Main determinants of profitability of the largest banks in the Republic of Croatia

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MAIN DETERMINANTS OF PROFITABILITY OF THE LARGEST BANKS IN THE REPUBLIC OF CROATIA

Abstract

This paper presents profitability trends in the largest Croatian banks in the period from 2008 to 2012, as well as concentration index trends in the Croatian banking sector. The values of the concentration indices in the Croatian banking sector suggest that a high level of correlation and "similarity" between the concentration indices is indicative of a quality concentration analysis. This is demonstrated by the following indices: the concentration ratio, the Herfindahl-Hirschman index, the Hall-Tideman index, the Rosenbluth index, the Gini coefficient and the entropy measure. It is evident that in the observed period there was an increase in the concentration of the Croatian banking system as a result of a reduction in the absolute number of banks, as well as an increase in the market shares of banks following behind the two banks holding the largest market shares (Zagrebačka banka and Privredna banka). An increase in market shares of the two leading banks increased inequality on the market, thus intensifying market competition between them. The level of concentration on the banking market in Croatia is directly related to the financial performance of banks. Hence, the largest banks in Croatia, which hold 90% of the total market, have recorded very strong financial performance.

Keywords: profitability of banks, concentration of the banking system, indices, correlation, regulation.

1. Introduction

Banking service users, potential investors in bank shares, regulators responsible for controlling the stability of the financial system, financial analysts, owners, managers, as well as professionals and researchers all need information on the performance of commercial banks. In order to provide potential users with quality and timely information for decision-making purposes, adequate instruments are needed to assess the performance of banks. Various relationships, ratios and indicators observed at the level of individual banks or by comparing banks with similar characteristics provide understanding of factors influencing the performance and value of a bank and possible guidance to the management in making strategic decisions.

The research problem of this study is the connection between the profitability of banks and their market shares. Namely, this paper analyses the relationship between market share of a bank and its profitability, i.e., the paper seeks to answer the question whether an increase in market share increases bank profitability and vice versa. The subject of research is a result of the observed research problem. The paper will theoretically and empirically investigate and analyze the profitability of Croatian banks. The emphasis is placed on the analysis of the financial statements, from which data for this research will be taken and based on which relevant conclusions will be made in accordance with the objectives and hypotheses proposed.

The research targets commercial banks in the Republic of Croatia whose profitability and concentration levels will be calculated based on the data from published annual financial statements for the period from 2008 to 2012.

It is realistic to assume that there is a considerable positive relationship between the market share of banks and their profitability, and that there is a high degree of positive correlation between various indicators of the concentration of the Croatian banking sector.

The basic objective is to determine the relationship between market structure and bank performance by analyzing the connection between the concentration and profitability of banks in order to answer the following questions:

- Does a higher level of concentration result in higher profitability of banks?
- What is the concentration of the Croatian banking system as measured by various indices and has it changed substantially throughout the observed period?

2. Assessment of the stability of the Croatian banking system

Banks are the main financial intermediaries of capital. The support of the financial system to the economic growth of a country largely depends on the stability and efficiency of the banking sector. Considering that banking systems are very sensitive, certain events can make it unstable, causing a crisis. Banking is a specific activity in which risks cannot be prevented and risk taking is unavoidable.

Since banks bring profit to their owners, but also serve the common good, each government in the world is interested in maintaining the stability of their operations and the public's trust in the banking system as the main precondition for any bank's successful performance. In order to minimise the possibility for problems in the banking industry to increase fiscal costs (due to rescuing of banks experiencing difficulties in their operations), public distrust, flight of capital or disrupt the entire economic system of a country, the banking sector is largely regulated as well as supervised and controlled by the responsible government institutions.[1]

It is generally known that bankers must be able to make free decisions about everyday business. However, given that this is an area of special public interest, the entire banking system is one of the most strictly regulated business activities. Banks are the creators of deposit money; the main depositories of money accumulated by individuals and business entities; generators of the financial potential (investments and consumer loans) and drivers of economic activities. The importance of banks for the overall economy has created a need to impose strict regulations concerning their operation.
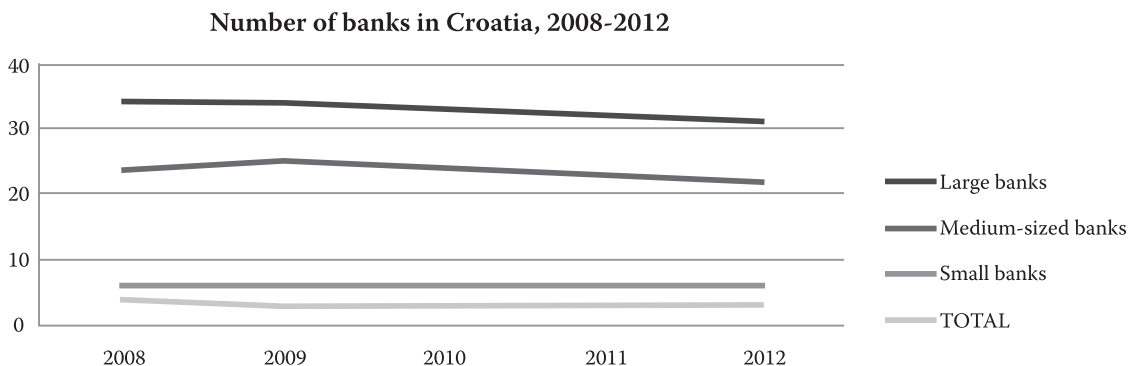
Table 1. Number of banks in Croatia in the period from 2008 to 2012

Type of bank	2008	2009	2010	2011	2012
Large banks	6	6	6	6	6
Medium-sized banks	4	3	3	3	3
Small banks	24	25	24	23	22
TOTAL	34	34	33	32	31

Source: HNB (Croatian National Bank), Bank Bulletin, No. 26, August 2013 and No. 24, August 2012

The Croatian banking system is regulated by the Croatian National Bank. Strict regulations regarding banking business operations were laid down before the outbreak of the global financial crisis in 2008, which proved to have an alleviating effect on the crisis. In addition, banks in Croatia lead a conservative policy, where there are no financial derivatives and speculation, and the business is based on traditional banking products. Due to strict regulations and cautiousness of the banks, the Croatian banking system is stable and well capitalized.

As expected, some banks failed, especially the small ones that granted risky loans and invested in risky placements in order to keep up with the competition. When problems accumulated to the point where there was no other option, these banks had to be liquidated. However, these are exceptional cases and the performance of banks in Croatia is stable.

3. Indicators of concentration of the Croatian banking system

In 2013, there were 31 banks operating on the Croatian banking market. Slight decline in the number of credit institutions from the previous period continued as a result of the fall in the number of small banks since 2010. At the end of 2012, Međimurska banka merged with its parent bank, Privredna banka Zagreb, consequently reducing the number of small banks to 22. The number of banks in Croatia from 2002 to 2012 is shown in Table 1 and Graph 1. It is evident that there is a downward trend in the total number of banks in Croatia. At the end of 2012, there were six large and three medium-sized banks, while the number of small banks dropped from 23 to 22.

Table 2 and Graph 2 show bank ownership structure. It is evident that the number of locally-owned banks reduced from 18 in 2010 to 15 in 2011, while the number of foreign-owned banks at the end of 2012 was 16. Thus, there are a slightly higher number of foreign-owned banks. Moreover, a downward trend in the number of locally owned banks as opposed to an upward trend in the number of foreign-owned banks is also observable.

Graph 1. Banks in Croatia according to their size in the period from 2008 to 2012

Number of banks in Croatia, 2008-2012

Source: Compiled by author

Table 2. Bank ownership structure in Croatia 2008 - 2012

Type of ownership	2008	2009	2010	2011	2012
Domestic ownership	18	19	18	15	15
Foreign ownership	16	15	15	17	16
TOTAL	34	34	33	32	31

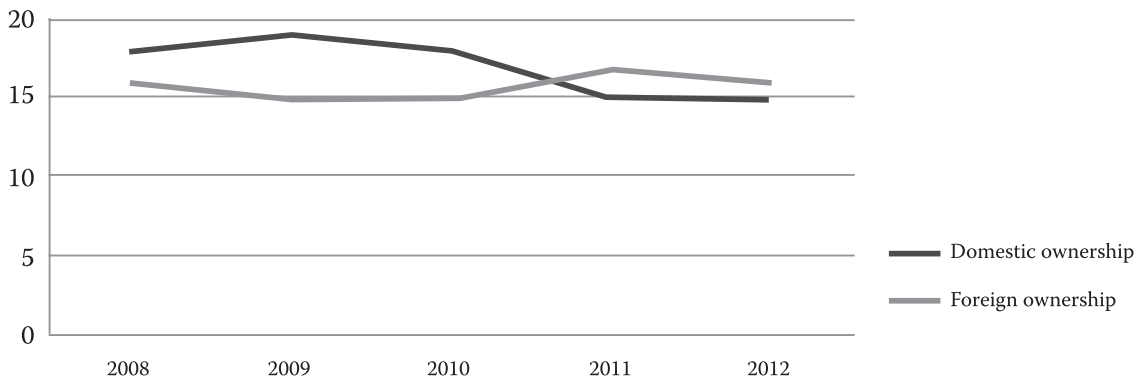*Source: HNB (Croatian National Bank), Bank Bulletin, No. 26, August 2013 and No. 24, August 2012*

Graph 2. Bank ownership structure in Croatia 2008 – 2012

Source: Compiled by author

Graph 3 shows the changes in the number of bank employees in Croatia in the period from 2008 to 2012.

From the above graph it is evident that the number of bank employees in Croatia in the observed period declined by 426 from 22,065 in 2008 to 21,639 at the end of 2012.

**Bank ownership structure in Croatia, 2008-2012**

Graph 3. Number of bank employees in Croatia 2008 - 2012

Total assets of the Croatian banking sector (Graph 4 below) were on the increase until 2011. In 2012 there was a decline for the first time since 1999.

In 2008, the value of assets amounted to 370 billion HRK, reaching a record high of 407 billion in

Number of bank employees in Croatia, 2008-2012
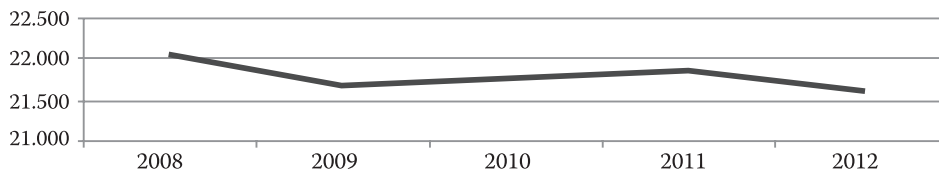
Source: HNB (Croatian National Bank), Bank Bulletin, No. 26, August 2013 and No. 24, August 2012

2011, and then dropping to 400 billion HRK in 2012, which is a decline by 7 billion HRK, i.e. 1.7%. This occurred as a result of a four–year long period of economic decline and stagnation in Croatia.

Graph 4. Total bank assets in Croatia 2008 - 2012
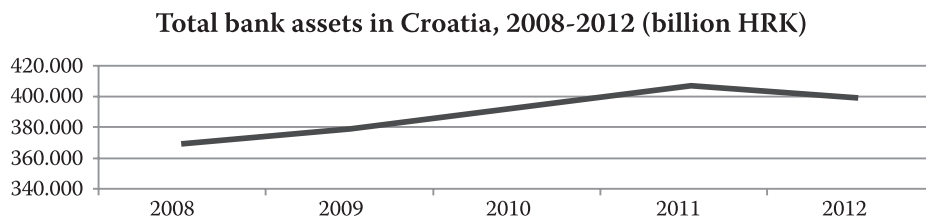
Total bank assets in Croatia, 2008-2012 (billion HRK)

Source: HNB (Croatian National Bank), Bank Bulletin, No. 26, August 2013 and No. 24, August 2012
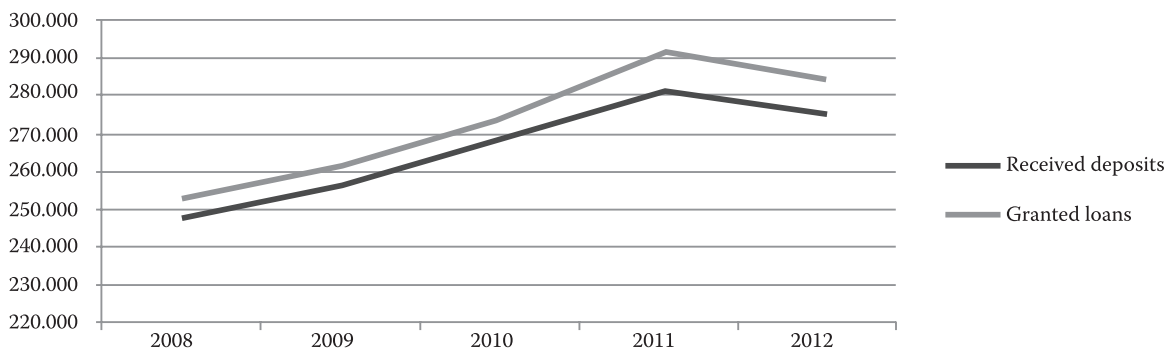
Graph 6 shows the trend in realized net profit of commercial banks in Croatia in the period from 2008 to 2012. In the observed period, the largest profit was achieved in 2008, when it amounted to 4.6 billion HRK.

Table 3. Received deposits and loans granted by banks in Croatia 2008 -2012 (billion HRK)

Year	2008	2009	2010	2011	2012
Received deposits	247,813.90	256,810.00	269,182.60	281,390.50	275,837.00
Granted loans	252,682.20	261,139.10	274,949.60	291,716.80	283,905.80

Source: HNB (Croatian National Bank), Bank Bulletin, No. 26, August 2013 and No. 24, August 2012

The reduction in the value of banks' assets was mainly driven by a decline in loans, which amounted to nearly 8 billion HRK, i.e. 3.0% annually.

Table 3 and Graph 5 depict trends in the level of deposits received and loans granted by commercial banks in Croatia in the period from 2008 to 2012. Table 3 shows an upward trend in both categories until 2011, whereupon in 2012 there was a decline, so that the level of deposits was at 276 billion HRK, while the level of loans was at 284 billion HRK.

In the following years, there was a decline, primarily caused by the global economic crisis, which had a strong negative impact on the economy and population. There was an increase in the level of risky loans (loans difficult to collect), due to which banks had to increase the level of reservations and thus automatically reduce their profit, as well as a result of stricter legal regulations. Thus, in 2012 a profit of 2.7 billion HRK was achieved, i.e. 1.9 billion HRK or 41% less than in 2008.

Graph 5. Received deposits and loans granted by banks in Croatia 2008 -2012

Received deposits and loans granted by banks in Croatia 2008-2012 (million HRK)

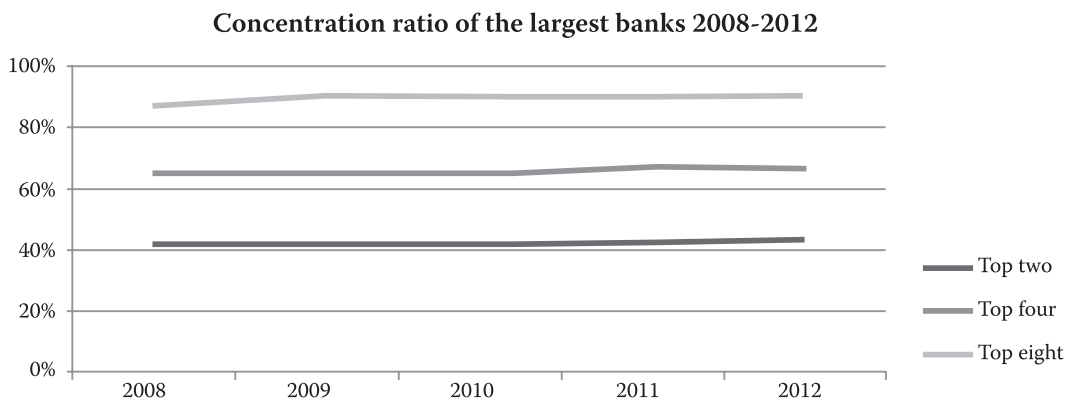*Source: Compiled by author*

Graph 6. Net profit realised by banks in Croatia, 2008-2012

Net profit of banks in Croatia, 2008-2012 (billion HRK)
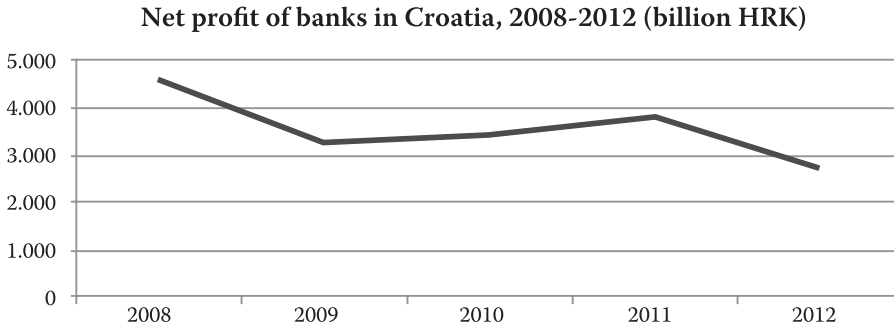
Source: HNB (Croatian National Bank), Banks Bulletin, No. 26, August 2013 and No. 24, August 2012

The drop in interest income, the major source of bank revenues, was a result of a lower level of risk propensity, decline in reference interest rates and stricter legal restrictions regarding interest rates. Increased caution in taking risks, reflecting in 2012 in low level of credit activity and less risky and thus less profitable investments, affected the banks' interest income.

Graph 7. Concentration ratios of the largest Croatian banks 2008–2012

4. Measures of concentration of the Croatian banking system

In addition to stability and profitability of Croatian banks, an important measure is also the concentration of banks on the Croatian banking market, which was observed in the period from 2008 to 2012. The following ratios were calculated: the concentration ratio, the Herfindahl-Hirschman index, the Hall-Tideman index, theRosenbluth index, the Gini coefficient and the entropy measure.

a) Concentration ratio

Table 4 and Graph 7 show the concentration ratio of 2, 4 and 8 largest banks operating on the Croatian market, calculated based on the size of their assets in the period from 2008 to 2012.

Concentration ratio of the largest banks 2008-2012

Source: Compiled by author

Table 4. Concentration ratios of the largest Croatian banks 2008 - 2012

Year	Top two	Top four	Top eight
2008	41.6%	64.8%	86.8%
2009	41.7%	65.2%	89.8%
2010	42.0%	65.3%	89.2%
2011	42.3%	66.4%	89.8%
2012	43.3%	66.6%	89.8%

Source: Compiled by author

From Table 4 and Graph 7 it is evident that the two largest banks held over 43% of the total assets of the entire Croatian banking sector and that this ratio was continuously increasing. The four largest banks held 2/3 of the total assets of the entire Croatian banking sector and the ratio also showed an upward trend, while the eight largest Croatian banks held almost 90% of the total market, and the remaining 23 banks held only 10% of the market. The data clearly show that the Croatian banking sector is moderately concentrated.

b) Herfindahl-Hirschman index

Table 5 and Graph 8 show the Herfindahl-Hirschman index of concentration of Croatian banks in the period from 2008 to 2012.

Graph 8. Herfindahl-Hirschman index of concentration of Croatian banks 2008 -2012
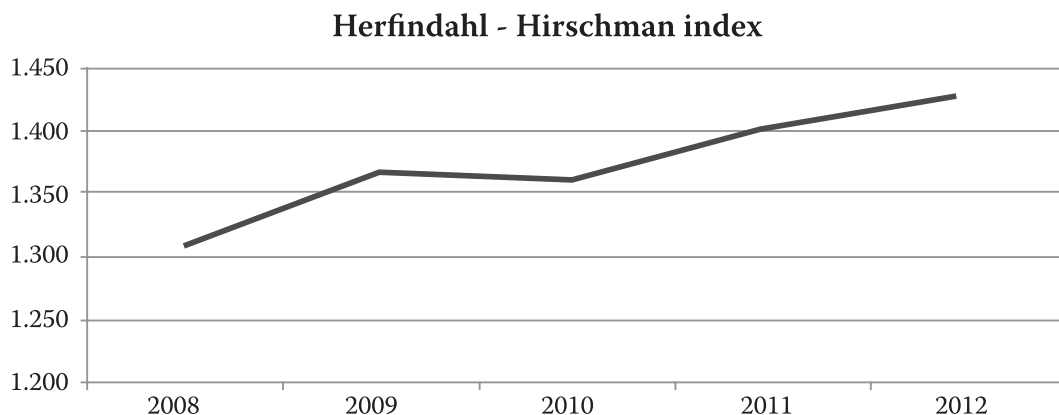
It is evident that throughout the observed period this index increased. Considering the range of values that, according to the Herfindahl-Hirschman index, determine the level of concentration of a sector, the value of 1,427 points suggests that the Croatian banking sector is moderately concentrated. A market is considered to be highly concentrated if this value is above 1,800 points.

Table 5. Herfindahl-Hirschman index of concentration of Croatian banks 2008 -2012

Year	Herfindahl - Hirschman
2008	1,309
2009	1,366
2010	1,362
2011	1,401
2012	1,427

Source: Compiled by author

c) Hall-Tideman index

Table 6 and Graph 9 show the Hall-Tideman index of concentration of Croatian banks for the period from 2008 to 2012.

It is evident that throughout the observed period this index increased. Considering that the values for this index can range between 0 and 100%, an index of 13% suggests that the Croatian banking market is moderately concentrated.

Herfindahl - Hirschman index

Source: Compiled by author

Table 6. Hall-Tideman index of concentration of Croatian banks 2008 -2012

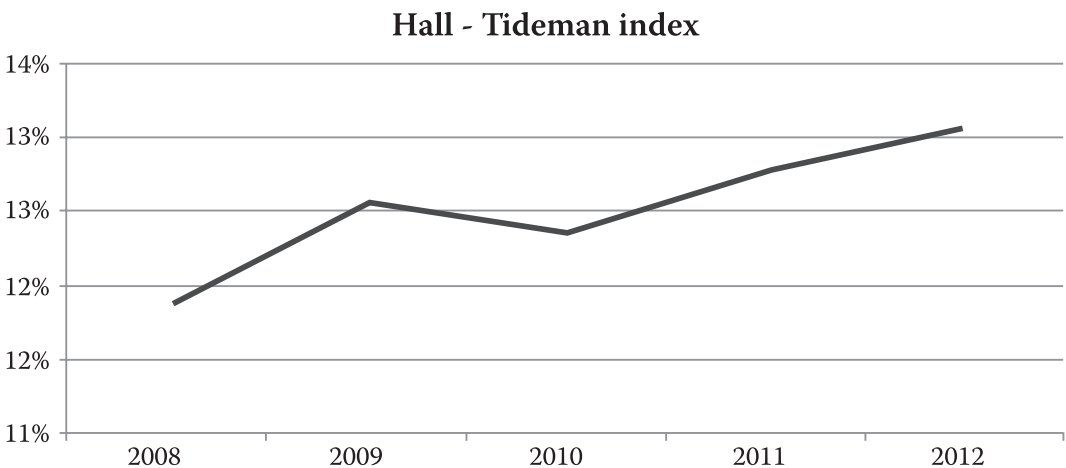| Year	Hall - Tideman
2008	11.9%
2009	12.6%
2010	12.4%
2011	12.8%
2012	13.0%

Source: Compiled by author

c) Rosenbluth index

Unlike the Hall Tideman index, the Rosenbluth index assigns top position to the smallest company. As a result, this index is largely affected by changes in the number of small businesses. If the number of companies on the market increases, the shares of the largest companies in the calculation of the sum are multiplied by the increasing absolute numbers, thus increasing the denominator. The result is a stronger decrease in the value of the Rosenbluth index in relation to the Hall-Tideman index.

Table 7 and the Graph 10 show the trend in the Rosenbluth index of concentration of Croatian banks for the period from 2008 to 2012.

Graph 9. Hall-Tideman index of concentration of Croatian banks 2008 -2012

It is evident that throughout the observed period, this index increased; however, the values were significantly lower in comparison to the Hall-Tideman index.

Table 7. Rosenbluth index of concentration of Croatian banks, 2008 -2012

Year	Rosenbluth
2008	1.68%
2009	1.67%
2010	1.73%
2011	1.78%
2012	1.84%

Source: Compiled by author

d) Gini coefficient of concentration

Table 8 and Graph 11 show the trend in the Gini coefficient of concentration of Croatian banks for the period from 2008 to 2012. It is evident that throughout the observed period, this index increased; however, the values were significantly lower in comparison to the Hall-Tideman index. Considering that when there is no concentration the Gini coefficient takes the value of 0 by default, in the case of the Croatian banking market this means that there is a relatively high level of concentration, given that this indicator was close to 100%, i.e. 81.7%.

Hall - Tideman index

Source: Compiled by author

Graph 10. Rosenbluth index of concentration of Croatian banks 2008 -2012

Rosenbluth index
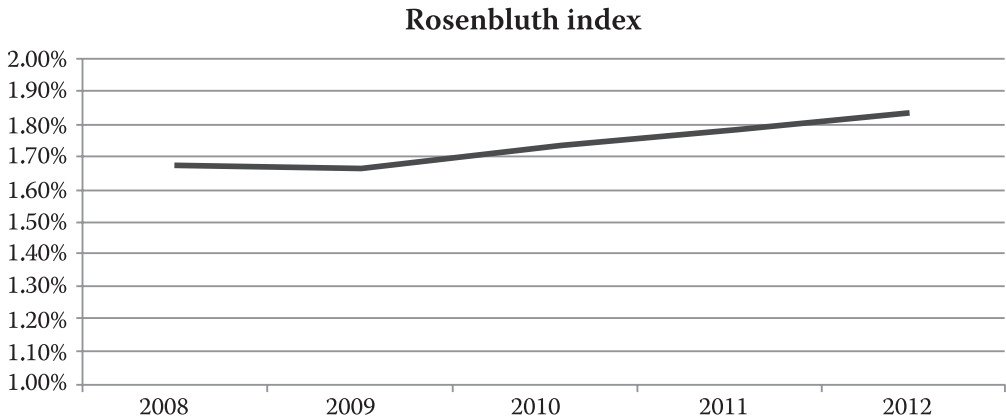
Source: Compiled by author

Table 8. Gini coefficient concentration of Croatian banks 2008 -2012

Year	Gini coefficient
2008	81.2%
2009	82.5%
2010	81.5%
2011	81.8%
2012	81.7%

Source: Compiled by author

e) Entropy measure

Table 9 and Graph 12 show the trend in the measure of entropy in the concentration of Croatian banks for the period from 2008 to 2012. It is evident that throughout the observed period this indicator had a downward trend. Such a trend is in accordance with the definition of entropy, because the measure of entropy over the observed period should confirm most of the results obtained using other indices, and since the value of the indicator changes inversely to the increasing concentration, the graph showing

Graph 11. Gini coefficient of concentration of Croatian banks 2008 -2012

t h e

Gini coefficient
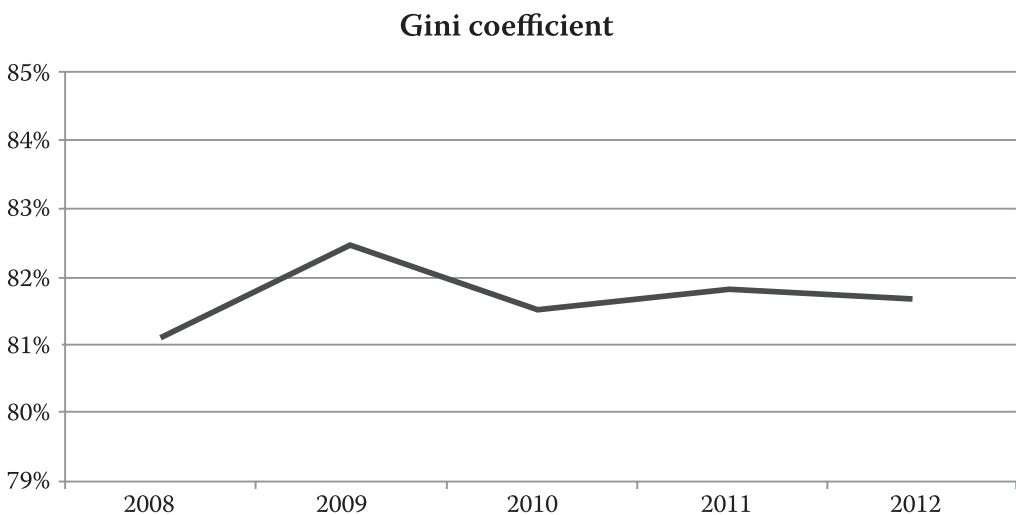
Source: Compiled by author

ternd in entropy is a reverse image of the trend in the Hirschman-Herfindahl index, showing a growing trend for the Croatian banking market in the period from 2008 to 2012.

Table 9. Entropy measure of concentration of Croatian banks 2008 -2012

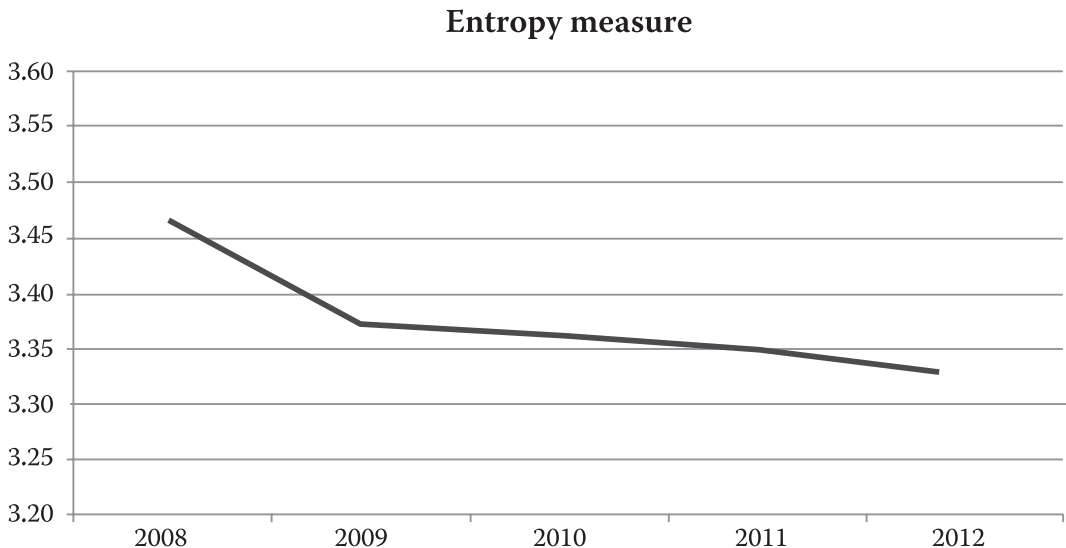| Year	Entropy measure
2008	3.47
2009	3.37
2010	3.36
2011	3.35
2012	3.33

Source: Compiled by author

5. Profitability of Croatian banks

Profitability of Croatian banks was measured by return of assets ratio (ROA), return on equity ratio (ROE) and gross profit margin.

Graph 12. Entropy measure of concentration of Croatian banks 2008 -2012

5.1. Return on assets in Croatian banks (ROA)

This section of the paper will present the profitability ratio in the 8 largest Croatian banks for the period from 2008 to 2012. The eight largest banks on the Croatian market are as follows: Zagrebačka banka, Privredna banka, Erste banka, Hypo banka, Raiffeisen banka, Splitska banka, Hrvatska poštanska banka and OTP banka.

Table 10 and Graph 13 show return on assets (ROA) of the 8 largest Croatian banks for the period from 2008 to 2012. This ratio shows how much Croatian banks profit per one unit of assets.

Table 10 and Graph 13 show that all 8 banks achieved positive financial results during the observed period. The best financial results were achieved by the largest Croatian banks, Zagrebačka banka and Privredna banka. Privredna banka recorded a net profit of 2 lipas per each kuna of its total assets, i.e. per each 100 HRK of assets 2 HRK of profit was realised (whereas Zagrebačka banka realised 1.6 HRK of net profit per each 100 HRK of assets). Erste banka also recorded a high return on assets in the last three years. The lowest rate of return on total assets among the observed banks was achieved by Hrvatska poštanska banka, which recorded negative financial results in 2009, i.e. recorded a loss of 1 lipa per one HRK of total assets.

Entropy measure

Source: Compiled by author

Table 10. Return on assets (ROA) of the 8 largest Croatian banks 2008 - 2012

which is of interest to potential investors in the banking sector.

Name of the bank	2008	2009	2010	2011	2012
Erste banka	2.2%	2.0%	1.5%	1.4%	1.4%
HPB	0.0%	-0.1%	0.4%	0.5%	0.5%
Hypo banka	0.7%	0.4%	0.7%	0.1%	0.2%
OTP banka	1.4%	0.9%	0.7%	1.0%	1.0%
PBZ	2.1%	1.7%	1.5%	2.0%	2.1%
RBA	1.4%	1.2%	1.1%	1.0%	1.0%
Splitska banka	1.3%	1.4%	0.8%	0.7%	0.7%
ZABA	1.9%	1.6%	1.6%	1.6%	1.6%

Source: Published annual financial statements

5.2. Return on equity of Croatian banks (ROE)

Return on equity, a ratio between net profit and equity, is considered the most important indicator of profitability. ROE shows how many units of profit a bank realizes per one unit of equity.

ROE = net profit / equity

Higher rate of return per unit of equity capital over a longer period of time means higher market value of the bank. For this reason one may say that the essential **objective of a bank is to increase its market value, while the maximization of the return per unit of equity is a manifestation of that objective**. The increasing trends in profit rates from previous periods are used as the basis for future projections,

Table 11 and Graph 14 show that practically all 8 banks achieved positive financial results in the observed period. The best results were achieved by the largest Croatian banks, Zagrebačka banka and Privredna banka. The latter recorded a net profit of 12.5 lipas per one HRK of total assets, i.e. 12.5 HRK of profit per 100 HRK of assets (whereas the former recorded a net profit of 10.7 HRK per 100 HRK of assets). Erste banka has also recorded a high return on assets in the last three years (in 2012 it recorded a profit of 12.7 HRK per 100 HRK of assets surpassing all other banks). The lowest return on assets among the observed banks was recorded by Hypo banka (1.2% in 2012), while Splitska banka recorded a relatively low ratio (5.5% in 2012).

Graph 13. Return on assets (ROA) of the 8 largest Croatian banks 2008 – 2012

Return on assets (ROA) of the 8 largest banks, 2008-2012
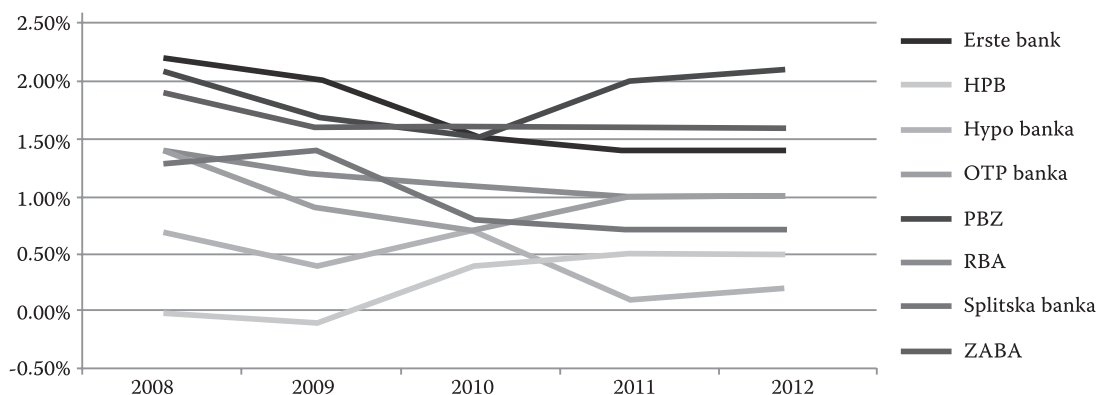
Source: Compiled by author

Table 11. Return on equity (ROE) of the 8 largest Croatian banks, 2008 - 2012

Name of the bank	2008	2009	2010	2011	2012
Erste banka	19.3%	17.2%	12.5%	12.5%	12.7%
HPB	0.9%	-1.6%	4.8%	6.6%	6.9%
Hypo banka	4.0%	2.5%	4.4%	1.0%	1.2%
OTP banka	12.4%	6.9%	6.4%	9.0%	9.3%
PBZ	15.0%	11.2%	10.0%	12.3%	12.5%
RBA	10.7%	8.9%	7.9%	6.8%	7.0%
Splitska banka	12.3%	12.6%	6.7%	5.3%	5.5%
ZABA	13.4%	10.7%	10.9%	10.5%	10.7%

Source: Published annual financial statements

An overview of average capital employed and profitability ratios of the 8 largest banks in the observed period is given in Table 12.

The objective function to increase value of a bank can be achieved by taking into account the average capital employed as the dependent variable and profitability ratios of the bank (Table 13 and 14). The mathematical formulation of the objective functions of the 8 largest banks is as follows:

Graph 14. Return on equity (ROE) of the 8 largest Croatian banks, 2008 – 2012

FC MODEL (forecasting model)

$$Max\ Z_1 = 19,3X_1 + 17,2X_2 + 12,5X_3 + 12,5X_4 + 12,7X_5$$

$$Max\ Z_2 = 0,9X_1 + (-1,6X_2) + 4,8X_3 + 6,6X_4 + 6,9X_5$$

$$Max\ Z_3 = 4,0X_1 + 2,5X_2 + 4,4X_3 + 1,0X_4 + 1,2X_5$$

$$Max\ Z_4 = 12,4X_1 + 6,9X_2 + 6,4X_3 + 9,0X_4 + 9,3X_5$$

$$Max\ Z_5 = 15,0X_1 + 11,2X_2 + 10,0X_3 + 12,3X_4 + 12,5X_5$$
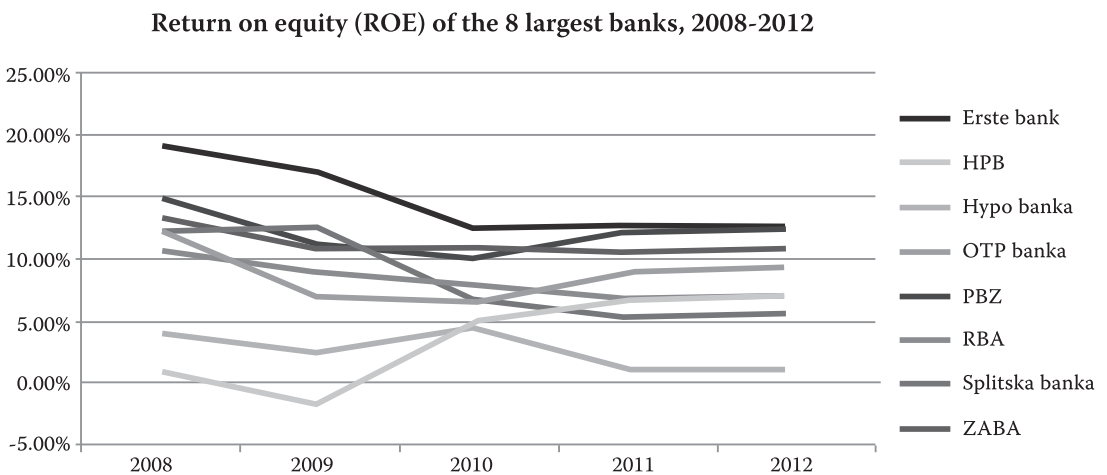
$$Max\ Z_6 = 10,7X_1 + 8,9X_2 + 7,9X_3 + 6,8X_4 + 7,0X_5$$

$$Max\ Z_7 = 12,3X_1 + 12,6X_2 + 6,7X_3 + 5,3X_4 + 5,5X_5$$

$$Max\ Z_8 = 13,4X_1 + 10,7X_2 + 10,9X_3 + 10,5X_4 + 10,7X_5$$

$$X_1 + X_2 + X_3 + X_4 + X_5 > 0 \longrightarrow$$

non-negativity conditions of decision-making variables

Return on equity (ROE) of the 8 largest banks, 2008-2012

Source: Compiled by author

Table 12. Average capital employed and profitability ratios

Name of the bank	Average capital employed in billion HRK	2008	2009	2010	2011	2012
Erste banka	6,009	19.3%	17.2%	12.5%	12.5%	12.7%
HPB	1,079	0.9%	-1.6%	4.8%	6.6%	6.9%
Hypo banka	5,707	4.0%	2.5%	4.4%	1.0%	1.2%
OTP banka	1,498	12.4%	6.9%	6.4%	9.0%	9.3%
PBZ	10,387	15.0%	11.2%	10.0%	12.3%	12.5%
RBA	5,516	10.7%	8.9%	7.9%	6.8%	7.0%
Splitska banka	3,513	12.3%	12.6%	6.7%	5.3%	5.5%
ZABA	14,504	13.4%	10.7%	10.9%	10.5%	10.7%

Source: Published annual financial statements

Table 13. Matrix of the dependent and independent variables

Observation	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6
1	6,009	19,3	17,2	12,5	12,5	12,7
2	1,079	0,9	-1,6	4,8	6,6	6,9
3	5,707	4,0	2,5	4,4	1,0	1,2
4	1,498	12,4	6,9	6,4	9,0	9,3
5	10,387	15,0	11,2	10,0	12,3	12,5
6	5,516	10,7	8,9	7,9	6,8	7,0
7	3,513	12,3	12,6	6,7	5,3	5,5
8	14,504	13,4	10,7	10,9	10,5	10,7

Source: Compiled by author

Table 14. Solution of the model by QSB program

04-15-2014 10:22:11	Variable name	Mean	Standard Deviation	Regression Coefficient	Standard Error	t value	p-value
Dependet	Factor 1	6,026625	4,512644				
Y-intercept	Constant			20,39819	20,48144	0,995935	0,4242176
1	Factor 2	110	59,20907	0,0832994	0,1320751	0,6306973	0,5926981
2	Factor 3	85,5	59,20184	-0,1442054	0,1289048	-1,118697	0,3796003
3	Factor 4	79,5	29,30139	0,1093	0,2091715	0,5225377	0,6534119
4	Factor 5	80	38,85504	9,380981	6,951016	1,349584	0,309617
5	Factor 6	82,25	38,84309	-9,366235	6,852067	-1,366921	0,3050178
	Se=	3,640999	R-square=	0,8140008	R-adjusted=	0,349003	

Source: Compiled by author

The solution shows multiple regression coefficients in which the dependent variable is average capital employed, and the independent variables are achieved profitability ratios of the banks:

$$\hat{Y} = a + b_1 X_1 + b_2 X_2 + ... + b_k X_k$$

The equation of the straight line reads:

Correlation coefficients shown in Table 15 indicate that in terms of return on capital the most difficult years were 2009 and 2012, because the highest positive correlation coefficients were achieved in the period 2008 to 2009 and the period 2011 to 2012. In 2012, the correlation coefficient amounted to just little short of 1 (0.9999291).

04-15-2014 10:27:46	Dependet Variable	Independet Variable
Equation	Factor 1 =	20,39819+0,0832994 Factor 2 - 0,1442054 Factor 3 + 0,1093 Factor 4 + 9,380981 Factor 5 - 9,366235 Factor 6

The regression line (Graph 15) shows that 2009 and 2012 were quite difficult in terms of return on capital employed as regression coefficients were negative, which leads to the conclusion that this was caused not only by a severe financial crisis, but also by the increasing concentration of the banking system.

Table 16 shows the forecast of the banks' capital that should be employed according to the achieved return on capital ratios, indicating that the 8 largest banks use their capital inefficiently, which is, inter alia, caused by a relatively high level of market concentration.

Graph 15. Regression line
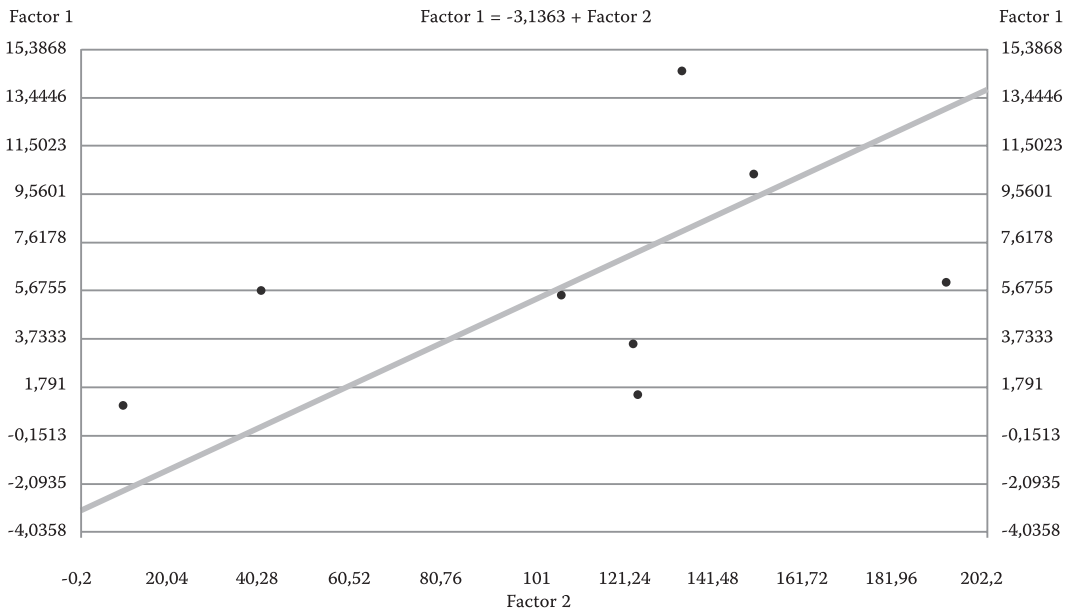
Source: Compiled by author

Table 15. Correlation coefficients

04-15-2014	Variable	Variable	Correlation
1	Factor 1	Factor 2	0,4298432
2	Factor 1	Factor 3	0,4218728
3	Factor 1	Factor 4	0,6565935
4	Factor 1	Factor 5	0,4228437
5	Factor 1	Factor 6	0,4152506
6	Factor 2	Factor 3	0,9588377
7	Factor 2	Factor 4	0,872257
8	Factor 2	Factor 5	0,7572033
9	Factor 2	Factor 6	0,7520322
10	Factor 3	Factor 4	0,8404931
11	Factor 3	Factor 5	0,616382
12	Factor 3	Factor 6	0,6092411
13	Factor 4	Factor 5	0,8508639
14	Factor 4	Factor 6	0,8452265
15	Factor 5	Factor 6	0,9999291

Source: Compiled by author

Table 16. Prediction of bank capital

04-15-2014 10:52:53	Actual Factor 1	Prediction	Std. Dev. of Prediction	Residual	% Residual	Standardized Residual
1	6,009	8,445024	2,994397	-2,436024	-28,84567	-1,251685
2	1,079	1,576152	3,616723	-0,4971519	-31,54213	-0,225448
3	5,707	6,349224	3,324121	-0,6422243	-10,115	-0,3299895
4	1,498	1,000848	3,616723	0,4971519	49,67306	0,255448
5	10,387	10,75348	3,5545	-0,3664801	-3,408014	-0,1883058
6	5,516	7,381955	1,572075	-1,865955	-25,27724	-0,9587702
7	3,513	1,846343	3,441721	1,666657	90,26798	0,8563663
8	14,504	10,85997	2,532264	3,644026	33,55465	1,872384

Source: Compiled by author

5.3. Gross profit margin of Croatian banks

Gross profit margin is calculated based on the data from the profit and loss account and represents a ratio between profit before tax plus interest and total revenue. For example, the 30% margin means that a bank has a net profit of 0.30 HRK per 1 HRK of revenue.

Higher gross profit margin means that a bank is more successful. Gross profit margin of the 8 largest Croatian banks in the period from 2008 to 2012 is shown in Table 17 and Graph 16.

Gross profit margin = (profit before taxes + interest) / total revenue. It is clear that the highest gross profit margins were achieved by Privredna banka (49.2%), Erste banka (49.1%) and Zagrebačka banka (38.8%).

6. Conclusion

A several-year-long decline in economic activity and poor prospects of rapid economic recovery led to a slowing down in banking activities in 2012 and stopped a slight increase in profitability present during the previous two years, mainly due to losses on banks' loan portfolios. In 2012, more than one third of the banks operated with losses, all but one being small banks (the only exception was a medium-sized bank). Consequently, a high degree of differentiation was still present in the banking system, and the leading role was still played by a small number of large, profitable, and well capitalized banks.

The data on the performance of Croatian banks in the period from 2008 to 2012 taken from published annual financial statements show that banks with large market share operated successfully throughout the observed period. The only exception is Hrvatska poštanska banka, which, in 2009, recorded a loss in its operations, thus proving the assumption that there is a significant positive relationship between a bank's market share and its profitability.

*Table 17. Gross profit margin of the 8 largest Croatian banks 2008-2012*

Name of the bank	2008	2009	2010	2011	2012
Erste banka	26.5%	23.5%	36.2%	48.8%	49.1%
HPB	0.9%	-1.8%	8.4%	11.6%	12.2%
Hypo banka	19.9%	10.1%	18.8%	4.3%	4.9%
OTP banka	34.0%	21.5%	17.4%	17.9%	18.4%
PBZ	51.4%	45.0%	41.4%	48.8%	49.2%
RBA	33.6%	26.3%	25.0%	22.5%	23.0%
Splitska banka	36.2%	37.5%	19.0%	15.1%	15.7%
ZABA	44.7%	39.3%	38.0%	38.4%	38.8%

Source: Published annual financial statements

By analyzing the concentration indicators of the Croatian banking market and the profitability of its participants in the period from 2008 to 2012, an increase in the level of concentration was observed. Likewise, there has been an increase in the profitability of banks that practically hold 90% of the market. Banks holding the largest market shares recorded the best performance results, which means that increased concentration had a positive effect.

Six indicators of market concentration were analyzed (the concentration ratio, the Herfindahl-Hirschman index, the Hall-Tideman index, the Rosenbluth index, the Gini concentration coefficient and the entropy measure) and it was found that these indicators all point to the same conclusion, which is that the Croatian banking market is moderately concentrated and that the concentration has increased year after year.

Graph 16. Gross profit margin of the 8 largest Croatian banks 2008-2012
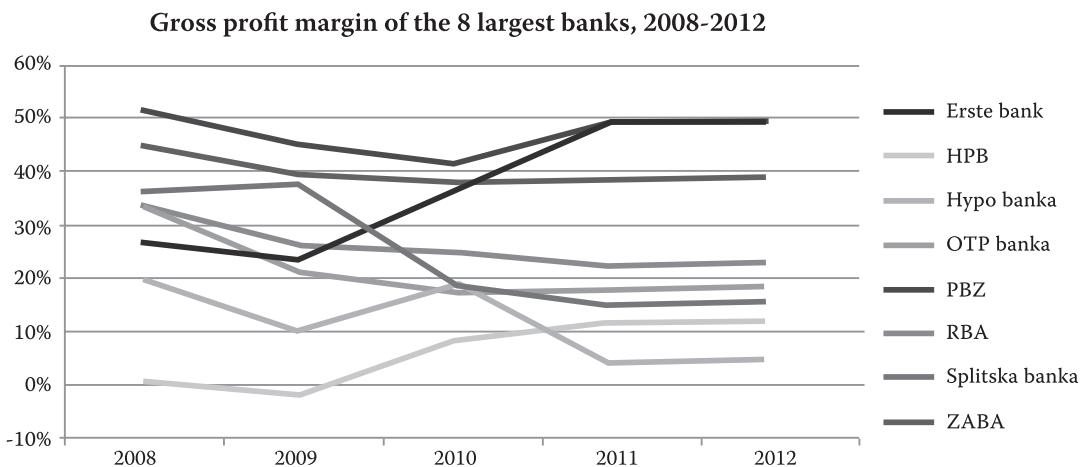
Source: Compiled by author

Several different indicators of concentration point to the same result, so it can be concluded that there is a high degree of positive correlation between various indicators of concentration of the Croatian banking sector.

This paper shows the trends in profitability of the 8 largest Croatian banks in the period from 2008 to 2012 and the trend in the index of market concentration of the Croatian banking system. The values of concentration indices lead to the following main conclusions:

a) a high level of correlation and "similarity" between the concentration indices shows that for a quality analysis of concentration it is sufficient to analyze a few of the most representative indices (the concentration ratio, the Herfindahl-Hirschman index, the Hall-Tideman index, the Rosenbluht index, the Gini concentration coefficient and the entropy measure),

b) an increase in the concentration of the Croatian banking system was recorded during the observed period,

c) an increase in concentration was caused by a reduction in the absolute number of banks, but also by an increase in the market shares of banks following behind the two banks holding the largest market shares (i.e. Zagrebačka banka and Privredna banka); or more precisely, the ones ranked third, fourth, fifth and sixth),

d) an increase in market shares of the two leading banks increased inequality on the market, thus intensifying market competition between the largest banks.

The concentration on the banking market in Croatia is directly related to the financial results achieved by banks. Namely, the 8 largest banks in Croatia, which hold 90% of the total market and have the greatest capital, have achieved the best financial results, while nearly all small banks have suffered losses. Thus, the main determinants of profitability of the largest banks in the Republic of Croatia are their market shares and the availability of capital.

References

1. Basel Committee on Banking Supervision (2006). *International Convergence of Capital Measurement and Capital Standards - A revised Framework.* Bank for International Settlements.

2. Bikker, J. A., & Groeneveld, J. M. (2002). *Measures of competition and concentration in the banking industry.* Central bank of the Netherland: Economic and financial modeling.

3. Božina, M. (2006). *Pravni i ekonomski aspekti regulacije poslovnih banaka u procesu ekonomske i monetarne integracije Republike Hrvatske.* Ekonomska istraživanja, 19(2), pp. 107-117. */Legal and economic aspects of the regulation of commercial banks in the process of economic and monetary integration of Croatia/*

4. Erste banka. Available at: http://www.erstebank.hr/hr/O_nama/Financijska_izvjesca

5. Gregurek, M., & Vidaković, N. (2011). *Bankarsko poslovanje.* Zagreb: RRiF. */Banking business/*

6. HNB. Available at: http://www.hnb.hr/statistika/hstatistika.htm

7. Hrvatska narodna banka, Bilten o bankama, no. 26, August 2013 and no. 24, August 2012. */Croatian National Bank, Bank Bulletin/*

8. Hypo-alpe-adria banka. Available at: http://www.hypo-alpe-adria.hr/home.nsf/pages/o_nama-godišnje_izvješće-192

9. Lovrinović, I., & Ivanov, M. (2009). *Monetarna politika.* Zagreb: RRIF. */Monetary policy/*

10. Ljubaj, I. (2005). *Indeksi koncentracije bankarskog sektora u Hrvatskoj.* Zagreb: Hrvatska narodna banka. */Concentration indices of the Banking sector in Croatia/*

11. Miletić, I. (2008). *Nadzor banaka i stabilnost bankarskog sustava.* Ekonomska istraživanja, 21(3), pp. 43-56. */Supervision of banks and the stability of the banking system/*

12. Narodne novine (2008). *Zakon o kreditnim institucijama.* Zagreb: Narodne novine, no. 117/08, Art. 5. */Credit Institutions Act/*

13. Narodne novine (2009). *Zakon o zaštiti tržišnog natjecanja.* Zagreb: Narodne novine, no. 79/09. */Law on Protection of Competition/*

14. Narodne novine (2013). *Zakon o kreditnim institucijama.* Zagreb: Narodne novine d.d., no. 54/13. */Credit Institutions Act/*

15. OTP banka. Available at: https://www.otpbanka.hr/html/gi.htm

16. Pavković, A. (2004). *Instrumenti vrednovanja uspješnosti poslovnih banaka.* Zagreb: Zbornik Ekonomskog fakulteta, year 2, no. 1, pp. 179-192. */Instruments for evaluating of the performance of commercial banks/*

17. PBZ banka. Available at: http://www.pbz.hr/Default.aspx?sec=1500

18. Pejić Bach, M. (2009). *Determinante profitabilnosti banaka u Hrvatskoj*. Zagreb: Zbornik Ekonomskog fakulteta, year 7, no. 1, pp. 81-92. */Determinants of profitability of banks in Croatia/*

19. RBA banka. Available at: https://www.rba.hr/wps/public-web/naslovna; 3_keywords=godi%C5%A1nj e+financijsko+izvje%C5%A1%C4%87e

20. Rose, P. (2005). *Menadžment komercijalnih banaka: 4.izdanje,* Zagreb: Mate. */ Management of commercial banks: 4th edition /*

21. Ružić, T. (2006). *Kontrola koncentracija u hrvatskome bankarskom sustavu*. Zagreb: Hrvatska narodna banka. */Control of concentration in the Croatian banking system/*

22. Splitska banka. Available at: http://www.splitskabanka.hr/o-nama/izvjesca

23. Vukičević, M., Gregurek, M., Odobašić, S., Grgić, J. (2010). Financijski menadžment u MS Excelu, Zagreb: Golden marketing – Tehnička knjiga. */Financial management in MS Excel/*

(Endnotes)

1   Miletić, I. (2008). *Supervision of banks and the stability of the banking system.* Economic surveys, 21(3), pp. 43-56.

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Glavne determinante profitabilnosti najvećih banaka u Republici Hrvatskoj

Sažetak

U radu je prikazano kretanje profitabilnosti najvećih hrvatskih banaka u razdoblju od 2008. do 2012. godine, kao i kretanje indeksa koncentracije hrvatskog bankarskog sektora. Vrijednosti indeksa koncentracije u hrvatskome bankarskom sektoru upućuju na to da visoka razina korelacije i „sličnost" između indeksa koncentracije pokazuju kvalitetnu analizu koncentracije. To pokazuju indeksi: koncentracijski omjer, Herfindahl-Hirschmanov indeks, Hall-Tidemanov indeks, Rosenbluthov indeks, Giniev koeficijent koncentracije i mjera entropije. Očigledno je u promatranom razdoblju došlo do povećanja koncentracije u hrvatskome bankarskom sustavu. Na povećanje koncentracije utjecalo je smanjenje apsolutnog broja banaka, ali i povećanje tržišnih udjela banaka koje se po redoslijedu nalaze iza dviju vodećih banaka (Zagrebačke i Privredne banke). Porast udjela dviju vodećih banaka očituje se i u povećanju nejednakosti na tržištu, što upućuje na pojačanu tržišnu borbu između najvećih banaka. Stanje koncentracije na bankarskom tržištu u Hrvatskoj je u izravnoj vezi s ostvarenim poslovnim rezultatima banaka. Činjenica je da nekoliko najvećih banaka u Hrvatskoj koje drže 90% ukupnog tržišta, ostvaruju visoke poslovne rezultate.

Ključne riječi: profitabilnost banaka, koncentracija bankarskog sustava, indeksi, korelacija, regulacija.