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SCENARIO MODELING OF RISKS IN THE PROCESS OF IMPLEMENTING FINANCIAL INCLUSION: METHODOLOGICAL ASPECTS

Financial inclusion in modern conditions is regarded not only as a socio-economic instrument for ensuring the accessibility of financial services to broad segments of the population and businesses, but also as a strategic priority of sustainable development that forms the foundation for macroeconomic stability and enhances the investment attractiveness of the state. Its significance is particularly increasing amid global economic turbulence, military challenges, and structural transformations of financial markets. The accelerated digitalization of financial processes, the integration of artificial intelligence technologies, and the proliferation of digital platforms create new opportunities for inclusive development, while simultaneously amplifying risks associated with cyber threats, macroeconomic instability, and institutional constraints.

Under such conditions, scenario modeling emerges as an essential methodological tool that enables the assessment of potential risks and the forecasting of outcomes related to the implementation of financial inclusion across different scenarios. The use of multifactor models, the construction of baseline, optimistic, and pessimistic scenarios, and the integration of digital technologies into the modeling process ensure flexibility in managerial decision-making and enhance adaptability to crisis challenges. Consequently, financial inclusion combined with scenario risk modeling becomes a key direction in shaping sustainable financial systems capable of maintaining a balance between social equity, economic efficiency, and long-term development stability.

Scenario modeling in the field of financial inclusion relies on the comprehensive application of multifactor models that account for a wide range of risks – from institutional

and macroeconomic to technological and behavioral. This approach not only formalizes the influence of external and internal factors on the financial system but also provides a multidimensional perspective on possible trajectories of its development.

The use of modern digital tools, particularly Big Data technologies and artificial intelligence algorithms, opens up opportunities to improve forecasting accuracy, promptly identify hidden patterns in financial behavior, and model complex relationships among economic variables. According to industry research, AI technologies enable a transition from static analysis to dynamic risk modeling in real time, allowing the incorporation of extensive behavioral data arrays for more accurate solvency assessments.

The scenario modeling methodology involves constructing alternative scenarios, which makes it possible to consider diverse development paths and ensures the adaptability of management decisions in an unstable environment. This approach contributes to the formation of a more flexible strategic planning system capable of responding to crisis challenges and minimizing potential losses.

An important aspect is the integration of classical methods of financial analysis (regression, econometric, and discriminant models) with modern digital technologies, forming the basis for next-generation combined models. The effectiveness of this integrated approach is confirmed by contemporary research demonstrating that hybrid econometric–algorithmic models significantly outperform isolated classical tools in forecasting volatility and identifying complex nonlinear dependencies. The combination of traditional time-series methods (such as GARCH or ARIMA) with machine learning algorithms produces a synergistic effect: classical models provide statistical rigor and interpretability, while machine learning enhances the ability to detect hidden patterns and adapt to changing market conditions. This approach not only improves forecast accuracy but also expands the possibilities for risk analysis within financial systems. In particular, integrated models can account for structural shifts, asymmetric market reactions, and long-tail effects in distributions – factors that are critically important for assessing systemic resilience. The use of hybrid tools establishes a foundation for more flexible scenario modeling, increases the reliability of managerial decisions, and reduces the likelihood of strategic errors in financial policy. Therefore, scenario risk modeling in the process of

financial inclusion functions not merely as a methodological forecasting tool but also as a conceptual framework for developing sustainable financial systems capable of ensuring a balance between social accessibility, economic efficiency, and long-term development stability.

Based on the analysis, a set of key risks accompanying the implementation of financial inclusion has been identified. These risks are multidimensional and exert varying degrees of influence on the stability of the financial system, necessitating the use of scenario modeling as a tool for their systematic assessment and forecasting of potential consequences.

Institutional risks arise from the imperfection of the regulatory framework, fragmentation of regulatory acts, and insufficient coordination among regulators. This situation generates legal uncertainty, complicates the operations of financial institutions, reduces investor confidence, and limits the integration of the national market into global financial processes. Moreover, institutional weakness may lead to delays in implementing innovative financial products and restrict access to them for socially vulnerable population groups.

Technological risks encompass a wide range of issues – from cyber threats and inadequate protection of information systems to poor data quality and incompleteness. In the context of financial digitalization, these risks are particularly relevant, as cybersecurity breaches can result in the loss of confidential information, financial losses, and erosion of trust in inclusive programs. Insufficient data quality complicates the development of reliable risk assessment models, thereby reducing the effectiveness of managerial decisions and potentially leading to systematic forecasting errors.

Behavioral risks are manifested in the low level of financial literacy of the population, which limits the ability of households and enterprises to effectively use financial instruments. The tendency to excessive risk or, conversely, the avoidance of innovative products reduces the effectiveness of financial inclusion programs. An important factor is also distrust of financial institutions, which can lead to low participation of the population in formal financial processes and the preservation of shadow practices.

Macroeconomic risks include inflation and currency fluctuations, which can offset the positive effect of expanding access to financial services. High volatility of the macroeconomic environment increases the vulnerability of households and enterprises to external shocks, reduces their ability to plan and invest for the long term. As a result, financial inclusion may lose its stabilizing function and turn into an additional channel for the spread of crisis phenomena.

Fig. 1 presents a conceptual model in which scenario modeling functions as a methodological framework for integrating heterogeneous categories of risks into the strategic management system of financial inclusion.

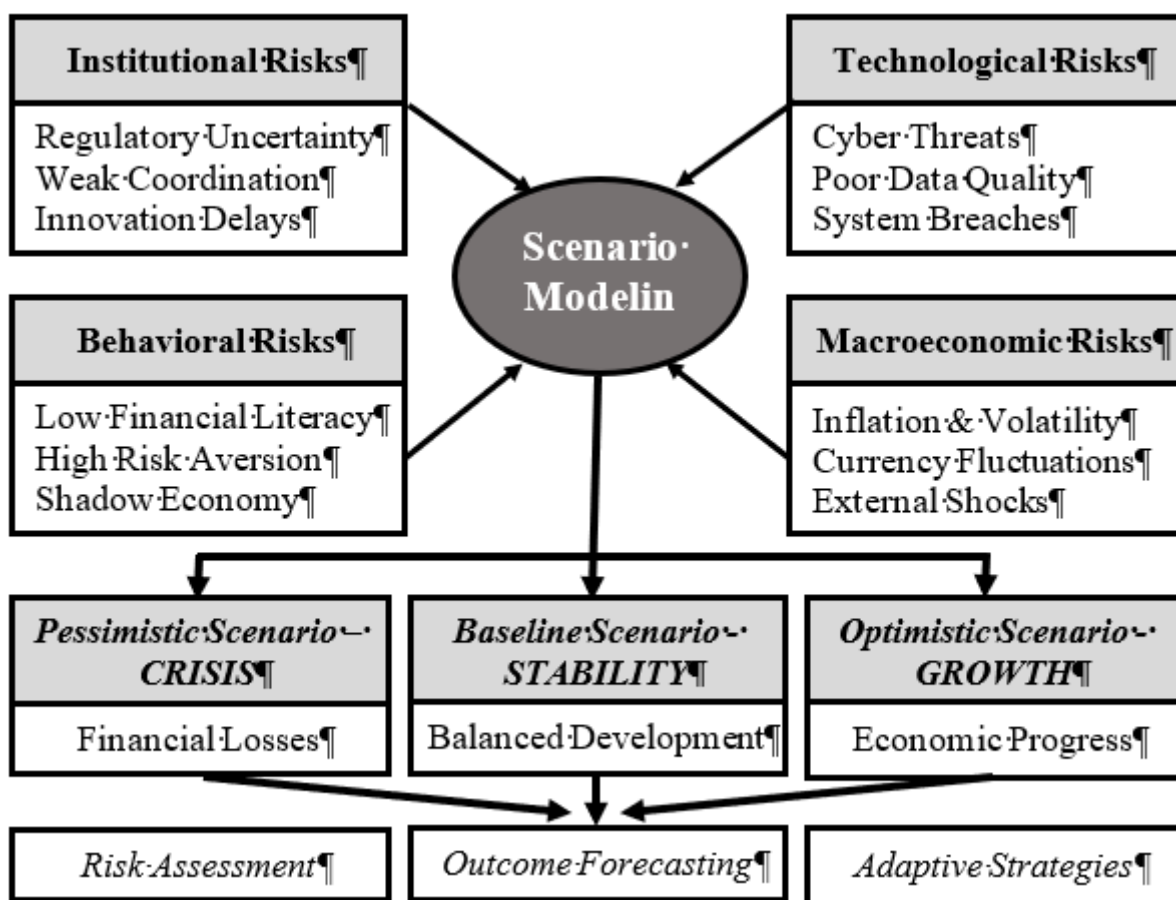


Fig. 1. Conceptual model of scenario modeling of risks in the process of implementing financial inclusion

The model demonstrates how institutional, technological, behavioral, and macroeconomic risks, each possessing multidimensional characteristics and varying degrees of systemic influence, can be incorporated into a unified analytical structure. Through this integration, scenario modeling enables the systematic identification,

classification, and forecasting of potential consequences under different trajectories of financial system development.

The figure emphasizes that scenario modeling is not limited to risk assessment but also serves as a dynamic instrument for constructing alternative pathways – pessimistic, baseline, and optimistic scenarios – thereby enhancing the adaptability of financial inclusion strategies to crisis challenges. By embedding risk factors into scenario-based projections, the model contributes to strengthening resilience, ensuring flexibility in managerial decision-making, and minimizing the probability of strategic errors. In this way, scenario modeling becomes a conceptual cornerstone for the formation of sustainable financial systems capable of balancing social accessibility, economic efficiency, and long-term stability.

Therefore, the complexity and interconnectedness of these risks requires a systematic approach to their identification and minimization. The implementation of financial inclusion should be accompanied not only by expanding access to financial services, but also by the formation of institutional, technological and educational mechanisms capable of ensuring the stability of the financial system in conditions of macroeconomic instability.

Список використаних джерел

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