



Driving Business Value Through Stress Testing

Improving banks' confidence in
business planning and forecasting

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Executive Summary

A new scope for stress testing

With the continuous evolution of new regulatory requirements, volatility in financial and commodity markets and structural shifts in the economy (e.g. ageing population and technology disruptions), the landscape for financial institutions is increasingly unpredictable.

Banks are leveraging traditional methods of stress testing to answer crucial risk management questions such as forecasting losses and capital adequacy under stressed conditions. However, banks are not utilizing the full potential of stress testing to shape their business and product strategy.

In most banks, globally, business planning continues to be a bottom-up exercise done at a business unit level. Such exercise falls short of accuracy for the following reasons:

- **Forecasting is performed through assuming a static economic environment over the forecast horizon.**
- **Forecasting does not consider the impact that business units within the group can have on each other.**
- **Forecasting is executed without an in depth understanding of interactions between external factors (macroeconomic, political, and social) and the balance sheet fundamentals.**
- **Individual business units use different scenarios to generate forecasting, which leads to inconsistency.**

Through the adoption of enhanced stress testing approaches, the impact of sudden macro-economic shifts on your business can be better estimated. Imagine knowing the quantum of impact of GDP on your net interest margin or the quantum of impact of external market shocks on your funding cost. This information would be quite powerful in guiding strategic decisions like:

- **Developing a product and investment strategy that is sensitive to changing macroeconomic conditions, industry dynamics and country dynamics.**
- **Setting coherent strategic objectives and risk appetite targets.**
- **Developing a stable funding strategy.**
- **What are the early warning indicators that should trigger contingency plans and countermeasures?**
- **How to stabilize asset quality and growth under adverse external conditions?**

In this paper, we will look at ways in which stress testing can be enhanced to help improve the management of risk and raise the level of confidence in business planning and forecasting.



Evolution of Stress Testing Practices

Stress testing has been around for more than two decades, and its maturity has evolved across two distinct phases:

1. Pre-financial crisis (up to 2009)
2. Post-financial crisis (2009 – present)

Clearly, stress testing was not effective in forecasting the financial crisis. Why was this?

Deficiencies in pre-financial crisis stress testing

- **Siloed approach:** Most banks did not have an integrated enterprise wide stress testing framework that spanned all material risks. Risk management was siloed, with disparate IT and data.
- **Narrow focus:** Stress testing was still primarily focused on a single factor i.e. Capital adequacy driven by market and credit risk.
- **Insufficient data:** There was limited data to model severe scenarios.
- **Micro prudential:** Supervisory stress testing has remained a micro prudential (i.e. focus on individual banks) rather than a macro prudential tool (i.e. focus on financial system as a whole).
- **Subjectivity:** Regulators took a principle based approach to stress testing, through Basel Pillar II.
- **Lack of awareness:** Lack of recognition of how interconnected the financial system was.

The Global Financial Crisis was a wakeup call for the banks and the regulators to implement a framework that would enable them to do a more robust forward looking assessment of risk. The US Federal Reserve and

European Banking Authority put in place a prescriptive stress testing approach (Comprehensive Capital Analysis and Review (CCAR) and EU-wide stress testing respectively) to examine and strengthen the solvency levels of banks. These frameworks brought more rigor and consistency to the scenario development and stress testing methodology.

Table 1, 2 and **Figure 1** illustrates the impact of supervisory stress testing.

Deficiencies in post-financial crisis stress testing

- Stress testing is still largely focused on solvency. Some regulators (e.g. Bank of Canada, Netherlands Bank) however do incorporate liquidity and funding stress as well.
- Organizational structure at most banks is not set up to conduct integrated stress testing or integrated risk management.
- Weak internal controls and documentation protocols lead to redundant effort and incoherent results.
- Banks still have duplicate stress testing processes and infrastructure for different purposes, i.e. supervisory stress tests, Pillar II, Recovery Resolution Planning etc.

Despite the proactive regulatory effort, stress testing still has the opportunity to further evolve to better address some of these deficiencies.

How has supervisory stress testing helped?



CCAR and EU-wide stress testing has had substantial impact in uncovering the excessive risks in the balance sheet of banks and putting them on a path to a healthier balance sheet. The post-financial crisis stress testing measures have, to a degree:

- Improved the resilience of banks and restored investor confidence in the banking system.
- Revealed systemic information about how macroeconomic factors and market shocks affect the health of the bank's balance sheet.
- Enhanced disclosures increased the transparency of risk management and capital planning process to supervisors.
- Informed regulatory actions (both micro prudential and macro prudential).
- Identified key weaknesses or gaps in the banks' risk management framework in terms of:
 - **Governance and internal controls**
 - **Methodology and assumptions**
 - **Model risk management**
 - **Deficiencies in management overlay**
 - **Deficiencies in capital policy**

Table 1: Positive impact of Federal Reserve stress testing on US banking system over a period of 3 years

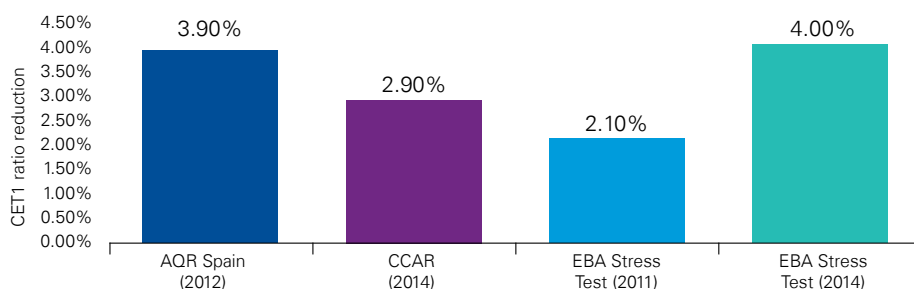
CCAR	2013	2014	2015
Failure rate	2 out of 18 bank holding companies (BHCs) failed for capital shortfall 2 BHCs given conditional approval for qualitative issues.	1 out of 30 BHCs failed for capital shortfall. 4 out of 30 BHCs failed for qualitative reasons.	No capital shortfall. 2 out of 30 BHCs failed for qualitative reasons.
Average minimum common equity tier 1 (CET1) ratio	6.6%	7.5%	8.7%
Key findings	Weaknesses in the risk measurement and capital planning process.	Weaknesses in governance, internal controls, management reports (MIS), estimation of stressed revenues, losses.	Weaknesses in governance, controls, MIS, estimation of stressed revenues, losses.



Table 2: Positive impact of EBA stress testing on European banking systems over a period of 3 years

EBA	2010	2011	2014
Failure rate	7 out of 91 banks failed (7.7% failure rate)	20 out of 90 banks failed (22% failure rate)	24 out of 123 banks failed (19.5% failure rate)
Average stressed CET1 ratio (or Tier 1 in 2010)	9.2%	7.4%	8.5%
Key findings	Tier 1 shortfall of EUR\$3.5 billion	CET1 shortfall of EUR\$2.5 billion	CET1 shortfall EUR\$9.5 billion

Figure 1: Overall capital reduction estimated under stressed scenarios



Sources: US Federal reserve CCAR Results publication; European Banking Authority's EU-Wide Stress Testing Results publication.

Six quick wins to capture the value of stress testing

“The industry and regulators alike are increasingly recognizing that stress testing is more than just a compliance exercise. In order to get more value out of stress testing, banks need to get the implementation right.”

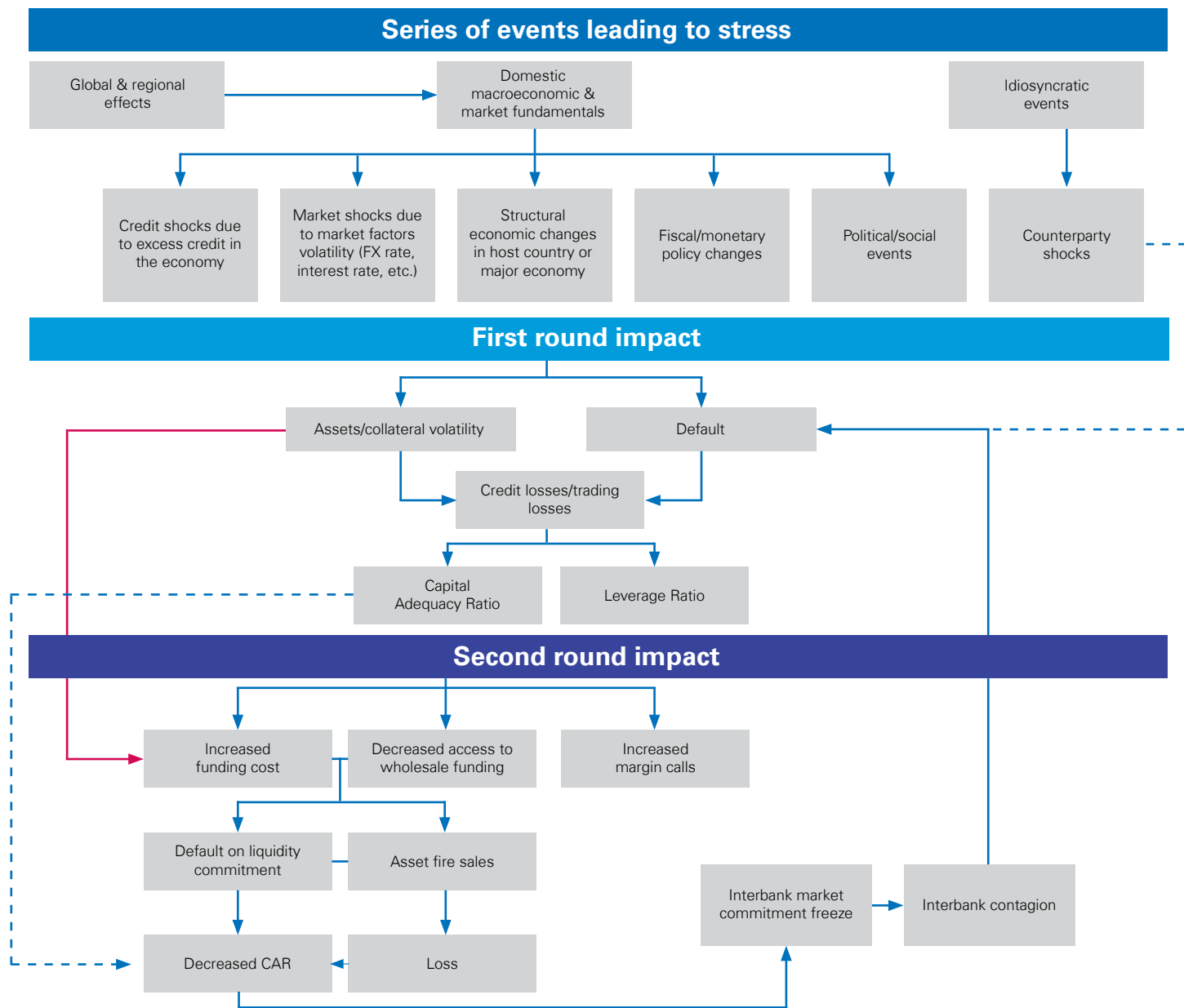
- Craig Davis, Partner, Asia Pacific Head of Financial Risk Management, KPMG in Singapore

While increasing number of regulators in Asia are adopting stress testing as a part of their supervisory framework, it is more than just a regulatory compliance exercise. KPMG's benchmarking analysis on stress testing practices in Asia revealed that most banks use it for their capital planning purposes and few banks are using it to establish their risk appetite as well.

A well designed and well implemented stress testing framework can add value to a bank in a host of different ways. Below are some emerging trends that we believe banks will embrace:

- 1. Strategic planning:** A combination of stress testing and sensitivity analysis can be used to scientifically measure the interactions between the balance sheet fundamentals and exogenous factors (macroeconomic factor, industry dynamics, political and social dynamics). This information will be powerful in guiding the bank's strategic objectives, product strategy and investment strategy.
- 2. Funding strategy and contingency planning:** Funding strategy and contingency liquidity plans will be better informed and sharper by stress testing the relationship between capital, funding cost and liquidity. The Basel committee had recently published a paper on stress testing where they emphasized the need to model this relationship. They cite that funding costs decrease by a range of 26 to 100 basis points (bp) for every 100bp increase in capital levels. **Figure 2** on the right illustrates how to simulate this inter-relationship.
- 3. Equity risk:** Crucial investment decisions can be guided through stress testing, which provides an understanding of the impact of adverse scenarios on minority investments.
- 4. Incorporate interbank contagion effects:** While an individual bank may be within its risk limits, it is still not immune from catching a “Financial Cold” or worse – thanks to the inter-connectedness of our financial system. Such a contagion effect can be a black swan event where banks have little time to react. Hence banks need to stress test the impact of contagion from its large banking counterparties or other financial institutions that are designated as high impact firms.
- 5. Feedback banks' responses to adverse scenarios:** In the event of breach of any of the risk limits (capital adequacy ratio, leverage ratio, LCR, exposure limits, or concentration limits), banks invariably take action in the form of deleveraging, asset fire sale, raising capital, new funding, cut down lending etc. These balance sheet changes could be captured iteratively in the stress testing time window, hence forecasting a ‘real-world’ outcome.
- 6. Enhance operational risk:** While there is no conclusive evidence on whether external macroeconomic factors influence operational risk losses, stress testing can still be used to determine the idiosyncratic factors which can be a root cause to these losses. Consequently, internal controls can be enhanced.

Figure 2: An illustration of solvency-liquidity interlink and interbank contagion effect



Strategies to take full advantage of stress testing



Stress testing can be a useful tool to serve the agenda of multiple stakeholders:

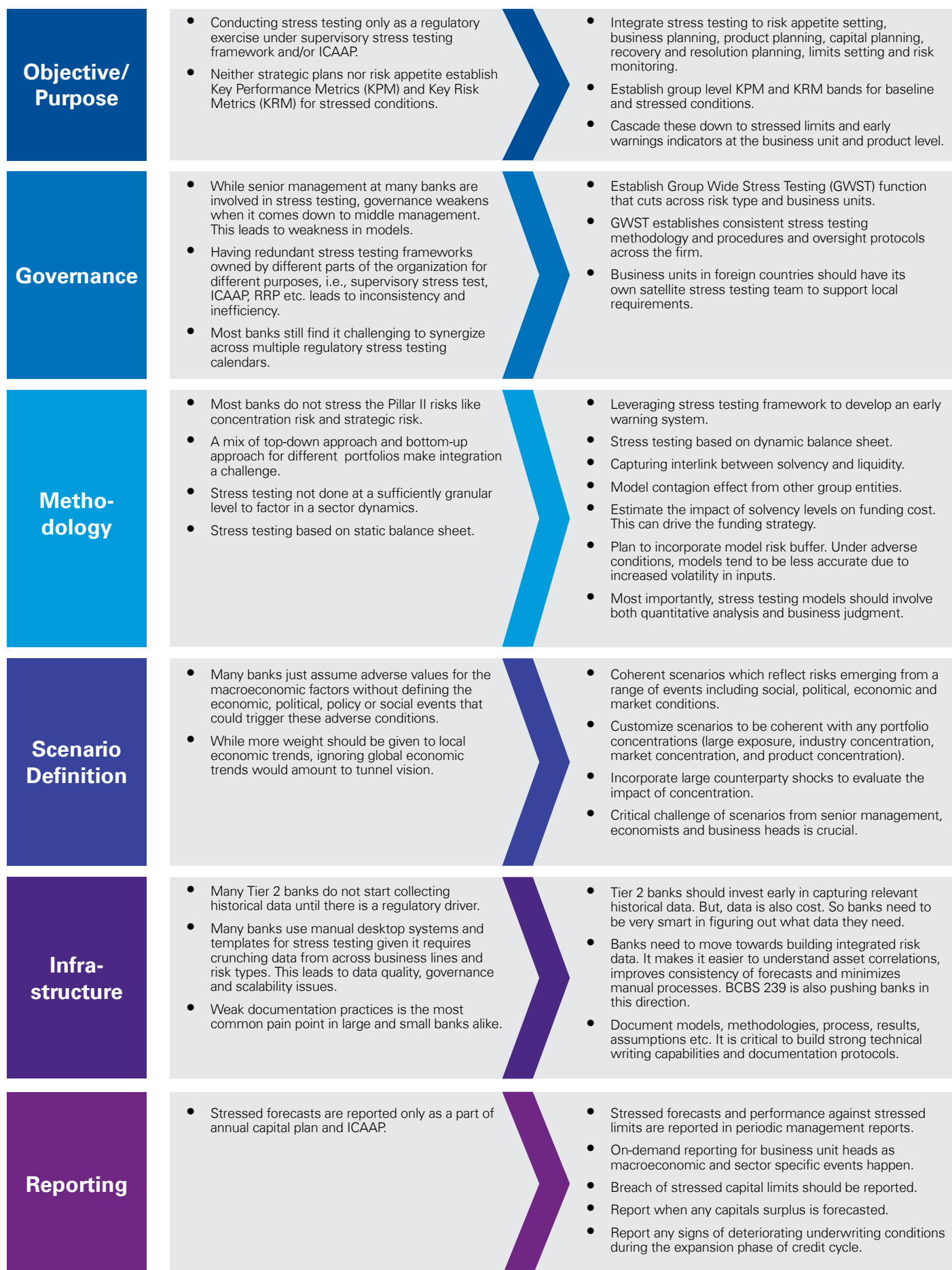
- Regulators already use it to manage financial stability of institutions and broader financial system.
- CFO and CRO at banks use it for capital planning. They also need to use it for recovery and resolution planning, defining stressed limits and other internal controls.
- Board and senior management can use it to define the bank's risk appetite and strategic objectives conditioned on adverse scenarios.
- Business heads can use it for defining their business and product strategy. They can also use it as an early warning system.

Stress testing is a complex activity which requires pulling together knowledge, competencies and infrastructure across the organization. In order to ensure it is not just a “check-in-the-box” compliance activity and it works effectively as a business navigation and risk management tool, banks need to get the following six elements of stress testing right **(Figure 3)**.

“Integrated stress testing is a very challenging exercise. But, as long as banks find the right balance between complexity and transparency, the benefits far outweigh the effort.”

- Nanda Thiruvengadam, Director, KPMG in Singapore

Figure 3: Recommended approach to the six elements of stress testing





How KPMG can help

Undoubtedly stress testing is a powerful tool to see through the haze in an uncertain environment. The value derived from painting a more accurate picture of the impact of potential macro-economic shifts or black swan events, cannot be underestimated. It gives both the risk takers and risk managers in banks more confidence in their long term decision-making and for senior management, it buttresses the necessity of risk management by magnifying the potential loopholes in the business model.

While a growing number of regulators are starting to use stress testing as a part of their banking system supervision, now is an opportunity for banks to embrace its full potential for risk management and business navigation. Banks need to not look at stress testing as a regulatory box ticking exercise, but as a step towards enhancing long term sustainability. While expanding the utility of stress testing, banks need to make sure they get the six elements of stress testing correct from the get go.

KPMG member firms can help banks maximize the potential of their stress testing procedures by:

- Determining objectives and business case for stress testing.
- Designing and implementing an integrated stress testing framework to measure stressed earnings, provisions, capital and liquidity.
- Defining scenarios and macroeconomic modelling.
- Developing stress testing models across credit, market, operational, liquidity, IRRBB, concentration and strategic risks.
- Designing and implementing a sensitivity analysis framework.
- Designing and implementing an early warning framework.
- Providing quality assurance on supervisory and internal stress testing.

Considering the growing relevance of stress testing exercises, we have developed the KPMG stress testing tool which can support banks in the adoption of a sound and comprehensive stress testing approach.

Authors



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Craig Davis is a Partner and leads KPMG's Financial Risk Management practice across ASPAC. He is also the ASEAN lead for the Financial Services sector and is the Global lead for Risk and Capital Markets technology. Craig joined KPMG from APRA where he was a member of the balance sheet and market risk oversight team responsible for the review of trading and balance sheet management at a range of financial institutions. His market experience spans risk management, operations and the sales/trading functions of major institutions in both Australia and London. He has had significant experience in leading Corporate Treasury related engagements with a specialty in risk and liquidity management.



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Steven Claxton is a Director in Financial Risk Management at KPMG in Singapore and leads the Credit Risk stream for the ASEAN region. He has over 13 years of quantitative risk management experience gained through working for two of the major Australian banks along with a global bank based out of Singapore. He has experience in both model development and validation covering wholesale and retail credit and operational risk across Asia Pacific. Steven is also a member of the Institute of Actuaries (Australia) Banking Practice Committee and Chair of the sub-committee on Education. He is currently developing a Banking course (at the Fellowship level) for the Australian Institute having previously assisted with the development of the same subject for the Actuarial Society of South Africa.



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Nanda is an Associate Director at KPMG in Singapore's Financial Risk Management practice. He has over 10 years of consulting experience in the banking sector in the US, Latin America, UK, Middle East, Singapore and ASEAN and has worked with several large global banks in these markets. He has a well-rounded risk and regulatory experience, specifically in Basel II / III, credit risk, market risk, stress testing, capital planning and ICAAP. Nanda has worked with both global and regional financial institutions to help them address a wide array of risk management challenges including risk appetite setting, capital management, stress testing, risk policy and credit risk. He has also assisted large US banks in developing and validating their CCAR stress testing models.

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