



FEDERAL RESERVE SYSTEM

12 CFR Part 252

[Regulation YY; Docket No. OP-1587]

Stress Testing Policy Statement

AGENCY: Board of Governors of the Federal Reserve System (Board).

ACTION: Proposed rule; policy statement with request for public comment.

SUMMARY: The Board is inviting comment on a proposed policy statement on the approach to supervisory stress testing conducted under the Board's Regulation YY pursuant to the Dodd-Frank Wall Street Reform and Consumer Protection Act (Dodd-Frank Act) and the Board's capital plan rule.

DATES: Comments must be received by January 22, 2018.

ADDRESSES: You may submit comments, identified by Docket No. OP-1587 by any of the following methods:

- Agency Web site: <http://www.federalreserve.gov>. Follow the instructions for submitting comments at <http://www.federalreserve.gov/generalinfo/foia/ProposedRegs.aspx>.
- Federal eRulemaking Portal: <http://www.regulations.gov>. Follow the instructions for submitting comments.
- Email: regs.comments@federalreserve.gov. Include the docket number and RIN number in the subject line of the message.
- Fax: (202) 452-2819 or (202) 452-3102.
- Mail: Ann Misback, Secretary, Board of Governors of the Federal Reserve System, 20th Street and Constitution Avenue NW., Washington, DC 20551.

All public comments will be made available on the Board's Web site at <http://www.federalreserve.gov/generalinfo/foia/ProposedRegs.aspx> as submitted, unless modified for technical reasons. Accordingly, your comments will not be edited to remove any identifying or contact information. Public comments may also be viewed electronically or in paper form in Room 3515, 1801 K St. NW. (between 18th and 19th Streets NW.), Washington, DC 20006 between 9:00 a.m. and 5:00 p.m. on weekdays. For security reasons, the Board requires that visitors make an appointment to inspect comments. You may do so by calling (202) 452-3684. Upon arrival, visitors will be required to present valid government-issued photo identification and to submit to security screening in order to inspect and photocopy comments.

FOR FURTHER INFORMATION CONTACT: Lisa Ryu, Associate Director, (202) 263-4833, Kathleen Johnson, Assistant Director, (202) 452-3644, Joseph Cox, Supervisory Financial Analyst, (202) 452-3216, Hillel Kipnis, Senior Financial Analyst, (202) 452-2924, Aurite Werman, Financial Analyst, (202) 263-4802, Division of Supervision and Regulation; Benjamin W. McDonough, Assistant General Counsel, (202) 452-2036, or Julie Anthony, Counsel, (202) 475-6682, Legal Division, Board of Governors of the Federal Reserve System, 20th Street and Constitution Avenue NW., Washington, DC 20551. Users of Telecommunication Device for Deaf (TDD) only, call (202) 263-4869.

SUPPLEMENTARY INFORMATION:

I. Overview

The proposed policy statement (Policy Statement) outlines the key principles and policies governing the Board's approach to the development, implementation, and validation of models used in the supervisory stress test. The supervisory stress test models are used to produce

estimates of post-stress capital ratios for covered companies,¹ pursuant to the Dodd-Frank Wall Street Reform and Consumer Protection Act (Dodd-Frank Act) and the Board's stress test rules.² This annual exercise is referred to as the Dodd-Frank Act Stress Test (DFAST). The supervisory models are also used in the Comprehensive Capital Analysis and Review (CCAR), pursuant to the Board's capital plan rule.³ The Board is proposing the Policy Statement to increase transparency around the development, implementation, and validation of these models by the Federal Reserve. Accordingly, the Policy Statement would not apply to models used by covered companies in the company-run stress tests mandated by the Dodd-Frank Act and the Board's stress test rules.⁴

II. Background

Supervisory stress testing is a tool that allows the Board to assess whether the largest and most complex financial firms are sufficiently capitalized to absorb losses in stressful economic conditions while continuing to meet obligations to creditors and other counterparties and to lend to households and businesses. The 2007-2009 financial crisis showed that many large bank holding companies (BHCs) did not hold capital commensurate with their risk profiles and were insufficiently capitalized to withstand unanticipated losses in severe economic stress and remain a going concern. Post-crisis reforms to regulation and supervision have improved the quality and quantity of capital in the financial system. These improvements have strengthened financial institutions and have reduced the likelihood and

¹ Covered companies are defined as bank holding companies (BHCs) and U.S. intermediate holding companies of foreign banking organizations (IHCs) with total consolidated assets of \$50 billion or more, and any nonbank financial company that the Financial Stability Oversight Committee has determined shall be supervised by the Board. See 12 U.S.C. 5365.

² Pub. L. no. 111-203, 124 Stat. 1376 (2010); 12 CFR part 252, subpart E.

³ 12 CFR 225.8.

⁴ See 12 U.S.C. 5365(i); 12 CFR part 252, subparts B and F.

severity of future financial crises, which can cause severe and lasting damage to the economy.

The Board's approach to supervisory stress testing has evolved since the Supervisory Capital Assessment Program (SCAP) in 2009, which was the first evaluation of BHCs' capital levels on a forward-looking basis under stress. The lessons from SCAP encouraged the creation, pursuant to the Dodd-Frank Act, of DFAST,⁵ a forward-looking quantitative evaluation of the impact of stressful economic and financial market conditions on covered companies' capital. CCAR is a related supervisory program that was developed pursuant to the Board's capital plan rule and focuses on forward-looking capital planning and the use of stress testing to assess firms' capital adequacy. The quantitative assessment in CCAR uses the same supervisory stress test as does DFAST, and includes firms' planned capital distributions, including any dividend payments or common stock repurchases.⁶ By assessing the capital adequacy of a covered company under severe projected economic and financial stress, the supervisory stress test complements minimum regulatory capital ratios, which reflect the covered company's current condition.

The proposed Policy Statement describes the principles, policies, and procedures that guide the development, implementation, and validation of the Federal Reserve's supervisory stress test models, and would complement the Board's policy statement on scenario design.⁷

The Federal Reserve maintains the same standards for model development and implementation of supervisory models as the Federal Reserve has established for covered companies. In addition to maintaining those standards, the Federal Reserve adheres to specific principles for model development and implementation. These principles, which apply

⁵ 77 FR 62377 (October 12, 2012) (stress test rules). See 12 CFR part 252, subparts E and F.

⁶ 12 CFR 225.8. CCAR also includes a qualitative assessment of capital planning practices at the largest and most complex firms, which is not the subject of this proposed Policy Statement.

⁷ See 12 CFR part 252, appendix A, "Policy Statement on the Scenario Design Framework for Stress Testing."

broadly across the full set of supervisory models, have guided the formulation of the Federal Reserve's supervisory modeling approach and continue to guide changes to supervisory models.

Models used in the supervisory stress test are also subject to ongoing review and validation by an independent unit within the Federal Reserve. In addition to addressing principles and policies of model development, implementation, and use, the Policy Statement describes principles of model validation, which is central to the credibility of supervisory models and to the credibility of the stress test exercise. The proposed Policy Statement is organized as follows. Section 1 describes the principles that guide the design of the supervisory stress test and the Federal Reserve's approach to supervisory modeling. Section 2 describes the governing policies and implementation of the supervisory stress test. Section 3 establishes the principles and policies for the validation of models used in the supervisory stress test. The Board may determine that modifications to the Policy Statement would be appropriate if the principles and policies that guide decisions in the supervisory stress test are revised materially. The Board is inviting public comment on all aspects of the proposed Policy Statement.

III. Administrative Law Matters

A. Use of Plain Language

Section 722 of the Gramm-Leach-Bliley Act (Pub. L. No. 106-102, 113 Stat. 1338, 1471, 12 U.S.C. 4809) requires the Federal banking agencies to use plain language in all proposed and final rules published after January 1, 2000. The Board has sought to present the proposed rule in a simple and straightforward manner, and invites comment on the use of plain language.

B. Paperwork Reduction Act Analysis

In accordance with the requirements of the Paperwork Reduction Act of 1995 (44 U.S.C. 3506), the Board has reviewed the proposed policy statement to assess any information collections. There are no collections of information as defined by the Paperwork Reduction Act in the proposal.

C. Regulatory Flexibility Act Analysis

In accordance with section 3(a) of the Regulatory Flexibility Act (RFA), the Board is publishing an initial regulatory flexibility analysis of the proposed policy statement. The RFA, 5 U.S.C. 601 et seq., requires each federal agency to prepare an initial regulatory flexibility analysis in connection with the promulgation of a proposed rule, or certify that the proposed rule will not have a significant economic impact on a substantial number of small entities.⁸ The RFA requires an agency either to provide an initial regulatory flexibility analysis with a proposed rule for which a general notice of proposed rulemaking is required or to certify that the proposed rule will not have a significant economic impact on a substantial number of small entities. Based on its analysis and for the reasons stated below, the Board believes that the proposed policy statement will not have a significant economic impact on a substantial number of small entities.

Under regulations issued by the Small Business Administration (SBA), a “small entity” includes those firms within the “Finance and Insurance” sector with asset sizes that vary from \$7 million or less in assets to \$175 million or less in assets.⁹ The Board believes that the Finance and Insurance sector constitutes a reasonable universe of firms for these purposes

⁸ See 5 U.S.C. 603, 604, and 605.

⁹ 13 CFR 121.201.

because such firms generally engage in activities that are financial in nature. Consequently, bank holding companies or nonbank financial companies with assets sizes of \$175 million or less are small entities for purposes of the RFA.

As discussed in the SUPPLEMENTARY INFORMATION, the proposed policy statement generally would affect the stress test framework used in regulations that apply to bank holding companies with \$50 billion or more in total consolidated assets and nonbank financial companies that the Council has determined under section 113 of the Dodd-Frank Act must be supervised by the Board and for which such determination is in effect. Companies that are affected by the proposed policy statement therefore substantially exceed the \$175 million asset threshold at which a banking entity is considered a “small entity” under SBA regulations.¹⁰ The proposed policy statement would affect a nonbank financial company designated by the Council under section 113 of the Dodd-Frank Act regardless of such a company's asset size. Although the asset size of nonbank financial companies may not be the determinative factor of whether such companies may pose systemic risks and would be designated by the Council for supervision by the Board, it is an important consideration.¹¹ It is therefore unlikely that a financial firm that is at or below the \$175 million asset threshold would be designated by the Council under section 113 of the Dodd-Frank Act because material financial distress at such firms, or the nature, scope, size, scale, concentration, interconnectedness, or mix of its activities, are not likely to pose a threat to the financial stability of the United States.

¹⁰ The Dodd-Frank Act provides that the Board may, on the recommendation of the Council, increase the \$50 billion asset threshold for the application of certain of the enhanced standards. See 12 U.S.C. 5365(a)(2)(B). However, neither the Board nor the Council has the authority to lower such threshold.

¹¹ See 76 FR 4555 (January 26, 2011).

As noted above, because the proposed policy statement is not likely to apply to any company with assets of \$175 million or less, if adopted in final form, it is not expected to affect any small entity for purposes of the RFA. The Board does not believe that the proposed policy statement duplicates, overlaps, or conflicts with any other Federal rules. In light of the foregoing, the Board does not believe that the proposed policy statement, if adopted in final form, would have a significant economic impact on a substantial number of small entities supervised. Nonetheless, the Board seeks comment on whether the proposed policy statement would impose undue burdens on, or have unintended consequences for, small organizations, and whether there are ways such potential burdens or consequences could be minimized in a manner consistent its purpose.

List of Subjects in 12 CFR Part 252

Administrative practice and procedure, Banks, Banking, Federal Reserve System, Holding companies, Nonbank financial companies supervised by the Board, Reporting and recordkeeping requirements, Securities, Stress testing.

Authority and Issuance

For the reasons stated in the Supplementary Information, the Board of Governors of the Federal Reserve System proposes to amend 12 CFR part 252 as follows:

PART 252—ENHANCED PRUDENTIAL STANDARDS (Regulation YY)

1. The authority citation for part 252 continues to read as follows:

Authority: 12 U.S.C. 321-338a, 1467a(g), 1818, 1831p-1, 1844(b), 1844(c), 5361, 5365, 5366.

2. Add appendix B to part 252 to read as follows:

Appendix B to Part 252 – Stress Testing Policy Statement

This Policy Statement describes the principles, policies, and procedures that guide the development, implementation, and validation of models used in the Federal Reserve’s supervisory stress test.

1. Principles of Supervisory Stress Testing

The system of models used in the supervisory stress test is designed to result in projections that are (i) from an independent supervisory perspective; (ii) forward-looking; (iii) consistent and comparable across covered companies; (iv) generated from simple approaches, where appropriate; (v) robust and stable; (vi) conservative; and (vii) able to capture the impact of economic stress. These principles are further explained below.

1.1. Independence

In the supervisory stress test, the Federal Reserve uses models that are developed internally and independently (i.e., separately from models used by covered companies). The supervisory models rely on detailed portfolio data provided by covered companies, but do not rely on models or estimates provided by covered companies to the greatest extent possible.

The Federal Reserve's stress testing framework is unique among regulators in its generation of estimates of covered companies' stressed losses and revenues that are not determined in consultation with firms or influenced by firm-provided estimates. Doing so enables the Federal Reserve to provide the public and the covered companies with credible, independent assessments of each firm's capital adequacy under stress and helps instill public confidence in the banking system.

The independence of the supervisory stress test allows stress test projections to adhere to the other key principles described in the Policy Statement. The use of independent models allows for consistent treatment across firms. Losses and revenues under stress are estimated using the same modeling assumptions for all covered companies, enabling comparisons across supervisory stress test results. Differences in covered companies' results reflect differences in firm-specific risks and input data instead of differences in modeling assumptions. The use of independent models also ensures that stress test results are produced by stress-focused models, designed to project the performance of covered companies in adverse economic conditions.

In instances in which it is not possible or appropriate to create a supervisory model for use in the stress test, including when supervisory data are insufficient to support a modeled estimate of losses or revenues, the Federal Reserve may use firm-provided estimates or third-party models or data. For example, in order to project trading and counterparty losses, sensitivities to risk factors and other information generated by covered companies' internal models are used. In the cases where firm-provided or third-party model estimates are used, the Federal Reserve monitors the quality and performance of the estimates through targeted examination, additional data collection, or benchmarking. The Board releases a list of the providers of third-party models or data used in the stress test exercise in the annual disclosure

of quantitative results.

Question number 1: The modeling framework of the Federal Reserve's supervisory stress test seeks to promote consistency and comparability in evaluating the impact of severe economic stress upon covered companies by generating independent estimates of losses, revenues, and capital. Are there additional advantages or disadvantages to this independent framework, relative to a framework that relies on models or estimates provided by covered companies?

1.2. Forward-looking

The Federal Reserve has designed the supervisory stress test to be forward-looking. Supervisory models are tools for producing projections of potential losses and revenue effects based on each covered company's portfolio and circumstances.

While supervisory models are specified using historical data, they should generally avoid relying solely on extrapolation of past trends in order to make projections, and instead should be able to incorporate events or outcomes that have not occurred. As described in Section 2.4, the Federal Reserve implements several supervisory modeling policies to limit reliance on past outcomes in its projections of losses and revenues. The incorporation of the macroeconomic scenario and global market shock component also introduces elements outside the realm of historical experience into the supervisory stress test.

1.3. Consistency and Comparability

The Federal Reserve uses the same set of models and assumptions to produce loss projections for all covered companies participating in the supervisory stress test. A standard set of scenarios, assumptions, and models promotes equitable treatment of firms participating in the supervisory stress test and comparability of results, supporting cross-firm analysis and providing valuable information to supervisors and to the public. Adhering to a consistent modeling approach across covered companies means that differences in projected results are

due to differences in input data, such as instrument type or portfolio risk characteristics, rather than differences in firm-specific assumptions made by the Federal Reserve.

1.4. *Simplicity*

The Federal Reserve uses simple approaches in supervisory modeling, where possible. Given a range of modeling approaches that are equally conceptually sound, the Federal Reserve will select the least complex modeling approach. In assessing simplicity, the Federal Reserve favors those modeling approaches that allow for a more straightforward interpretation of the drivers of model results and that minimize operational challenges for model implementation.

1.5. *Robustness and Stability*

The Federal Reserve maintains supervisory models that aim to be robust and stable, such that changes in model projections over time reflect underlying risk factors, scenarios, and model enhancements, rather than transitory factors. The estimates of post-stress capital produced by the supervisory stress test provide information regarding a covered company's capital adequacy to market participants, covered companies, and the public. Adherence to this principle helps to ensure that changes in these model projections over time are not driven by temporary variations in model performance or inputs. Supervisory models are recalibrated with newly available input data each year. These data affect supervisory model projections, particularly in times of evolving risks. However, these changes generally should not be the principal driver of a change in results, year over year.

1.6. *Conservatism*

Given a reasonable set of assumptions or approaches, all else equal, the Federal Reserve will opt to use those that result in larger losses or lower revenue. For example, given a lack of information about the true risk of a portfolio, the Federal Reserve will compensate

for the lack of data by using a high percentile loss rate.

1.7. *Focus on the Ability to Evaluate the Impact of Severe Economic Stress*

In evaluating whether supervisory models are appropriate for use in a stress testing exercise, the Federal Reserve places particular emphasis on supervisory models' abilities to project outcomes in stressed economic environments. In the supervisory stress test, the Federal Reserve also seeks to capture risks to capital that arise specifically in times of economic stress, and that would not be prevalent in more typical economic environments. For example, the Federal Reserve includes losses stemming from the default of a covered company's largest counterparty in projections of post-stress capital for firms with substantial trading or processing and custodial operations. The default of a company's largest counterparty is more likely to occur in times of severe economic stress than in normal economic conditions.

2. *Supervisory Stress Test Model Policies*

To be consistent with the seven principles outlined in Section 1, the Federal Reserve has established policies and procedures to guide the development, implementation, and use of all models used in supervisory stress test projections, described in more detail below. Each policy facilitates adherence to at least one of the modeling principles that govern the supervisory stress test, and in most cases facilitates adherence to several modeling principles.

2.1. *Soundness in Model Design*

During development, the Federal Reserve (i) subjects supervisory models to extensive review of model theory and logic and general conceptual soundness; (ii) examines and evaluates justifications for modeling assumptions; and (iii) tests models to establish the accuracy and stability of the estimates and forecasts that they produce.

After development, the Federal Reserve continues to subject supervisory models to

scrutiny during implementation to ensure that the models remain appropriate for use in the stress test exercise. The Federal Reserve monitors changes in the economic environment, the structure of covered companies and their portfolios, and the structure of the stress testing exercise, if applicable, to verify that a model in use continues to serve the purposes for which it was designed. Generally, the same principles, rigor, and standards for evaluating the suitability of supervisory models that apply in model development and design will apply in ongoing monitoring of supervisory models.

2.2. Disclosure of Information Related to the Supervisory Stress Test

In general, the Board does not disclose firm-specific results or other information related to the supervisory stress test to covered companies if that information is not also publicly disclosed. This policy promotes consistent and equitable treatment of covered companies by ensuring that institutions do not have access to information about the supervisory stress test that is not accessible to all covered companies, corresponding to Principle 1.3.

The Board publicly discloses information related to the supervisory stress test on a regular basis, instead of privately communicating this information to covered companies. The Board has increased the breadth of its public disclosure since the inception of the supervisory stress test to include more information about model changes and key risk drivers, in addition to more detail on different components of projected net revenues and losses. Increasing public disclosure helps the public understand and interpret the results of the supervisory stress test, particularly with respect to the condition and capital adequacy of participating firms. Providing additional information about the supervisory stress test also allows the public to make an evaluation of the quality of the Board's capital adequacy assessment.

2.3. Phasing in of Highly Material Model Changes

The Federal Reserve may revise its supervisory stress test models to include advances in modeling techniques, enhancements in response to model validation findings, incorporation of richer and more detailed data, public comment, and identification of models with improved performance, particularly under adverse economic conditions. Revisions to supervisory stress models may at times have a material impact on modeled outcomes.

In order to mitigate sudden and unexpected changes to the supervisory stress test results, the Federal Reserve follows a general policy of phasing highly material model changes into the supervisory stress test over two years. The Federal Reserve assesses whether a model change would have a highly significant impact on the projections of losses, components of revenue, or post-stress capital ratios for covered companies. In these instances, in the first year when the model change is first implemented, estimates produced by the enhanced model are averaged with estimates produced by the model used in the previous stress test exercise. In the second and subsequent years, the supervisory stress test exercise will reflect only estimates produced by the enhanced model. This policy contributes to the stability of the results of the supervisory stress test, corresponding to Principle 1.5. By implementing highly material model changes over the course of two stress test cycles, the Federal Reserve seeks to ensure that changes in model projections primarily reflect changes in underlying risk factors and scenarios, year over year.

Question number 2: The Federal Reserve assesses individual model changes each year to determine whether these model changes will have a highly significant impact on the projections of losses, revenues, or post-stress capital ratios for covered companies, and whether these changes warrant a phase-in over two stress test exercises. What thresholds should the Federal Reserve use to determine whether model changes will have a highly

significant impact on projections?

2.4. Limiting Reliance on Past Outcomes

Models should not place undue emphasis on historical outcomes in predicting future outcomes. The Federal Reserve aims to produce supervisory stress test results that reflect likely outcomes under the supervisory scenarios. The supervisory scenarios may potentially incorporate events that have not occurred historically. It is not consistent with the purpose of a stress testing exercise to assume that the future will always be like the past.

In order to model potential outcomes outside the realm of historical experience, the Federal Reserve generally does not include variables that would capture unobserved historical patterns in supervisory models. The use of industry-level models, restricted use of firm-specific fixed effects (described below), and minimized use of dummy variables indicating a loan vintage or a specific year ensure that the outcomes of the supervisory models are forward-looking, consistent and comparable across firms, and robust and stable.

Firm-specific fixed effects are variables that identify a specific firm and capture unobserved differences in the revenues, expenses or losses among firms. Firm-specific fixed effects are generally not incorporated in supervisory models in order to avoid the assumption that unobserved firm-specific historical patterns will continue in the future. Exceptions to this policy are made where appropriate. For example, if granular portfolio-level data on key drivers of a covered company's performance are limited or unavailable, and firm-specific fixed effects are more predictive of a covered company's future performance than are industry-level variables, then supervisory models may be specified with firm-specific fixed effects.

Models used in the supervisory stress test are developed according to an industry-level approach, calibrated using data from many institutions. In adhering to an industry-level

approach, the Federal Reserve models the response of specific portfolios and instruments to variations in macroeconomic and financial scenario variables. In this way, the Federal Reserve ensures that differences across covered companies are driven by differences in firm-specific input data, as opposed to differences in model parameters or specifications. The industry approach to modeling is also forward-looking, consistent with Principle 1.2, as the Federal Reserve does not assume that historical patterns will necessarily continue into the future for individual firms. By modeling a portfolio or instrument's response to changes in economic or financial conditions at the industry level, the Federal Reserve ensures that projected future losses are a function of that portfolio or instrument's own characteristics, rather than the historical experience of the covered company. This policy helps to ensure that two firms with the same portfolio receive the same results for that portfolio in the supervisory stress test.

The Federal Reserve minimizes the use of loan vintage or year-specific fixed effects when estimating models and producing supervisory projections. In general, these types of variables are employed only when there are significant structural market shifts or other unusual factors for which supervisory models cannot otherwise account. Similar to the firm-specific fixed effects policy, and consistent with Principle 1.2, this vintage indicator policy is in place so that projections of future performance under stress do not incorporate assumptions that patterns in unmeasured factors from brief historical time periods persist. For example, the loans originated in a particular year should not be assumed to continue to default at a higher rate in the future because they did so in the past.

Question number 3: The Federal Reserve seeks to model potential outcomes outside the realm of historical experience, and in connection with doing so, has implemented policies to limit its own reliance on historical outcomes in model design and calibration. What other

policies or methodologies would allow the Federal Reserve to incorporate events that have not occurred historically in supervisory stress test projections while maintaining the integrity of the supervisory stress tests?

2.5. Treatment of Global Market Shock and Largest Counterparty Default Components

Both the global market shock and counterparty default components are exogenous components of the supervisory stress scenarios that are independent of the macroeconomic and financial market environment specified in those scenarios, and do not affect projections of risk-weighted assets or balances. The global market shock, which specifies movements in numerous market factors,¹ applies only to covered companies with significant trading exposure. The largest counterparty default scenario component applies only to covered companies with substantial trading or processing and custodial operations. Though these stress factors may not be directly correlated to macroeconomic or financial assumptions, they can materially affect covered companies' risks. Losses from both components are therefore considered in addition to the estimates of losses under the macroeconomic scenario.

Counterparty credit risk on derivatives and repo-style activities is incorporated in supervisory modeling in part by assuming the default of the single counterparty to which the covered firm would be most exposed in the global market shock event.² Requiring covered companies subject to the largest counterparty default component to estimate and report the

¹ See appendix A to this part, "Policy Statement on the Scenario Design Framework for Stress Testing," for a detailed description of the global market shock.

² In addition to incorporating counterparty credit risk by assuming the default of the covered company's largest counterparty, the Federal Reserve incorporates counterparty credit risk in the supervisory stress test by estimating mark-to-market losses, credit valuation adjustment (CVA) losses, and incremental default risk (IDR) losses associated with the global market shock.

potential losses and effects on capital associated with such an instantaneous default is a simple method for capturing an important risk to capital for firms with large trading and custodial or processing activities. Engagement in substantial trading or custodial operations makes the covered companies subject to the largest counterparty default scenario component particularly vulnerable to the default of their major counterparty or their clients' counterparty, in transactions for which the covered companies act as agents. The largest counterparty default component is consistent with the purpose of a stress testing exercise, as discussed in Principle 1.7. The default of a covered company's largest counterparty is a salient risk in a macroeconomic and financial crisis, and generally less likely to occur in times of economic stability. This approach seeks to ensure that covered companies can absorb losses associated with the default of any counterparty, in addition to losses associated with adverse economic conditions, in an environment of economic uncertainty.

The full effect of the global market shock and counterparty default components is realized in net income in the first quarter of the projection horizon in the supervisory stress test. The Board expects covered companies with material trading and counterparty exposures to be sufficiently capitalized to absorb losses stemming from these exposures that could occur during times of general macroeconomic stress.

2.6. Incorporation of Business Plan Changes

The Federal Reserve incorporates material changes in the business plans of covered companies, including mergers, acquisitions, and divestitures over the projection horizon, in the supervisory stress test projections. The incorporation of business plan changes in the supervisory stress test is a requirement of the capital plan rule,³ and captures a risk to the

³ 12 CFR 225.8(e)(2).

capital of covered companies. Allowing for the inclusion of mergers, acquisitions, and divestitures is forward-looking, and consistent with Principle 1.2, as the Federal Reserve seeks to capture material impacts on a covered company's post-stress capital that may arise from a business plan change in the course of the projection horizon.

The incorporation of business plan changes in supervisory projections is consistent with the purpose of a stress testing exercise, corresponding to Principle 1.7. In CCAR specifically, the Board evaluates whether covered companies have the ability to complete their projected capital actions in the supervisory stress test while remaining above post-stress minimum capital and leverage ratios. Business plan changes such as mergers, acquisitions, or divestitures, may have material impacts on these firm-projected capital actions and on the projected ability of a covered company to make planned capital distributions and maintain capital ratios above regulatory minima.

A consistent methodology for modeling of business plan changes is applied across covered companies. The data that are available about characteristics of assets being acquired or divested are generally limited and less granular than other data collected by the Board in the Capital Assessments and Stress Testing (FR Y-14) information collection. Projections of the effects of business plan changes may rely on less granular information and may result in simpler modeling approaches than supervisory projections for legacy portfolios or businesses.

2.7. Credit Supply Maintenance

The supervisory stress test incorporates the assumption that aggregate credit supply does not contract during the stress period. The aim of supervisory stress testing is to assess whether firms are sufficiently capitalized to absorb losses during times of economic stress, while meeting obligations and continuing to lend to households and businesses. The

assumption that a balance sheet of constant or increasing magnitude is maintained allows supervisors to evaluate the health of the banking sector, assuming firms continue to lend during times of stress.

In order to implement this policy, the Federal Reserve must make assumptions about new loan balances. To predict losses on new originations over the planning horizon, newly originated loans are assumed to have the same risk characteristics as the existing portfolio, where applicable, with the exception of loan age and delinquency status. These newly originated loans would be part of a covered company's normal business, even in a stressed economic environment. While an individual firm may assume that it reacts to rising losses by sharply restricting its lending, (e.g. by exiting a particular business line), the banking industry as a whole cannot do so without creating a "credit crunch" and substantially increasing the severity and duration of an economic downturn. The assumption that the magnitude of firm balance sheets will be fixed or growing in the supervisory stress test ensures that covered companies cannot assume they will "shrink to health," and serves the Federal Reserve's goal of helping to ensure that major financial firms remain sufficiently capitalized to accommodate credit demand in a severe downturn. In addition, by precluding the need to make assumptions about how underwriting standards might tighten or loosen during times of economic stress, the Federal Reserve adheres to Principle 1.3 and promotes consistency across covered companies.

Question number 4: The Federal Reserve seeks to assess covered companies' capital adequacy in times of stress while those firms continue to lend. Beyond assuming that the magnitude of firm balance sheets is fixed or growing, are there other assumptions that could be incorporated into the supervisory stress test that would allow the Federal Reserve to make this assessment?

2.8. Firm-Specific Overlays and Additional Firm-Provided Data

The Federal Reserve does not make firm-specific overlays to model results used in the supervisory stress test. This policy ensures that the supervisory stress test results are determined solely by the industry-level supervisory models and by firm-specific input data. The Federal Reserve does not use additional input data submitted by one or more covered companies unless it collects comparable data from all the covered companies that have material exposure in a given area. Input data necessary to produce supervisory stress test estimates is collected via the Capital Assessments and Stress Testing (FR Y-14) information collection. The Federal Reserve may request additional information from covered companies, but otherwise will not incorporate additional information provided as part of a firm's CCAR submission or obtained through other channels into stress test projections.

This policy curbs the use of data only from firms that have incentives to provide it, as in cases in which additional data would support the estimation of a lower loss rate or a higher revenue rate, and adheres to Principle 1.3 by promoting consistency across the stress test results of covered companies.

2.9. Treatment of Missing or Erroneous Data

Missing data, or data with deficiencies significant enough to preclude the use of supervisory models, create uncertainty around estimates of losses or components of revenue. If data that are direct inputs to supervisory models are not provided as required by the Capital Assessments and Stress Testing (FR Y-14) information collection or are reported erroneously, then a conservative value will be assigned to the specific data based on all available data reported by covered companies, depending on the extent of the data deficiency. If the data deficiency is severe enough that a modeled estimate cannot be produced for a portfolio segment or portfolio, then the Federal Reserve may assign a conservative rate (e.g.,

10th or 90th percentile PPNR or loss rate, respectively) to that segment or portfolio.

This policy reflects a conservative assumption given a lack of information sufficient to produce a risk-sensitive estimate of losses or revenues. This policy promotes policy 1.3 by ensuring consistent treatment for all covered companies that report data deemed insufficient to produce a modeled estimate. Finally, this policy is simple and transparent, consistent with Principle 1.4.

2.10 Treatment of Immaterial Portfolio Data

The Federal Reserve makes a distinction between missing or insufficient data reported by covered companies for material and immaterial portfolios. To limit regulatory burden, the Federal Reserve allows covered companies not to report detailed loan-level or portfolio-level data for loan types that are not material as defined in the FR Y-14 reporting instructions. In these cases, a loss rate representing the median rates among covered companies for whom the rate is calculated will be applied to immaterial portfolios. This approach is consistent across covered companies, simple, and transparent, promoting Principles 1.3 and 1.4.

Question number 5: Each of the modeling policies described in Section 2 are consistent with at least one of the central principles of supervisory stress test modeling described herein. Are there other policies the Federal Reserve could implement to further promote the principles of independence, forward-looking perspective, consistency and comparability, simplicity, robustness and stability, or conservatism, or that would focus on the ability to evaluate the impact of severe economic stress?

3. Principles and Policies of Supervisory Model Validation

Independent and comprehensive model validation is key to the credibility of the supervisory stress test. An independent unit of validation staff within the Federal Reserve, with input from an advisory council of academic experts not affiliated with the Federal

Reserve, ensures that stress test models are subject to effective challenge, defined as critical analysis by objective, informed parties that can identify model limitations and recommend appropriate changes.

The Federal Reserve's supervisory model validation program, built upon the principles of independence, technical competence, and stature, is able to subject models to effective challenge, expanding upon supervisory modeling teams' efforts to manage model risk and confirming that supervisory models are appropriate for their intended uses. The supervisory model validation program produces reviews that are consistent, thorough, and comprehensive. Its structure ensures independence from the Federal Reserve's model development function, and its prominent role in communicating the state of model risk to the Board of Governors assures its stature within the Federal Reserve.

3.1. Structural Independence.

The management and staff of the internal model validation program are structurally independent from the model development teams. Validators do not report to model developers, and vice versa. This ensures that model validation is conducted and overseen by objective parties. Validation staff's performance criteria include an ability to review all aspects of the models rigorously, thoroughly, and objectively, and to provide meaningful and clear feedback to model developers and users.

In addition, a council of external academic experts provides independent advice on the Federal Reserve's process to assess models used in the supervisory stress test. In biannual meetings with Federal Reserve officials, members of the council discuss selected supervisory models, after being provided with detailed model documentation for those models, including some confidential supervisory information. The documentation and discussions enable the council to assess the effectiveness of the models used in the

supervisory stress tests and of the overarching model validation program.

3.2. Technical Competence of Validation Staff.

The model validation program is designed to provide thorough, high-quality reviews that are consistent across supervisory models.

First, the model validation program employs technically expert staff with knowledge across model types. Second, reviews for every supervisory model follow the same set of review guidelines, and take place on an ongoing basis. The model validation program is comprehensive, in the sense that validators assess all models currently in use, and expand the scope of validation beyond basic model use, and cover both model soundness and performance.

The model validation program covers three main areas of validation: (1) conceptual soundness; (2) ongoing monitoring; and (3) outcomes analysis. Validation staff evaluate all aspects of model development, implementation, and use, including but not limited to theory, design, methodology, input data, testing, performance, documentation standards, implementation controls (including access and change controls), and code verification. Finally, the model validation program seeks to balance technical expertise with fresh scrutiny of supervisory models. In order to provide a new perspective on established models and practices, validation staff are re-allocated across models at regular intervals.

3.3. Stature of Validation Function.

Through clear communication and participation in the model decision making process, the validation function has the influence and stature within the Federal Reserve to ensure that any issues and deficiencies are appropriately addressed in a timely and substantive manner.

The model validation program communicates its findings and recommendations

regarding model risk to all internal stakeholders. Validators provide detailed feedback to model developers and provide thematic feedback or observations on the overall system of models to the management of the modeling teams. Model validation feedback is also communicated to the users of supervisory model output for use in their deliberations and decisions about supervisory stress testing. In addition, the Federal Reserve Board's Director of Supervision and Regulation approves all models used in the supervisory stress test in advance of each exercise, based on validators' recommendations, development responses, and suggestions for risk mitigants. In several cases, models have been modified or implemented differently based on validators' feedback. The advisory council of academic experts also contributes to the stature of the Federal Reserve's validation program, by providing an external point of view on modifications to supervisory models and on validation program governance.

Ultimately, the validation program serves to inform the Board of Governors about the state of model risk in the overall stress testing program, along with ongoing practices to control and mitigate model risk.

By order of the Board of Governors of the Federal Reserve System, December 7, 2017.

Ann E. Misback,
Secretary of the Board.

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