Making Sense of Stress Testing

A best practice whitepaper

JAYWING

Contents

Section One

Hello

Welcome to our whitepaper 'Making sense of Stress Testing', written by resident stress testing expert and Risk Practice Director, Ben O'Brien.

In this paper we'll help you make sense of the current stress testing regime in the UK and how you can meet the requirements. We will cover:

- Key facts from the latest Bank of England stress testing update
- How the stress testing landscape has evolved
- Why you need to prepare now
- Eight key steps to successful stress testing

This paper is based on our industry knowledge, and experience of helping many leading banks and building societies to conduct stress tests over a number of years.

During this time we have supported clients with their ICAAP production and been engaged by large institutions, including those subject to the new BoE stress testing regime introduced in 2013. Currently we are supporting clients in IFRS 9 impairment, harnessing the synergies with a best practice stress testing approach.

We hope you find this whitepaper useful. If you have any questions or would like to talk to our team, please call us on **0333 370 6600**, or email us at **risk@jaywing.com**.

You may also like:

Our latest IFRS 9 whitepaper 'Evolution not revolution – Solving IFRS 9 Impairment'. In this paper you will learn a best practice approach to complying with the IFRS 9 requirements. To get your free copy, please email **risk@jaywing.com**.

Section Two

About the author

Ben O'Brien
Risk Practice Director at Jaywing

Ben is an expert in credit risk management, providing analytical consultancy to organisations in financial services, telecoms and utilities. With over 19 years' experience, his expertise spans stress testing, IFRS 9, loss forecasting, portfolio monitoring, modelling and the analytical components of capital management. In addition to his deep subject matter expertise, Ben also has a natural talent for communicating complex information with clarity.

Ben leads the risk consulting practice at Jaywing, and since joining in 2001, Ben has led analytics teams for a number of clients in the UK, Europe and Australia - including a substantial number of clients in the UK banking sector.

Prior to Jaywing, Ben was a consultant at Experian, where he started out developing the Delphi suite of risk models and systems to a diverse client base, including the introduction of credit scoring methods to the building society sector.

Section Three

The latest update

On 21 October 2015, The Bank of England (BoE) published its most important update on the stress testing regime since the original discussion paper was released two years ago.

The BoE hopes that its approach will promote increased resilience in the banking sector, strengthening the wider economy and helping to fulfil its Financial Stability Objectives. Commenting on the latest update, the BoE Governor, Mark Carney, said "The United Kingdom needs banks that can weather shocks without cutting lending to the real economy".

Transparency

It's clear that the BoE intends to become more transparent. The update offered clarifications on hurdle rate mechanisms and on how the regulator will use information from the stress tests to inform individual institutions' capital buffers.

The BoE also provided greater detail on the timeline of events to 2018, allowing institutions to plan resource effectively. In addition, the BoE will remain committed to being transparent with systematic capital adequacy and liquidity processes that the relevant financial institutions will need to satisfy, as well as a comprehensive public disclosure of results.

Proportionality

The scope of the concurrent stress testing regime will remain limited to those institutions with £50bn or more of retail deposits – currently the same seven firms that were included in this year's CST. Annual cyclical stress tests are to be supplemented by more idiosyncratic exploratory scenarios biennially from 2017.

Mark Carney said the focus on the largest banks was intended to ensure the BoE's resources were focused on lenders that have the biggest effect on the economy. These major banks currently account for 80% of the UK's lending. It is also clear that the BoE will continue to hold the systemic and globally systemic banks to a higher standard, including the requirement for incremental buffers from 2016.

Smaller lenders may be relieved by the decision not to widen the scope of the annual concurrent stress testing to include a larger number of firms beyond the current seven.

However, even smaller players need to conduct stress tests in support of their ICAAP. Indeed, many smaller players aspire towards achieving industry best practice and a more rigorous approach to stress testing in order to satisfy their stakeholders.

Counter-cyclicality scenarios and capital buffers

We also see the introduction of an annual cyclical scenario that will systematically link the severity of the test to the financial cycle.

Every year, the BoE will design and run a scenario intended to assess the risks to the banking system emanating from the financial cycle — the 'annual cyclical scenario'. This scenario will include domestic, global and market elements. The severity of the cyclical test will be tougher in an upswing, for example when growth in credit is rapid or asset prices appear unsustainably high.

Results of the annual test will be used by the BoE's Financial Policy Committee and Prudential Regulation Authority to set counter-cyclical capital buffers across all banks, and bespoke capital buffers for individual banks.

Looking forward

The BoE has also set out plans to introduce further exploratory stress tests, potentially targeted at individual banks or a subset of the overall group. These scenarios will be designed to assess the ability of bank balance sheets to withstand specific latent or emerging risks outside of the normal financial cycle, and will be run in alternate years starting from 2017.

It remains the BoE's objective to improve its own modelling capability to assess systemic risks and amplification mechanisms over and above the scrutiny of individual firms' submissions. Further information will be published in due course on the BoE's approach to stress testing beyond 2018. However, the stress testing framework is likely to evolve further to reflect regulatory developments, including structural reform of the banking sector.

Section Four

How the stress testing landscape has evolved

Stress testing has been a key part of the regulatory landscape since the introduction of the Basel II accord over a decade ago. The Basel framework requires individual companies to consider how their business would perform under extreme macroeconomic stress, in order to help them set appropriate capital buffers.

Before the October 2013 discussion paper, stress testing exercises were purely company-specific, using a firm's own models and scenarios to simulate how economic stresses would impact the profit dynamics and capital position of the business. A regulatory review of each company's stress testing results was performed on an individual basis. The results were then used to set capital adequacy guidelines and impose capital buffers on financial institutions to help put appropriate conservatism into the banking sector. It was in this context that the ICAAP and accompanying SREP processes were introduced to help financial institutions and regulators comply with the Basel II requirements.

As firms had performed their stress testing in relative silos, the extent of the interdependency between financial institutions worldwide was not fully considered. Despite the major players in the UK and global banking systems completing several rounds of stress testing, the fall of Lehman Brothers in late 2008 precipitated a major global banking crisis.

This level of interconnectedness between institutions was one of the major factors contributing to the severity of the banking crisis, and highlighted the flaws in a purely company-specific stress testing approach. Each financial institution may have been adequately capitalised to cover the macroeconomic stresses seen in 2008 and 2009 if the external marketplace had remained consistent, but it didn't, and the impact of this crisis is still felt globally today.

The immediate aftermath of the banking crisis required significant interventions by central banks and national Governments.
To avoid such disastrous repercussions in the future, the BoE is now directly accountable to Parliament in the UK for the fulfilment of certain Financial Stability Objectives. One objective is to introduce a more comprehensive and rigorous programme for stress testing the UK banking system as a whole. That's why the BoE introduced a new concurrent stress test for the largest financial institutions in 2014, which has now almost completed its second annual round.

The level of stress testing was augmented in October 2013 as a direct response to the failings of the previous regime, with the BoE publishing its discussion paper "A framework for stress testing the UK banking system", in pursuit of its Financial Stability Objectives.

The new approach outlined by the BoE introduced an annual stress testing regime in 2014. Concurrent annual tests for the largest financial institutions is intended to ingrain the process within the fabric of banking organisations and remove the potential market instability that can be caused when the regulator announces a new round of stress testing.

Beyond the individual ICAAP tests undertaken by financial institutions, the concurrent stress test (CST) is designed to allow direct comparison of each company's results and hence measure the system as a whole.
The new stress testing regime provides a predefined set of common base and common stressed economic scenarios that all participating firms need to model. Increasingly, the regulator also expects other institutions to apply a variant of the scenario for their ICAAP, widening the span of organisations for which

they have broadly comparable stress testing results, without increasing the number of participants in the annual concurrent tests.

Another major new element of the concurrent stress test, beyond the normal ICAAP regime, is the demand for all institutions involved to supply the same clearly defined data to the BoE. The regulator will use this data in its own models to assess the UK banking system as a whole in each scenario, as well as the resilience of the individual firms. The data requirements are detailed in the Firm Data Submission Framework (FDSF), with the threat of penal capital buffers for inadequate data supply, so it is vital financial institutions get their data preparation and submissions right.

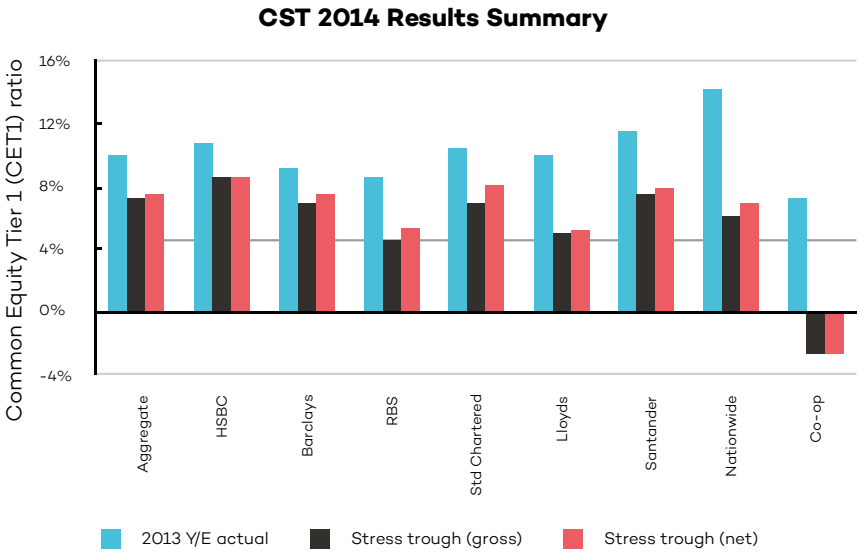
The results of the wider stress testing exercise include analysis of banks' own results and analysis from the BoE's own models. This analysis will produce information that can be used to inform the Financial Policy Committee (FPC) and Prudential Regulation Authority (PRA) judgements on bank capital adequacy.

The introduction of the concurrent stress testing regime, with its heightened expectation of senior management involvement, means that stress testing can't be solely seen as a theoretical construct understood by technical teams in isolation from the executive team, but needs to be ingrained in financial organisations' processes.

Current position and future expectations

The aim of the concurrent stress testing regime is to provide a better answer to the question of how the whole UK banking system would react to severe economic stresses.

The results of the first round of the new regime were published in December 2014 and the tone of the BoE's response was one of cautious optimism, principally showing the wider banking system had the capacity to maintain its core functions in a severe stress scenario. Although the Co-operative Bank was revealed to hold insufficient capital to absorb its credit losses at the peak of the stress, the other seven institutions involved managed to meet the required capital adequacy thresholds despite the severe recessionary scenario provided.



In light of these results, the first round could be considered a success for the BoE although it is likely to remain cautious given global economic and political uncertainties.

The scenarios for the past two years have explored the impacts of a deep house price trough and a price deflationary environment respectively, testing the ability of institutions to simulate their portfolios in economic situations that have been not been seen before.

In 2015 the regulator demanded an increased emphasis on specific counterparty risk, and alongside this the BoE continues to consider whether there is the need for a separate stress testing regime for central counterparties (CCPs) operating in the UK, given their importance to financial stability. However, there have been no further specific developments in this area since the BoE's December 2013 supervisory paper on counterparty credit risk[1].

What remains clear is with increasing demands from the regulator for evidence of responsible stress testing practice there has never been a more important need to plan and prepare.

Figure 1:
2014 Concurrent stress test results showing actual and minimum stressed CET1 ratios before (gross) and after (net of) 'strategic' management actions. Source: Bank of England, Stress testing the UK banking system: 2014 results (December 2014)

The next few years will involve a number of key developments in regulation of financial institutions.

The BoE has now confirmed its intention to limit the annual concurrent stress test to PRA-regulated banks and building societies (including UK subsidiaries of any foreign global systemically important institutions) with retail deposits greater than £50 billion. This means that the playing field will not currently extend beyond the seven organisations participating in the 2015 CST unless there are significant changes in the balance sheets of other financial institutions.

One of the aspects of the original 2013 BoE paper yet to be completed is the regulator's own examination of the impact of feedback and amplification structures on the resilience of the UK banking sector. Understanding the interconnectedness of the financial industry was a key aim of the original plan for the concurrent stress tests. Scenarios like those in the 2015 tests, with an emphasis on international economic dynamics, could be taken as an indicator of the regulator's move towards fulfilling its promise in this regard. In addition, the amount of structured and unstructured data participants are asked to provide is designed to support this industry-wide analysis.

Despite the BoE's decision to remain focused on the larger players, medium-sized financial institutions will nevertheless need to continue to develop their economic modelling capabilities in the context of IFRS 9 Impairment requirements, and against a regulatory backdrop where there is an increased emphasis on the need for financial institutions to be able to withstand economic shocks.

[1] Bank of England Prudential Regulation Authority; Supervisory Statement SS12/13; December 2013

[2] Barclays, HSBC, Lloyds Bank, Nationwide BS, RBS, Santander (UK), Standard Chartered

Section Five

Preparation is everything

Stress testing impacts every financial institution in the UK. Today, putting a forecasting framework in place isn't just the obligation of larger institutions participating in the BoE's concurrent stress tests. ICAAP is for everyone, and the level of technical analysis, qualitative detail and management insight required will become more challenging each year.

Regardless of whether institutions have to conduct just the ICAAP or if they have to participate in concurrent national or international stress testing exercises, they not only have to model more scenarios than ever before, they have to do so with speed and accuracy. In addition, high quality data may need to be supplied to the regulator in the prescribed format and within the given timescales; all of this while continuing business as usual. This undoubtedly places pressure on resources.

As annual testing becomes increasingly sophisticated, both in the demands made by the regulator and the solutions and infrastructure required to deliver it, organisations may need to re-address their stress testing processes. This could mean moving from an institutionally and departmentally isolated ad hoc activity to one that is integrated with other business activities and part of business as usual operations.

Additionally, the arrival of IFRS 9 means that economically responsive default rate and credit loss forecasting has moved to the heart of every credit risk and finance department. Senior managers will be expected to be more closely involved in stress testing activity, using the results to inform strategy and planning for the business. For some, this more rigorous stress testing regime may require an overhaul of organisational structure and the realignment of analytical resources.

The first step is to understand the requirements demanded of the institution. From this, you can plan on-going stress testing activity, identify how this differs from the current state of play and get a picture of the likely impact of the requirements.

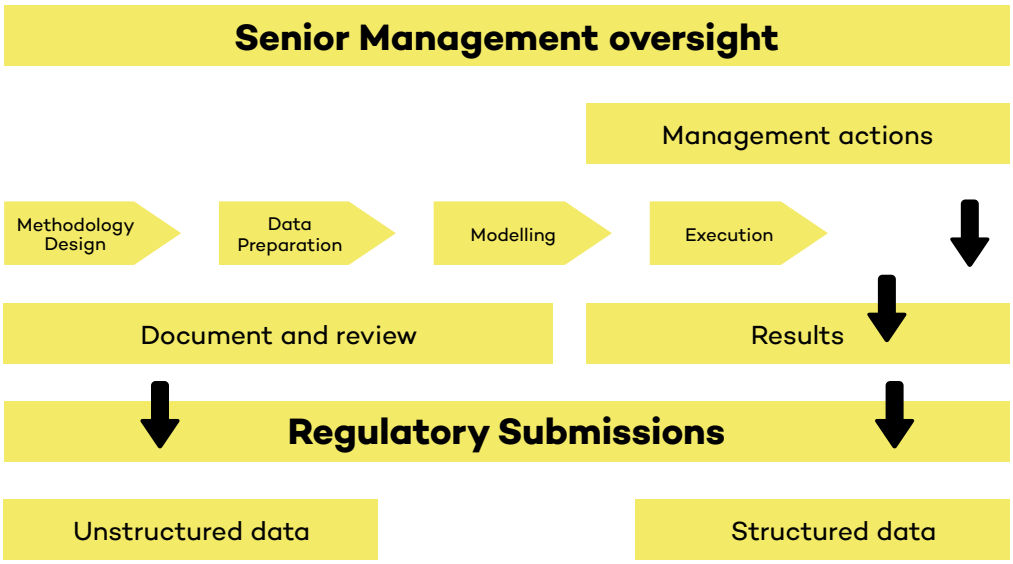
Section Six

Eight key steps to successful stress testing

Here are eight key steps for a successful stress testing project. Some of these steps need to be conducted sequentially, while overarching activities that span the entire project also take place.

1. Methodology design
2. Data preparation
3. Modelling
4. Execution
5. Management involvement
6. Regulatory submissions
7. Document and review
8. Result

The diagram below shows how the steps above are fundamental to the success of any stress testing project.



1.

Methodology design

Having a clear picture of the requirements and an understanding of your own resources, data and process will set the foundation for identifying how the stress testing project should be run. It's important to choose the right methodology to both suit your business and that will be acceptable to the regulator.

Consideration needs to be given to the maturity and diversity of the portfolios in question, the degree of integration between different aspects of the modelling (such as revenue and loss metrics) and the number and type of models to be developed and implemented.

The overall approach will require a range of modelling techniques, along with analytical and management insights to capture idiosyncrasies in the portfolio, and a process of review and challenge to synthesise these inputs into a robust set of outputs.

Once you have defined your methodology, it's important to establish a process for continuous review and refinement to enable the business to learn from insights along the way. The initial design should be well thought through to provide a baseline that will be both stable and credible to the regulator.

2.

Data preparation

For many, the next step in creating an adequate stress testing solution is likely to be the aggregation and validation of source data that underpins the economic modelling and analysis that lies at the heart of the process. Portfolios already on Advanced IRB rating systems will tend to have a head-start in this respect, but there is no room for complacency given the regulator's intention to raise the bar on data quality over time. Also the introduction of IFRS 9 may add extra complexity to data management issues going forward.

"It is important to consider the quantity and quality of your data before embarking on your stress testing project."

Having the right data is critical. As we all know, any model is only as good as the quality of the input data and model methodology. It's important to consider the quantity and quality of your data before embarking on your stress testing project. While many financial institutions are working towards delivering longer-term strategic data solutions that meet the requirements of stress testing, the BoE advises that any short-term solutions should align with such strategic longer-term solutions as swiftly as possible.

Data often sits across multiple systems, sometimes with discrepancies between data sources. Legacy banking systems aren't easy to change and they generally rely upon bolt-ons and workarounds to join them up operationally. Add to that systems from acquired businesses and the data architecture starts to look complex and messy. Unsurprisingly, this can hinder the stress testing process, potentially leaving you exposed. A data mart that collates data and acts as a 'single version of the truth' could alleviate the problem. This is how many banks are tackling this issue, leaving nothing to chance.

With stress testing, data integrity is crucial to success. Given that the core of the stress test is the impact on the impairment and capital forecasts, accurate historical views of the necessary inputs to such calculations are vital for the success of any stress testing exercise. The added complexity of IFRS 9 requirements and their impact on calculating impairment means that any data solution for stress testing must be integrated with the wider financial reporting framework.

Increasingly, financial organisations are viewing stress testing and IFRS 9 economic forecasting requirements as two sides of the same analytical coin. Data audit and reconciliation becomes increasingly important in this framework as underlying issues in the data

3.
Modelling

Stress testing adds an extra layer of complexity to normal modelling methods. For many credit risk modelling teams, this may be the first time that time-series methodologies have been used. A number of statistical issues particular to econometric modelling need to be addressed in any stress testing exercise, and the regulator is increasingly looking for institutions to be aware of these and show evidence of competency in handling them.

The nature of stress testing means that a combination of top-down vs. bottom-up modelling approaches is needed, and the methodology design needs to address the level of granularity employed at different stages of the modelling. Consideration also needs to be given to the level of integration that can be achieved between different aspects of modelling. For example, in a dynamic stress test, assumptions on the volume and profile of future lending will inform both net interest margin projections and impairment forecasts. Therefore, central coordination of modelling activities across different business areas is vital to avoid contradictory assumptions being used.

While a top-down approach to modelling default rates may underpin the stress test forecast, it may still be necessary for this to be woven into bottom-up account-level models so that forecasts of complex financial credit risk metrics can be derived, such as IRB Risk Weighted Assets and Impairment.

Modelling is expected to cover all asset classes, but the methods are likely to vary according to the portfolio being assessed. The ability to model economic impacts on profit and risk drivers for different portfolios may depend on the nature of the specific portfolio, the products involved and the available data history. Therefore, it's important for organisations to consider a variety of different modelling approaches to both revenue and losses.

Institutions need to understand in detail the different economically dependent components of default risk, and many are using sophisticated techniques such as Exogenous-Maturity-Vintage (EMV) decomposition to achieve this. His method enables Exogenous economic factors to be systematically isolated from the inherent Maturity and Vintage effects driving the portfolio performance over time. Such sophistication is not just applicable to large lending books. For smaller volume portfolios that are more sensitive to specific counterparty risk, probability of event modelling, including Monte Carlo simulations, is often more appropriate, although this approach brings its own mathematical challenges.

Macroeconomic factors that typically feature in these economic response models include measures on consumer confidence, unemployment and average earnings, interest rates, house prices and inflation. Other considerations in the modelling process include the impact of the economy on demand for new credit, draw-down of existing exposures and the ability of some sub-populations to refinance their existing debts.

Economically responsive models need to consider a wide range of variation in the scenarios presented. The regulator is not averse to presenting scenarios with conditions never seen in the post-WW2 UK economy. For example, the 2015 concurrent stress test featured a price-deflationary 0% interest rate scenario, testing firms' ability to forecast the effects of a situation for which there is no comparable historic data available.

Finally, there is also an expectation from the PRA that firms will use a variety of modelling techniques to arrive at a final position on scenario results, rather than relying on a single approach. This brings the need for 'challenger' models to be developed, which can be used to provide high-level validation of more sophisticated methods, or alternatively expose their pitfalls and weaknesses under certain scenarios.

One of the necessities for successful stress testing is the need to develop a wider framework across an institution that allows enterprise-wide stress testing to be carried out. The reliability of models need to be assessed through the exploration of different approaches. Moving forward, it's recommended that stress testing models be subject internally to the same governance and control as credit risk models under the CRD IV, which will entail a significant amount of time being allowed for model validation and oversight when planning the development work.

As organisations move towards IFRS 9 compliance, it will be apparent to many that the core economic response modelling at the heart of stress testing is similar to that involved in IFRS 9 expected credit loss estimation. Increasingly, institutions are looking to align these two aspects of their business operations. Indeed, the same infrastructure that drives the economically driven factors in lifetime expected loss ought to be implemented for stress scenario loss calculations.

4.

Execution

The execution phase takes the models developed in the previous step together with the particular economic scenarios that you are being asked to evaluate and produces movements in capital requirements, balance sheet positions and profitability under the prescribed scenarios. Economic response models are only as useful as the infrastructure they are implemented within. A well-structured execution framework is vital for a successful stress testing delivery. This includes both technical solutions for data extraction and model implementation – which need to be thoroughly tested prior to execution – as well as management processes to enable business assumptions to be determined and results to be reviewed and signed off.

You will need a detailed project plan, with clear roles and responsibilities assigned and checkpoints identified.

Coordination between functional areas such as, credit risk, operations, finance and capital management, throughout the execution phase is essential given the interdependencies that exist between many different areas of business performance, whether in normal circumstances or during a stress scenario.

Although credit losses, impairment and risk weighted assets are likely to remain the primary area of focus in any stress test, a holistic approach that takes account of the broad range of performance measures such as net interest margin, lending volumes, deposits, operational and conduct risks, and capital resources is needed.

Beyond the immediate outputs required by the regulator, a properly executed stress test will include sensitivity analysis and other investigative work. It can be extremely useful to management to understand the impact on financial forecasts of variations in the scenario. Firms will also wish to consider the wider impact on their operations of the scenario presented.

A statistical model may forecast the default rate at the peak of a recession, but what would be the added effect of other stressed metrics, for example if there was another industry-wide crisis in liquidity?

These factors, beyond simply applying mathematical models, are increasingly important for any bank or building society wanting to show evidence of an organisation-wide response to severe potential stress. Identification of specific vulnerabilities and challenges can often be linked to work already done on the organisation's risk and resolution plan and reverse stress testing.

Stress Testing and IFRS 9 as business as usual (BAU) functions

The ideal stress testing framework is governed by a year-long perspective that involves all aspects of the business involved in the delivery of scenario-based forecasting and reporting. As IFRS 9 becomes embedded within institutions, the need for impairment assessments that are economically dynamic is becoming more apparent. This same framework can be used for continuous stress testing as financial organisations move towards understanding how the business would respond to various external stresses, which is quickly becoming a key component in the everyday life of an institution's risk and corporate planning functions.

5.

Management involvement

Under the BoE's concurrent stress testing regime there is a strong presumption of senior management involvement in the entire process. While many senior managers are already engaged in reviewing results from stress testing, it is vital that they are involved throughout the process, review the outputs and actively use this information to inform business decisions and on-going strategy.

The results of stress tests are to be used not only to assess capital planning buffers but also to develop contingency and risk mitigation plans. The results should form a key input for senior management and board discussions. Early engagement of senior management in the methodology design can set organisations on the right track for having the level of involvement the BoE requires from senior stakeholders.

Many institutions have previously delegated responsibility for stress testing, but in the new world they have to find a way for board members and executive management to take a more active role. This requires an efficient and transparent process for reporting of risks, assumptions and model outputs, along with a schedule of regular check-points and sign-offs to enable this to happen. With these processes in place, senior managers will be expected to review the process, make a judgement on its effectiveness and robustness, and instigate change as required.

"Early engagement of senior management can set organisations on the right track for the level of involvement the BoE requires."

Financial institutions are expected to identify any realistic management actions that could be taken to maintain or restore capital adequacy in a stress scenario. Regulators do not expect business as usual responses, but they do expect the clear identification of specific steps that could – and would – be taken in response to any capital or liquidity inadequacies.

More than simply a list of possible actions, the modelling needs to evaluate the impacts of the stress scenario both with and without these management actions. This includes, what would the portfolio metrics look like if no management actions were taken in response to an economic stress, and what is the timing and impact of those management actions in mitigating the risks to the P&L and balance sheet?

In assessing potential remedial actions, careful consideration needs to be given to the plausibility of implementation, and impacts need to be balanced against the BoE's guidance on maintaining levels of lending in the economy during the stress. Management actions will include a set of levers that could be pulled in an economic downturn to raise additional capital, increase net interest margin or reduce impairment. The regulator will expect to see evidence that such management actions are reasonable, implementable and do not rely on significantly reducing lending, as this can have knock on impacts on the wider economy.

"Financial institutions are expected to identify any realistic management actions that could be taken to maintain or restore capital adequacy in a stress scenario."

6.

Regulatory submissions

One major change in the past few years affecting both ICAAP reporting and the BoE's concurrent stress tests is the requirement to supply data to the regulator in a prescribed format within defined timescales. Ensuring you have the systems and processes in place to fulfil this requirement is crucial. For the past few years, the BoE has worked with a number of large UK banks to develop the Firm Data Submission Framework (FDSF) for the submission of the data necessary for conducting stress tests.

"The onus is on the banks themselves to clean and check their data for quality and completeness."

In addition to supplying the data in the right format within the required timeframes, the onus is increasingly on the financial institutions themselves to clean and check their data for quality and completeness before submission. As the PRA moves closer towards a strict data quality regime, all financial institutions will need to ensure their data processes and internal safeguards are robust enough to deliver what is required.

The BoE retains the right to impose penal capital buffers on organisations whose data supply falls beneath a minimum standard and so the cost of inadequate data submission could be significant.

The concurrent stress testing regime requires submission of both "structured" and "unstructured" data; that is broadly quantitative and qualitative data respectively. Models used in the stress test need to be itemised and summarised, and their dependencies on external factors described. A high degree of coordination and cross-referencing is required across business units and functional areas to make sure the data supplied is both accurate and internally consistent. As such, it's important not to underestimate the level of complexity involved in data submissions and the resources needed to ensure their timely delivery. This is likely to mean that work on the unstructured data requests will need to run in parallel with model validation and execution work, therefore it is essential to have a clear process established up-front.

As well as submitting management information reports and policy documentation to the regulator, firms are expected to supply portfolio data to enable the BoE to conduct its own modelling on the banking system as a whole.

Supply of accurate, relevant MI will enable the PRA to be confident that the firm has a suitable monitoring framework in place, so that when stress testing highlights any areas for concern, the financial institution is seen to be equipped to deal with it. Although having this type of governance and control will not be new for most institutions, some adaptation of existing ways of working will be inevitable as the regulatory stress testing framework evolves in the UK.

"The cost of inadequate data submission could be significant."

7.

Documentation and review

As the demands from regulators increase, it is vital that organisations undertake extensive and multi-levelled reviews of their stress testing processes. The move away from stress testing as a one-off process to business as usual, and an accompanying continuous improvement cycle, is important for delivering the best results in the most efficient manner.

Comprehensive and accurate documentation is a key part of this. All component models and processes need to be itemised to a sufficiently rigorous and consistent standard for regulatory submission.

The complexity and sheer number of models involved increases the need for a clear top-down documentation structure and set of common templates across business units, to allow efficient completion and review of both management and technical documents.

When submitting stress test results for either ICAAP or the concurrent stress tests, each firm is expected to have documented its methodology and any judgements made in deriving the outputs and delivering the results. This includes explanations of how the institution has interpreted and tested the scenarios and the modelling assumptions made. Any existing documentation will need to be reviewed, refined and updated for on-going review. The PRA will expect this documentation to be in place and will view it as evidence of the reasonableness of any model assumptions. Also, having the full process and approach clearly documented and regularly reviewed is a 'must have' with respect to compliance and audits, and any records and documentation must be kept for a minimum of three years.

The documentation is the window through which the regulator views your stress testing approach and results and should be prioritised and resourced accordingly.

"Existing documentation will need to be reviewed, refined and updated."

8.

Results

As explored earlier, while individual firms are conducting their stress testing analysis, for the concurrent tests the BoE plans to do likewise, based on data submitted by the participants. The BoE expects senior management within all institutions to be fully engaged and sign off any results before they are submitted to the regulator. When modelling the scenario, financial institutions are expected to project both their capital resources and regulatory capital requirements over the specified time horizon.

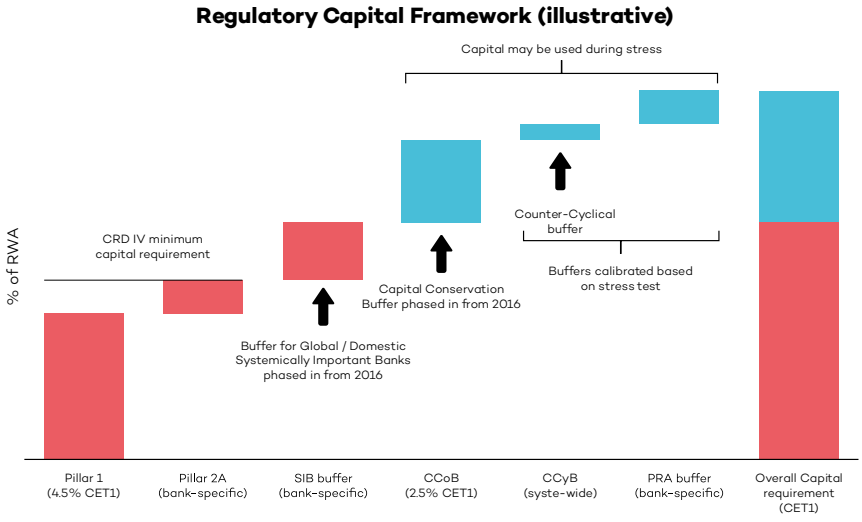
"While individual firms are conducting their stress testing analysis, the BoE plans to do likewise."

Stress test results, both gross and net of management actions, are used by the BoE to inform judgements of bank capital adequacy at both a system-wide and company- specific level. An assessment is made of the individual company's stress testing and capital planning processes, and the adequacy of its capital plans. This will determine whether they are sufficient to meet the overall level of capitalisation determined by the FPC and the PRA Board. It is important that credible action plans are put in place to mitigate the potential impacts of the stress scenario. These plans must involve realistic timings around triggers for portfolio intervention, and may lag by several months the start of the economic scenario 'on paper'.

The published timeline for the annual concurrent stress test includes a three month challenge phase after submission of firms' results in June, during which time the regulator will review and challenge the projections based on a mixture of qualitative assessments and comparison against its own internal models. This is followed by a further two month period of regulatory review prior to final publication of results and BoE policy responses.

Figure 1:
Components of regulatory capital including CRD IV and PRA buffers.

Source: The Bank of England's approach to stress testing the UK banking system (October 2015)



Section Seven

Resources and planning

While stress testing has been a feature of the financial landscape for some time, the BoE's concurrent stress test regime and IFRS 9 impairments has brought a step change in regulatory oversight of major financial institutions, with significant resource implications.

Meeting these requirements is no longer a standalone process. It is quickly becoming a fully integrated activity which informs and shapes strategic planning and interacts directly with other regulatory demands like CRD IV and implementation of IFRS 9. Processes and policies need to be both efficient and reliable, and will be much more closely scrutinised by the regulators. Senior managers and executives need to demonstrate engagement in the whole process and not just be involved in reviewing results.

Even for smaller organisations outside the scope of the BoE's annual tests, the increased emphasis on stress testing in the banking industry in general, as well as the need for forward-looking economic assessments in IFRS 9 impairment estimates, mean they will face increased regulatory scrutiny of their economic modelling and stress testing capabilities.

If financial institutions prepare now to overcome these challenges they will be in a better position when they hit.

Timescales

The BoE's October 2015 paper retains an eleven month end-to-end timeline from the year-end balance sheet cut-off to final publication of results, in keeping with the concurrent stress tests conducted in 2014 and 2015:

- Jan-Mar: BoE scenario preparation and guidance
- Apr-Jun: Firm's analysis and execution of stress test
- Jul-Sep: Regulatory review and challenge of banks' results
- Oct-Nov: FPC and PRA review and finalise numbers and policy responses
- Nov/Dec: Final results published

The current timetable is intended to remain in place until 2018. The three month execution period in the second quarter remains the most intensive phase of the process by far, but there is a sizeable amount of preparatory work organisations need to carry out internally before the concurrent stress testing can begin, to ensure smooth execution and credible results.

"There is a sizeable amount of preparatory work to carry out internally before the concurrent stress testing can begin. Just getting the data in order may take several weeks."

As the new regime calls for annual stress testing, participating banks and building societies need to consider how they should adapt their existing forecasting and planning framework to incorporate the annual concurrent stress test, and how much time needs to be set aside for the necessary groundwork.

Development of a stress testing data platform and modelling engine brings the opportunity to leverage this infrastructure in other applications such as regular loss forecasting and IFRS 9 expected credit losses. However, this also poses the challenge of integrating the process across these different channels of activity, especially given the prescriptive time frames and data cut-off for the BoE's annual tests.

Depending on the company's existing stress testing framework and data infrastructure, just getting the data in order for analysis and modelling may take several weeks or even months. Add to that the time it can take to get a team established and mobilised, and lead times can be considerable.

Resources

As we know, stress testing is nothing new and many financial institutions have small teams already dedicated to conducting stress tests. However, to deal with the increased rigour and frequency of regulatory stress testing, while minimising the impact on other business activities, many companies may find themselves facing resourcing shortfalls.

The BoE has stated its expectation that financial institutions assign adequate resources, including IT systems, to stress testing and scenario analysis so that they are able to accommodate different and changing stress tests at an appropriate level of granularity. They have also stated that they consider it key for appropriate resources to be assigned to upgrading the data infrastructure to enable the institution to service internal and external data needs easily.

A further resourcing consideration is the extra demands that increasingly sophisticated stress testing processes place on other areas of the business, not just those directly responsible for undertaking the analysis and modelling. The BoE has clearly stated its desire for stress testing to have greater involvement from board members and senior management, so the impact this will have on their workloads needs to be taken into account when allocating resources. Other areas likely to be impacted include IT and data teams, as well as finance, audit, compliance and risk. Understanding the level of involvement required from these different business areas will be fundamental to effective resource planning.

The most time consuming and resource intensive elements of a stress testing project are the model development and validation, and evaluation and review of results. These are both areas that need experts, and while investment in technology and automation may help reduce delivery times, having the right people and processes is essential. This will usually comprise a team of experienced data specialists, model builders and analytical consultants, who should be up-to-date with regulatory requirements and analytical techniques. Many financial institutions are looking at options from recruiting to outsourcing, each with its relative costs and benefits.

"The PRA has stated its expectation that financial institutions assign adequate resources to stress testing."

Section Eight

Project management and governance

While each organisation is different, and therefore faces different challenges, the broad outline of each project is likely to be similar.

Project structure

Responsibility for central coordination of the stress testing programme and communication with the regulator needs to be clearly agreed up-front, as does the delegation of individual work-streams to specific areas such as risk management, finance, capital management and treasury teams. The executive sponsor is most likely to be the chief risk officer, and given its high-profile and cross-functional nature, the appointment of an experienced programme manager for the annual stress test is essential.

Although the nature of stress testing is largely theoretical in setting capital adequacy requirements, it can be far-reaching in terms of the possible outcomes in a stress scenario. Therefore, alongside the analysts and modellers directly involved, stakeholders will need to include risk committees and operational management, in order to understand the potential mitigating actions in a stress scenario that could include major organisational cost-cutting and change-management programmes.

Obtaining accurate data to model the scenario correctly will involve a range of business functions beyond economic forecasting and credit risk modelling. Product management teams are often closely involved, providing projections of pricing impacts of the specific stress scenario. Lending control functions may need to advise on their capacity to handle large volumes of additional arrears cases, feeding back directly into the credit risk projections.

Modelling oversight

Given the degree of regulatory scrutiny, it is important that stress testing models are subject to thorough internal validation and senior oversight before implementation.

Typically, as with IRB capital modelling, the oversight team (or individual) needs to be independent from the actual model development team. Approval of the high-level model design is needed to ensure compliance with internal model development standards and regulatory requirements, and later to establish a narrative to outline the credibility of the modelling approach under a range of potential stress scenarios for the benefit of senior managers and regulators alike.

"It is important this function has extensive modelling experience and the authority to ensure robust techniques and outcomes."

Therefore, it is important that this function has extensive modelling experience and the authority to challenge the analytical team to ensure they are robust in their interpretation of data, use of techniques and determination of outcomes.

The data stage and team

Data used in stress testing may be extracted from a variety of existing sources, including analytical data marts, rating systems, financial reporting or risk reporting systems. It is essential to make sure data is accurate and consistent across these different systems, whether used in model development or execution, or directly into regulatory data submissions.

The data team's role is to ensure a reliable and comprehensive supply of data across all aspects of the project. As a minimum a data validation exercise should be undertaken with senior level sign-off of data quality, to allow modelling and regulatory reporting to progress with confidence and avoid penalties upon submission of outputs to the PRA.

In some cases it will be desirable to design and build a bespoke data platform for the stress testing process, in which case the team will require technical architects and developers to deliver the data infrastructure required for stress testing and the FDSF, along with input from analysts and oversight to ensure the design meets their needs.

The modelling stage and team

Organisations need to establish and maintain a detailed inventory of the suite of econometric and financial forecasting models used in the stress testing process, along with known weaknesses and planned enhancements where applicable.

The modelling team will require a combination of econometric modelling skills and detailed knowledge of the portfolio, products and the existing capital and impairment models and systems. Account acquisition and customer management policies will also need to be taken into account when producing forward-looking projections of portfolio performance. The project will therefore be driven by the nature of the individual organisation and agreed high-level design.

It's also advisable for a range of alternative modelling techniques to be employed, particularly for the core economic response components of the stress test – with external input where required to complement internal skill sets and capacity. This will help reduce the model risk associated with systematic errors from particular model types, monitored and guided by the project oversight.

A set of model development and validation standards will need to be in place across the organisation to govern the model builds. However, it is common for the existing model governance framework to require adapting or enhancing, with oversight approval, to cover the specific needs of stress testing, where time series analysis and modelling are likely to be employed.

Moving to business as usual

As financial institutions strive to bring annual stress testing within their normal business operations, it's important for the learnings from the initial setup to become embedded quickly. A crucial aspect of this is making sure knowledge transfer takes place to the relevant teams, especially where ad hoc or external resources have been used to support the initial development.

Furthermore, to absorb the expanded regulatory requirements into business as usual activity, 'right-sizing' and 'right-shaping' the team are essential. The annual stress testing cycle means there may be peaks in demand for specialist resource at certain times of the year, so it may still be expedient for organisations to outsource some aspects of their stress testing programme to external specialists to deal with these fluctuations. This could include on-going enhancement and validation of models, assistance with process automation or development of a more robust data infrastructure.

"There will be annual peaks in resource demand".

Section Nine

Conclusion

Stress testing is increasingly becoming a central part of any financial institution's regular activity. When linked with other key regulatory reporting areas like IFRS 9, the benefits on the whole organisation's reputation are clear to see.

The new stress testing regime has impacted financial institutions across the whole UK banking system, not necessarily limited to the original eight included in the first round of the process in 2014. Even smaller institutions are now having to up their game in the stress testing arena.

Given that the stress testing regime across the concurrent and ICAAP tests will only increase in sophistication, those that start to prepare now will stand themselves in good stead not only to meet the requirements but to establish a robust and efficient annual stress testing framework that can be absorbed into business as usual.

The activities required will not be one-off activities; the BoE has expressed a desire to make stress testing a fundamental part of business planning and strategy setting for financial institutions. Implementing the new regime poses some interesting challenges for organisations, the biggest of which are around data and modelling. These two elements are fundamental to meeting the requirements laid out by the regulator and must be done with rigour, accuracy and expertise. Certainly, ensuring that data sources provide a 'single version of the truth' is good practice in any event, as is an approach to stress testing that would meet the requirements of the BoE's new regime.

As with all step changes, it requires a considerable investment of resources to achieve success. However, this will genuinely test the system, and if done well will restore confidence in the sector.

This will of course place pressure on skilled resources for the on-going management and development of the stress testing framework. The key to success is to successfully integrate the stress testing process into wider risk management activities, looking for opportunities to improve controls and efficiency. This may be most readily achieved using a blend of internal and external specialist resources.

"If choosing an external partner to work with, make sure any consultants you engage are fully aware of the requirements and can demonstrate solid experience in this new regime."

A good stress testing process requires strong oversight and a team with a wide range of skills, including data specialists and modellers with direct experience and a deep understanding of the profit dynamics and sensitivities of your portfolio. If choosing an external partner to work with, it is important to ensure any consultants you engage are fully aware of the requirements and can demonstrate solid experience in this new regime. The consequences of poor or sub-standard submissions are significant.

Financial institutions may look to use aspects of the data and modelling infrastructure they have developed for regulatory stress testing to support their implementation of IFRS 9 Expected Credit Loss provisions due to come into force for financial reporting from 2018.

Section Ten

About Jaywing

Jaywing has significant stress testing experience gained from working with several UK banks and building societies, both before and after the introduction of the new concurrent stress testing regime.

We believe that we have the best team of analytical credit risk professionals in the UK, and that's not something we say lightly. We are renowned for the strength of our skills in data, modelling and analysis; skills which underpin all of the roles needed for a stress testing project.

We have provided teams of consultants to conduct stress tests, ICAAP and IFRS 9 consultancy work for many leading UK banks and building societies. Because of this, we are well placed to mobilise our stress testing, risk modelling and data management expertise to support you and guide you through the process.

Our team of experienced credit risk consultants can help you complete the required stress testing work to an excellent standard, showing your risk analysis capabilities in the best possible light. Our team brings with it a blend of experience across credit risk management, capital management, analysis, modelling, and data management. They are happy to work on or off-site, often combining the two, with a lead consultant managing the work and acting as your main point of contact throughout.

The stress testing regime requires close collaboration between your credit risk and modelling teams and any external suppliers involved. The ability to cultivate effective peer-to-peer relationships within client organisations is a particular strength of ours, and we often act as a bridge between different departments such as the business, finance and IT teams.

We believe that involvement from senior management is critical to any successful stress testing programme, so provide a structured approach to facilitate engagement with these senior stakeholders.

We have a reputation for delivery excellence and analytical rigour. Our consultants have the right skills and experience to look at the wider implications of a project, and we pride ourselves on being creative and innovative, while remaining pragmatic.

We have an excellent track-record of delivering large projects to our clients on time, while exceeding expectations, in the areas of credit risk, capital management, data management, modelling and analysis.

Our services cover the full range of analysis and strategy across the customer lifecycle from application processing, credit and customer management to collections and recoveries, as well as IRB capital requirements, stress testing, bad debt forecasting and IFRS 9.

"Having been impressed by Jaywing's credentials in Basel model validation, we have the utmost confidence in their expertise, knowledge and ability to support us through our IRB waiver process. Jaywing's capacity for examining our application from multiple perspectives, across models, data and IT, was a significant factor in its selection as our partner."

David Harvey
Head of IRB at
Skipton Building Society

Section Eleven

Contact us

Why not invite us in for a chat and we can give you the inside track on what stress testing or IFRS 9 means for your business. We can help you learn about the changes in the stress testing and IFRS 9 regimes and what you need to do to meet the regulatory requirements, the demands it will place on your organisation and what you can do now to prepare.

Call Ben O'Brien on **0333 370 6600**
or email **risk@jaywing.com**

You may also like:

Request a copy of our IFRS 9 whitepaper 'Evolution not revolution – solving IFRS 9 impairment' by emailing **risk@jaywing.com**. In this paper you will learn our best practice approach to complying with IFRS 9 requirements on impairment.

jaywing.com
hello@jaywing.com
0333 370 6600

Sheffield
Players House
300 Attercliffe
Common
Sheffield
S9 2AG

Newbury
Albion House
27 Oxford Road
Newbury
RG14 1JG

London
31-35 Kirby Street
London
EC1N 8TE

Swindon
Arclite House
Century Road
Peatmoor
Swindon
SN5 5YN

JAYWING