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STRESS-TESTING OF COMPLEX RISKS IN THE BANKING SYSTEM, AS AN INSTRUMENT OF STATE ANTI-CRISIS MANAGEMENT

Abstract. In the article the basic methods of crisis management of financial activity of banks are investigated. The constituent elements for the development of the program of financial rehabilitation of Ukrainian banks under the state anti-crisis management have been identified. The typology of stress-testing according to the functional orientation (sphere of use) is described. The types of stress-testing of risks in the banking system, as an instrument of state crisis management, are described. The basic methods of stress testing in the banking system as a tool of state crisis management are offered. The emphasis is on the factors in which stress testing is effective.

Determined that the criteria for a successful exit from the crisis of the banking institutions, in addition to these results can be considered the use of certain methods of crisis management financing activities Bank: stop outflow of customers; creation of sufficient reserve of liquid assets; Achieving an optimal balance between assets and liabilities by maturity; reaching an agreement on restructuring with all or an absolute majority of creditors; absence of arrears of the bank before contractors; positive tendencies in returning debts by borrowers, increase of share of standard loans; stable tendency to reduce losses and subsequently – increase of the level of profitability of work; raising capitalization with a sufficient buffer of capital

in the event of stress events and a steady excess of regulatory capital over statutory; stabilization of the management at the level of government and key units; closure of unprofitable or unpredictable and long-term business development projects of the bank; completion of the restructuring of the bank's affiliate network.

Keywords: crisis management, stress testing, bank risks, financial crisis, public administration, banking system, state.

СТРЕС-ТЕСТУВАННЯ КОМПЛАЄНС-РИЗИКІВ У БАНКІВСЬКІЙ СИСТЕМІ ЯК ІНСТРУМЕНТ ДЕРЖАВНОГО АНТИКРИЗОВОГО УПРАВЛІННЯ

Анотація. Досліджено основні методи антикризового управління фінансовою діяльністю банків. Виділено складові елементи для розроблення програми фінансового оздоровлення банків України при державному антикризовому управлінні. Описано типологію стрес-тестування за функціональною спрямованістю (сферою використання). Схарактеризовано типи стрес-тестування ризиків у банківській системі як інструменту державного антикризового управління. Запропоновано базові методи проведення стрес-тестування в банківській системі як інструменту державного антикризового управління. Акцентовано увагу на факторах, за яких стрес-тестування є ефективним.

Визначено, що критеріями успішного виходу банківської установи з кризи, крім виконання, можна вважати такі результати використання певних методів антикризового управління фінансовою діяльністю банку: припинення відтоку коштів клієнтів; створення достатнього запасу ліквідних коштів; досягнення оптимального балансу між активами і зобов'язаннями за строками; досягнення домовленості про реструктуризацію з усіма або абсолютною більшістю кредиторів; відсутність простроченої заборгованості банку перед контрагентами; позитивні тенденції у поверненні боргів позичальниками, збільшення частки стандартних кредитів; стійка тенденція до скорочення збитків і згодом — зростання рівня прибутковості роботи; підвищення капіталізації з достатнім буфером капіталу на випадок стресових подій і стійкого перевищення регулятивного капіталу над статутним; стабілізація керівного складу на рівні правління та ключових підрозділів; закриття нерентабельних або неперспективних і довгострокових проектів розвитку бізнесу банку; завершення реструктуризації філійної мережі банку.

Ключові слова: антикризове управління, стрес-тестування, банківські ризики, фінансова криза, державне управління, банківська система, держава.

СТРЕСС-ТЕСТИРОВАНИЕ КОМПЛАЕНС-РИСКОВ В БАНКОВСКОЙ СИСТЕМЕ КАК ИНСТРУМЕНТ ГОСУДАРСТВЕННОГО АНТИКРИЗИСНОГО УПРАВЛЕНИЯ

Аннотация. Исследуются основные методы антикризисного управления финансовой деятельностью банков. Выделены составляющие элементы для разработки программы финансового оздоровления банков Украины при государственном антикризисном управлении. Описана типология стресс-тес-

тирования по функциональной направленности (сферой использования). Охарактеризованы типы стресс-тестирования рисков в банковской системе как инструмент государственного антикризисного управления. Предложены основные методы проведения стресс-тестирования в банковской системе как инструмент государственного антикризисного управления. Акцентируется внимание на факторах, при которых стресс-тестирование является эффективным.

Определено, что критериями успешного выхода банковского учреждения из кризиса, кроме выполнения, можно считать такие результаты использования определенных методов антикризисного управления финансовой деятельностью банка: прекращение оттока средств клиентов; создание достаточного запаса ликвидных средств; достижение оптимального баланса между активами и обязательствами по срокам; достижение договоренности о реструктуризации со всеми или абсолютным большинством кредиторов; отсутствие просроченной задолженности банка перед контрагентами; положительные тенденции в возвращении долгов заемщиками, увеличение доли стандартных кредитов; устойчивая тенденция к сокращению убытков и впоследствии — рост уровня прибыльности работы; повышение капитализации с достаточным буфером капитала на случай стрессовых событий и устойчивого превышения регулятивного капитала над уставным; стабилизация руководящего состава на уровне правления и ключевых подразделений; закрытие нерентабельных или неперспективных и долгосрочных проектов развития бизнеса банка; завершение реструктуризации филиальной сети банка.

Ключевые слова: антикризисное управление, стресс-тестирование, банковские риски, финансовый кризис, государственное управление, банковская система, государство.

Problem statement. The current economic and financial crisis that has exploded lately is plundering companies, banks, insurance companies, enterprises that are closing down and dismissing workers, depriving the general public of work and livelihoods. The economic crisis began with problems in the banking sector at the same time in Ukraine.

Thus, anti-crisis management should be prepared even when the bank is in normal condition, in order to quickly 'incorporate' the emergency mechanism of salvation, and not to carry out experiments with transformations. Current research of the crisis management sys-

tem based on stress testing is relevant, since the management presents a set of management decisions and their implementation in order to restore the normal state, eliminate the internal causes of the crisis and ensure the bank's readiness for new tests.

Analysis of recent researches and publications. Foreign researchers, such as K. Borio, M. Drechmann, T. Ojama, R. Rebonato and K. Tsatsaronis were thoroughly engaged in questions of constructing models, selecting risk factors, developing scenarios, and quantitatively measuring stress-testing. Foreign scientists such as K. Borio,

M. Drechmann, T. Oiama, R. Rebonato and K. Tsatsaronis were thoroughly engaged in this issue. P. Ye. Zhytnyi, I. B. Ivasiv, T. D. Kosova, R. S. Lysenko, A. V. Maksimova, V. I. Mishchenko, S. V. Naumenkova, S. M. Shapovalova and others. Due to the emergence of new stress testing functions after the global financial crisis, a small amount of research is devoted to the study of the role of this tool to ensure the financial stability of banking systems in modern conditions. Therefore, this issue requires a more detailed study.

Formulating the goals of the article. The purpose of the study is to assess the stress-testing of compliance risks in the banking system as an instrument of state crisis management.

Presentation of the main material. An important condition for economic development is the stability and reliability of the banking sector. Under the current conditions that are the result of the de-

ployment of the financial and economic crisis in our country, the issue of ineffective crisis management, and sometimes, in general, its absence was acute.

Antichrists management can be considered as a multifunctional and multifaceted system, which includes a large number of various elements that are in a certain relationship, are interconnected and form a single whole [1].

In addition, there is an objective need to develop appropriate crisis management measures aimed at improving the financial performance of banks and stabilizing their functioning in general, given the deterioration in the financial situation and the loss-making performance of many banking institutions, the low level of capitalization and liquidity, and a significant deterioration in the quality of their assets. It is advisable to consider in more detail the methods of crisis management of the financial activity of the bank (Table 1).

Table 1

Methods of crisis management of financial activities of banks

№	Basic methods of crisis management	Characteristics of existing methods of crisis management
1	Regulatory and legal	Development of internal legal documents on crisis management of financial activities of the bank
2	Informational and analytical	Preliminary diagnostics and forecasting of crisis processes; conducting of stress-testing; development of programs for financial rehabilitation, plans for crisis management of liquidity; assessment of the quality of assets and liabilities
3	Organizational and managerial	Development and implementation of risk management systems; restructuring procedures; outsourcing; benchmarking; reduction of staff; forming a positive image of the bank; closing of non-profit affiliates; refusal from unpredictable business directions
4	Financial	Diversification of resource base and assets; establishment of internal financial standards and limits; attraction of long-term resources in the form of capital instruments and subordinated debt; restructuring of financial debt; asset sale; introducing new methods for managing profits

Source: compiled by the author

Thus, the functioning of banking institutions is connected with the necessity of constant avoidance of negative consequences of risks, which are caused by their current activity and interconnection with the external environment. Therefore, the National Bank of Ukraine should not only identify the risks, but also identify possible alternatives to the management of the bank to overcome the consequences of adverse events. Effective tool for solving this problem is stress testing, which provides an opportunity to quantify the risks, and as a result, focus the attention of the management of the bank on the most cost-effective aspects of the banking institution in the context of its financial security.

In addition, stress testing allows you to assess how specific a bank or banking system is generally resistant to 'exceptional but probable shocks'. It is intended to provide an overview of available adverse scenarios related to different risks and the amount of capital required absorbing losses in the event of a shock scenario [2].

If banks are in a phase of a crisis that threatens their further existence and requires an immediate financial recovery, which is to restore the bank's solvency and bring the financial performance of its activities in line with the

requirements in force. To do this, you need to develop a program of financial rehabilitation (Fig. 1).

Stress testing is a general term that combines a group of methods to assess the impact on the financial situation of the organization of adverse events, defined as 'exceptional, but possible' (in the English version, 'exceptional but plausible') [3].

In fact, this is a sensitivity testing or scenario test to assess the insurer's readiness for possible crisis situations.

Stress testing is widely used to assess liquidity risk, currency risk, and interest rate risk.

According to Ukrainian legislation, stress testing is a method of quantification of risk, which is to determine the magnitude of the uncoordinated position that puts the bank at risk and in determining the shock value of the external factor change [4].

The most vulnerable areas of individual areas of activity of banks are determined with the help of stress testing. In this case, the obvious feasibility of a comprehensive approach to stress tests should contribute to the formation of a unified approach to managing various risks, as in a crisis situation, simultaneously implemented and mutually reinforcing heterogeneous

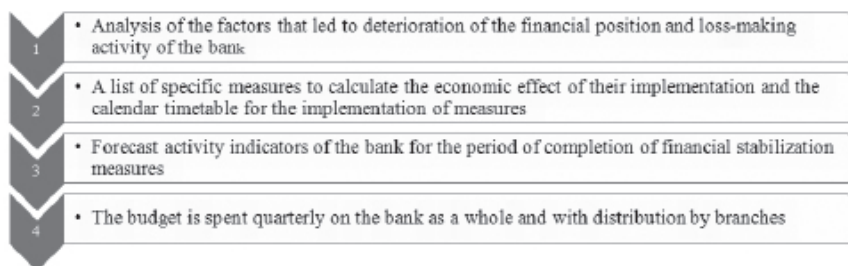


Fig. 1. The main components for the development of the program of financial rehabilitation of Ukrainian banks under state anti-crisis management

Source: compiled by the author

risks: fluctuations in exchange rates and quotes coincide with the crisis of the interbank market, delays payments on corporate loans and mass removal of client resources, which creates an extreme load on the banking system.

We consider it appropriate to divide the various goals of this technique to determine the role of stress testing in today's financial space. Variety of approaches to stress testing is reflected

in the typology proposed by the IMF (Table 2) [5].

The Bank's ability to overcome temporary and longer-term difficulties in financing some or all of its activities with a reasonable level of expenditure may depend on the adequacy of its official anti-crisis plans. The anti-crisis plan to overcome liquidity problems should consist of several components that involve managerial coordination.

Table 2

Typology of stress-testing according to the functional orientation (sphere of use)

Characteristics	Macro-prudential approach	Micro-prudential approach	Anti-crisis management	Internal Risk Management System
The purpose of stress testing	Identify sources of systemic risk and sensitive system vulnerabilities	Evaluate the sustainability of a separate institution for regulatory purposes	Provide the basis for recapitalization, restructuring, etc.	Manage the risks of an existing portfolio
Organizer	Central banks, macro-prudential bodies, the IMF	Regulatory body (micro-prudential)	Micro-and macro-prudential)	Financial institutions
The observed shocks	Systemic shocks, or events, probable for a specific sector and group of institutions	Specific for an institution taking into account macroeconomic forecasts	Current system risk with particular attention to insolvency risks	Specific or systemic risk (depending on the institution)
Object of study	Financial sector, banking system, and systemically important institutions	Individual financial institutions	Financial institutions that are in a condition crisis	A separate financial institution
Examples	Supervisory Sector Assessment Program (FSAP), Global Financial Stability Report (GFSR)	Basel Approach Stress Test, Comprehensive Capital Analysis and Review in the US (CCAR), EU Stress Test (CEBS/EBA)	Supervisory Capital Assessment Program by supervision bodies of the United States (SCAP), EU Stress Tests (CEBS/EBA)	VaR (Value at Risk) Model of J. P. Morgan

Source: compiled by the author on the basis [6]

The anti-crisis plan must describe the procedures for ensuring the timeliness and continuity of cash reserves or other highly liquid assets, which will allow managing a temporary, unexpected cash outflow. Other components of the anti-crisis plan should be to maintain client relationships with bondholders, borrowers, as well as trading and off-balance counterparties [7].

In general, it is advisable to identify four types of stress tests, taking into account their ultimate goal (Table 3).

Each bank can develop its own stress-testing procedure and introduce its models for analysing the impact of various risk factors on the financial result, taking into account the individuality of the risk portfolio and the specifics of its activities. Worldwide practice involves conducting stress testing quarterly. Given that

in today's conditions there is a rapid spread of crisis events and accelerated development of extreme situations; it is expedient for banks to carry out operational stress testing. Therefore, the introduction of stress testing techniques for each bank should be an objective necessity, and not a mandatory norm of the National Bank of Ukraine (NBU) [9].

In addition, paying attention to the European experience, you can distinguish four basic methods of stress testing (Table 4).

It is advisable to emphasize that the most common methods of stress testing in Ukraine are scenario analysis and sensitivity analysis. Stress testing scenario is a model of the possible development of events under the influence of various risk factors. Stress testing scenario should cover all prerequisites

Table 3

Types of stress-testing of risks in the banking system, as an instrument of state anti-crisis management

No	Types	Description of components
1	Stress testing as an internal risk management tool	Financial institutions use stress testing to assess and manage their own investment risks. One of the first was J.P. Morgan, who introduced Value-at-Risk (VaR) model in the mid-1990s to assess market risk
2	Micro-prudential analysis	In the framework of the standardized approach, Basel II requires banks to conduct stress tests for market risk and, in some cases, credit risk, in order to determine the minimum capital for their coverage
3	Macro-prudential analysis	In the last two decades, many countries have begun to use stress tests to analyse overall systemic risks. This analysis enables continuous monitoring of the state of the financial system, its internal interactions, interaction with the real sector, the budget sphere, as well as with the tendencies of development of world financial and commodity markets in order to ensure its stable functioning
4	Stress testing during anti-crisis management	The use of stress tests has become particularly necessary in order to assess the extent to which key financial institutions in countries need recapitalization and state aid after the Global Financial Crisis of 2008–2009

Source: compiled by the author on the basis [8]

Basic methods of stress testing in the banking system, as an instrument of state anti-crisis management

№	Basic methods of stress testing	Brief description of the existing methods of conducting stress-testing
1	The method of elasticity	The method is intended for the analysis of sensitivity, which assesses the risk as a result of the standard change in market indicators, when it is impossible to give a probabilistic quantified estimate that would allow to statistically determine the required amount of capital, and reserves, etc.
2	Method of estimating losses	It is related to the analysis of the most probable events, or determination of losses due to the implementation of economic risks. In this case, the risk assessment is called the expected risk, which may seem paradoxical at the level of an individual event. However, the expected risk is the most important statistical characteristic of the position, and therefore it is the basis for making many managerial decisions
3	The method of scenario analysis	It is based on analysing moderately-adverse events, which allows us to determine the maximum amount of damage that an investor can incur for a certain period of time at a given probability and shows a change in the value of the investment portfolio
4	Index method or 'risk indexes'	The dynamics of the indexes established on the results of the stress test depends on the aggregate impact of the main risks, which today are considered significant and affect the stability

Source: compiled by the author

that may seriously affect the financial stability of the bank [10].

If historical scenarios cannot take into account certain risk factors, then it is advisable to use hypothetical scenarios. The advantages of this type of scenario are the possibility of a more flexible formulation of possible crises. These scenarios can be used to identify events for which the portfolio of banking assets is most vulnerable. It is imperative that these scenarios are probable and plausible and reflect the real facts of historical events. The choice of scenarios depends on many factors and should take into account the relationship between the historical event and the specific banking portfolio. Therefore, it is necessary to take into account a number of factors in which

stress-testing scenarios should have a positive result (Figure 2) [11].

Although this method lacks historical and economic content, which may, at the same time, limit its usefulness to strategic decisions, sensitivity testing is an extremely important method of conducting operational stress testing, the results of which cannot be overestimated in the preparation of certain measures to reduce the level risk. An example of stress-testing of sensitivity may be the negative changes in interest rates on loans and/or deposits for a certain number of base points or a decrease in the level of profitability [12].

Thus, the high probability of occurrence of crisis phenomena in the financial activities of the banks necessitates the introduction of specialized

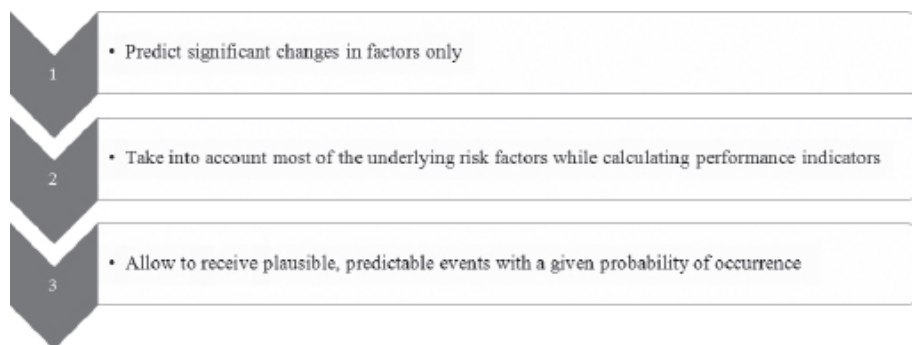


Fig. 2. Factors in which stress testing is effective

Source: compiled by the author

anti-crisis management measures (regulatory, informational, analytical, organizational, managerial and financial), aimed at protecting and neutralizing these phenomena. These measures should be of a comprehensive nature and contribute to the stability and credibility of the bank. This will enable the creation of a flexible management system that will respond in a timely manner to the negative changes in the internal and external environment, as well as contribute to the restoration of positive trends in the development of the institution of the bank.

Among the criteria for successful exit from the banking institution from the crisis, in addition to the following, the following results can be considered as the use of certain methods of crisis management of the financial activity of the bank: the termination of outflow of clients' funds; creation of sufficient reserve of liquid assets; achieving an optimal balance between assets and liabilities by maturity; reaching an agreement on restructuring with all or an absolute majority of creditors; absence of arrears of the bank before contractors; positive tendencies in returning debts by borrowers, increase of share of standard loans; stable tendency to reduce losses and sub-

sequently as increase of the level of profitability of work; raising capitalization with a sufficient buffer of capital in the event of stress events and a steady excess of regulatory capital over statutory; stabilization of the management at the level of government and key units; closure of unprofitable or unpredictable and long-term business development projects of the bank; and completion of the restructuring of the bank's affiliate network.

Conclusions. Therefore, it is necessary to study and introduce more in detail into the day-to-day practice of monitoring the activities of banks in Ukraine. After all, the Ukrainian banking system needs to seize global experience in conducting stress testing as an effective public instrument for preventing systemic crises inherent in banking activities in the context of increasing the volatility of financial markets. This, in turn, will increase the efficiency of the assessment and management of financial stability of individual banks, as well as increase the level of reliability, and, as a consequence, stability of the Ukrainian banking system as a whole. Besides, the state's influence on the banking sector must be carried out through the establishment of an acceptable regulatory framework for

banks and the functioning of the financial services market, as well as monitoring compliance with the requirements of legislative and other regulatory acts.

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