УДК 336.71:65.012.32

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VALUE-BASED SECURITY SYSTEM OF THE COMMERCIAL BANK

Abstract. The article explores the main approaches to understanding the concept of "value-oriented management". It is established that there are different methods of assessing the value of banking institutions, in particular, cost, revenue and comparative approaches. The main advantages and disadvantages of value-oriented management are outlined.

The analysis of cash flows of three systemic Ukrainian banks: JSC "The State Export-Import Bank of Ukraine", JSC CB "Privatbank", PJSC "State Savings Bank of Ukraine" is conducted. On the basis of the analysis, the value of banks is calculated. It is defined that the main factors influencing the value of banking institutions are adequacy of regulatory capital, return on equity, return on assets, interest rate margin, liquidity, level of problem loans, capital adequacy ratio and financial leverage. A correlation analysis of the bank's dependence on these factors is carried out. It is established that individual factors have a multicollinarn dependence, which makes it impossible to use them in constructing a regression model. Among the factors mentioned are factors that have the greatest impact on the value of banking institutions. These factors include the following: adequacy of regulatory capital, level of problem loans, capital adequacy ratio. The regression model of the dependence of the bank's cost to the balance capital on the determined factors is constructed.

The regression equation obtained in the result of the analysis shows that the ratio of the bank's value to the balance (book) capital of PJSC "State Savings Bank of Ukraine" in the period of 2013-2017 is directly dependent on the coefficient of capital adequacy and inversely related with the adequacy of the regulatory capital and the level of the problem loans. It is established that when developing the strategy of raising the value of the bank the measures aimed at managing capital adequacy and reducing the level of problem loans should be developed.

Keywords: bank value, value-oriented management, problem loans, capital adequacy, adequacy of regulatory capital.

JEL Classification G21, G32

Formulas: 4; fig.: 0; tabl.: 4; bibl.: 18.

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ВАРТІСНО-ОРІЄНТОВАНА СИСТЕМА БЕЗПЕКИ КОМЕРЦІЙНОГО БАНКУ

Анотація. Розглянуто основні підходи до розуміння поняття «вартісно-орієнтоване управління». Установлено, що існують різні методики оцінки вартості банківських установ, зокрема витратний, дохідний і порівняльний. Окреслено основні переваги і недоліки вартісно-орієнтованого управління.

Проведено аналіз грошових потоків трьох системних українських банків — ПАТ «Державний експортно-імпортний банк України», АТ КБ «ПриватБанк», ПАТ «Державний Ощадний банк України». На основі проведеного аналізу розраховано вартість досліджуваних банків. Установлено, що основними чинниками, які впливають на вартість банківських установ, є адекватність регулятивного капіталу, рентабельність капіталу, рентабельність активів, рівень процентної маржі, ліквідність, рівень проблемних кредитів, коефіцієнт достатності капіталу і фінансовий леверидж. Проведено кореляційний аналіз залежності вартості банку від вказаних чинників. Установлено, що окремі фактори мають мультиколінеарну залежність, що унеможливлює їх використання при побудові регресійної моделі. Серед вказаних чинників виокремлено фактори, що мають найбільший вплив на вартість банківських установ. Такими чинниками визначено такі: адекватність регулятивного капіталу, рівень проблемних кредитів, коефіцієнт достатності капіталу. Побудовано регресійну модель залежності відношення вартості банку до балансового капіталу від визначених факторів.

Отримане в результаті проведеного аналізу рівняння регресії свідчить про те, що відношення вартості банку до балансового капіталу ПАТ «Державний Ощадний банк України» у період 2013—2017 рр. прямо залежить від коефіцієнта достатності капіталу та обернено залежить від адекватності регулятивного капіталу і рівня проблемних кредитів.

Установлено, що при визначенні стратегії зростання вартості банку доцільно розробити заходи, спрямовані на управління достатністю капіталу та зниження рівня проблемних кредитів.

Ключові слова: вартість банку, вартісно-орієнтоване управління, проблемні кредити, достатність капіталу, адекватність регулятивного капіталу.

Формул: 4; рис.: 0; табл.: 4; бібл.: 18.

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СТОИМОСТНО-ОРИЕНТИРОВАННАЯ СИСТЕМА БЕЗОПАСНОСТИ КОММЕРЧЕСКОГО БАНКА

Аннотация. Рассмотрены подходы к пониманию понятия «управление, ориентированное на стоимость». Описаны подходы к оценке стоимости банковский учреждений. Описаны преимущества и недостатки управления, ориентированного на стоимость.

Проведен анализ денежных потоков троих системных украинских банков, рассчитано их стоимость с использованием доходного подхода. Установлено факторы, влияющие на стоимость банка, — адекватность регуляторного капитала, рентабельность капитала, рентабельность активов, уровень процентной маржи, ликвидность, уровень проблемных кредитов, коэффициент достаточности капитала и финансовый левередж. Наибольшее влияние на стоимость банка имеют адекватность регуляторного капитала, уровень проблемных кредитов, коэффициент достаточности капитала.

Установлено, что при разработке стратегии увеличения стоимости банка необходимо разработать мероприятия, нацеленные на управление достаточностью капитала и снижение уровня проблемных кредитов.

Ключові слова: стоимость банка, управление, ориентированное на стоимость, проблемные кредиты, достаточность кредитов, адекватность регуляторного капитала.

Формул: 4; рис.: 0; табл.: 4; библ.: 18.

Introduction. Modern conditions of functioning of Ukrainian banks are characterized by unpredictability, instability and high level of dynamism. The variability of the external environment, combined with social and political transformations in the state and the permanent global financial crises, creates the preconditions for the emergence of a significant number of threats and dangers for the existence and effective functioning of domestic banks. Ensuring financial and economic security is a crucial condition for the functioning of commercial banks and one of the main objectives of their management. In order to maintain profitability, liquidity and achieve competitive advantages, it is important to form an effective financial strategy to support the security of the commercial bank. The analysis of economic literature allows us to distinguish different scientists viewpoints regarding the methods and tools for bank security provision: by managing resources, financial results, establishing an organizational and economic mechanism, introducing measures for state regulation of banking institutions, etc. The new and underdeveloped approach to ensuring bank security is an approach based on the application of bank value indicators, a value-oriented approach.

Research analysis and problem statement. The management concept based on cost management was first proposed by A. Rapapaport and B. Stewart and became the subject of

research by J. Mirrina and T. Collier, G. Amold, A. Blek, K. Savares and others. Among the domestic scientists the cost management of the companies was studied by O.G. Mendrul, R.A. Slavjuk, O. Tereshchenko, N.P. Shulga et al.

Global competition among banks and the threat of (hostile) takeovers, as well as the increased pressure from shareholders for superior returns has forced banks to focus on managing their value. Broadly accepted that a bank's ultimate objective function is value maximization. At the same time, the specific of bank's business should be taken into account. In accordance with G.Schroeck the approach typically applied to valuation framework is slightly adjusted for banks. It estimates the bank's (free) cash flows to its shareholders and then discounts these at the cost of equity capital, to derive the present value (PV) of the bank's equity - which should equal (ideally) the capitalization of its equity in the stock market. The special emphasis is given to risk-management decisions in banks on the base of economic capital and RAROC (risk-adjusted return on [economic] capital) [15].

In accordance with the international leading banks practice the traditional valuation framework (including return on assets (ROA), return of equity (ROE) and Discounted Cash Flow (DCF) approach focus) do not have the economic focus of a valuation framework for judging whether a transaction or the bank as a whole contributes to value creation. They are too accounting-driven, the capital requirement is not closely enough linked to the actual riskiness of the institution, and, additionally, they do not adequately reflect the linkage between capital-budgeting, capital-structure, and risk-management decisions. To improve the valuation framework the set of practical heuristics called Risk-Adjusted Performance Measures (RAPM) [16] or also better known, RAROC (risk-adjusted return on capital) [17].

In accordance with Wills research among fifty-five selected leading banks worldwide, 59% have established an "economic capital /RAROC process", 12% plan to do so, and 29% do not use such an approach [18].

The purpose of the article is to develop the value-based approach to use value-based performance metrics for making better security decisions in the commercial bank. In this research, we intend to define the key value drivers on the example of empirical research of Ukrainian commercial banks. As a result, we intend to find out on which risk-management decisions in banks should be based the value maximization decision.

Research results. Value-oriented management is a fundamental theory of modern management, based on the principles of cost management of the bank. Proper and effective application of methods, tools, principles of value-oriented management depends on understanding its internal content. Modern scientific thought does not have the unified approach to the interpretation of the category "value-oriented management" (Table 1).

Summarizing the scientists' views, we can distinguish the following approaches to understanding value-oriented management:

- Concept of management. Value-oriented approach is a systematic set of management actions that involves the use of management tools, control systems, apparatus used for integration of resources to achieve the stated objectives.

- Management approach. Value-oriented management is a way of activities' performance aimed at increasing the value of the company.

- Maximization of value. Value-oriented management is an activity aimed at creating the highest value of assets or giving assets qualities of valuable investment.

A distinctive feature of the value-oriented approach is that the adoption of financial and economic decisions is based on the priority of the financial interests of shareholders (owners) and on the need to maximize the bank's value, taking into account the objectives of stakeholders as an additional condition.

Table 1

Scientific approaches to the definition of the concept of "value-oriented management"

	The essence of the approach
"Value-oriented management" as a management concept	
Kovaliov V. [1]	Value-oriented approach is a management concept according to which the company's main financial goal is to maximize the capital of its owners, and therefore in the context of a particular reporting period, is the main financial indicator that evaluates the performance of the company's top managers, is the indicator of the added economic value, which reflects the increase in owner's capital, which exceeds the average market rate of return
Copelend T. [2]	Value-oriented approach is the concept of management aimed at qualitative improvement of strategic and operational decisions at all levels of the company due to the concentration of efforts of all decision-makers on key factors of value creation
Polishuk A. [3]	Value-oriented approach is the concept of management aimed at creating the value of the enterprise; the concept of management, aimed at qualitative improvement of strategic and operational decisions at all levels of the organization through the concentration of efforts of all decision makers on key cost factors
"Value-oriented management" as an approach to management	
Arnold D. [4]	Value-oriented management is an approach main purpose of which is to maximize the wealth of shareholders. The goals of the company, its systems, strategy, processes, analysis methods, productivity assessment and culture, all this is subjected to the task of maximizing the wealth of shareholders
Boulos F., Haspeslagh P., Noda T. [5]	Value-based management is an approach to management that covers revised goals, structures and systems, updated strategic and operational processes, personnel practices of the firm. This is not a process that involves making quick decisions, but a way that requires persistency and commitment
Jepifanov A. O. [6]	An approach to management that does not focus on individual components of financial management, liquidity, risk and return management, but on their simultaneous balanced combination, which ultimately results in the company's value added
Shatylo L. [7]	An approach to the financial and economic decision making, based on the priority of the financial interests of owners and the need to maximize the value of the company, taking into account the objectives of the stakeholders as an additional condition
"Value-oriented management" as a process of shareholder value maximization	
Abbasi1 A. [8]	The philosophy of creating and maintaining the maximum level of value in organizations
Bannister J., Jesuthasan R. [9]	The management is based on the fact that the main goal of all public companies is to maximize shareholder value
Pankov V. [10]	Managing the process of creating long-term values, which aggregated characterize the factors of maximizing the company's value

The essence of value-oriented management is to maximize the efficient use of capital through the growth of its value, that is, the benefit of investors' committed capital should exceed the benefit of investing with a similar risk. The use of a value-oriented approach for managing a bank has a number of advantages over existing approaches:

- application of the bank's value index to assess and analyze the level of financial and economic security. Most approaches for assessing financial and economic security are based on the size of the bank's profit and the level of profitability. In the overwhelming majority, such an approach comes down to carrying out a financial analysis of the bank's activities without taking into account risks. Profit can not testify to the effective provision of financial and economic security, but is only a prerequisite for its provision in the future;

- a value approach makes it possible to combine long-term and short-term goals of the bank by combining value and profit indicators that have a positive impact on the level of bank security;

- the reconciliation of the interests of the bank's owners (shareholders) and managers undermines the conflicts of interest uprise;

- implementation of constant and maximum full monitoring of the bank's activities, which increases the quality of the assessment of the bank, the identification of early signs of the threats or risks existence, and, consequently, the effectiveness of management of its financial and economic security;

- providing an effective system of personnel motivation. The system of material incentives and stimulation of the bank's staff based on the value-oriented approach involves linking the value created by each employee to the material remuneration (by defining, planning the control of key

value factors at each work area performed by the bank employees) enables reducing the risks in the work of the personnel;

- the development of a sound system of value indicators and their use in the management process allows identification of costs, risks and outline "growth points".

Along with the mentioned benefits of value-oriented management, this concept has a number of disadvantages:

- absence of an unified system of indicators and methodology for calculating the company's value;

- the complexity of forecasting cash flows, which makes it impossible to use this approach for small companies;

- significant expenses for the practical implementation of this approach;

- incapability of using accounting data to measure indicators of value-oriented management.

Bank evaluation is a complex and versatile process. Management of the bank based on the value-oriented approach involves development of tools for evaluating the value. An analysis of existing approaches to assessing the value of a bank showed the presence of a large number of techniques that can be organized into two groups: the methods of direct and of relative valuation. Methods of relative valuation of the bank are based on the use of the market value of shares of the bank; this in terms of underdevelopment of the stock market complicates the calculations. That is why this method is not used in domestic practice. In Ukraine, the use of a direct valuation methodology is more common practice, and includes three approaches: income, cost and comparative. In [11], an analysis of the feasibility of using valuation approaches for Ukrainian banks was conducted. The authors have determined that according to the criteria of the sufficiency of information and taking into account the prospects of the bank's development, the most expedient for assessing the value of the bank is an income approach. By the criteria of consideration of the current financial bank's condition it is a cost approach. However, according to the three proposed criteria, the income approach has an advantage (61% of significance) [11, p.18]. For the analysis, we have chosen the method of cash flow discounting. It is considered to be the most appropriate for investors as it takes into account future revenues that enable the investor to recoup the investments and gain more profit. For the research we have chosen banks of the first group, banks with state ownership in which the state owns more than 75% of the share capital: JSC "The State Export-Import Bank of Ukraine", JSC CB "PrivatBank" and PJSC "State Savings Bank of Ukraine".

The discount rate is the interest rate used to estimate and discount future cash flows to a certain amount of current value, which is the basis for calculating the market value of the bank within the income approach. Cash flows discounting is carried out according to the formula:

$$Value = \sum_{t=1}^{i-n} \frac{CFt}{(1+r)t} \quad (1)$$

where Value — value of the bank, CF_t — net cash flow in a certain period, r — discount rate; n — life span of an asset.

If we consider the discount rate from the economic point of view, then it can be defined as the value of the capital attracted by the bank. The discount rate (capitalization) is calculated using the model CAMP:

$$k_e = R_f + \beta \times (k_m — R_f) + S_1 + S_2 + C, \quad (2)$$

where k_e — required return on equity rate; R_f — risk free rate; β — beta coefficient; k_m — expected return on equity in the market; S_1 — size premium; S_2 — risk premium; C — country risk premium [12, c.141].

The beta coefficient (β) is calculated by specialized institutions, by analyzing the stock market. Since there is no information on the value of the discount rate, we will try to evaluate it.

The risk-free rate is the interest rate on Eurobonds issued by the state of Ukraine with maturity in 2017, which is 6.08%. The risk premium is 3.2. The country risk premium is calculated as the difference between the rates on US Treasury bonds (4.56%) and Eurobonds issued by the State of Ukraine (6.08%). The premium for the size is 4.35%. The risk premium indicator for a company with a small capitalization is calculated as the difference between the average historical yield of a company with a small capitalization and average historical return of the company in the

stock market. The coefficient β (system risk indicator), without including the financial leverage, for the banking institution is 0.52 [13].

Forecast of free cash flow for nine years is the next stage of assessing the value of banks. Table 1 shows the dynamics of the free cash flow of JSC "State Export-Import Bank of Ukraine", JSC CB "PrivatBank" and PJSC "State Savings Bank of Ukraine" for the period 2013-2017.

As can be seen from Table 2, the dynamics of the indicator is characterized by instability, since in certain periods there has been a decrease in the rate of free cash flow. This complicates the forecasting of this indicator for subsequent periods.

That is why we believe that it is necessary to introduce certain assumptions that the cash flow will change with the average absolute deviation over the past five years.

The forecasted values of banks' cash flows are presented in Table 3.

In order to calculate the value of the bank within the income approach, we use the formula for discounting cash flows:

JSC "State Export-Import Bank of Ukraine".

$$Value_1 = \frac{55957}{(1+0,116)1} + \frac{63686}{(1+0,116)2} + \frac{71415}{(1+0,116)3} + \frac{79144}{(1+0,116)4} + \frac{86873}{(1+0,116)5} = 253862,0 \text{ mln. UAH}$$

Table 2

Dynamics of free cash flow of JSC "State Export-Import Bank of Ukraine", JSC CB "Privatbank", PJSC "State Savings Bank of Ukraine" for 2013-2017, mln.UAH

Years	JSC "State Export-Import Bank of Ukraine"		JSC CB "Privatbank"		PJSC "State Savings Bank of Ukraine"	
	Free cash flow	The average value of the absolute deviation of the cash flow	Free cash flow	The average value of the absolute deviation of the cash flow	Free cash flow	The average value of the absolute deviation of the cash flow
2013	17313		73501		22664	
2014	32044	14731	65591	-7910	26226	3562
2015	45483	13439	82169	16578	50455	24229
2016	46968	1485	77096	-5073	88300	37845
2017	48228	1260	105772	28676	80340	-7960
The average value of the absolute deviation	-	7729	-	8068	-	14419

Source: developed by authors based on bank reporting data

JSC CB "Privatbank"

$$Value_2 = \frac{113840}{(1+0,116)1} + \frac{121908}{(1+0,116)2} + \frac{129976}{(1+0,116)3} + \frac{138044}{(1+0,116)4} + \frac{146112}{(1+0,116)5} = 466800,5 \text{ mln. UAH}$$

PJSC "State Savings Bank of Ukraine"

$$Value_3 = \frac{94759}{(1+0,116)1} + \frac{109178}{(1+0,116)2} + \frac{123597}{(1+0,116)3} + \frac{138016}{(1+0,116)4} + \frac{152435}{(1+0,116)5} = 438526,7 \text{ mln. UAH}$$

Table 3

Forecasted values of cash flow of JSC "State Export-Import Bank of Ukraine", JSC CB "PrivatBank", PJSC "State Savings Bank of Ukraine" in 2018-2026, mln. UAH

Years	JSC "State Export-Import Bank of Ukraine"	JSC CB "Privatbank"	PJSC "State Savings Bank of Ukraine"
2018	55957	113840	94759
2019	63686	121908	109187
2020	71415	129976	123597
2021	79144	138044	138016
2022	86873	146112	152435
2023	94602	154180	166854
2024	102331	162248	181273
2025	110060	170316	195692
2026	117789	178384	210111

Source: developed by authors

After calculating the value of the above-mentioned banks, it should be noted that the method for assessing the value of a bank using the income approach takes into account future cash flows, not past ones. On the one hand, this is a positive moment, because it considers investors' expectations and prospects for the development of a banking institution. On the other hand, this method should be used for banking institutions with predictable and stable development. In addition, a significant problem of value-oriented management is the determination of the discount rate. In our particular case, the discount rate is determined roughly, because the coefficient β is calculated based on the information of the stock market. Unfortunately, as known, the stock market in Ukraine is characterized by insufficient development. These factors call into question the reliability of the calculations.

To resolve the situation, we propose to determine the financial indicators that are most important for banking institutions and that characterize the cash flow. The study of the dynamics of such indicators will allow conducting a qualitative assessment of value-oriented management, identify positive and negative trends and, as a result, form the basis for the development of strategies for the banking institutions of Ukraine.

A correlation analysis of the dependence of the value of banks and relative indicators: adequacy of regulatory capital; return on equity; profitability of assets; level of interest margin; the efficiency of operations with interest funds; efficiency of commission activity; liquidity; level of bad loans; coefficient of capital adequacy; financial leverage is conducted. Using the methods of regression analysis, we determine the these indicators' impact on the growth of market value of the bank, because in each individual case, these factors are in different ratios.

Regression models have the following advantages:

- analytically show the relationship between the indicator and the factors under study;
- give an opportunity to estimate the degree of influence of individual factors on the indicator;
- enable determination of impact assessment of all factors on the indicator;
- can be relatively simple to implement on modern electronic computers;
- give an opportunity to obtain the probable results of forecasting both for the complex dynamics of the object under study and for the complex connection between the variables;
- they can be checked by modern mathematical methods for the adequacy of actual statistical data;
- are simple enough to implement.

The complex interaction of all factors (X1, X2, ...Xn) with the resultant index (Y) can be described by the equation of the linear multivariate regression [14]:

$$Y = a_0 + a_1x_1 + a_2x_2 + \ldots\ldots a_nx_n, \quad (3)$$

Using the data of JSC "State Export-Import Bank of Ukraine", JSC CB "PrivatBank", PJSC "State Savings Bank of Ukraine" in the annual dynamics for 2013-2017, we construct a regression model of the dependence of the bank's value to balance capital (Y) on the factors:

X1 - adequacy of regulatory capital; X2 - return on equity; X3 - return on assets; X4 - level of interest margin; X5 - liquidity; X6 - level of non-performing loans; X7 - capital adequacy ratio; X8 - financial leverage.

In the method of conducting correlation-regression analysis, it is important to test the model for the presence of multicollinearity - the linear relationship between factors. There is a stochastic (probabilistic) and functional form of multicollinearity. In the functional form, there must be at least one factor in the model that is associated with functional dependence with any other factor of the model or with all others. In economic models, multicollinearity, as a rule, manifests itself in a stochastic form [14].

To test the model for multicollinearity, it is necessary to form a correlation matrix using MS Office Excel.

The essence of the correlation analysis is to determine the degree of connection between two random variables (X and Y). To determine this relationship, a correlation coefficient is used which is evaluated by the choice of *n* related pairs of observations (x_i, y_i) from the entire set of X and Y.

The correlation coefficient has a value from -1 to 1. If during the calculations we get a value less than -1 or greater than +1, this means that there is an error in the calculations. If the value of the correlation coefficient is 0, this means that the linear relationship between the given variables does not exist.

We determine the level of correlation of the bank's value to balance capital (Y) from the factors (Table 4).

As can be seen from the calculations, the strong relationship is observed between the bank's value and balance sheet capital with the level of interest margin, the coefficient of capital adequacy and the inverse-proportional effect is the level of non-performing loans.

Table 4

Correlation coefficients of the ratio of the bank's value to the balance capital from the factors

	JSC "State Export-Import Bank of Ukraine"	JSC CB "Privatbank"	PJSC "State Savings Bank of Ukraine"
Adequacy of regulatory capital	0,695767	0,558919	0,434929
Return on equity	0,245183	0,301196	-0,16401
Return on assets	0,225157	0,36716	-0,37088
Level of interest margin	0,848691	0,860726	0,989301
Liquidity	-0,24069	0,112133	0,128434
Level of non-performing loans	-0,92165	-0,96391	-0,89781
Capital adequacy ratio	0,833223	0,594473	0,615395
Financial leverage	-0,02016	-0,17691	-0,35773

Due to the fact that many quantities are multicollinear or have a low impact on Y, we will not take into account these factors when constructing a regression model. Consequently, we will obtain an economical and mathematical model of the dependence of the ratio of the bank's value to the balance capital in the following form:

$$Y = a_1 + a_2X_1 + a_3X_2 + a_4X_3, \quad (4)$$

where Y — the ratio of the bank's value to balance capital; X_1 — level of interest margin; X_2 — level of non-performing loans; X_3 – capital adequacy ratio.

The econometric model of the dependence of the bank's cost to balance capital and selected factors of PJSC "State Savings Bank of Ukraine" will have the following form:

$$Y = 225{,}02 — 40{,}06X_1 — 0{,}93X_2 + 0{,}13X_3$$

The coefficient of determination (R-squared) was used to identify the magnitude of the influence of the indicators on the ratio of the bank's value to the balance capital. It was 0.9947, that is, 99.47% change in the ratio of the bank's value to the balance sheet capital of banks due to changes in the selected indicators. The normalized R-squared, which determines how much adding a new variable can improve the model's quality, was 0.9577, which is less than the R-squared, so the increase in the number of independent variables in the model is inappropriate. After checking the coefficient of pair correlation for the significance of the t-criterion of Student, we see that there is a statistical relationship between the variables. The verification of the value of the determination coefficient was carried out according to Fisher's criterion, which value was 31.21, that is significantly greater than the table value (0.1306). The R-squared is close to 1. This means that the model is adequate. The model gives an explanation that 98.94% is attributed to the factors we selected (X1-X8), and 1.062% for other unregarded factors.

The result of the analysis of the regression equation shows that the ratio of the bank's value to the balance capital of PJSC "State Savings Bank of Ukraine" in the period of 2013-2017 directly depends on the level of interest margin and capital adequacy ratio and the inverse of it depends on the level of non-performing loans.

Conclusions. To conclude in general, banks can create their value by restructuring from the inside, by divesting genuinely value destroying businesses, or by being forced into a restructuring from the outside. We proved that the price for the bank-specific risk will vary directly with the cost of external financing and depends on the current capital structure of the bank. Therefore, banks are

trying to avoid financial distress situations or are trying to decrease the likelihood of their occurrence by using risk management.

In conducted research has shown that when assessing the value of banking institutions it is expedient to use methods of direct valuation, in particular, the income method. An analysis of the activities of three systemic banks: JSC "State Export-Import Bank of Ukraine", JSC CB "PrivatBank", PJSC "State Savings Bank of Ukraine", showed that the value of Ukrainian banks in the period from 2013 to 2017 depended to a large extent on the adequacy of the regulatory capital, the level of non-performing loans and the ratio of capital adequacy. Therefore, when developing a bank's strategy it is expedient to develop measures aimed at managing the specified components of its value. The developed models allow banks to identify comparative advantages that, in turn, would help to maximize their value and to make practical solution to capital budgeting that is communicable and implementable at all bank levels.

However, much more research needs to be done in order to make such a model operational in practice of Ukrainian commercial banks more widely. In perspective research the modified return on equity measure should be developed for Ukrainian bank in order to link it to a market-determined minimum required return to find out whether a transaction adds value to the bank or not.

Література:

1. Ковалев В. Г. Корпоративные финансы и учет: понятия, алгоритмы, показатели : учеб. пособие / В. Г. Ковалев. — Москва : КНОРУС, 2010. — 768 с.
2. Коупленд Т. Стоимость компаний: оценка и управление / Т. Коупленд, Т. Коллер, Д. Муррин. — Москва : Олимп Бизнес, 1999. — 126 с.
3. Полищук А. Введение концепции VBM в практику управления стоматологической премиум-клиникой «Полимед» [Электронный ресурс] / А. Полищук, Г. Христян, И. Чернобыльский. — 2013. — Режим доступа : http://economy en_ru.academic.ru/66522/valuebasedmanagement.
4. Arnold G. Value-Based Management: Context and Application / G. Arnold, M. Davies. : Chichester, UK : John Wiley & Sons, 2000. — 388 p.
5. Boulos F. Getting the value out of value-based management / F. Boulos, P. Haspeslagh, T. Noda // INSEAD survey. — 2001. — P. 54.
6. Єпіфанов А. О. Вартість банківського бізнесу : монографія / [А. О. Єпіфанов, С. В. Лєонов, Й. Хабер та ін.] ; за заг. А. О. Єпіфанова та С. В. Лєонова. — Суми : ДВНЗ «УАБС НБУ», 2011. — 295 с.
7. Шатило Л. Value-Based Management в украинских реалиях: стоит ли отечественным компаниям хорошо стоить? [Электронный ресурс] / Л. Шатило. — 2013. — Режим доступа : http://www.prostobiz.ua/biznes/razvitie_biznesa/stati/value.
8. Abbasi1 A. Role of Islamic leadership in value based corporate management: the case of Pakistan / A. Abbasil, K. Rehman, O. Abbasi // African Journal of Business Management. — 2010. — Vol. 4 (18). — P. 4003—4020.
9. Bannister J. Is your company ready for value-based management? / J. Bannister, R. Jesuthasan // Journal of Business Strategy. — 1999. — March / April. — P. 12–15.
10. Панков В. А. Управління вартістю наукоємного машинобудівного підприємства : автореф. дис. … д-ра екон. наук : спец. 08.06.01 «Економіка, організація і управління підприємствами» / В. А. Панков. — Донецьк, 2004. — 34 с.
11. Оцінка вартості банку при виборі його конкурентної та корпоративної стратегій : монографія / І. О. Губарєва, Д. Д. Гонтар. — Харків : Вид. «ІНЖЕК», 2016. — 204 с.
12. Слав'юк Р. А. Формування вартості банку : монографія / Р. А. Слав'юк, О. В. Лук'янська. — Львів, 2015. — 278 с.
13. Кочетков В. М. Оцінка ринкової вартості банку як ділового підприємства : монографія / В. М. Кочетков, Ю. С. Комарицький. — Київ : МУФ, 2009 — 175 с.
14. Кореляційно-регресійний аналіз впливу факторів на формування фінансового результату банків Харківського регіону [Електронний ресурс]. — Режим доступу : http://molodyvcheny.in.ua/files/journal/2014/12/100.pdf.
15. Schroeck G. Risk Management and Value Creation in Financial Institutions / G. Schroeck. — New Jersey : John Wiley & Sons, Inc. ; Hoboken, 2002. — 355 p.
16. Reyniers P. Risk Adjusted Profitability Measurement in Banks / P. Reyniers. — London : Price Waterhouse, 1991. — Vol. 1 : Concepts and Applications. — 350 p.
17. Zaik E. RAROC at Bank of America: From Theory to Practice / E. Zaik, J. Walter, G. Kelling, J. Christopher // Journal of Applied Corporate Finance. — 1996. — Vol. 9. — № 2. — Summer. — P. 83—93.
18. Wills S. Operational Risk — The Next Frontier / S. Wills, S. Hinko, M. Haubenstock, K. Leibfried, A. Pozzi, N. Hayes ; British Bankers' Association / International Swaps and Derivatives Association (ISDA) // Pricewaterhouse Coopers/RMA. — 1999. — 300 p.

Стаття рекомендована до друку 06.05.2019

References:

1. Kovalev, V. G. (2010). *Korporativnye finansy i uchet: ponyatiya, algoritmy, pokazateli [Corporate finance and accounting: concepts, algorithms, indicators]*. Moscow: KNORUS [in Russian].
2. Copeland, T., Koller, T. & Murrin, D. (1999). *Stoimost' kompanij: ocenka i upravlenie [Cost of companies: assessment and management]*. Moscow: Olymp Business [in Russian].

3. Polishchuk, A., Khristyan, G., & Chernobyl'skij I. (2013). *Vvedenie koncepcii VBM v praktiku upravleniya stomatologicheskoj premium-klinikoj «Polimed» [Introduction of the VBM concept into the practice of managing the dental clinic «Polimed»]*. Retrieved from http://economyen_ru.academic.ru/66522/valuebasedmanagement [in Russian].

4. Arnold, G., & Davies, M. (2000). Value-Based Management: Context and Application. Chichester, UK: John Wiley & Sons.

5. Boulos, F., Haspeslagh, P., & Noda T. (2001). Getting the value out of value-based management. *INSEAD survey.*

6. Epiphanov A. O., Lyonov, A. O., & Haber, J. (et al.). (2011). *Vartist bankivskoho biznesu [Value of the banking business]*. A. O. Epiphanov, A. O. Lyonov (Eds.). Sumy: DVNZ «UABS NBU» [in Ukrainian].

7. Shatilo, L. (2013). *Value-Based Management v ukrainskih realiyah: stoit li otechestvennym kompaniyam horosho stoit'? [Value-Based Management in the Ukrainian reality: is it worth for domestic companies to value well?*]. Retrieved from: http: //www.prostobiz.ua/biznes/razvitie_biznesa/stati/value [in Russian].

8. Abbasil, A., Rehman, K., & Abbasi, O. (2010) Role of Islamic leadership in value based corporate management: the case of Pakistan. *African Journal of Business Management, Vol. 4* (18), 4003—4020.

9. Bannister, J., & Jesuthasan, R. (1999). Is your company ready for value-based management? *Journal of Business Strategy, March / April*, 12—15.

10. Pankov, V.A. (2004). Upravlinnia vartistiu naukoiemnoho mashynobudivnoho pidpryiemstva [Management of a science-intensive machine-building enterprise cost]. *Extended abstract of Doctor's thesis.* Donetsk [in Ukrainian].

11. Gubarova, I. O., & Gontar, D. D. (2016). *Otsinka vartosti banku pry vybori yoho konkurentnoi ta korporatyvnoi stratehii [Estimates of a bank value when choosing a competitive corporate strategy]*. Kharkiv: INZhEK [in Ukrainian].

12. Slaviuk, R. A., & Lukianska, O. V. (2015). *Formuvannia vartosti banku [Forming the bank value]*. Lviv [in Ukrainian].

13. Kochetkov, V. M., & Komarytskyi, Yu. S. (2009). *Otsinka rynkovoi vartosti banku yak dilovoho pidpryiemstva [Estimation of market value of a bank as a business enterprise]*. Kyiv: MUF [in Ukrainian].

14. *Koreliatsiino-rehresiinyi analiz vplyvu faktoriv na formuvannia finansovoho rezultatu bankiv Kharkivskoho rehionu [Correlation and regression analysis of the influence of factors on the financial results of the banks of the Kharkiv region]*. Retrieved from http://molodyvcheny.in.ua/files/journal/2014/12/100.pdf [in Ukrainian].

15. Schroeck, G. (2002). Risk Management and Value Creation in Financial Institutions. New Jersey: John Wiley & Sons, Inc., Hoboken.

16. Reyniers, P. (1991). Risk Adjusted Profitability Measurement in Banks. London: Price Waterhouse.

17. Zaik, E., Walter, J., Kelling, G., & Christopher, J. (1996). RAROC at Bank of America: From Theory to Practice. *Journal of Applied Corporate Finance, Vol. 9*, 2, 83—93.

18. Wills, S., Hinko, S., Haubenstock, M., Leibfried, K., Pozzi, A., & Hayes, N. (1999). Operational Risk — The Next Frontier, British Bankers' Association/International Swaps and Derivatives Association (ISDA). *Pricewaterhouse Coopers/RMA.*

The article is recommended for printing 06.05.2019