Journal DOI: 10.36713/epra1013 | SJIF Impact Factor (2025): 8.619 ISSN: 2347-4378
EPRA International Journal of Economics, Business and Management Studies (EBMS)
Volume: 12 | Issue: 12 | December 2025 -Peer-Reviewed Journal

WAYS TO ENHANCE THE EFFECTIVENESS OF STRESS-TESTING MODELS FOR COMMERCIAL BANKS IN INTERNATIONAL PRACTICE

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ABSTRACT

This article explores key approaches to enhancing the effectiveness of stress-testing models for commercial banks based on international practice. The study examines how advanced banking systems improve stress-testing methodologies by strengthening scenario design, integrating multiple risk types, and incorporating macroeconomic and financial feedback effects. Particular attention is given to the role of model governance, data quality, and the consistent use of stress-testing results in capital and liquidity planning. The analysis highlights practical measures that increase the reliability and policy relevance of stress-testing outcomes, including dynamic modeling, multi-period horizons, and closer alignment with regulatory frameworks. The findings demonstrate that improving stress-testing model effectiveness contributes to stronger risk management, enhanced supervisory oversight, and greater financial stability in the banking sector.

KEYWORDS: *Stress Testing, Commercial Banks, Risk Management, Model Effectiveness, International Practice, Financial Stability.*

INTRODUCTION

In the context of increasing financial complexity and heightened macroeconomic uncertainty, stress testing has become a fundamental tool for assessing the resilience of commercial banks. Global financial crises and subsequent market disruptions have demonstrated that traditional risk assessment methods are often insufficient to capture the full range of potential vulnerabilities within banking systems. As a result, stress-testing models have evolved into essential instruments for both supervisory authorities and bank management, supporting forward-looking evaluations of capital adequacy, liquidity strength, and overall risk exposure.

International regulatory frameworks have significantly influenced the development of stress-testing practices. In particular, the implementation of Basel III requirements has reinforced the role of stress testing as an integral component of prudential regulation. Stress-testing models are now expected to assess the impact of severe but plausible scenarios on multiple risk dimensions, including credit, market, and liquidity risks. This shift has increased the demand for more sophisticated and effective modeling approaches capable of reflecting complex interdependencies and dynamic feedback effects within the financial system.

Despite widespread adoption, the effectiveness of stress-testing models varies considerably across jurisdictions and institutions. Differences in scenario design, data availability, modeling techniques, and governance structures often lead to inconsistencies in stress-test outcomes and limit their practical usefulness. In some cases, stress testing remains a compliance-driven exercise rather than a strategic risk management tool, reducing its ability to support timely and informed decision-making. These challenges highlight the need for continuous improvement in the design and application of stress-testing models.

Enhancing the effectiveness of stress-testing models requires a comprehensive approach that goes beyond technical model refinement. International experience suggests that improvements in scenario realism, integration of risk types, and alignment with supervisory expectations are equally important. Moreover, the effective use of stress-test results in capital planning, liquidity management, and internal governance processes plays a critical role in translating analytical outputs into meaningful risk mitigation actions.

The objective of this article is to analyze international practices aimed at improving the effectiveness of stress-testing models for commercial banks. By examining key methodological enhancements and institutional arrangements, the study seeks to identify practical approaches that strengthen stress-testing frameworks and contribute to greater financial stability. The findings are intended to provide insights for policymakers,

supervisors, and banking institutions seeking to enhance the robustness and relevance of stress-testing models in an increasingly uncertain global environment.

LITERATURE REVIEW

The effectiveness of stress-testing models has become a prominent topic in the banking and financial stability literature, particularly as stress testing has evolved from a regulatory compliance tool into a strategic risk management instrument. A number of scholars emphasize that the value of stress testing depends not only on model sophistication, but also on how well scenarios reflect real economic vulnerabilities and how results are incorporated into decision-making processes.

Several studies focus on the role of scenario design in improving stress-testing outcomes. Foglia (2009) argues that overly simplified or historically anchored scenarios reduce the predictive power of stress tests, especially during periods of structural change in the economy. According to his findings, forward-looking and exploratory scenarios are more effective in identifying emerging risks than purely backward-looking approaches. Similarly, Breuer, Jandacka, Rheinberger, and Summer (2009) highlight that stress-testing models should be flexible enough to capture extreme but plausible events, rather than relying on narrow distributions of past shocks.

Another strand of the literature emphasizes model structure and risk integration as key determinants of effectiveness. Elsinger, Lehar, and Summer (2006) demonstrate that stress-testing models which explicitly incorporate interbank linkages and balance-sheet interdependencies provide more informative results than isolated, institution-level models. Their work suggests that neglecting cross-risk and cross-institutional channels may lead to a systematic underestimation of systemic risk, thereby weakening the practical usefulness of stress tests.

Data quality and model calibration are also frequently cited as critical factors. Čihák (2007) points out that stress-testing results are highly sensitive to data assumptions, particularly in relation to loss given default, recovery rates, and liquidity behavior under stress. He argues that improving data granularity and transparency is essential for enhancing model reliability. In a similar vein, Blaschke, Jones, Majnoni, and Martinez Peria (2001) stress that stress tests should be supported by consistent datasets and clearly documented assumptions to avoid misleading policy conclusions.

Governance and institutional use of stress-testing results represent another important theme in the literature. Borio and Shim (2007) note that stress tests often lose effectiveness when they are treated as technical exercises disconnected from management actions. They argue that stress-testing frameworks are most effective when embedded within broader risk governance structures, where results directly influence capital buffers, liquidity strategies, and risk limits. This perspective highlights the importance of organizational and procedural factors alongside quantitative modeling.

More recent contributions focus on the dynamic dimension of stress testing. Anderson, Bolder, and Jones (2010) advocate for multi-period stress-testing models that capture the evolution of risks over time, rather than static, single-horizon assessments. Their research shows that dynamic models provide more realistic insights into how shocks accumulate and interact, thereby enhancing the strategic value of stress-testing exercises.

Overall, the literature suggests that improving the effectiveness of stress-testing models requires a holistic approach. Enhancements in scenario realism, model integration, data quality, and governance practices are all necessary to ensure that stress testing serves as a meaningful tool for risk management and financial stability. This body of research provides a strong conceptual foundation for examining international practices aimed at strengthening stress-testing frameworks for commercial banks.

RESEARCH METHODOLOGY

This study employs a qualitative and analytical research approach to examine ways to enhance the effectiveness of stress-testing models for commercial banks in international practice. The methodological framework is designed to evaluate both technical and institutional aspects of stress testing, with a focus on identifying practical improvements that increase the reliability and policy relevance of stress-testing outcomes.

The research is based on a structured review and analysis of international regulatory standards, supervisory guidelines, and publicly available stress-testing practices adopted by advanced banking systems. These materials are examined to identify common methodological features, such as scenario construction, risk coverage, modeling

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horizons, and the treatment of feedback effects. This approach enables a systematic comparison of stress-testing frameworks without reliance on individual bank-level confidential data.

Comparative analysis is used as a core method to assess differences and similarities in stress-testing model design across jurisdictions. Stress-testing models are evaluated according to predefined criteria, including scenario severity, integration of credit, market, and liquidity risks, data assumptions, and the role of stress-test results in supervisory and internal decision-making. This comparative perspective supports the identification of effective practices and recurring weaknesses.

Scenario-based analysis constitutes a central element of the methodology. The study examines how adverse macroeconomic and financial scenarios are designed and applied within stress-testing models, with particular attention to consistency across risk categories and time horizons. The analysis also considers whether scenarios are static or dynamic and how they capture the transmission of shocks through bank balance sheets.

In addition, the research evaluates governance and implementation aspects of stress-testing frameworks. This includes an assessment of how stress-test results are used in capital planning, liquidity management, and risk governance processes. The effectiveness of stress testing is analyzed not only in terms of technical model outputs, but also in relation to how these outputs influence strategic and supervisory actions.

Overall, the applied methodology provides a comprehensive basis for assessing international practices aimed at improving stress-testing model effectiveness. By combining regulatory review, comparative assessment, and scenario-based evaluation, the study ensures analytical rigor and supports well-founded conclusions on enhancing stress-testing frameworks in commercial banking.

ANALYSIS AND RESULTS

The analysis of international practice demonstrates that the effectiveness of stress-testing models for commercial banks largely depends on methodological depth, scenario realism, and the degree of integration across risk types. Countries with more advanced stress-testing systems tend to treat stress testing as a continuous analytical process rather than a periodic regulatory exercise. This approach allows banks to better anticipate vulnerabilities and align stress-testing outcomes with strategic risk management objectives.

One of the key results of the analysis is that improvements in stress-testing effectiveness are closely linked to enhancements in scenario design and model structure. In particular, models that incorporate multiple adverse macroeconomic paths, longer time horizons, and consistent assumptions across risk categories generate more informative results. These features enable banks to assess not only immediate losses but also the cumulative impact of stress over time.

The main methodological approaches used to enhance stress-testing effectiveness in international practice are summarized in Table 1.

Table 1. Key approaches to enhancing stress-testing model effectiveness in international practice

№	Enhancement dimension	Traditional approach	Improved approach	Expected effect on results
1	Scenario design	Single adverse scenario	Multiple severe but plausible scenarios	Higher risk coverage
2	Time horizon	Short-term (1 year)	Multi-period (3–5 years)	Better forward-looking analysis
3	Risk coverage	Single risk focus	Integrated credit, market, liquidity risks	More realistic loss estimation
4	Use of assumptions	Static assumptions	Dynamic, scenario-consistent assumptions	Reduced model bias

The table indicates that moving from traditional to improved modeling approaches significantly enhances the analytical value of stress tests. In particular, integrated risk coverage and dynamic assumptions reduce the likelihood of underestimating systemic vulnerabilities, which is a common limitation of simplified stress-testing models.

Beyond methodological design, the results highlight the importance of governance and implementation factors. Effective stress-testing frameworks are supported by strong internal processes that ensure regular model

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validation, clear documentation, and consistent use of outputs in decision-making. Where these elements are weak, even technically advanced models fail to produce meaningful risk insights.

Further analysis focuses on how improvements in stress-testing models influence banks' risk management outcomes. Table 2 presents the observed relationship between model enhancements and practical risk management benefits.

Table 2. Impact of stress-testing model enhancements on bank risk management outcomes

№	Model improvement area	Impact on capital planning	Impact on liquidity management	Overall effectiveness level
1	Enhanced scenario realism	High	Moderate	High
2	Integrated risk modeling	High	High	Very high
3	Dynamic balance-sheet modeling	Moderate	High	High
4	Strong governance integration	High	High	Very high

The results suggest that integrated risk modeling and strong governance integration have the most significant impact on overall stress-testing effectiveness. These elements ensure that stress-test outcomes are not only analytically sound but also actionable, directly supporting capital allocation and liquidity buffer decisions.

The analysis of international practice indicates that improving the effectiveness of stress-testing models requires a structured and multidimensional approach. Empirical evidence suggests that isolated technical refinements are insufficient to significantly enhance stress-testing outcomes unless they are supported by coherent scenario design, integrated risk assessment, and robust governance arrangements. Consequently, effective stress-testing frameworks are increasingly viewed as systems that combine methodological rigor with institutional discipline, ensuring that stress-test results are both analytically sound and operationally relevant.

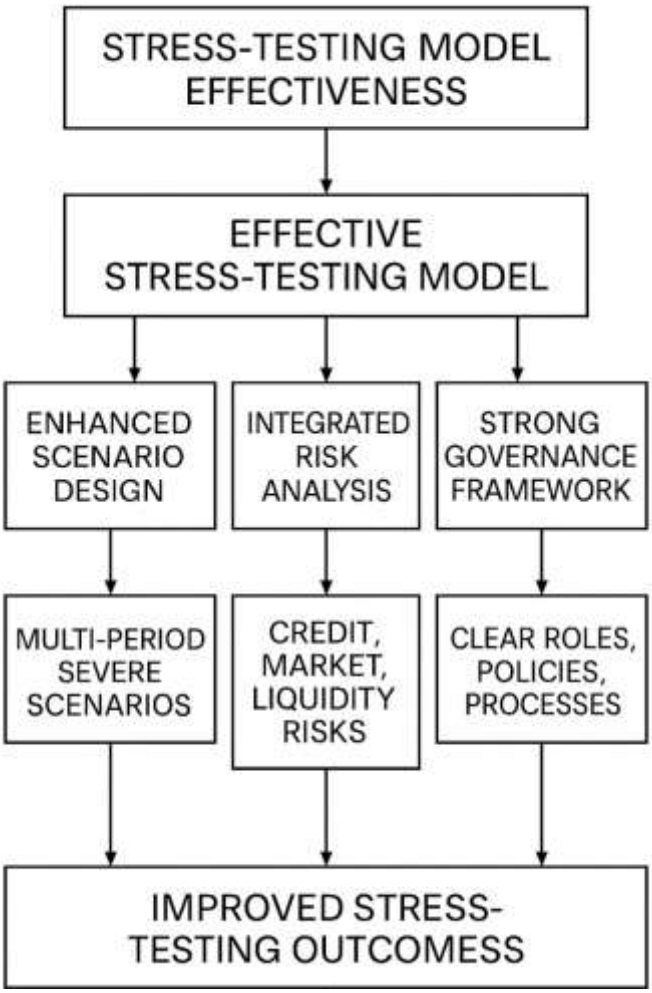


Figure 1. Framework for enhancing the effectiveness of stress-testing models in commercial banks

Figure 1 presents a conceptual framework illustrating the key components that contribute to enhanced stress-testing model effectiveness in commercial banks. The framework emphasizes that model effectiveness is not a standalone outcome but the result of coordinated improvements across three core dimensions: scenario design, risk integration, and governance structure. These elements jointly determine the quality, consistency, and usability of stress-testing outputs.

The framework highlights enhanced scenario design as a foundational element of effective stress testing. The use of multi-period and severe yet plausible scenarios allows banks to capture the dynamic evolution of risks over time. Such scenarios improve the ability of stress-testing models to assess cumulative losses and delayed effects, thereby strengthening forward-looking risk assessment and strategic planning.

Integrated risk analysis constitutes the second critical pillar of the framework. By jointly modeling credit, market, and liquidity risks, stress-testing models can account for interdependencies and feedback mechanisms that amplify shocks during periods of financial stress. This integration enhances the realism of stress-test results and reduces the likelihood of underestimating systemic vulnerabilities arising from risk interactions.

The third pillar of the framework relates to governance and institutional arrangements. Strong governance structures, characterized by clearly defined roles, policies, and processes, ensure that stress-testing exercises are consistently implemented and regularly reviewed. Effective governance also facilitates the translation of stress-test results into actionable decisions related to capital allocation, liquidity buffers, and risk limits.

Overall, the framework demonstrates that improved stress-testing outcomes emerge from the alignment of technical modeling improvements with sound governance practices. International experience confirms that commercial banks adopting such comprehensive frameworks are better positioned to strengthen risk management, enhance regulatory compliance, and maintain financial stability under adverse economic conditions.

CONCLUSION AND RECOMMENDATIONS

This study has examined international practices aimed at enhancing the effectiveness of stress-testing models for commercial banks and has demonstrated that stress testing has evolved into a critical pillar of modern risk management and supervisory oversight. The findings confirm that effective stress-testing models extend beyond technical calculations and require a comprehensive framework that integrates scenario design, risk modeling, and governance mechanisms. Such an approach strengthens banks' ability to anticipate vulnerabilities and respond proactively to adverse economic conditions.

The analysis indicates that improvements in stress-testing effectiveness are most pronounced when models adopt multi-period and severe but plausible scenarios. These scenarios allow banks to capture the dynamic nature of macroeconomic and financial shocks and assess their cumulative impact on balance sheets over time. As a result, stress-testing outcomes become more informative for strategic planning and capital adequacy assessments, reducing reliance on short-term and static risk evaluations.

Another key conclusion is the importance of integrated risk analysis. International experience shows that stress-testing models that jointly assess credit, market, and liquidity risks provide a more realistic representation of systemic risk than fragmented approaches. The integration of risk channels enables banks to identify feedback effects and nonlinear interactions that may amplify losses during periods of stress. This enhances the credibility and analytical depth of stress-testing results.

Based on these findings, several recommendations can be proposed. First, commercial banks should prioritize the development of integrated stress-testing frameworks that ensure consistency across risk types, assumptions, and time horizons. Second, stress-testing results should be systematically embedded into internal decision-making processes, particularly in capital planning, liquidity management, and risk appetite setting. This integration will help transform stress testing from a compliance-driven exercise into a strategic management tool.

Furthermore, strong governance arrangements are essential for sustaining stress-testing effectiveness. Clear roles and responsibilities, regular model validation, and transparent documentation should be established to ensure accountability and continuous improvement. Supervisory authorities can support this process by providing guidance that encourages methodological consistency while allowing flexibility to reflect institution-specific risk profiles.

In conclusion, enhancing the effectiveness of stress-testing models requires a balanced combination of methodological rigor and institutional discipline. International practice demonstrates that banks adopting comprehensive and well-governed stress-testing frameworks are better equipped to manage risks, comply with regulatory standards, and maintain financial stability in an increasingly uncertain global environment. The insights derived from this study can serve as a practical reference for policymakers and banking institutions seeking to strengthen stress-testing systems and improve resilience across the banking sector.

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