Journal of Central Banking Theory and Practice, 2013, 3, pp. 29-46
Received: 03 September 2013; accepted: 12 September 2013.

UDC: 336.71(497.11)

Jelena Stanković *
Vesna Janković-Milić **
Snežana Radukić ***

* *Faculty of Economics, University of Niš*

Email: jelena.stankovic@eknfak.ni.ac.rs

** *Faculty of Economics, University of Niš*

Email: vesna.jankovic@eknfak.ni.ac.rs

** *Faculty of Economics, University of Niš*

Email: snezana.radukic@eknfak.ni.ac.rs

Quantitative Analysis of Business Success Indicators in the Banking Sector of the Republic of Serbia[1]

Abstract: Identification of an appropriate set of indicators of the banking sector to be analyzed has to be observed in terms of the needs of different users. For the purpose of managing financial systems, methods for early detection of problems in banks are essential in order to protect the interests of citizens and the entire system. From the standpoint of the interests of shareholders, it is necessary to apply the method of performance comparison with competing banks in order to identify the causes of inefficiency in operations and causes of action to improve efficiency. Finally, in terms of individual users of banking services, quality of a bank shall assess the level of risk in the business, as well as the assessment of a specific risk.

Some aspects of bank performance, such as liquidity and capital adequacy, are of great importance for the stability of the entire sector and their minimum values are prescribed by the National Bank of Serbia. On the other hand, financial performance and profitability indicators are essential for long-term and successful pursuit of banking business. In this paper, we use regression analysis to evaluate the influence of some of these indicators on the financial result of the banking sector in Serbia. The period that is analyzed is post 2000, immediately after the reform of the banking sector. For the purpose of analysis, the entire period is divided in two sub-periods: (1) the period from 2000 to 2008, and (2) the period after 2008, which was characterized by a negative impact of the global economic crisis.

[1] The paper was prepared for the purpose of projects no. 44007 and no. 179066 supported by the Ministry of Education, Science and Technological Development of the Republic of Serbia.

Keywords: Financial Result, ROE, ROA, Liquidity, Capital Adequacy, Banking Sector of the Republic of Serbia, Statistical Analysis.

JEL Classiffication: C52 and G21.

1. Introduction

Capital adequacy is the one of the most important indicator of bank performance and one of the demands of regulators. Stricter capital regulation can effectively reduce the level of exposure to risk of a bank (Furlong and Keeley, 1989). At the same time, the demands of capital adequacy will decrease the marginal profits from the subsidization of savings insurance due to the increase in asset risk, and lessen the incentive to increase risk (Furlong and Keeley 1987, 1989). Required level of capital adequacy in Serbia is higher than the usual 8%, as required by Basel II standard. On the other hand, by heightening the demands on capital adequacy economic effectiveness will decrease (Gennotte and Pyle, 1991). Though risk-based capital regulation can effectively regulate the moderate assumed risk of a bank, however, this is too strict and does not allow banks the choice of portfolio, which leads to a skewed distribution of resources and causes a loss of benefit to society (Lin, 1994).

The recent financial crisis has raised fundamental issues about the role of bank equity capital, particularly from the standpoint of bank survival. Not surprisingly, the public outcries for more bank capital tend to be greater after financial crises, and post-crisis reform proposals tend to focus on how capital regulation should adapt to prevent future crises. Various such proposals have been put forth recently (e.g., Kashyap, Rajan, and Stein, 2008; BIS, 2010; Acharya, Mehran, and Thakor, 2011; Admati, DeMarzo, Hellwig, and Pfleiderer, 2011; Calomiris and Herring, 2011; and Hart and Zingales, 2011). Given the divergent views in the literature, the issue of the effects the capital has on bank performance, the magnitude of these effects, and how they might differ across different types of crises and normal times boils down to an empirical question, one that we confront in this paper. In particular, the goal of this paper is to empirically examine the effects of bank capital on two dimensions of bank performance (probability of survival and market share) during different types of financial crises and normal times. Most theories predict that capital enhances a bank's survival probability. Holding fixed the bank's asset and liability portfolios, higher capital mechanically implies a higher likelihood of survival. A deeper justification is provided by incentive-based theories such as Holmstrom and Tirole (1997), Acharya, Mehran, and Thakor (2011), Allen, Carletti, and Marquez (2011), Mehran and Thakor (2011), and Thakor (2012). However, some theories suggest that under certain circum-

stances increasing bank capital could be counterproductive because it perversely increases bank risk taking (e.g., Koehn and Santomero, 1980; and Besanko and Kanatas, 1996). Nonetheless, the reviews in Freixas and Rochet (2008) suggest that the scales are tilted in favour of the prediction that capital has a salutary effect on the probability of survival. The view that capital strengthens a bank's competitive position in asset and liability markets, which can also improve its odds of survival, is also buttressed by the empirical evidence in papers such as Calomiris and Mason (2003) and Calomiris and Wilson (2004).

In order to be rationed, the banks could reduce propensity to extend credit and thereby adversely affect the real economy. Some authors argue that banks have a propensity to underinvest ex ante in liquid assets because they prefer others to bear that cost. Therefore, it is important to analyze the Liquidity regulatory index (see Bryant (1980), Diamond and Dybvig (1983), Donaldson (1992), Bhattacharya and Fulghieri (1994), and Allen and Gale, (2000)).

Considering contemporary literature review, for the purposes this paper, the indicators that will be monitored are: (1) capital adequacy, (2) liquidity, (3) total assets, (4) total equity, (5) capital share in liabilities, (6) financial result, (7) return on assets, and (8) return on equity. In addition to the above, the analysis will also include (9) the number of banks operating in the sector, as well as the (10) number of employees in the sector.

2. Aim, scope and methodology of the research

The null hypothesis in this research represents that there is no change in the influence of indicators such as Capital share in Liabilities, Liquidity and Capital Adequacy on the financial result, Return on Assets and Return on Equity.

For the purpose of testing this hypothesis it was necessary to:

- Divide observed period (2000-2012) into two sub-periods: the first period 2000-2008 and the second 2009-2012,
- Calculate the average values of indicators related to the performances of the banking sector in Serbia,
- Examine the influence of Capital share in Liabilities, Liquidity and Capital Adequacy on the financial result, Return on Assets and Return on Equity in whole observed period and in sub-periods.

The methods which are used in order to conduct analyses listed above are: descriptive statistics and regression analysis.

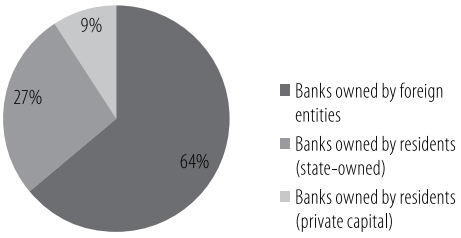
3. Key indicators of business success of banking sector in the Republic of Serbia

The banking system of the Republic of Serbia consists of commercial banks operating in the territory of Serbia and the National Bank of Serbia, as the central bank and the regulatory authority responsible for the supervision of the banking sector. Commercial banks are independent in their activities in order to generate profit on the principles of solvency, profitability and liquidity. The National Bank of Serbia is an independent in its activities that are established under the Law on the National Bank of Serbia and other laws and it is accountable to the National Parliament of the Republic of Serbia. All data analyzed under this heading were collected from official reports of the National Bank of Serbia, specified in the reference list under numbers from [27] to [39]. In addition, all data for 2012 refer to the period up to 30 September because the annual business report was not yet available at the time of writing this paper.

3.1. General information about the banking sector in the Republic of Serbia

At the end of 2012, 33 commercial banks operated in the banking sector in Serbia, of which 21 banks owned by foreign entities and 12 owned by domestic entities, of which 9 are owned by the state as the majority or the largest shareholder, and 3 banks are privately owned (Figure 1).

Figure 1: The ownership structure of the banking sector in the Republic of Serbia



The figure clearly shows that are the prevailing banks owned by foreign entities, which account for 74% of total assets, 74% equity, 71% of employees and gross profit of 17.5 billion dinars.

Banks owned by foreign entities originating from banking groups from 11 countries. The most important banks owned by foreign entities, observed as the share in total assets of the sector, come from Italy, 23% of total share, and then from Austria with 16%, Greece with 15%, France with 9%, and all other countries with the total share of 11%. Banks owned by the state and domestic private entities` share in total assets and total equity is 26%, with a 29% share in the number of employees, and generated net loss of

5.5 billion dinars (state-owned banks were operating with a loss of 8.2 billion dinars and banks owned by domestic private entities with a gain of 2.7 billion dinars).

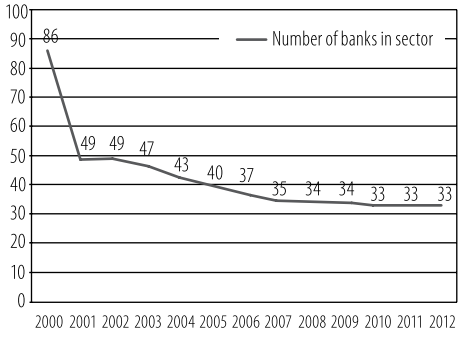
The number of banks in Serbia in the last 13 years reduced. Starting from almost paradoxical number of 81 banks, which operated in 2000 in the Republic of Serbia, this number has gradually decreased. The first significant reduction in the number of banks occurred during the reform of the banking sector conducted in 2001 and 2002, resulting in 49 banks holding the banking license as at 31 December 2001. In fact, already in 2001, 23 banks lost their license, including four large banks in early 2002.[2] The average number of banks by observed periods is presented in the Table 1.

Table 1: Average number of banks by periods

Period	Average number of banks
2000-2008	44
2009-2012	33

The downward trend in the number of banks which operating in the Serbian market is in favor of tendency of enlarging the capital of market participants and increasing the quality of services because the licenses preserve only those banks that are eligible for it. Thus, users of financial services in Serbia in this field are protected from occurrences of pyramid banks and/or banks with suspected credibility. The number of banks that operate in Serbia is still largely in relation to the size of the market, so that the downward trend in the number of banks is real and expected. Changes in the number of banks in the period 2000-2012 are shown in Figure 2.

Figure 2: Number of banks in the period 2000-2012

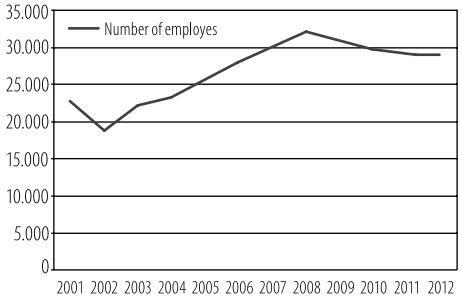


Unlike the number of banks, the number of employees in banks had been recording growth until 2009, and after there was a reduction primarily due to the impact of the economic crisis. Today, the banking sector employs 29,129 people. The downward trend in the number of employees in the banking

[2] Beobanka AD Beograd, Beogradska banka AD Beograd, Investbanka AD Beograd and Jugobanka AD Beograd.

sector in Serbia, which started in 2009 continued into 2010 to result in 1.295 persons less than at the end of 2009. From the beginning of 2009 until 31 December 2010, that number was reduced to 2.455 or by 7.6%. Drastically reduced number of employees, observing the period since 2000 by 2010, refers precisely to 2001 and 2002, because it was during this period that most banks lost the license, or proceedings of rehabilitation or liquidation were initiated. By liquidation of 4 major banks, the number of employees was reduced by 8.322, which is 36.5% of the total number of employees in the banking sector at this moment. The same year, the number of newly employed workers was 3,193. Changes in the number of employees are shown in Figure 3.

Figure 3: Changes in the number of employees in the period 2001-2012



As it can be seen from the Figure 3, starting from 2003, the number of employees in the sector grew until 2009, followed by the aforesaid decrease. The most significant growth in the number of employees is recorded in the period from 2005 to 2007.

Table 2: Average number of employees in banking sector by periods

Period	Average number of employees
2000-2008	25136
2009-2012	29845

According to the results from Table 2, an average number of employees in the banking sector in the second sub-period is 18.73% higher compared to the period 2000-2008.

3.2. The concept of minimum capital requirement

The method of determining capital requirements, as defined by the Basel Committee on Banking Supervision, is a set of regulatory standards aimed at determination of provisions for credit, market and operational risk, as well as a set of rules relating to good risk management in banks and other financial institutions. Setting standards for bank capital reserves is very important, because it brings: (1) the reducing of the difference in the amounts that banks set aside in order to ensure exposure to these risks, and (2) the localization of the reasons for this gap, because it introduces a unique methodology.

The simplest way to define the required capital is the use of regulatory capital. It is a common practice in the absence of any internal methodology. In addition, regulatory capital is a legal requirement for bank operations. Indicator related to the fulfilment of the requirements for capital, called capital adequacy (Capital Adequacy - CA), and is calculated as:

$$CA = C/RWA \quad (1)$$

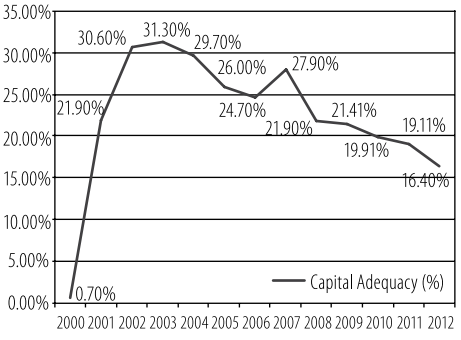
where C is the bank's capital and RWA is risk weighted asset (according to Basel Committee on Banking Supervision, 1988).

Thus, the capital adequacy ratio is calculated from the ratio of capital and risk-weighted asset. The Basel agreement provides that the value of this indicator is at least 8% and, if necessary, the national legislation may prescribe a higher level of capital requirements.

Risk weighted asset (RWA) is the sum of risk weighted asset for each of the three risks: credit, market and operational. Risk weighted asset for credit risk is calculated differently depending on the chosen approach, which will be further discussed in the section devoted to credit risk. Risk weighted asset for market and operational risks is calculated so that the capital requirement multiplied by 12.5 (this is a reciprocal value of the minimum capital ratio of 8%).

Starting from the Basel Committee recommendation that the national authorities, as appropriate, can set this minimum above 8%, the National Bank of Serbia (NBS) has determined that the capital adequacy ratio should not be less than 12% (Decision on the capital adequacy of banks, Official Gazette no. 129/2007 and 63/2008). A bank shall at all times maintain the level of capital required to cover all the risks that can arise in a bank and capital requirement must be met at all times. For that reason, it is important to monitor changes in capital adequacy of the entire banking sector.

Figure 4: Average value of the capital adequacy ratio in the banking sector in the Republic of Serbia for the period 2000-2012[3]



[3] According to the decision of the National Bank of Serbia from 2005, the minimum capital adequacy ratio is set at 12%, whereas in the earlier period it was 8%.

Statistical data on average values of the capital adequacy ratio in the banking sector in Serbia is encouraging, because there have not been undercapitalized banks in the past ten years. Also, the average value of the ratio was well above the regulatory minimum, except in 2000, when it amounted to 0.70%, as a consequence of the chaotic situation in the banking sector, when it was followed by the reform during 2001-2002 (Figure 4).

Table 3: Average values of capital adequacy ratio and capital share in liabilities by periods

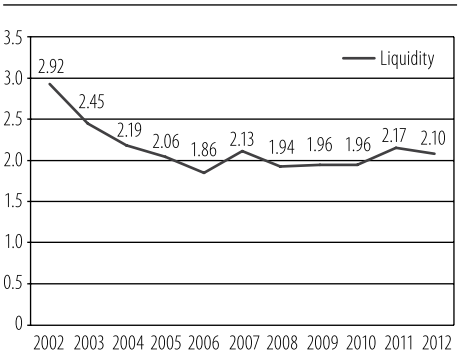
Period	Mean value of Capital Adequacy	Mean value of Capital share in liabilities
2000-2012	18.13%	17.29%
2000-2008	17.71%	16.10%
2009-2012	19.12%	20.28%

Results presented in Table 3 indicate that mean values of capital adequacy and capital share in liabilities are higher in period 2009-2012 compared to the subperiod 2000-2008.

3.3. The liquidity of banking sector in the Republic of Serbia

Similar to capital adequacy, the liquidity ratio is also a category that is prescribed by the National Bank of Serbia (Decision on liquidity risk management, Official Gazette No. 129/2007). In accordance with the legislation, the liquidity ratio is measured on daily basis and the average regulatory liquidity ratio at the end of 2012 amounted to 2.10 (Figure 5). The importance of liquidity, as a parameter of bank performance, is very important. The regulatory minimum for the liquidity ratio is set at the level of 1.0, and preferred values, theoretically, range from 1.0 to 1.2.

Figure 5: Average annual regulatory liquidity ratio



From this point, the liquidity of the banking sector in Serbia is satisfactory. What speaks most about the importance of the liquidity risk management is the Basel III document referring to capital provisions for exposure to liquidity risk.

Table 4: Average liquidity by periods

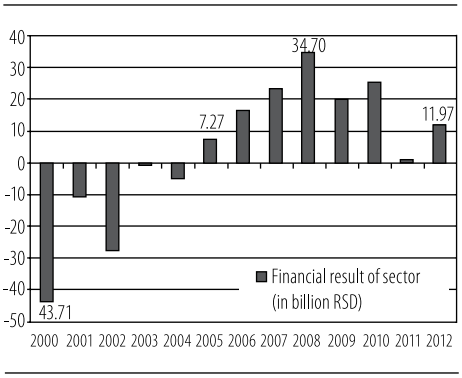
Period	Average liquidity
2000-2012	2.14
2000-2008	2.19
2009-2012	2.05

As it can be seen from Table 4, average liquidity of the banking sector in the period 2009-2012 did not reach the level from the period 2000-2008.

3.4. Profitability of the Serbian banking sector

Undoubtedly, the most important indicator of business is the financial result. Therefore, in analyzing the financial performances of the banking sector should start from financial results of the banking sector in the past decade (Figure 6).

Figure 6: Financial result of the banking sector in the period 2000-2012



As we can see in Table 5, the period 2000-2008 was characterized by a negative financial result. Namely, the banking sector in that period was still traumatized by the period prior to 2000 when most of the banks in Serbia had been recording losses. The characteristic of the period until 2004 is that foreign-owned banks still have a positive financial results, a loss is mostly related to state-owned banks.

Table 5: Average financial result of the banking sector by periods

Period	Financial result – average value (billions RSD)
2000-2012	4.054
2000-2008	-0.657
2009-2012	9.337

The poor financial performance trend terminated as of 2005. In the period 2005-2008, the profit is constantly growing and in 2008 it reached 34.7 billion dinars, which is the best financial result of the banking sector in the past decade. Realized profit in 2009, as a result of the economic crisis, significantly reduced by as much as 42.36% and amounted to only 20.0 billion dinars. Total pre-tax profit of

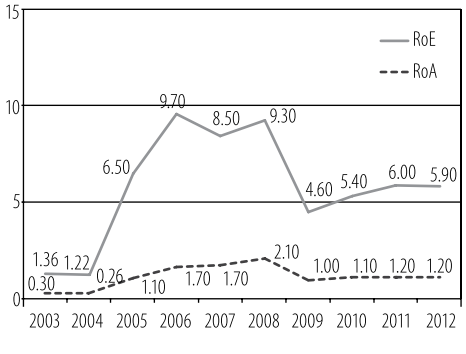
the banking sector in 2010 amounted to 25.4 billion dinars and it increased 27% compared to 2009. In 2011, there has been a significant decline in profits in the banking sector (1.25 billion dinars), primarily caused by a large amount of loss reported by some banks (Agrobanka and Development Bank of Vojvodina). In 2012, the financial result was 11.95 billion dinars, which is still significantly lower than the results in the period between 2008 and 2010.

Also, in order to maintain the continuity and sustainability of the banking sector, it is necessary to take into account the profitability indicators. Profitable banking business and achieving an adequate return on invested funds ensure not only business continuity and sustainability of the bank in the market, but expansion and diversification of banking activities. Profitability indicators are the most important synthetic indicators of performance possibilities of bank.

In calculating the profitability of banks in international practice there are a use of the following two indicators: return on assets and return on equity.

Return on Assets (RoA) is nothing more than a share of net profit to total assets, and is obtained by multiplying the return on operating revenue (Return on Income - RoI) and the indicator of assets use (AU). If RoA is less than 0.5%, it is considered poor profitability of the bank, if between 0.5% and 1% the bank profitability is average, if RoA value is between 1% and 2% the profitability is good, and if it is over 2% it is considered high, but if RoA exceeds 2.5%, this shows that the banking market is cartelized, i.e., high-risk portfolio of a bank or a special event, such as, for example, sales branch (Collier, 2009).

Figure 7: Return on assets and return on equity in period 2003 – 2012



When the return on assets multiplied by the equity multiplier (EM) receives a Return on Equity (RoE). Equity multiplier is obtained from the ratio of total assets and equity and shows how assets are financed from its own sources. As a measure of the risk of loss shows how many losses the bank may file before it becomes insolvent. The aim of banking management is to achieve an adequate rate of return per unit of equity. A serious warning is the value of RoE above 20-25% because it suggests that the bank has resorted to extremely large borrowing in the financial market (Collier, 2009). The movement of RoA and RoE indicators in the banking sector in Serbia is shown in Figure 7.

Key indicators of performances of the banking sector were slightly lower compared to 2008: return on assets is 1.2%, which is slightly better than the same indicator in 2009 and 2010, but noticeably lower than 2.1% recorded in 2008 (the indicator that suggests high profitability). The same can be concluded for return on equity. The aforesaid values lead to a conclusion that profitability of the banking sector in the Republic of Serbia is rated between average and good.

Table 6: Indicators of profitability by periods – average values

Period	Return on equity	Return on assets
2000-2012	4.855	0.981
2000-2008	4.497	0.897
2009-2012	5.445	1.122

4. Regression analysis of the business success indicators of the banking sector in the Republic of Serbia

The previous analysis pointed to changes in average values of business success indicators in the observed period and sub-periods. Most of the observed indicators, other than Liquidity, had higher average values in the second sub-period (2009-2012), compared to the period 2000-2008. The next task in this research is to explore the relationship between the observed indicators. Namely, the question is how *Capital Adequacy, Capital share in Liabilities and Liquidity on Financial result* influence the Financial result, Return on Equity and Return on Assets in whole observed period and in sub-periods. With that aim in mind, several regression models were formulated. The results are presented in Tables 7-15.

Table 7: Influence of Capital Adequacy, Capital share in Liabilities and Liquidity on Financial result, period 2000-2012

Variables	Unstandardized coefficients		Significance testing	
	Beta	Standard Error	t-statistic	p-value
Constant	68.411	28.196	2.426	.046
Capital share in Liabilities	277.047	120.501	2.299	.055
Liquidity	-52.780	10.385	-5.083	.001
Capital Adequacy	-4.370	60.632	-.072	.945

$$R^2 = 0.858$$

According to the results of the regression analysis presented in Table 7, Liquidity and Capital Adequacy have negative influence on Financial results in the analysed period.

Table 8: Influence of Capital Adequacy, Capital share in Liabilities and Liquidity on Financial result in period 2000-2008

Variables	Unstandardized coefficients	
	Beta	Standard Error
Constant	275.821	38.317
Capital share in Liabilities	-39.752	133.983
Liquidity	-166.518	15.543
Capital Adequacy	275.821	162.155

In this period variables Capital share in Liabilities and Liquidity had a negative impact on Financial result, while increased Capital Adequacy had a positive impact on Financial result.

Table 9: Influence of Capital Adequacy, Capital share in Liabilities and Liquidity on Financial result in period 2009-2012

Variables	Unstandardized coefficients
	Beta
Constant	315.591
Capital share in Liabilities	-409.957
Liquidity	-99.302
Capital Adequacy	-75.293

All observed variables have negative influence on the Financial result in period 2009-2012.

Table 10: Influence of Capital Adequacy, Capital share in Liabilities and Liquidity on Return on Equity, period 2000-2012

Variables	Unstandardized coefficients		Significance testing	
	Beta	Standard Error	t-statistic	p-value
Constant	29.342	11.149	2.632	.039
Capital share in Liabilities	20.399	41.081	.497	.637
Liquidity	-13.385	6.198	-2.159	.074
Capital Adequacy	.937	20.063	.047	.964

$$R^2 = 0.521$$

Liquidity had negative influence on Return on Equity over the entire observed period.

Table 11: Influence of Capital Adequacy, Capital share in Liabilities and Liquidity on Return on Equity, period 2000-2008

Variables	Unstandardized coefficients	
	Beta	Standard Error
Constant	36.404	14.252
Capital share in Liabilities	18.573	63.219
Liquidity	-12.351	19.643
Capital Adequacy	-30.069	110.749

$R^2 = 0.767$

In this period, Return on Equity was negatively influenced by Liquidity and Capital Adequacy.

Table 12: Influence of Capital Adequacy, Capital share in Liabilities and Liquidity on Return on Equity in period 2009-2012

Variables	Unstandardized coefficients
Constant	8.158
Capital share in Liabilities	-75.793
Liquidity	6.263
Capital Adequacy	-.696

Capital share in Liabilities and Capital Adequacy have negative impact on Return on Equity in period after economic crisis.

Table 13: Influence of Capital Adequacy, Capital share in Liabilities and Liquidity on Return on Assets, period 2000-2012

Variables	Unstandardized coefficients		Significance testing	
	Beta	Standard Error	t-statistic	p-value
Constant	5.069	2.064	2.456	.049
Capital share in Liabilities	9.319	7.606	1.225	.266
Liquidity	-2.737	1.148	-2.385	.054
Capital Adequacy	-.419	3.715	-.113	.914

$R^2 = 0.583$

Liquidity and Capital Adequacy have negative influence on Return on Assets in period 2000-2012.

Table 14: Influence of Capital Adequacy, Capital share in Liabilities and Liquidity on Return on Assets, period 2000-2008

Variables	Unstandardized coefficients	
	Beta	Standard Error
Constant	6.353	2.589
Capital share in Liabilities	8.022	11.484
Liquidity	-2.102	3.568
Capital Adequacy	-8.803	20.118

The direction of linear relationship between dependent variable Return on Assets and independent variables in the pre-crisis period was the same as in all observed periods (2000-2012).

Table 15: Influence of Capital Adequacy, Capital share in Liabilities and Liquidity on Return on Assets in period 2009-2012

Variables	Unstandardized coefficients
Constant	1.299
Capital share in Liabilities	-8.413
Liquidity	.826
Capital Adequacy	-.824

In this period, Liquidity has positive influence on Return on Assets, while variables Capital share in Liabilities have negative impact on Return on Assets.

5. Conclusion

After the reforms of the banking sector in 2001 and 2002, it is safe to say that this sector recorded a good business results. The banking system of the Republic of Serbia consists of commercial banks operating in the territory of Serbia and the National Bank of Serbia. The number of banks in Serbia reduced in the last 13 years. The downward trend in the number of banks operating in the Serbian market goes in favour of tendency of enlarging the capital of market participants and increasing the quality of services, because only eligible banks keep the license. Unlike the number of banks, the number of employees had been recording growth until 2009, and afterwards there was a reduction in this number, primarily due to the impact of the economic crisis. Equity of banks operating in Serbia has increased significantly in the past ten years. Statistical data on average values of the capital adequacy ratio in the banking sector in Serbia is encouraging be-

cause there have been no undercapitalized banks in the past ten years. Nonetheless, the liquidity of the banking sector in Serbia is satisfactory. Results obtained in this research point to the conclusion that the performance of the banking sector has not been dramatically affected. In fact, the statistical analysis shows that there are positive changes in average values of business success indicators in the observed period and sub-periods, and most of the observed indicators, except Liquidity, have higher average values in the second sub-period (2009-2012) as compared to the 2000-2008 period.

In additional the analysis, several regression models were formulated in order to explore the relationship between the observed indicators. This analysis has provided the answer to the question of how Capital Adequacy, Capital share in Liabilities and Liquidity influence the Financial result, Return on Equity and Return on Assets in the entire observed period and in sub-periods. According to the results for the period 2000-2008, Liquidity and Capital Adequacy have a negative influence on Financial results. At the same time, Capital share in Liabilities and Liquidity have a negative impact on Financial result, while the increasing Capital Adequacy has a positive impact on Financial result. In the period 2009-2012, all observed variables had a negative impact on Financial result.

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