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Internal factors of bank profitability in the republic of Serbia

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Abstract: For adequate profitability management, it is important to identify all the factors that lead to its rise or fall, as well as to determine the intensity of correlation between relevant factors and profitability. This is to take timely and adequate measures to eliminate deviations arising from the expected profitability and improve it in the future period. The research subject is bank profitability in the Republic of Serbia in the period 2012-2015. The research objective is to outline the possible factors of bank profitability, with particular reference to internal factors of banking sector profitability in the Republic of Serbia. Research results show a high degree of correlation between the ROA and ROE profitability ratios, both statically and dynamically; dynamics of profitability ratios is in inverse correlation with capital adequacy ratio; there is a link between bank size and profitability and a link between the change of bank ownership and profitability, but it does not necessarily mean that foreign banks are more profitable than domestic banks.

JEL Classifications: G21

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1. Introduction

A modern business environment imposes new demands on managers in the process of adopting and implementing management and business decisions. Today, banks face complex regulations and high costs to apply them. At the same time, costs of switching to the new electronic banking platform are getting higher. For small banks, this is a comparative disadvantage, compared to large banks. This is because these high fixed costs are allocated to small assets. Nevertheless, bank size is not the only factor affecting bank profitability in the long run. Profitability depends on bank-specific factors and the market on which it operates. For example, bank factors such as business strategies are reflected in the structure of bank assets and liabilities and this can affect profitability. At the same time, market factors, such as market growth, market capitalization, and the like, can significantly influence long-term profitability. An efficient banking system is a prerequisite for economic growth and development of a country. Hence, the role of commercial banks and their efficiency, above all, profitability, has been the subject of academic research for many years. This applies both to developed market economies and transition economies, as the one of the Republic of Serbia. Commercial bank loans are one of the most important sources of funding for small and medium-sized enterprises in transition countries.

In the 1990s, the banking sector in the Republic of Serbia was ruined, primarily due to the conditions characterizing the environment in which the banks operated (political instability, high inflation, economic isolation, loss of foreign currency savings, and

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complete loss of confidence in the banking sector). Due to the overall situation, banks were not able to perform their mediation role, solve non-performing loans, manage risks, and operate in accordance with prudential rules. Enormous losses and dependence on political structures were clear signals that privatization and bank restructuring were needed to create a market banking model (Todorović & Tomić, 2017). At the same time, inflow of foreign capital into the banking sector was encouraged through the establishment of foreign bank branches and the capital increase of domestic banks.

The result of the restructuring process is the modern and stable banking sector, which managed to remain stable even in crisis conditions. Capital adequacy, liquidity, and solvency ratios have significantly improved, and profitability growth has been achieved in a very short period of time.

The enviable growth of the banking sector of the Republic of Serbia is somewhat slowed down by the newly emerging situation in the world. The global crisis, which began in 2007 on the US mortgage market, quickly spilled over the rest of the world. Serbian economic and financial sector have also felt the crisis impact. First of all, the crisis has had a psychological effect on people. Banks in the Republic of Serbia felt the first financial crisis blow in October 2008, when people in panic withdrew foreign currency savings in the amount of 960 million euros in just a month and a half. Banks, as the key players in the financial system of Serbia, received significant funds for their lending activities from their central offices abroad. However, at the time of a global decline in confidence in the banking system, any connection with European banks that experienced losses with securitized securities is an additional factor affecting financial crisis spillover.

Judging by the current situation, it is obvious that the crisis did not significantly affect the banking sector of the Republic of Serbia, which is still relatively stable, highly liquid, and adequately capitalized. First of all, there were no direct risks related to investment in securitized mortgage loans and other high-risk financial instruments, which are at the heart of the global financial crisis. Also, restrictive measures of the National Bank of Serbia, which caused high liquidity, adequate capitalization, and overvaluation of provisions for non-performing loans, proved to be an advantage of the domestic banking system in relation to all other countries in the region. At the same time, such NBS measures relatively quickly mitigated negative psychologically induced factors, which led to a massive withdrawal of household deposits at the very beginning of the crisis. Banks successfully responded to deposit withdrawal requests, and as early as December 2008 not only stopped the outflow, but also influenced new deposit inflows. In this way, practically, confidence in the banking sector was preserved.

Due to the pronounced bank-centrism of the Serbian financial system, the prevailing number of foreign-owned banks, and the significantly unfavourable performance of the real sector, the paper examines the correlation of certain internal factors and bank profitability.

The paper does not consider all internal and external factors, but only whether bank size and change in ownership have an impact on profitability. Hence, research objectives are to establish:

1. Correlation between bank profitability ratios (ROA and ROE) and capital adequacy ratio;
2. Whether bank size, measured by balance sheet assets and the number of employees, affects bank profitability ratios;

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3. Whether ownership structure has an effect on bank profitability; and
4. Whether the change in ownership affects the change in bank profitability.

2. Review of literature and development of hypotheses

Arshadi & Lawrence (1987) analyze new bank performance. The authors show that bank performance is determined by endogenous factors that bank management controls. Operating costs and deposit growth are influenced by management policies. Surprisingly, demand factors (demographics and net income) do not significantly affect bank performance. The authors emphasize multidimensional approach to bank performance measurement. Dietrich & Wanzenried (2014) investigate whether and why commercial bank profitability varies in low-, medium-, and high- income countries, and whether bank profitability ratios depend on income level and economic development of individual countries. The authors conclude that commercial bank profitability ratios vary considerably, and that income level has a significant impact on profitability ratios. Dependent variables are the three common accounting profitability ratios, return on average assets (ROAA), return on average equity (ROAE), and net interest margin (NIM). Independent variables are bank characteristics, as internal factors, capital ratio, cost-to-income ratio, loan loss provisions, deposit growth, bank size, interest income share, funding costs, bank ownership, bank nationality, and macroeconomic factors and industry-specific characteristics, as external factors, effective tax rate, inflation rate, gross domestic product growth rate, gross domestic product per capita, stock market capitalizations to GDP, bank concentration. Dummy variable is the financial crisis in the period 2007-2009.

Petria, Capraru, & Ihnatov (2015) assess the main determinants of bank profitability in the 27 banking systems of the European Union in the period 2004-2011. Dependent variables are the rate of return on average assets (ROAA) and the rate of return on average equity (ROAE). Independent variables are internal factors that directly relate to the bank: bank size, capital adequacy, credit risk, management efficiency, liquidity risk, business mix indicator, and external factors characteristic of the banking system, market concentration, and external macroeconomic factors, inflation rate and economic growth rate. The results obtained correspond to the expected. Credit and liquidity risk, management efficiency, business diversification, market concentration / competition, and economic growth rate have an impact on bank profitability, both on return on average assets and return on average equity. An interesting result is the positive impact of competition on bank profitability.

Regehr & Sengupta (2016) analyze how bank profitability changes depending on bank assets, taking into account other factors that affect profitability. The authors find that bank profitability, measured by return on assets (ROA), increases with bank size, but at a declining rate. In addition, the authors do not find a statistically significant difference in size-profitability ratio before and after the crisis and claim that this relationship has not changed in recent times to leave small banks at a comparative disadvantage in comparison to large competitors.

There are good reasons why it is possible to believe that bank size and profitability are linked. Large banks can increase bank profitability because the size allows them to realize economies of scale. This means that large banks can allocate fixed costs to a broader assets base, thereby reducing average fixed costs. In addition, large banks can make greater

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risk diversification by diversifying their activity portfolio, both in terms of bank products and geographically (Regehr & Sengupta, 2016). A lower risk contributes to greater profitability directly through loss reduction, or indirectly by making creditors willing to accept lower return at lower risk, which, in turn, reduces funding costs.

Tan (2017) tests the effect of competition and shadow banking on bank profitability on a sample of 100 Chinese commercial banks in the period 2003-2013. The author concludes that non-interest income market has a higher level of competition in relation to deposit and loan market. Lower competition level on the deposit market leads to higher profitability of Chinese commercial banks. Finally, the results of the survey indicate that shadow banking improves the profitability of Chinese banks.

Trujillo-Ponce (2013) examines bank profitability ratios in Spain in the period 1999-2009. The author concludes that the high profitability of banks in this period is related to a large share of loans in total assets, large share of customer deposits, good efficiency, and low doubtful assets. A high capital ratio increases the rate of return on assets as a measure of profitability. The author points to differences between the performance of commercial banks and savings banks.

Medeiros Garcia & Guerreiro (2016) study profitability of 27 universal banks in Portugal in the period 2002-2011. Profitability benchmarks are return on average assets (ROAA), return on average equity (ROAE), and net interest margin. Among independent variables, the authors include several bank-specific ones, as well as macroeconomic and industry-specific variables, which have not been previously considered in studies. As internal factors, or bank characteristics, there is equity over total assets, cost-income ratio, loan loss provisions over total loans, annual growth in deposits, difference between total loan growth at the bank and market level, interest income share, cost financing. The macroeconomic factors and industry-specific factors are included as external factors, namely: effective tax rate, real growth of gross annual product, term structure of interest rates, and yearly growth of household disposable income. The authors conclude that the selected independent variables behave in accordance with expectations and that bank profitability depends on bank-specific factors and macroeconomic factors. This is because the impact of independent variables on dependent ones varies depending on whether the relationship is observed before, during, or after the crisis. The authors found that the variables such as the difference between bank and market growth to total loans and the yearly growth of household disposable income have the positive impact on banks' profitability, while the variables, such as the cost-income ratio and GDP, have negative impact on banks' profitability.

Chime, Ramos, & Dias (2016) analyze the banking sector performance before and during the global financial crisis. The authors consider it possible to create two clusters. Prior to the crisis, one cluster consists of banking institutions in developed economies with floating stock performance, while another cluster consists of banking institutions in developing economies with subordinate performance. During the crisis, banking institutions behaved similarly and the synchronization regime increased.

Staikouras, Mamatzakis, & Koutshomanoli-Filippaki (2007) analyze the performance of the banking sector in Southeast Europe in the period 1998-2003. Specifically, the authors examine the relationship between operating expenses and bank, market, and national economy specifics. Business performance is in a positive correlation with loan quality and asset size or bank market share, but negatively correlated with liquidity, loan ratio, and years of bank existence.

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Djalilov & Piesse (2016) investigate bank profitability determinants in early transition countries of Central and Eastern Europe and late transition countries of former USSR. The results of the survey show that profitability determinants vary among transition countries. The banking sector in early transition countries is more competitive. Nevertheless, credit risk has a positive impact on bank profitability in early transition countries, but negative in later transition countries. Government spending and monetary freedom have a negative impact on bank profitability only in late transition countries. Better capitalized banks are more profitable in early transition countries because these banking sectors are more robust. As a dependent variable, the authors take the rate of return on assets (ROA), and, as independent variables, capital, credit risk, costs, bank size, square sum of bank market share, annual gross domestic product growth rate, inflation rate, government spending, fiscal and monetary freedom.

Bonin, Hasan, & Wachtel (2005) investigate the effects of ownership, in particular the influence of foreign capital, on bank efficiency in 11 transition countries. The authors conclude that privatization alone is not sufficient to increase bank efficiency since state-owned banks are not particularly less efficient than domestic private banks. The authors find that foreign banks are more cost-efficient than other banks and provide better services, especially if the bank has an international strategic partner. As a measure of profitability, the rate of return on assets (ROA) and rate of return on equity (ROE) are taken. Independent variables are bank size and type of bank ownership. Lin & Zhang (2009) also investigate the impact of a change in bank ownership and performance in China. The authors conclude that state-owned commercial banks are less profitable and less efficient, with poorer quality of assets than other types of banks.

Gupta (2015) compares bank profitability of the old and new private bank sector and concludes that the old private sector has better results than new private banks. The new private sector has been formed after the reform and has a good capital base, professional labour, and technical superiority. By contrast, the old private sector does not have skilled labour, nor does it possess technological skills. Despite these weaknesses, the old private sector has better results than new private banks in all segments, except in terms of return on equity, as a measure of profitability. Similar results are found in terms of net profit/total assets ratio. The reasons why the old private bank sector has such performance in relation to the new private banking sector are the ability to control non-interest expenditures, non-performing assets, and operating expenses. Berger et al. (2005) analyze static and dynamic effects of bank ownership on profitability. Based on data from Argentina in the 1990s, the authors conclude that state-owned banks have poor long-term performance (static effect). Banks that went through the privatization process had particularly poor performance (selection effect), but these banks dramatically improved next privatization (dynamic effect). This is because most improvement was due to the placement of non-performing loans into residual entities, leaving "good" privatized banks aside.

Seemule et al. (2017) analyze profitability determinants of commercial banks in Botswana. The authors classify determinants into internal and external factors. Internal factors relate to bank-specific factors that can be controlled by bank management, namely: capital adequacy, operational efficiency, liquidity, asset quality, and bank size. External factors relate to macroeconomic factors, such as gross domestic product, inflation, and money supply. As the dependent variable, the rate of return on assets (ROA) is taken to measure profitability. The authors prove that capital adequacy and bank size are in a positive correlation with bank profitability. Operational efficiency and asset quality have no

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significant impact on bank profitability. In contrast, liquidity, gross domestic product, and money supply have a significant but negative impact on profitability. Inflation has a positive but insignificant impact on bank profitability. Sufian (2012) examines profitability determinants in developing countries, the banking sector of South Asia in particular. The author proves that bank-specific characteristics – liquidity, non-interest income, credit risk, and capitalization – have a positive and significant impact on bank performance, while costs are in a negative correlation with bank profitability. As for macroeconomic indicators, the results show that economic growth has a positive and significant impact, while inflation has no significant impact on bank profitability. In addition, private investment is positively related to bank profitability, while private consumption expenditure has a negative impact.

Bucevska & Misheva (2017) investigate profitability determinants in the banking sector on a sample of 127 commercial banks from six Balkan countries (Slovenia, Croatia, Serbia, Bosnia and Herzegovina, Montenegro, and Macedonia) in the period 2005-2009. The authors conclude that the banking sector efficiency is significantly and positively related to bank profitability, while the concentration of the banking sector is of no particular significance. In addition, the authors argue that bank size has no impact on profitability, while ownership has a positive impact. Inflation and economic growth have no impact on bank profitability. Ganić, Ismić, & Riđić (2015) research what triggers the profitability of the banking sector in the case of Bosnia and Herzegovina. The results of their survey show that the rate of return on average assets (ROAA) is positively correlated with capital employment, effective management of operating expenses, increased share of deposits in financial loans. On the other hand, rate of return on equity (ROE) depends on cost efficiency and credit risk management.

Knežević & Dobromirov (2016) investigate the impact of banking, market, and macroeconomic factors on bank profitability in the Republic of Serbia in the period 2004-2011. The rate of return on assets (ROA) is taken as dependent variable. Independent variables are: bank-related factors (bank size, cost-to-income ratio, bank capitalization, bank liquidity); market factors (market concentration, total assets of commercial banks divided by gross domestic product, market capitalization to total assets of commercial banks); macroeconomic factors (market capitalization to GDP, annual inflation rate, gross domestic product growth rate). The results show that bank factors and market factors affect bank profitability, but macroeconomic factors do not. The authors find that the influence of liquidity and financial development measures on bank profitability in the Republic of Serbia is in contrast to the same in the European Union. In addition, various factors affect the profitability of domestic and foreign banks, while the financial crisis has the opposite effect on the profitability of domestic and foreign banks.

Alihodžić (2016) examines the correlation between return and risk for a large group of banks in the Republic of Serbia. The main research objective is to determine factors such as bank size, operating activities, lending activities, competitive environment, and bank management style, which have an impact on return and risk correlation. The author concludes that performance sustainability over time depends primarily on the defined strategy, risk tendency, and bank management skills. Long-term sustainability of performance and profitability can be achieved by increasing loans and an adequate risk management process. Proceeding from a detailed literature review, it is possible to define the following starting hypotheses:

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1. Banks with higher profitability ratios of ROA and ROE have a higher capital adequacy ratio;
2. Larger banks, measured by the size of balance sheet assets and number of employees, have better profitability in the observed period;
3. Foreign banks record higher profitability than domestic banks;
4. Banks in which ownership change has occurred record higher profitability compared to banks in which there has been no change in ownership.

3. Research method

In order to test the research hypotheses, data is taken from the Annual Reports of the Association of Serbian Banks (Serbian Banking 2012, 2013, 2014 and 2015). The sample consists of 20 banks, out of a total of 28 ones. Specifically, the sample consists only of banks with all data on the relevant variables available, i.e. rate of return on total assets (ROA), return on equity (ROE), and capital adequacy ratio. Table 1 gives an overview of banks under survey, with all the relevant characteristics: bank size based on total balance sheet assets (in millions of euros), bank size based on a number of employees, ownership, and change of ownership. Bank size is determined according to two criteria, size of balance sheet assets and number of employees. Table 2 shows the bank ranking according to the value of balance sheet assets in 2015*. Table 3 ranks banks by the number of employees in 2015. Table 4 gives an overview of bank performance measures, namely rate of return on assets (ROA), return on equity (ROE), and capital adequacy ratio in the period 2012-2015†. Profitable banks are considered banks with positive values of ROA and ROE in all years of the observed period. All tests are made at a confidence level of 95%.

The results obtained are statistically processed using the adequately selected statistical methods, depending on data type and distribution, thus providing an optimal model for understanding the dependence and differences between the studied research results. χ^2 independence test is applied in data processing and analysis, as a non-parametric test. This is because it is a small sample that does not have a normal distribution.

4. Results and discussion

Table 5 shows the Pearson correlation coefficient matrix of all individual variables, return on assets (ROA), return on equity (ROE), and capital adequacy ratio (CAR).

Based on the data in Table 5, it can be concluded that there is a high degree of correlation between ROA and ROE, both by years and overall. Between ROA and ROE, on one side, and capital adequacy ratio, on the other side, there is a low degree of correlation; and in some years it is negative, which means that the movement of profitability ratios is in contrast to the capital adequacy ratio. It is concluded that hypothesis 1 cannot be accepted.

In order to test the second, third, and fourth hypotheses, two independent samples are isolated from a set, to test the relationship between the two features. Thus, two

* The reason why 2015 is taken is the unavailability of the 2016 and 2017 data in authors' research period.
† During the research period, the 2016 and 2017 data was not available.

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independent samples are taken from the same sample: large and small banks, domestic and foreign banks, banks in which the ownership change occurred, and banks in which there was no change in ownership. As dependent variable modalities (profitability), unprofitable and profitable bank are taken.

Table 6 shows the relationship between *bank size* and *profitability*. Two independent samples are singled out from the same sample, i.e. large and small banks.

Given that it is the 2x2 contingency table, the degree of freedom is 1*. At the degree of freedom of 1 and p = 0.05, in the table with χ^2 distribution, the limit value is $\chi^2 = 3{,}841$.

$\chi^2 = 146{,}89 > \chi^2_{(1i\ 0{,}05)} = 3{,}841$ and $p<0{,}05$.

As the χ^2 value of 146.89 is higher than the limit table value of $\chi^2 = 3{,}841$, at the degree of freedom of 1 and the significance threshold p = 0.05, an alternative hypothesis with error $p<0.05$ and certainty $P>95\%$ is accepted, to conclude that there is correlation between bank size and profitability, which confirms hypothesis 2, i.e. there is a link between bank size and profitability. In order to determine the intensity of correlation between bank size and profitability, we calculate contingency coefficient:

Table 7 shows the correlation between the *type of bank ownership* and *profitability*. Two independent samples are singled out from the same sample, i.e. foreign and domestic banks.

As the χ^2 value of 1.740 is higher than the limit table value of $\chi^2 = 3{,}841$, at the degree of freedom of 1 and the significance threshold p = 0.05, an alternative hypothesis with error $p<0.05$ and certainty $P>95\%$ is rejected, to conclude that there is no correlation between the type of bank ownership and profitability, which rejects hypothesis 3, i.e. there is no link between the type of bank ownership and profitability. In order to determine the intensity of correlation between the type of bank ownership and profitability, we calculate contingency coefficient:

$$C = \sqrt{\frac{\chi 2}{N+\chi 2}} = \sqrt{\frac{1{,}74}{20+1{,}74}} = 0{,}023$$

For the 2x2 contingency table, the maximum value of contingency coefficient is:

$$C_{max} = \sqrt{\frac{2-1}{2}} = \sqrt{0{,}5} = 0{,}707$$

Since the value of contingency coefficient is closer to zero, we conclude that the correlation between the type of bank ownership and profitability is of low intensity.

* Degree of freedom is determined by formula: S.S. = (K - 1) x (R - 1), where K - number of columns, and R - number of rows.

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Table 8 shows the correlation between the *change of ownership* and *bank profitability*. From the same sample, banks in which there was a change of ownership and banks in which there was no change of ownership are taken.

As the χ^2 value of 11.61 is higher than the limit table value of $\chi^2 = 3{,}841$, at the degree of freedom of 1 and the significance threshold $p = 0.05$, an alternative hypothesis with error $p<0.05$ and certainty $P>95\%$ is accepted, to conclude that there is correlation between the change in ownership and profitability, which accepts hypothesis 4, i.e. there is a link between the change in ownership and profitability. Please note that it does not mean, as seen in the previous case, that foreign banks are more profitable. In order to determine the intensity of correlation between the change in ownership and profitability, we calculate contingency coefficient:

$$C = \sqrt{\frac{\chi 2}{N+\chi 2}} = \sqrt{\frac{11{,}61}{20+11{,}61}} = 0{,}606$$

As in the previous case, for the contingency table 2x2, the maximum value of contingency coefficient is:

$$Cmax = \sqrt{\frac{2-1}{2}} = \sqrt{0{,}5} = 0{,}707$$

Since the value of contingency coefficient is closer to the maximum value of contingency coefficient, we conclude that the correlation between the change in bank ownership and profitability is more intense and stronger. In order to determine the effects of takeover on bank profitability and apply the McNemar's test, data on bank profitability before the takeover, not only after the takeover is needed. Considering that there is no profitability data before the takeover for all the banks, such an analysis will not be carried out.

5. Conclusion

Bank profitability depends on bank-specific characteristics and the market on which it operates. Profitability determinants can be of internal and external character. Internal factors that determine bank profitability include: capital ratio, cost-to-income ratio, loan loss provisions, deposit growth, bank size, interest income share, funding costs, bank ownership, and bank nationality. External factors are macroeconomic factors and industry-specific characteristics: effective tax rate, inflation rate, growth rate of gross domestic product, GDP per capita, stock market capitalizations to GDP, concentration of banks. Dummy variable is the financial crisis in the period 2007-2009. Hence, the general conclusion is that bank profitability determinants are different in developed countries, transition economies (emergency countries), and developing countries. Nevertheless, the determinants considered to be the primary are capital adequacy ratio, bank size, type of ownership, and the change of ownership. The paper analyzes the correlation between internal factors and profitability. External factors – market and macroeconomic factors – are excluded because the macroeconomic environment is significantly more unfavourable than the financial one. This can be considered as research limitation.

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The results of the survey show that banks with higher profitability levels do not necessarily have higher capital adequacy ratio. Large banks, as measured by the size of balance sheet assets and the number of employees, record higher profitability in the observed period. It has not been proven that foreign banks record higher profitability than domestic banks. In contrast, banks that have changed ownership record higher profitability than banks with no change in ownership.

In the future, it is desirable to include other variables, such as market and macroeconomic ones, as well as to consider the impact of the financial crisis on bank profitability. In addition, in order to better assess bank efficiency, it is desirable to include, in addition to traditional accounting measures, non-financial performance benchmarks.

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Appendix

TABLE 1. OVERVIEW OF ANALYSED BANKS

NO.	NAME OF THE BANK	SIZE ACCORDING TO TOTAL BALANCE SHEET ASSETS (IN MILLIONS OF EUROS) IN 2015	SIZE ACCORDING TO THE NUMBER OF EMPLOYEES IN 2015	OWNERSHIP	CHANGE IN OWNERSHIP
1	AIK Banka	1.472	610	Domestic	Yes
2	Alpha Bank	667	948	Foreign	Yes
3	Banca Intesa	4011	3010	Foreign	Yes
4	Banka Poštanska štedionica a.d.	868	1872	Domestic	No
5	Crédit Agricole Bank	588	865	Foreign	Yes
6	Erste Bank	966	1027	Foreign	Yes
7	Eurobank	1156	1315	Foreign	Yes
8	Findomestic (taken over in 2017)	114	292	Foreign	Yes
9	HalkBank	263	395	Foreign	Yes
10	Hypo Alpe Adria Bank (taken over in 2016)	835	753	Foreign	No
11	Komercijalna banka	3222	2877	Domestic	No
12	OTP banka	372	673	Foreign	Yes
13	ProCredit bank	677	644	Foreign	No
14	Raiffeisen Bank	1927	1617	Foreign	No
15	SBERBANK	878	768	Foreign	No
16	Societe Generale Banka	1895	1349	Foreign	No
17	Srpska banka	73	73	Domestic	No
18	UniCredit banka	2535	1145	Foreign	No
19	Vojvođanska banka	989	1579	Foreign	Yes
20	NLB banka	236	459	Foreign	No

Source: Authors.

TABLE 2. RANKING OF BANKS ACCORDING TO TOTAL BALANCE SHEET ASSETS

NO.	NAME OF THE BANK	SIZE ACCORDING TO TOTAL BALANCE SHEET ASSETS (IN MILLIONS OF EUROS) IN 2015
1	Banca Intesa	4011
2	Komercijalna banka	3222
3	UniCredit banka	2535
4	Raiffeisen Bank	1927
5	Societe Generale Banka	1895
6	AIK Banka	1.472
7	Eurobank	1156
8	Vojvođanska banka	989

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TABLE 2. RANKING OF BANKS ACCORDING TO TOTAL BALANCE SHEET ASSETS

NO.	NAME OF THE BANK	SIZE ACCORDING TO TOTAL BALANCE SHEET ASSETS (IN MILLIONS OF EUROS) IN 2015
9	Erste Bank	966
10	Sberbank	878
11	Banka Poštanska štedionica a.d.	868
12	Hypo Alpe Adria Bank (taken over in 2016)	835
13	ProCredit bank	677
14	Alpha Bank	667
15	Crédit Agricole Bank	588
16	OTP banka	372
17	HalkBank	263
18	NLB banka	236
19	Findomestic (taken over in 2017)	114
20	Srpska banka	73

Source: Authors.

TABLE 3. RANKING OF BANKS BY NUMBER OF EMPLOYEES

NO.	NAME OF THE BANK	SIZE BY NUMBER OF EMPLOYEES IN 2015
1	Banca Intesa	3010
2	Komercijalna banka	2877
3	Banka Poštanska štedionica a.d.	1872
4	Raiffeisen Bank	1617
5	Vojvođanska banka	1579
6	Societe Generale Banka	1349
7	Eurobank	1315
8	UniCredit banka	1145
9	Erste Bank	1027
10	Alpha Bank	948
11	Crédit Agricole Bank	865
12	Sberbank	768
13	Hypo Alpe Adria Bank (taken over in 2016)	753
14	OTP banka	673
15	ProCredit bank	644
16	AIK Banka	610
17	NLB banka	459
18	HalkBank	395
19	Findomestic (taken over in 2017)	292
20	Srpska banka	73

Source: Authors.

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TABLE 4. BANK PERFORMANCE RATIOS

NO.	ROA				ROE				CAPITAL ADEQUACY RATIO			
	2012	2013	2014	2015	2012	2013	2014	2015	2012	2013	2014	2015
1	2.70	0.82	1.2	1.9	15.21	2.44	3.6	12.6	34.66	38.05	36.46	32.75
2	-3.26	-1.79	5.44	-1.10	-24.57	-12.43	1.58	-7.99	23.63	17.13	18.92	20.78
3	3.89	3.85	3.61	3.6	22.73	20.61	16.30	20.6	19.79	19.91	19.40	20.7
4	2.23	0.15	0.28	0.15	19.92	2.88	5.79	2.88	23.02	19.43	26.83	19.43
5	0.02	0.02	0.10	0.28	0.10	0.25	0.4	1.52	15.70	17.50	17.34	16.91
6	1.38	1.15	0.2	1.2	12.56	10.55	2.7	11.7	21.34	20.95	20.5	17.9
7	1.1	0.8	-1.8	3.54	6.6	5.4	-6	9.21	22.7	19.5	14.64	15.90
8			0.38	0.90			1.50	3.01	22.46	20.06	20.08	25.13
9	0.18			-0.59	0.99			-5.07	17.25	16.47	12.81	15.79
10	1.14	-3.21	-1.48	-7.11	11.08	-34.36	-12.57	-49.8	17.14	25.49	22.34	20.91
11	1.53	1.33	1.2	-1.61	13.56	11.68	11.9	-15.74	21.88	19.02	17.7	22.7
12			0.3	0.2			0.8	0.7	16.48	37.76	30.8	26.1
13	3.11	3.66	3.35	2.83	17.04	19.38	16.96	14.63	17.67	18.43	16.84	15.65
14	3.42	3.42	3.23	2.73	21.06	19.70	19.03	15.81	20.04	20.75	19.67	21.14
15	1.47	1.09	1.59	-0.47	8.90	6.84	10.5	-3.36	16.56	19.89	17.18	20.05
16	0.06		0.08	0.96	0.43		1.55	8.74	18.67	20.76	16.10	16.80
17	0.05			5.22	0.31			19.44	15.12			25.54
18	2.23	1.49	2.20	2.30	18.62	16.23	23.15	26.97	18.51	23.07	20.45	19.55
19		1.27	0.13	0.02		8.46	0.95	0.21	17.05	16.61	17.57	18.88
20				0.5				2.7	20.95	17.25	25.71	27.97

Source: Authors.

TABLE 5. CORRELATION BETWEEN PROFITABILITY RATIOS (ROA AND ROE) AND CAPITAL ADEQUACY RATIO

ROA/CAR					ROE/CAR				
2012	2013	2014	2015	Total coefficient	2012	2013	2014	2015	Total coefficient
0.13823	-0.1294	-0.0628	0.0413	-0.00976	0.0984	-0.1950	-0.1062	0.0183	-0.05147

Source: Authors.

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TABLE 6. BANK SIZE AND PROFITABILITY

	PROFITABLE	UNPROFITABLE	TOTAL		
Large banks	5	1	6		
Small banks	12	2	14		
TOTAL	17	3	20		
	F_d	F_o	f_d-f_o	$(f_d-f_o)^2$	$(f_d-f_o)^2/F_o$
Large profitable	5	5.1	-0.1	0.01	0.001960784
Small profitable	12	0.9	11.1	123.21	136.9
Large unprofitable	1	11.9	-10.9	118.81	9.984033613
Small unprofitable	2	2.1	-0.1	0.01	0.004761905
TOTAL	20	20	0	Test value	**146.89**
				p value	8.29E-34

Source: Authors.

TABLE 7. TYPE OF BANK OWNERSHIP AND PROFITABILITY

	PROFITABLE	UNPROFITABLE	TOTAL		
Foreign banks	13	3	16		
Domestic banks	4	0	4		
TOTAL	17	3	20		
	F_d	F_o	f_d-f_o	$(f_d-f_o)^2$	$(f_d-f_o)^2/F_o$
Foreign profitable	13	13.6	-0.6	0.36	0.026470588
Domestic profitable	4	2.4	1.6	2.56	1.0666666667
Foreign unprofitable	3	3.4	-0.4	0.16	0.047058824
Domestic unprofitable	0	0.6	-0.6	0.36	0.6
TOTAL	20	20	0	Test value	**1.740196078**
				p value	0.187113984

Source: Authors.

TABLE 8. CHANGE IN BANK OWNERSHIP AND PROFITABILITY

	PROFITABLE	UNPROFITABLE	TOTAL		
Change of ownership	8	2	10		
No change of ownership	9	1	10		
TOTAL	17	3	20		
	F_d	F_o	f_d-f_o	$(f_d-f_o)^2$	$(f_d-f_o)^2/F_o$
Change of ownership- profitable	13	8.5	4.5	20.25	2.382352941
No change of ownership - profitable	4	1.5	2.5	6.25	4.166666667
Change of ownership -unprofitable	3	8.5	-5.5	30.25	3.558823529
No change of ownership -unprofitable	0	1.5	-1.5	2.25	1.5
TOTAL	20	20	0	Test value	**11.60784314**
				p value	0.000656743

Source: Authors.

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