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ANALYSIS OF COMPETITION IN BANKING SECTOR OF SERBIA

Banks play a vital role in the economy of a country and evaluation of their overall performances is very important. In the last 10 years the banking sector in Serbia has gone through the period of turbulence, changes of ownership structure caused by privatization, organizational structure changes inside bank institutions, as well as the changes due to law requirements. This paper will present and discuss the results of the econometric analysis of competition in banking sector of Serbia in the 5-year period from 2005 to 2009. The Panzar-Rosse H-statistics is used.

Keywords: banking sector; competition; H-statistics.

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АНАЛІЗ КОНКУРЕНЦІЇ В БАНКІВСЬКОМУ СЕКТОРІ СЕРБІЇ

У статті доведено, що банки грають важливу роль в економіці Сербії і оцінка ефективності їх діяльності дуже важлива. У останні десять років банківський сектор країни пройшов через період турбулентності, змін у структурі власності, викликаних приватизацією, змін організаційної структури банківських установ, а також змін, пов'язаних з вимогами закону. Представлено і обговорено результати економетричного аналізу конкуренції в банківському секторі Сербії за п'ятирічний період з 2005 по 2009 рік. Для аналізу використано метод H-статистики Панзара-Росса.

Ключові слова: банківський сектор; конкуренція; H-статистика.

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АНАЛИЗ КОНКУРЕНЦИИ В БАНКОВСКОМ СЕКТОРЕ СЕРБИИ

В статье доказано, что банки играют важную роль в экономике Сербии и оценка эффективности их деятельности очень важна. В последние десять лет банковский сектор страны прошел через период турбулентности, изменений в структуре собственности, вызванных приватизацией, изменений организационной структуры банковских учреждений, а также изменений, связанных с требованиями закона. Представлены и обсуждены результаты эконометрического анализа конкуренции в банковском секторе Сербии за пятилетний период с 2005 по 2009 год. Для анализа использован метод H-статистики Панзара-Росса.

Ключевые слова: банковский сектор; конкуренция; H-статистика.

Introduction. Serbian industry went through a long period of recession in the '90s. Banking industry faced decreasing performances, undeveloped financial market, absence of appropriate legal framework etc. In the last decade, comprehensive changes in the industrial sector, legal system and institutions and, consequently, in the banking system, occurred. The process of economy revitalization and restructuring of the banking system began in 2001 (Knezevic et al., 2011a,b). Out of about 50 banks owned by the state, which operated under very bad and nontransparent conditions and without trust from Serbia's population at that time, now, at the same mar-

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ket, there are over 20 foreign-owned banks and only few domestic, private or state-owned (Djuric, 2010; Knezevic et al., 2010; Bulajic et al., 2011). All of them operate under significantly different conditions, under strong control by the National Bank of Serbia (NBS), which adopted many regulations that are being applied in the European Union as well.

Decrease in the number of banks is an expected trend in the following period, through further consolidation of the banking sector, under the influence of the country's strategy on the question of its share in the ownership of banks. It is expected that further growth of banks will influence the increase of competition.

An important characteristic of banking in Serbia is a constant sharpening of competition. Besides the banks that are already operating at the market, there is an increased interest of foreign banks to enter "the last vacant market with high growth potential" (Jeremic, 2007). The strategy of the NBS was to direct foreign investors to purchase of domestic banks, so that between 2001 and 2008 no bank licenses were issued, not counting transformed savings banks. On the other hand, expansion of banks with majority of domestic capital which managed, in 2006, to strengthen its capital base by emission of stocks at Belgrade Stock Exchange, which were extremely current in stock exchange transactions and achieved significant growth, by which they successfully competed with foreign banks, is interesting. That can certainly make them even more interesting for foreign investors (Knezevic et al., 2012).

Due to constant tendency towards concentration of banking market, there is a fear of creation of oligopoly structure. That is not the case with Serbian banking sector. On the contrary, the banks in Serbia operate in healthy and strong competition. Confirmation of this can be found in the annual reports published by the NBS, that regularly follows the concentration level in banking sector.

In this paper, we will present the results of quantitative analysis which confirms that Serbian banks operate in conditions of strong competition.

Banking sector of Serbia. Market concentration and market shares of banks in Serbia, at the end of the year, for the years 2005 to 2009 are given in Table 1.

Table 1. **Market concentration and market shares of banks in Serbia**

Sector market share	2005		2006		2007		2008		2009	
	%	Nº of banks	%	Nº of banks	%	Nº of banks	%	Nº of banks	%	Nº of banks
More than 5%	52.3	5	52.6	6	52.77	6	51.62	6	57.71	7
2%-5%	18.2	5	25.8	8	35.79	11	36.27	11	29.83	10
Less than 2%	31.5	30	21.6	23	11.44	19	12.11	19	12.46	17
Total	100	40	100	37	100	36	100	36	100	34

It can be seen that the most intense competitive struggle occurs among medium banks, which managed to significantly increase their market share from 18.2% in 2005 to 36.27% in 2007. That growth was created at the expense of small banks whose share dropped from 31.5% to only 12.46%. Two medium banks even moved to the category of large banks, with 7 banks that make only 57.71% in 2009. It is clear that small banks are losing their pace more and more, while medium ones are scrambling for market share with large banks and among themselves.

A prominent characteristic of banking and the type of competitive battle in the previous two years is also an expansive policy of bank network spreading. There was a question of how many branches would Serbian market be able to absorb. However, during 2009, due to a combination of market saturation and world financial crisis, the number of bank branches decreased by about 12%. Still, the increase of the number of branches compared to 2005 is over 50%. Competitive battle results in wide assortment and higher quality of banking services.

The number of banks' branches and employees in banking sector of Serbia at the end of the year, for the years from 2005 to 2009, are presented in Figure 1.
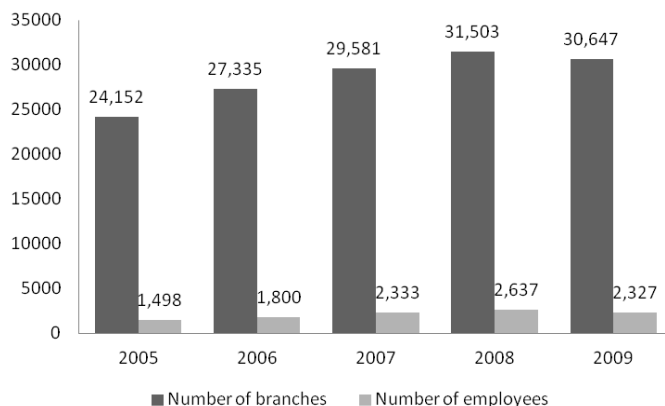
Figure 1. **The number of banks' branches and employees in banking sector of Serbia**

Financial sector is the mirror of the condition of the whole economy, while banking sector represents its most important part. Positive correlation of banking sector development and the whole economy was proven empirically a long time ago.

Investigating banking competition. The conditions in which the banks in Serbia operate are one of the topics that are especially popular in the years of the banking sector revitalization. The main elements of the research presented in this paper are individual banks in Serbia as participants on the observed market. Quantitative analysis of competition will be performed by testing hypotheses on (non)existence of monopoly. The research is performed at the level of the whole sector, so that the banks that are different in their ownership structure, time spent on the market, size, business orientation, strategy etc. are included in the analysis.

In the last 30 years in the world, many econometric models have been developed, which quantitatively evaluated conditions of modern economic systems. One of them is methodology for competition assessment using H-test developed by Rosse-Panzar in 1980's (Panzar, J. C. and Rosse, J. N., 1982) and which leans on Chamberlain's theory of static economic equilibrium. Due to the great importance of the banking sector in the economy, as well as transparent and standardized data given by the banks, this methodology is most widely applied in that field.

The main idea of the methodology is to set a linear regression model whose parameters are evaluated and, based on which, H-statistics is calculated. H-statistics

is a quantitative evaluation of market competition. If H is negative, the market is ruled by monopoly. Value 0<H<1 points to monopolistic competition. Some entities (banks) are fighting to be monopolists. In a case of perfect competition, H=1.

Such defined H-statistics enables comparison of competition in shorter time sub-intervals of a longer period of time and in that way gives possibility to view the competition trend of the observed branch of economy during a time period.

The goal of this paper is to determine the degree of competition at the banking market in Serbia and its trend.

Revenue test by Rosse-Panzar methodology in the banking sector is based on empirical observation of two components:

- Impact of revenue at the level of one bank, depending on its input factors;

- Analysis of mutual influence of all the banks at the observed market during a defined period of time

This theory was applied for the first time in banking in the works of Shafer in 1982. He modified the general equation of the model according to specific qualities of banking sector. As a response to criticism that Panzar-Rosse methodology is only efficient when the market is in long-term equilibrium, Shafer introduced a prerequisite for application of H-statistics, the so-called E-statistics. It takes ROA as a dependent variable, instead of revenue; ROA depends both on total revenue and total expenses. E-statistics examines if a market is in equilibrium (E=0).

The structure of the models is as follows (Shaffer, S., 1982):

- Shafer's E-statistics:

$$\ln ROA_{it} = \alpha'_0 + \alpha'_1 \ln PL_{it} + \alpha'_2 \ln PK_{it} + \alpha'_3 \ln PF_{it} + eksties$$

$$E = \alpha'_1 + \alpha'_2 + \alpha'_3$$

- Panzar-Rosse H-statistics:

$$\ln REV_{it} = \alpha_0 + a_1 \ln PL_{it} + a_2 \ln PK_{it} + a_3 \ln PF_{it} + \beta_1 \ln RISKASS_{it} + \beta_2 \ln ASSET_{it} +$$
$$+ \beta_3 \ln BR_{it} + y_1 GROWTH_t$$

$$E = \alpha_1 + \alpha_2 + \alpha_3$$

Where, for the bank i, $i=1,2,…,N$ and year t, $t=1,2,…,J$:

- *ROA* is the return on asset;
- *REV* is the ratio of revenue to total asset;
- *PL* is the personnel expenses to employees;
- *PK* is the ratio of capital asset to fixed asset;
- *PF* is the ratio of annual interest expanses to total loanable funds;
- *RISKASS* is the ratio of provisions to total assets;
- *ASSET* is bank size, measured by total asset;
- *BR* is the ratio of the bank's number of branches to the total number of branches for all banks;
- *GROWTH* is the rate of GDP growth for the year t.

The models consist of 4 parts:

- Variables that refer to internal factors in a bank (α coefficients);
- Variables that refer to external factors that rule banking sector (β coefficients);
- Variables that refer to the whole economy of a country (γ coefficient) and

- Standard parts of all regression models (intercepts α'_0 , α_0 , observation errors that are dependent on mutual influence of banks w'_{it} , w_{it} and errors of the models ε'_i and ε_i).

For the needs of the analysis, it is necessary to gather data on all the included entities and all the indicators for all the years included.

Competition in banking sector of Serbia. Due to problems with gathering consistent data that are necessary for competitive analysis, the research of banking competition in Serbia will include 5-year period, from 2005 to 2009 (at the time of writing the paper, relevant data for 2010 were not available), the source is the NBS.

The NBS as the central bank in Serbia is responsible for monetary policy in the country, has the role of the main supervisor of all banks. Banks are obliged to send quarterly financial reports on their business, which are then published on the NBS website. At the end of every year banks are obliged to file a report by an authorized external auditor, which represents the most reliable source of data.

On the NBS website all data from banks currently operating since 2003 are available. However, due to constant harmonization with the EU regulations, the format of the published data has been changing. Also, due to intense changes of bank owners in the period between 2003 and 2005 and merging of some banks, the analysis cannot include the period before 2005.

Out of 34 banks operating in Serbia at the end of 2009, from the analysis are excluded 4 banks for which the data are not available for all the years. Those banks are Kosovsko-Metohijska bank and Jugobank Kosovska Mitrovica, which are local and do not have all data, and Moskovska and Opportunity banks started their work in 2007 and 2008. The sum of assets of all these banks is less than 1% of total assets in the banking sector of Serbia in 2009, their exclusion from the analysis will not disturb the general image and it can be considered that the whole population is included. Finally, in the analysis presented in this paper 5 years from 2005 to 2009 and 30 banks operating in Serbia at the end of the considered period are taken. The analysis is conducted for the whole observed period, 2005-2009, and for two subperiods, 2005-2006 and 2007-2009.

The analysis is performed in EViews software and fixed effects panel data models are used. The results for the tests of equilibrium (E-statistics) for the analysis performed on the data for all 3 observed periods are given first, in Table 2 (t-ratios are given in parentheses).

The main result in Table 2 is the equilibrium test, i.e. test of the hypothesis H0 that E-statistics does not significantly differ from 0. Wald test is used and its results show that H0 can be accepted at all significance levels for all three observed periods. The conclusion is that the banking sector of Serbia appears to be significantly in a state of equilibrium. These results enable further research and application of Panzar-Rosse methodology in order to examine the competition in banking sector of Serbia.

The value of the contestability parameter H is given in the last row of Table 3. Other relevant results of the analysis are presented in the same table. For H-statistics, hypotheses H0 (H=0) and H1 (H=1) for the observed periods are tested.

The value of H-statistics for the overall period, from 2005 to 2009, is 0.0767, positive, but near 0, and indicates that the market is not competitive. The fact that hypothesis H1 for this period is rejected, for all the significance levels, confirms that.

In order to analyze the problem in more details and to find trends of competition in the years of development of the banking sector, as mentioned above, the period is divided in two subperiods and different results are obtained for them.

Table 2. **Tests of market equilibrium in Serbian banking sector**

Variable	2005-2009	2005-2006	2007-2009
Intercept	0.283	-0.317	-2.749
	(0.674)	(-0.209)	(-1.864)
ln PL	-0.021	-0.054	-0.005
	(-0.731)	(-0.634)	(-0.058)
ln PK	0.059	0.034	0.017
	(5.034)	(2.172)	(0.669)
ln PF	-0.026	0.013	0.124
	(-1.078)	(0.545)	(4.914)
ln RISKASS	0.008	0.017	-0.022
	(0.503)	(0.573)	(-0.449)
ln ASSET	-0.028	-0.006	-0.034
	(-1.078)	(-0.068)	(-0.747)
ln BR	0.014	0.023	0.137
	(0.932)	(0.31)	(1.492)
ln GROWTH	0.003	0.067	0.007
	(2.060)	(1.042)	(3.3)
R^2 within	0.501	0.749	0.726
F-statistics	3.153	1.903	3.895
Ho: E=0	$F_{(1,113)} = 0.1365$	$F_{(1,23)} = 0.0052$	$F_{(1,53)} = 2.1188$
Probability	0.7125	0.94	0.151
E - statistics	**0.0128**	**-0.0066**	**0.1352**

Table 3. **Tests of competition for Serbian banking sector**

Variable	2005-2009	2005-2006	2007-2009
Intercept	8.533	10.804	3.223
	(3.366)	(0.831)	(0.753)
ln PL	-0.167	-0.974	0.348
	(-0.961)	(-1.346)	(-1.347)
ln PK	0.200	0.1494	0.212
	2.803	(1.129)	(2.908)
ln PF	0.043	0.481	0.136
	0.502	(2.287)	(1.849)
ln RISKASS	-0.022	-0.005	0.003
	(-0.229)	(-0.018)	(0.018)
ln ASSET	0.349	0.107	0.741
	(2.201)	(0.154)	(2.777)
ln BR	0.041	0.633	-0.118
	(0.442)	(1.001)	(-0.882)
ln GROWTH	0.011	0.632	0.003
	(1.268)	(1.149)	(0.565)
R^2 within	0.9195	0.9703	0.9854
F-statistics	35.882	20.869	99.399
Ho: H = 0	$F_{(1,113)} = 0.1329$	$F_{(1,23)} = 0.1915$	$F_{(1,53)} = 6.6513$
Probability	0.7161	0.6657	0.0127
H_1: H = 1	$F_{(1,113)} = 12.239$	$F_{(1,23)} = 2.9184$	$F_{(1,53)} = 1.2843$
Probability	0.000	0.101	0.2622
H - statistics	**0.0767**	**-0.3444**	**0.6948**

The value of H-statistics for the period 2005-2006 is -0.3444. Both hypotheses, H = 0 and H = 1, can not be rejected at none of the usual significance levels, but it

can be concluded that the sector in this period is almost monopolistic. The absence of perfect competition and existence of monopoly in the observed period can be explained based on the data on the banks' performances used in the analysis. Namely, two big banks (Banka Intesa and Komercijalna Banka) out of 30 analyzed, stand out due to their large assets and widely spread networks. They have a share of over 30% of these indicators (additionally, shares of expenses in relation to total assets are significantly lower than for other banks). Besides, two other banks (Hypo and Raiffeisen) are singled out due to large assets, but less widely spread networks, as well as Vojvodanska banka, due to its very well developed network, but smaller assets.

In the second period, 2007-2009, when all the banks in previous years strengthened their positions and witnessed much fiercer market fight, the value of H is 0.6948. The hypothesis H=0 can be rejected at the level 0.05 and the hypothesis that there exists perfect competition (H=1) can be adopted at all the levels.

The situation on the market is completely different compared to previous two years. Coefficient with PL is now positive (by increasing expenses for salaries, i.e. by stimulation of working force, revenue increases as well) while others had a decrease, but are still positive.

By comparing values and tests' results for 3 periods, some conclusions can be derived. Value H=0.0767 and the results of W-test, which confirms the hypothesis that in the period from 2005 to 2009 there exists a monopoly, is in conflict with the results from the last 3 years, then the hypothesis that there exists perfect competition at the market is accepted. The explanation of this paradox lies in the fact that the strength of monopoly from the first two years is much bigger from the strength of perfect competition from the last 3 years, so the end result H-statistics gravitates more towards monopoly and blurs the whole picture.

Still, the general trend is that H-statistics is rapidly growing with development of financial market in Serbia. Absolute change of value of H-statistics is 1.039. It is empirically impossible to achieve the maximum value of 1 and the state of perfect competition.

The results obtained are consistent with similar researches that were conducted and that described certain rules for movements of H-statistics trend (2009). Average value of H for 25 analyzed countries in the research of J. Goddard and J. Wilson is 0.528. For developing countries the average is 0.698, and for developed ones it is 0.371. The value of H-statistics in Serbia for the second period is almost equal to the average of developing countries, according to the mentioned research.

Based on the present research, general trend of movement of H-statistics can be seen. Shortly after structural reforms in the country, competition of banking market increased up to a point after which there was a longer period of growth saturation and separation of big players at the market. They gradually either oust or take over smaller players and, by that, decrease the strength of competition. Gradually oligopoly or monopoly appears, which can be proved by identifying decrease of competition indicators. Consequences of such trends are obvious during the global financial crisis which started in 2008. However, with efficient legal mechanisms and strong institutions authorized to prevent absolute monopoly at financial markets, situations where the values of H-statistics in developed countries would reach negative values are very unlikely.

Conclusion. Transition as a complex process of movement from one system into another, better and more efficient system, has its advantages and disadvantages. Since transition is carried out at all levels of the society, it is difficult to scientifically measure progress in a defined period of time (Adries & Asandului, 2010; Gverovski et al., 2011; Milovic, 2010; Motocu, 2011; Tunuguntla & Berjan, 2011). Economy as the most important part of a society is encompassed by most extensive changes during transition. Financial sector, as the heart of economy, first started fierce reform, and it can be said that it ended first in Serbia. Since the most was done in transition, and U-cycle of transition is at its end, here are presented the results of the objective econometric analysis testing one of the most important qualities of the new system: competition (Efendic and Avdic, 2011).

After 10 years of transition and questionable structural reforms in many spheres in Serbia, we can, with certainty, say that the banking sector in Serbia was successfully reformed. The number of banks was almost cut in half. The banks whose business was bad went into bankruptcy. Foreign banks arrived, which invested a lot into the development of the banking sector, as well as the economy of Serbia. NBS started successful application of standards that are in accordance with the EU regulations. It is certain that the image of the banking sector 10 years ago and now are unbelievably different, and obviously, for better. Concrete proofs for this claim are the results of Panzar-Rosse methodology for banking sector competition analysis.

Until Serbia enters the circle of developed countries, there should not be a drastic decrease of competition, based on the experiences from other countries. The advantage of such market is the stability of the whole system in case new participants enter, or if the existing participants crash.

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