

Kuznetsova L. V.

*Doctor of Economics, Professor,
Professor of the Department of Banking,
Odessa National University of Economics, Ukraine;
e-mail: lvkuznecova@ukr.net; ORCID ID: 0000-0002-5538-1029*

Kuznietsov A. N.

*Ph. D. in Economics, Senior Lecturer of the Department of Management,
Odessa National University of Economics, Ukraine;
e-mail: akuznietsov@gmail.com; ORCID ID: 0000-0003-401-390*

Derkach Ju.B.

*Ph. D. in Economics, Senior Lecturer of the Department of Banking,
Odessa National University of Economics, Ukraine;
e-mail: djul@ukr.net; ORCID ID: 0000-0002-5195-18211*

MONITORING OF EXCHANGE RISK OF BANKS BASED ON THE CONSOLIDATED BALANCE SHEET INDEX

Abstract. The paper deals with basic approaches to monitoring of the currency risk. The purpose of the paper is to substantiate the theoretical and methodological foundations of the complex application of risk assessment methods to prevent the adoption of its excessive level, as well as instruments for monitoring the profitability of operations in the foreign exchange market, based on the calculation of the consolidated balanced index.

It was determined that in the context of the volatility of the national currency the exposure of banks to currency risk increases significantly, it means that is, the magnitude of the consequences of its manifestation for most financial intermediaries increases. The authors of the paper consider the system of currency risk management as a set of goals, principles, functions, methods, tools and specific techniques of purposeful, continuous influence of the management system on the managed one for timely estimation and monitoring of currency risk in order to minimize it and achieve specified parameters of currency yields.

In according to current management standards, implemented by leading financial institutions and international regulators, currency risk monitoring mechanisms must not only timely and effectively identify deviations from key risk targets, but also provide for the ability to identify unforeseen situations.

It was proved that that the monitoring tools, policies and procedures have to meet a number of criteria, which are taken into account at the achievement of the main goals of the bank and increase its resistance to external shocks on the foreign exchange market. Taking into account the fact that the value of currency risk by the ES metric is included in the calculation of the consolidated balanced index, the change in the regulatory regimes is made on the basis of the projected deviations of the CEI from the target corridor, recorded at the initial stage in determining the level of risk exposure of the bank. Thus, the proposed balanced approach to forecasting involves the use, on the one hand, of statistically reliable quantitative analysis tools and, on the other hand, qualitative environmental change signals that aggregate the benefits of structural methods, while providing the flexibility and timeliness of managerial decision-making.

The specification of currency risk management regimes should be tailored to the specific features of a particular bank and have a combinatorial nature that involves the integration of individual impulses by analysis tools, forecasting, time horizons and levels of management, as well as in terms of components of the CEI consolidated balance sheet and risk level of activity in the foreign exchange market. This approach allows for the flexibility of management systems and their adaptability to the external conditions of the bank, and the use of quality monitoring signals

increases the speed of decision-making and elimination of deficiencies that can be inherent in econometric assessment tools.

Keywords: currency risk, banks, monitoring, balanced index, national currency, volatility.

JEL Classification G21, G32

Formulas: 0; fig.: 3; tabl: 1; bibl.: 16.

Кузнєцова Л. В.

*доктор економічних наук, професор, професор кафедри банківської справи,
Одеський національний економічний університет, Україна;
e-mail: lvkuznecova@ukr.net; ORCID ID: 0000-0002-5538-1029*

Кузнєцов А. М.

*кандидат економічних наук, старший викладач кафедри менеджменту,
Одеський національний економічний університет, Україна;
e-mail: akuznietsov@gmail.com; ORCID ID: 0000-0003-0401-3901*

Деркач Ю. Б.

*кандидат економічних наук, старший викладач кафедри банківської справи,
Одеський національний економічний університет, Україна;
e-mail: djul@ukr.net; ORCID ID: 0000-0002-5195-1821*

МОНІТОРИНГ ВАЛЮТНИХ РИЗИКІВ БАНКІВ НА ОСНОВІ ЗВЕДЕНОГО ЗБАЛАНСОВАНОГО ІНДЕКСУ

Анотація. Розглянуто основні підходи до моніторингу валютного ризику банків. Метою роботи є обґрунтування теоретико-методичних засад комплексного застосування методів оцінки ризику для недопущення прийняття його надмірного рівня, а також інструментів моніторингу прибутковості операцій на валютному ринку, на основі розрахунку зведеного збалансованого індексу.

Визначено, що в умовах волатильності курсу національної грошової одиниці значно посилюється експозиція банків до валютного ризику, тобто зростають масштаби наслідків його прояву для більшості фінансових посередників. Розглянуто систему управління валютним ризиком як сукупність цілей, принципів, функцій, методів, інструментів і специфічних прийомів цілеспрямованого, безперервного впливу керуючої системи на керовану для своєчасної оцінки та моніторингу валютного ризику з метою його мінімізації та досягнення заданих параметрів дохідності від валютних операцій.

Відповідно до сучасних управлінських стандартів, що впроваджуються провідними фінансовими інститутами і міжнародними регуляторами, механізми моніторингу валютного ризику повинні не лише своєчасно та ефективно визначати відхилення ключових показників ризику від планових значень, а й передбачати можливість ідентифікувати непередбачувані ситуації.

Доведено, що інструменти, політики та процедури моніторингу повинні відповідати низці критеріїв, урахування яких сприяє досягненню основних цілей діяльності банку та призводить до зростання рівня його стійкості до зовнішніх шоків на валютному ринку. Ураховуючи той факт, що величина валютного ризику за ES-метрикою включається при розрахунку зведеного збалансованого індексу, зміна режимів регулювання здійснюється, виходячи з прогнозованих відхилень показника CEI від тергетованого коридору, зафіксованого на початковому етапі при визначенні рівня схильності банку до ризику. Запропонований збалансований підхід до прогнозування передбачає використання, з одного боку, статистично надійних інструментів кількісного аналізу, а з другого — якісних сигналів зміни стану середовища, які агрегують переваги структурних методів, забезпечуючи при цьому гнучкість та оперативність ухвалення управлінських рішень.

Специфікація режимів регулювання валютного ризику повинна здійснюватися з урахуванням особливостей функціонування певного банку і мати комбінаторний характер,

що передбачає інтеграцію окремих імпульсів за інструментами аналізу, прогнозування, часовими горизонтами та рівнями управління, а також у розрізі складових зведеного збалансованого індексу CEI за рівнем ризику та прибутковості діяльності на валютному ринку. Такий підхід дозволяє забезпечити гнучкість управлінських систем та їхню адаптивність до зовнішніх умов функціонування банку, а застосування якісних сигналів моніторингу сприяє зростанню оперативності ухвалення рішень та усуненню недоліків, які можуть бути притаманні економетричним інструментам оцінки.

Ключові слова: валютний ризик, банки, моніторинг, збалансований індекс, національна валюта, волатильність.

Формул: 0; рис. 3; табл.: 1; бібл.: 16.

Кузнецова Л. В.

доктор экономических наук, профессор, профессор кафедры банковского дела, Одесский национальный экономический университет, Украина; e-mail: lvkuznecova@ukr.net; ORCID ID: 0000-0002-5538-1029

Кузнецов А. Н.

кандидат экономических наук, старший преподаватель кафедры менеджмента, Одесский национальный экономический университет, Украина; e-mail: akuznietsov@gmail.com; ORCID ID: 0000-0003-0401-3901

Деркач Ю.Б.

кандидат экономических наук, старший преподаватель кафедры банковского дела, Одесский национальный экономический университет, Украина; e-mail: djul@ukr.net; ORCID ID: 0000-0002-5195-1821

МОНИТОРИНГ ВАЛЮТНИХ РИСКОВ БАНКОВ НА ОСНОВЕ СВОДНОГО СБАЛАНСИРОВАННОГО ИНДЕКСА

Аннотация. Рассмотрены основные подходы к мониторингу валютного риска банков. Целью работы является обоснование теоретико-методических основ комплексного применения методов оценки риска для недопущения принятия его чрезмерного уровня, а также инструментов мониторинга доходности операций на валютном рынке, на основе расчета сводного сбалансированного индекса.

Доказано, что инструменты, политики и процедуры мониторинга должны отвечать ряду критериев, учет которых способствует достижению основных целей деятельности банка и приводит к росту уровня его устойчивости к внешним шокам на валютном рынке. Получен вывод о том, что спецификация режимов регулирования валютного риска должна осуществляться с учетом особенностей функционирования конкретного банка и иметь комбинаторный характер, что предполагает интеграцию отдельных импульсов по инструментам анализа, прогнозирования, временным горизонтам и уровням управления, а также в разрезе составляющих сводного сбалансированного индекса CEI по уровню риска и доходности деятельности на валютном рынке.

Ключевые слова: валютный риск, банки, мониторинг, сбалансированный индекс, национальная валюта, волатильность.

Формул: 0; рис. 3; табл.: 1; библи.: 16.

Introduction. The intensification of macroeconomic imbalances and shocks in the financial sector is putting constant pressure on the activities of second tier banks, which stimulates the search for ways to improve internal management systems in the context of developing adaptive measures to ensure stable efficient operation. In the context of the volatility of national currency, the exposure of banks to currency risk increases significantly, the magnitude of the consequences of its manifestation for most financial intermediaries increases.

The long-term aspect of the banking operation involves permanent improvement of its management systems, and the promulgation of new recommendations by international regulators on the quality and volume of capital that is formed to cover the negative manifestation of financial risks (including currency), actualize the need for this process. Traditional management theories are based on the hypothesis of the need to minimize the level of risk, but in this case there is a violation of the basic conditions and principles of a systematic approach to currency risk management, which is based on the condition of balancing management impulses to achieve the target level of efficiency, so today the question arises reconciliation of the planned amount of profit from operations in the foreign exchange market and the level of risk that the bank accepts to generate new value. In line with the above, the urgent issue is to develop an effective mechanism for monitoring the currency risks of banks.

Analysis and statement of the research problem. Among the foreign scientists who have been studying the problem are there papers of Angelache C., Angel M., Grigorescu D. [1], Blum P., Dacorogna M., Embrechts P., Neghaiwi A. [2], Papaioannou M. [3], Munch J., Skrzypczyński P., [4], Bishop T. [5], Beasley M., Branson B., Hancock H. [6]. These scientific papers emphasize the importance of currency risk assessment and monitoring, models of its quantitative determination are considered, the need to observe national norms and rules for minimizing currency risk established for banks and economic agents.

The problems of currency risk management are devoted to the scientific works of Ukrainian scientists. The scientists Kudritska Zh.V. [7, p. 440] and Verbybka I.I. [8, p. 377] consider financial instruments for hedging currency risk. Shatkovska-Shmorgay V.B. substantiates the need to apply stress testing in addition to VaR models and proposes an algorithm and initial conditions for stress testing of a bank's currency position [9, p. 271]. Sopko V., proposed a technology for controlling the currency risk of the bank, which will help increase the efficiency of Ukrainian banks in the foreign exchange market [10, p. 108].

The critical analysis of these publications proved that the new algorithms for forecasting, assessing and regulating the level of banks' currency risk management efficiency need to be developed. Summarizing the above, the authors believe that the currency risk management system should be considered as a set of goals, principles, functions, methods, tools and specific techniques of a purposeful, continuous impact of the management system on the managed to timely assess and monitor currency risk in order to achieve its currency risk parameters of profitability from currency transactions.

Therefore, the purpose of the paper is to substantiate the theoretical and methodological foundations of the comprehensive application of risk assessment methods to prevent the adoption of its excessive level, as well as instruments for monitoring the profitability of operations in the foreign exchange market, based on the calculation of the consolidated balanced index.

Results of a research study. According to current management standards implemented by leading financial institutions and international regulators, currency risk monitoring mechanisms should not only timely and effectively identify deviations from key targets, but also provide for the ability to identify unanticipated scenarios that are reviewed regularly, ensuring that they cover events that may have the greatest impact on the banking by agreeing activities, communication channels and more.

In turn, the monitoring tools, policies and procedures must meet a number of criteria, which take into account the achievement of the main goals of the bank and increase its resistance to external shocks in the foreign exchange market:

- currency and related risks are identified and adequately assessed, and the monitoring system ensures the consistency and accuracy of such assessments;
- currency and related risks are maintained according to the bank's tolerance levels set by management;
- decisions on taking currency and related risks are compatible with the current and strategic tasks of the bank and arise in the process of achieving them;

- decisions on risk taking are transparent and understandable both at the level of senior management of the bank and for responsible persons of the operational level, who are directly or indirectly involved in the management of currency and related risks or activities of which may lead to change of its level;
- expected return offsets the risks taken, that is, internal monitoring systems protect the value of assets and prevent the loss of capital or income of the bank;
- allocation of capital corresponds to the existing and prospective amount of currency and related risks, and their assessment is made on the basis of conservative metrics and instruments;
- early diagnosis of crisis states is ensured according to the CEI as a whole and in the context of its individual components, which further initiates the detailed analysis in order to identify the causes of deviations;
- the system of promotion of the bank is consistent with the accepted levels of risk tolerance, and its development should take place in the conditions of minimizing the conflict of interests of management subjects;
- currency risk monitoring and control measures are flexible and operational, and their integration with planning tools allows to define management standards that reflect the current results of the process of achieving the set goals;
- currency risk monitoring takes into account the set of interrelationships with related risks and covers all activities of the bank that affect its risk profile, which involves making decisions and taking measures to avoid, transfer, insure, hedge, set limits or adopt risk limits;
- control over the level of currency risk is dynamic and preventive, while being consistent with the requirements of the regulator and the best international management standards.

The formation of the set of preventive measures to ensure the efficiency of regulation of the bank's activity in the foreign exchange market actualizes the issue of calculation of the consolidated balanced index for the future, which forms the basis for the introduction of a scientifically sound system of review of limits of key indicators of currency risk (KRI). To achieve this goal, it was proposed to carry out exchange rate forecasts, which are subsequently used to determine the forward-looking risk profile based on the simulation of costing in different scenarios.

Taking into account the fact that the value of currency risk by the ES metric is included in the calculation of the consolidated balanced index, the change in the regulatory regimes is made on the basis of the projected deviations of the CEI from the target corridor, recorded at the initial stage in determining the level of risk exposure of the bank. Thus, the proposed balanced approach to forecasting involves the use, on the one hand, of statistically reliable quantitative analysis tools and, on the other, qualitative environmental change signals that aggregate the benefits of structural methods, while providing the flexibility and timeliness of managerial decision making (*Fig. 1*).

The choice of the exchange rate prediction method depends on the exchange rate regime, the forecast horizon (as a rule, there is a distinction between the use of technical methods in the short term and fundamental ones in the long term), the object of forecasting (real, nominal exchange rate or its deviation).

The most difficult in practice is to build forecasts in the medium term, due to the lack of data series to account for the impact of fundamental macrofactors and the inadequacy of the estimates obtained when extrapolating the results of technical modeling, so under these conditions analytical conclusions are formed on the basis of composite forecasting by constructing a consensus weighted average according to multiple estimates).

In terms of ensuring the efficiency of regulation of the bank's activity in the foreign exchange market, technical methods of forecasting deserve special attention, since in this case the time horizon is usually limited to a period of 1 day to 1 week.

The main directions of quantitative prediction of exchange rates are structural and non-structural and combined time series models. Structured exchange rate determination models are

based on macroeconomic identities and interrelations, and identify the dependence on fundamental factors and their intensity over a given time horizon.

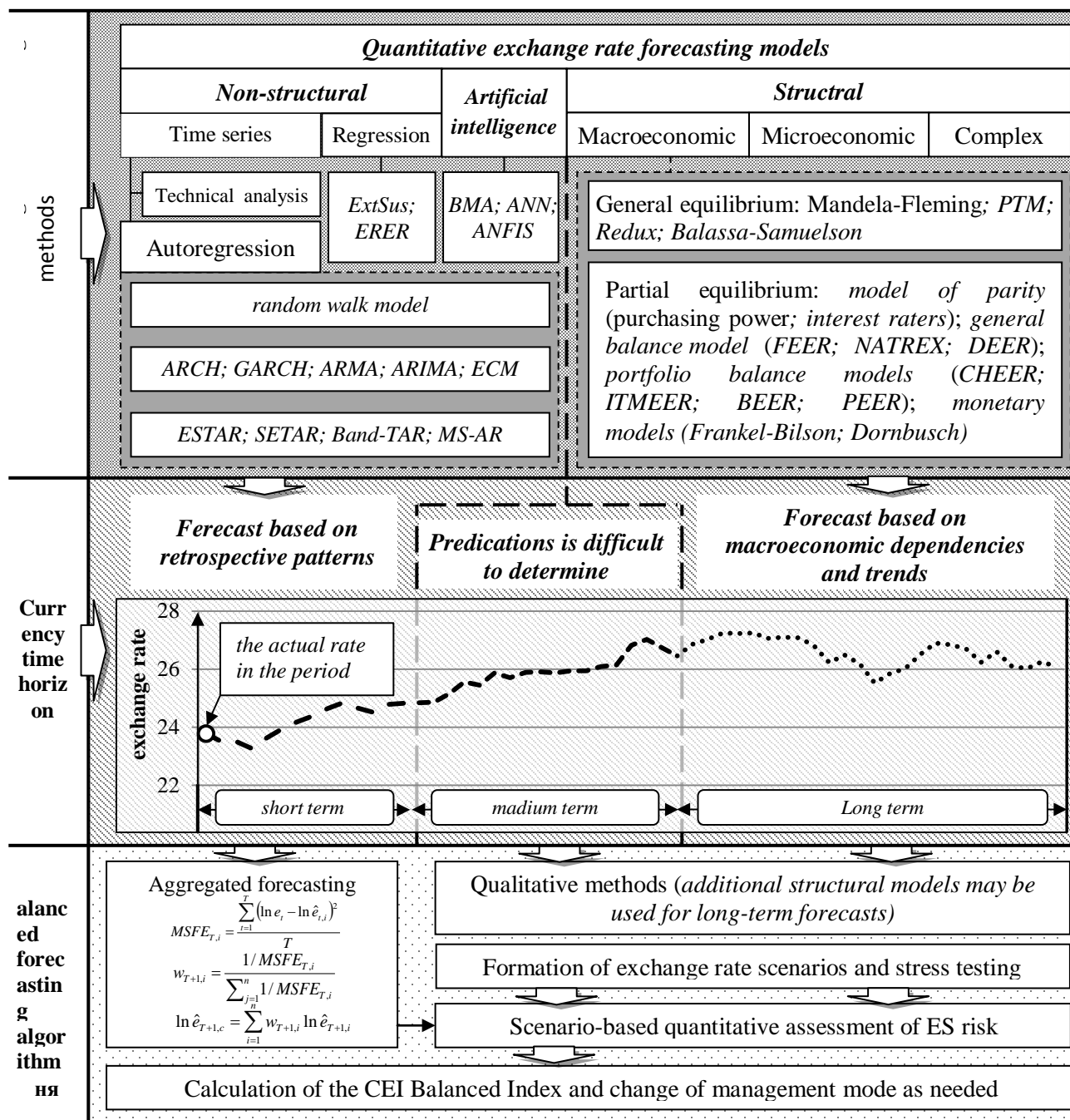


Fig. 1. A balanced approach to forecasting the exchange rate on different time horizons
Source: development of authors.

Within the set of non-structural models, time series analysis and regression models are key. In the case of random walk models [4], the dynamics of the forecast indicator is considered as a random process, the value of the corresponding currency index in future periods is equal to its value in retrospect, adjusted for the magnitude of random error.

The list of main characteristics of structural models of exchange rate prediction include: concentration on identification of equilibrium exchange rate in the absence of currency interventions [3]; focus on determining the medium or long-term equilibrium exchange rate; the existence of assumptions about international parity in terms of interest rate parity, Fisher effect, purchasing power parity, forward exchange rate as an indicator that determines the future spot rate [5].

Structural approaches to exchange rate forecasting are based on the use of macroeconomic, microeconomic and combined models. When applying the first group of instruments, macroeconomic variables (money supply, interest rates, etc.) are the main determinants of the exchange rate, but their undeniable disadvantage is the inability to account for the dynamics of exchange rates in the short term.

Within the microeconomic approach, it is assumed that exchange rate movements are determined by the process and mechanism of foreign exchange trading. In addition, fundamental macroeconomic projections are based on the assumption that all the information required to determine the exchange rates for the future is publicly available and can be aggregated from public sources, while microeconomic forecasting assumes that economic agents have different levels access and have incomplete information about market conditions, that is, the input data are not publicly available, which is a very relevant assumption when modeling in volatile markets for which the dynamics of currencies tion rate is determined not only economic but also political factors.

There are also mixed models that use both macroeconomic and microeconomic (interest rate differential, change in order flow) variables, the most widespread of which is the Evans order flow model, which explains much of the fluctuations in nominal exchange rates up to four months, due to the mechanism of expectations formation: macroeconomic variables can correctly describe the model, but its empirical estimation does not allow to determine statistically significant parameters of expected values of future funds. mental performance, that is, in such cases, the flow of orders is the best indicator of changes in expectations. On the other hand.

The method described is most suitable for use in the activity of real-sector enterprises, since in this case the nature of foreign exchange flows is related to the production of products, so its possibilities for use by banks are limited.

The disadvantages of structural models are the poorer quality of estimates compared to the random walk model, as well as the low significance of out-of-sample verification results, due to the instability of the relationship between fundamental factors and the exchange rate, and the difficulty of testing them. The key areas for improving this type of model are the use of panel data, the optimal set of fundamental factors, the statistical and economic criteria for model evaluation, and the monitoring of their dynamics.

The largest number of macroeconomic equilibrium models implies the achievement of a balance in only one or more markets, but not in the economy as a whole, so within the partial approaches there are models of parity, intra-external, portfolio balance, monetary models.

In internal-external balance model, equilibrium exchange rate provides internal (part-time and low inflation) and external (stable balance of payments in the medium-term, minimum criterion - stability of current account) in several economic simultaneously. countries, but such approaches are generally applied by international regulators, due to their range of functions, and are not acceptable for the purpose of managing a bank's currency risk in the short term. perspective.

A fairly common class of models is monetary models, in which the exchange rate is regarded as the relative price of two currencies, determined by relative supply and demand, imbalances between which are adjusted by changes in the exchange rate, which depend on both current and expected values of fundamental variables (money and real money offers). The basic assumption of the model is the mobility of capital, the complete substitutability of national and foreign assets, ie the condition of uncovered interest rate parity without risk premium. Otherwise, the portfolio balance model [11] is applied, which takes into account the incomplete substitutability of all national and foreign financial assets, that is, this approach is not limited to the money market.

Time series analysis in the context of exchange rate forecasting is used in the context of constructing autoregressive and technical models, the first of which involves the separation of the function of random values, which cannot be the object of forecasting and is formed as a result of shock fluctuations, and the optimal horizon of analysis is limited to three months.

The vector of further development of this group of methods is determined by the need to identify additional factors and periods for which exchange rates are estimated. Thus, the ESTAR model [5] reveals that the approximation of the exchange rate to the equilibrium level is directly proportional to the value of a random error, resulting in a decrease in the predictability of its dynamics.

Artificial intelligence models are widely used to predict exchange rates based on the detection and estimation of nonlinear dependencies, the most common being neural network models, fuzzy logic, and combinatorial models, such as ANFIS. Their advantages are the ability to take into account the dynamics of non-stationary time series and any nonlinear data configurations, as well as the absence of specification conditions at the previous stage of any regression dependencies or fundamental relationships between input variables, which reduces the model's dependence on the subject's qualification. At the same time, the possibilities of introducing these econometric tools into the practical activity of banks are limited by the significant increase in the costs of software and hardware development.

Thus, the review of the exchange rate prediction models, which have become widespread in the world, has formed the basis for the choice of a balanced quantitative method as a base for calculating the CEI in the short term. Its peculiarity is the composite incorporation of the results obtained by the most reliable non-structural methods by assigning weight attributes to each of them depending on the time horizon, since in practice there is variation in the adequacy of the individual econometric models on different series of data.

The presence of time lags in the publication of official information on the dynamics of major macroeconomic indices in Ukraine creates significant obstacles to reliable analysis using structural methods.

However, signals about the state of the foreign exchange market and its prospects should be taken into account using qualitative forecasting methods, which allows to quickly aggregate information on the activity of market entities and the dynamics of the environment, which is further used for the development of prospective scenarios, quantitative risk assessment by ES-metric on the basis of which it provides an opportunity to change the regulatory regimes and to review the level of the bank's risk appetite with the resultant CEI.

Qualitative exchange rate forecasting models are allocated in the following directions: making contingent assumptions about exchange rate dynamics over the forecast period relative to the cut-off level (the date preceding the forecasting period and defining the period for the exchange rate assessment); expert assessments based on market expectations through forward rates; Consensus forecasts (composite forecasts), which provide for the aggregation of individual forecasts.

In practice, the quality of consensus forecasts is determined by the characteristics of individual forecasts (heterogeneity, stationarity, etc.), and aggregation procedures allow to smooth out random errors or inaccuracies of estimates [13].

By its nature, the proposed balanced exchange rate forecasting method is similar to a composite forecast, but the practical implementation of a scientific and methodological approach to banks' activities involves aggregation of data based on intra-bank forecasting.

In Figure 1 above, three forecast horizons were identified, each using a different set of analysis tools. In addition, given the need to build effective communication channels between the Bank's currency risk management entities, their impact on the separate objects should be divided into separate levels (*Table*), corresponding to certain time horizons and ensuring the distribution of spheres of influence according to the existing subordination connections.

Table

Characteristics of the bank's currency risk management levels

Level	Features of management
Institutional	Introduced by senior management and bank owners and envisages long-term strategic control; unbiased evaluation of the performance of the bank as a whole and of its divisions, systems; determining the bank's appetite for currency risk and approving systems to control its level.
General banking executive	Provides control of operations; specification of risk appetite based on limits and limitations; compliance of regulatory reports with best practices and regulatory requirements; identification of deficiencies and violations of established limits of risk indicators (including KRI); development of a complex of measures for elimination of violations.
Current executive	Operational control and self-control of compliance with the requirements of internal documents, regulations, procedures on currency risk management. The main task of management at this level is to respond promptly to the set of factors that may lead to imbalances in the risk-return link, in accordance with the approved limits.

Source: systematized by the authors.

The construction of a scheme of interaction of the subjects of currency risk monitoring on the basis of isolated levels provides specification of their subordination and functional relations by means of structural models, whose complex generalization in terms of management levels, time horizons and methods is shown in *Fig. 2*.

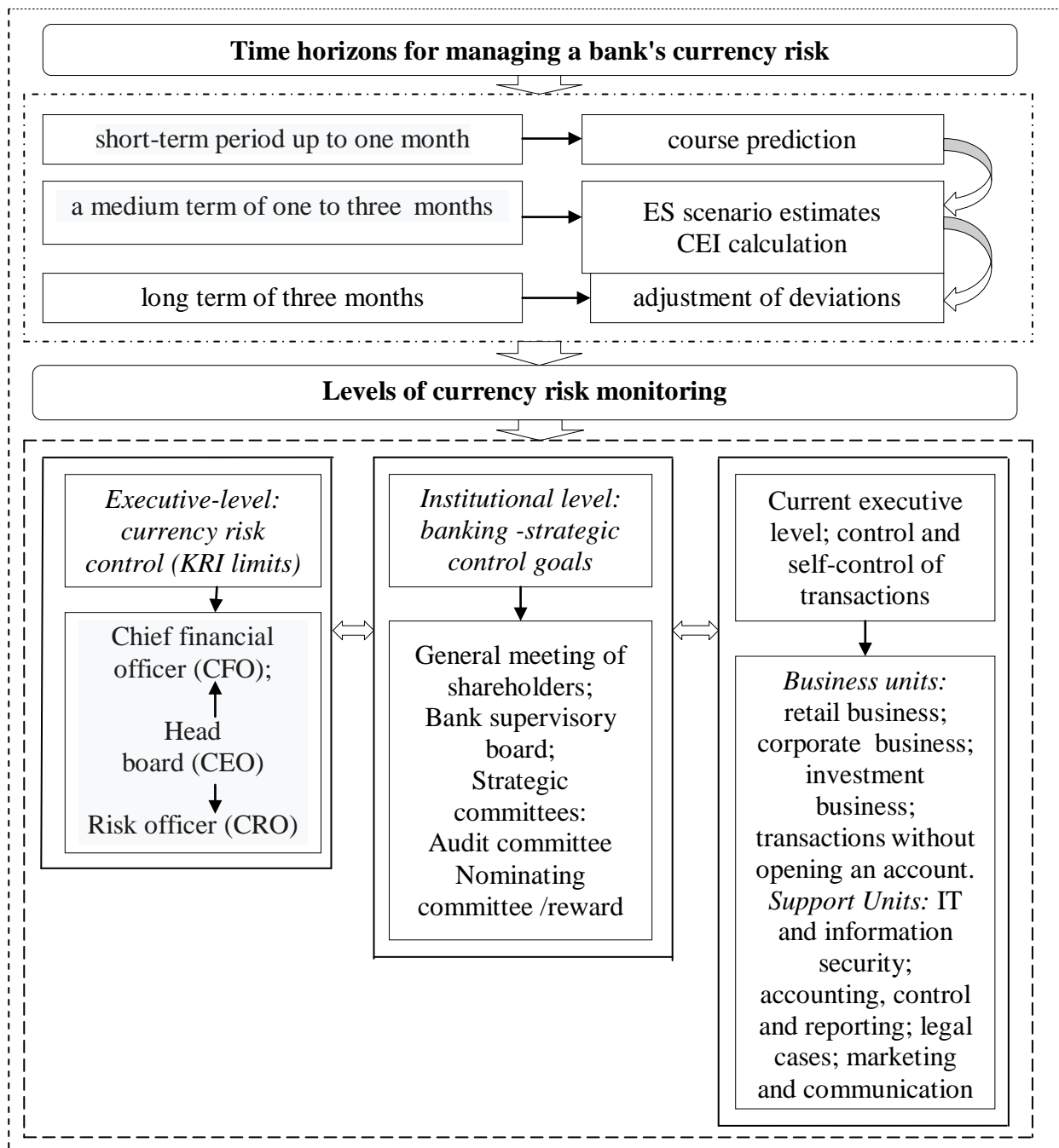


Fig. 2. Infrastructure of interaction of monitoring entities in the bank's currency risk management system

Source: systematized by authors according to the materials [6, 14].

Within the institutional level, two major management models have emerged in the world practice, the first of which (unitary board) provides for the functioning of a single board of directors, consisting of both executive and non-executive representatives, resulting in rapid decision-making, since the meeting are held jointly. At the same time, the implementation of such a structure in the practical activity of domestic banks is impossible due to regulatory constraints, so they operate on a two-tier board model.

There is no consensus in modern scientific publications on the optimality of a particular model, as there are examples of successful functioning of both councils in the world, and the choice of structure is usually due to national business traditions and the regulatory field. Thus, a clear advantage of the two-tier board of directors is the clear division of responsibilities and powers of the individual boards, which contributes to the fulfillment of the main function of the corporate governance system in the bank regarding the division of spheres of execution (implementation of objectives) and strategic control.

As it shown on *Fig. 2*, international financial management practices provide for the mandatory establishment of strategic bank committees serving as a liaison between the supervisory board and the board, however, the regulatory bodies in Ukraine pay greater attention to the formation of executive committees (Asset Committee and liabilities, credit committee).

At the same time, it was proposed to form separate risk, audit and remuneration / appointment committees in order to achieve the strategic goals of the Bank's activities in terms of reconciling the level of profitability and risk of currency market activity at the institutional management level.

The operation of the former in the context of currency risk management involves the development and approval of sound methods of determining the risk appetite, and the audit committee should be responsible for the adequacy of the procedures, regulations and policies of the bank in this area.

The remuneration / appointment committee activities are not directly related to currency risk management, but the financial crisis of 2007—2009 identified a close link between senior management and risk management systems adopted by financial institutions [15]. the said committee is to develop reasonable remuneration mechanisms that would not lead to the adoption of undue risk by responsible persons.

At the bank-wide executive level, the Bank's currency risk management is managed by boards (including the risk director and CFO), the relevant executive committees (the Assets and Liabilities Committee, credit) and the risk management unit. It should be noted that this level of management can be expanded depending on the type and volume of transactions, the level of branching of the bank's territorial network, etc.

Functions at the current managerial level are provided by the Bank's treasury, as well as business units and business support departments. Of particular importance is the issue of establishing subordination links between the bank's treasury and top-level entities, the difference between which is a divergent model is that, when using a market-oriented approach, the flow of treasury reports flows to asset and liability management and reconciliation. with the risk management unit.

When using the integration model, the area of responsibility from the viewpoint of controlling the treasury's activities belongs more to the CFO, therefore, considering the need to reconcile the opposite conditions of profitability and risk of activity in the foreign exchange market, it is advisable to introduce the second model.

The Bank's currency risk management model is presented in *Fig. 3*.

The proposed scheme of interaction of the Bank's currency risk monitoring entities on the basis of the consolidated balanced index provides for coordinated interaction of the relevant authorities at all levels and their implementation of both standard functions and the use of regulatory influences to correct the detected deviations.

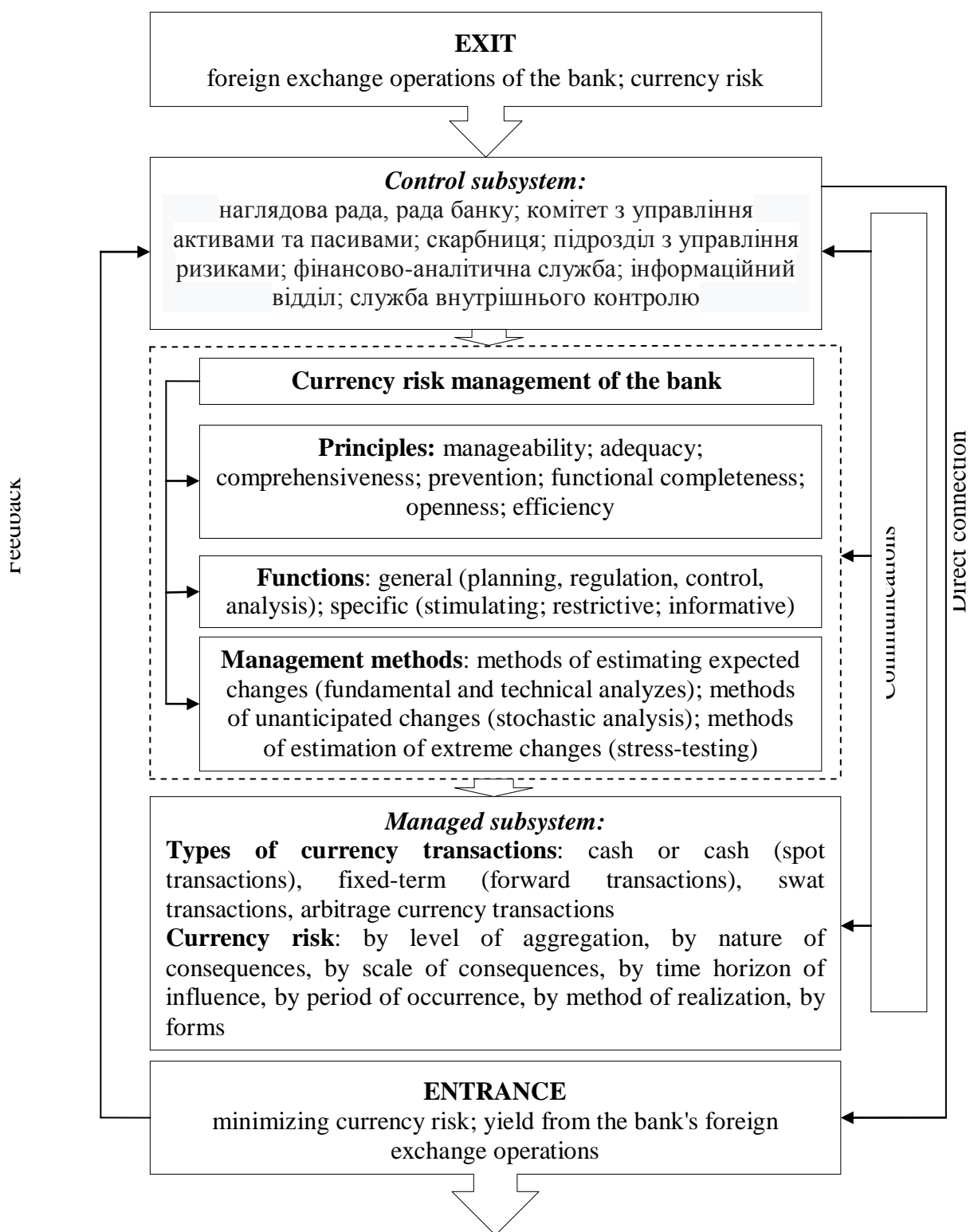


Fig. 3. Bank currency risk management model

Source: compiled by authors using materials [16, p. 154—156].

Conclusions. Further specification of currency risk management regimes should be tailored to the specific features of a particular bank and have a combinatorial nature that involves the integration of individual impulses by analysis tools, forecasting, time horizons and management levels, as well as in the context of the components of the CEI consolidated balance sheet and CEI activities in the foreign exchange market. This approach allows for the flexibility of management systems and their adaptability to the external conditions of the bank, and the use of quality monitoring signals increases the speed of decision-making and elimination of deficiencies that can be inherent in econometric assessment tools.

Література

1. Angelache C. Currency risk management model / C. Angelache, M. Angel, D. Grigorescu // *Theoretical and applied economics*. — 2019. — Vol. 3. — Is. 620. — P. 21—34.
2. Blum P. Using DFA for modelling the impact of foreign exchange risks on reinsurance decisions [Electronic resource] / P. Blum, M. Dacorogna, P. Embrechts, A. Neghaiwi // *Casualty actuarial society 2001. Reinsurance call for papers — using dynamic financial analysis to optimize ceded reinsurance programs and retained portfolios*. — Available at : <https://www.casact.org/pubs/forum/01sforum/01sf049.pdf>.
3. Papaioannou M. Exchange rate risk measurement and management: issues and approaches for firms / M. Papaioannou // *IMF Working Paper. Monetary and Capital Markets*. — 2006. — № 255. — 22 p.
4. Mućk J. Can we beat the random walk in forecasting CEE exchange rates? / J. Mućk, P. Skrzypczyński // *National Bank of Poland. Economic institute // Working paper*. — 2012. — Vol. 127. — 19 p.
5. Bishop T. Money, interest rates and exchange rates [Electronic resource] / T. Bishop // *Pearson adison-Wesley*. — 2006. — Available at : http://eml.berkeley.edu/~obstfeld/182_sp06/c14.pdf.
6. Beasley M. Developing key risk indicators to strengthen enterprise risk management [Electronic resource] / M. Beasley, V. Branson, H. Hancock ; Committee of Sponsoring Organizations of the Treadway Commission. — 2010. — Available at : <https://www.coso.org/Documents/COSO-KRI-Paper-Full-FINAL-for-Web-Posting-Dec110-000.pdf>.
7. Кудрицька Ж. В. Хеджування валютного ризику / Ж. В. Кудрицька, А. Ю. Гнилицька // *Економіка і суспільство*. — 2017. — № 11. — С. 439—442.
8. Вербицька І. І. Хеджування валютних ризиків / І. І. Вербицька // *Сталий розвиток економіки*. — 2013. — Вип. 4. — С. 374—380.
9. Шатковська-Шморгай В. Б. Стрес-тестування в банках: уроки кризи / В. Б. Шатковська-Шморгай. — *Науковий вісник НЛТУ України*. — 2010. — Вип. 20.5. — С. 269—276.
10. Сопко В. Механізм контролю валютного ризику банку / В. Сопко, Т. Ружанська // *Вісник Київського національного торгово-економічного університету*. — 2015. — № 1. — С. 103—120.
11. John F. Exchange rate theory and practice / F. John, O. Bilson, R. Marston // *University of Chicago Press*. — 1984. — 544 p.
12. Buncic D. Understanding forecast failure of ESTAR models of real exchange rates / D. Buncic // *EERI Research Paper Series*. — 2009. — Vol. 18. — 35 p.
13. Миркин Я. М. 1971—2025: курсы валют, мировые цены на сырье, курсы акций / Я. М. Миркин. — Москва : Магистр, 2015. — 592 с.
14. Hyde P. A comprehensive risk appetite framework for banks [Electronic resource] / P. Hyde, T. Liebert, P. Wackerbeck // *Strategyand*. — 2009. — September 30. — Available at : http://www.strategyand.pwc.com/media/file/Risk_Appetite_Framework.pdf.
15. Raghuram G. R. Has financial development made the world riskier? [Electronic resource] / G. R. Raghuram ; Jackson Hole. Federal Reserve Bank of Kansas City. — Kansas City, 2005. — Available at : <http://www.nber.org/papers/w11728>.
16. Система ризик-менеджменту в банках: теоретичні та методологічні аспекти : монографія / за ред. В. В. Коваленко. — Одеса : ONEU, 2017. — 304 с.

Стаття рекомендована до друку 25.02.2020

© Кузнєцова Л. В., Кузнєцов А. М., Деркач Ю. Б.

References

1. Angelache, C., Angel, M. & Grigorescu, D. (2019). Currency risk management model. *Theoretical and applied economics*, Vol. 3 (620), 21—34.
2. Blum, P., Dacorogna, M., Embrechts, P., & Neghaiwi, A. (2001). Using DFA for modelling the impact of foreign exchange risks on reinsurance decisions. *Casualty actuarial society 2001. Reinsurance call for papers — using dynamic financial analysis to optimize ceded reinsurance programs and retained portfolios*. Retrieved from <https://www.casact.org/pubs/forum/01sforum/01sf049.pdf>.
3. Papaioannou, M. (2006). Exchange rate risk measurement and management: issues and approaches for firms. *IMF Working Paper. Monetary and Capital Markets*, 255.
4. Mućk, J., & Skrzypczyński, P. (2012). Can we beat the random walk in forecasting CEE exchange rates? *National Bank of Poland, Economic institute. Working paper*, 127, 19.
5. Bishop, T. (2006). Money, interest rates, and exchange rates. *Pearson Adison-Wesley*. Retrieved from http://eml.berkeley.edu/~obstfeld/182_sp06/c14.pdf.
6. Beasley, M., Branson, B., & Hancock, H. (2010). Developing key risk indicators to strengthen enterprise risk management. *Committee of Sponsoring Organizations of the Treadway Commission*. Retrieved from: <https://www.coso.org/Documents/COSO-KRI-Paper-Full-FINAL-for-Web-Posting-Dec110-000.pdf>.
7. Kudrytska, Zh. V., & Gnylytska, A. Yu. (2017). Khedzhuvannya valyutnoho ryzyku [Foreign currency risk]. *Ekonomika i suspilstvo — Economy and Society*, 11, 439—442 [in Ukrainian].
8. Verbitska, I. I. (2013). Khedzhuvannya valiutnykh ryzykiv [Currency risk hedging]. *Stalyi rozvytok ekonomiky — Sustainable economic development*, 4, 374—380 [in Ukrainian].
9. Shatkovska-Shmorhai, V. B. (2010). Stres-testuvannya v bankakh: uroky kryzy [Stress testing in banks: lessons from the crisis]. *Naukovyy visnyk NLTU Ukrainy — Scientific Bulletin of NLTU of Ukraine*, 20.5, 269—276 [in Ukrainian].
10. Sopko, V., & Ruzhanska, T., (2015). Mekhanizm kontroliu valiutnoho ryzyku banku [The mechanism of control of currency risk of the bank]. *Visnyk Kyivskoho natsionalnoho torhovo-ekonomichnoho universytetu — Bulletin of the Kiev National University of Trade and Economics*, 1, 103—120 [in Ukrainian].
11. John, F., Bilson, O., & Marston, R. (1984). *Exchange rate theory and practice*. University of Chicago Press.
12. Buncic, D. (2009). Understanding forecast failure of ESTAR models of real exchange rates. *EERI Research Paper Series*, 18.
13. Mirkin, Ya. M. (2015). 1971—2025: kursy valyut, mirovye ceny na syr'e, kursy akcij [1971—2025: exchange rates, world prices for raw materials, stock prices]. Moscow: Master [in Russian].
14. Hyde, P., Liebert, T., & Wackerbeck, P. (2009, September 30). A comprehensive risk appetite framework for banks. *Strategyand*. Retrieved from http://www.strategyand.pwc.com/media/file/Risk_Appetite_Framework.pdf.
15. Raghuram, G. R. (2005). Has financial development made the world riskier? Jackson Hole. Federal Reserve Bank of Kansas City. Retrieved from <http://www.nber.org/papers/w11728>.
16. Kovalenko, V. V. (2017). *Systema ryzyk-menedzhmentu v bankakh: teoretychni ta metodolohichni aspekty [Risk management system in banks: theoretical and methodological aspects]*. Odessa: ONEU [in Ukrainian].

The article is recommended for printing 25.02.2020

© Kuznetsova L. V., Kuznetsov A. N., Derkach Ju.B.