Regulatory brief

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Stress testing: Getting to credibility
Firms between $10 and $50 billion

Overview

As the banking regulators continue the push to finalize the implementation of the Dodd Frank Act's stress testing requirements ("DFAST"), the latest release of long awaited guidance for firms between $10 and $50 billion has finally arrived. Earlier this month, the Board of Governors of the Federal Reserve ("FRB"), the Office of Comptroller of the Currency ("OCC") and the Federal Deposit Insurance Corporation ("FDIC") jointly issued proposed guidance. The comment periods end on September 25th for the FDIC's and OCC's proposal, and on September 30th for the FRB's.

The draft guidance outlines supervisory expectations across five broad areas of enterprise-wide stress testing related to the DFAST final rule issued by banking regulators last year:[1]

- Supervisory scenarios
- Data sources and segmentation
- Loss estimation
- Pre-provision net revenue ("PPNR"), risk-weighted assets ("RWA") and balance sheet projections
- Governance and controls

This guidance is intended to supplement the draft regulatory reporting templates and instructions issued by the regulators in March 2013 that midsize firms are expected to use for their first DFAST submissions in March 2014.

In addition to the midsize domestic firms, similarly-sized intermediate holding companies of foreign banking organizations will likely face similar reporting templates and supervisory expectations once the Enhanced Prudential Standards are finalized, which we expect will be by the end of this year.

Based on our discussions with several midsize firms, it is our view that the draft guidance addresses a number of firms' core concerns, but also leaves important questions unanswered. This **Financial Services Regulatory Brief** introduces these questions across each of the five areas, and provides our perspective of the approach firms should be taking.

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[1] See PwC's *Financial Services Regulatory Brief, Dodd-Frank stress testing requirements for mid-sized firms: Highlights and insights* (February 2013).

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Supervisory scenarios

Regarding supervisory scenarios, the draft guidance states the following:

"Companies may use all or, as appropriate, a subset of the variables from the supervisory scenarios depending on whether the variables are relevant or appropriate to the company's line of business. The companies may, but are not required to, include additional variables or additional quarters to improve their company run stress tests."

In order to meet this expectation, firms should address the following questions:

> ***Question:*** *The FR Y-16 template provides for additional variables that may be used in the forecast. When should institutions incorporate these variables into the forecasting methods and when should these be avoided?*

Our view: Institutions may consider incorporating additional variables, such as local unemployment or state-level GDPs when the use of these variables improves the forecasting method's accuracy. Institutions should ensure that these local variables are consistent with those provided in supervisory scenarios, and should provide the rationale for their inclusion (supported by robust analysis and clear documentation).

> ***Question:*** *May I use a third party to develop additional variables or translate the national economic variables into local variables? What are the considerations?*

Our view: We see pervasive use of third party data providers by midsize institutions to develop additional variables, including regional macroeconomic estimates for housing price indices, unemployment and gross domestic product. Third parties are also providing forecasts of these variables based on the supervisory scenarios.

The regulators expect institutions that engage such third party providers to fully understand the methods and assumptions used to develop their variables and related forecasts. Institutions are also expected to sufficiently understand the limitations of the utilized methods and assumptions.

> ***Question****: Under what circumstances should I consider forecasting beyond the timeframe of supervisory scenarios (i.e., Q4 2013 to Q4 2015 for the March 2014 submission)?*

Our view: We see institutions extend the forecasts beyond the regulatory timeframes to improve stress testing methodologies in a number of areas. Institutions often estimate allowance for loan and lease losses ("ALLL") for each period of the nine quarter horizon by forecasting losses over a loss emergence period under each scenario and then estimating the ALLL needed to cover these losses. As a result we see institutions forecast loan losses four to eight quarters beyond the nine quarter horizon. For example, to estimate ALLL levels required for Q4 2015, losses may be estimated from Q1 2016 through Q2 of 2017.

> ***Question****: The proposed guidance provides a lot of incremental information on regulatory expectations. How do I "right-size" my DFAST implementation effort to meet the DFAST requirements without placing undue burden on my institution?*

Our view: We see wide diversity in the levels of preparedness by midsize institutions subject to the DFAST stress testing for the first time. Proposed guidance offers insights into regulatory expectations that allow institutions to refocus their efforts on some areas while reducing focus on others. Institutions may consider performing an updated gap assessment to align their current implementation efforts to regulatory expectations outlined in proposed guidance. For example, some institutions may find that sufficient level of work has been performed and sufficient methodologies exist to forecast components of PPNR or other relatively less complex or immaterial[2] portfolios. However, other areas, such as controls over stress testing process, documentation and model validation may require further enhancements.

Data source and segmentation

Regarding data source and segmentation, the draft guidance states the following:

"In conducting a stress test, a company should segment its portfolios and business activities into categories based on common or related risk characteristics. The company should select the appropriate level of segmentation based on the size, materiality and riskiness of a given portfolio, provided there are sufficiently granular historical data available … Companies should ensure that any historical loss data used are consistent with the company's current exposures and condition."

[2] Portfolios considered immaterial are those that would not represent a consequential effect on capital adequacy under any of the scenarios provided.

In order to meet this expectation, firms should address the following questions:

> ***Question:*** *I believe that I have sufficient internal data over one or more economic cycles including data on my acquisitions before and during periods of stress. To the extent my business model, underwriting practices or portfolio composition has changed significantly since the downturn, should I now disregard my historical experience?*

Our view: Many banks made changes to underwriting practices, product lines, strategy and portfolio composition following the last downturn in the credit cycle. Institutions should analyze and remove historical data that is no longer relevant to the current portfolio composition or to current portfolio risk profile. Very clear documentation of this data analysis and transformation is important to provide transparency and support for such adjustments.

> ***Question:*** *My firm faces a number of data constraints. How should I approach developing robust, and conceptually and statistically sound, credit loss models with limited historical internal data?*

Our view: Institutions should aim to develop forecast methodologies that produce credit performance results consistent with supervisory scenarios. Sensitivity of credit performance to supervisory scenarios and model robustness is generally diminished with shorter data series. Regulators expect companies to include at least one stress period within development data to reflect elevated losses or reduced revenues.

Institutions with limited internal data are encouraged to look to alternative data sources (such as peer organizations with similar profile and portfolio characteristics) to supplement internal data. In using third party data, management should ensure that the data aligns with the risk characteristics of the firm's portfolios.

> ***Question:*** *What criteria should I consider when segmenting my portfolio for loss estimation purposes?*

Our view: Portfolio segmentation should result in asset pools that contain loans with homogeneous risk attributes and similar sensitivity to supervisory scenarios. Institutions often face data constraints where internal data may yield insufficient loss experience within a particular segment to sufficiently support its loss estimations. In these cases, firms should consider whether the segmentation is too narrow.

Institutions should seek to supplement internal data with external data, or develop analytics or benchmarks at an appropriate level of segmentation to evidence that the overall forecasting method is sufficiently robust. Institutions should also consider materiality of portfolios and proposed segments.

> ***Question****: I have deemed certain portfolios immaterial based on balances. What is the implication of the guidance?*

Our view: While portfolio balances in relation to significant balance sheet categories such as total loans and leases or total assets may be relatively small, firms should conduct further analysis to ensure that potential stressed losses in that portfolio do not produce a *consequential* effect on capital adequacy. For less material portfolios, institutions may consider a less sophisticated approach for stress testing projections. That said firms should develop transparent methods and criteria for such "materiality" tests and ensure that these are consistently applied throughout the firm.

> ***Question****: The guidance highlights the importance of being conservative. How should this guidance be applied in practice?*

Our view: Institutions often ponder when to apply a conservative set of assumptions, as opposed to those expected to yield more realistic results under a given scenario. We believe institutions should aim to use the most realistic assumptions that are expected to yield results that are both credible and most consistent with a given scenario. Institutions may then perform a sensitivity analysis to demonstrate the method's predictive power and its limitations. Using the most conservative assumptions throughout the stress testing process may yield results that are neither realistic nor useful in informing the institution and its regulator.

We believe that the conservatism principle may be relevant when the range of assumptions used in a particular method is highly uncertain, such as the institution's ability to put in place a new loss mitigation initiative after the loss event has commenced but before all losses have been realized.

Loss estimation

Regarding loss estimation, the draft guidance states the following:

"A company must estimate the following for each required scenario: pre-provision net revenue ("PPNR"), provision for loan and lease losses ("PLLL") and net income. Credit losses associated with loan portfolios

and securities holdings should be estimated directly and separately, whereas other types of losses should be incorporated into estimated PPNR. Larger or more sophisticated companies should consider more advanced loss estimation practices that identify the key drivers of losses for a given portfolio, segment or loan; determine how these drivers would be affected in supervisory scenarios; and estimate resulting loses."

In order to meet this expectation, firms should address the following questions:

Question: *My bank has eclipsed the $10 billion threshold through recent acquisitions. Do I need to develop quantitative models to estimate credit losses, or may I estimate the impact of regulatory scenarios qualitatively?*

Our view: While the regulators do not prescribe any specific methodology for loss forecasting, a range of modelling techniques is described in the guidance including net charge-off models, roll-rate models and transition matrices. We believe that quantitative estimation techniques should be explored for all material or complex portfolios.

Question: *I have a large investment portfolio that includes non-agency structured securities and other fixed income instruments. What approaches should I consider to forecast credit losses?*

Our view: Securities classified as available for sale ("AFS") or held to maturity ("HTM") are subject to an other than temporary impairment ("OTTI") that must be included in loss projections for the securities portfolio. Consistent with the guidance, the OTTI estimates should follow current accounting requirements. Under current US GAAP, OTTI is a two step process. In estimating OTTI for HTM or AFS portfolios, institutions should consider:

i. How market value changes over the forecast horizon compared with the amortized cost of security positions; and

ii. How recovery value changes over time compared with amortized cost.

Recovery value calculations for structured securities may involve estimating discounted cash flows under different scenarios using a cash flow waterfall approach. For non-structured products, institutions often estimate recovery value based on expected cash flows, qualitative and other factors.

Question: *There is extensive discussion in the guidance on loss forecasting; however, there is no discussion on market risk. Do I need to develop market risk models?*

Our view: It depends on the materiality of trading exposures within the firm that may impact regulatory capital levels under stressed market conditions. Under US GAAP, trading portfolios are marked to market through earnings. The draft guidance highlights that the Supervisory Adverse and Supervisory Severely Adverse scenarios "may" include trading or other components.

PPNR, RWA and balance sheet projections

Regarding PPNR, the draft guidance states the following:

"The proposed guidance indicates that companies that are less complex or less sophisticated could estimate PPNR based on the three main components of PPNR ... Companies that are more complex or more sophisticated should consider methods that more fully capture potential risks to their business and strategy."

In addition to PPNR, this section of the draft guidance discusses RWA and balance sheet projections and notes the following:

"A company would be expected to ensure that projected balance sheet and risk-weighted assets remain consistent with regulatory and accounting changes, are applied consistently across the company and are consistent with the scenario and the company's past history of managing through different business environments."

In order to meet these expectations, firms should address the following questions:

Question: *The draft guidance includes extensive documentation requirements for forecasting methods and strategies, policies and procedures, key judgments and assumptions. How do I know if I have sufficient documentation?*

Our view: With respect to forecasting methodologies and key assumptions, an easy litmus test is whether the documentation is sufficient for a competent independent third party to understand the methodology and assumptions in order to effectively challenge or re-perform the forecasting process (with sufficient understanding of the conceptual soundness, development data, methodology, implementation and output).

Documentation should include independent model validation and internal audit assessments covering all significant forecasting methodologies. All material findings should be addressed by senior management through controls that allow for credible results. Qualitative assumptions should be carefully documented along with independent review and effective challenge that may include benchmarking, sensitivity analysis and back-testing.

Question: *Basel III guidance was finalized in July 2013 and will be effective on January 1, 2015. Since the inaugural midsize company run stress test under the DFAST guidance will cover nine quarters ending on December 31, 2015, will the stress testing calculations be subject to the new Basel III rules?*

Our view: Yes. Institutions should measure their regulatory capital levels and regulatory capital ratios for each quarter in accordance with the rules that would be in effect during that quarter, per the transition arrangements set forth in the final capital rules. Accordingly, capital ratio forecasts should follow Basel I rules for the first 5 quarters of the DFAST projection period, and Basel III rules for the remaining 5 quarters.

Governance and controls

Regarding governance and controls, the draft guidance states the following:

"A company is required to establish and maintain a system of controls, oversight and documentation, including policies and procedures, that are designed to ensure that its stress testing processes are effective in meeting the requirements of the DFA stress test rule."

In order to meet this expectation, firms should address the following questions:

Question*: There is extensive guidance in the proposed guidance on board of directors' roles and responsibilities with respect to capital stress testing. What are these roles and responsibilities in practical terms?*

Our view: There are a number of very specific requirements that institutions should consider when developing the capital adequacy and stress testing governance structures, policies and procedures. In summary the board is required to:

- *Stay informed* on the institution's stress tests, including results from each scenario, key assumptions, uncertainties and limitations
- *Effectively challenge* stress testing methodologies, key assumptions and results in order to ensure with the company's risk appetite, overall strategy and business plans
- *Consider stress test results in the normal course of business,* including capital planning, assessment of capital adequacy and risk management practices

Institutions should not be surprised by regulators requesting board materials, or seeking meetings with board members, in order to evaluate the institution's compliance with the above guidance. Regulators may consider the time given to the board to review and effectively challenge stress testing methodologies, key assumptions and results. Regulators may also seek information on how the board considered stress testing results in normal course of business, including board actions.

Question: *My bank does not have any "quants," finance PhDs, statisticians or economists. May I outsource the loss forecasting and other quantitative aspects of the stress testing to avoid hiring such resources?*

Our view: While many banks are relying on vendor models or third party advisors in model development for loss, balance sheet and PPNR forecasting, each institution's management is responsible for the stress testing results, robustness of methodologies and reasonableness of assumptions used in the forecasting process. The regulators expect management to "demonstrate knowledge of the model's design, intended use, applications, limitations and assumptions" even when using vendor models. The regulators further stipulate that institutions "should have as much in-house knowledge as possible in the event of vendor contract termination ... [or] where a vendor model is no longer available."

Question: *What are other institutions doing to put in place model risk management practices, including model documentation and model validation ahead of the March 2014 DFAST submission date?*

Our view: Since the issuance of supervisory guidance on Model Risk Management[3] in 2011, firms have progressed in meeting supervisory expectations to varying degrees. Recent supervisory comments by regulators have focused on firms' expansion and formalization of control processes designed to mitigate model risk at its source, including a controlled and

[3] OCC Bulletin 2011-12 and FRB Bulletin SR 11-7, "Supervisory Guidance on Model Risk Management" (April 4, 2011).

documented model development and implementation process. Where we have seen firms enhance their model governance framework is in the following areas:

- An evolution of the independent model validation program to include more dynamic, real-time identification and measurement of model risk.
- An evolution in program objectives away from whether models are "Acceptable" or "Valid," and toward a program focused on long-term and short-term remediation of residual model risks.
- An evolution of the model approval process to include roles and responsibilities for governance and oversight committees – including a focus on designing and monitoring technical model remediation plans and on short-term risk mitigants to reduce residual risks to levels consistent with the bank's risk appetite.

Those with pronounced shortcomings have been subject to supervisory examination findings (e.g., MRAs and MRIAs) particularly related to model risk management governance frameworks, model documentation and model validation processes. For further discussions on model risk management practices, please see the following two PwC publications: *A Closer Look: The Evolution of Model Risk Management* (May 2013) and *A Closer Look: Model Risk Mitigation and Cost Reduction through effective documentation* (June 2013).

Question: *What is the practical role of internal audit in the DFAST submission?*

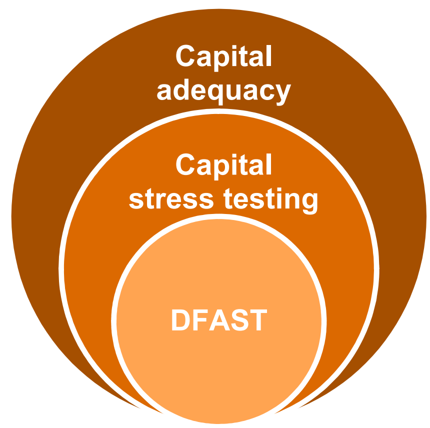
Our view: Internal Audit ("IA") should have an expanded role in the Bank's model risk management framework, in particular, ensuring that the testing program addresses the following:

- *Governance:* evaluating the design of model risk management policies and procedures, and ensuring adherence to such formalized policies and procedures.
- *Data:* ensuring the efficacy of data controls, including sourcing, reconciliations, transformation and aggregation.
- *Development and validation testing:* reviewing a sample of completed validation tests, assessing the validation process (including the process's rigor and effective challenge of assumptions), and assessing the independence and expertise of model developers and validators.

Given this increasing responsibility, management should ensure that IA staff possess sufficient subject matter expertise in relevant model risk management concepts.

Conclusion

Regulators acknowledge that DFAST does not address every risk an institution faces and will not inform management on all capital impacts under the supervisory scenarios. It is best to view DFAST as a component of a broader capital stress testing program, which in turn is one of the components of a broad capital adequacy assessment, as depicted in the below graphic.[4]



For example, DFAST does not include:

- Effects of stress scenarios on a company's liquidity
- Effects of an institution's unique business model, such as loans collateralized by commodities where prices may be countercyclical

Such effects should be captured through broader capital stress testing activities that incorporate idiosyncratic scenarios, liquidity stress testing and reverse stress testing.

Midsize institutions are not subject to capital stress testing under the FRB's capital plan rule (i.e., CCAR), and are not required to formally submit a capital plan. However, we are seeing institutions develop and enhance their capital plans concurrently with DFAST implementation, incorporating the expectations of DFAST and other supervisory guidance into their strategic and financial planning processes.

[4] Graphic is based on "Supervisory Expectations for Capital Stress Testing at Mid-Sized Organizations," Presentation by the FRB, OCC, and FDIC at the American Bankers Association's midsize stress testing working group meeting (June 2013).

Appendix: Key regulatory guidance references

Regulatory guidance	Link
Comprehensive Capital Analysis and Review 2013 Summary Instructions and Guidance (November 2012)	http://www.federalreserve.gov/newsevents/press/bcreg/bcreg20121109b1.pdf
Capital Plan Review 2013 Summary Instructions and Guidance (November 2012)	http://www.federalreserve.gov/newsevents/press/bcreg/bcreg20121109b2.pdf
2013 Supervisory Scenarios for Annual Stress Tests Required under the Dodd-Frank Act Stress Testing Rules and the Capital Plan Rule (November 2012)	http://www.federalreserve.gov/newsevents/press/bcreg/bcreg20121115a1.pdf
"Capital Plans, Final Rule," *Federal Register* 76 (December 1, 2011): 74631-48	http://www.gpo.gov/fdsys/pkg/FR-2011-12-01/pdf/2011-30665.pdf
"Supervisory and Company-Run Stress Test Requirements for Covered Companies, Final Rule," *Federal Register* 77 (October 12, 2011): 62378-96	http://www.gpo.gov/fdsys/pkg/FR-2012-10-12/pdf/2012-24987.pdf
"Regulatory Capital Rules: Regulatory Capital, Implementation of Basel III, Minimum Regulatory Capital Ratios, Capital Adequacy, Transition Provisions, and Prompt Corrective Action, Joint Notice of Proposed Rulemaking," *Federal Register* 77 (August 30, 2012): 52792-886	http://www.gpo.gov/fdsys/pkg/FR-2012-08-30/pdf/2012-16757.pdf
"Regulatory Capital Rules: Advanced Approaches Risk-Based Capital Rule; Market Risk Capital Rule, Joint Notice of Proposed Rulemaking," *Federal Register* 77 (August 30, 2012): 52978-3057	http://www.gpo.gov/fdsys/pkg/FR-2012-08-30/pdf/2012-16761.pdf
"Risk-Based Capital Guidelines: Market Risk Rule, Joint Final Rule," *Federal Register* 77 (August 30, 2011): 53060-115	http://www.gpo.gov/fdsys/pkg/FR-2012-08-30/pdf/2012-16759.pdf
Basel Committee on Banking Supervision, "Global Systemically Important Banks: Assessment Methodology and the Additional Loss Absorbency Requirement, Rules Text" (November 2011)	http://www.bis.org/publ/bcbs207.pdf

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