

INDUSTRY INSIGHT

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With over twenty-three years of banking experience, Thomas is currently focused on CCAR/DFA stress testing, pre-provision net revenue (PPNR) calculations, risk measurement methodologies, liquidity risk quantification and reporting, capital planning, performance and balance sheet management.

Breaking the Black Box: Managing Stress Testing, Capital Assessment and Risk Appetite Frameworks in a CCAR World

by Thomas Day

Abstract

In an effort to improve transparency and increase confidence, global policy leaders have embarked on an ambitious agenda that has as its centerpiece improvements in data architecture and infrastructure, firm-wide stress-testing¹, capital planning, and risk appetite frameworks. In the United States, this is known as the Comprehensive Capital Assessment and Review (CCAR).

CCAR, Basel III, and enhanced liquidity risk management expectations aren't easy problems to solve. To "break the black box"² and provide needed transparency, understanding position risk, both known and potential, at a granular level is critical. To be useful, analytical methods must result in actionable business intelligence. To be actionable, methods and processes must be accurate, auditable, and transparent.

¹ Importantly, the stress-testing paradigms being developed include quantification of credit, interest rate, liquidity, operational, collateral, and other related risks. While focus has been, to date, largely centered on credit risks, understanding the relationship between and across risk types is an important objective of the financial reform package.

² See "[What's Inside America's Banks?](#)," The Atlantic, January/February 2013, and "[Big Banks Are 'Black Boxes,' Disclosure is 'Woeful,'](#)" The Big Picture, 3 January 2013. References to third-party articles do not constitute endorsements of the opinions in the articles.

Introduction

If you work in the financial services industry and are paying attention to the G-20, Financial Stability Board (FSB), and banking supervision reform agenda, it's a safe bet that you are "uncomfortably aware" of the emerging stress testing and capital planning requirements promulgated by the bank supervisory agencies globally. "Uncomfortable" because you realize the challenge that new requirements pose; "aware" because these semi-annual (or annual, depending on average balance sheet size) exercises are taking up an enormous amount of your time, energy and resources – at the professional staff, senior executive, and board level.

In a bid to improve transparency and increase confidence, global policy leaders have embarked on an ambitious agenda that has as a centerpiece improved stress testing, capital planning, and risk appetite frameworks. In the United States, this is known as the Comprehensive Capital Assessment and Review (CCAR) and Capital Planning Review (CapPR).

Some practitioners have opined that these tests are a senseless compliance exercise³ and are inconsistent with enhancing safety and soundness and reducing systemic risk. For banks that approach the new requirements with this perspective, it will likely become a self-fulfilling prophecy – that the new requirements will be treated as an agonizing regulatory chore. Unfortunately, this view could persist until a bank's primary regulator steps in and prohibits a dividend payment, stock repurchase program, merger or acquisition, incentive compensation plan, or issues a Matter Requiring Board Attention (MRBA) or – worse – a Cease and Desist (C&D) Order or Capital Directive. Such banks could make relatively attractive acquisition targets for firms that are taking the longer view.

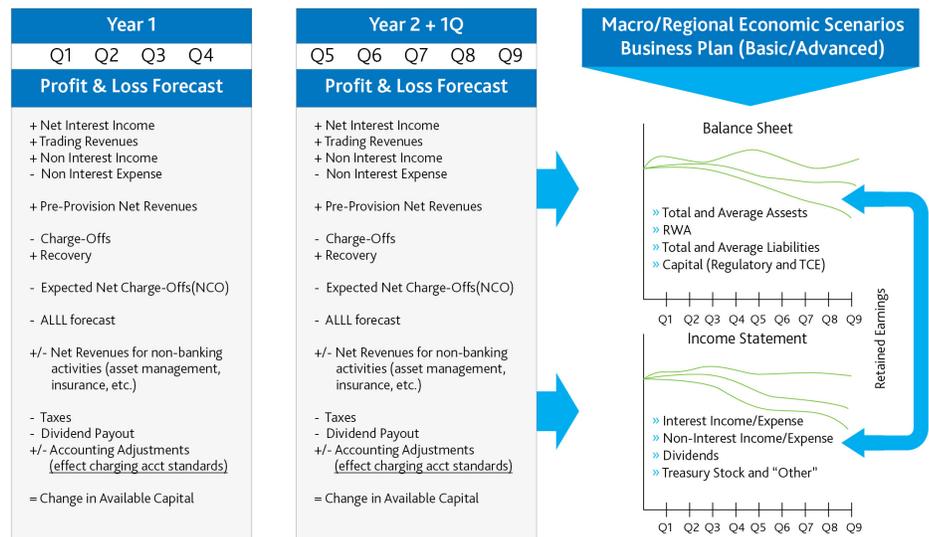
Taking Risk and Finance Processes Seriously

On the other side of the equation are those banks that understand how the new requirements can re-tool and dramatically enhance existing processes such as credit loss estimation, budgeting and planning, asset-liability management (ALM) and risk and financial management. In many banks, these processes are difficult to coordinate, harmonize, and validate in a consistent fashion.

With validation of forward-looking, scenario-based forecasts becoming an increasingly recognized sign of organizational and managerial strength, most banks are taking the new requirements seriously and re-imagining and re-inventing their existing processes and risk analytics. To be sure, the complexity of the new stress-testing and capital planning requirements is daunting and requires a commitment at the senior leadership levels of a banking franchise, as Exhibit 1 shows. However, the promised utility of these tests – for planning, analysis, and decision-making – is not trivial.

³ See "[Stress Tests? Baloney](#)," American Banker, January 2013. References to third-party articles do not constitute endorsements of the opinions in the articles.

Exhibit 1: Computational Complexities—Data, Modeling and Reporting



To calculate a comprehensive, forward-looking stress-test, the calculation must be able to produce a pro-forma balance sheet and income statement for at least nine quarters. This calculation must be based on macro-economic scenarios and market data (for example rates, curves, volatilities, FX rates, and other market data), that are consistent with given economic conditions. For example, a recession scenario with a forward two percent LIBOR could be considered suspect. Also, the calculation must be reconciled to existing ALM, budgeting/planning system forecasts, and other internal/external reports if, indeed, the stress-test result is to be considered valid. Results must be able to dynamically include new business volumes conditioned on economic scenarios, as well as calculate Basel capital under numerous methods and with rules that are sensitive to areas of national discretion. The calculation should allow for various dividend and other capital decisions, should support the capital planning process, and should be fully transparent and auditable.

Comprehensive Capital Assessment and Review (CCAR): An Analogy

Firms that are taking an organized and strategic approach to the new mandates may remember the requirements of the Federal Deposit Insurance Corporation's Improvement Act (FDICIA), Section 305. FDICIA Section 305 proposed to mandate capital charges for exposure to Interest Rate Risk (IRR). Although the proposal was ultimately watered down from a capital charge perspective, due in part to international Basel convergence issues and cross-border competitiveness concerns, it launched a renaissance in balance sheet management and forward-looking balance sheet and income statement simulations.

In fact, at least one regulatory agency went through a tortuous process, similar to today's new FR Y-14Q data requirements, and implemented a regulatory option-adjusted spread (OAS) based IRR model – the Office of Thrift Supervision's NPV model. Although the OTS may have been a less than rigorous supervisory agency, this aspect of their supervisory practice was ahead of its time. Ultimately, the OCC eliminated the OTS model, not because it lacked utility, but because such basic balance sheet modeling should be undertaken, not by the regulator, but by the bank itself. By relying on the regulator for basic IRR analysis, an industry and its supervisor spent more time trying to reconcile differences in modeling methods than understanding actual balance sheet and income statement risk exposures.

Nothing New Under the Sun

The concept of modeling a balance sheet and income statement in adverse scenarios is nothing new. In fact, the FDICIA Section 305 requirements were a primary reason for making the CAMEL bank rating system a plural: CAMELS, with "S" being the sensitivity of a bank to IRR, both earnings and economic value. Today, ALM models are an integral part of all Asset Liability Management Committee's (ALCO) monthly processes, and these dynamic projections of IRR exposure are disclosed as part of annual SEC-required reporting. Will the same occur for stress-testing and CCAR processes? This is a result that many expect will occur. In fact, beginning in 2015, all banks subject to the Dodd-Frank Act Stress-Testing (DFAST) requirements will begin to publish their results. This is the beginning of a level of industry transparency that banks, and especially C-suite, should recognize as new, important, and potentially relevant for investors and other stakeholders.

Although there is nothing new about the concepts that underpin the CCAR requirements, existing risk and finance systems are agonizingly ill-suited to handle the dramatically more rigorous requirements. This is true across three levels of need:

1. Data and data management
2. Analytical models and methods
3. Comprehensive internal and external reporting requirements

1. Data: Granular, Frequent, Comprehensive and Persistent

The Federal Reserve's FR Y-14 schedules⁴ provide an interesting glimpse of the rigor that the supervisory agencies are applying under the new statutory mandates. These quarterly submissions provide much of the data necessary to comprehensively assess current position credit loss, net interest income, non-interest expense, regulatory and economic capital, as well as the bank's CCAR results. In an effort to arrive at plausible and reasonable answers, many banks can and should supplement a rigorous data-driven process with expert judgment: That is, all solutions should permit such expert overlays to calculate results. However, given the complexity of the exercise and the fact that any single answer is likely to be precisely wrong, using multiple conceptually sound approaches (i.e., top-down and bottom-up) is critical – indeed, it is a policy requirement.

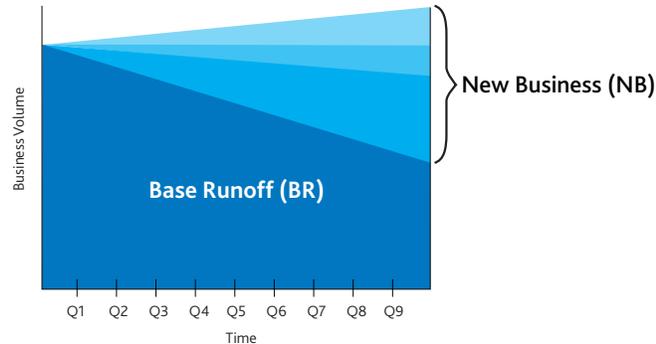
In most instances, existing production treasury and finance systems are not designed to properly use this required data, as Exhibit 2 shows. In fact, most data stores remain inconsistent with the new standards. Elsewhere, most budgeting and planning systems – which are used in a comprehensive CCAR process to populate baseline new business volumes, non-interest income, non-interest expense, and various Allowance for Loan and Lease Losses (ALLL) forecasts – are not conditioned on adverse or other stress scenarios, nor are they designed to plan for the future credit quality of forward-looking asset production or associated funding. Treasury risk systems, likewise, were not originally designed to rigorously handle credit risk.

⁴ See [Board of Governors of the Federal Reserve System, Reporting Forms, FR Y-14Q](#).

Exhibit 2: Stress-Testing: How Does PPNR and ALM Intersect with CCAR/DFAST Stress Testing?

New Business (NB)

- » Is this conditioned and simulated on economic scenarios? (i.e., supply and demand factors or expert judgement?)
- » How is credit quality incorporated?
- » Does it reconcile with Budgeting and Planning (B&P)?
- » Is the Net Interest Income (NII) from this business accurate? Is it consistent with ALM and the plan?
- » Is non-interest income and expense consistent with the scenarios including operational risk?



Base Runoff (BR)

- » Is P71 (schedule and unschedule) conditioned and simulated on economics scenarios?
- » Granularity - by asset class
- » Relationship to budget/plan
- » Do sensitivity measures include transitions of credit quality?

Issue: Are systems designed for today's modern risk modeling, process workflow, and reporting requirements?

Existing treasury systems can be ill-suited to the calculation of a meaningful and comprehensive stress-test. Many ALM systems have been designed to calculate exposure to changing interest rates and spreads. Advanced credit analytics are often lacking, particularly PD, LGD, and EAD parameters that are a natural part of most credit risk quantification processes. Moreover, capital rules, new business volume, and regulatory reporting requirements based on macro-economic stresses are usually difficult to maintain in traditional ALM systems, even when possible. When considering overall solution design, transparency, auditability, validation, and process control are important considerations.

As a result, many banks struggle to link siloed "specialized" risk and finance processes together at the data level and beyond, resulting in a patch-work system design. Nonetheless, professional financial managers understand the value of a centralized data store that can analyze, slice and dice, and use this improved, comprehensive data. At least one investment banking firm has gone so far as to form a deal team to advise banks that if they don't get this right, they may want to consider placing a "for sale" sign on their bank charter.

2. Analytical Models and Methods

Without the proper reference default and recovery data, accurately calibrating a credit model is impossible. Most existing solutions simply provide a framework to take credit loss parameters "as inputs," but this is insufficient. To achieve harmony with front-office credit teams (relationships, underwriting, and pricing), asset models must properly accommodate and calibrate a firm's unique credit characteristics. Furthermore, these risk measures must be consistent with the macro- and micro-economic scenarios that a firm's decision-makers or regulators want to explore. The modeling methods must also incorporate new model validation requirements that are becoming ever more important to the regulatory community. And these asset models should also provide accurate interest income and non-interest income values. Keep in mind that the supervisory mandated scenarios are likely to become a minimum benchmark. Many of the mandated scenarios may not be meaningful to a bank, requiring instead more idiosyncratic scenarios that are aligned with management's understanding of the firm's true risk profile, concentrations, and sensitivities.

As firms begin tackling these analytical challenges, data availability (i.e., sparse data sets), modeling capabilities, and internal risk assessment processes are being challenged. Resources that can integrate risk measures based on economic scenarios are not always readily available, and the process re-engineering needed can be opaque. Understanding industry best practices and regulatory drivers becomes critical at an early design stage.

For example, the current CCAR process fails to properly consider liquidity risk. If there is one lesson that has been learned from the recent financial crisis, it is how market illiquidity, credit losses (actual or perceived) and mark-to-market impacts (for example, OTTI) are linked and how this necessitates more comprehensive liquidity, collateral, and margin management. Although bank supervisors plan to correct this gap through additional supervisory exercises and requirements, creating a comprehensive roadmap is likely to save significant future expense. As a simple example, the FR Y-14Q securities template doesn't acknowledge that certain securities may be pledged and as a result would be unavailable for repo or for securing additional funding. Given that many banks use securities as collateral against a wide variety of secured funding choices, building a solution that doesn't properly capture such data will require an unnecessary amount of future work that would have been minimized if undertaken at an earlier design stage. These gaps can be numerous and widespread, and it is important that decisions are made with full awareness of the broader risk management goals of executive management, not merely with an orientation toward compliance with a regulatory mandate. Even today, many well known advisory firms continue to make these fairly basic design errors. Unfortunately, some firms are building solutions out of necessity and urgency, not out of a sense of sound design. This is due, in part, to an aggressive implementation timeline, as well as less than complete guidance and subject-matter understanding.

3. Comprehensive Internal and External Reporting Requirements

To be useful, a solution that seeks to improve the efficiency and rigor of existing stress testing processes must start with the end-state in mind: management utility. If the result of the CCAR and CapPR exercises is merely a stack of paperwork, the supervisory agencies will have failed. This is not the supervisory goal or expectation, nor is it the anticipated outcome.

Although the industry's current pain threshold is, indeed, the annual submission of regulatory CCAR reports and associated capital plans, many banks are moving beyond this stage and asking how these processes can enhance early warning risk systems by integrating them with risk appetite frameworks. They are asking how these new risk measures can improve decision-making and risk-pricing, as well as determining how to leverage, enhance, or replace existing modeling and analytical tools.

Although submitting the annual FR Y-14Q results is a challenge, if they are designed from the bottom-up with thoughtful linking to production risk and finance systems, improving operational efficiency is possible. This is accomplished, in part, in three distinct ways:

1. By reducing duplicate and overlapping business processes that can minimize certain operational vulnerabilities
2. By creating deeper institutional awareness allowing for improved and faster organizational and decision-making
3. By enhancing forward-looking scenario analyses tied to plausible economic environments that can have a dramatic impact on risk and performance, thereby allowing for better planning or actual tactical and strategic adjustments

The goal should be to operate at a pace that allows professional staff to create, at a minimum, quarterly bespoke stress-testing results with a low pain threshold. Good design from the data, analytic and reporting layer can even improve this further, such that a monthly production cycle is attainable. Once this is accomplished, we would be able to see the beginning of the end of black-box banking.

Conclusion

The growth pain the industry is experiencing isn't unexpected. The CCAR, Basel III, and enhanced liquidity risk management expectations aren't easy problems to solve with trifurcated business processes.

To break the black box and provide the needed transparency into various obligor and portfolio-wide risk exposures, understanding position risk, both known and potential, at a granular level is critical. To be useful, the analytical methods must result in actionable business intelligence. To be actionable, the methods and processes must be accurate, auditable, and transparent.

To properly calculate the forward-looking capital needs of a firm and ensure that the process meets the use test, analytics and software have to be developed and implemented in a rigorous, bottom-up fashion (except for certain retail portfolios, but not mortgage portfolios). With a well planned design and strategy, stress-testing becomes a central component of a bank's risk and capital management strategy. One look at regulatory agencies' data reporting requirements will remove all doubt as to the rigor expected of banks with more than \$10 billion in assets.

If implemented correctly, CCAR will foster a renaissance in enterprise risk assessment and help minimize the fragility of current position risk and bank operations, while also allowing for meaningful experiments of potential future stressed exposures. Moreover, a comprehensive CCAR process will naturally accommodate Basel I, II and III calculations, as required by national banking authorities. At the system-wide level, this capability could in time help assess risk interconnections and systemic risk to ensure the overall safety and soundness of one of the world's most complex financial systems.

Moody's Analytics CCAR Solution: Modular, Flexible and Comprehensive

Moody's Analytics comprehensive solution is modular, flexible, and encompasses three distinct tiers of design: 1) data infrastructure, 2) analytical models (internal and external), and 3) integrated management and regulatory reporting. The solution has been designed to ensure a comprehensive approach to all three of these elements, enabling regulatory compliance, operational efficiency and strategic business decisions. We also complement our enterprise-wide offering with data and expert implementation and advisory services.

For more information, please visit www.moodyanalytics.com/manageccaranddfast.

About Moody's Analytics

Moody's Analytics, a unit of Moody's Corporation, helps capital markets and credit risk management professionals worldwide respond to an evolving marketplace with confidence. The company offers unique tools and best practices for measuring and managing risk through expertise and experience in credit analysis, economic research and financial risk management. By offering leading-edge software and advisory services, as well as the proprietary credit research produced by Moody's Investors Service, Moody's Analytics integrates and customizes its offerings to address specific business challenges.

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