomy projections, the macro-economic and profitability figures remained good throughout the crisis: average CEE-5 ROE dropped to 15% in 2008 and 13% in 2009, but the C/I ratio also fell to 51% in 2009. Neither was the increase in NPL dramatic: from 3.9% to 5% on average in the same period (ECB 2005-2009 and IMF 2010a). Thus bank performance in CEE-5 countries was less affected by the crisis than in the old EU countries.

A relatively liberal financial sector combined with large foreign ownership has been another distinguishing feature. Poland has the largest and relatively low concentrated banking sector (the lowest C5 ratio in table 2) and a sound financial system, with low dependence on sophisticated financial instruments and relatively low leverage: total loans to total deposits around 100%. Also in the Czech Republic banks are characterized by a very conservative funding structure, based on domestic deposits. On the other spectrum, Hungarian banks display the highest degree of risk, stemming not only from high non-depository financing, but also from high dependence on foreign currency loans: 70% of banking sector loans to the private sector in Hungary has been denominated in foreign currencies (EBRD 2010).

Table 2. CEE-5: Macroeconomic and banking key figures

	Total Loans as % of GDP			Total Loans as % of Total Deposits			Growth rate of Total Loans			C5 Ratio	Bank Assets (bil. EUR)	% Share of Foreign Banks in TA
	2006	2008	2009	2006	2008	2009	2006	2008	2009	2009	2009	2009
Czech R.	45	52	58	67	77	75	26	15	3	62	160	87
Hungary	63	72	79	119	139	130	22	17	4	55	126	91
Poland	35	44	57	79	103	102	24	18	11	44	274	63
Slovakia	48	47	49	110	136	142	47	16	1	72	54	94
Slovenia	69	93	101	119	164	146	27	18	2	60	53	37
EU-27	146	154	162	143	115	113	11	0	-1	44	42 144	-

Source: ECB (2010) and Raiffeisen Research (2011).

In the last decade, most of the highly developed countries have largely expanded their banking sectors, which now poses a significant threat to macroeconomic stability. In contrast, in most CEE-5 countries banks have remained small, following a traditional model of banking intermediation, and not presenting a significant systemic risk (tab. 3). Foreign banks invested heavily in the CEE region right from the beginning of the transition period. Only in Poland and Slovenia some large banks are state or domestic privately controlled. In 2009, the most concentrated banking sector was in Slovenia, with assets of top three banks equalling 86% of the GDP, while the least concentrated market was in Poland, where assets of the top three banks constituted 29% of Polish GDP.

Table 3. The largest banks by assets in CEE-5 countries, 2009

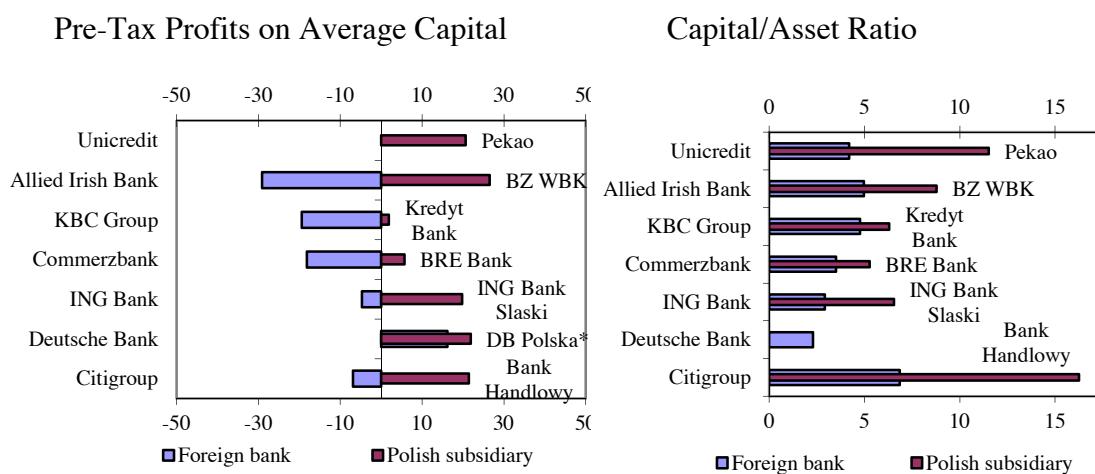
Bank/Country	Bank Assets mln.EUR	Bank Assets as % of country GDP	Main shareholder
Czech Republic			
1. Ceskoslovenska Obchodni Banka A.S. (CSOB)	32 462	23.7	KBC (BE)
2. Ceska Sporitelna a.s.	32 317	23.5	ERSTE Group (AT)
3. Komercni Banka	26 268	19.1	Societe Generale (FR)
Hungary			
1. OTP Bank Plc	36 006	38.7	private global investors
2. MKB Bank Zrt	11 466	12.3	Bayerische Landesbank (DE)
3. K&H Bank Zrt	11 311	12.2	KBC (BE)
Poland			
1. Powszechna Kasa Oszczednosci Bank Polski SA	38 109	12.3	State
2. Bank Pekao SA	31 810	10.3	Unicredit (IT)
3. BRE Bank SA	19 732	6.4	Commerzbank (DE)
Slovenia			
1. NLB dd-Nova Ljubljanska Banka d.d.	19 606	56.2	State (33%), KBC (30%)
2. Nova Kreditna Banka Maribor d.d.	5 786	16.6	State
3. Abanka Vipa dd	4 557	13.1	domestic private investors
Slovakia			
4 Slovenska sporitel'na as-Slovak Savings Bank	11 485	18.1	ERSTE Group (AT)
5 Vseobecna Uverova Banka a.s.	9 852	15.6	Intesa Sanpaolo (LU)
6 Tatra Banka a.s.	9 014	14.2	Raiffeisen (AT)

Source: Own calculation, based on Bankscope database.

Banks in CEE have remained profitable and well-capitalized, even through the 2009 crisis year, except for Slovenia. On average, the Polish and Czech Republic top banks were least affected by the crisis, while the Hungarian ones were quickest in regaining stability and recapitalization. Austrian banks were among the first to enter CEE, followed by Italian, and later Belgian and French banks. Consequently, UniCredit, Raiffeisen and Erste are the largest CEE players (UniCredit 2010). As figure 3 demonstrates for Poland, the investment in CEE-5 banks turned out to be

very profitable, not only from pre-crisis, but also from the post-crisis perspective, and allowed mother companies to regain much of their initial investments. However, investment in CEE carried also 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 level of involvement in the region than banks from neighbouring countries.

Figure 3. Foreign Banks and their Polish subsidiaries (2009)



Note: DB Polska was not included in The Banker Top 1000 World Bank Ranking. Data on Pre-Tax Profits on Average Capital obtained from bank's financial statement.

Source: The Banker 2010.

Foreign currency borrowing constitutes a significant risk in all East European countries. Before the crisis, many foreign-owned CEE banks refinanced themselves abroad and then passed on the currency risk to their clients. Macro-economic stability and expectation of currency appreciation after EU accession stimulated demand for such loans. However, FX exposure differs among CEE countries: in 2007, un-hedged 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 un-hedged borrowers exposed CEE economies to systemic risk, but at the same time functioned as an engine for dynamic growth (Brown, De Haas 2011).

3.2 DEA results on bank efficiency in CEE-5

Efficiency is a broad concept which can be applied to many dimensions of bank activities. To analyse how the efficiency of CEE banks was affected by the pre- and post-crisis environment, in this paper we have investigated technical and scale efficiency in the period 2002-09 using DEA technique, based on the BankScope database, where only commercial and savings banks were analysed. DEA is a non-parametric linear programming technique that computes a comparative ratio of outputs to inputs for each unit, which is reported as the relative technical efficiency score. All non-parametric methods generally yield slightly lower mean efficiency estimates and seem to have a greater dispersion than the results of parametric models (Berger and Humphrey 1997). Technical efficiency is related to the ability of a firm to produce outputs with given inputs: a production plan is technically efficient if there is no way to produce the same output(s) with less input(s) or to produce more output(s) with the same inputs. Technical efficiency considers scale and scope economies. Among a number of DEA models, the most popular are the CCR and BCC-models. The CCR model (Charnes et al. 1978) yields an objective evaluation of overall efficiency and identifies inefficiencies. It estimates efficiency on the assumption of constant return to scale (CRTS). The BCC model (Banker et al. 1984) estimates efficiency on the assumption of variable return to scale (VRTS). It distinguishes between technical and scale inefficiencies by estimating pure technical efficiency at the given scale of operation.

Technical efficiency has been analysed assuming constant, variable and non-increasing returns to scale. The following symbols have been applied:

- E_{crs} – measure of technical efficiency under constant returns to scale assumption,
- E_{vrs} - measure of technical efficiency under variable returns to scale assumption,
- E_n – measure of technical efficiency under non-increasing returns to scale assumption.

For the above three efficiency measures (E_{crs} , E_n , E_{vrs}), the following property also holds: $0 < E_{crs} \leq E_n \leq E_{vrs} \geq 1$. We should notice that VRTS technical efficiency scores are greater than or equal to CRST technical efficiency scores.

Following the scale properties of the two major DEA models (CCR and BCC-models) we have the definition of scale efficiency: $E_s = E_{crs}/E_{vrs}$. If $0 < E_{crs} <$

$E_{vrs} \leq 1$, this means that scale efficiency $e_s < 1$ and the given bank/firm is scale inefficient (but we do not know if it is too big or too small). Based on scale efficiency measure (E_s) only, it is not possible to distinguish in which region the given bank/firm is operating: increasing or decreasing returns to scale, to make this distinction, these measures must be compared with E_n measure. If $E_{crs} = E_n$ this means that bank/firm is not scale efficient and is operating with increasing returns to scale. If $E_n > E_{crs}$ that bank/firm is operating with decreasing return to scale (Charnes et al. 1997).

3

In order to test how bank efficiency changed over the period 2002-2009, an efficiency analysis has been carried out for the banking sectors in the Czech Republic, Slovakia, Slovenia, Hungary and Poland. The model chosen for estimation of efficiency is the expanded BCC model, output-oriented. In the technical efficiency analysis according to the DEA method, we have applied the classification of input and output based on *value added approach* (VAA) proposed by Grigorian and Manole (2002), were the input was: (x_1) - personnel expenses, (x_2) - total fixed assets, (x_3) - interest expense. The output was: (y_1) - total loans net, (y_2) - liquid assets, (y_3) - total deposits.

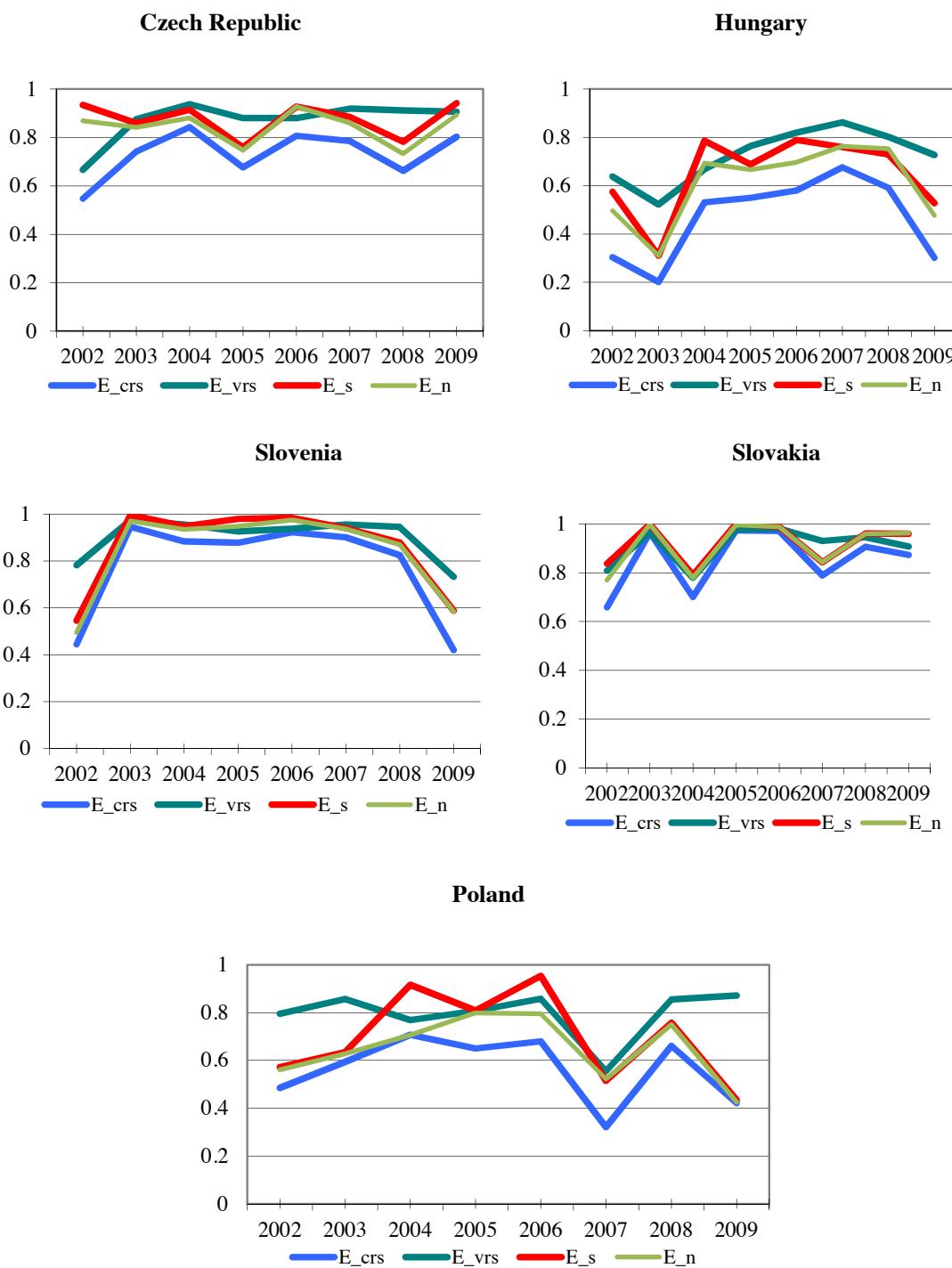
The results of the efficiency analysis according to DEA method of E_{crs} and E_{vrs} measures in the period 2002-2009 are presented in table 4.

Table 4. Efficiency measures of CEE5 countries

Year	2002	2003	2004	2005	2006	2007	2008	2009	No. of banks
E_{crs}									
Czech Republic	0.55	0.74	0.84	0.68	0.81	0.79	0.66	0.80	27
Poland	0.49	0.59	0.71	0.65	0.68	0.32	0.66	0.42	41
Slovakia	0.65	0.96	0.70	0.97	0.97	0.79	0.91	0.87	17
Slovenia	0.44	0.95	0.88	0.88	0.92	0.90	0.82	0.42	19
Hungary	0.30	0.20	0.53	0.55	0.58	0.68	0.59	0.30	32
E_{vrs}									
Czech Republic	0.67	0.88	0.94	0.88	0.88	0.92	0.91	0.90	27
Poland	0.80	0.86	0.77	0.81	0.86	0.56	0.85	0.87	41
Slovakia	0.81	0.97	0.78	0.98	0.98	0.93	0.95	0.91	17
Slovenia	0.78	0.97	0.96	0.93	0.94	0.96	0.94	0.73	19
Hungary	0.64	0.52	0.67	0.76	0.82	0.86	0.80	0.73	32

Source: own calculations, Bankscope database.

Figure 4. DEA indicators for banking sectors of CEE-5 countries (2002-09 means)



Source: own analysis, BankScope database.

The results of the analysis have confirmed that the accession of CEE-5 countries to the EU has boosted the efficiency of commercial banks in the analysed period, particularly between 2004-2006. However, efficiency in all analysed countries decreased in 2008-2009, most dramatically for Hungarian banks.

The process of changes of scale efficiency was also analyzed by a comparison of technical efficiency measures (E_{crs} , E_{vrs} , E_n) and scale efficiency measures (E_s) (see Fig. 4). The result of comparison in 2009 showed that the majority of examined banks in Poland and the Czech Republic were operating with increasing or constant returns to scale region (for the majority of banks $E_n = E_{crs}$). The results of the analysis showed that the efficiency of CEE-5 banking sectors increased after EU accession and decreased due to the financial crisis. The majority of banks in Poland were operating with increasing returns to scale, which means that there is still room for new M&A.

3.3 Banking market competitive conditions in CEE-5

Anayiotos et al. (2010), researching the relative efficiency of East European banks using DEA technique, showed that DEA efficiency scores before the recent crisis were strongly linked to the host country level of development. Miklaszewska and Mikolajczyk (2011) pointed to the importance of bank home-country governance model: better results were recorded by banks with headquarters in countries with shareholder model than with the stakeholder model. Lensink et al. (2008) indicated that domestic institutional structure did matter for bank efficiency. Thus, assuming the importance of host county conditions, our next step was to compare the competitive environment in CEE-5 countries. The level of competition of CEE-5 was evaluated using the H-statistic based on the reduced form of revenue equation of the firms (Panzar and Rosse 1987, Claessens and Laeven 2004, Yildrim and Philippatoas 2007, Bikker and Bos 2008).

In order to estimate the H-statistic for the Polish banking sector, we used the reduced form of revenue equation, where the *dependent variable* IR_{it} is the natural logarithm of interest income $\ln(II)_{it}$ or the natural logarithm of interest income divided by total assets $\ln(II/TA)_{it}$ of bank i in time t , *explanatory variables* were defined for

each bank i in period t , as follows: w_{1it} – price of funds (relation of interest expenses to total liabilities); w_{2it} – price of labor (personnel expenses, relation of pay and pay-related cost to net assets); w_{3it} – price of physical capital (relation of depreciation to fixed assets), oth_{it} – relation of loans to deposit, where: e_{it} – error, a_1, a_2, a_3, d – regression coefficients¹:

$$\ln(IR_{it}) = c_i + a_1 * \ln w_{1it} + a_2 * \ln w_{2it} + a_3 * \ln w_{3it} + d * oth_{it} + e_{it} \quad [1]$$

The panel data for this analysis comprises data from BankScope and cover the period from 2002 to 2009 and two variants of reduced form of revenue equation were estimated (Pawlowska 2011). The first variant explains the natural logarithm of interest income divided by total assets $\ln(II/TA)$ as a dependent variable, whereas the second model explains the natural logarithm of interest income $\ln(II)$. In order to analyse changes in the level of competition in the banking sectors the value of H statistic function was calculated for the entire period and for two sub-periods: 2002–2007 (H_1) and 2008–2009 (H_2) (tab. 5).

Table 5. Value of H statistic for CEE-5

Estimations results with time interaction terms for overall sample:		<i>Dependent variable: Interest Income</i>				
		Czech Republic	Hungary	Slovakia	Slovenia	Poland
H₁	2002 – 2007	0.28	0.34	0.19	0.27	0.30
H₂	2008 – 2009	0.07	0.003	0.11	-0.012	0.09
p(F-test)	H₀ : H₁ = H₂	(0.037)	(0.000)	(0.612)	(0.034)	(0.002)
H	2002 – 2009	-0.25	0.35	0.28	0.30	0.16
Estimations results with time interaction terms for overall sample:		<i>Dependent variable: Interest Income/ Total Assets</i>				
		Czech Republic	Hungary	Slovakia	Slovenia	Poland
H₁	2002 – 2007	0.48	0.85	0.85	0.44	0.83
H₂	2008 – 2009	0.38	0.98	0.76	0.39	0.44
p(F-test)	H₀ : H₁ = H₂	(0.290)	(0.526)	(0.276)	(0.851)	(0.003)
H	2002 – 2009	0.43	0.55	0.70	0.53	0.68

Source: own analysis, BankScope database.

¹ The sum of regression ratios ($a_1+a_2+a_3$) determines the value of H statistic for the sector of commercial banks.

3

The empirical results with respect to the H-statistic in the period 2002-2009, have shown that the values of H statistics were higher when the dependent variable was scaled by assets. The results of the empirical analysis demonstrated that between 2002 and 2007 (before the financial crisis) commercial banks in CEE-5 operated in the environment of monopolistic competition (values of H statistic were between 0 and 1). By estimating the different regression equations with interaction terms for two periods, significant changes over time were found for the two sub-periods in the overall sample, which was confirmed by the test for significance of the differences between the two periods ($H_1 = H_2$) for the Czech Republic, Slovenia, Hungary and Poland, mainly when dependent variable was based on the natural logarithm of interest income $\ln(II)$.

The level of competition in the Polish banking sector was similar to the euro zone countries level (Bikker and Spijerdijk, 2008). A strong driver for an increase in competition in the CEE-5 banking sectors was the accession to the European Union. In the period 2008 – 2009, the slight decrease in competition resulted from the financial crisis' consequences.

3.4 CEE-5 bank efficiency and soundness

In the post-crisis period, bank risk/return preferences have shifted towards risk minimalization, both globally and in the CEE countries. However, assessing bank safety is even more difficult than assessing its efficiency. In this section, the Z-Score index of bank sensitivity to default has been adopted as a proxy measure of bank soundness. The index is based on the volatility of returns and the lack of adequate capital as the main sources of risk (Lown et al. 2000). The Z-Score is calculated as the sum of equity capital to assets ratio (CAR) and return on assets ratio (ROA), divided by standard deviation of ROA. Thus the value of the Z-Score is determined by the level of capitalization and by the level and stability of profits, and can be interpreted as the distance from a default, measured by standard deviation of profits. A high level in the Z-Score denotes bank stability, which means it has enough equity capital to cover potential losses. The key element, which has a considerable influence on the Z-Score, is the denominator. If the level of profitability is stable, it

contributes to the high value of the index, but during unstable times (increase or decrease in profits) it causes a sudden decline in the Z-Score.

In this section the Z-Score is calculated in two different ways. Firstly, standard deviation of ROA is calculated for the whole 2004-2010 period and the denominator of the Z-Score formula is constant. That allows to express the impact of the value of ROA and CAR, the volatility of profits averaging for the whole period (fig. 5a)

$$Z - Score_t = \frac{ROA_t + CAR_t}{\sigma(ROA)} \quad [2]$$

ROA_t, CAR_t – Return on Assets and Capital to Assets Ratio for year t ;
 $\sigma(ROA)$ – standard deviation for 7 years period.

However, in order to analyze the impact of growing instability on financial markets after 2007, the average Z-Score was also calculated in 3 year rolling windows, starting from 2004-2006 period and terminating in 2008-2010 (fig. 5b).

$$Z - Score_{3y} = \frac{\overline{ROA} + \overline{CAR}}{\sigma(ROA)} \quad [3]$$

$\overline{ROA}, \overline{CAR}$ – 3y arithmetic average;
 $\sigma(ROA)$ – standard deviation for 3y period

The bank data were extracted from the Bankscope database. The original data set comprised all CEE-5 banks categorized as commercial or saving banks, but to prevent distortion banks with assets lower than 0.5% of the total domestic banking sector assets were excluded. That reduced the number of banks from 130 to 97.

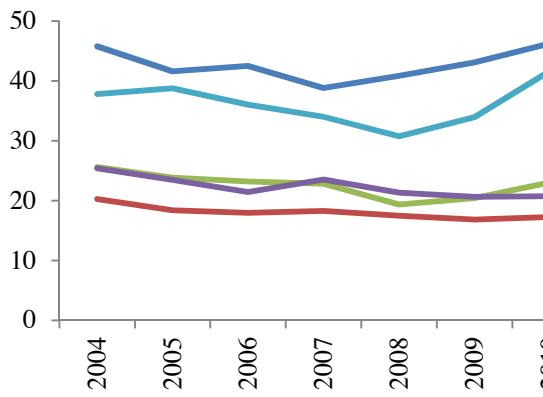
Table 6. Banking sector capitalisation and profitability ratios in CEE-5 countries

Country \ Year	2004	2005	2006	2007	2008	2009	2010	2004	2005	2006	2007	2008	2009	2010
CAR							ROA							
CZ	8.0	8.0	7.4	7.0	7.8	8.5	8.8	1.56	1.62	1.49	1.56	1.32	1.70	1.62
HU	7.9	8.0	8.5	8.5	7.7	8.3	8.5	1.80	1.93	1.71	1.85	1.67	0.91	0.69
PL	10.0	9.9	9.8	9.7	9.2	10.8	11.9	1.01	1.78	2.08	2.19	2.21	1.20	1.55
SI	7.9	7.6	7.2	7.8	7.6	7.2	7.0	0.67	0.97	1.03	1.06	0.33	0.10	-0.28
SK	8.0	8.0	7.7	7.3	6.7	8.6	9.3	1.44	1.46	1.51	1.47	1.42	0.85	1.28
Total	8.4	8.3	8.1	8.1	7.8	8.7	9.1	1.30	1.55	1.56	1.63	1.39	0.95	0.97

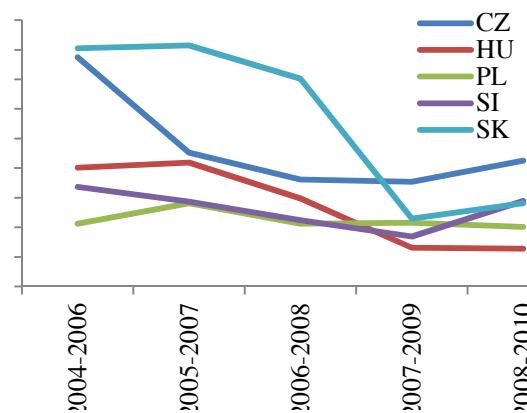
Source: own calculation, Bankscope database.

Figure 5. Z-Score for banks in CEE-5 countries

a) calculated for the whole period windows



b) averaged for 3 years rolling



Source: own calculation, Bankscope database.

When the volatility of profits was flattened for the 7 year period, the value of Z-Score slowly decreased, on average from 31 to 26 in 2008, and then slightly increased to 29 in 2010. This resulted from changes in capital ratio, which diminished till 2008, and then substantially rose, well above the pre-crisis level in all countries but Slovenia. Poland recorded high bank capitalization and profitability in 2006-2008 period, however it was accompanied by high volatility of ROA, and consequently Z-Score between 20-25 was much lower than in the Czech Republic and Slovakia, and similar to Slovenia, where banks had the lowest ROA in CEE-5 region and also low CAR value (tab.6). Calculating the Z-Score in 3 year rolling windows resulted in its much higher values, particularly in the Czech Republic and Slovakia in the pre-crisis period. The steepest fall of the Z-Score was in Slovakia, from 160 to 46, the lowest level, below 30, was in Hungary. Thus our results indicate a sharp decline in bank safety in CEE-5 countries in 2007-2009 period, triggered by the crisis. Its main reason was not so much a fall in profitability, which remained much higher than in most developed economies, but the high volatility of ROA, resulting from the excessive profitability in pre-crisis period. The reinvestment of bank profits after 2008 resulted in the increase of the Z-Score in the period 2008-2010.

4. New European supervisory architecture and CEE-5 banks: summary of results

This paper presents an analysis of the possible impact of a new post-crisis regulatory architecture on CEE-5 banks. Economic theory provides some contrasting evidence as to the impact of bank regulation and supervision on bank performance (e.g. Barth et al. 2004, 2008 and 2010). Furthermore, as noted by Chortareas et al. (2011), most research in this area concentrates on banking markets in highly developed countries. A recent paper by Delis et al. (2011) provides some evidence on the link between regulation and supervision and bank efficiency from transition economies, which suggest a negative short term impact. In our paper, the focus has been more on the longer-term regulatory impact for CEE5 banks.

From the data presented in the empirical part of the paper, it is evident that the 2007-2009 crisis affected CEE banks to a lesser degree than those in highly developed countries, although a short-term bank efficiency loss was evident. CEE banks entered the crisis in good shape, after their successful restructuring in the 1990s and high economic growth following EU accession. Because of the high profitability generated by the traditional bank intermediary model, many global risk areas had not yet developed there, with the result that during the crisis they required less restructuring than did their global owners. The CEE-5 banks emerged from the 2008 crisis relatively unscathed and not in need of fundamental restructuring. Banking sector assets in CEE-5 countries have remained relatively small as a percentage of their GDPs and bank concentration is low, with a resulting low threat of systemic risk. During the crisis, their global owners behaved responsibly, restraining from bank decapitalization, although M&A did intensify as a result of restructuring carried out by bank owners. Market stability, as measured by Z-score index, decreased initially both for all CEE banking sectors and for the top three banks in each CEE-5 country, although this trend was reversed during the 2008-2010 period. It can be concluded that in CEE, strong banks create sound systems, which have survived the global financial crisis relatively well.

In the light of the 2008 crisis, the traditional business model of banking intermediation, which dominates in Central and Eastern Europe, turned out to be the

safest, although one must be careful not to overstate the virtues of traditional banking, as this may adversely affect long term growth, which is based on innovation and risk taking. Nevertheless, CEE banks will have no choice but to participate in the new European regulatory and supervisory architecture, centered on the prevention of systemic risk posed by large global banks, at the expense of bank risk taking, while for CEE-5 banks credit market growth and the introduction of financial innovations, both based on risk-taking, are of fundamental importance.

Thus the macro-prudential pillar of the new European supervisory architecture constitutes rather a burden for CEE banks. The assessment of the impact of the micro-prudential pillar (the EBA) is more ambiguous (Basel Committee on Banking Supervision, 2010; European Parliament 2011). For countries with a very strong presence of foreign capital, the role and competencies of the host supervisors are vital and the EBA coordinating mandate may undermine it. On the other hand, harmonization of regulatory standards and enhancement of market transparency should be universally beneficial, also for CEE banks. However, EBA so far had a limited powers over national supervisors and was unable to deal with “too big to fail” problem. The newest EU proposals of creating Banking Union is a step to deal with this issue, by giving strong supervisory powers to ECB and creating a mechanism of shared bank rescue burden for the euro zone members. However, this is a step in new direction, changing and weakening the current European supervisory structure, before it managed to demonstrate its performance. Moreover, instead of weakening big banks, it will create another rescue vehicle for them. For CEE, with small and competitive banking sectors, it will create another mechanism for their marginalization.

5. Conclusions

This paper analyses whether the new European regulatory and supervisory architecture, based on a relatively complex institutional framework, will provide more efficient supervision in the EU, thus contributing to market stability and economic growth. In assessing the cumulative effect of the new European supervisory architecture, we may conclude that it is based on a restrictive regulatory system, complex and costly, which includes many new institutions accentuating stability at the expense of market efficiency and growth. For home countries, the benefits of the new regulations may well outweigh their costs, particularly for countries with large banks which pose a systemic risk. For host countries in CEE, with small, traditionally oriented banks, the opposite may be true. Their pre- and post-crisis experience support the assertion that strong banks, following healthy business models and operating in a competitive market structure, create a sound banking system.

Literature

- Acharya, V., Cooley, T., Richardson, M. P., Walter, I., 2011. Regulating Wall Street: The Dodd-Frank Act and the new architecture of global finance. Wiley, New Jersey.
- Acharya, V., Wachtel, P., Walter, I., 2009. International alignments of financial sector regulation. In: Acharya, V., Richardson, M. P. (Eds.), Restoring financial stability: How to repair a failed system. Wiley, Hoboken, New Jersey.
- Allen, F., Babus, A., Carletti, E., 2009. Financial crises: Theory and evidence. Annual Review of Financial Economics 1, 97-116.
- Allen F., Back T., Carletti E., Lane P.R., Schoenmaker D. Wagner W., 2011. Cross-border banking in Europe: Implications for financial stability and macroeconomic policies. CEPR, London.
- Anayiotos, G., Toroyan, H., Vamvakidis, A., 2010. The efficiency of emerging Europe's banking sector before and after the recent economic crisis. Financial Theory and Practice 34 (3), 247-267.
- Apinis, M., Bodzioch, M., Csongradi, E., Filipova, T., Foit, Z., Kotkas, J., Porzycki, M., Vettrak, M., 2010. The role of national central banks in banking supervision in selected Central and Eastern European countries, ECB Legal Working Paper Series 11. Frankfurt.
- Banker R. D, A. Charnes, W.W. Cooper, 1984. Some Models for Estimating Technical and Scale Inefficiencies in Data Envelopment Analysis, Management Science, vol 30, s. 92-1078.
- Barth J.R., Caprio, G., Levine, R., 2004. Bank regulation and supervision: what works best? Journal of Financial Intermediation 13, 205-248.
- Barth, J.R., Caprio G., Levine R., 2008. Bank regulations are changing: For better or worse? Comparative Economic Studies 50, 537-563.

- Barth, J.R., Lin, C., Ma, Y., Seade, J., Song, F.M., 2010. Do bank regulation, supervision and monitoring enhance or impede bank efficiency? Available from: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1579352.
- Basel Committee on Banking Supervision, 2010. An assessment of the long-term economic impact of stronger capital and liquidity requirements. Available from: <<http://www.bis.org/publ/bcbs173.htm>>.
- Beck, T., 2010. Regulatory reform after the crisis: Opportunities and pitfalls. CEPR Discussion Paper 7733.
- Berger, A.N., Humphrey, D.B., 1997. Efficiency of financial institutions: International survey and directions for future research. European Journal of Operational Research 98 (2), 175-212.
- Bikker, J., Bos, J., 2008. Bank performance. A theoretical and empirical framework for the analysis of profitability. Competition and Efficiency, Routledge, London.
- Bikker, J., Spierdijk L., 2008. How banking competition changed over time. DNB Working paper 167.
- BIS, 2010. The Basel Committee's response to the financial crisis. Report to the G20, Basel. Available from: <http://ec.europa.eu/internal_market/consultations/2009/fin_supervision_may_en.htm>.
- Brown, M., De Haas, R., 2011. Foreign currency lending in Emerging Europe: Bank-level evidence. Paper for the 54th Panel Meeting of Economic Policy.
- CEBS Annual Report 2010. Available from: <<http://www.eba.europa.eu/>>.
- Charnes, A., Cooper, W., Golany, W., Seiford, B., Lewin, A.Y., 1997. Data envelopment analysis, theory, methodology and applications. Kluwer Academic Publishers, Boston.
- Charnes, A., Cooper, W., Rhodes, A., 1978. Measuring the efficiency of decision making units. European Journal of Operational Research 2 (6), 429-444.

- Chortareas, G.E., Girardone, C., Ventouri, A., 2011. Bank supervision, regulation, and efficiency: Evidence from the European Union. *Journal of Financial Stability*. DOI:10.1016/j.jfs.2011.12.001.
- Claessens, P., Laeven, L., 2004. What drives bank competition? Some international evidence. *Journal of Money, Credit, and Banking* 36 (3), 564-583.
- Delis, M., Molyneux, P., Pasiouras, F., 2011. Regulations and productivity growth in banking: Evidence from transition economies. *Journal of Money, Credit and Banking* 43(4), 735-764.
- Demirgüç-Kunt, A., Huizinga, H., 2009. Bank activity and funding strategies: The impact on risk and return. CEPR Discussion Paper 7170.
- Demirgüç-Kunt A., Huizinga H., 2011. Do we need big banks? Evidence on performance, strategy and market discipline. CEPR Discussion Paper 8276.
- EBA, 2011. Board of Supervisors. Available from:
<http://www.eba.europa.eu/Aboutus/Organisation/Board-of-Supervisors/Members-and-Observers.aspx>.
- EBRD, 2010. Transition Report. London.
- ECB, 2005-2009. EU Banking Sector Stability Reports. Frankfurt.
- ECB, 2010. EU Banking Structures. Frankfurt.
- Ernst & Young, 2007. European Attractiveness Survey. Available from:
www.ey.com/attractiveness.
- European Parliament, DG for Internal Policies, 2011. Cumulative assessment of the impact of various regulatory initiatives on the European banking sector. DG for Internal Policies. Available from: <http://www.europarl.europa.eu>.
- Giovannini, A., 2010. Financial system reform proposals from first principles. CEPR Policy Insight 4.

- Grigorian, D.A., Manole, V., 2002. Determinants of commercial bank performance in transition: An application of data envelopment analysis. IMF Working Paper 2 (146).
- IMF, 2010a. Global Financial Stability Report, Washington, DC.
- IMF, 2010b. IMF Survey Magazine: Countries & Regions. Available from: <www.imf.org/external/pubs/ft/survey/so/2009/INT011409A.htm>.
- Kuppens T., Prast H., Wesseling S., 2003. Banking supervision at the crossroads. Edward Elgar Publishing, Cheltenham.
- Lensink, R., Meesters, A., Naaborg, I., 2008. Bank efficiency and foreign ownership: Do good institutions matter? Journal of Banking and Finance 32, 834-844.
- Lízal, L., 2011. Financial Stability and Regulatory Responsibility. 17th Baltic Financial Forum. Available from: <<http://www.cnb.cz>>.
- 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 11.
- Masciandaro, D., Quintyn, M., 2008. Helping hand or grabbing hand? Politicians, supervision regime financial structure and market view. North American Journal of Economics and Finance 19 (2), 153-173.
- Masciandaro, D., Nieto, M.J., Quintyn, M., 2009a. Will they sing the same tune? Measuring convergence in the new European system of financial supervisor. IMF CEPR Policy Insight 37.
- Masciandaro, D., Nieto, M., Quintyn, M., 2009b. Financial supervision in the EU. Is there convergence in the national architecture? Journal of Financial Regulation and Compliance 17 (2), 86-92.

- Masciandaro, D., Nieto, M. Quintyn, M., 2011. Exploring governance of the new European Banking Authority – A case for harmonization? *Journal of Financial Stability* 7, 204-214.
- Masciandaro, D., 2011. Reforming regulation and supervision in Europe: Five missing lessons from the financial crisis. *Paolo Baffi Centre Research Paper* 2011-89. Available from: <<http://ssrn.com/abstract=1825823>> or <<http://dx.doi.org/10.2139/ssrn.1825823>>.
- Masera, R., 2009. Enhancing European supervision. Paper at the conference: Towards a new supervisory architecture in Europe. European Parliament, Bruxelles.
- Masera, R., 2010. *Reforming financial systems after the crisis: a comparison of EU and USA*. *PSL Quarterly Review* 63 (255), 299-362.
- Miklaszewska, E., Mikolajczyk, K., 2011. *Foreign banks in Central Eastern Europe. Impact of foreign governance on bank performance*. In: Molyneux, P. (Eds.), *Bank performance, risk and firm financing*. Palgrave Macmillan, Basingstoke, 55-82.
- Naaborg, I.J., 2007. Foreign bank entry and performance with a focus on Central and Eastern Europe. Rijksuniversiteit, Groningen. Available from: <http://dissertations.ub.rug.nl/FILES/faculties/eco/2007/i.j.naaborg/11_thesis.pdf>
- Naaborg, I., Lensink, R., 2008. Banking in transition economies: Does foreign ownership enhance profitability? *European Journal of Finance* 14, 545–62.
- Nier, E., 2010. On the governance of macroprudential policies. FRB Chicago 13th International Banking Conference.
- Panzar, J.C., Rosse, J.N., 1987. Testing for “monopoly” equilibrium. *Journal of Industrial Economics* 35, 443–456.
- Pawlowska, M., 2011. *Competition in the Polish banking market prior to the recent crisis - empirical results obtained with the use of three different models for the period 1997-2007*. *Bank i Kredyt* 5, 5-40.

Raiffeisen Research, 2011. CEE Banking Sector Report.

The Bank of England and Prudential Regulation Authority, 2011. Our Approach to Banking Supervision, BoE and FSA. Available from: <<http://www.fsa.gov.uk>>.

The Banker, 2010. Top 1000 World Banks: 2010 Results, www.thebankierdatabase.com.

The Economist, 2006. *A Survey of International Banking: Thinking Big*, 18 May.

UniCredit Group, 2010. *CEE Strategic Analysis*, CEE Research.

World Economic Forum Report (2010). *The Future of the Global Financial System: Navigating the Challenges Ahead*.

Yildirim, H.P., Philippatos, G.C., 2007. *Competition and contestability in Central and Eastern European banking markets*. Managerial Finance 33(3), 195–209.