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INTEGRAL ASSESSMENT OF BANKING ACTIVITY EFFECTIVENESS AND RATING OF UKRAINIAN AND BULGARIAN BANKS

The article proposes a method for evaluating and rating the effectiveness of banks on the basis of coefficient analysis. It is proposed to calculate 24 coefficients, which allow to estimate capital-resource, credit-investment and general effectiveness of banks. According to the developed method, the rating of banks of Ukraine and Bulgaria was formed. Based on the rating, the banks of both countries are divided into 4 groups: high, sufficient, low and critical effectiveness. The rating indicators prove the higher effectiveness of the banks in Bulgaria and generally the higher stability of the banking system compared to Ukraine. The study developed an integral indicator of the bank's operation, which is a tool for a comprehensive assessment of the bank's performance and can be used to analyze the absolute effectiveness and stability of banks in different countries. Along with effectiveness, the integral indicator includes indicators of bank capital adequacy and its qualitative characteristics (customer confidence, image, transparency, comfort and simplicity). According to the results of the integral assessment, taking into account the balance of coefficients in groups, banks occupy the corresponding position in the matrix, which indicates their class (strong, mediocre, weak) and the presence of problems in certain aspects of the activity.
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Topicality

In the conditions of accelerating globalization process in the financial sector, a search for the most effective ways to organize the activities of bank establishments becomes a vital issue. The growth of competitiveness, especially through the financial globalization and penetration of foreign capital into the bank systems of the countries urge banks to enforce their competitiveness and thus their effectiveness. The task to form strong and dynamic banks makes the quality of management for every financial institution and the bank system in general especially significant. A proper analytical background is necessary for that. For this reason the elaboration of an approach to integral evaluation of the banks' activity effectiveness and methods of their ranking became the subject of our research.

Research analysis

The effectiveness of banking business is a one of the most important issues of modern banking management. The problems of finding international criteria for the country's banking system effectiveness evaluation are researched in the works of Kazarenkova and Kolmykova (2016). Banks' effectiveness in transition economies in Central and Eastern Europe and effect of geographical location on banking are researched by Degl'Innocenti et al. (2017). Many researches focus on the study of the banking business effectiveness in periods of crisis (Schoenmaker, 2017). The impact of crisis on structural change in cross-border banking and international banks direct cross-border and local affiliates' lending are studied by Bremus and Fratzscher (2015); Cerutti and Claessens (2017).

Spokeviciute et al. (2019) research activity of less efficient banks as compared to more efficient banks during financial crises in the USA. Ertürk (2016), Cohen et al. (2014) analyzed post-crisis regulatory reform initiatives and their impact on effectiveness and risks of bank institutions. The relationship between capitalization strategies, systemic risk in the banking sector and banks' corporate governance are researched by Anginer et al. (2016; 2018).

Different methods that are used in operational activity and financial indicators in private banks are compared (Sharma G. & Sharma D., 2017).

Tan and Floros are studying the interplay between the level of competition, risk and effectiveness using a sample of Chinese commercial banks. According to the research of banks in China, those banks that have higher levels of credit risk have lower levels of cost effectiveness (Tan & Floros, 2019).

The effectiveness of the Ukrainian banking system after double reduction in the number of commercial banks during 2016-2018 is researched (Prymostka O. & Prymostka L., 2018).

In general, the notion of effectiveness can be interpreted on the basis of the following two approaches: the effectiveness of any activity is measured by the ratio of the results obtained (income) to the spent resources (costs) for this activity; effectiveness as a measure reflecting the influence of the human factor (organization of work, competence of employees, management structure, etc.) on the achieved results (Tolchin, 2007).

In the scientific literature, there are many methods for determining the effectiveness of banking activities. Based on this, the definition of this indicator is quite versatile.

Thus, Buriak A. (Buriak, 2010) understands, by the effectiveness of banks, "its ability to achieve its goals through optimal use of resources, while taking into account not only the microeconomic but also the macroeconomic function of banks in a market economy". The author among the indicators that will affect the effectiveness of the bank, allocates income and expenses, but does not provide a coherent, precise methodological approach to determining this effectiveness.

O. Rybalka (Rybalka, 2007) offers a systematic approach to assessing the effectiveness of banking in the triple dimension of "profitability – riskiness – reliability". The advantage of this approach is to take into account, in addition to the indicators of profitability and other factors that affect the activities of the bank.

L. Yeris (Єрic, 2014) measures effectiveness through the prism of managing cash flows as the main economic category in the activities of banks, while still taking as basis the indicators of profitability. In general, investigating this issue, most researchers focus on the indicators of profitability. We consider it necessary to develop and substantiate an integrated approach to assessing the effectiveness of banking activities taking into account various indicators of the bank's activity (quantitative and qualitative), but profitability indicators are the basis for the rating of banks in Ukraine and Bulgaria.

The objective of the article is to elaborate a complex approach to evaluating the bank activity effectiveness and to conduct ranking of Ukrainian and Bulgarian banks.

Methodological background

Analysis of the theoretical background of bank activity effectiveness and ways of its evaluation, strategies of abstraction and generalization, as well as induction and deduction methods are used. The coefficient and convolution methods serve as a basis for the ranking and calculating the integral index of effectiveness and stability of a bank. In order to take into consideration qualitative indicators of the bank activity, the method of expert evaluation is used. The synthesis method, matrix, graphical and table methods (approaches) were used to show the rankings of the bank results and integral index calculation. Having analyzed the results of the research of the bank systems of Bulgaria and Ukraine in the context of their activity and stability of their banks, methods of comparison and grouping are used.

Research results

To ensure the efficient functioning of the bank, first of all, the proper organization of analytical work is necessary, the results of which are the basis for the adoption of operational management decisions. The complex of indicators of the bank's performance is

summed up by the appropriate methodology, which is the basis for the formation of its rating.

For rating of banks, different methods are used, which are complex or partial. Partial methods involve choosing the coefficients for assessing the financial condition of the bank and ranking them for each of these indicators. The disadvantage of such techniques is the lack of a vision of a coherent picture of the work of one or another bank.

Comprehensive methods are mainly based on the definition of an integral indicator of the bank's activity. The variation of these techniques consists in which particular activity indicators take into account and which weight coefficients are assigned to a separate coefficient. The results of such ratings are mainly reflected in points or in the form of an index. The index method is based on multi-factor index models that characterize the relationship between the rating index and the indicators of the financial condition of banks (Kolesnik, 2012).

The most popular ballroom valuation and rating system is the CAMELS system. This system is used by the National Bank of Ukraine. This rating system is aimed at assessing the financial condition of a commercial bank to identify shortcomings in the activities and management of the bank. The biggest disadvantage of this technique is the use of indicators that constitute banking secrecy. Therefore, it is closed and inaccessible to researchers and experts. The CAMELS rating system was developed in the US and used there along with the FIMS technique. When applying the FIMS method, more than 30 factors are used, which mainly reflect the quality of assets and the state of capital of the bank. For comparison, banks in BAKIS methodology are ranked in Germany, which is based on the calculation of 47 coefficients.

Most open rating techniques do not take into account the entire spectrum of indicators for assessing the financial situation, the quality of the bank's performance and the influence of external factors, which banks are particularly sensitive to. Therefore, in most of them, they are not able to provide a complete objective assessment of the effectiveness of the bank. Standard and Poor's, Fitch Ratings, Moody's Investors' Service are the leading international rating agencies operating successfully in the European and US markets.

Rating agencies Moody's and Fitch provide individual (that takes into account only the financial condition of the bank without possible support of the state or the owners) and general (that takes into account the state or owners support) bank ratings. Standard & Poor's does not divide bank ratings into individual and general ratings, explaining that credit ratings already take into account the risks of the bank's operating environment and possible support. We agree with the last statement and offer a rating based mainly on the financial position of the bank. These leading international rating agencies use Through-the-Cycle (TTC) approach for their rating that analyses the subject during certain period of time. So Moody's rating agency takes into account the following indicators in its methodology: market share and stability of the bank, geographical diversification, stability and diversification of income, corporate governance, transparency of financial statements, propensity to take risks, quality of liquidity management, regulatory environment, quality of liquidity management, level of corruption, the legal system and regulation, the coefficients of assessment of the bank's financial condition.

Such indicators are taken into account: the ratio of profit before tax to assets, the ratio of net income to assets, the ratio of short-term borrowings and liquid assets to total assets, the share of equity in assets, the ratio of operating expenses to gross income, the proportion of problem loans, the ratio of problem loans to equity and reserves for problem loans. Each of these indicators has a weight expressed as a percentage. In general, rating agency Moody's, when evaluating the bank's "internal financial strengths," focuses on forecasting capital ratios and taking into account the expected expenditures of the bank; rating agency Fitch pays greater attention to off-balance sheet instruments, capital and liquidity risk; and rating agency Standard and Poor's assesses the quality of risk management and the ability to raise capital through profit.

Also in EU there is The European Banking Authority (EBA), an independent EU Authority that has to ensure effective and consistent prudential regulation and supervision across the European banking sector. The EBA Risk Dashboard is part of the regular risk assessment conducted by the EBA and it complements the Risk Assessment Report. The EBA Risk Dashboard summarises the main risks and vulnerabilities in the banking sector in the European Union (EU) by looking at the evolution of Risk Indicators (RI) among a sample of banks across the EU (Eba.europa.eu, 2019). In accordance with its mandate, the European Systemic Risk Board (ESRB) has engaged in developing a monitoring framework to assess systemic risks in the European Union (EU) banking sector. The ESRB is monitoring the sources of systemic risk in the European financial system and in the economy (Grillet-Aubert et al., 2019)

The World Bank analyzes the development of the banking sector in every country as a whole and takes into account such indicators as: the ratio of M2 to GDP and the ratio of private credit to GDP (Siteresources.worldbank.org, 2019). In order to provide a rating of a bank, rating agencies and other organizations need accounting and analysis of its internal information. Such information is not accessible to all market participants, and rating agencies counterbalance this information asymmetry in some way on the market and act as information intermediaries. The proposed methodology involves the use of available information, so it provides an opportunity to bypass intermediaries and evaluate the bank's activity independently.

Depending on the group of rating users and their goals, there are credit, deposit, current, and long-term ratings. Taking into account the specifics of each of these ratings, relying on factors from the methods of leading international rating agencies in relevant to individual rating, and taking the coefficient analysis as a basis, we have developed a set of indicators reflecting different aspects of the bank's activity and effectiveness of bank activity in general.

We suggest an approach to ranking the banks according to the criteria of effectiveness that is quite simple to use and is available to everybody, since the necessary data can be found in public information. In addition, this methodology can be used by investors (also individuals) and clients who do not have access to inside information of the bank. The ratio that we take into consideration reflects the financial state of the banks, the structure of incomes and expenditures, and the effectiveness of their activity, namely indicators of capital-resource effectiveness, indicators of the effectiveness of credit and investment activity, and indicators of overall performance.

It is this division of coefficients that allows taking into account all the functional elements of the bank's activity. Thus, the coefficients of capital-resource effectiveness reflect the effectiveness of the formation of own resources and the engagement of the bank's resource base (Table 1).

Table 1

The indicators of the bank's capital-resource effectiveness

	Indicator	The mechanism of calculation
K_1	The coefficient of profitability of interest expenses	The ratio of gross profit to interest expenses of the bank
K_2	The coefficient of return on equity	Net profit to equity ratio
K_3	The coefficient of profitability of attracted deposits	The ratio of gross profit to the attracted deposits of the bank
K_4	The coefficients of coverage of the bank's obligations with absolute liquid assets	The ratio of absolutely liquid assets to total liabilities of the bank
K_5	The coefficient of the security of deposit activity with absolute liquid assets	The ratio of absolutely liquid assets to the bank's deposit liabilities
K_6	The coefficient of interest rate management	The ratio of interest expense to the bank's income

The indicators of the bank's capital-resource effectiveness reflect the general structure of the liabilities balance and the activity of attracting the resource base of the bank from external sources; in particular, customer deposits (Moiseenko, 2011).

With the development of the financial sector, along with the traditional credit activities of the banks, the investment activity, which involves the formation of portfolios of the bank's securities for maintenance and sale occupies a significant place as well. These two types of activities reflect the activity of the bank in the credit and stock markets, and their results can provide high revenues and profits of the bank. Accordingly, the next group of indicators for assessing the functioning of banks is the performance indicators of the bank's lending and investment activities (Table 2).

Table 2

The indicators of effectiveness of the bank's lending and investment activity

	Indicator	The mechanism of calculation
K_7	The coefficient of interest income in gross profit	The ratio of interest income in gross profit
K_8	The coefficient of commission income in gross profit	The ratio of commission income in gross profit
K_9	The coefficient of investment effectiveness in credit operations	The ratio of interest income to the total assets of the bank
K_{10}	The coefficient of investment effectiveness in commissions and intermediary operations	The ratio of commission income to the total assets of the bank
K_{11}	The commission income ratio	The ratio of commission income to total revenues
K_{12}	The interest income ratio	The ratio of interest income to total revenues
K_{13}	The coefficient of the credit-investment activity	The ratio of the amount of loans and securities provided in the bank's portfolio to the total assets of the bank
K_{14}	The coefficient of net interest margin	The ratio of net interest margin to total assets
K_{15}	The profitability ratio of credit operations	The ratio of interest income to all loans

These indicators aim at the evaluation of the financial resources of the bank placement and usage effectiveness. The financial result of a commercial bank is profit, gross profit depends mainly on the ratio of its revenues and expenses; its formation is influenced by the structure of the institution's income (Credit Risk Modeling, 1999).

The indicators (Table 2) comprehensively characterize the effectiveness of placement of bank's financial resources, that is, its credit and investment operations.

It is worth noting that multifaceted activities require additional costs for the organization of work and customer service of the bank. All this affects the performance of the bank and makes it necessary to allocate a group of coefficients that reflect the overall effectiveness of the bank (Table 3).

Table 3

The indicators of overall effectiveness of the bank's activity

	Indicator	The mechanism of calculation
K_{16}	The return on assets	The ratio of gross profit to total assets of the bank
K_{17}	The return on revenue	The ratio of gross profit to the total income of the bank
K_{18}	The return on costs	The ratio of gross profit to the bank's expenses
K_{19}	The return on administrative costs	The ratio of gross profit to the administrative expenses of the bank
K_{20}	The coefficient of coverage of the bank's total expenses	The ratio of total income and total costs
K_{21}	The coefficient of effectiveness of credit and deposit activity	The ratio of interest expense to interest income
K_{22}	The effectiveness of using assets of the bank	The ratio of total income and aggregate assets
K_{23}	The coefficient of administrative costs	The ratio of administrative costs to total costs
K_{24}	The coefficient of coverage of administrative costs	The ratio of net operating income to administrative expenses

All the coefficients for evaluating the bank's performance suggested in the methodology combine the periodic performance indicators of the bank, that is, the indicators calculated for the relevant period (income, expenses, profit), and instantaneous rates, the absolute size of which is calculated at the appropriate time in accordance with the balance sheet (assets, capital) (Baranovskyi, 2014). The methodology can be applied as part of an absolute assessment of the bank's performance based on the integral indicator of evaluation calculation, and for comparing the work of banks within the established rating.

Formation of the banks rating presupposes taking into account the following aspects of the banking institutions rating methodology:

1. Coefficient analysis of banks in terms of the three above-mentioned groups of indicators. Taking into account different importance of individual indicators for reliable assessment of the bank's performance, different weighted indexes are given in the methodology (integers from 1 to 3), indexes that assess certain aspects of banking

operations (for example, transactions relating to securities, lending, attraction of deposits, as well as income and expenses associated with them) have less weight in the methodology, indicators that assess the bank's overall performance and also allow it to estimate its aggregate income and expenses have more weight.

2. The basis of any ranking methodology is the choice of comparison base. The choice of a "standard" bank can be done in different ways, choosing: a bank with average characteristics among all commercial banks; bank with a reference that is recommended by scientific literature values of indicators. In the offered method on the basis of separate coefficients the value of some generalized indicator of commercial bank BR level of effectiveness is calculated with the help of convolution method. In the method, such convolution was carried out by finding the relation between the ratio values of certain banks K1j ... K24j and the " standard bank". We consider the bank to be a " standard" bank, when it has the best relative performance characteristics for each of the individual ratios. The normative values of the ratios are omitted, since the aggregate of indicators for the methodology of the bank performance evaluation with certain types of transactions and in general is formed in order to make the growth (or decline) of their values correlate directly with the effectiveness level of the bank.

3. Among the above-mentioned indexes are the ones with reference best value going to the maximum (stimulants, Kse), and those whose reference value goes to a minimum (disincentive, Kde).

For the stimulants the following is true:

$$K_{se} \rightarrow \max \qquad (1)$$

For disincentive:

$$K_{de} \rightarrow \min \qquad (2)$$

For example, when the profitability indicators increase they reflect higher effectiveness of the bank activity, while banks are trying to minimize indicators that take into account the cost ratios.

4. The individual ranking index for each indicator-stimulant is calculated as the relation of the individual bank's index value to the same value for the master bank (one that has a maximum index).

$$Z_{ijs} = \frac{K_{ij}}{K_{ie}}, \qquad (3)$$

where Z_{ijs} is normalized individual rating indicator for the *i-index* of the *j-bank* for the indicators-stimulants;

K_{ij} is a value of the *i-indicator* of the *j-bank*;

K_{ie} is a value of the *i-indicator* of the "standart-bank" (maximum value in the group).

5. Taking into account, that the best value of the disincentive indexes is a minimum value among the banks with that index, in order to bring indexes for the stimulants and disincentive to the commensurable values, individual ranking index for each disincentive is calculated as a relation of the "standard-bank" ratio (that has minimum ratio) and ratio value of the individual or separate bank.

$$Z_{ijd} = \frac{K_{ie}}{K_{ij}}, \tag{4}$$

where Z_{ijd} is normalized individual rating indicator for the i-index of the j-bank for the indicators-stimulants;

K_{ij} is a value of the *i-indicator* of the *j-bank*;

K_{ie} is a value of the *i-indicator* of the "standard-bank" (minimum value of the indicator). In the methodology, indicators-disincentives serve as the three indexes; the capital-resource effectiveness bank group indicator. Interest rate management index K6 and 2 indicators for evaluating the overall performance of the bank: indexes of the credit and deposit activity effectiveness K21 and administrative expenses index K23.

6. It should be noted that moving towards maximum or minimum, the indexes can deviate significantly from average in the banking system and in terms of the individual financial indices ratio they can display wrong correlation of the two values used in the calculation of these indexes (they differ significantly from the overwhelming majority of the indexes values in the banking system). Such deviations are considered to be imbalances in the bank's indexes analysis. The values of these indexes are not taken into account when calculating the normalized individual indicators and they are assigned with the value of this indicator as a bank of the standard or bank outsider.

7. The place in the ranking of each bank is determined by the rating point of the bank BR that means the sum of the normalized individual ratings of banks Z1j ... Z24j taking into account the weight of the indexes in the rating. The total amount of points for the j-bank is calculated with the formula:

$$BR_j = \sum_{i=1}^{24} w_{zi} z_{ij} \tag{5}$$

$$\begin{pmatrix} BR_j = Z_{1j} + Z_{3j} + Z_{6j} + Z_{7j} + Z_{8j} + Z_{9j} + Z_{10j} + Z_{11j} + Z_{12j} + Z_{15j} + Z_{19j} + Z_{23j} + \\ + 2(Z_{4j} + Z_{5j} + Z_{13j} + Z_{14j} + Z_{17j} + Z_{21j} + Z_{24j}) + \\ + 3(Z_{2j} + Z_{16j} + Z_{18j} + Z_{20j} + Z_{22j}) \end{pmatrix}$$

where: *BR* means the ranking point of the bank;

Zij is normalized individual rating indicator for the i-index of the j-bank for the indicators-stimulants;

W_{zi} means a weight (value) of the normalized individual ranking index.

The proposed methodology has been used to assess the activities of Ukrainian and Bulgarian banks effectiveness, which functioned in 2018 and to derive their rating.

For comparison, we have selected the banks of Ukraine and Bulgaria. Ukraine is an associate member of the EU and Bulgaria is a full member. This makes it interesting to compare the two countries in terms of the effectiveness in the work of individual banks and the banking system as a whole to understand the problems and challenges facing banks operating in different economic environments.

All banks reporting data was received and consolidated on the basis of official bank reporting on the websites of certain Bulgarian banks and consolidated data of the National Bank of Ukraine. Forty eight banks operate in Ukraine, in tables 4, 5, 6 there is data of 10 banks with the best total rating and 10 with the worst rating in the indicators groups of the method.

Table 4

Normalized individual rating indicators for the coefficients of the bank's capital-resource effectiveness (Ukraine)

Bank	Z_{1s}	Z_{2s}	Z_{3s}	Z_{4s}	Z_{5s}	Z_{6d}
Standard-bank	*12,63555*	*0,71871*	*0,33706*	*0,61506*	*1,78012*	*0,00062*
PJSC "Bank "Yunison"	1	0,16736	1	0,65489	1	1
PJSC "Bank Alians"	0,56174	0,31923	0,52023	0,19842	0,07254	0,00541
PJSC KB"Finansova initsiatyva"	0,04852	-0,22923	0,89556	0,01083	0,03021	0,00163
PJSC "IdeiaBank"	0,02778	0,38973	0,14884	0,11014	0,040551003	0,00205
PJSC "A – Bank"	0,04426	0,39288	0,19621	0,06272	0,02249	0,00238
PJSC "Rozrakhunkovyi Tsentr"	1	0,04196	0,59340	0,06274	0,02723	1
PJSC "Sitibank"	0,06865	0,27310	0,10456	0,08245	0,02897	0,00175
PJSC "Bank "Portal"	1	0,04849	0,99662	0,44506	0,16873	0,03512
PJSC "Europrombank"	0,01231	0,03921	0,08139	0,12295	0,04404	0,00155
JSC "Ukrsybbank"	0,15640	0,21950	0,10052	0,18402	0,07275	0,00562
…						
PJSC "Skai Bank"	-0,21137	-0,23018	-0,63534	0,08015	0,03285	0,00260
PJSC "Ukrsotsbank"	-0,12225	-0,64421	-0,32374	0,12053	0,04586	0,00161
PJSC "Megabank", Kharkiv	-0,07916	-0,84029	-0,28900	0,09285	0,03899	0,00102
JSC "Ukreksimbank"	-0,06725	-0,78893	-0,26371	0,07137	0,04245	0,00090
PJSC "Bank Kredyt Dnipro"	-0,09046	-0,98287	-0,23914	0,08558	0,03030	0,00108
PJSC KB "Pryvatbank"	-0,10353	-1,30715	-0,34155	0,13717	0,05299	0,00134
Ukr.Bank Rekonstruktsii ta Rozvytku	-0,09486	-0,06359	-9,83818	0,17668	0,62924	0,00142
PJSC KB "Tsentr"	-1,23560	-0,62039	-3,43731	0,24183	0,08818	0,01730
JSC "BM Bank"	-0,16204	-1,28910	-0,65481	0,19844	0,07522	0,00076
PJSC "BTA Bank"	-0,24752	-1,58838	-6,68266	0,16857	0,09504	0,00080

Source: Calculated by the authors on the basis of financial reporting of banks (40. National Bank of Ukraine, 2018).

Table 5

Normalized individual rating indicators for the coefficients of the bank's lending and investment activity (Ukraine)

Bank	Z_{7s}	Z_{8s}	Z_{9s}	Z_{10s}	Z_{11s}	Z_{12d}	Z_{13s}	Z_{14s}	Z_{15s}
Standard-bank	*121,40164*	*34,70761*	*0,33930*	*0,41802*	*0,81345*	*0,99788*	*0,98632*	*0,22104*	*14,63527*
PJSC "Bank "Yunison"	0,02320	0,02651	0,38771	0,10309	0,30046	0,74771	0,62415	0,59514	0,014601
PJSC "Bank Alians"	0,00619	0,01315	0,23020	0,11381	0,45881	0,61406	0,91135	0,28714	0,007562
PJSC KB"Finansova initsiatyva"	0,03527	0,00025	0,61022	0,00101	0,00252	1	0,81001	0,57996	0,01771
PJSC "IdeiaBank"	0,06732	0,03022	1	0,10444	0,13756	0,87149	0,89647	1	0,03007
PJSC "A – Bank"	0,03885	0,04728	0,75075	0,21257	0,29476	0,68883	0,93578	0,71560	0,02081
PJSC "Rozrakhunkovyi Tsentr"	0,02701	0,00274	0,30037	0,00708	0,02509	0,70368	0,63708	0,46067	1
PJSC "Sitibank"	0,02532	0,00504	0,28382	0,01315	0,06617	0,94439	0,88798	0,27229	0,01220
PJSC "Bank "Portal"	0,03406	0,00759	0,42071	0,02182	0,07263	0,92643	0,96599	0,63345	0,01594
PJSC "Europrombank"	0,12744	0,01780	0,62542	0,02032	0,04727	0,96240	0,95221	0,56137	0,01608
JSC "Ukrsybbank"	0,03259	0,00873	0,30404	0,01895	0,08153	0,86534	0,84323	0,40702	0,00926
…									
PJSC "Skai Bank"	-0,00622	-0,00688	0,19199	0,04944	0,18798	0,48297	0,35926	0,14866	0,01893
PJSC "Ukrsotsbank"	-0,00693	-0,01417	0,20253	0,09630	0,36232	0,50421	0,69102	0,07186	0,00733
PJSC "Megabank", Kharkiv	-0,01028	-0,01027	0,26019	0,06054	0,26772	0,76135	0,78491	0,07940	0,00787
JSC "Ukreksimbank"	-0,01333	-0,00165	0,22547	0,00649	0,04139	0,95058	0,76715	0,09443	0,01138
PJSC "Bank Kredyt Dnipro"	-0,00895	-0,00772	0,22668	0,04551	0,21795	0,71822	0,74049	0,06785	0,00884
PJSC KB "Pryvatbank"	-0,00789	-0,01746	0,26207	0,13490	0,45452	0,58424	0,68665	0,08143	0,03418
Ukr.Bank Rekonstruktsii ta Rozvytku	-0,00970	-0,00071	0,13897	0,00236	0,01592	0,61946	0,72342	0,06229	1
PJSC KB "Tsentr"	-0,00371	-0,03815	0,41837	1	0,91536	0,25339	0,81645	0,55100	0,01637
JSC "BM Bank"	-0,00283	-0,00345	0,15957	0,04524	0,24685	0,57606	0,72613	-0,10307	0,00516
PJSC "BTA Bank"	-0,00125	-0,00044	0,28167	0,02295	0,04535	0,36826	0,75913	-0,47147	0,02005

Source: Calculated by the authors on the basis of financial reporting of banks (40. National Bank of Ukraine, 2018).

Table 6

Normalized individual rating indicators for the coefficients of the overall effectiveness of the bank's activity (Ukraine)

Bank	Z_{16s}	Z_{17s}	Z_{18s}	Z_{19s}	Z_{20s}	Z_{21d}	Z_{22s}	Z_{23d}	Z_{24s}
Standard-bank	0.10108	0.81529	0.90239	4.73839	2.58110	0.00088	0.56140	0.00238	14.34886
PJSC "Bank "Yunison"	0.44939	0.32490	0.39095	0.21195	0.51599	1	0.31427	0.00678	0.25637
PJSC "Bank Alians"	1	1	1	0.56584	0.42882	0.00472	0.22722	0.00708	0.18687
PJSC KB"Finansova initsiatyva"	0.46524	0.28582	0.66652	1	1	0.00232	0.36985	1	1
PJSC "IdeiaBank"	0.39945	0.13051	0.20442	0.27236	0.67169	0.00254	0.69545	0.01667	0.57062
PJSC "A – Bank"	0.51964	0.17874	0.27266	0.24877	0.65413	0.00233	0.66057	0.01142	0.39596
PJSC "Rozrakhunkovyi Tsentr"	0.29909	0.26268	0.30315	0.11647	0.49488	1	0.25871	0.00481	0.17795
PJSC "Sitibank"	0.30145	0.37604	0.71172	1	0.81160	0.00236	0.18215	0.01758	0.68088
PJSC "Bank "Portal"	0.33220	0.27424	0.33872	0.19291	0.52964	0.04624	0.27524	0.00712	0.27493
PJSC "Europrombank"	0.13198	0.07613	0.11710	0.24055	0.65956	0.00213	0.39387	0.02570	0.75701
JSC "Ukrsybbank"	0.25090	0.26772	0.36010	0.21629	0.57679	0.00692	0.21294	0.00751	0.25183
…									
PJSC "Skai Bank"	-0.82966	-0.78243	-0.50501	-0.37608	0.27678	0.00178	0.24093	0.00932	0.14510

PJSC "Ukrsotsbank"	-0.78536	-0.73298	-0.56870	-0.73820	0.33271	0.00115	0.24345	0.01624	0.17791
PJSC "Megabank", Kharkiv	-0.68076	-0.74676	-0.69505	-1.16921	0.39912	0.00110	0.20713	0.02105	0.23152
JSC "Ukreksimbank"	-0.45488	-0.71894	-0.77338	-2.11829	0.46129	0.00121	0.14376	0.03428	0.32827
PJSC "Bank Kredyt Dnipro"	-0.68102	-0.80891	-0.63961	-0.63650	0.33907	0.00110	0.19129	0.01245	0.10726
PJSC KB "Pryvatbank"	-0.89280	-0.74615	-0.60096	-1.32644	0.34538	0.00111	0.27187	0.02762	0.32374
Ukr.Bank Rekonstruktsii ta Rozvytku	-0.38506	-0.64345	-0.53472	-0.30298	0.35636	0.00125	0.13597	0.00709	0.10682
PJSC KB "Tsentr"	-3.02947	-0.68788	-0.68223	-1.28347	0.42530	0.00623	1	0.02354	0.26342
JSC "BM Bank"	-1.51557	-2.05111	-0.84554	-0.57010	0.17677	0.00062	0.16789	0.00844	-0.00246
PJSC "BTA Bank"	-6.01250	-2.94696	-1.02031	-2.52411	0.14846	0.00042	0.46358	0.03096	0.00680

Source: Calculated by the authors on the basis of financial reporting of banks (40. National Bank of Ukraine, 2018).

The list of Bulgarian banks is formed according to the Bulgarian National Bank. Since the methodology takes into account the information of every single independent financial statement of each bank, rating do not include branches of foreign banks that provide financial information in the consolidated statements of their financial groups, in particular: Citi Bank Europe – Bulgaria Branch, BNP Paribas S.A. – Sofia Branch, ING Bank N.V. – Sofia Branch, BNP Paribas Personal Finance S.A. – Bulgaria Branch, T.C. Ziraat Bankas – Sofia Branch, Varengold Bank AG – Sofia Branch.

The rating lists 20 Bulgarian banks operating in 2018 (Table 7, 8, 9) by categorizing them into groups of method coefficients.

Table 7

Normalized individual rating indicators for the coefficients of the bank's capital-resource effectiveness (Bulgaria)

Bank	Z_{1s}	Z_{2s}	Z_{3s}	Z_{4s}	Z_{5s}	Z_{6d}
Standard-bank	11,14298	0,47689	1,07766	5,83137	1,36673	0,03517
DSK Bank	1	1	1	1	1	1
Eurobank Bulgaria	-0,46381	1	0,02302	0,02058	1	1
TBI Bank	0,41776	0,39000	0,06195	0,05452	0,24063	0,51469
Procredit Bank	1	0,31128	0,01908	0,01872	0,08026	1
Raiffeisenbank	0,75987	0,30928	0,02604	0,03553	0,17480	0,70794
UniCredit Bulbank	0,65222	0,21874	0,01923	0,03937	0,17084	0,65666
Expressbank	0,55013	0,29378	0,01968	0,03135	0,13772	0,53926
Bulgarian Development Bank	0,34727	0,05670	0,02505	0,04444	0,39725	0,40388
Allianz Bank Bulgaria*	0,24675	0,29220	0,01458	0,05224	0,23220	0,31779
D Commerce Bank	0,30968	0,21768	0,01706	0,04073	0,17539	0,41732
Piraeus Bank Bulgaria	0,15141	0,16667	0,01137	0,02869	0,13003	0,24475
Municipal Bank	0,00724	0,00072	0,00023	0,02938	0,12594	0,44247
Bulgarian-American Credit Bank	0,06973	0,09313	0,00711	0,03550	0,15744	0,16554
Central Cooperative Bank	0,13308	0,16723	0,00734	0,06225	0,27012	0,30258
First Investment Bank	0,00966	0,20784	0,00125	0,03180	0,14250	0,19219
Texim Bank	0,01361	0,00706	0,00061	0,03357	0,14579	0,70957
Tokuda Bank	0,03376	0,06331	0,00272	0,03402	0,15091	0,26837
International Asset Bank	0,03661	0,11894	0,00505	0,05580	0,24372	0,12109
United Bulgarian Bank	-0,36381	-0,10962	-0,00827	0,02278	0,09787	0,93033
Investbank	-0,12781	-0,40416	-0,01555	0,02810	0,12456	0,16013

* Allianz Bank Bulgaria's indicators are calculated according to the bank's reporting in 2016
Source: Calculated by the authors on the basis of financial reporting Bulgarian banks, 2017.

Normalized individual rating indicators for the coefficients of the bank's lending and investment activity (Bulgaria)

Bank	Z_{7s}	Z_{8s}	Z_{9s}	Z_{10s}	Z_{11s}	Z_{12d}	Z_{13s}	Z_{14s}	Z_{15s}
Standard-bank	103,71590	34,21306	0,12786	0,72211	0,99898	0,91939	0,89385	0,11731	0,19550
DSK Bank	1	0,04880	0,00432	1	1	0,00083	0,04085	0,00471	0,07750
Eurobank Bulgaria	-0,14054	0,00155	0,31437	0,00149	0,02005	0,80916	0,98991	0,32646	0,25044
TBI Bank	0,02508	0,01404	1	0,03270	0,15295	0,89995	0,77481	1	1
Procredit Bank	0,01674	0,01786	0,24754	0,01543	0,23981	0,74033	1	0,25588	0,18453
Raiffeisenbank	0,01414	0,01845	0,24311	0,01852	0,26581	0,67115	0,89104	0,24366	0,24013
UniCredit Bulbank	0,01402	0,01913	0,19719	0,01572	0,25511	0,61577	0,86999	0,19460	0,22261
Expressbank	0,01450	0,01710	0,21372	0,01473	0,23423	0,65405	0,89684	0,20769	0,20093
Bulgarian Development Bank	0,02630	0,00291	0,19216	0,00124	0,03355	1	0,51115	0,18962	0,34599
Allianz Bank Bulgaria*	0,02306	0,01854	0,25726	0,01209	0,19331	0,79156	0,79641	0,23777	0,37079
D Commerce Bank	0,01921	0,02554	0,24521	0,01904	0,25441	0,63047	0,80080	0,22842	0,28653
Piraeus Bank Bulgaria	0,02160	0,02529	0,17758	0,01214	0,21007	0,59101	0,95058	0,14238	0,16114
Municipal Bank	1	1	0,18942	0,01106	0,21965	0,72353	0,84325	0,18179	0,38528
Bulgarian-American Credit Bank	0,04802	0,02154	0,24635	0,00645	0,12180	0,89431	0,80572	0,19914	0,22508
Central Cooperative Bank	0,03624	0,03974	0,20928	0,01340	0,23462	0,70488	0,63779	0,18720	0,29679
First Investment Bank	0,33467	0,34406	0,31222	0,01875	0,23230	0,74431	0,67026	0,24932	0,34918
Texim Bank	0,57103	0,69320	0,25263	0,01791	0,17852	0,48440	0,67440	0,24472	0,38556
Tokuda Bank	0,11840	0,11192	0,24812	0,01370	0,18903	0,65868	0,81179	0,21192	0,30479
International Asset Bank	0,04956	0,07487	0,19724	0,01740	0,30406	0,66294	0,66433	0,11248	0,24101
United Bulgarian Bank	-0,04054	-0,04864	0,25249	0,01769	0,25535	0,70099	0,92234	0,25908	0,22230
Investbank	-0,01776	-0,02695	0,21434	0,01900	0,28880	0,62678	0,75546	0,14458	0,35013

* Allianz Bank Bulgaria's indicators are calculated according to the bank's reporting in 2016
Source: Calculated by the authors on the basis of financial reporting Bulgarian banks, 2017.

Normalized individual rating indicators for the coefficients of the overall effectiveness of the bank's activity (Bulgaria)

Bank	Z_{16s}	Z_{17s}	Z_{18s}	Z_{19s}	Z_{20s}	Z_{21d}	Z_{22s}	Z_{23d}	Z_{24s}
Standard-bank	0,43241	0,59821	1,48889	2,34412	2,48889	0,04731	0,72284	0,25794	5,75826
DSK Bank	1	1	1	0,96935	1	1	1	0,39366	0,65965
Eurobank Bulgaria	0,04709	0,6299	0,40611	1	0,64472	1	0,07475	1	1
TBI Bank	0,11369	0,53177	0,30088	0,29929	0,56582	0,57285	0,21379	0,40395	0,29550
Procredit Bank	0,04215	0,65515	0,43289	0,3107	0,66074	0,91559	0,06433	0,29148	0,30014
Raiffeisenbank	0,04901	0,70321	0,4877	0,38166	0,69353	0,58762	0,06969	0,31782	0,32022
UniCredit Bulbank	0,04009	0,65072	0,42809	0,66364	0,65788	0,50009	0,06161	0,62956	0,56971
Expressbank	0,04202	0,66836	0,44743	0,47418	0,66944	0,43621	0,06287	0,4304	0,36670
Bulgarian Development Bank	0,02083	0,56332	0,34137	0,61925	0,60599	0,4995	0,03697	0,73668	0,43810
Allianz Bank Bulgaria	0,03181	0,50869	0,29379	0,29169	0,57753	0,3111	0,06253	0,40321	0,33403
D Commerce Bank	0,03638	0,48617	0,27545	0,2207	0,56656	0,3254	0,07483	0,32539	0,27493
Piraeus Bank Bulgaria	0,02343	0,40532	0,21498	0,20031	0,53038	0,17889	0,05781	0,37841	0,41160
Municipal Bank	0,00054	0,01072	0,00434	0,00453	0,40437	0,39589	0,05037	0,42466	0,22522
Bulgarian-American Credit Bank	0,01463	0,27599	0,17812	0,16926	0,64537	0,1831	0,05300	0,38591	0,32867
Central Cooperative Bank	0,01646	0,28815	0,13989	0,19249	0,48546	0,26378	0,05712	0,55883	0,08759
First Investment Bank	0,00266	0,03296	0,01649	0,02138	0,50044	0,17692	0,08071	0,52656	0,34494
Texim Bank	0,00126	0,01257	0,00509	0,00428	0,40483	0,42509	0,10034	0,34161	0,23173

Tokuda Bank	0,00597	0,08243	0,03484	0,06967	0,42262	0,21862	0,07247	0,81218	0,49138
International Asset Bank	0,01135	0,19822	0,09008	0,12639	0,45447	0,09923	0,05724	0,56976	0,26304
United Bulgarian Bank	-0,0178	-0,2562	-0,08926	-0,1373	0,34839	0,80654	0,06930	0,62468	-0,05048
Investbank	-0,0344	-0,5229	-0,16004	-0,3116	0,30604	0,12413	0,06579	0,79081	0,30165

* Allianz Bank Bulgaria's indicators are calculated according to the bank's reporting in 2016
Source: Calculated by the authors on the basis of financial reporting Bulgarian banks, 2017
Ratings of Ukrainian banks (first and last 10 ratings) are given below (Table 10).

Table 10

Ratings of Ukrainian banks

Ukrainian banks	Ratings (BR)	Total assets	Profit for the year	Total equity
PJSC "Bank "Yunison"	19,24692247	553 960	25 832	214 744
PJSC "Bank Alians"	17,35205834	777 264	66 501	289 844
PJSC KB"Finansova initsiatyva"	16,86818969	13 491 669	652 345	-3 959 527
PJSC "IdeiaBank"	15,29282346	3 579 591	118 591	423 373
PJSC "A – Bank"	14,68391002	4 499 645	193 901	686 692
PJSC "Rozrakhunkovyi Tsentr"	14,23086597	263 238	6 390	211 838
PJSC "Sitibank"	14,04476145	19 001 051	357 697	1 822 352
PJSC "Bank "Portal"	13,92126085	235 154	7 272	208 635
PJSC "Europrombank"	11,23524385	641 627	8 709	309 029
JSC "Ukrsybbank"	10,7345069	46 576 672	878 946	5 571 498
…				
PJSC "Skai Bank"	-3,463318842	428 277	-37 018	223 757
PJSC "Ukrsotsbank"	-3,530390428	29 248 959	-2 387 554	5 156 639
PJSC "Megabank", Kharkiv	-4,043667963	9 129 353	-646 421	1 070 353
JSC "Ukreksimbank"	-4,258277645	171 011 254	-8 196 902	14 456 085
PJSC "Bank Kredyt Dnipro"	-4,624107116	9 411 152	-666 003	942 804
PJSC KB "Pryvatbank"	-5,775101332	259 061 473	-24 057 582	25 607 710
Ukr.Bank Rekonstruktsii ta Rozvytku	-7,821799985	210 781	-8 435	184 562
PJSC KB "Tsentr"	-9,515856978	296 132	-94 173	211 202
JSC "BM Bank"	-12,58025552	1 147 943	-230 815	249 127
PJSC "BTA Bank"	-37,49032925	1 086 290	-678 728	594 544

Source: Calculated by the authors

Analyzing Ukrainian banks' rating assessments and individual data on their financial reporting (aggregate assets, equity and profits) we can argue that the effectiveness of the bank and, accordingly, its place in the ranking relates to the level of profit or loss. Thus, more lucrative banks have high profitability indicators and show high ranking positions while unprofitable banks are the last in the ranking.

Independence of the total rating of the bank from the scope of its activities shows that proper management, balanced structure of assets and liabilities of the bank, the quality of capital, rather than its size, cost-effective credit and investment activities, optimization of administrative costs ensure the efficient work of the bank, which has the potential for gaining a significant share in the financial market.

Ratings of Bulgarian banks (first and last 10 ratings) are given below (Table 11).

Table 11

Ratings of Bulgarian banks

Bulgarian banks	Ratings (BR)	Total assets	Profit for the year	Total equity
DSK Bank	29,99944812	5 423	2 343	4 913
Eurobank Bulgaria	20,43454873	7 420 982	136 265	1236587
TBI Bank	15,86700264	688 306	30 517	164 075
Procredit Bank (Bulgaria)	14,35406137	1 975 401	32 165	216 669
Raiffeisenbank (Bulgaria)	18,18795128	7 199 157	137 304	930 898
Unicredit Bulbank	13,65275206	19 096 088	297 653	2 853 255
Expressbank	13,39932294	6 447 214	106 699	761570
Bulgarian Development Bank	11,43389222	2 472 243	20 145	745 001
Allianz Bank Bulgaria*	12,39196683	2 460 472	30 255	217 110
D Commerce Bank	10,67603077	758 501	10 730	103 359
Piraeus Bank Bulgaria	10,06206046	3 076 602	29 862	375 701
Municipal Bank	9,962177946	1 507 314	32	92 510
Bulgarian-American Credit Bank	9,306021496	1 240 099	7 830	176 285
Central Cooperative Bank	8,820679682	5411847	36814	461615
First Investment Bank	8,781109492	8 921 198	93651	944842
Texim Bank	8,25580105	220 005	120	35 629
Tokuda Bank	8,440514841	387 836	1 001	33 153
International Asset Bank	9,092546181	1 372 046	6 007	105 900
United Bulgarian Bank	6,438311075	7 358 141	-51029	976 063
Investbank	3,648800375	1 954 129	-29 333	152 187

* Allianz Bank Bulgaria's indicators are calculated according to the bank's reporting in 2016
Source: Calculated by the authors

Analyzing the scale and profitability of Bulgarian banks and their ratings, similar tendencies are observed: leaders and outsiders of the rating have approximately the same volumes of assets and equity; two banks that showed negative financial results for the year ended up at the end of the rating, while banks in the first half of the ranking have generally higher earnings than those in the second half of the rating. This again proves the direct dependence of the rating not on the volumes of aggregate assets and equity, but how effectively they are used by the banks.

Higher indicators in the rating indicate the proximity of banks to the "standard-bank" that is the leader with the highest cumulative indicator of capital-resource, credit-investment and overall effectiveness of operations. The higher density of distribution of rating points to individual banks shows both stability and homogeneity in terms of banking system performance of the country as a whole. As a result of bank's rating, we can state the general higher effectiveness of banks in Bulgaria. It should be noted that the highest performance of DSK Bank, in our opinion, is due to the fact that this bank specializes not in classical banking operations, but in the management of alien assets. Thus, the volume of foreign assets in the management of DSK Bank is 225,789 thousand levs, while the balance sheet of the bank is 5,423 thousand levs. Accordingly, the risks of DSK Bank's banking activities

are significantly lower than the risks of banks in the same macroeconomic conditions; the ratio of income and expenditures is also significantly different. Regarding the last ten banks of Ukraine, due to the negative values of the final figures, we can talk about their low effectiveness, significant losses, and inefficient structure of expenses and incomes of the main banking activity. According to the rating results banks can be grouped according to the level of their activities effectiveness. The number of groups for the division is determined empirically, and the actual values of normalized indicators, taking into account their validity (spread of the final rating value), are the basis for grouping of banks.

There are the following levels of effectiveness of banks functioning according to the general score of BR:

1) $BR \geq 12$ – Strong bank – high level of effectiveness of the bank as a whole (profitability, optimal ratios and structure of expenses and incomes, adaptation of the main banking activity to actual market conditions);

2) $BR = [8;12)$ – Mediocre bank – sufficient level of effectiveness of the bank, capital-resource, credit-investment and overall effectiveness of the bank are at the proper level, the bank effectively invests accumulated financial resources;

3) $BR = [2;8)$ – Weak bank – low level of effectiveness of the bank, (the result of separate banking operations is negative, the structure of incomes and expenses is unsatisfactory);

4) $BR = (-R;2)$ – Loss bank – the critical level of effectiveness. (The Bank generates losses, individual banking operations, and the structure of incomes and expenses do not meet the necessary minimum values for the normal functioning of the bank). Graphically, the distribution of the number of banks in Ukraine and Bulgaria in terms of the effectiveness of operation is presented in Fig. 1, 2.
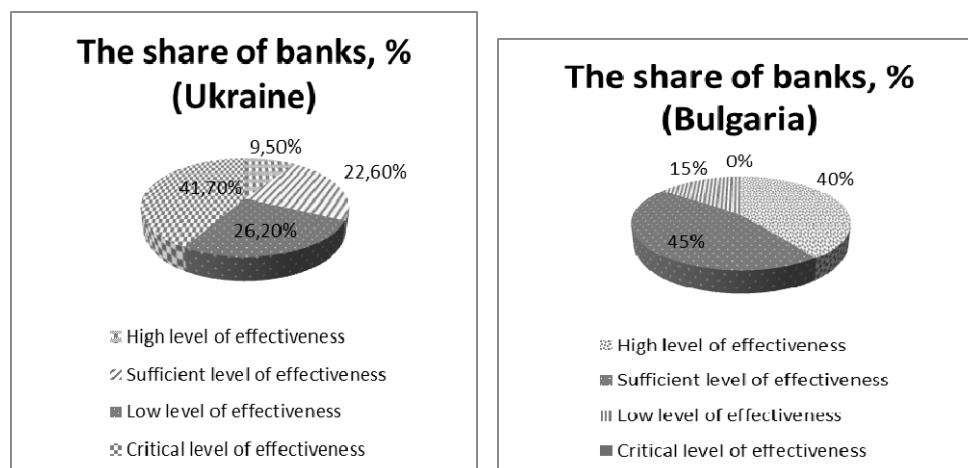
Figure 1

Distribution of the number of banks in Ukraine and Bulgaria according to effectiveness indicators
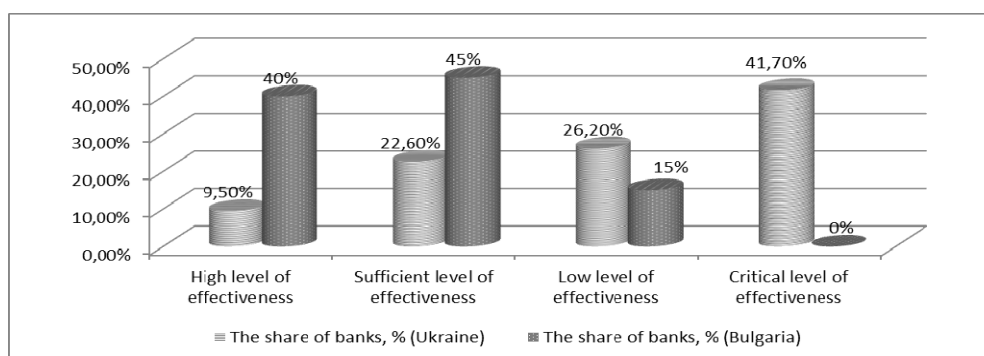
Source: Built by the authors

Figure 2

The shares of banks in Ukraine and Bulgaria in terms of effectiveness

Source: Built by the authors

To confirm the adequacy of the received rating results, we can compare the ratings of individual banks of Ukraine with those of the international rating agencies.

Based on the results of comparisons across Ukrainian banks, we can say that estimates generally coincide with the exception of some deviations. This is acceptable given the differences in methodologies, the large number of banks in Ukraine, the polarization of their effectiveness, and the low popularity of international rating agencies' services among Ukrainian banks (Table 12).

Table 12

The credit ratings for some Ukrainian banks

Bank	Evaluation by the author's method (levels of effectiveness)	Evaluation by the rating agency
PJSC "KREDI AGRIKOL BANK"	9,63 (sufficient)	Fitch: B-
JSC "PROKREDYT BANK"	5,79 (low)	Fitch: B
PJSC "ALFA-BANK"	5,6 (low)	Fitch: B-
JSB "PIVDENNYI"	2,13 (low)	Moody's: Ca
JSC "OSHCHADBANK"	-2,45 (critical)	Moody's: Ca
PJSC "UKRSOTSBANK"	-3,53 (critical)	Fitch: B
JSC "UKREKSIMBANK"	-4,25(critical)	Moody's: Ca
PJSC KB "PRYVATBANK"	-5,77 (critical)	Moody's: C

Source: (Hrudzevych, 2017)

The credit ratings (end of 2017) for some Bulgarian banks are presented in the table 13.

Table 13

The credit ratings for some Bulgarian banks

Bank	Evaluation by the author's method (levels of effectiveness)	Evaluation by the rating agency
Procredit Bank (Bulgaria)	14,35 (high)	Fitch: BBB-
Raiffeisenbank (Bulgaria)	18,19 (high)	Fitch, Moody's: BBB-/Baa2
UniCredit Bulbank	13,65 (high)	Fitch: BBB-/-
Allianz Bank Bulgaria, 2016	12,39 (high)	Fitch: BBB+/-
Bulgarian Development Bank	11,43 (sufficient)	Fitch: BBB-

Source: (Directory and Country, 2019)

According to our ratings, 90% of Bulgarian banks show high and sufficient effectiveness in their work, which indicates the adequacy of results.

Besides assessing the relative level of the effectiveness of functioning within the rating of banks of a separate banking system, the proposed system of coefficients can be used to calculate the absolute indicator of effectiveness and stability of the bank's functioning. At the same time, giving a general (comprehensive) assessment of the effectiveness and stability of the bank's activity it is advisable to take into account, in addition to quantitative indicators, qualitative ones, which include the following: customer confidence (loyalty of depositors), image (reputation, record), comfort (respect to clients, professionalism of staff, the quality of internal communications), simplicity (clarity), transparency.Trust in the banking business is one of the key factors for successful business. Trust in terms of bank valuation will be reflected in the number of depositors and the structure of the deposit base (deposits of a large part of clients for longer terms indicate a high level of trust in the bank). Ensuring a long commercial success of a bank in a competitive market environment directly depends on its reputation (image).

Based on the openness of the ownership structure of the bank, business partners and final beneficiaries, the availability of audit findings from international companies, we can talk about such an indicator as transparency of the bank. (Gavurova, 2017). Openness to cooperation and high business activity on the national and international financial markets also testify about the transparency of the bank's operations. It is also expedient to include the comfort and ease of interaction between the bank and the clients to the qualitative performance indicators. Bank which offers a wide range of services for business and individuals, transparent and understandable tariffs, clear and flexible terms of cooperation, has branches in all regions of the country and even abroad, a large number of ATMs and terminals, developed infrastructure, established cooperation with other banks and a number of other similar characteristics – can be called simple and convenient for clients.

Given the quantitative performance indicators of the bank in the integral assessment, it is also necessary to take into account the risks associated with lack of equity capital. This is due to the peculiarities of the banking business, which is vulnerable to various economic fluctuations and is largely based on trust associated with possible risks.

In addition, banks in their pursuit to increase profit may not pay enough attention to risk management and thus, in the long run, not to be able to ensure stable activity and formulate

stress testing practices (Principles for sound stress testing practices and supervision, 2009). That is why for the formation of a balanced assessment of the bank's activities it is necessary to take into account, along with activity indicators, quality indicators of the capital-resource base. With this aim, a separate group of indicators of the bank's resource base structure, which includes the coefficient of reliability, independence and activity of deposit activity, is allocated in the integral indicator of the bank's activity.

The difficulty of defining the sufficiency of the bank's own capital lies in the calculation of its relative sufficiency that is why index analysis is the main instrument in evaluating the structure of the resource base. Therefore, we calculate these ratios as follows: the ratio of the bank's reliability – the ratio of equity to total liabilities, the index of independence – the ratio of equity to liabilities of the bank, the index of deposit activity – the ratio of deposits amount to liabilities of the bank.

The integral indicator of the bank's activity is calculated on the basis of qualitative indicators, indexes of capital-resource, credit-investment and overall effectiveness, as well as indicators of the bank's resource base structure and their value.

The integral indicator is the sum of bank points for each of the above groups of coefficients:

$$II = \sum_{j=1}^{5} Sj \tag{6},$$

Generalized assessment Sj for each group of the bank indexes can be calculated by using the formula:

$$Sj = \sum_{i=1}^{n} AijKij \tag{7},$$

Where: II is an integral indicator of the bank's activity;

S is a generalized assessment of the separate group of j indexes;

A is weight (value) of the i-financial index of the j-group.

K is calculated value of the i-financial index in the j-group. Indexes-disincentives of the methodology (Interest expenses management index, credit-deposit effectiveness index, administrative expenses index) are calculated with the mathematical symbol «-»;

In general, the higher the integral indicator of the bank's activity, the more efficient and stable the bank is, and vice versa, the smaller it is, the less efficient and stable the bank. According to the integral indicator of the bank's activity, the bank can be classified as strong, mediocre, weak or loss, the group is empirically derived from the calculation of the integral indicator of the bank's activity in Bulgaria and Ukraine (Table 14).

Table 14

Scale for determining the bank class by the integral indicator of the bank's activity

Indicator value	*Bank class*
More than 35	A (Strong bank)
Between 20 and 35	B (Mediocre bank)
Between 0 and 20	C (Weak bank)
Less than 0	D (Loss bank)

Source: Developed by the authors

However, counting the integral indicator, you should take into account the same nuances as in the ranking methodology. Thus, when calculating the integral estimate for a bank that has a significantly overestimated or understated individual coefficients relative to the average indicators in the system, one must understand that the assessment will be either overestimated or undervalued without a real financial and economic basis. Therefore, any serious imbalances in the final results of the indicator groups in the integral indicator of the bank's activity is a disturbing signal for the bank, which needs to be taken into account in future management. The matrix of the integrated assessment of banks performance is shown in Figure 3.

Figure 3

Matrix of integrated assessment of banks activity
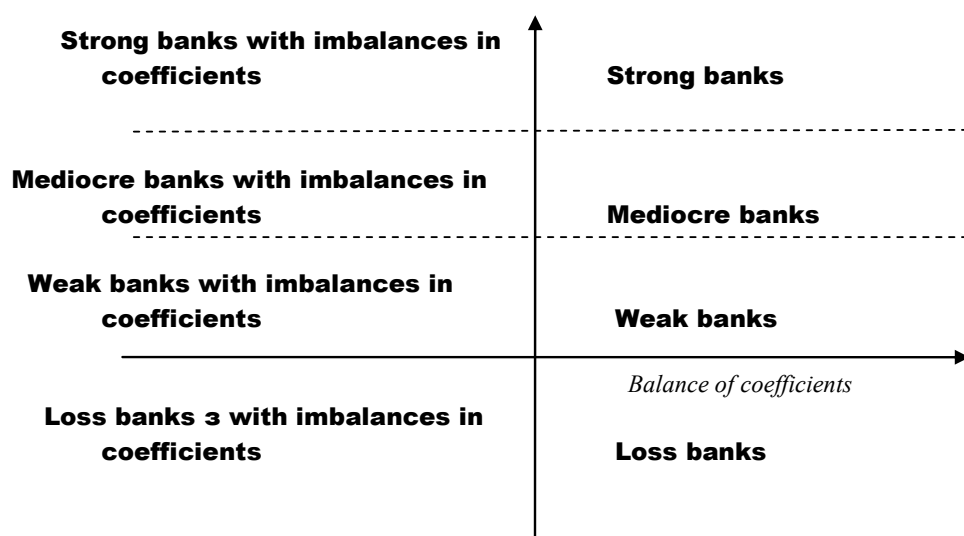
Source: Developed by the authors

Thus, a bank can be considered strong and stable, if it has a high integral indicator of the bank's activity and, at the same time, has no imbalances based on the results of the points

in the groups of coefficients. Accordingly, banks that have lower integral scores and balanced ratios refer to medium or weak banks. Those banks with negative financial results and unsatisfactory results of the overwhelming majority of the coefficients fall into the group of loss-making banks.

On the left side of the matrix are groups of banks that have imbalances with individual coefficients or groups of coefficients. Therefore, these banks need to pay particular attention to certain aspects of their activities, in particular, to increase the effectiveness or reduce the risks of lending and investment activities, to optimize the structure of the resource base, income and expenditure, or to pay attention to the qualitative characteristics of work, such as image, customer confidence, etc.

The integral indicator of the bank's activity in the example of the Ukrainian bank "Pat-A-Bank" is calculated in Table 15.

Table 15

The integral indicator of the bank's activity in the example of the Ukrainian bank "Pat-A-Bank"

№	Indicator	Theoretical value of the indicator (range of values)	Significant value of the indicator (A_{ij})	Estimated value of the indicator (K_{ij})	Indicator value for bank
I group – Qualitative indicators of the bank's activity					
1	Customer confidence	0-3	1	2	2
2	Image (reputation)	0-3	1	2	2
3	Transparency	0-3	1	2	2
4	Comfort, simplicity	0-3	1	2	2
Total in I group (S_i)					*8*
II group – The indicators of the bank's capital-resource effectiveness					
1	The coefficient of profitability of interest expenses	increase	1	*0.559292312*	*0.559292312*
2	The coefficient of return on equity	increase	3	*0.282369451*	*0.847108354*
3	The coefficient of profitability of attracted deposits	increase	1	*0.06613628*	*0.06613628*
4	The coefficients of coverage of the bank's obligations with absolute liquid assets	increase	2	*0.038578877*	*0.077157755*
5	The coefficient of the security of deposit activity with absolute liquid assets	increase	2	*0.040033774*	*0.080067548*
6	The coefficient of interest rate management	decrease	1	*0.26055962*	*(0.26055962)*
Total in II group (S_2)					*1.629762249*
III group – The indicators of effectiveness of the bank's lending and investment activity					
1	The coefficient of interest income in gross profit	increase	1	*4.716796664*	*4.716796664*
2	The coefficient of commission income in gross profit	increase	1	*1.645351008*	*1.645351008*
3	The coefficient of investment effectiveness in credit operations	increase	1	*0.254737639*	*0.254737639*
4	The coefficient of investment effectiveness in commissions and intermediary operations	increase	1	*0.08885964*	*0.08885964*
5	The commission income ratio	increase	1	*0.239775344*	*0.239775344*
6	The interest income ratio	increase	1	*0.68737402*	*0.68737402*

7	The coefficient of the credit-investment activity	increase	2	*0.92298462*	*1.84596924*
8	The coefficient of net interest margin	increase	2	*0.15817545*	*0.31635089*
9	The profitability ratio of credit operations	increase	1	*0.30461603*	*0.30461603*
	Total in III group (S₃)				**10.09983048**
	IV group – The indicators of overall effectiveness of the bank's activity				
1	The return on assets	increase	3	*0.054006492*	*0.162019475*
2	The return on revenue	increase	2	*0.145728992*	*0.291457984*
3	The return on costs	increase	3	*0.246048676*	*0.738146027*
4	The return on administrative costs	increase	1	*1.1787864*	*1.1787864*
5	The coefficient of coverage of the bank's total expenses	increase	3	*1.688398938*	*5.065196815*
6	The coefficient of effectiveness of credit and deposit activity	decrease	2	*0.37906527*	*(0.758130539)*
7	The effectiveness of using assets of the bank	increase	3	*0.370595382*	*1.111786146*
8	The coefficient of administrative costs	decrease	1	*0.208730501*	*(0.208730501)*
9.	The coefficient of coverage of administrative costs	increase	2	*5.68162731*	*11.36325462*
	Total in IV group (S₄)				**19,91064747**
	V group – Indicators of the structure of the bank's resource base				
1.	The coefficient of reliability	0,25	4	*0.180094677*	*0.720378708*
2.	The coefficient of independence	0,1-0,15	4	*0.152610363*	*0.610441452*
3.	The coefficient of activity of deposit activity	0,7-0,8	3	*0.816594035*	*2.449782106*
	Total in V group (S₅)				3.780602266
	Total				**43.42084246**

Source: Calculated by the authors

The integral indicator in the example of Raiffeisenbank (Bulgaria) is calculated in Table 16.

Table 16

The integral indicator of the bank's activity in the example of
the Raiffeisenbank (Bulgaria)

№	Indicator	Theoretical value of the indicator (range of values)	Significant value of the indicator (A_{ij})	Estimated value of the indicator (K_{ij})	Indicator value for bank
	I group – Qualitative indicators of the bank's activity				
1	Customer confidence	0-3	1	2,5	2,5
2	Image (reputation)	0-3	1	2,5	2,5
3	Transparency	0-3	1	2	2
4	Comfort, simplicity	0-3	1	2	2
	Total in I group (Si)				**9**
	II group – The indicators of the bank's capital-resource effectiveness				
1	The coefficient of profitability of interest expenses	increase	1	8.467229036	8.467229036
2	The coefficient of return on equity	increase	3	0.147496289	0.442488866
3	The coefficient of profitability of attracted deposits	increase	1	0.028062921	0.028062921
4	The coefficients of coverage of the bank's obligations with absolute liquid assets	increase	2	0.20721288	0.41442576
5	The coefficient of the security of deposit activity with absolute liquid assets	increase	2	0.238904624	0.477809249
6	The coefficient of interest rate management	decrease	1	0.04968182	(0.04968182)
	Total in II group (S₂)				**9.830016**

	III group – The indicators of effectiveness of the bank's lending and investment activity				
1	The coefficient of interest income in gross profit	increase	1	1.46684494	1,46684494
2	The coefficient of commission income in gross profit	increase	1	0.631233983	0,631233983
3	The coefficient of investment effectiveness in credit operations	increase	1	0.0310867	0,0310867
4	The coefficient of investment effectiveness in commissions and intermediary operations	increase	1	0.01337768	0,01337768
5	The commission income ratio	increase	1	0.265539527	0,265539527
6	The interest income ratio	increase	1	0.617053776	0,617053776
7	The coefficient of the credit-investment activity	increase	2	0.796462697	1,592925394
8	The coefficient of net interest margin	increase	2	0.02858376	0,05716753
9	The profitability ratio of credit operations	increase	1	0.0469468	0,0469468
	Total in III group (S_3)				**4,722176**
	IV group – The indicators of overall effectiveness of the bank's activity				
1	The return on assets	increase	3	0.0211929	0.06357869
2	The return on revenue	increase	2	0.4206674	0.8413347
3	The return on costs	increase	3	0.72612402	2.17837205
4	The return on administrative costs	increase	1	0.894666166	0.894666166
5	The coefficient of coverage of the bank's total expenses	increase	3	1.726124017	5.17837205
6	The coefficient of effectiveness of credit and deposit activity	decrease	2	0.080514571	(0.161029142)
7	The effectiveness of using assets of the bank	increase	3	0.05037923	0.1511377
8	The coefficient of administrative costs	decrease	1	0.81161448	(0.81161448)
9.	The coefficient of coverage of administrative costs	increase	2	1.843943143	3.687886287
	Total in IV group (S_4)				**12.99535**
	V group – Indicators of the structure of the bank's resource base				
1.	The coefficient of reliability	0,25	4	0.14850982	0,59403927
2.	The coefficient of independence	0,1-0,15	4	0.129306529	0,517226114
3.	The coefficient of activity of deposit activity	0,7-0,8	3	0.75519217	2,265576511
	Total in V group (S_5)				3,376841895
	Total				**39.9243817**

Source: Calculated by the authors

According to the results of the integral indicator of the bank's activity calculation and the results for groups of indexes, the analyzed banks can be classified as Class A (strong banks without imbalances, definitely strong banks), which indicates their high effectiveness and stability. The final value of the integral indicator and the results for individual groups of coefficients testifies to the balance of results in the areas of banking activity and in general indicates the profitability and high quality of bank management.

Conclusions

The developed rating methodology allows assessing the position of a particular bank relative to other banks in the banking system of the country in terms of the effectiveness of its activities. It is based on a multidimensional analysis of the bank's work (capital-

resource, credit-investment and overall effectiveness), which can be carried out on the basis of available public data. This rating is so valuable for the bank's management at the micro-level as it helps to determine the level of bank effectiveness in relation to other structures that operate in similar macroeconomic conditions.

The results of the methodology implementation in regard to the data about the Ukrainian and Bulgarian banks confirmed its scientific validity and applicability and made it possible to generate a rating of these countries' banks. The ratings of Ukrainian banks testify mainly to high polarization in effectiveness of their activities and a large number of loss-making banks, while with regard to Bulgaria, the situation is to an extent better: the range of rating indicator is much smaller and tight enough.

Based on the rating, banks in Ukraine and Bulgaria are divided into 4 groups: banks with high, sufficient, low, and critical activity level. It can be argued that the share of banks with high (40%) and sufficient (45%) effectiveness of activity in the banking system of Bulgaria significantly exceeds the number of such banks in Ukraine (9.5% and 22%, respectively). At the same time, banks with a low (26.6%) and critical (47.1) operating effectiveness levels prevail in Ukraine. Correspondingly, Bulgarian banks are more profitable and have an optimal revenue and expenditure structure.

Given the importance of risk and trust in banking activity, the methodology for an integrated assessment of bank's activity, in addition to the effectiveness factors, involves the inclusion of the sufficiency and qualitative indicators of the resource provision. The integral indicator of the bank's activity is a tool for the comprehensive assessment of the bank's activity and it can be used to analyze the absolute effectiveness of banks with different banking systems.

According to the number of total points a bank can be classified as strong, mediocre, weak or loss. The final points in the groups of the integral indicator and the location on the matrix of the integrated assessment of the banks' activity allow us to see what aspects of the bank's activities management should be pay attention in order to increase the effectiveness and stability of the bank.

The relevant directions for increasing effectiveness of Ukrainian and Bulgarian banks should be reducing the cost of activities; finding new sources of income through expansion of the areas of interaction between banks and economic entities; optimizing the structure of income, expenses and assets; and development of the resource base. Considerable attention should be paid to increasing the level of trust, transparency of activities, comfort and maintaining a positive image of banks in particular countries.

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