FINANCIAL PERFORMANCE EVALUATING AND RANKING BANKS IN BOSNIA AND HERZEGOVINA USING AHP METHOD

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Abstract: Financial performances of banks reflect the internal value of the bank, its success in the market, efficiency and effectiveness of operations and represent a fundamental prerequisite for achieving a better competitive position in the market. By monitoring and comparing results achieved by bank, quality and quantity of its business it is possible to allocate market leaders which define and set up standards of doing business for other financial institutions, in order to ensure stable financial system of the country with high financial performances. This particularly, because banks with high corporative performances show client focused orientation, desire for investing in new banking operations and services, solid and stable credit process and have high level of corporative responsibility which are necessary for insuring the success of the banking system in the process of financial intermediation and encouraging the economic growth of a country. The foregoing is particularly important for countries with medium or less-developed financial system which is bank-centric, as is the case with Bosnia and Herzegovina. In this environment, it is often expressed oligopolistic structure of the banking market and the sensitivity of the country's banking sector on the volatility of the performance of the largest banks in the system - because they affect the overall assessment of the efficiency and effectiveness of the entire banking system of the country, disguising by its strength, poorer performance of smaller or weaker banks. According to that, weakening performances of the large banks can easily lead to increased systemic risk which could be reflected in launching bank panic and financial crises driven by distrust in banking system of the country. Due to this role that banks have in the economy and the specific situation of the banking sector in our country, this issue attracts significant attention of the public and financial regulators, as well as all other users of banking products and services. Traditionally, partial financial indicators are used for measuring bank performances. However, the complexity of evaluating bank performances question the use of this traditional methods and imposes the need for using complex quantitative methods and models which will consider how various different factors affect the bank performances. The aim of this study is assessment of financial performance of banks and their ranking by using AHP method. We used various quantitative criteria and ranked banks, but also we obtained the rank for each criterion and formed a unique rank by all criteria. The criteria which are taken into the analysis are liquidity, profitability, solvency, financial structure, efficiency and the market power of the bank. The analysis was performed for twenty-two banks operating in Bosnia and Herzegovina, based on a data from their financial statements. Applying AHP methodology and developing models of multi-criteria optimization is established the financial position of all banks and identified the banks that have a leading position in the market.
Keywords: financial performances, banking sector, AHP method, ranking, evaluation

1. INTRODUCTION

Financial performances of the banking sector are relevant for assessing the banking sector performance in the financing economy and in the adequate resources allocation in sectors which support economic growth and development of a country. The role of banks as financial intermediaries impose an obligation on banks to maintain a high quality level of its operations which is reflected through the transfer security, asset liquidity, ability to settle obligations to claimants, as well as ensuring demanding return rate on capital for investors. These categories are easily measurable in practice thanks to the traditional financial performance indicators. However, taking into account modern and rapid changes in the economy, openness, interconnectivity and interdependence of all economic sectors and policy at the state level, and the increase exposure to a numerous risks results that internally oriented financial indicators do not have the ability to cover a wide range of factors from internal and external environments that operate simultaneously, which makes their assessment of the quality of banks incomplete. For these reasons there is a need for using multi-criteria analysis in order to comprehensively analyze and evaluate the performance of the banking sector and enable the banks ranking by multiple criteria.

2. BACKGROUND OF THE BANKING SECTOR IN BOSNIA AND HERZEGOVINA

In Bosnia and Herzegovina there are 23 banks, of which 8 banks in the Republic of Srpska and 15 banks in the Federation of Bosnia and Herzegovina, which operate through a network of 822 organizational units and employing 9,744 workers. Observed through the structure of ownership, those are the banks with predominantly private ownership dominated by the participation of foreign capital from Austria, Slovenia, Italy, Turkey and Croatian. Only one bank from the Federation of Bosnia and Herzegovina is a predominantly state-owned. The share of the banking sector assets in the country's nominal GDP at the end of 2018 was 91.6%, which indicates the dependence of the economy on the banking sector. This situation, refers to the fact that the banking sector is the largest and most significant participant in the financial system of our country and that all changes therein are reflected in the other segments of the economy which is why there is a need and obligation for banks to adequately evaluate their performance and take into account the assessment of credit worthiness of clients to ensure the proper allocation and use of resources in a competitive environment in which they operate. Banks in Bosnia for many years recorded a trend of savings and credit growth that last year reached a level of 60% of the nominal GDP of the country, in which 47.4% of the share occupied loans for the population and 43.7% of loans intended for business sector.(*Report of financial stability*, 2018) However, looking at the type of loans in the household sector, the highest share is occupied by residential and non-earmarked cash loans, while the credit activity of the business sector is allocated to the trade and production. The increased collection of credit receivables, the share of non-performing loans to total loans are at the level of 8.77% for the entire banking sector, but the exposure to credit risk is more pronounced on the side of business sector loans than the household sector. It is important to mention that the banking sector of Bosnia and Herzegovina is highly capitalized with a capital adequacy ratio of core capital of 16.5% and the rate of regulatory capital of 17.5%, which is partially consequence of higher required demands for regulation to provide additional resistance to a young banking markets, and on the other side the result of good business. Due to forgoing indicators banking sector of Bosna and Herzegovina is probably the most stable and most successful sector in our economy. Still there is a doubt that its efficiency is not a result of efficiency of all banks in system but few biggest which form the oligopolistic market structure and by its results mask the results of other banks. This situation points to the increased sensitivity of financial systems to large banks, which may have a negative impact on the economy if there is a deterioration in the performance of their business and financial performances.

3. THE CHARACTERISTICS OF TRADITIONAL MEASURES OF FINANCIAL PERFORMANCE

Financial indicators are defined to allow measuring liquidity, profitability, solvency, efficiency, and market power of the banks, and since they are calculated form historical data from balance sheet, they represent objective and valid evaluation of banks operating results. Most common used ratios to determine profitability of banks are: Return on Equity (ROE) which measures a corporation's profitability by revealing how much profit a company generates with the money shareholders have invested. The higher such ratio, the more efficient is the financial performance of profitability of a bank. Such profitability ratios measure the financial performance and the managerial efficiency of bank (Adam, 2014); other is Return on Asset (ROA) as a share of net profit in total assets which shows the level of managerial efficiency in managing assets in order to gain net profit (Djukic,Bjelica,&Ristic, 2006) and the third one Return on operating income (ROI) as a ratio between net profit after taxation and operating income which shows the ability of management control of expenditure. Beside this, analyzing bank liquidity is important for all bank stakeholders which are interested in knowing is bank capable to meet its short-term obligations and obtain sustainability in the market. That's why the L1 ratio is defined as a relation between average cash amount, and the average deposits, and the second ratio L2- is defined as a relation between the average loans amount and average deposits. The higher value of this ratios indicates that firm has larger margin safety to cover its short-term obligations. On the side of efficiency for banks it is important how effective a bank is in using overhead expenses including salaries and benefit costs and occupancy expenses as well as other operating expenses in generating revenues (Hays, Lurgio & Gilbert,Jr., pp.4) in order to achieve maximum results with minimum costs, so the ratios of operational costs and total operating income (E1) and ratio of operational income and total number of employees (E2) will show the decrease or increase of bank efficiency. The ratio of operational costs and operational income (EI) will show for how much the efficiency of the bank will increase if this ratio decreases. One of the most important segments of bank business is solvency, as well as the ability to pay obligations in long-term without provoking the loss of the depositors and other creditors. That's why the indicators of solvency will reflect the overall financial position of a bank. Adequate capital held by the bank provides protection to investors' interest, and it enhances the stability and efficiency of the bank.(Dadepo & Afolabi, 2017) Solvency is an indicator which determines the financial health. Since banks protects its activities with its own and borrowed capital it is important to see the reflections of financial structures on the bank performances.(Rakocevic & Dragasevic,2009) This indicator is measured with three sub indicators: the ratio between total obligations and equity (S1), the ratio between

equity a total loans (S2) and relation between total deposits and equity. All of these indicators are the most known and used in literature, but it is important to emphasize that all of them aren't used separately for making some evaluation of the banks performances, but used combined through several models like CAMEL(S) or DEA, or here presented AHP. Since previous two mentioned models has its limitations considering the creation of cumulative rankings by subjective judgment or the lack of multiple similar entities to be compared the AHP method will be used.

4. ANALYTIC HIERARCHY PROCESS

Method of analytic hierarchy process was first presented by Thomas Saaty (1980), and today is one of the most popular methods of multi-criteria analysis. It is a very effective technique that provides assistance to decision makers in solving complex problems by facilitating the selection of priorities and make the best decision. AHP method is very flexible because it producessimple way to find the relationship between criteria and alternatives. This method and thereby to assess the relevance of the criteria in the real world and determine the interaction between the criteria, in case of complex problems with many criteria and relatively large number of alternatives(Atanasova–Pachemska,. Lapevski &Timovski, 2014, pp.313) This method can be applied to a large number of complex decision problems involving finite number of alternatives and the existence of several different criteria. By Cabala, (2010) the key stages in this method are:

- Preparation of the hierarchical structure of the system: at this stage to identify the elements of the system, and then grouped them into a series of hierarchies. All the elements that are at a higher hierarchical level affect the elements that are at a lower level.
- The second phase is the so-called preferential analysis, which includes the evaluation of individual elements and consistency check of this evaluation.

So, after the presentation of the hierarchical structure of the observed problems it is important to determine the relative impact of each element in the functioning of the system as a whole. Preferential analysis is performed on the basis of matrix comparisons in pairs. This includes assigning relative score to each element of a hierarchical level and for each hierarchical level. The reference point for comparison is the element that is higher in the hierarchy. Matrix comparisons in pairs and can be written as follows:

$$A = \left(w_i / w_j\right)_{nxn} = \begin{bmatrix} w_1/w_1 & w_1/w_2 & \ldots & w_1/w_n \\ w_2/w_1 & w_2/w_2 & \ldots & w_2/w_n \\ \vdots & \vdots & \ddots & \vdots \\ w_n/w_1 & w_n/w_2 & \ldots & w_n/w_n \end{bmatrix}$$

Code comparison of comparative elements is sufficient to compare the values that have been made above the diagonal of the matrix A. The remaining values are either equal to 1 (the values on the diagonal), or the inverse of the values above the diagonal. For a comparison of the elements it is used "nine points" scale presented by the author given method (Saaty, 1980). After that it is calculated eigenvector by method of normalized average.

5. EMPIRICAL VERIFICATION OF MODEL

In order to apply the AHP model for ranking the banking sector it is necessary to first build a hierarchical model, and define the objective criteria, sub-criteria and alternatives. The goal of the model is the ranking of banks in Bosnia and Herzegovina in relation to the quantitative financial criteria, based on data from their financial statements in 2018. The financial criteria that are included in the analysis are: profitability, liquidity, solvency, efficiency and market power. Within each of the indicator are defined by the corresponding sub-indicator as defined in the previous section. According to defined criteria and sub-criteria is necessary to rank the alternatives to this model, and they are presented to banks. So there are total 22 alternatives. One bank is excluded from calculation because it is the only bank in BH that operates by the principals of Islamic banking which diferes comparing to all other banks in country. So, first, it is determined the weight of each criterion and sub-criterion based on the pair-wise comparison due to their relative importance. Looking at the individual sub-indicators it can't be created a clear picture of the overall performance of banks by financial criteria, as some banks are better by some individual criteria, but weaker by others. Based on the values for these indicators there has been calculated their limiting values (max and min) in order to determine the intensity which separates different grades. With these intensities there has been made the rating model and provided an overall rating of banks in Bosnia and Herzegovina for the year 2018

according to their financial performance. There were calculated the weights of the criteria and sub-criteria. They indicate their importance in the overall ranking of banks, and the values can be found in Table 1 and Table 2. There were also calculated the indices of consistency which for the criteria takes value of 0.033, and the value of 0.044 for sub-criteria. These values indicate that estimations are consistent. Depending on what is interested for decision makers, AHP model provides the ability to create the rating for each criterion separately, as it is shown in Table 1. It may be noted that according to various criteria the rating of banks is different, so it is possible to perform a sensitivity analysis by changing priorities of individual criteria. In this way it is possible to see what is happening with the banks in such a case and review different situations. From this table it can be seen that banks with greater market share are more profitable, while the situation is more unbalanced by other criteria.

Table 1: Rating banks by individual criteria

Bank	Profitability	Liquidity	Solvency	Efficiency	Market power
Weights	0,126	0,43	0,282	0,07	0,092
Bank 1	12	18	22	2	11
Bank 2	4	10	14	17	4
Bank 3	8	15	21	11	22
Bank 4	7	11	13	21	9
Bank 5	20	1	9	9	15
Bank 6	3	14	12	16	2
Bank 7	1	16	16	18	7
Bank 8	6	22	10	4	1
Bank 9	19	5	1	7	14
Bank 10	21	12	19	8	10
Bank 11	15	13	7	6	6
Bank 12	10	17	8	15	16
Bank 13	18	9	20	10	13
Bank 14	5	20	11	19	5
Bank 15	2	19	6	22	8
Bank 16	17	6	17	5	12
Bank 17	16	8	2	20	3
Bank 18	14	21	18	3	18
Bank 19	9	3	15	13	19
Bank 20	11	7	3	12	20
Bank 21	13	2	4	14	17
Bank 22	22	4	5	1	21

Source: Calculation of authors

Table 2: Normalized values and overall rank banks

Bank	P1	P2	P3	E1	E2	S1	S2	S3	L1	L2	MP1	Total	Rank
	0,062	0,055	0,058	0,047	0,035	0,13	0,121	0,106	0,185	0,173	0,027		
	max	max	max	min	max	min	max	min	max	max	max		
Bank 1	0,320	0,188	0,426	3,016	0,434	1,000	0,820	1,227	0,431	0,501	0,151	0,067	15
Bank 2	0,603	0,596	0,836	1,728	0,645	1,928	0,378	2,423	0,487	0,551	0,350	0,088	2
Bank 3	0,560	0,285	0,450	2,554	0,422	1,104	1,000	1,000	0,449	0,504	0,018	0,068	17
Bank 4	0,491	0,521	0,481	1,410	0,626	1,988	0,423	2,413	0,526	0,494	0,195	0,084	4
Bank 5	0,003	0,004	0,004	2,481	0,616	2,639	0,261	1,931	0,661	1,000	0,085	0,092	19
Bank 6	0,645	0,676	0,757	1,719	0,667	1,998	0,462	2,367	0,490	0,461	0,746	0,089	7
Bank 7	0,999	1,000	0,957	1,677	0,696	1,765	0,249	2,411	0,134	0,840	0,242	0,088	9
Bank 8	0,567	0,551	0,636	2,450	1,000	1,935	0,453	2,459	0,196	0,453	1,000	0,087	1
Bank 9	0,032	0,054	0,101	2,771	0,293	3,453	0,624	4,337	1,000	0,186	0,131	0,123	5
Bank 10	-1,112	-0,940	-1,281	2,441	0,699	1,461	0,532	1,499	0,345	0,632	0,172	0,049	22
Bank 11	0,160	0,175	0,266	2,763	0,482	2,150	0,364	2,513	0,419	0,551	0,243	0,086	6
Bank 12	0,338	0,361	0,414	1,995	0,490	2,065	0,401	2,569	0,449	0,490	0,084	0,085	21
Bank 13	0,142	0,096	0,173	2,575	0,425	1,236	0,597	1,415	0,467	0,597	0,135	0,067	20
Bank 14	0,589	0,605	0,798	1,555	0,670	1,965	0,396	2,487	0,325	0,512	0,282	0,085	8
Bank 15	0,771	0,848	1,000	1,417	0,569	2,134	0,450	2,509	0,465	0,446	0,240	0,091	3
Bank 16	0,162	0,151	0,233	2,878	0,367	1,781	0,423	2,081	0,550	0,572	0,149	0,081	11
Bank 17	0,151	0,289	0,157	1,483	0,761	3,460	0,255	3,760	0,542	0,525	0,372	0,110	10
Bank 18	0,189	0,160	0,261	2,928	0,463	1,808	0,488	1,952	0,175	0,529	0,078	0,074	16
Bank 19	0,484	0,435	0,305	2,058	0,670	1,861	0,396	2,197	0,706	0,579	0,068	0,086	14
Bank 20	0,287	0,389	0,319	2,555	0,415	2,745	0,357	3,401	0,668	0,415	0,052	0,105	13
Bank 21	0,270	0,283	0,351	1,974	0,525	2,348	0,385	2,718	0,871	0,480	0,082	0,095	12
Bank 22	-1,973	-1,867	-3,405	6,390	0,144	2,357	0,343	2,716	0,702	0,541	0,030	0,068	18

Source: Calculation of authors

6. CONCLUSION

Measuring the financial performance of banks is an important issue regarding to their role in the economic system. Partial financial indicators provide different information about the performance of banks, so it impose the need for using more appropriate method which will give a more comprehensive view of the success of their business. In this study the applied AHP method is a method for decision making. Case study included 22 banks in Bosnia and Herzegovina. For each of the banks there were calculated selected financial indicators, but reviewing them it isn't possible to get a clear picture of their success. Applying AHP methodology it is determined the ranking of banks, taking into account all criteria and sub-criteria, as well as their ranking by individual criteria - and the results differ. This is important for making the right evaluation of bank performance. In this way we can highlight banks that are most successful and they can be a benchmark for those less successful in order to improve their performance. This work shows that this method can offer a lot of useful informations for the bank managers, as well as information useful to other users of banking services. Of course, it is possible to include other indicators in the model, both quantitative and qualitative, depending on the informations we desire to get.

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