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Vysotska I.

*Ph. D. in Economics, Associate Professor,
Associate Professor of the Department of Finance and Accounting,
Lviv State University of Internal Affairs, Ukraine;
e-mail: inna_vysot@ukr.net; ORCID ID: 0000-0003-4252-987X*

Savina S.

*Ph. D. in Economics,
Senior Lecturer of the Department of Agrarian Management and Marketing,
Vinnytsia National Agrarian University, Ukraine;
e-mail: ssgrom@ukr.net; ORCID ID: 0000-0002-7415-4526*

Mazur K.

*Ph. D. in Economics, Associate Professor,
Head of the the Department of Agrarian Management and Marketing,
Vinnytsia National Agrarian University, Ukraine.
e-mail: kv_mazur@ukr.net; ORCID ID: 0000-0002-1137-3422*

Nahirna M.

*Ph. D. in Economics,
Assistant of the Department of Foreign Trade and Customs,
Lviv Polytechnic National University, Ukraine;
e-mail: nagirnamar@gmail.com; ORCID ID: 0000-0002-7680-2064*

Dorosh I.

*Senior Lecturer
the Department of Administrative and Financial Management,
Lviv Polytechnic National University, Ukraine;
e-mail: iryna.m.dorosh@lpnu.ua; ORCID ID: 0000-0003-1394-5639*

JUSTIFICATION OF BANK FINANCIAL SECURITY MANAGEMENT STRATEGY

Abstract. Inconsistency of modern conditions of commercial banks operation pose a threat to their activities and existence. Therefore, the problem of ensuring the financial security of banks is relevant. Ensuring the financial security of the bank should be based on a scientifically sound strategy that involves action on certain functional components of security.

It is proposed to use a functional approach to the integrated assessment of the level of financial security of a banking institution, which takes into account four groups of indicators — capital and resource, credit and investment, currency security, as well as the security of bank income and expenses. This approach makes it possible to quantify the impact of each group of indicators on the level of financial security of a banking institution. An integrated assessment of the key components of the bank's integrated financial security indicator revealed that the four surveyed banks are characterized by a sufficient level of financial security. The results of the integrated indicator of financial security of the bank should be used in developing a strategy for ensuring the financial security of the bank.

The article proposes and substantiates the theoretical and methodological foundations of the strategy for ensuring the financial security of the bank. It is substantiated that to achieve a certain level of financial security of the bank it is advisable to use the GAP-method. It is proved that the application of this method will allow to single out only those components that have the greatest impact on the level of bank security and which need to be influenced. It is established that the strategy of ensuring the financial security of a banking institution should be aimed at bridging the gaps in key indicators. The methodology of game theory was used to establish the expediency of overcoming strategic gaps. It is proved that the application of the chosen methods of strategic planning will allow to quickly identify the causes of deviations from the safe level of the bank and justify the feasibility of influencing certain factors.

Keywords: financial security of the bank, financial security strategy, GAP-method, integrated indicator of financial security of the bank.

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Висоцька І. Б.

*кандидат економічних наук, доцент,
доцент кафедри фінансів та обліку,*

Львівський державний університет внутрішніх справ, Україна;

e-mail: inna_vysot@ukr.net; ORCID ID: 0000-0003-4252-987X

Савіна С. С.

кандидат економічних наук,

старший викладач кафедри аграрного менеджменту та маркетингу,

Вінницький національний аграрний університет, Україна;

e-mail: ssgrom@ukr.net; ORCID ID: 0000-0002-7415-4526

Мазур К. В.

кандидат економічних наук, доцент,

завідувач кафедри аграрного менеджменту та маркетингу,

Вінницький національний аграрний університет, Україна;

e-mail: kv_mazur@ukr.net; ORCID ID: 0000-0002-1137-3422

Нагірна М. Я.

кандидат економічних наук,

асистент кафедри зовнішньоекономічної та митної діяльності,

Національний університет «Львівська політехніка», Україна;

e-mail: nagirnamar@gmail.com; ORCID ID: 0000-0002-7680-2064

Дорош І. М.

старший викладач кафедри адміністративного та фінансового менеджменту,

Національний університет «Львівська політехніка», Україна;

e-mail: iryna.m.dorosh@lpnu.ua; ORCID ID: 0000-0003-1394-5639

ОБҐРУНТУВАННЯ СТРАТЕГІЇ ЗАБЕЗПЕЧЕННЯ ФІНАНСОВОЇ БЕЗПЕКИ БАНКУ

Анотація. Мінливість сучасних умов функціонування комерційних банків створюють загрози для їхньої діяльності та існування. Тому проблема забезпечення фінансової безпеки банків є актуальною. Забезпечення фінансової безпеки банку повинно відбуватися на основі науково обґрунтованої стратегії, що передбачає дію на певні функціональні складові безпеки.

Запропоновано використовувати функціональний підхід до інтегральної оцінки рівня фінансової безпеки банківської установи, який передбачає врахування чотири груп показників — капітало-ресурсної, кредитно-інвестиційної, валютної безпеки і безпеки доходів та витрат банку. Цей підхід дає змогу кількісно оцінити вплив кожної групи показників на рівень фінансової безпеки банківської установи. Інтегральна оцінка ключових компонентів інтегрального показника фінансової безпеки банку дозволила виявити, що для чотирьох досліджуваних банків характерний достатній рівень фінансової безпеки. Результати інтегрального показника фінансової безпеки банку доцільно використовувати при розробленні стратегії забезпечення фінансової безпеки банку.

Запропоновано та обґрунтовано теоретико-методологічні основи формування стратегії забезпечення фінансової безпеки банку. Обґрунтовано, що для досягнення певного рівня фінансової безпеки банку доцільно використовувати GAP-метод. Доведено, що застосування цього методу дозволить виокремити лише ті компоненти, на які найбільше впливають на рівень безпеки банку і на котрі потрібно вплинути. Установлено, що стратегія забезпечення фінансової безпеки банківської установи повинна бути спрямована на подолання розривів за основними показниками. Для встановлення доцільності подолання стратегічних розривів використано методологію теорії ігор. Доведено, що застосування обраних методів

стратегічного планування дасть можливість швидко виявляти причини відхилень від безпечного рівня банку та обґрунтовувати доцільність впливу на певні чинники.

Ключові слова: фінансова безпека банку, стратегія забезпечення фінансової безпеки, GAP-метод, інтегральний показник фінансової безпеки банку.

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Introduction. The openness of the economies in different countries, the intensification of globalization, permanent financial crises, the prolonged global pandemic have a negative impact on the operating conditions and profitability of commercial banks. The security of the economy banking sector is crucial for the development of the economic system and national security. The significance of the banking system is that it is a donor to fill the real economy and the state with financial resources. The banking system contributes to the intensification of investment processes in the state, the organization of the movement of financial resources at all levels.

Under such conditions, the problem of ensuring the financial security of banking institutions becomes especially relevant both in the world and in Ukraine, in particular. The development of a sound strategy for financial security of the banking institution, taking into account the peculiarities of the development of its individual functional components is particularly relevant. In order to ensure liquidity, competitiveness and profitability, it is important to form an effective strategy for ensuring and managing the financial security of commercial banks.

Research analysis and problem statement. The problem of ensuring the security of banking institutions has been the subject of research by many scientists, in particular: D. Artemenko [5], O. Baranovskyi [17], M. Baryliuk [9], P. Herasymov [2], Yu. Holoborodko [3], A. Epifanov [7], S. Ksiondz [6], O. Khytrin [1].

The task is to systematize the existing approaches to defining the concept of «financial security of the bank» and justify the strategy of its provision.

The purpose of the article is to formulate recommendations for the development and selection of a strategy for financial security of commercial banks by a functional approach.

The following **methods** were used in the research process: abstract-logical analysis, system and statistical analysis, mathematical modeling.

Results of the research. The development of the banking system is crucial for the development of the economy as a whole. Banks are the locomotive of the development of the real sector of the economy. Problems of ensuring the financial security of banking institutions have attracted the attention of many scientists. However, during the scientific discussions and controversy, scientists have still not been able to agree on an understanding of the concept of «bank financial security». Thus, some scientists (Khytrin [1]) understand the «bank financial security» as the state of a commercial bank, which guarantees its effective functioning. At the same time Herasymov P. A. [2] understands the financial security of the bank as its stable and stable state, Holoborodko Y. O. — as the state in which the optimal attraction and use of financial resources is achieved [3], Natochaeva — as a set of elements that ensure the efficiency of the bank [4]. Of course, the authors' opinion is interesting. However, we believe that these definitions do not reflect the essence of the concept of «bank security», but relate to the problems of ensuring the efficiency of its operation. Artemenko D. A. emphasizes the measures to strengthen the security of the bank in his work. [5]. However, most scientists (Ksiondz S. M. [6], Epifanov A. O. [7], Dmytrov S. O. [8]) emphasize the protection of the bank from external and internal threats and neutralize their actions. Thus, the financial security of the bank should be understood as the state of the bank's security, which provides protection against potential and existing threats, preservation and increase of assets, stability and achievement of objectives in order to increase bank efficiency and strengthen market position.

Ensuring financial security cannot be chaotic. All actions must take place consistently, purposefully, in accordance with the goal set by stakeholders. To this end, a strategy to ensure the financial security of the bank is being developed. The strategy of ensuring the financial security of the bank is a set of measures aimed at neutralizing external and internal threats, ensuring solvency, liquidity and stability, efficient capital structure and the most profitable areas of its investments.

The development of a financial security strategy should be preceded by an assessment of its level. When assessing the integrated level of financial security of the bank, it is advisable to use the methodology developed by O. I. Baranovskyi and M. R. Baryliuk. This technique involves a tactical and integrated assessment of the level of financial security and involves the assessment of the main functional components: capital and resource security, credit and investment security, currency security and security and security of income and expenses of the bank [9]. The advantage of this method is the ability to identify problem areas of the bank. This will make it possible to direct the strategy measures to eliminate the identified problems and not to waste financial and labor resources. The level of the integrated indicator of financial security is assessed taking into account Fibonacci law [9] and is determined by the scale: high level (0.7—1.0), sufficient (0.35—0.69), low (0—0.34). An empirical study of the level of financial security will be conducted on the example of the TOP-4 Ukrainian banks in terms of assets on 01.01. 2021, namely JSC CB «PrivatBank» [10], JSC «State Savings Bank of Ukraine» [11], JSC «State Export-Import Bank of Ukraine» (hereinafter referred to as JSC «Ukreximbank») [12] and PJSC JSB «Ukrigasbank» [13].

According to *Table 1*, all selected banks are characterized by a sufficient level of financial security. However, JSC CB «PrivatBank» and JSC «Ukreximbank» have the lowest values. Therefore, the development of financial security strategy will be studied on the example of these banks.

Table 1

Indicators of integrated assessment of financial security of TOP-4 commercial banks of Ukraine

Banking institutions	Capital resources	Credit and investment security	Currency security	Security of income and expenses	Integral indicator and level of financial security of the bank
JSC CB «PrivatBank»	0.12	0.17	0.001	0.1	0.4 <i>enough</i>
JSC «State Savings Bank of Ukraine»	0.12	0.19	0.02	0.08	0.41 <i>enough</i>
JSC «Ukreximbank»	0.13	0.18	0.01	0.07	0.39 <i>enough</i>
PJSC JSB «Ukrigasbank»	0.13	0.28	0.02	0.07	0.5 <i>enough</i>

Source: calculated by the authors according to the data [10—13].

The strategy development process involves the use of strategic analysis methods. When developing a strategy for financial security, we consider it appropriate to use the method of GAP-analysis. In order to identify problem areas of banks, we calculate the «gaps» of the actual indicators from the normative value of the indicators (*Table 2*).

The largest gaps in the level of financial security are characteristic of JSC CB «PrivatBank» and JSC «Ukreximbank» in terms of capital and resource security, currency security and security of income and expenses.

Table 2

Gaps between normative and actual values of functional components of financial security of commercial banks

Banking institutions	Capital resources	Credit and investment security	Currency security	Security of income and expenses	Integral indicator and level of financial security of the bank
<i>Standard value</i>	<i>0.35</i>	<i>0.3</i>	<i>0.1</i>	<i>0.25</i>	<i>1</i>
JSC CB «PrivatBank»	<i>0.23</i>	0.13	<i>0.09</i>	<i>0.24</i>	<i>0.6</i>
JSC «State Savings Bank of Ukraine»	0.23	0.11	0.08	0.17	0.59
JSC «Ukreximbank»	<i>0.22</i>	0.12	<i>0.09</i>	<i>0.18</i>	<i>0.61</i>
PJSC JSB «Ukrigasbank»	0.22	0.02	0.08	0.18	0.5

Source: calculated by the authors according to the data [10—13].

Regarding the currency security of banks, its low level can be explained by the implementation of the NBU policy of the economy dedollarization. The consequence of this policy is a change in the preferences of depositors in favor of hryvnia deposits and a reduction in demand for foreign currency loans [14]. These factors affect the level of financial security of all banks to the same extent. At the same time, banks do not have the opportunity to influence these factors. That is why we consider it inappropriate to take into account the level of currency security when developing a strategy to ensure the bank’s financial security.

The analysis of gaps in each component of security showed that all surveyed banks are characterized by maximum gaps in two key components of security — capital and resource security and security of income and expenses. Therefore, the strategy of financial security should primarily provide for the implementation of measures aimed at reducing the gaps in these components.

In order to determine the feasibility of overcoming the identified gaps by applying the proposed strategies, it is advisable to use the methodology of game theory. Optimal strategies are characterized by stability, ie it is not profitable for any player to deviate from their optimal strategy.

The strategy of ensuring the financial security of the bank is formed on the basis of 8 selected variables (components) — indicators of capital and resource security of the bank and security of income and expenses. The combination of these variables identified possible game combinations (situations). Output payment matrices are formed for each player. The game payment matrix is a matrix that shows the payment of one player to another, provided that the first player chooses the strategy A_i , the second — B_i [15].

We believe that A_1, B_1 strategies are the strategies currently used by banks, ie all indicators of the components of capital and resource security and security of income and expenses; A_2, B_2 strategies are the strategies that change the components in order to overcome strategic gaps to their optimal level and implement the recommended strategy for financial security of the bank.

For JSC CB «Privatbank», the financial security strategy (A_2) will be aimed at increasing the reliability and return on assets ratio and reducing the share of authorized capital in the bank’s equity structure (Table 3).

Table 3

Payment matrix to determine the optimal strategic decision to overcome strategic gaps in the components of financial security of the bank

Indicators	JSC CB «PrivatBank»		JSC «Ukreximbank»	
	A1	A2	B1	B2
Coefficient of reliability	0.21	0.35	0.07	0.35
Share of authorized capital in the bank’s equity	0.66	0.25	0.87	0.25
Equity concentration ratio	0.18	0.18	0.06	0.20
The level of time deposits in customer’s deposits	0.46	0.46	0.63	0.63
Coefficient of legal capacity of a commercial bank	0.55	0.55	1.00	1.00
Profitability ratio	0.37	0.37	0.01	0.01
Return on assets ratio	0.11	0.25	0.00	0.25
Return on equity	0.60	0.60	0.01	0.25

Source: calculated and developed by the authors according to the data [10—13].

As for JSC «Ukreximbank», in order to achieve the regulatory values, it is advisable to improve the value of the reliability ratio, concentration of the bank’s equity, return on assets and equity and reduce the share of authorized capital in the bank’s equity. We will make calculations to make the optimal strategic decision to bridge the gaps for the studied banks.

The principle of choosing the most careful strategy for each party is called the minimax principle. This principle comes from the assumption that players strive to achieve the best results for each player. The lower value of the game α is the maximum win that can be guaranteed by choosing one of your strategies. This strategy is called the maximum and is calculated by the formula:

$$a = \max_i \min_j \{a_{ij}\} \tag{1}$$

The top value of the game β is the minimum loss that a competitor can count on when choosing one of their strategies. This strategy is called minimax and is calculated by the formula:

$$\beta = \min_i \max_j \{a_{ij}\}. \tag{2}$$

If $\alpha = \beta = \gamma$, that is $\max_i \min_j \{a_{ij}\} = \min_i \max_j \{a_{ij}\} = \gamma$, then the number γ is called the value of the game. A game for which $\alpha = \beta$, the minimum value is equal to the maximum is called a saddle point game.

Calculation of distances between bank positions in n -dimensional space allowed to construct a payoff matrix (Table 4).

Table 4

Payoff matrix to determine the optimal decision on the feasibility of bridging strategic gaps

		JSC «Ukreximbank»		
		B ₁	B ₂	Minimum payoff
JSC CB «PrivatBank»	A ₁	0.8940	0.9711	0.8940
	A ₂	1.2431	0.9132	0.9132
	maximum loss	1.2431	0.9711	

Guaranteed payoff, determined by the lower game value $A = \max (a_i) = 0.9132$. The game value A indicates the purest strategy A_2 . The top game value $B = \min (b_j) = 0.9711$. Since $A \neq B$, i.e. the saddle point of the game is absent, the value of the game is in the range $0.9132 \leq y \leq 0.9711$. That is, it is advisable to use mixed player strategies. It is advisable to solve linear inequalities to determine the optimal mixed strategies. Thus, for JSC CB «Privatbank» will look like a matrix:

$$S_A = \begin{pmatrix} A_1 & A_2 & A_n \\ p_1 & p_2 & p_n \end{pmatrix}, \tag{3}$$

where S_A is an optimal strategy for JSC CB «PrivatBank»;
 $A_1 \dots A_n$ — pure strategies for JSC CB «PrivatBank»;
 $p_1 \dots p_n$ — the probability of using a pure strategy.

For PJSC «State Export-Import Bank of Ukraine» the optimal mixed strategy will be in the form of a matrix:

$$S_B = \begin{pmatrix} B_1 & B_2 & B_n \\ q_1 & q_2 & q_n \end{pmatrix} \tag{4}$$

where S_B is an optimal strategy for PJSC «State Export-Import Bank of Ukraine»;
 $B_1 \dots B_n$ – pure strategies for PJSC «State Export-Import Bank of Ukraine»;
 $q_1 \dots q_n$ – the probability of using a pure strategy.

To determine the optimal strategy of JSC CB «PrivatBank» it is necessary to solve the system of inequalities:

$$\begin{aligned} x_1 + 4.491 x_2 &\geq 1 \\ 1.771 x_1 + 1.192 x_2 &\geq 1 \\ F(x) = x_1 + x_2 &\rightarrow \min. \end{aligned}$$

The system of inequalities for PJSC «State Export-Import Bank of Ukraine» will look like this:

$$\begin{aligned} y_1 + 1.771 y_2 &\leq 1 \\ 4.491 y_1 + 1.192 y_2 &\leq 1 \\ Z(y) = y_1 + y_2 &\rightarrow \max. \end{aligned}$$

The solution of this system of inequalities is carried out by the simplex method. The results of solving the inequalities are presented in Table 5.

The solution of linear equations made it possible to determine the optimal strategy for overcoming strategic gaps for each bank. Thus, the current strategy, A_1 strategy, is optimal for JSC CB «PrivatBank». That is, to achieve the value of the integrated indicator of financial security at the level of 0.96 JSC CB «PrivatBank» it is advisable to continue to use the current strategy and develop measures to increase the profitability of the bank.

Table 5

Determining the feasibility of using mixed strategies to bridge gaps

Bank	Strategy	The probability of choosing a strategy	Value, games	Optimal strategy
JSC CB «PrivatBank»	A1	0.811	0.96	A1
	A2	0.189		
PJSC «State Export-Import Bank of Ukraine»	B1	0.142	0.96	B2
	B2	0.858		

Strategy *B2* is optimal for PJSC «State Export-Import Bank of Ukraine». To ensure a high level of financial security of PJSC «State Export-Import Bank of Ukraine» it is necessary to apply a strategy aimed at improving the reliability ratio, concentration of equity of the bank, return on assets and equity and reduce the share of authorized capital in equity. To do this, the banking institution must implement the following measures:

- timely forecasting and leveling of deposit activity risks;
- active implementation and use of the latest information technologies in the field of customer attraction;
- diversification of the commercial bank resources attracting;
- restoring confidence in the bank and forming a positive image of the institution;
- prevention and avoiding of criminal acts by bank employees;
- structuring the bank's assets according to the degree of risk and profitability.

Conclusions. Ensuring the financial security of banks is the key to ensuring the economic security of the state. When assessing the level of financial security of the bank, it is advisable to apply a functional approach. Which will allow to identify and timely neutralize threats in certain areas of the bank. Ensuring a high level of financial security should be consistent within the framework and on the basis of the developed strategy. The development and implementation of the bank's financial security strategy should be carried out using the GAP method (the method of strategic gaps). The use of the GAP-method to identify the causes of deviations in the level of financial security allows us to identify the components that have the greatest impact on the level of financial security. Game theory was used to establish the feasibility of overcoming strategic gaps. The application of this method makes it possible to quickly identify the causes of deviations from the safe level of the bank and take measures to reduce gaps, and, consequently, to ensure the financial security of the bank.

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