

# INFORMATION AND METHODOICAL SUPPORT OF THE BANK FINANCIAL SECURITY EVALUATION

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The essence of the term "alarm indicator" being a means of measuring and displaying changes in the bank financial security under the influence of threats was specified. The consistency of development of the bank financial security level in the dimension of dynamics of respective indexes was defined using Q-technique of factor analysis. A methodical approach to identification of the primary indexes of the bank financial security was offered, such indexes, when showing an imbalanced change comparing to other indexes, affecting negatively the bank's ability to protect its financial interests. A system of alarm indicators for creating a map of threats to the bank financial security was formed based on the primary indexed.

*Keywords:* state of financial security, management of the bank financial security, alarm indicators, primary indexes, information base, identification of threats.

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## ІНФОРМАЦІЙНО-МЕТОДИЧНЕ ЗАБЕЗПЕЧЕННЯ ОЦІНЮВАННЯ СТАНУ ФІНАНСОВОЇ БЕЗПЕКИ БАНКУ

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Визначено сутність поняття "сигнальний індикатор" як показника, що є засобом вимірювання та відображення зміни стану фінансової безпеки банку під впливом загроз. Встановлено гармонійність розвитку рівня фінансової безпеки банку у просторі динаміки сукупності відповідних показників з використанням Q-техніки факторного аналізу. Запропоновано методичний підхід до визначення первинних показників, що характеризують стан фінансової безпеки банку, дисбаланс зміни котрих відносно інших показників негативно впливає на здатність банку до захисту своїх фінансових інтересів та які можуть бути використані для формування системи сигнальних індикаторів, що застосовується в процесі побудови карт визначення загроз стану фінансової безпеки банківської установи.

*Ключові слова:* стан фінансової безпеки, управління фінансовою безпекою банку, сигнальні індикатори, первинні показники, інформаційна база, ідентифікація загроз.

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## ИНФОРМАЦИОННО-МЕТОДИЧЕСКОЕ ОБЕСПЕЧЕНИЕ ОЦЕНИВАНИЯ ФИНАНСОВОЙ БЕЗОПАСНОСТИ БАНКА

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Определена сущность понятия "сигнальный индикатор" как средства измерения и отображения изменения состояния финансовой безопасности банка под воздействием угроз. Установлена гармоничность развития уровня финансовой безопасности банка в пространстве динамики совокупности соответствующих показателей с использованием Q-техники факторного анализа. Предложен методический подход к определению первичных показателей, характеризующих состояние финансовой безопасности банка, дисбаланс изменения которых относительно других показателей негативно влияет на способность банка защищать свои финансовые интересы и которые могут использоваться для формирования системы сигнальных индикаторов при построении карт определения угроз финансовой безопасности банка.

**Ключевые слова:** состояние финансовой безопасности, управление финансовой безопасностью банка, сигнальные индикаторы, первичные показатели, информационная база, идентификация угроз.

Resistance of the Ukrainian banking sector to internal and external threats, the ability to ensure effective functioning of national economy and economic growth of the country is one of the target fields of development of national security in the financial sector [1]. Special attention should be paid to information support of management of the bank financial security, which must meet the requirements of relevance, completeness, and at the same time, while not being excessive, it should be sufficient for timely decision-making to prevent and neutralize the threats to the financial security of banking institutions.

Problems of management of financial security and, particularly, identification of threats, were discussed in works of such native scholars as O. Baranovskiy, I. Blank, O. Kyrychenko, I. Medvedieva, M. Pogosova, A. Yefifanov, M. Yermoshenko etc. [2 – 8]. However, the issues of early detection of factors that may threaten the financial security of a bank are not described in the scientific and analytical literature.

The aim of the article is to develop a methodical approach to determining a combination of indexes that can be used as a system of alarm indicators, which signal threats to financial security of a banking institution.

An alarm signal is the value which reflects the state of the system, and is the result of measurements made during supervisions [9]. Therefore, the alarm indicator is considered to be the index whose dynamics corresponds to the dynamics of the financial security of the bank under the influence of threats, i.e. the increase of the indicator's value shows improvement of the financial security of a bank (if the index is a driver) or its deterioration (if the index is a suppresser).

To determine a certain combination of indexes characterizing the state of the financial security (primary indicators or data) that can be used as a system of alarm indicators the method of factor analysis was used. It is usually used in research practice to reduce the information volume, i.e. to get a small number of generalized characteristics that explain the variation (dispersion) of elementary characteristics (R-technique of factor analysis) or variation of the observed objects (Q-technique of factor analysis) [10]. Note that R-technique of factor analysis is more commonly used in economic research. This technique is based on determination of correlation between characteristics of the process or the phenomena analyzed in

time. In this study Q-technique was used. It allows researchers to investigate the interrelation between objects. A technological feature of applying the Q-technique of factor analysis lies in using a transposed (relative to R-technology) matrix of primary indexes as the input (Fig. 1).

To implement the procedure of factor analysis the following conditions were taken as the input: the level of financial security of the bank to be the phenomenon; the state of financial security by the years to be the object; the set of indexes of the level of financial security to be the characteristics. The essence of the hypothesis is that if the dispersion of levels of financial security of the bank for different years is not significant, which indicates its harmonious development in the dimension of the dynamics of respective indexes, then such a combination can be used as a base for the formation of the alarm indicators system. The changes in their values will notify the existence of threats to the state of the discovered phenomenon. It is worth mentioning that regarding the financial security as a system, the authors consider harmonious development to be the transition from one financial state to another basing on harmonized and unfluctuating changes in its basic characteristics, which are measured by the mentioned pool of alarm indicators.

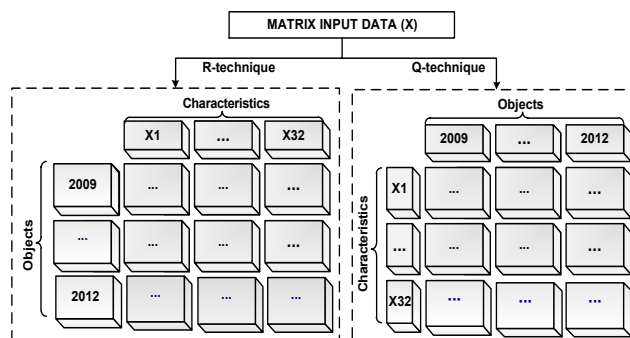


Fig. 1. Differences forming the input matrix by factor analysis techniques

The input matrix for the factor analysis consists of indexes, which are usually used in the assessment of the level of the financial security of the bank, and indicate its

financial stability, liquidity, business activity, riskiness and efficiency of functioning. They are taken from the financial statements of one of Ukrainian state banks (hereinafter the Bank). All indicators were designated as X1 – X32. The input matrix is formed according to Fig. 1 (Q -technique). The results of factor analysis are presented in the Table.

Table

The results of factor analysis

Object	Factor 1	
	Loading of the factor on object	Factor dispersion, %
2009	0.936	95.87
2010	0.992	
2011	0.995	
2012	0.993	

According to the results of factor analysis, Factor 1 was formed (see the Table). The value of this factor (loading of initial indexes (X1 – X32) of the financial security) expresses the relative correlation between the states of the financial security of the Bank for years. Taking into account that the maximum loading of the factor can be equal to one, the most harmonious dynamics of the financial security of the Bank was in 2010 – 2012, as the loading in these years was about the same: 0.992, 0.995 and 0.993 respectively (see the Table).

The interpretation of the results according to Q -technique of factor analysis was as follows: the closer are the studied objects to each other in the dimension of loading of the derived factors (in our case it is Factor 1), the more consistent is their dynamics. In other words, most of the primary indexes characterizing the state of the financial security of the Bank changed proportionally, without significant fluctuation. For visual presentation of the abovementioned interpretation the results of factor analysis is presented in the graphical form (Fig. 2).

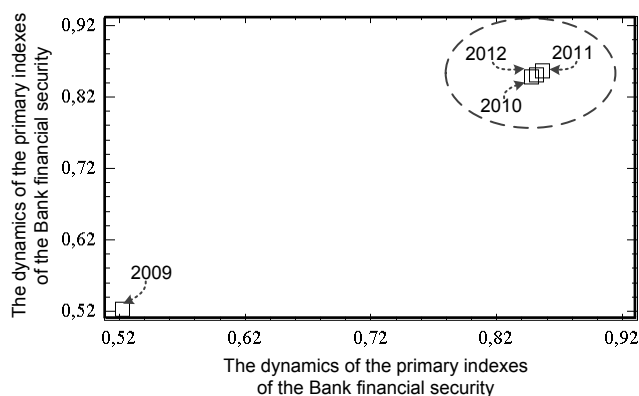


Fig. 2. Location of objects in the dimension of the dynamics of respective indexes

As it is shown in Fig. 2, the period from 2010 to 2012 was characterized by balanced dynamics of the financial security of the Bank, because the given years are grouped very closely together in the dimension of their initial indexes.

The only exception is 2009, which differs from 2010 – 2012: the factor loading on the state of the financial security in 2009 was 0.935 (the Table), which led to its remote location from the other analyzed years (see Fig. 2).

Thus, there were primary characteristics of the financial security of the Bank which due to their economic nature adversely affect the stability of protection of the financial interests of the Bank. In other words, there were a number of indicators among X1 – X32 which had significant deviations from standard or recommended values. In its turn it led to an imbalance of the whole system of primary indexes of the financial security and hence to the disturbance of its progressive advance. The number of these indexes could be either a minority or a majority. In the case of their minority the imbalance can be caused by the power of their correlation because the stability of the system is largely determined by strength of ties between its elements rather than elements themselves.

The stability of the dynamics of the financial security in the 2010 – 2012 period can be explained by the predominance of proportionally changing indexes among its primary characteristics. However, it is reasonable to check if there were parameters which either were in the imbalance with

others or did not change their value. Those indexes therefore cannot be used as indicators. This test was conducted using the multivariable statistical method of cluster analysis [11]. The essence of this method is in grouping (clustering) a certain set of objects (primary indexes of the state of the financial security of the Bank) with different characteristics (coherence of dynamics of the financial security of the Bank in 2009 – 2012) in order to obtain homogeneous groups – clusters, which help to determine the degree of homogeneity of the primary indexes of the Bank financial security by the value of the factor identified as a result of factor analysis.

Visual representation of the results of cluster analysis is presented in Fig. 3.

As it is shown in Fig. 3, all the primary indexes formed three clusters, which indicates the unbalanced character of their dynamics that caused the inconsistent changes of the financial security of the Bank in 2009 – 2012. Due to the obtained distribution of indexes among clusters the following conclusions were made:

indexes that were in the second and third clusters are characterized by balanced dynamics both within a cluster and relatively to each other. It is caused by the close grouping of indexes within the cluster, and close positioning of clusters to each other (see Fig. 3);

indexes that were in the first cluster, differ significantly from those in the second and third ones by their dynamics, but are close to each other within the cluster. According to the analysis of primary indexes we note that the overall (X10) and resources (X11) liquidity ratios were significantly lower in 2009 than in 2010 – 2012. As for the standard of "large" credit risk, its dynamics was not so abrupt. However the defined cluster combines indexes with higher values, as opposed to indicators of the second and third clusters. These indexes affect higher deviation in the dynamics, and therefore can largely influence the trend of changes in the Bank financial security. The mentioned differences determine the grouping of analyzed indexes of liquidity and credit risk in a single cluster. You can also assume that it is an imbalance between the clusters that was the root of significant differences of the financial security of the Bank in 2009, which was marked by a factor analysis (see Fig. 3).

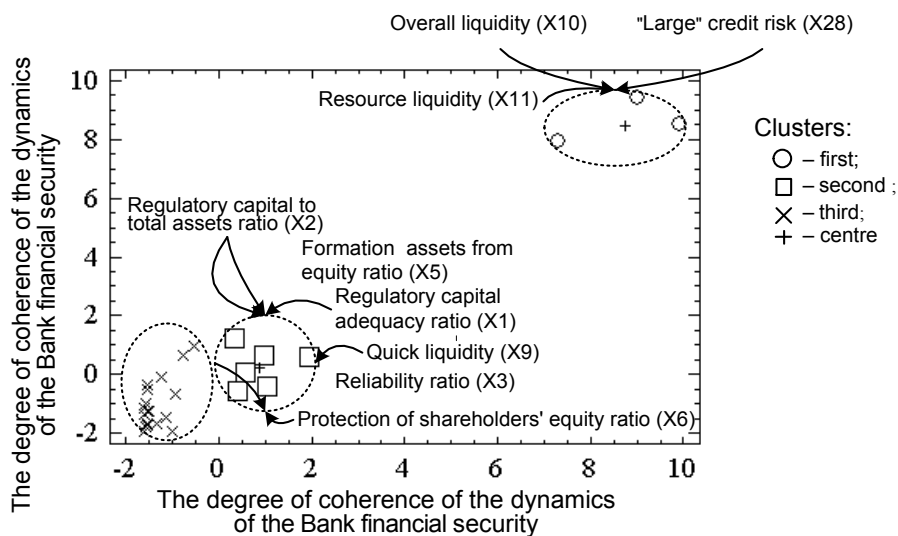


Fig. 3. Grouping primary characteristics of the financial security of the Bank depending on the degree of coherence of the dynamics of its condition

Thus, the use of Q-technique of factor analysis and the clustering method allowed researchers to determine the level of consistency of dynamics of the Bank financial security, and in the case of disproportion, to determine the primary indexes whose imbalance in change relatively to other indicators had negative impact on the Bank's ability to protect its financial interests. Given the obtained results all the indexes analyzed should be used as indicators that may signal the corresponding threats.

Therefore, the use of the proposed methodical approach will improve the information base for the decision-making process through the formation of the alarm indicator system. Such an alarm indicator system can be used as the input for creating the maps of the bank financial security threats. This will be subject to further study.

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**References:** 1. Про схвалення Концепції забезпечення національної безпеки у фінансовій сфері: Розпорядження Кабінету Міністрів України від 15.09.2012 р. № 569-р [Електронний ресурс]. – Режим доступу: <http://zakon1.rada.gov.ua/laws/show/569-2012-%D1%80>. 2. Барановський О. І. Банківська безпека: проблема виміру / О. І. Барановський // Економіка і прогнозування. – 2006. – № 1. – С. 7–26. 3. Барановський О. І. Фінансова безпека в Україні (методологія оцінки та механізми забезпечення): монографія / О. І. Барановський. – К.: КНТЕУ, 2004. – 760 с. 4. Бланк И. А. Управление финансовой безопасностью предприятия / И. А. Бланк. – К.: Эльга, Ника-Центр, 2005. – 784 с. 5. Кириченко О. А. Економічна безпека банківської системи України в умовах глобальної фінансової кризи / О. А. Кириченко, С. В. Мелесик // Актуальні проблеми економіки. – 2009. – № 8. – С. 223–232. 6. Медведєва І. Б. Діагностування як складова процесу управління фінансовою безпекою підприємства / І. Б. Медведєва, М. Ю. Погосова // Економіка розвитку. – 2008. – № 1 (45). – С. 75–78. 7. Спіфанов А. О. Фінансова безпека підприємств і банківських установ: монографія / А. О. Спіфанов, О. Л. Пластун, В. С. Домбровський. – Суми: ДВНЗ "УАБС НБУ", 2009. – 295 с. 8. Срошненко М. М. Фінансова безпека держави: національні інтереси, реальні загрози, стратегія забезпечення: монографія / М. М. Срошненко. – К.: КНТЕУ, 2001. – 308 с. 9. Френк Л. Теорія сигналів / Л. Френк; пер. с англ.; под ред. Д. Е. Вакмана. – М.: Советское радио, 1974. – 344 с. 10. Иберла К. Факторный анализ / К. Иберла; пер. с нем. В. М. Ивановой. – М.: Статистика, 1980. – 398 с. 11. Ким Дж.-О. Факторный, дискриминантный и кластерный анализ / Дж.-О. Ким. – М.: Финансы и статистика, 1989. – 216 с.

Советское радио, 1974. – 344 с. 10. Иберла К. Факторный анализ / К. Иберла; пер. с нем. В. М. Ивановой. – М.: Статистика, 1980. – 398 с. 11. Ким Дж.-О. Факторный, дискриминантный и кластерный анализ / Дж.-О. Ким. – М.: Финансы и статистика, 1989. – 216 с.

**References:** 1. Pro skhvalenniia Kontseptsii zabezpechennia natsionalnoi bezpeky u finansovii sferi: Rozporiadzhennia Kabinetu Ministriv Ukrainy vid 15.09.2012 r. No. 569-r [Electronic resource]. – Access mode: <http://zakon1.rada.gov.ua/laws/show/569-2012-%D1%80>. 2. Baranovskiy O. I. Bankivska bezpeka: problema vymiru / O. I. Baranovskiy // Ekonomika i prohnozuvannia. – 2006. – No. 1. – P. 7–26. 3. Baranovskiy O. I. Finansova bezpeka v Ukraini (metodolohiia otsinky ta mekhanizmy zabezpechennia) [Financial Security in Ukraine (Assessment Methodology and Support Tools)] / O. I. Baranovskiy. – K.: KNTEU, 2004. – 760 p. 4. Blank I. A. Upravlenie finansovoy bezopasnostyu predpriyatiya [The Management of Enterprise Financial Security] / I. A. Blank. – K.: Elga, Nika-Tsentr, 2005. – 784 p. 5. Kyrychenko O. A. Ekonomichna bezpeka bankivskoi systemy Ukrainy v umovakh globalnoi finansovoi kryzy / O. A. Kyrychenko, S. V. Melesyk // Aktualni problemy ekonomiky. – 2009. – No. 8. – P. 223–232. 6. Medvedieva I. B. Diagnostuvannia yak skladova protsesu upravlinnia finansovoi bezpekoju pidpriemstva / I. B. Medvedieva, M. Yu. Pogossova // Ekonomika rozvytku. – 2008. – No. 1 (45). – P. 75–78. 7. Yepifanov A. O. Finansova bezpeka pidpriemstv i bankivskikh ustanov [Financial Security of Companies and Banking Institutions]: monohrafiia / A. O. Yepifanov, O. L. Plastun, V. S. Dombrovskiy. – Sumy: DVNZ "UABS NBU", 2009. – 295 p. 8. Yermoshenko M. M. Finansova bezpeka derzhavy: natsionalni interesy, realni zahrozy, stratehiia zabezpechennia [State Financial Security: National Interests, Real Threats, the Strategy of Providing]: monohrafiia / M. M. Yermoshenko. – K.: KNTEU, 2001. – 308 p. 9. Frenks L. Teoriya signalov [The Theory of Signals] / L. Frenks; per. s angl.; pod red. D. E. Vakmana. – M.: Sovetskoe radio, 1974. – 344 p. 10. Iberla K. Faktorny analiz [Factor Analysis] / K. Iberla; per. s nem. V. M. Ivanovoy. – M.: Statistika, 1980. – 398 p. 11. Kim Dzh.-O. Faktorny, diskriminantny i klasternyy analiz [Factor, Discriminant and Cluster Analysis] / Dzh.-O. Kim. – M.: Finansy i statistika, 1989. – 216 p.

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