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Foreign practices of an integrated stress-testing framework based on Basel III requirements

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Abstract

This article examines foreign practices in the development and implementation of integrated stress-testing frameworks based on Basel III requirements. The study focuses on how advanced banking systems incorporate stress testing into risk management, capital adequacy assessment, and liquidity supervision. Particular attention is paid to the integration of credit, market, and liquidity risks within a unified stress-testing architecture, as well as the role of macroeconomic scenarios in assessing banks' resilience under adverse conditions. The analysis highlights methodological approaches applied in international practice, including scenario design, model integration, and governance arrangements. Based on the review of foreign experience, the article identifies key strengths and limitations of existing stress-testing frameworks and outlines practical implications for improving risk management and supervisory practices. The findings contribute to a better understanding of how Basel III–based integrated stress testing enhances financial stability and supports informed decision-making in the banking sector.

Keywords: Integrated Stress Testing; Banking Regulation; Risk Management; Capital Adequacy; Liquidity Risk; Financial Stability

1. Introduction

In recent decades, the stability of the global banking system has been repeatedly challenged by financial crises, market volatility, and systemic shocks. These events have highlighted the critical importance of robust risk management frameworks capable of identifying vulnerabilities in advance and ensuring banks' resilience under adverse conditions. As a result, stress testing has become a core instrument in both supervisory oversight and internal bank risk management, particularly following the introduction of the Basel III regulatory framework.

Basel III significantly strengthened prudential standards by enhancing capital adequacy requirements, introducing liquidity ratios, and promoting a more comprehensive approach to risk assessment. Within this context, stress testing is no longer viewed as a standalone analytical exercise, but rather as an integrated framework that links credit, market, and liquidity risks with macroeconomic developments. Many advanced banking systems have adopted integrated stress-testing frameworks to evaluate the combined impact of multiple risk factors on banks' financial positions and to support forward-looking decision-making.

Despite the widespread adoption of stress testing, international experience reveals substantial differences in methodological approaches, governance structures, and degrees of integration across countries. Variations exist in scenario design, model calibration, data granularity, and the use of stress-test results in supervisory and strategic processes. These differences raise important questions regarding the effectiveness and comparability of stress-testing

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frameworks implemented under Basel III requirements, particularly in the context of cross-border banking activities and global financial stability.

An integrated stress-testing framework aims to overcome the limitations of fragmented risk assessments by capturing interdependencies between risk types and feedback effects within the financial system. By combining macroeconomic scenarios with bank-specific balance sheet dynamics, such frameworks provide a more realistic assessment of potential losses, capital depletion, and liquidity pressures. International practices demonstrate that the effectiveness of integrated stress testing depends not only on technical modeling, but also on institutional arrangements, transparency, and the integration of results into risk governance and supervisory decision-making.

The purpose of this article is to analyze foreign practices in the implementation of integrated stress-testing frameworks based on Basel III requirements. The study seeks to identify key methodological approaches, highlight best practices, and assess common challenges observed in international experience. By synthesizing these practices, the article aims to provide insights that can support the development and refinement of stress-testing frameworks in banking systems seeking to strengthen financial stability and regulatory effectiveness.

2. Literature Review

The academic literature on bank stress testing has expanded significantly following the global financial crisis, reflecting the growing role of stress testing within prudential regulation and risk management. Early theoretical contributions emphasized the importance of banks' vulnerability to adverse shocks and the need for forward-looking risk assessment tools. In this context, Diamond and Dybvig (1983) laid the theoretical foundation by demonstrating how liquidity transformation exposes banks to systemic risk, thereby justifying regulatory intervention and stress-based analysis.

With the evolution of regulatory frameworks, stress testing became increasingly formalized. The introduction of Basel III marked a turning point in the literature by embedding stress testing into capital and liquidity regulation. The Basel Committee on Banking Supervision (BCBS) conceptualized stress testing as an integral component of supervisory review, particularly under Pillar 2, where banks are required to assess capital adequacy under adverse scenarios. Scholars such as Goodhart (2008) argue that Basel III transformed stress testing from a microprudential tool into a macroprudential instrument aimed at safeguarding system-wide stability.

A substantial body of literature focuses on the integration of multiple risk types within stress-testing frameworks. Borio (2014) emphasizes that traditional silo-based stress tests fail to capture the financial cycle and the amplification of shocks across risk categories. Similarly, Drehmann and Juselius (2014) highlight the importance of incorporating macro-financial linkages, arguing that integrated stress tests provide a more realistic assessment of banks' resilience under systemic stress. Their findings suggest that ignoring feedback loops between credit, market, and liquidity risks may lead to an underestimation of potential losses.

Research on international stress-testing practices highlights methodological diversity across jurisdictions. Hirtle, Schuermann, and Stiroh (2009) analyze stress-testing programs in the United States and demonstrate how supervisory stress tests influence banks' capital planning and strategic behavior. In the European context, Constâncio (2016) discusses the role of EU-wide stress tests in enhancing transparency and market discipline, while acknowledging challenges related to model heterogeneity and cross-country comparability.

The governance and practical use of stress-test results represent another key theme in the literature. Schuermann (2014) argues that stress testing is most effective when results are embedded into decision-making processes rather than treated as regulatory compliance exercises. Empirical studies by Aikman, Kapadia, and Drehmann (2018) further show that integrated stress-testing frameworks improve early warning capabilities by capturing nonlinear dynamics and contagion effects within the banking system.

Overall, the literature indicates broad consensus on the necessity of integrated stress-testing frameworks under Basel III, while also identifying persistent challenges. These include scenario realism, data limitations, model risk, and the effective translation of stress-test outcomes into supervisory and managerial actions. Despite these challenges, international experience suggests that well-designed integrated stress-testing systems play a crucial role in enhancing banking sector resilience and supporting financial stability.

3. Research Methodology

This study adopts a qualitative and comparative research design to examine foreign practices in the implementation of integrated stress-testing frameworks based on Basel III requirements. The methodological approach combines regulatory analysis, comparative assessment, and systemic evaluation of stress-testing frameworks applied in advanced banking jurisdictions. This approach enables a comprehensive understanding of how integrated stress testing is embedded within supervisory and risk management structures.

The research is based on the analysis of international regulatory documents, supervisory guidelines, and publicly available stress-testing reports issued by financial authorities and central banks. These materials are examined to identify key structural elements of integrated stress-testing frameworks, including scenario design, risk integration mechanisms, and governance arrangements. Special attention is given to the alignment of stress-testing practices with Basel III capital and liquidity standards.

A comparative analysis method is employed to assess similarities and differences across jurisdictions in terms of stress-testing objectives, methodological design, and practical implementation. Stress-testing frameworks are evaluated based on predefined criteria such as the degree of integration between credit, market, and liquidity risks, the use of macroeconomic and financial scenarios, and the incorporation of feedback effects within the banking system. This comparative perspective allows for the identification of best practices and common challenges observed in international experience.

Scenario analysis constitutes a central component of the methodology. The study examines how adverse macroeconomic scenarios are constructed, calibrated, and applied within integrated stress-testing frameworks. Emphasis is placed on the consistency of assumptions across risk types and the dynamic interaction between macroeconomic variables and bank-specific balance sheet positions. This approach facilitates a more realistic assessment of banks' resilience under severe but plausible stress conditions.

In addition, the study evaluates the role of stress-test results in supervisory and managerial decision-making processes. This involves assessing how outcomes are used to inform capital planning, liquidity management, and corrective actions. The integration of stress-testing outputs into risk governance structures is analyzed to determine the extent to which stress testing functions as a forward-looking management tool rather than a purely regulatory requirement.

Overall, the applied methodology ensures a systematic and coherent assessment of integrated stress-testing frameworks under Basel III. By combining regulatory review, comparative analysis, and scenario-based evaluation, the study provides a robust analytical foundation for understanding foreign practices and deriving insights relevant to the enhancement of stress-testing systems and financial stability.

4. Results and Discussion

The analysis of foreign practices shows that integrated stress-testing frameworks based on Basel III requirements have become a central component of modern banking supervision. In advanced jurisdictions, stress testing is no longer conducted in isolation for individual risk types, but instead applied through a unified framework that captures interactions between credit, market, and liquidity risks. This integrated approach allows supervisors and banks to assess the cumulative impact of adverse scenarios on capital adequacy, liquidity positions, and overall financial resilience.

A key analytical finding is that the depth of integration varies significantly across countries. Some jurisdictions emphasize strong macroeconomic scenario design combined with balance-sheet-based modeling, while others focus more on granular risk segmentation and bottom-up bank-level assessments. Despite these differences, common elements can be identified, including multi-year stress horizons, consistency of assumptions across risk types, and explicit links between stress-test outcomes and supervisory actions.

The comparative results of selected foreign stress-testing practices are summarized in the table below.

Table 1 Key Characteristics of Basel III–Based Integrated Stress-Testing Practices in Selected Jurisdictions

№	Analytical dimension	United States	European Union	United Kingdom	Other advanced economies
1	Scope of integration	Credit, market, liquidity	Credit, market, liquidity	Credit, market, liquidity	Mainly credit and liquidity
2	Scenario horizon	2–3 years	3 years	5 years	2–3 years
3	Scenario type	Macro-financial, adverse	Baseline and adverse	Severe but plausible	Mainly adverse
4	Use of results	Capital planning, supervision	Supervisory review, disclosure	Capital buffers, governance	Supervisory monitoring
5	Degree of supervisory involvement	High	High	Very high	Moderate

The table indicates that jurisdictions with a higher degree of supervisory involvement tend to place greater emphasis on the integration of stress-test results into capital planning and governance processes. In particular, the use of multi-year horizons enhances the forward-looking nature of stress tests, enabling authorities to assess the sustainability of banks' capital and liquidity positions under prolonged stress conditions. This reinforces the role of stress testing as a preventive rather than reactive supervisory tool.

Beyond institutional design, the analysis highlights the importance of structural integration within stress-testing frameworks. Integrated models enable the transmission of shocks from macroeconomic variables to bank balance sheets, capturing feedback effects between declining asset quality, market valuation losses, and liquidity pressures. Such interaction effects are often underestimated in fragmented stress-testing approaches, leading to an incomplete assessment of systemic vulnerability.

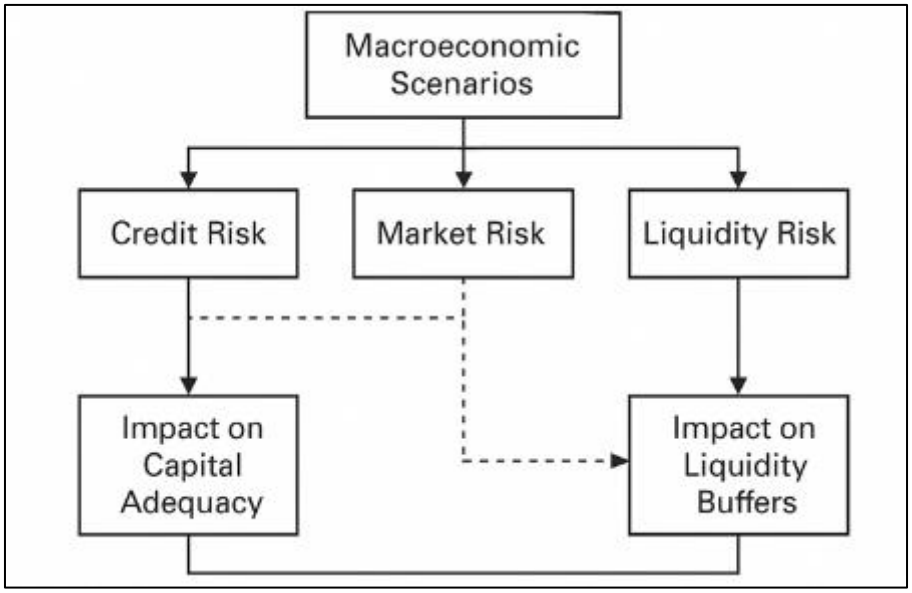

Figure 1 Conceptual structure of an integrated Basel III–based stress-testing framework

The figure illustrates the conceptual architecture of an integrated stress-testing framework aligned with Basel III requirements. It demonstrates how macroeconomic scenarios act as a unified transmission channel affecting multiple risk categories simultaneously. Credit risk, market risk, and liquidity risk are modeled in parallel, while their interdependencies are explicitly captured through feedback mechanisms. This structure reflects the transition from isolated risk assessments to a system-wide perspective on bank vulnerability.

The analytical results indicate that the integration of risk channels significantly improves the accuracy and policy relevance of stress-testing outcomes. When macroeconomic shocks are transmitted consistently across credit, market, and liquidity risks, the resulting impact on capital adequacy and liquidity buffers becomes more realistic. This integrated approach allows supervisors and banks to identify nonlinear effects that may otherwise remain hidden in fragmented stress-testing frameworks.

Furthermore, the figure highlights the role of interaction effects between risk types, particularly the feedback from market and credit stress to liquidity conditions. In foreign practice, such feedback loops are critical in assessing the sustainability of liquidity buffers under prolonged stress scenarios. The inclusion of these mechanisms enhances the forward-looking nature of stress tests and supports more effective capital and liquidity planning decisions.

Overall, the results confirm that integrated stress-testing frameworks based on Basel III requirements provide a more comprehensive assessment of banking sector resilience. Jurisdictions that apply such frameworks are better equipped to detect systemic vulnerabilities, strengthen supervisory interventions, and enhance financial stability. The empirical evidence from foreign practice underscores that the effectiveness of stress testing depends not only on scenario severity, but also on the structural integration of risks and the consistent use of results in regulatory and managerial decision-making.

5. Conclusion and Recommendations

This study has examined foreign practices in the implementation of integrated stress-testing frameworks based on Basel III requirements and has demonstrated their growing importance in modern banking regulation and risk management. The findings confirm that integrated stress testing represents a significant advancement over traditional, silo-based approaches by capturing the combined effects of credit, market, and liquidity risks under adverse macroeconomic conditions. Such frameworks enhance the ability of both banks and supervisory authorities to assess resilience in a forward-looking and comprehensive manner.

The analysis reveals that jurisdictions with well-developed integrated stress-testing systems tend to achieve more reliable assessments of capital adequacy and liquidity sustainability. By applying consistent macroeconomic scenarios across risk categories and incorporating feedback effects within bank balance sheets, these frameworks provide a more realistic picture of potential vulnerabilities. In contrast, fragmented stress-testing approaches may underestimate systemic risk and delay corrective actions, thereby increasing the likelihood of financial instability.

Based on the results, several recommendations can be derived. First, banking supervisors and financial institutions should further strengthen the integration of stress-testing models across risk types, ensuring consistency in assumptions, time horizons, and data inputs. This integration is essential for capturing interdependencies and nonlinear effects that emerge during periods of severe stress. Second, stress-testing frameworks should increasingly adopt dynamic, multi-period scenarios that reflect the evolving nature of macro-financial shocks rather than relying on static, one-off assessments.

Third, the effective use of stress-test results should be reinforced by embedding them into strategic decision-making processes. Stress-testing outcomes should directly inform capital planning, liquidity management, and the calibration of prudential buffers, rather than serving solely as compliance tools. Clear governance structures and transparent communication of results can enhance accountability and improve the credibility of stress-testing exercises.

Finally, international experience suggests that continuous refinement of stress-testing methodologies is necessary to address emerging risks and structural changes in the financial system. Advances in data availability, modeling techniques, and macroprudential oversight provide opportunities to further enhance the effectiveness of integrated stress-testing frameworks. By adopting best practices observed in foreign jurisdictions, banking systems can strengthen financial stability and improve their capacity to withstand future economic shocks.

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