THE RELATION BETWEEN PROFITABILITY, CAPITAL REQUIREMENTS AND THE STRUCTURE OF ASSETS-LIABILITIES IN BANKS

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Abstract: *As a result of the direct connection between the banking system an economic growth and development it is important to have a clear picture regarding the evolution and stability of the banking sector. Economic shocks and economic cycles influence the stability and resilience of the financial sector, the mainly cyclical nature of the bank sector, raises serious problems for the supervisory institutions, which is one of the reasons why Basel III proposes new instruments in order to create additional capital buffer during the boom period. The level of risk has increased over the levels of 2011-2012 period, due to an increase in the market/liquidity risk and the emerging market risk. There is also an increase in the credit risk, especially in the developed markets the determining factors being a decline in stock prices of banks and a rising in the credit spreads (IMF, 2016).*
For shareholders the performance is defined by analyzing the level of profitability, when the performance indicators are analyzed from the point of view of the stakeholders it is required (Ja Bikker, 2010, p. 141) to extend the indicators used in order to capture the impact of financial institutions on the welfare of society, requiring macro-indicators such as: assessing the level of competition within the banking system, efficiency of banking institutions, the banking system soundness and stability. Using a dataset of 228 banks over the 2005-2013 period we analyze the evolution of asset quality indicators, capital adequacy indicators, indicators regarding operational results and liquidity indicators. It can be observed that over this period banks performance indicators degraded.

Keywords: bank assets-liabilities, correlation, financial crises, balance sheet

JEL classification: C31, G21, G01

1. Introduction

The importance of banks in modern economies derives from the connection between the banking system and economic growth and development, different studies showing that there is a direct link between a banking system operating at optimum levels and economic growth (Barth, Lin, Ma, Seade, & Song, 2013, p. 2; Levine, 2005, p. 869).

The failure of banks to achieve the objective of maximizing profitability occurs due to the influence of the following disturbance factors (Andries, 2010, p. 113):

- exogenous factors, which manifest themselves in the form of economic

shocks, changes in the regulations of the banking sector;

■ endogenous factors, manifested in the form of misaligned incentives, banking inefficiency.

Economic shocks and economic cycles influence the stability and resilience of the financial sector; eg an economic downturn affects the quality of the loan portfolio which negatively effects the profitability of the banking sector (Ugo & Gambacorta, 2009, p. 7)□. Analyzing a panel of ten banks in the industrialized countries (Austria, Belgium, France, Germany, Italy, Netherlands, Portugal, Spain, United Kingdom and United States) for the period 1981-2003 (Ugo & Gambacorta, 2009, p. 23)□ find that banks' performance is correlated with GDP both in terms of revenues generated from interest but also with the quality of loan portfolio. Regarding the profitability of the banking sector there are studies that show that a low level of profitability is an indicator of the financial crisis (Demirguc-Kunt & Detragiache, 2000)□ and banking crises are strongly correlated with currency crises (Komulainen & Lukkarila, 2003)□.

The procyclicality of the financial sector (banking) derives from the influence of economic cycles, respectively the business and financial cycle; when analyzing cycle effect on the economies an important part is differencing between traditional business cycle and financial cycle. The characteristics of financial cycle (Borio, 2014, p. 2)□ are:

■ within the financial cycle there is a correlation between the level of loans and real estate prices;

■ It has a frequency much lower than traditional business cycle which makes the contraction phase of the financial cycle longer, with a duration period which can last for several years;

■ the peaks of the financial cycles are associated with financial crises, in the case of economic crises associated with financial crises the impact is more severe than those caused by traditional business cycle;

■ the analysis of financial cycle progression allows us for an early assessment of the probability of financial crises and its impact on the economy.

■ the length and amplitude of the financial cycle depends on characteristics of the financial system and monetary policies, the evolution of the financial cycle is not regular and steady,

The mainly cyclical nature of the financial sector in general, and in particularly that of the bank sector, raises serious problems for the supervisory institutions, which is one of the reasons why Basel III proposes new instruments in order to create additional capital buffer during the boom period; the effectiveness of these methods, however, is challenged (Repullo & Saurina, 2012, p. 22)□ shows that the use of countercyclical capital buffer will not lead to a reduction of cyclicality in the banking system, on the contrary may even increase the synchronization between economic cycles and the capital needs of the banking system. Analyzing the various types of macro-prudential policies implementation including the countercyclical capital buffer (Agenor, Alper, & da Silva, 2013, p. 231)□ observe that the effectiveness of these instruments depends on the type of shocks that the economy is subject. The influence of shocks in the financial sector has both a linear and also nonlinear impact on economic growth (Mittnik & Semmler, 2013)□. Given the impact of financial crisis on the global economy is understandable the preoccupation of researchers in analyzing the types of financial crises, their effects

(Claessens & Kose, 2013)⬚ the degree of stability of the financial sector, and the stability of the banking sector. Banking crises have high costs on the economy, for example in the case of Ireland the level of tax costs are up to 40% of GDP (Laeven & Valencia, 2013)⬚ and in US the costs for the taxpayers are trillions of dollars (Atkinson, Luttrell, & Rosenblum, 2013)⬚, also the recessions that follow banking crises are long-standing and influence the long-term economic growth.

The Global Financial Stability Report (2016) compiled by the International Monetary Fund shows a worsening of the economic environment due to the rising of macroeconomic risk, the existence of a negative sentiment on the financial market, and changes in monetary and fiscal policies (IMF, 2016)⬚; a mix of decline in the oil and commodity prices, China sub-pair growth, tighter credit condition have maintained the emerging markets risk at a high level (IMF, 2016).
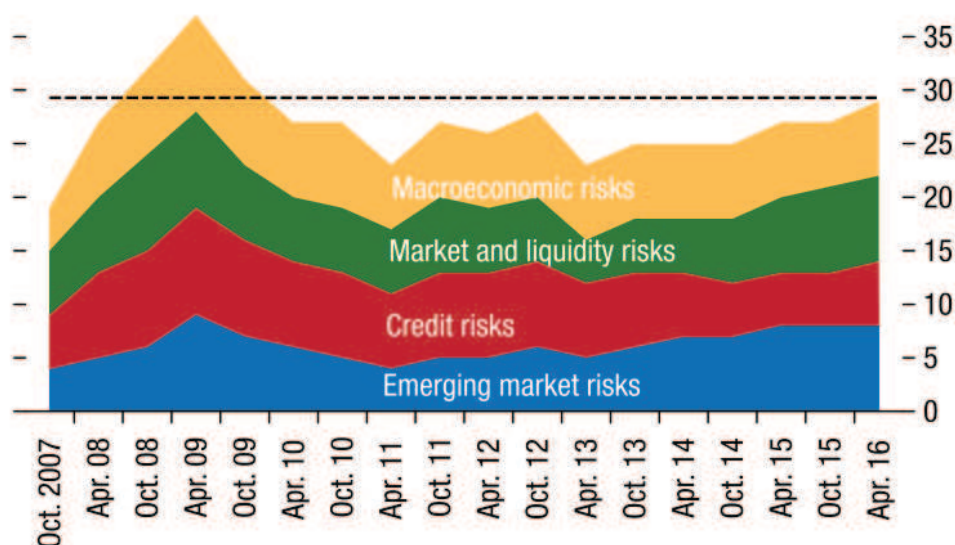

Figure 1. Global Financial Stability Map Risk Indicators
Source: (IMF, 2016, p. 4)⬚

The level of risk (Figure 1) has increased over the levels of 2011-2012 period, due to an increase in the market/liquidity risk and the emerging market risk. There is also an increase in the credit risk, especially in the developed markets the determining factors being a decline in stock prices of banks and a rising in the credit spreads (IMF, 2016). The rates of non-performing loans in 2014 (Figure 2) are at a higher levels compared with 2008 period (Aiyar et al., 2015, p. 7); the Southern countries, which are part of the Eurozone, and Central and Eastern countries have a NPL levels over 10%.

2. Literature review

The role of the financial system (Levine, 2005, p. 869)⬚ is to produce ex ante information on investment projects and capital allocation, monitoring investments and achieve corporate governance, the financial system provides instruments of risk management, collects and mobilizes resources, having an important role in facilitating trade in goods and services. From this standpoint banking sector, which

is an important component of the financial sector at the European level, it is clear that it must fulfil its role at optimal parameters. An optimal level in the case of the banking system must take into account both the interests of shareholders and that of the stakeholders, the importance and role of the two categories being able to influence the behaviour of banking institutions, and sometimes the interests of both categories are different.

The modality in which we can capture these interests, sometimes divergent, is done using the performance analysis of the banks (both at the individual and the whole banking system). The performance of a bank is understated as bank efficiency in line with her objectives (Bolocan & Trenca, 2011, p. 18)□, a level of profitability appropriate to the level of risks (Olteanu, Olteanu, & Badea, 2003)□, also performance can It is expressed in terms of efficiency, productivity, competitiveness and profitability (Andries, 2010, p. 112)□. While the European Central Bank (European Central Bank, 2010, p. 6)□ defines performance as the ability of banks to generate sustainable profits.

If profit is the main objective of banking institutions, from a microeconomic point of view, this objective can be achieved by minimizing costs or maximizing revenue. (Jacob Bikker & Bos, 2008, p. 6)□ uses a model general to capture the behavior of banks, for the shareholder the main objective is a high profitability level as possible, an objective that can be achieved by minimizing costs, if market is characterized by perfect competition. However, these authors show that in practice, due to inefficiencies in the market the process of cost minimization, or profit maximization, is not always noticeable.

The performance indicators can be classified (J.a. Bikker, 2010, p. 141)□ depending on the interests of shareholders and stakeholders. For shareholders the performance is defined by analyzing the level of profitability, usually the following performance are used (Bolocan & Trenca, 2011, p. 63)□:

- return on equity (ROE), defined as the ratio between net profit and equity;
- return on assets (ROA), defined as the ratio between net profit and total assets;
- leverage ratio, defined as inversely proportional to the share capital in total assets;
- the rate of asset utilization, defined as the ratio between total income and assets;
- net interest margin, defined as the ratio between interest income less interest costs and interest-bearing assets;
- Yield on earning assets, defined as the ratio between interest income and interest-bearing assets;
- Cost rates on interest bearing funds, defined as the ratio between interest costs and interest-bearing liabilities;
- profit rate, defined as the ratio between net profit and total revenue.

One of the main shortcomings of these indicators are related to their inability to capture the associated risk, thus were introduced new ways of quantifying the profitability related to the risk: Risk-Adjusted Return On Capital(RAROC), economic value added (EVA).
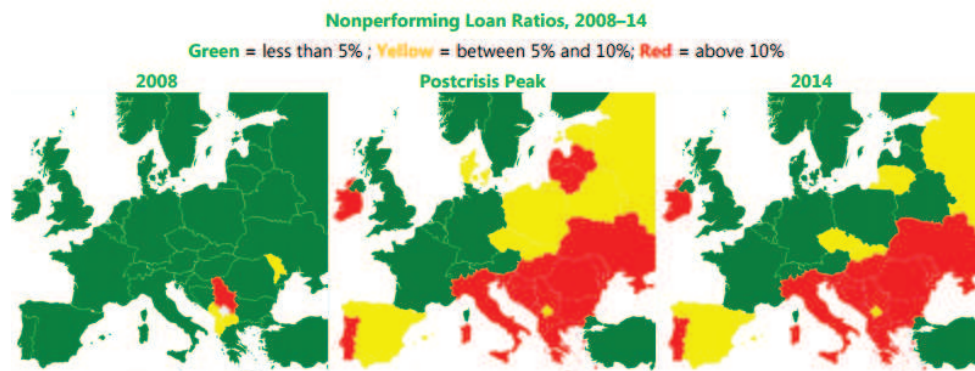
Figure 2. NPLs after the Financial Crisis
Source: A strategy for resolving Europe's Problem Loans (Aiyar et al., 2015, p. 7)⬜

Using traditional indicators (ROA, ROE) within the analysis banks performance suffer due to not accounting for associated risks, studies done by the ECB (European Central Bank, 2010, p. 37) concludes that the use of these indicators in the pre-crisis not investors would have provided any indication of the real situation of banks, requiring the use of performance indicators which take into account the quality of assets, the financing capacity of the banking institutions, namely the risk associated with the activities of the banks. However, the analysis of the traditional indicators can improve the understanding of banks performance.

When the performance indicators are analyzed from the point of view of the stakeholders it is required (Ja Bikker, 2010, p. 141) to extend the indicators used in order to capture the impact of financial institutions on the welfare of society, requiring macro-indicators such as: assessing the level of competition within the banking system, efficiency of banking institutions, the banking system soundness and stability. Comparing the efficiency of banks in terms of the stakeholders interests (San-Jose, Retolaza, & Torres Pruñonosa, 2014)⬜ observe that savings banks or credit unions are as effective as traditional banks although their objectives are not only purely economic but also social.

3. Data and methodology

The dataset consists of annually financial information for 228 banks (Annexes 1), the analysed period is from 2005 until 2013, the dataset is from the Bankscope database. The analysis is performed on four major categories of bank indicators:

- **5.1** asset quality indicators: Loan Loss Reserve / Gross Loans; Reserves for Impaired Loans / NPLs; %Loan Loss Provision / Net Interest Revenue.
- **5.2** capital adequacy indicators:%Tier 1 Ratio, %Total Capital Ratio, %Equity / Total Assets, %Capital Funds / Total Assets.
- **5.3** indicators regarding operational results: %Return On Average Assets (ROAA), %Return On Average Equity (ROAE), %Net Interest Margin, %Cost To Income Ratio.
- **5.4** liquidity indicators: %Interbank Assets / Interbank Liabilities, %Net Loans / Customer & Short Term Funding, %Liquid Assets / Deposits & Short Term Funding.

4. Results

In the case of asset quality indicators we observe that over the analysed period the rate of Loan Loss Reserve / Gross Loans has increase with over 257%, which shows the degradation of the quality of the loan portfolio. Analysing the Loan Loss Provision/Net Interest Revenue indicator, which shows the relation between provisions and the interest revenue, it can be observed that it's value has increased over 411%; so for the analysed period the rate of provision has increase at a higher pace than the revenues from interest, which shows that the high level of risk is not being properly remunerated.

The capital adequacy indicators evolution is influenced by the implementation of the capital requirements, the supervisory institutions objective being that the banks sectors capitalization should rise in order to withstand any additional shock. The Total Capital Ratio has risen with over 50% on the 2005-2013 period, the ratio between Equity/Total Assets show an increase of over 14%. Every increase in capital is expensive for banks, but higher levels of capitals reduce the default probability of banks and also the probability of a systemic crisis (Gauthier, Lehar, & Souissi, 2012)□.

Bank indicators evolution (average of the period)

Indicators	2005	2007	2009	2011	2013
Loan Loss Reserve/ Gross Loans	2.52	1.95	3.9	5.03	6.49
Reserves for Impaired Loans / NPLs	566.71	746.21	1427.2	1959.9	2331.7
Loan Loss Provision/Net Interest Revenue	11.07	10.85	60.61	43.59	51.51
Tier 1 Ratio	6.77	7.39	8.8	10.72	11.48
%Total Capital Ratio	10.08	10.21	11.66	13.82	15.31
%Equity / Total Assets	8.35	8.22	8.59	8.79	9.57
%Capital Funds / Liabilities	11.34	11.31	12.48	13.46	11.29
%Return On Avg Assets (ROAA)	1.11	1.25	0.09	-0.13	-0.28
%Return On Avg Equity (ROAE)	14.22	15.04	-0.51	-9.13	-6.24
%Net Interest Margin,	2.51	2.39	2.28	2.25	2.09
%Cost To Income Ratio	62.42	60.42	63.86	70.03	70.70
%Interbank Assets / Interbank Liabilities	328.16	583.75	636.26	85.35	98.55
%Net Loans / Customer & Short Term Funding	82.41	96.99	83.55	79.61	76.01
%Liquid Assets / Deposits & Short Term Funding	43.40	40.89	36.86	35.37	31.96

Source: Dataset Bankscope, own calculations

The indicators regarding operational results (ROAA, ROAE, Net Interest Margin, Cost To Income Ratio) have deteriorated over the analysed period. In the case of ROAA, which measures the investment rate return on assets, and ROAE, which measures the efficiency of bank capital, the values are negative for the 2011-2013 period due to the losses that banks where facing. The Cost to Income Ratio, which is an efficiency indicator, has increased steadily over the analyzed period from 62% in 2005 to over 70% in 2013.
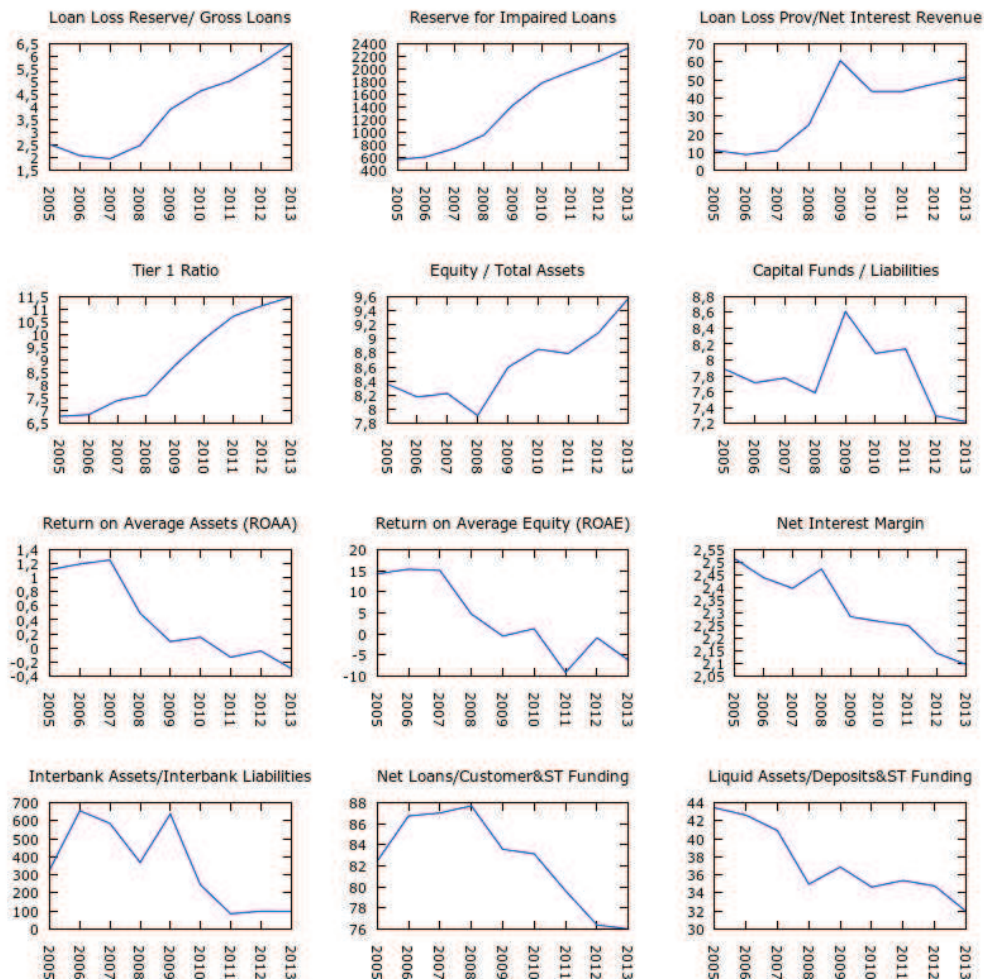
Figure 3: Bank indicators evolution 2005-2013, own calculations

For the analyzed banks the liquidity indicators show that banks have downsized their exposure to other banks, due to the fact that the value of these indicators is below its normal value shows that banks have a liquidity problem after 2010. Although the value of the indicator Net loans/Customer& Short-term funding is decreasing, which represent a positive aspect, the value of the Liquid Assets / Deposits & Short Term Funding is also decreasing which show an increase of banks vulnerability to massive withdrawals of deposits.

5. Conclusion

In the case of asset quality indicators we observe over the analysed a degradation of the quality of the loan portfolio, also the rate of provision has increase at a higher pace than the revenues from interest, which shows that the high level of risk is not being properly remunerated. The capital adequacy indicators evolution show an increase. The indicators regarding operational results have deteriorated over the analysed period, also the efficiency of banks has

decreased steadily over the analyzed period. The liquidity indicators show that banks have downsized their exposure to other banks, but banks vulnerability to massive withdrawals of deposits has increased.

The level of risk the European economies faces has increased between 2011-2012 period the banking sector failed to recover quickly. The European banking sector is still in an adjustment period, the rates of non-performing loans in 2014 still being at a higher level compared with 2008 period.

6. Annexes

Dataset summary

Country name	Country ID	Number of banks per country	Assets (2013) mil. euro
AUSTRIA	AT	12	404992
BELGIUM	BE	4	796418
BULGARIA	BG	3	13424
SWITZERLAND	CH	11	1562013
CYPRUS	CY	3	42047
CZECH REPUBLIC	CZ	6	115940
GERMANY	DE	9	1054120
DENMARK	DK	10	831028
ESTONIA	EE	3	13635
SPAIN	ES	10	1996443
FINLAND	FI	5	379728
FRANCE	FR	19	5483409
UNITED KINGDOM	GB	28	7306354
GREECE	GR	5	358278
CROATIA	HR	5	34256
HUNGARY	HU	9	79942
IRELAND	IE	4	322846
ITALY	IT	17	1860263
LITHUANIA	LT	5	17713
LUXEMBOURG	LU	3	73316
LATVIA	LV	10	20332
MALTA	MT	3	7932
NETHERLANDS	NL	11	941351
POLAND	PL	8	146718
PORTUGAL	PT	6	288910
ROMANIA	RO	6	35950
SWEDEN	SE	3	563438
SLOVENIA	SI	7	27581
SLOVAKIA	SK	3	23055
TOTAL	29	228	24.801.432

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