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Early Response System in Ensuring Financial Stability of Banks when Carrying out Transactions with Derivative Financial Instruments

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ABSTRACT

The article is devoted to the analysis of the early response system, which is an important element of the mechanism for ensuring the financial stability of banking institutions, in particular when carrying out transactions with derivative financial instruments. Given the increased complexity and dynamism of financial markets, the use of derivative contracts in the activities of banks is becoming increasingly relevant, but at the same time, it increases the risks and threats to financial stability. The article proposes a concept for modifying the existing systems for managing active operations of banking institutions by integrating an early response system, which allows for the timely identification of potentially problematic derivative financial instruments and an effective response to minimize possible financial losses. The modification involves the implementation of a structured system that includes several key stages: 1) identification of potentially problematic derivative financial assets using an appropriate set of early warning indicators; 2) classification – segmentation of identified potentially problematic derivative financial assets by quality categories; 3) application of necessary means of influence depending on the group to which the derivative financial asset was assigned; 4) assessment of results – control over deadlines, completeness, efficiency of implementation, as well as adjustment of measures. The early response system allows the bank to apply new methods and tools of financial management, in particular, the latest technologies for risk management in the context of the specifics of derivative financial instruments. This provides not only proactive risk management but also reduces the likelihood of financial losses in the event of negative scenarios. The implementation of such a system will allow banking institutions to actively respond to changes in the market situation, reduce the burden on units dealing with problem assets, and consider both internal and external threats. Thus, the proposed early response system is an effective mechanism for ensuring the financial stability of banking institutions for the prompt identification of potentially problematic derivative financial assets, preventing significant losses, and optimizing risk management at all stages of the bank's activities.

KEYWORDS

derivative financial instruments, financial stability, banking risk management, financial market, banking institutions.

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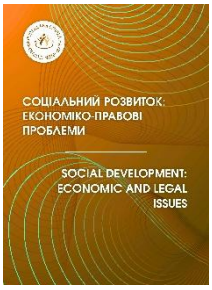

Система раннього реагування у забезпеченні фінансової стабільності банків при здійсненні операцій з деривативними фінансовими інструментами

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СТАТТЯ

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АНОТАЦІЯ

Статтю присвячено аналізу системи раннього реагування, що є важливим елементом механізму забезпечення фінансової стабільності банківських установ, зокрема під час здійснення операцій з деривативними фінансовими інструментами. З огляду на підвищену складність і динамічність фінансових ринків, використання деривативних контрактів у діяльності банків стає все більш актуальним, проте в той же час це підвищує ризики та загрози для фінансової стабільності. У статті запропоновано концепцію модифікації діючих систем управління активними операціями банківських установ шляхом інтеграції системи раннього реагування, яка дозволяє вчасно виявляти потенційно проблемні деривативні фінансові інструменти та здійснювати ефективне реагування для мінімізації можливих фінансових втрат. Модифікація передбачає впровадження чітко структурованої системи, що включає кілька ключових етапів: 1) виявлення потенційно проблемних деривативних фінансових активів за допомогою відповідного набору індикаторів раннього попередження; 2) класифікацію – сегментацію виявлених потенційно-проблемних деривативних фінансових активів за категоріями якості; 3) застосування необхідних засобів впливу залежно від групи, до якої було зараховано деривативний фінансовий актив; 4) оцінку результатів – контроль за строками, повнотою, ефективністю виконання, а також коригування заходів. Система раннього реагування дозволяє банку застосовувати нові методи та інструменти фінансового менеджменту, зокрема новітні технології для управління ризиками в контексті специфіки деривативних фінансових інструментів. Це забезпечує не лише проактивне управління ризиками, а й знижує ймовірність фінансових втрат у разі розвитку негативних сценаріїв. Впровадження такої системи дасть змогу банківським установам активно реагувати на зміни ситуації на ринку, зменшити навантаження на підрозділи, які займаються проблемними активами, та врахувати як внутрішні, так і зовнішні загрози. Таким чином, запропонована система раннього реагування є ефективним механізмом забезпечення фінансової стабільності банківських установ для оперативного виявлення потенційно проблемних деривативних фінансових активів, запобігання значним втратам та оптимізації управління ризиками на всіх етапах діяльності банку.

КЛЮЧОВІ СЛОВА

деривативні фінансові інструменти, фінансова стабільність, ризики, управління банківськими ризиками, фінансовий ринок, банківські установи.

1. Introduction

Transactions with derivative financial instruments (hereinafter referred to as DFIs) are among the riskiest types of banking activity. The complexity and flexibility of various types of DFIs, the existence of gaps in the regulatory framework, valuation methods, accounting, as well as the insufficient level of awareness of bank managers regarding the possible threats that different types of such instruments pose, do not allow ensuring the financial stability of the bank when using DFIs only through financial management. Moreover, it is worth mentioning the impact of external threats, unpredictable behavior of other market participants or bank counterparties, and systemic risk, the occurrence of which is often simply impossible to predict, and therefore, it is impossible to manage such risks only through the internal risk management system. Banking institutions should use a comprehensive and adequate risk management mechanism that would consider the specifics of transactions with DFIs, as well as the risk management requirements established by the regulator to maintain the necessary level of financial stability. Having studied the scientific achievements of domestic economists, we can conclude that due to the low level of development of the DFI market and the absence of many types of derivative contracts in Ukraine, a significant number of problematic issues remain insufficiently disclosed or are not covered at all in the works. Among these is the issue of forming an effective risk management mechanism for operations of banking institutions with DFIs, because in most works, the same methods and tools are specified for DFIs as for transactions on the securities market as a whole.

2. Literature Review

The mechanism of ensuring the financial stability of a bank is considered in many works of domestic scientists, such as O. Vasylchyshyn [24], O. Vovchenko [25], N. Davydenko [3], N. Zhurybida [27], M. Zveryakov [28], V. Kovalenko [5], Ya. Kuznichenko [10], O. Muzychka et al. [15], N. Pohorelenko, & O. Kalinin [19], L. Shtefan, & N. Ilnitska [23]. In particular, the study of bank operations in the DFI market, the functioning of the market itself, and its infrastructure was carried out by such scientists as V. Bazylevich [2], S. Bardash [1], L. Kuznetsova, & Y. Shmuratko [9], P. Kutsyk [8], O. Lysa [12], O. Lysenok et al. [13], I. Makarenko [14], O. Parandiy [16], V. Sheludko [20], and many others.

Based on the classification of derivative financial instruments, according to which instruments are divided into derivative contracts and derivative securities, the separation and clarification of these concepts of which occurred relatively recently in the regulatory framework of Ukraine occurred relatively recently, there is a need to make effective management decisions regarding each type of DFIs separately. This need is caused by the fact that each type of derivative contracts, as well as derivative securities, has its inherent threats, which are transformed into different types of risks (individual, systematic, systemic), therefore, the elements of the mechanism for ensuring financial stability when using different types of DFIs must be adapted, taking into account the specifics and characteristics of the corresponding type of instrument, its complexity, as well as the purpose of the transactions.

3. Problem Statement

Taking into account Ukraine's focus on the actual launch of the derivative financial instruments market, increasing transaction volumes, introducing innovative derivative instruments, implementing a regulatory framework developed based on European practice, which contains an expanded classification of DFIs, new provisions on the functioning and improvement of the market infrastructure, the issue of adapting the mechanism for ensuring financial stability when using derivative contracts, based on the specifics of transactions with them, is relevant. Especially in the case of potential opportunities for banks to use credit derivatives, which allow them to redistribute credit risks, free up funds for reinvestment and increase lending volumes, however, which can cause huge threats not only to an individual institution, but can also trigger a systemic financial crisis due to the use of ineffective management tools. Given the existence of the above-mentioned problematic issues, the purpose of this article is to formulate proposals for improving the efficiency of the bank's internal risk management system as the most important element of the mechanism for ensuring the financial stability of a banking

institution and to search for possible options for adapting the asset management system to transactions with derivative contracts.

4. Methods and Materials

The theoretical and methodological basis of the study is the work of domestic and foreign scientists in the field of economic science on the financial stability of the banking system, operations of banking institutions with derivative financial instruments, as well as risk management. When solving the tasks set in the study, various general scientific and special research methods were used: methods of abstraction, generalization, induction, deduction, analysis, synthesis – in the formation of theoretical principles for ensuring the financial stability of the banking system, risk management of banking institutions when carrying out operations on the DFI market; analogies and extrapolations – in the study of world practice of risk management of operations on the DFI market, as well as the regulatory legal framework, in assessing the possibilities of using world experience in domestic realities; systems analysis – in the study of prospects and recommendations for systematizing the tools for ensuring the financial stability of banks when carrying out operations with derivative contracts, abstract-logical – in the formulation of conclusions and proposals. This methodological toolkit allowed to improve the mechanism for ensuring the financial stability of banking institutions when carrying out transactions with DFIs by adapting the early warning system to transactions with derivative financial assets.

5. Results and Discussion

Given that banking institutions are an element of the banking system and play a leading role in the financial market, a significant deterioration in financial stability or bankruptcy of an individual bank will hurt the financial stability of the entire banking system, creating a threat of the emergence and spread of a financial crisis. The desire of banks to receive higher profits, expand lending opportunities, conscious acceptance of large risks, or neglect of the regulator's recommendations on asset management leads to the realization of various types of individual risks when using derivative financial instruments in their activities. However, due to the complexity and flexibility of these instruments, the high concentration of their market, as well as the lack of an effective mechanism to protect its participants, derivatives from a hedging tool are transformed into an accelerator of systemic risk, which affects not only the financial stability of an individual institution, but also the financial security of the state, as well as its economic growth (Figure 1).

Thus, to ensure an adequate level of financial stability when carrying out operations with DFIs, the bank must use an effective risk management mechanism, the set of elements of which must include both an internal risk management system and micro- and macroprudential regulation [18]. The most important element here is the bank's internal risk management system. Traditionally, the risk management process of a banking institution involves several stages [6; 7; 11; 17; 21; 22; 26]:

1. *Identification of different types of possible risks*. The first stage involves building a risk matrix. At the same time, the first methodological approach builds an aggregated matrix that does not provide for a quantitative or qualitative assessment of risks. This type of matrix is built to systematize the most significant risk factors, while all types of risks are identified and controllable and uncontrollable risk factors are indicated. Due to the clear definition and division of risk factors into controllable and uncontrollable, the bank's management has the opportunity to choose the most effective method of risk management based on controllable factors or possible measures to mitigate the effects of uncontrollable factors. The second methodological approach is subjective and inaccurate, since it is based on the method of expert judgment, and the matrix is displayed in the form of a table indicating the probability of risk occurrence and the level of possible losses. The third approach consists of a quantitative assessment of risks, which indicates the sum of actual and possible losses calculated with a given probability of occurrence. The last methodological approach to constructing a risk matrix is combined – it is carried out based on quantitative and qualitative assessment methods, but it is time-consuming and requires a clear interpretation of each parameter.

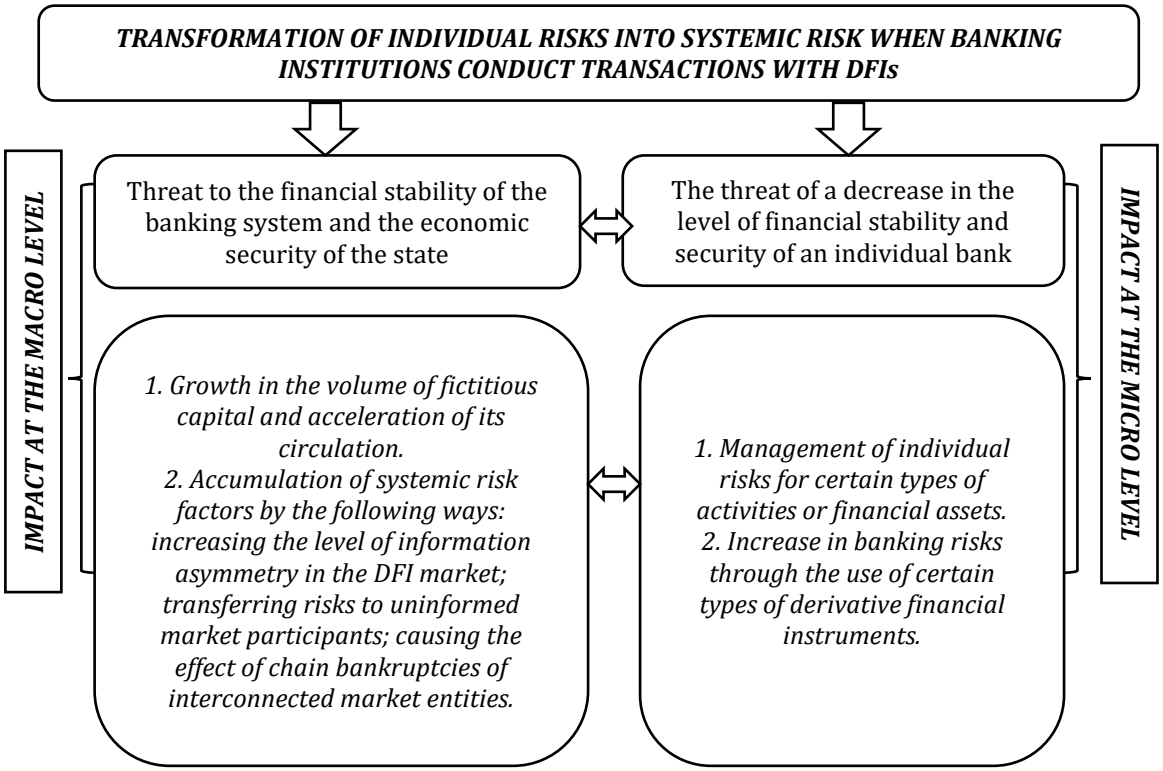

Figure 1. Risk transformation of banks' transactions with DFIs

Source: Compiled by authors.

2. *Risk measurement/assessment* is the second stage of risk management and involves conducting a continuous analysis of individual and portfolio risks of the bank. Risk measurement should begin with determining the presence of a correlation between them, as this makes it possible to determine the aggregate risk, which should be consistent with the bank's risk appetite. Based on the results of risk assessment, banking institutions form scenarios of various stress events that may arise in different areas and transform into different types of risks, and also develop appropriate plans for responding to crisis events. The risk level for each position is compared with the limits, based on which the need to make certain changes to the limit system due to market conditions is determined.

3. *Organization* and *selection* of management methods is the third stage of risk management. Having analyzed the official reporting, as well as the provisions of banks on risk management and risk management systems, we can distinguish the following techniques and methods of risk management used by banks in Ukraine: setting various types of limits; creating reserves to cover losses; covering losses from the realization of risks with the bank's capital; ensuring a sufficient level of capitalization and creating appropriate capital buffers to absorb negative consequences; hedging; diversification; assessing critical indicators for various types of risk; developing a motivation program for units involved in risk management; constant quality control of credit, investment, deposit portfolios, as well as securities portfolios; selling risky assets; transferring risks through guarantees and sureties; accepting liquid collateral; determining various types of margins. Most often, in domestic practice, such a method of reducing risks from transactions with DFIs is used as a limit. Banking institutions must comply not only with the requirements of the regulation on the internal limiting system, but also with prudential risk limits established by the National Bank of Ukraine through the implementation of economic standards.

4. The *monitoring* stage involves analyzing risks in dynamics, the causes of changes, and planning preventive measures in case of an increase in the level of risks.

5. The final stage of bank risk management is *control*. Internal control involves checking compliance with the requirements of internal bank documents, regulatory legal acts, requirements of current legislation, conducting an independent assessment and examination of the risk management system. Organizing internal audit and preparing management reporting are important tasks of the risk management system to ensure internal control.

Domestic banks in their activities are mainly involved in securities transactions, and the volume of their transactions with DFIs is insignificant and limited to currency derivatives. Thus, the domestic practice of managing active transactions of banking institutions is based on the experience of managing securities risks and some types of traditional derivative contracts. However, the emergence of new types of DFIs for the Ukrainian financial market in recent years, the consolidation of provisions on determining their essence, classification and regulation in the regulatory framework, as well as the strategy of the financial sector for the development of the DFI market, indicates the need to modify the existing asset and risk management systems of banks considering the peculiarities of specific types of derivative contracts [7]. Derivative contracts are characterized by a high level of complexity, provide for flexibility in the conditions of their use and combine different types of specific risks, and therefore require new skills and techniques from financial management, tools and methods of risk management that will allow for acting in advance.

In our opinion, it is advisable to introduce an early response system (ERS) for operations with DFIs, which is a modern approach to managing active bank operations, as it allows for starting active actions earlier in order to prevent an unacceptable scenario for the bank. An effective early response system will reduce the burden on units working with problem assets [4]. The effectiveness of the early response system depends on each of its components (Figure 2).

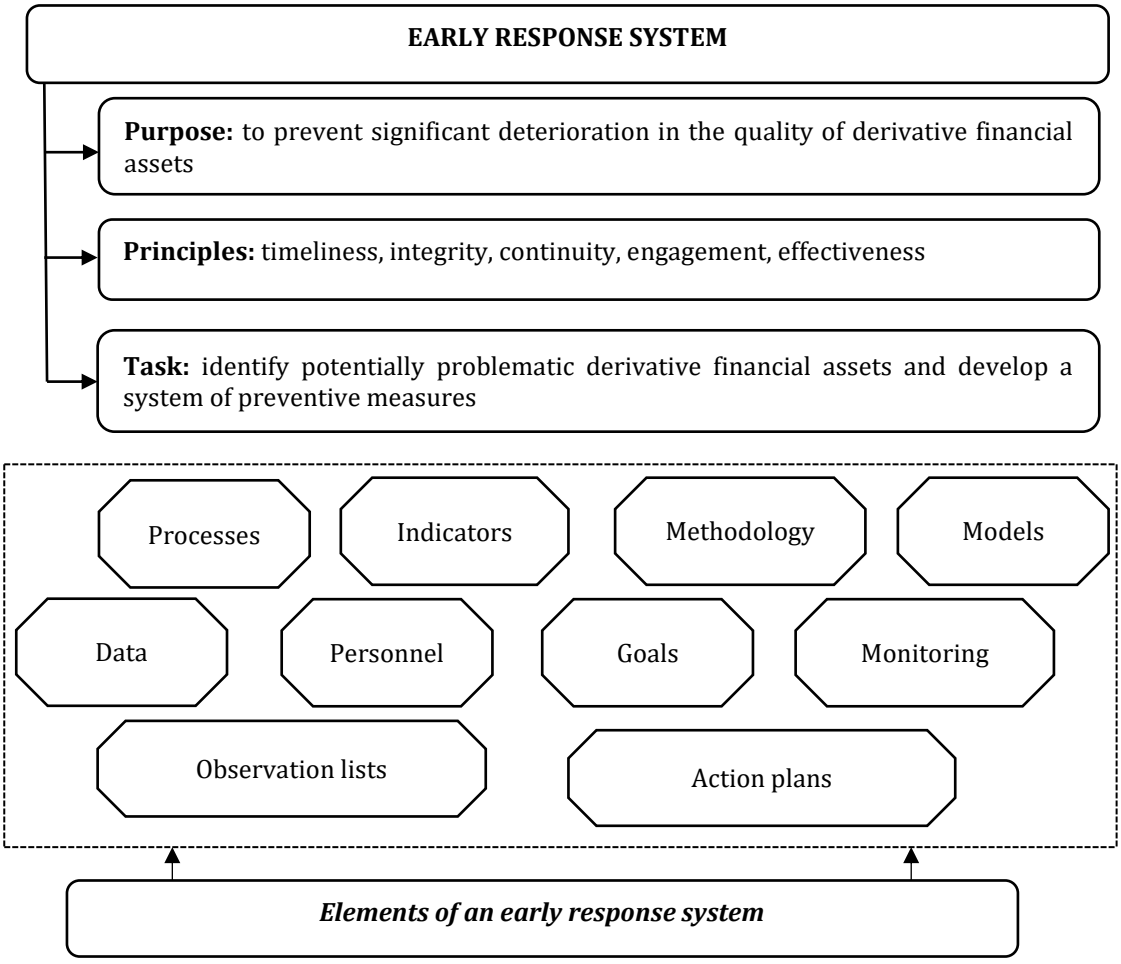

Figure 2. Elements of an early response system

Source: Adapted by authors based on [4].

Each potentially problematic derivative financial asset goes through four key stages: identification, classification, application of necessary means of influence, and evaluation of results. The identification stage includes such activities as data collection and preparation; calculation of indicator values; obtaining and evaluating model results; marking of potentially problematic assets. Firstly, individual types of risks are identified for each derivative financial asset under consideration. At the same time, the bank must consider all external and internal factors that may affect the realization of a

particular type of risk for each type of derivative financial instrument. Quantitative assessment of risks for derivative financial assets is carried out using a set of indicators by the assessment models used and depending on the types of derivative financial assets, which are calculated based on the bank's internal and external data.

A bank's early warning system for identifying potentially problematic derivative financial assets should use the following data [17]:

1. Internal bank data: financial characteristics of a specific derivative financial asset, namely the current price of the subject of the contract/underlying asset, the execution price, the contract execution term, the interest rate level, the volatility of the underlying asset's return, the credit quality of the subject of the contract – the probability of default and its expected depth, etc.; information characterizing the state of the DFI market.
2. External data: public information (publications in the media, expert opinions, news) and global data (macroeconomic statistics, market or industry statistics, changes in legislation).

Identification of potentially problematic derivative financial assets should be done using a set of indicators, which may differ depending on the type of derivative financial asset.

Banking institutions can use the full range of data available for analysis, which are divided into the following types [17]:

– infrastructure data containing the ratio of the volumes of the over-the-counter and exchange market segments; the presence of a collateral and margin system; the presence of central counterparties; the quality of the risk management of the exchange and central counterparties; the level of market transparency; the development of modern technologies;

– behavioral data, which include the following indicators: indices of underlying asset markets and indicators of its volatility; spread between bid and ask prices, interest spread in the credit market; assets, liabilities, financial result of market participants; ratio of equity to assets of market participants; ratio of the volume of open positions in the DFI to the equity of participants; number of created and liquidated market participants [14];

– DFI market risk concentrations: the ratio of the DFI market volume to GDP; the level of leverage; the share of problem financial assets in DFIs in the system to their total volume; the volume of shadow transactions with DFIs aimed at manipulation and fraud; the gross propensity of market participants to the risk associated with the use of DFIs; the level of moral hazard [14];

– the state of the economy and the financial sector: capitalization of underlying asset markets; interest rate levels; GDP volume and growth; inflation index; impact of globalization; cyclicality of economic development; exchange rate fluctuations;

– regulatory, which includes the level of development of the self-regulation system in the market; standardization of contracts; digitalization, regulation, and taxation of transactions in the DFI market;

– methodological, namely, the compliance of DFI assessment models with their modern types and realities; the reliability of reflection in accounting; the availability and reliability of information on DFI operations.

The second stage of implementing the early warning system is classification, which involves checking the values of triggers; the distribution of potentially problematic assets according to observation lists; and segmentation of identified potentially problematic derivative financial assets into categories according to certain criteria. Classification and management of potentially problematic derivative financial assets are carried out using the classical scheme (Figure 3) [17].

The organization of work with observation lists is carried out by the following basic rules [17]:

1. An increase in the risk level is a criterion for inclusion in the observation list. The observation list includes derivative financial assets for which an increase in various types of risks is observed or expected.
2. Intensification of work with a derivative financial asset from the list. The watch list is the basis for taking additional measures to avoid the asset becoming problematic.
3. An arbitrary number of observation lists. The number of observation lists depends on the individual characteristics of the contracts and risks accepted by the bank, as well as the development of the monitoring system.
4. Grouping of lists by the level of criticality of the situation with the asset. The lists differ in the criticality of possible consequences.

5. Standardized action plans for each observation list. A significant number of possible impact measures that can be used by the bank to prevent problems should be formed for each list.

6. Time limit for the stay of a derivative financial asset on the list. An asset cannot be on the list permanently. There should be a clear regulation for excluding an asset from the observation list.

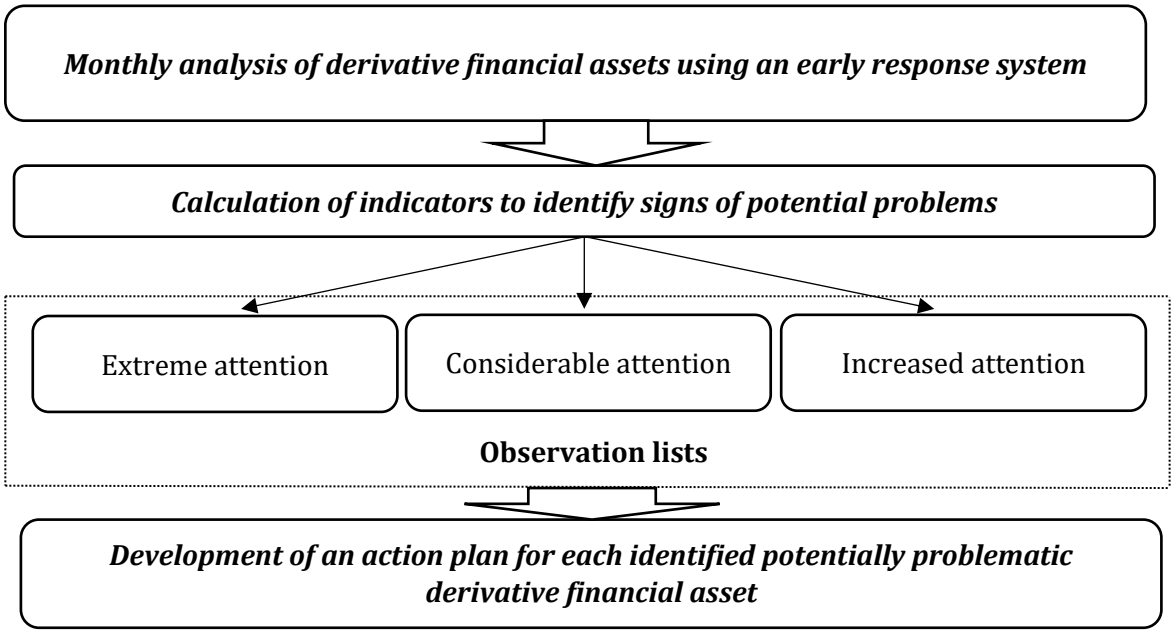

Figure 3. Scheme for classification and management of potentially problematic derivative financial assets

Source: Adapted by authors based on [4].

The third stage of working with potentially problematic derivative financial assets is to determine the impact measures. This stage involves determining a short list of impact measures, adjusting the selected impact measures for each asset, implementing the action plan, as well as monitoring and dynamically adjusting the action plans. Depending on which group (extreme attention, significant attention, increased attention) of the observation list the potentially problematic asset is included in, the appropriate impact measures are selected: observation, long-term measures, and short-term measures. The successful outcome of preventing the deterioration of the quality of a derivative financial asset depends on the correct choice of impact measures, which should be flexible and dynamic. At the same time, they should be constantly monitored and adjusted. In addition, it is worth noting that the system should be formed and adjusted as a holistic mechanism, i.e., the identified warning signals, the classification of potentially problematic contracts according to the lists, and the corresponding action plans should function harmoniously and comprehensively (Figure 4).

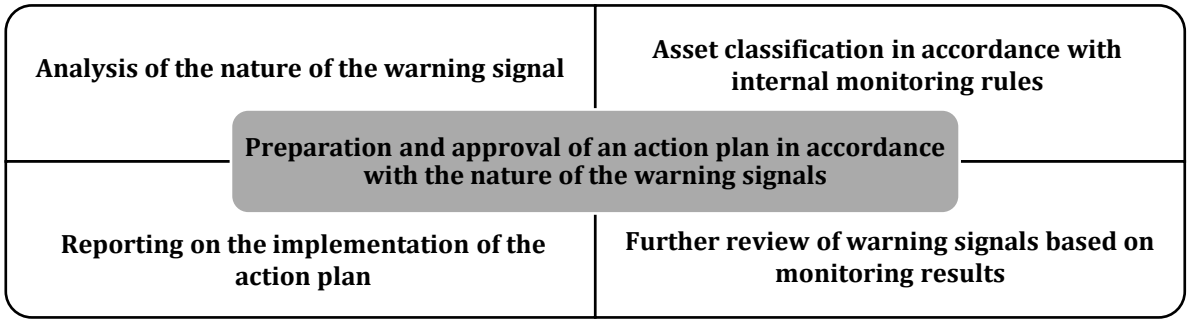

Figure 4. Early response system as a holistic mechanism

Source: Adapted by authors based on [4].

The final stage of implementing an early response system is the evaluation of results, which includes monitoring of observation lists and implementation of the action plan, assessing the effectiveness of impact measures, analyzing the effectiveness of the functioning of the system as a whole, as well as correcting and improving it.

Monitoring the implementation of the action plan and evaluating its results is carried out according to four main criteria, namely [17]:

1. Clear deadlines. The main goal of an early response system is to have additional time in reserve for an effective response. Late implementation of measures nullifies the very essence of the existence of the ERS.
2. Completeness of implementation. Monitoring the compliance of implemented measures with approved measures, as well as conducting an analysis of the causes of deviations, if any.
3. Effectiveness of implementation. Analysis of changes in the potential problematic nature of a derivative financial asset that occurred due to the application of appropriate measures, or the absence of such changes. Assessment of the timeliness of such measures.
4. Adjustment of measures. Transformation of the action plan in case of deviations. Identification of new triggers and development of an appropriate action plan for them, as well as replacement of static scenarios with dynamic ones.

Assessment and review of the effectiveness of the ERS should be carried out regularly. It is necessary to constantly analyze which indicators had a key impact on the inclusion of the relevant asset in the problem group, as well as whether there is a problem in the set of indicators used or in their defined significance. Assets that became problematic at the end of the system's life cycle require increased attention. Thus, it is necessary to review which impact measures were applied to such assets, the completeness and timeliness of their implementation, and whether there was a dynamic adjustment of the action plan. In addition, it is worth assessing the correctness of the construction of the "global classification" of assets; which problem group the least effective groups of measures (which required correction) corresponded to. The effectiveness and result of the functioning of the early response system depends on the availability of data, the integration of the ERS and the quality of operation of all automated systems, as well as the coordinated work of each bank unit.

6. Conclusions

An effective mechanism for ensuring the financial stability of banking institutions when conducting operations with derivative financial instruments should consist of an internal risk management system, micro- and macroprudential regulation. There is a need to adapt the bank's internal risk management system for the safe use of not only traditional and derivative securities, but also various types of derivative contracts. It is proposed to modify the existing systems for managing derivative financial assets of banking institutions by implementing an early response system, which will include the following stages: identifying potentially problematic derivative financial assets using an appropriate set of early warning indicators; segmenting potentially problematic derivative financial assets by quality categories according to certain criteria; applying the necessary means of influence; evaluating results and adjusting measures. Such proposals will allow the early detection of potentially problematic derivative financial assets using early warning indicators that consider both internal and external threats, as well as to initiate active actions before the quality of derivative financial assets deteriorates to prevent the development of a negative scenario for the bank.

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