



2020 REPORT CYCLE
DODD-FRANK ACT STRESS TESTS
SUMMARY INSTRUCTIONS AND GUIDANCE

March 10, 2020

Accompanying Order Nos.
2020-OR-FNMA-1, AND 2020-OR-FHLMC-1



Federal Housing Finance Agency

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Introduction

Section 165(i)(2) of the Dodd-Frank Act, as amended by section 401 of the Economic Growth, Regulatory Relief, and Consumer Protection Act (“EGRRCPA”) requires certain financial companies with total consolidated assets of more than \$250 billion, and which are regulated by a primary federal financial regulatory agency, to conduct periodic stress tests to determine whether the companies have the capital necessary to absorb losses as a result of severely adverse economic conditions. These statutory changes became effective on November 24, 2019. The Federal Housing Finance Agency (FHFA) is the primary federal financial regulator of Fannie Mae and Freddie Mac (the Enterprises), and the 11 Federal Home Loan Banks (Banks). These entities are collectively referred to as the regulated entities.

FHFA’s rule on Stress Testing of Regulated Entities (12 CFR 1238), along with these instructions and guidance, apply to the Enterprises because each Enterprise has total consolidated assets of more than \$250 billion. Due to their total consolidated asset amounts, function in the mortgage market, size of their retained portfolios, and their share of the mortgage securitization market, FHFA requires each Enterprise to conduct the stress test on an annual basis. Because the Banks do not meet the total consolidated asset threshold of \$250 billion, they are not subject to the stress test requirements of the rule.

The Enterprises’ capital positions, supported and restricted by the Senior Preferred Stock Purchase Agreements with the Department of the Treasury, are unique. Nonetheless, the

Enterprises incorporate capital into their business decision-making processes. FHFA expects the Enterprises to have processes and procedures for managing their businesses notwithstanding Treasury’s support.

FHFA’s stress testing rule establishes the basic requirements for each Enterprise to conduct Dodd-Frank Act Stress Tests (DFAST) and report the results. This summary instructions and guidance document supplements the rule. FHFA expects each Enterprise to follow the instructions and guidance in conducting stress tests and reporting and publishing results under the rule.

General instructions and guidance are provided relating to:

- Scenario assumptions
- Reporting and timing
- Stress test process governance
- Use of stress test results
- Incomplete data
- Evaluation of stress test processes
- Correspondence related to stress tests

Stress Test Scenarios

The stress tests are based on portfolios as of December 31, 2019. The planning horizon for the stress test is nine quarters, starting with the first quarter of 2020 and extending through the first quarter of 2022. The Enterprises are required to submit the results of stress tests based on two scenarios: Baseline and Severely Adverse. Assumptions for the variables in each scenario are contained in Appendices 3 through 7.

FHFA expects each Enterprise to use those

variables that are relevant to the Enterprise's line of business and that are consumed by the Enterprise's models. However, FHFA expects each Enterprise to apply all of the relevant global market shocks provided. Each Enterprise is expected to indicate which variables are included in its stress tests in its report to FHFA and the Federal Reserve Board of Governors (Board). FHFA also expects each Enterprise to extrapolate any of the aforementioned variables beyond the projection date as required. One year of scenario assumptions beyond the nine-quarter planning horizon will be provided and may be utilized, if needed. Historical data is provided should models require that information.

It is important to note that the scenarios and assumptions provided are not forecasts, but instead are hypothetical scenarios and assumptions to assess the financial strength of the Enterprises.

Global Market Shock Assumptions

The global market assumptions provided by FHFA are to be applied to the Enterprises' trading securities, available-for-sale securities, and other fair value assets as of December 31, 2019, for the Severely Adverse scenario.

The result of the global market shock is to be taken as an instantaneous loss and reduction of capital in the first quarter of the planning horizon. The global market shock should be treated as an add-on that is exogenous to the macroeconomic and financial market environment specified in the supervisory stress scenario. The Enterprises should assume no recoveries of the losses generated by the global market shock over the nine quarters. The capital impact of the global

market shock is carried over the planning horizon.

If an Enterprise can demonstrate that its loss-estimation methodology stresses identical positions under both the global market shock and the macroeconomic scenario, the Enterprise may assume that the combined losses from such positions do not exceed the losses resulting from the greater of the global market shock losses or the macroeconomic losses.

Counterparty Default Scenario Component

The counterparty default scenario component of the global market shock should be treated as an add-on to the macroeconomic and financial market scenario specified in the Severely Adverse scenario. The counterparty default scenario component involves an instantaneous and unexpected default of one of the following:

- an Enterprise's largest counterparty across the Enterprise's secured and unsecured lending, securities lending, repurchase/reverse repurchase agreements (collectively Securities Financing Transactions or SFTs), unsecured overnight deposits, and derivative exposures, as well as the potential losses and effects on capital associated with such a default;
- an Enterprise's largest counterparty across the Enterprise's single-family mortgage insurance providers and the potential losses and effects on capital associated with such a default; or
- an Enterprise's largest counterparty across the Enterprise's providers of

multifamily credit enhancements and the potential losses and effects on capital associated with such a default.

The Enterprise should identify its largest counterparty as the counterparty that represents the largest total net stressed loss if the counterparty defaulted on its obligations. Net stressed losses for SFT counterparties are calculated after applying the instantaneous market shock to any non-cash SFT assets (securities/collateral) posted or received, and for derivatives, to the value of the trade position and non-cash collateral exchanged.¹

The as-of date for the counterparty default scenario component is December 31, 2019 – the same date as the global market shock.

All estimated losses from the counterparty default scenario component should be assumed to occur instantaneously and should be reported in the initial quarter of the planning horizon.

More detailed instructions for implementing certain assumptions follow:

¹ In selecting its largest counterparty, an Enterprise will not consider certain sovereign entities (Canada, France, Germany, Italy, Japan, the United Kingdom, and the United States) or designated central clearing counterparties.

House Prices

The House Price Index assumptions provided by FHFA describe the path of national house prices. Each Enterprise should extrapolate the national house price path beyond the projection date as needed.

Each Enterprise should also translate the national house price path in each scenario to regional house price paths as appropriate for each Enterprise's models and should interpolate the house price paths to accommodate the frequency of data required by their models.

Missing Variables

Each Enterprise should use its internal assumptions for variables that its models consume but that FHFA does not provide.

Balance Sheet Evolution

Each Enterprise should use its internal assumptions to roll its balance sheets forward through the nine-quarter projection period. The assumptions should reflect reasonable expectations for future business and should conform to the Enterprise's internal strategic plan. The Enterprise should ensure that the size and composition of its book of business during the stress test is consistent with the goals in FHFA's Conservatorship Scorecard.

Capital Actions

The Enterprises should comply with the terms of the Senior Preferred Stock Purchase Agreements, as amended, to determine the level of dividends to pay over the planning horizon.

Operational Risk Losses

Operational risk losses are losses that arise

from external events or from inadequate internal processes, people, or systems. The Enterprises should estimate operational risk losses for each scenario and submit the results to FHFA.

Changes in Accounting Standards

The Financial Accounting Standards Board (FASB) periodically makes revisions to U.S. Generally Accepted Accounting Principles (U.S. GAAP). These changes affect an entity's financial reporting upon adoption by the entity. The FASB has made major revisions to accounting standards associated with recognition and measurement of financial instruments, revenue recognition, leases, credit losses, and derivatives and hedging. The effective dates for these standards range from fiscal years beginning after December 15, 2017, to fiscal years beginning after December 15, 2020.

An Enterprise should not reflect the adoption of new accounting standards in its projections unless the entity has already adopted the accounting standard for financial reporting purposes.

With regard to Accounting Standards Update No. 2016-13, Financial Instruments – Credit Losses (Topic 326): Measurement of Credit Losses on Financial Instruments (CECL), the Enterprises should include the effect of CECL for the 2020 DFAST reporting cycle.

When reviewing the processes, procedures, and reporting templates associated with the 2020 DFAST reporting cycle, FHFA will take into consideration the potential challenge(s) associated with the initial implementation of

CECL into the DFAST process. This approach would also extend to the 2021 DFAST reporting cycle.

Reporting Format and Timing

The Enterprises must submit results of the Baseline and Severely Adverse scenarios to FHFA and the Board on or before May 20, 2020, and must publicly disclose a summary of the results of only the Severely Adverse scenario between August 1 and August 15.

The results of an Enterprise's analysis for each scenario should encompass all potential losses and other impacts to net income and capital that the Enterprise might experience under the scenarios. In all cases, each Enterprise should substantiate that its results are consistent with the specified macroeconomic and financial environment and that the components of its results are internally consistent within each scenario.

The Enterprises are required to report the results using the DFAST templates provided in Appendix 2.

The Enterprises are also required to submit qualitative information describing the methodologies, including any simplifying or other assumptions used to produce the estimates, as well as any other information necessary to fully support the reasonableness of the stress test results.

Each Enterprise must submit its results and any supporting information to FHFA through a secure site. The Enterprises must use the secure server.

Stress Test Governance

The board of directors of each Enterprise or a designated committee thereof is responsible for reviewing and approving policies and

procedures established to comply with the rule. Each board of directors should also receive and review the results of the stress tests for compliance with the rule and established policies and procedures. Senior management of each Enterprise is responsible for establishing and testing controls. Senior management and each member of the board of directors are to receive a summary of the stress test results.

Use of Stress Test Results

The rule requires that each Enterprise take the results of the annual stress test into account in making changes as appropriate to its capital structure (including the level and composition of capital), exposures, concentrations, risk positions, plans for recovery and resolution, or plans to improve overall risk management. Consultation with FHFA staff is expected in making any such changes. As the Enterprises are under FHFA conservatorship, any post-assessment actions would require FHFA's prior approval.

Results should include effects on capital, as required under the DFAST rule. Specifically, and in accordance with the rule, each Enterprise must calculate how each of the following is affected during each quarter of the stress test planning horizon, for each scenario:

- Aggregate losses, pre-provision net revenues, and capital positions over the planning horizon
- Capital levels and capital ratios (including regulatory capital and net worth) and any other capital ratios, as

specified by FHFA

Incomplete Data

The Enterprises are required to report all data elements in the attached FHFA DFAST templates. Failure to submit complete data to FHFA in a timely manner may result in remedy or penalty authorized under the Federal Housing Enterprises Financial Safety and Soundness Act of 1992, as amended (12 U.S.C. 4501 et seq.) (Safety and Soundness Act).

Evaluation of Stress Test Processes and Results

FHFA will focus particular attention on the processes related to the implementation of the scenarios to ensure that these processes are robust and that they capture and stress key vulnerabilities and idiosyncratic risks facing the entity and that the translation of the scenario into loss, revenue, and capital projections is conceptually sound and implemented in a well-controlled manner. FHFA will evaluate the extent to which stress testing processes at the Enterprises adhere to the regulatory principles outlined in Appendix 1. FHFA will also review the stress results for reasonableness.

FHFA will review each Enterprise's assumptions for reasonableness and consistency with the assumptions used by the other Enterprise. FHFA may require an Enterprise to adjust its assumptions or resubmit its results where FHFA deems the stress test results, assumptions, or processes are unacceptable.

Appendix 1: Regulatory Expectations for a Stress Testing Process

An Enterprise's stress testing process should adhere to the following principles:

Principle 1: The Enterprise has a sound risk measurement and management infrastructure that supports the identification, measurement, assessment, and control of all material risks arising from its exposures and business activities.

- A satisfactory stress testing process requires (1) a comprehensive risk identification process, and (2) complete and accurate measurement and assessment of all material risks.
- An Enterprise should measure or assess the full spectrum of risks that face the Enterprise, using both quantitative and qualitative methods, where applicable.
- The Enterprise should have data capture and retention systems that allow for the input, use, and storage of information required for sound risk identification and measurement and to produce reliable inputs for assessments of capital adequacy.
- Quantitative processes for measuring risks should meet supervisory expectations for model effectiveness and be supported by robust model development, documentation, validation, and overall model governance practices. Both qualitative and quantitative processes for assessing risk should be transparent, repeatable, and reviewable by an independent party.

- Any identified weaknesses in risk measures used as inputs to the stress testing process should be documented and reported to relevant parties, with an assessment of the potential impact of risk-measurement weaknesses on the reliability of the stress test results.

Principle 2: The Enterprise has effective processes for translating risk measures into estimates of potential losses over a range of stressful scenarios and environments and for aggregating those estimated losses across the Enterprise.

- Stress tests should include methodologies that generate estimates of potential losses for all material risk exposures, one of which should be an enterprise-wide stress test using scenario analysis. Methodologies should be complementary, not suffer from common limitations, and minimize reliance on common assumptions.
- Using the loss estimation methodologies for its various risk exposures, an Enterprise should develop consistent and repeatable processes to aggregate its loss estimates on an Enterprise-wide basis.
- An Enterprise should demonstrate that its loss estimation tools are developed using sound modeling approaches, appropriate for the manner in which they are being employed, and that the most relevant limitations are clearly identified, well documented, and appropriately communicated.

- An Enterprise should recognize that its loss projections are estimates and should have a good understanding of uncertainty around those estimates, including the potential margin of error and the sensitivity of the estimates to changes in inputs and key assumptions.

Principle 3: The Enterprise has a clear definition of available capital resources and an effective process for estimating available capital resources (including any projected revenues) over the same range of stressful scenarios and environments used for estimating losses.

- Management and the board of directors should understand the loss absorption capabilities of the components of the Enterprise’s capital base and maintain projection methodologies for each of the capital components included in relevant capital adequacy metrics.
- In estimating available capital resources, an Enterprise will need to consider not only its current positions and mix of capital instruments, but also how its capital resources may evolve over time under varying circumstances and stress scenarios.
- As part of a comprehensive enterprise-wide stress testing program, projections of pre-provision net revenue (PPNR) should be consistent with balance sheet and other exposure assumptions used for related loss estimation. Projections should estimate all key elements of PPNR, including net interest income, non-interest income, and non-interest expense at a

level of granularity consistent with material revenue and expense components.

- An Enterprise should demonstrate that its capital resource estimation tools are developed using sound modeling approaches, appropriate for the manner in which they are being employed, and that the most relevant limitations are clearly identified, well documented, and appropriately communicated.
- An Enterprise should recognize that its projections of capital resources are estimates and should have a good understanding of the uncertainty around those estimates, including the potential margin of error and the sensitivity of the estimates to changes in inputs and key assumptions.

Principle 4: The Enterprise has processes for bringing together estimates of losses and capital resources to assess the combined impact on capital adequacy in relation to the Enterprise’s stated goals for the level and composition of capital.

- An Enterprise should have a comprehensive and consistently executed process for combining loss, resource, and balance sheet estimates to assess the baseline and post-stress impact of those estimates on capital measures.
- An Enterprise should calculate and use several capital measures that represent both leverage and risk at specified time horizons under both baseline and stressful conditions, consistent with its capital

policy framework. Measures should include quarterly estimates for the impact on capital and leverage ratios, as well as other capital and risk measures useful in assessing overall capital adequacy.

- The processes for bringing together estimates of losses and capital resources should ensure that appropriately stressful conditions over the Enterprise's planning horizon have been incorporated to properly address the institution's unique vulnerabilities.
- The processes should provide for the presentation of any information that may have material bearing on the Enterprise's capital adequacy assessment, including all relevant risks and strategic factors, as well as key uncertainties and process limitations.

Principle 5: The Enterprise has a comprehensive capital policy and robust capital planning practices for establishing capital goals, determining appropriate capital levels and composition of capital, making decisions about capital actions, and maintaining capital contingency plans.

Capital Policy

- A capital policy is defined as an Enterprise's written assessment of the principles and guidelines used for capital planning, capital issuance, usage, and distributions, including internal capital goals, the quantitative or qualitative guidelines for dividend and stock repurchase decisions, the strategies for addressing potential capital shortfalls, and the internal governance procedures around capital policy principles and guidelines.

- An Enterprise should establish capital goals aligned with its risk appetite and risk profile as well as expectations of stakeholders, providing specific targets for the level and composition of capital. The Enterprise should ensure that maintaining its internal capital goals will allow it to continue its operations under stressful conditions.
- The capital policy should describe the decision making processes regarding capital goals, the level and composition of capital, capital actions, and capital contingency plans, including an explanation of the roles and responsibilities of key decision makers and information and analysis used to make decisions.
- The Enterprise should outline in its policy specific capital contingency actions it would consider to remedy any current or prospective deficiencies in its capital position, including any triggers and escalation procedures. The policy should also include a detailed explanation of the circumstances in which it will reduce or suspend a dividend or repurchase program, or will not execute a previously planned capital action.

- An Enterprise should establish a minimum frequency with which its capital plan is reevaluated (at least annually). In addition, an Enterprise should review its capital policy at least annually to ensure it remains relevant and current.

Capital Planning Practices

- At regular intervals, an Enterprise should compare the estimates of baseline and post-stress capital measures (see

Principle 4) to the capital goals established in the capital policy for purposes of informing capital decisions.

- For capital decisions, consideration should be given to any information that may have material bearing on the Enterprise's capital adequacy assessment, including all relevant risks and strategic factors, key uncertainties, and limitations of the stress test.
- Assessments of capital adequacy and decisions about capital should be supported by high quality data and information, informed by current and relevant analysis, and subject to challenge by senior management and the board of directors.
- Periodically, the Enterprise should conduct a thorough assessment of its capital contingency strategies, including their impact, timing, feasibility under stress, and potential stakeholder reactions.
- An Enterprise should administer its capital planning activities and capital decision processes in conformance with its policy framework, documenting and justifying any divergence from policy.

Principle 6: The Enterprise has robust internal controls governing capital adequacy process components, including policies and procedures, change control, model validation and independent review, comprehensive documentation, and review by internal audit.

- The internal control framework should encompass the entire stress test, including the risk measurement and management

systems used to produce input data, the models and other techniques used to estimate loss and resource estimates, the process for making capital adequacy decisions, and the aggregation and reporting framework used to produce management and board reporting. The set of control functions in place should provide confirmation that all aspects of the stress test are functioning as intended.

- Policies and procedures should ensure a consistent and repeatable process and provide transparency to third parties for their understanding of an Enterprise's stress test processes and practices. Policies and procedures should be comprehensive, relevant to their use in the stress test, periodically updated and approved, and cover the entire stress test and all of its components.
- Specific to the stress test, an Enterprise should have internal controls that ensure the integrity of reported results and that all material changes to the stress test and its components are appropriately documented, reviewed, and approved. An Enterprise should have controls to ensure that management information systems are robust enough to support stress tests with sufficient flexibility to run ad hoc analysis as needed.
- Expectations for validation and independent review for components of the stress test are consistent with existing supervisory guidance on model risk management. Models should be independently validated or otherwise reviewed in line with model risk management and model governance expectations.

- An Enterprise should have clear and comprehensive documentation for all aspects of its stress test, including its risk measurement and management infrastructure, loss- and resource-estimation methodologies, the process for making capital decisions, and efficacy of control and governance functions.
- An Enterprise's internal audit should play a strong role in evaluating the stress test and its components. A full review of the capital adequacy process component should be done by audit periodically to ensure that as a whole the stress test is functioning as expected and in accordance with the Enterprise's policies and procedures. Internal audit should review the manner in which stress test deficiencies are identified, tracked, and remediated.

Principle 7: The Enterprise has effective board and senior management oversight of the stress test, including periodic review of the Enterprise's risk infrastructure and loss and resource estimation methodologies, evaluation of capital goals, assessment of the appropriateness of stressful scenarios considered, regular review of any limitations and uncertainties in all aspects of the stress test, and approval of capital decisions.

- The board of directors should make informed decisions on capital adequacy by receiving sufficient information detailing the risks the Enterprise faces, its exposures and activities, and the impact that loss and resource estimates may have on its capital position.
- Information provided to the board of

directors about capital adequacy should be framed against the capital goals established by the Enterprise and by obligations to external stakeholders, and consider capital adequacy for the Enterprise with respect to the current circumstances as well as on a pro forma, post-stress basis.

- The information the board of directors reviews should include a representation of key limitations, assumptions, and uncertainties within the stress test, enabling the board of directors to have the perspective to effectively understand and challenge reported results. The board of directors should take action when weaknesses in the stress test are identified, giving full consideration to the impact of those weaknesses in their capital decisions.
- Senior management should ensure that all weaknesses in the stress test are identified, as well as key assumptions, limitations, and uncertainties, and evaluate them for materiality (both individually and collectively). Senior management also should have remediation plans for any weaknesses affecting stress test reliability or results.
- Using appropriate information, senior management should make informed recommendations to the board of directors about the Enterprise's capital, including capital goals and distribution decisions. Senior management should include supporting information to highlight key assumptions, limitations, and uncertainties in the stress test that may affect capital decisions.

- An Enterprise should appropriately

document the key decisions about capital adequacy – including capital actions – made by the board of directors and senior management, and describe the information used to make those decisions.

Appendix 2: FHFA DFAST Reporting Templates - Enterprises

Scenario Templates Cover Sheet

Each regulated entity is expected to provide input data for all the tabs in this spreadsheet.

Institution Name:

Date of Data Submission:

Institution Contact Name:

Institution Contact Phone Number:

Institution Contact Email Address:

Supplied Scenario Variables

(Please indicate which scenarios were used in your model by checking the appropriate box:)

Domestic Variables

- Real GDP Growth
- Nominal GDP Growth
- Real Disposable Income Growth
- Nominal Disposable Income Growth
- Unemployment Rate
- CPI Inflation Rate
- 3-month Treasury Yield
- 5-year Treasury Yield
- 10-year Treasury Yield
- BBB Corporate Yield
- Mortgage Rate
- Prime Rate
- Dow Jones Total Stock Market Index
- House Price Index
- Commercial Real Estate Price Index
- Market Volatility Index (VIX)
- Private Label Securities (PLS) or Non-Agency Prices for Residential Mortgage-backed Securities (RMBS), Asset-based Securities (ABS), Commercial Mortgage-backed Securities (CMBS) and other collateral
- Agency Securities Option-Adjusted Spreads (OAS)
- Municipal Securities
- Counterparty Default Risk

International Variables

- Euro Area Real GDP Growth
- Euro Area Inflation
- Euro Area Bilateral Dollar Exchange Rate (\$/euro)
- Developing Asia Real GDP Growth
- Developing Asia Inflation
- Developing Asia Bilateral Dollar Exchange Rate (F/USD, indes, base = 2000,Q1)
- Japan Real GDP Growth
- Japan Inflation
- Japan Bilateral Dollar Exchange Rate (yen/USD)
- U.K. Real GDP Growth
- U.K. Inflation
- U.K. Bilateral Dollar Exchange Rate (USD/pound)

For variables not used, please provide a brief explanation below as to why it was not used:

Variable Name	Explanation
---------------	-------------

- 1
- 2
- 3
- 4
- 5

Scenario Variables Beyond Those Supplied

Baseline Scenario (additional variables used beyond those supplied)

Variable Number	Variable Name	Variable Definition
1		
2		
3		
4		
5		

Severely Adverse Scenario (additional variables used beyond those supplied)

Variable Number	Variable Name	Variable Definition
1		
2		
3		
4		
5		

Baseline

Spread Assumptions

Category	Benchmark	Spread to Benchmark									
		Actual			Projected						
		4Q 2019	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9
Example: Advance	3-Month LIBOR	10.0	10.0	10.0	10.0	15.0	15.0	15.0	15.0	15.0	15.0

Variables Used Beyond Those Supplied

Variable Name	Actual			Projected						
	4Q 2019	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9

Forward Curve

Maturity	Actual				Projected						
	4Q 2019	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	
3-Month Treasury	1.6	1.6	1.5	1.5	1.4	1.4	1.4	1.5	1.5	1.6	
6-Month											
1 year											
2 year											
5 year Treasury	1.6	1.7	1.7	1.7	1.8	1.8	1.9	2.0	2.0	2.1	
10 year Treasury	1.8	1.8	1.9	1.9	2.0	2.0	2.1	2.1	2.2	2.2	
15 year											
30 year											

House Price Index

(NOTE: For printing purposes dates only goes to Oct-20. However, the underlying excel spreadsheet collects 30 years of data.)

Region	Actual			Projected								
	4Q 2019	Jan-20	Feb-20	Mar-20	Apr-20	May-20	Jun-20	Jul-20	Aug-20	Sep-20	Oct-20	
Region 1												
Region 2												
.												
.												
.												
.												
.												

Severely Adverse

Spread Assumptions

Category	Benchmark	Spread to Benchmark									
		Actual				Projected					
		4Q 2019	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9
Example: Advance	3-Month LIBOR	10.0	10.0	10.0	10.0	15.0	15.0	15.0	15.0	15.0	15.0

Variables Used Beyond Those Supplied

Variable Name	Actual				Projected					
	4Q 2019	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9

Forward Curve

Maturity	Actual				Projected					
	4Q 2019	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9
3-Month Treasury	1.6	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
6-Month										
1 year										
2 year										
5 year Treasury	1.6	0.5	0.6	0.6	0.7	0.8	0.9	1.0	1.0	1.1
10 year Treasury	1.8	0.7	0.9	1.0	1.1	1.2	1.3	1.4	1.5	1.6
15 year										
30 year										

House Price Index

(NOTE: For printing purposes dates only go to Oct-20. However, the underlying excel spreadsheet collects 30 years of data.)

Region	Actual				Projected						
	4Q 2019	Jan-20	Feb-20	Mar-20	Apr-20	May-20	Jun-20	Jul-20	Aug-20	Sep-20	Oct-20
Region 1											
Region 2											
.											
.											
.											
.											
.											

Stress Test Template Instructions

1. All numbers should be reported in millions
2. Reported numbers should reflect the 12/31/2019 start date.

Enterprise Dodd-Frank Act Stress Test Template (Disclosure to FHFA ONLY)

(\$s in millions)

Income Statement (BASELINE)	Most Recent Quarter	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Nine Quarter Cumulative Total
1 Net interest income (excluding management and guaranty fee income)											
2 Management and guaranty fee income ¹											
3 Total net interest income											
4 Other income ²											
5 Total revenue											
6 REO (foreclosed property expense)											
7 Operational risk losses											
8 Administrative expenses											
9 Other expenses ³											
10 Pre-provision net revenue											
11 (Provision) benefit for credit losses											
12 Derivatives gains (losses)											
13 Trading gains (losses)											
14 Other gains (losses)											
15 Global market shock impact on trading securities and held-for-sale loans											
16 Counterparty default losses											
17 Pre-Tax income (loss)											
18 (Provision) benefit for federal income taxes											
19 Extraordinary gains (losses), net of tax effect											
20 Net income (loss)											
21 Global market shock impact on available-for-sale securities											
22 Other comprehensive income											
23 Comprehensive income (loss)											

¹ Includes guaranty fees received for managing credit risk on mortgage loans of consolidated trusts/PCs.

² Includes SOP 03-3 gains/losses, net.

³ Includes Security Impairments.

Enterprise Dodd-Frank Act Stress Test Template (Disclosure to FHFA ONLY)

(\$s in millions)

Capital Roll Forward (BASELINE)	Most Recent Quarter	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Nine Quarter Cumulative Total
CAPITAL											
1 Beginning capital											
2 Senior preferred Treasury draw (prior period)											
3 Net income (loss)											
4 Less: Dividends											
5 Change in AOCI											
6 Change in non-controlling/minority interest											
7 Other											
8 Ending capital (deficit)											
9 Beginning PSPA funding commitment available											
10 Treasury draw required											
11 Remaining PSPA funding commitment available											
OTHER											
12 Deferred tax assets, net of allowance											
13 Total Assets											

Enterprise Dodd-Frank Act Stress Test Template (Disclosure to FHFA ONLY)

(\$s in millions)

<u>Portfolio Balances (BASELINE)</u>	Most Recent Quarter	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9
RETAINED PORTFOLIO										
Agency securities										
1 Single-family										
2 Multifamily										
Non-Agency securities										
3 Private Label Securities (PLS)										
4 Commercial Mortgage-backed Securities (CMBS)										
5 Other ¹										
Whole loans										
6 Single-family										
7 Multifamily										
8 Total retained portfolio										
9 Single-family guaranty book of business										

¹ Other includes mortgage revenue bonds and other.

Enterprise Dodd-Frank Act Stress Test Template (Disclosure to FHFA ONLY)

Credit Overview - Quarterly (BASELINE)
(includes single-family and multifamily)

	Most Recent Quarter	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Nine Quarter Cumulative Total
TOTAL PORTFOLIO											
CREDIT EXPENSES (\$s in millions)											
1											
2											
3											
4											
5	Credit Expenses ¹										
LOAN LOSS RESERVE (\$s in millions)											
6											
7											
8											
9											
10	Ending Total Loan Loss Reserve										
11											
11 Unpaid Principal Balance (\$s in millions)											

¹ Amount depicts the summation of foreclosed property expense and provision for credit losses.

Enterprise Dodd-Frank Act Stress Test Template (Disclosure to FHFA ONLY)

(\$s in millions)

Multifamily - Income Statement (BASELINE)	Most Recent Quarter	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Nine Quarter Cumulative Total
1 Net interest income ¹											
2 Management and guaranty fee income											
3 Other non-interest income											
4 Total revenue											
5 REO (foreclosed property exp.)											
6 Other expenses ²											
7 Pre-provision net revenue											
8 (Provision) benefit for credit losses											
9 Derivatives gains (losses)											
10 Gains (losses) on loans											
11 Other fair value gains (losses)											
12 Global market shock impact on trading securities and held-for-sale loans											
13 Pre-Tax income (loss)											
14 Provision (benefit) for federal income taxes											
15 Extraordinary gains (losses), net of tax effect											
16 Net income (loss)											
17 Global market shock impact on available-for-sale securities											
18 Other comprehensive income											
19 Comprehensive income (loss)											

¹ Includes net interest income on multifamily whole loans, GSE multifamily MBS held in the retained portfolio, CMBS, and multifamily MRBs.

² Includes operational risk losses, administrative expenses, gains from partnership investments, and security impairments.

**Enterprise Dodd-Frank Act Stress Test Template
(Disclosure to FHFA ONLY)**

Multifamily Credit Overview - Quarterly (BASELINE)	Most Recent Quarter	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Nine Quarter Cumulative Total
TOTAL PORTFOLIO											
CREDIT EXPENSES (\$s in millions)											
1 Foreclosed property expense (REO)											
2 Net charge-offs											
3 Credit losses											
4 Provision for credit losses											
5 Credit Expenses ¹											
LOAN LOSS RESERVE (\$s in millions)											
6 Beginning loan loss reserve											
7 Net charge-offs											
8 Provison (benefit) for loan losses											
9 Other											
10 Ending Total Loan Loss Reserve											
11 Unpaid Principal Balance (\$s in millions)											

¹ Amount depicts the summation of foreclosed property expense and provision for credit losses.

Enterprise Dodd-Frank Act Stress Test Template (Disclosure to FHFA ONLY)

<u>Multifamily Key Metrics (BASELINE)</u>	Most Recent Quarter	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Nine Quarter Cumulative Total
(\$s in millions)											
1 Total multifamily market volume (industry)											
2 Enterprise market share percentage											
3 New acquisition volume											
4 Liquidation volume ¹											
5 Securitization volume											
6 Effective guaranty fee rate ² (bps)											
7 Guaranty portfolio balance											
8 Loans and securities held in portfolio											

¹ Includes property sales and other run-off/prepayments.

² Guaranty fee income divided by weighted average portfolio balance.

**Enterprise Dodd-Frank Act Stress Test Template
(Disclosure to FHFA ONLY)**

Single-Family Credit Overview - Quarterly (BASELINE)	Most Recent Quarter	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Nine Quarter Cumulative Total
TOTAL PORTFOLIO											
CREDIT EXPENSES (\$s in millions)											
1	Foreclosed property expense (REO)										
2	Net charge-offs										
3	Credit losses										
4	Provision for credit losses										
5	Credit Expenses ¹										
LOAN LOSS RESERVE (\$s in millions)											
6	Beginning loan loss reserve										
7	Net charge-offs										
8	Provision (benefit) for loan losses/guaranty losses										
9	Other										
10	Ending Total Loan Loss Reserve										
Memo:											
11	FAS 5 Loan Loss Reserve										
12	FAS 114 Loan Loss Reserve										
13	Concessions in FAS 114 Loan Loss Reserve ²										
14	Unpaid Principal Balance (\$s in millions)										
CURRENT BOOK (as of 12/31/19)											
CREDIT EXPENSES (\$s in millions)											
15	Foreclosed property expense (REO)										
16	Net charge-offs										
17	Credit losses										
18	Provision for credit losses										
19	Credit Expenses ¹										
LOAN LOSS RESERVE (\$s in millions)											
20	Beginning loan loss reserve										
21	Net charge-offs										
22	Provision (benefit) for loan losses/guaranty losses										
23	Other										
24	Ending Loan Loss Reserve - Current Book										
25	Unpaid Principal Balance (\$s in millions)										
NEW BUSINESS											
CREDIT EXPENSES (\$s in millions)											
26	Foreclosed property expense (REO)										
27	Net charge-offs										
28	Credit losses										
29	Provision for credit losses										
30	Credit Expenses ¹										
LOAN LOSS RESERVE (\$s in millions)											
31	Beginning loan loss reserve										
32	Net charge-offs										
33	Provision (benefit) for loan losses/guaranty losses										
34	Other										
35	Ending Loan Loss Reserve - New Business										
36	Unpaid Principal Balance (\$s in millions)										

¹ Amount depicts the summation of foreclosed property expense, provision for credit losses, and SOP 03-3 losses.
² Amount includes the impact of all troubled debt restructuring (TDR) related impairments.

**Enterprise Dodd-Frank Act Stress Test Template
(Disclosure to FHFA ONLY)**

Single-Family Credit Overview - Quarterly (BASELINE)	Most Recent										
	Quarter	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	
SERIOUSLY DELINQUENT LOAN ACTIVITY (count in '000s)											
1	Beginning seriously delinquent loans										
2	Seriously delinquent inflows - new SDQ										
3	Seriously delinquent inflows - cured										
4	Seriously delinquent cured by modification										
5	Seriously delinquent - cured										
6	Seriously delinquent to default										
7	Seriously delinquent to payoff										
8	Ending Seriously Delinquent Loans										
9	Ending seriously delinquent rate (%)										
10	Aggregate UPB of seriously delinquent loans (\$s in millions)										
<hr/>											
11	Loan modifications (count in 000s)										
	(\$s in millions)										
PRIVATE MORTGAGE INSURERS - OVERVIEW (Nine Quarter Cumulative Totals)											
		Arch Mortgage Insurance Company	Essent Guaranty, Inc.	Genworth Mortgage Insurance Corporation	Mortgage Guaranty Insurance Corporation	PMI Mortgage Insurance Co.	Radian Guaranty Inc.	Republic Mortgage Insurance Company	Triad Guaranty Insurance Corporation	United Guaranty Residential Insurance Co.	Other
12	Expected Gross Claims to MI Companies ¹										
13	Less: Reinsurance Proceeds										
14	Subtotal (net of reinsurance)										
15	Less: Haircut Amount										
16	Expected Net Claims from MI Companies¹										
17	Gross MI Benefit included in ending Loan Loss Reserves ²										
18	Less: Haircut Amount ³										
19	Net MI Benefit included in ending Loan Loss Reserves ²										
20	Total Net MI Benefit										

¹ Represents amount related to loans that default during the nine-quarter projection period.
² Represents amount of MI benefit included in loan loss reserves at the end of the nine-quarter projection period.
³ Represents amount Gross MI benefit included in loan loss reserves at the end of the nine-quarter projection period is reduced due to MI Haircut.

NOTE: Seriously delinquent loans are 90 days or more delinquent, or in the process of foreclosure.

Enterprise Dodd-Frank Act Stress Test Template (Disclosure to FHFA ONLY)

Single-Family Credit Summary (BASELINE)

Delinquency Status - CURRENT BOOK

(\$s in millions)

End of Quarter Unpaid Principal Balance (UPB)

Loan Status	Most Recent Quarter	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9
MODIFIED LOANS										
1 Current										
2 Less than 90 days delinquent										
3 Seriously delinquent (90 days or more delinquent or in the process of foreclosure)										
4 Total										
NON-MODIFIED LOANS										
5 Current										
6 Less than 90 days delinquent										
7 Seriously delinquent (90 days or more delinquent or in the process of foreclosure)										
8 Total										

(\$s in millions)

Loan Loss Reserve

Loan Status	Most Recent Quarter	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9
MODIFIED LOANS										
9 Current										
10 Less than 90 days delinquent										
11 Seriously delinquent (90 days or more delinquent or in the process of foreclosure)										
12 Total										
NON-MODIFIED LOANS										
13 Current										
14 Less than 90 days delinquent										
15 Seriously delinquent (90 days or more delinquent or in the process of foreclosure)										
16 Total										

(\$s in millions)

End of Quarter Projected Charge-Offs (Undiscounted \$s)

Loan Status	Most Recent Quarter	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Nine Quarter Cumulative Total
17 Modified											
18 Non-Modified											

Enterprise Dodd-Frank Act Stress Test Template (Disclosure to FHFA ONLY)

Single-Family Credit Summary (BASELINE)

Mark-to-Market Loan-to-Value - CURRENT BOOK

(\$s in millions)

		End of Quarter Unpaid Principal Balance (UPB)								
Loan Status	Most Recent Quarter	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9
1	<=80%									
2	>80% - 100%									
3	>100%									
4	Total									

(\$s in millions)

		Loan Loss Reserve								
Loan Status	Most Recent Quarter	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9
5	<=80%									
6	>80% - 100%									
7	>100%									
8	Total									

(\$s in millions)

		End of Quarter Projected Charge-Offs (Undiscounted \$s)									
Loan Status	Most Recent Quarter	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Nine Quarter Cumulative Total
9	<=80%										
10	>80% - 100%										
11	>100%										

**Enterprise Dodd-Frank Act Stress Test Template
(Disclosure to FHFA ONLY)**

Single-Family Credit Summary (BASELINE)

Vintage Status - CURRENT BOOK

(\$s in millions)		End of Quarter Unpaid Principal Balance (UPB)									
Loan Status	Most Recent Quarter	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	
1	2004 and prior										
2	2005										
3	2006										
4	2007										
5	2008										
6	2009										
7	2010										
8	2011										
9	2012										
10	2013										
11	2014										
12	2015										
13	2016										
14	2017										
15	2018										
16	2019										

(\$s in millions)		Loan Loss Reserve									
Loan Status	Most Recent Quarter	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	
17	2004 and prior										
18	2005										
19	2006										
20	2007										
21	2008										
22	2009										
23	2010										
24	2011										
25	2012										
26	2013										
27	2014										
28	2015										
29	2016										
30	2017										
31	2018										
32	2019										

(\$s in millions)		End of Quarter Projected Charge-Offs (Undiscounted \$s)									
Loan Status	Most Recent Quarter	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Nine Quarter Cumulative Total
33	2004 and prior										
34	2005										
35	2006										
36	2007										
37	2008										
38	2009										
39	2010										
40	2011										
41	2012										
42	2013										
43	2014										
44	2015										
45	2016										
46	2017										
47	2018										
48	2019										

Enterprise Dodd-Frank Act Stress Test Template (Disclosure to FHFA ONLY)

(\$s in millions)

Single-Family - 9 Quarter Cumulative Credit Losses (BASELINE)

		Loan-To-Value											
		<30	30 - 60	61 - 70	71 - 75	76 - 80	81 - 85	86 - 90	91 - 95	96 - 100	101 - 110	111 - 120	>120
Credit Score	<620												
	620 - 640												
	641 - 660												
	661 - 680												
	681 - 700												
	701 - 720												
	721 - 740												
	741 - 760												
	761 - 780												
	>780												

Credit losses represent the summation of net charge-offs and foreclosed property expenses (REO).

Use LTV and credit score as of December 31, 2019.

Enterprise Dodd-Frank Act Stress Test Template (Disclosure to FHFA ONLY)

(\$s in millions)

Single-Family - Loan Loss Reserves (BASELINE)

Loan Loss Reserves as of 12/31/19

		Loan-To-Value											
		<30	30 - 60	61 - 70	71 - 75	76 - 80	81 - 85	86 - 90	91 - 95	96 - 100	101 - 110	111 - 120	>120
Credit Score	<620												
	620 - 640												
	641 - 660												
	661 - 680												
	681 - 700												
	701 - 720												
	721 - 740												
	741 - 760												
	761 - 780												
	>780												

Use LTV and credit score as of December 31, 2019

Loan Loss Reserves at 3/31/22 (end of nine quarters)

		Loan-To-Value											
		<30	30 - 60	61 - 70	71 - 75	76 - 80	81 - 85	86 - 90	91 - 95	96 - 100	101 - 110	111 - 120	>120
Credit Score	<620												
	620 - 640												
	641 - 660												
	661 - 680												
	681 - 700												
	701 - 720												
	721 - 740												
	741 - 760												
	761 - 780												
	>780												

Use LTV and credit score as of December 31, 2019

**Enterprise Dodd-Frank Act Stress Test Template
(Disclosure to FHFA ONLY)**

**Single-Family Credit Summary (BASELINE)
Vintage and MTMLTV Status - CURRENT BOOK**

(\$s in millions)	Loan Status at 12/31/19	End of Quarter (UPB) Most Recent Quarter	Cumulative Unpaid Principal Balance (UPB)							End of Quarter (UPB) Q9
			Inflows	Cumulative Defaults ¹	Cumulative Prepays ²	Run-off ³	Other ⁴	Migrate to <=80%	Migrate to 80% - 100%	
	<=80%									
	80% - 100%									
	>100%									
	<=80%									
	80% - 100%									
	>100%									
	<=80%									
	80% - 100%									
	>100%									

(\$s in millions)	Loan Status at 12/31/19	Loan Loss Reserves				
		Beginning	Cumulative Charge-offs	Provision for Credit Losses	Other	Ending
	<=80%					
	80% - 100%					
	>100%					
	<=80%					
	80% - 100%					
	>100%					
	<=80%					
	80% - 100%					
	>100%					

¹ Amount depicts principal balance of loans that are in the process of foreclosure.
² Amount depicts principal balance of loans that have prepaid through refinance.
³ Amount depicts reduction in principal balance due to amortization.
⁴ Amount includes NPL sales and other miscellaneous items.

**Enterprise Dodd-Frank Act Stress Test Template
(Disclosure to FHFA ONLY)**

**Single-Family Credit Summary (BASELINE)
Vintage and Delinquency Status - CURRENT BOOK**

(\$s in millions)			End of Quarter (UPB) Most Recent Quarter	Cumulative Unpaid Principal Balance (UPB)								End of Quarter (UPB) Q9		
				Inflows	Cumulative Defaults ¹	Cumulative Prepays ²	Run-off ³	Other ⁴	Migrate to Modified Current	Migrate to Modified <90 Days	Migrate to Modified SDQ		Migrate to Non-Modified Current	Migrate to Non-Modified <90 Days
2004 and prior	Loan Status at 12/31/19	Current												
		Modified <90 Days SDQ												
2005 - 2008	Loan Status at 12/31/19	Current												
		Modified <90 Days SDQ												
2009 and Later	Loan Status at 12/31/19	Current												
		Modified <90 Days SDQ												
	Loan Status at 12/31/19	Current												
		Non-Modified <90 Days SDQ												

(\$s in millions)			Loan Loss Reserves				
			Beginning	Cumulative Charge-offs	Provision for Credit Losses	Other	Ending
2004 and prior	Loan Status at 12/31/19	Current					
		Modified <90 Days SDQ					
2005 - 2008	Loan Status at 12/31/19	Current					
		Modified <90 Days SDQ					
2009 and Later	Loan Status at 12/31/19	Current					
		Modified <90 Days SDQ					
	Loan Status at 12/31/19	Current					
		Non-Modified <90 Days SDQ					

¹ Amount depicts principal balance of loans that are in the process of foreclosure.
² Amount depicts principal balance of loans that have prepaid through refinancing.
³ Amount depicts reduction in principal balance due to amortization.
⁴ Amount includes NPL sales and other miscellaneous items.

**Enterprise Dodd-Frank Act Stress Test Template
(Disclosure to FHFA ONLY)**

**Single-Family Credit Summary (BASELINE)
MTMLTV and Delinquency Status - CURRENT BOOK**

(\$s in millions)			End of Quarter (UPB) Most Recent Quarter	Cumulative Unpaid Principal Balance (UPB)								End of Quarter (UPB) Q9			
				Inflows	Cumulative Defaults ¹	Cumulative Prepays ²	Run-off ³	Other ⁴	Migrate to Modified Current	Migrate to Modified <90 Days	Migrate to Modified SDQ		Migrate to Non-Modified Current	Migrate to Non-Modified <90 Days	Migrate to Non-Modified SDQ
<=80%	Modified	Current <90 Days SDQ													
	Non-Modified	Current <90 Days SDQ													
80% - 100%	Modified	Current <90 Days SDQ													
	Non-Modified	Current <90 Days SDQ													
>100%	Modified	Current <90 Days SDQ													
	Non-Modified	Current <90 Days SDQ													

(\$s in millions)			Loan Loss Reserves				
			Beginning	Cumulative Charge-offs	Provision for Credit Losses	Other	Ending
<=80%	Modified	Current <90 Days SDQ					
	Non-Modified	Current <90 Days SDQ					
80% - 100%	Modified	Current <90 Days SDQ					
	Non-Modified	Current <90 Days SDQ					
>100%	Modified	Current <90 Days SDQ					
	Non-Modified	Current <90 Days SDQ					

¹ Amount depicts principal balance of loans that are in the process of foreclosure.
² Amount depicts principal balance of loans that have prepaid through refinance.
³ Amount depicts reduction in principal balance due to amortization.
⁴ Amount includes NPL sales and other miscellaneous items.

**Enterprise Dodd-Frank Act Stress Test Template
(Disclosure to FHFA ONLY)**

Credit Risk Transfers - Quarterly (BASELINE)	Most Recent Quarter	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Nine Quarter Cumulative Total
	(\$s in millions)										
Single-Family											
CAS/STACR (Non-REMIC/Non-Trust)											
1	Interest Expense										
2	Fair Value Gain (Loss)										
3	Other Expenses										
4	Recoveries										
CAS/STACR (REMIC/Trust)											
5	Credit Expense										
6	Other Expenses										
7	Recoveries										
CIRT/ACIS											
8	Premium Expense										
9	Other Expenses										
10	Recoveries										
OTHER											
11	Fair Value Gain (Loss)										
12	Other Expenses										
13	Recoveries										
14	Total Single-Family Income (Loss)										
Multifamily											
CIRT/ACIS											
15	Premium Expense										
16	Other Expenses										
17	Recoveries										
18	Total Multifamily Income (Loss)										
19	Total Income (Loss)										
Reference Pool											
20	CAS/STACR REMIC/Trust Debt Issuances										
21	CIRT/ACIS Transactions										
22	Other Transactions										
23	Reference Pool (Quarter)										
24	Outstanding Reference Pool										

Enterprise Dodd-Frank Act Stress Test Template (Disclosure to FHFA ONLY)

(\$s in millions)

Income Statement (SEVERELY ADVERSE) (without establishing DTA)	Most Recent Quarter	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Nine Quarter Cumulative Total
1 Net interest income (excluding management and guaranty fee income)											
2 Management and guaranty fee income ¹											
3 Total net interest income											
4 Other income ²											
5 Total revenue											
6 REO (foreclosed property expense)											
7 Operational risk losses											
8 Administrative expenses											
9 Other expenses ³											
10 Pre-provision net revenue											
11 (Provision) benefit for credit losses											
12 Derivatives gains (losses)											
13 Trading gains (losses)											
14 Other gains (losses)											
15 Global market shock impact on trading securities and held-for-sale loans											
16 Counterparty default losses											
17 Pre-Tax income (loss)											
18 (Provision) benefit for federal income taxes											
19 Extraordinary gains (losses), net of tax effect											
20 Net income (loss)											
21 Global market shock impact on available-for-sale securities											
22 Other comprehensive income											
23 Comprehensive income (loss)											

¹ Includes guaranty fees received for managing credit risk on mortgage loans of consolidated trusts/PCs.

² Includes SOP 03-3 gains/losses, net.

³ Includes Security Impairments.

Enterprise Dodd-Frank Act Stress Test Template (Disclosure to FHFA ONLY)

(\$s in millions)

Income Statement (SEVERELY ADVERSE) (with establishing DTA)	Most Recent Quarter	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Nine Quarter Cumulative Total
1 Net interest income (excluding management and guaranty fee income)											
2 Management and guaranty fee income ¹											
3 Total net interest income											
4 Other income ²											
5 Total revenue											
6 REO (foreclosed property expense)											
7 Operational risk losses											
8 Administrative expenses											
9 Other expenses ³											
10 Pre-provision net revenue											
11 (Provision) benefit for credit losses											
12 Derivatives gains (losses)											
13 Trading gains (losses)											
14 Other gains (losses)											
15 Global market shock impact on trading securities and held-for-sale loans											
16 Counterparty default losses											
17 Pre-Tax income (loss)											
18 (Provision) benefit for federal income taxes											
19 Extraordinary gains (losses), net of tax effect											
20 Net income (loss)											
21 Global market shock impact on available-for-sale securities											
22 Other comprehensive income											
23 Comprehensive income (loss)											

¹ Includes guaranty fees received for managing credit risk on mortgage loans of consolidated trusts/PCs.

² Includes SOP 03-3 gains/losses, net.

³ Includes Security Impairments.

Enterprise Dodd-Frank Act Stress Test Template (Disclosure to FHFA ONLY)

(\$s in millions)

<u>Capital Roll Forward (SEVERELY ADVERSE)</u> <u>(without establishing DTA)</u>	Most Recent Quarter	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Nine Quarter Cumulative Total
CAPITAL											
1 Beginning capital											
2 Senior preferred Treasury draw (prior period)											
3 Net income (loss)											
4 Less: Dividends											
5 Change in AOCI											
6 Change in non-controlling/minority interest											
7 Other											
8 Ending capital (deficit)											
9 Beginning PSPA funding commitment available											
10 Treasury draw required											
11 Remaining PSPA funding commitment available											
OTHER											
12 Deferred tax assets, net of allowance											
13 Total Assets											

Enterprise Dodd-Frank Act Stress Test Template (Disclosure to FHFA ONLY)

(\$s in millions)

<u>Capital Roll Forward (SEVERELY ADVERSE)</u> <u>(with establishing DTA)</u>	Most Recent Quarter	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Nine Quarter Cumulative Total
CAPITAL											
1 Beginning capital											
2 Senior preferred Treasury draw (prior period)											
3 Net income (loss)											
4 Less: Dividends											
5 Change in AOCI											
6 Change in non-controlling/minority interest											
7 Other											
8 Ending capital (deficit)											
9 Beginning PSPA funding commitment available											
10 Treasury draw required											
11 Remaining PSPA funding commitment available											
OTHER											
12 Deferred tax assets, net of allowance											
13 Total Assets											

Enterprise Dodd-Frank Act Stress Test Template (Disclosure to FHFA ONLY)

(\$s in millions)

<u>Portfolio Balances (SEVERELY ADVERSE)</u>	Most Recent Quarter	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9
RETAINED PORTFOLIO										
Agency securities										
1 Single-family										
2 Multifamily										
Non-Agency securities										
3 Private Label Securities (PLS)										
4 Commercial Mortgage-backed Securities (CMBS)										
5 Other ¹										
Whole loans										
6 Single-family										
7 Multifamily										
8 Total retained portfolio										
9 Single-family guaranty book of business										

¹ Other includes mortgage revenue bonds and other.

Enterprise Dodd-Frank Act Stress Test Template (Disclosure to FHFA ONLY)

(\$s in millions)

Global Market Shock (SEVERELY ADVERSE)

Applicable
UPB

Q1 Loss

- 1 Private Label Securities (PLS) or Non-Agency Prices for Residential Mortgage-backed Securities (RMBS)
- 2 Commercial Mortgage-backed Securities (CMBS)
- 3 Asset-based Securities (ABS) and other collateral
- 4 Single-Family Agency Securities
- 5 Multifamily Agency Securities
- 6 Municipal Securities
- 7 Single-Family Loans
- 8 Multifamily Loans
- 9 Counterparty Default Risk*

* Please provide the name and attribution of counterparty default risk by type (eg: derivatives, repo, etc.) of the largest counterparty below:

Counterparty Name	Counterparty Type	Total Potential Income Statement Impact
	Derivatives	
	Repo	
	Single-Family Mortgage Insurance Provider	
	Multifamily Credit Enhancement Provider	
	Other	
	Total	

Enterprise Dodd-Frank Act Stress Test Template (Disclosure to FHFA ONLY)

(\$s in millions)

Global Market Shock (SEVERELY ADVERSE)

Applicable
UPB

Q1 Loss

TRADING SECURITIES

- 1 Private Label Securities (PLS) or Non-Agency Prices for Residential Mortgage-backed Securities (RMBS)
- 2 Commercial Mortgage-backed Securities (CMBS)
- 3 Asset-based Securities (ABS) and other collateral
- 4 Single Family Agency Securities
- 5 Multifamily Agency Securities
- 6 Municipal Securities
- 7 Counterparty Default Risk

AVAILABLE-FOR-SALE SECURITIES (Post-Tax Amounts)

- 8 Private Label Securities (PLS) or Non-Agency Prices for Residential Mortgage-backed Securities (RMBS)
- 9 Commercial Mortgage-backed Securities (CMBS)
- 10 Asset-based Securities (ABS) and other collateral
- 11 Single Family Agency Securities
- 12 Multifamily Agency Securities
- 13 Municipal Securities

HELD-FOR-SALE LOANS

- 14 Single Family Loans
- 15 Multifamily Loans

**Enterprise Dodd-Frank Act Stress Test Template
(Disclosure to FHFA ONLY)**

(*Credit ratings should be as of December 31, 2019)

MV* (\$MM)	Grand Total	RMBS														RMBS SubTotal	
		Non-Agency Prime	Sub-prime	Option ARMS	Other AltA	Unspec Non-Prime	HELOC	RMB CDO	RMB CDS	Credit Basket	PrimeX	ABX / TABX	Prime Whole Loans	Non-Prime Whole Loans	European RMBS		Other / Unspecified
AAA Total	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Pre 2006	\$0																
2006	\$0																
2007	\$0																
Post 2007	\$0																
Unspecified Vintage	\$0																
AA Total	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Pre 2006	\$0																
2006	\$0																
2007	\$0																
Post 2007	\$0																
Unspecified Vintage	\$0																
A Total	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Pre 2006	\$0																
2006	\$0																
2007	\$0																
Post 2007	\$0																
Unspecified Vintage	\$0																
BBB Total	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Pre 2006	\$0																
2006	\$0																
2007	\$0																
Post 2007	\$0																
Unspecified Vintage	\$0																
BB Total	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Pre 2006	\$0																
2006	\$0																
2007	\$0																
Post 2007	\$0																
Unspecified Vintage	\$0																
B Total	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Pre 2006	\$0																
2006	\$0																
2007	\$0																
Post 2007	\$0																
Unspecified Vintage	\$0																
<B Total	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Pre 2006	\$0																
2006	\$0																
2007	\$0																
Post 2007	\$0																
Unspecified Vintage	\$0																
NR Total	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Pre 2006	\$0																
2006	\$0																
2007	\$0																
Post 2007	\$0																
Unspecified Vintage	\$0																
Total	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0

Profit/Loss (\$MM)	Grand Total	Non-Agency Prime	Sub-prime	Option ARMS	Other AltA	Unspec Non-Prime	HELOC	RMB CDO	RMB CDS	Credit Basket	PrimeX	ABX / TABX	Prime Whole Loans	Non-Prime Whole Loans	European RMBS	Other / Unspecified	RMBS SubTotal
AAA Total	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Pre 2006	\$0																
2006	\$0																
2007	\$0																
Post 2007	\$0																
Unspecified Vintage	\$0																
AA Total	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Pre 2006	\$0																
2006	\$0																
2007	\$0																
Post 2007	\$0																
Unspecified Vintage	\$0																
A Total	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Pre 2006	\$0																
2006	\$0																
2007	\$0																
Post 2007	\$0																
Unspecified Vintage	\$0																
BBB Total	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Pre 2006	\$0																
2006	\$0																
2007	\$0																
Post 2007	\$0																
Unspecified Vintage	\$0																
BB Total	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Pre 2006	\$0																
2006	\$0																
2007	\$0																
Post 2007	\$0																
Unspecified Vintage	\$0																
B Total	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Pre 2006	\$0																
2006	\$0																
2007	\$0																
Post 2007	\$0																
Unspecified Vintage	\$0																
<B Total	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Pre 2006	\$0																
2006	\$0																
2007	\$0																
Post 2007	\$0																
Unspecified Vintage	\$0																
NR Total	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Pre 2006	\$0																
2006	\$0																
2007	\$0																
Post 2007	\$0																
Unspecified Vintage	\$0																
Total	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0

Enterprise Dodd-Frank Act Stress Test Template (Disclosure to FHFA ONLY)

Trading and Other Fair Value Assets
Munis (Severely Adverse)

	MV (\$MM) Available-for-Sale Securities	MV (\$MM) Trading Securities	Profit/Loss from OAS Widening (AFS)	Profit/Loss from OAS Widening (Trading Secs)
Bonds				
AAA				
AA				
A				
BBB				
BB				
B				
<B				
NR				
Bonds Total	\$0	\$0	\$0	\$0
1M				
3M				
6M				
9M				
1Y				
2Y				
3Y				
5Y				
7Y				
10Y				
15Y				
20Y				
30Y				
Bonds Total	\$0	\$0	\$0	\$0
Loans				
AAA				
AA				
A				
BBB				
BB				
B				
<B				
NR				
Loans Total	\$0	\$0	\$0	\$0
1M				
3M				
6M				
9M				
1Y				
2Y				
3Y				
5Y				
7Y				
10Y				
15Y				
20Y				
30Y				
Loans Total	\$0	\$0	\$0	\$0
CDS				
AAA				
AA				
A				
BBB				
BB				
B				
<B				
NR				
CDS Total	\$0	\$0	\$0	\$0
1M				
3M				
6M				
9M				
1Y				
2Y				
3Y				
5Y				
7Y				
10Y				
15Y				
20Y				
30Y				
CDS Total	\$0	\$0	\$0	\$0

Enterprise Dodd-Frank Act Stress Test Template (Disclosure to FHFA ONLY)

Trading & Other Fair Value Assets Template
Agencies (Severely Adverse)

	MV (\$MM) Available-for-Sale Securities	MV (\$MM) Trading Securities	Profit/Loss from OAS Widening (AFS)	Profit/Loss from OAS Widening (Trading Secs)
US Residential Agency Products				
IOs				
POs				
Other CMOs				
Pass-Throughs				
Agency Debt/Debentures				
IOS Index				
POS Index				
MBX Index				
Other Agency Derivatives				
TBA's				
Reverse Mortgages				
Residential Other / Unspecified				
Total	\$0	\$0	\$0	\$0
US Commercial Agency Products				
Cash Agency CMBS				
Agency CMBS Derivatives				
Commercial Other / Unspecified				
Total	\$0	\$0	\$0	\$0
Non-US Agency Products				
AAA				
AA				
A				
BBB				
BB				
B				
<B				
NR				
Total	\$0	\$0	\$0	\$0

**Enterprise Dodd-Frank Act Stress Test Template
(Disclosure to FHFA ONLY)**

Credit Overview - Quarterly (SEVERELY ADVERSE)
(includes single-family and multifamily)

	Most Recent Quarter	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Nine Quarter Cumulative Total
TOTAL PORTFOLIO											
CREDIT EXPENSES (\$s in millions)											
1	Foreclosed property expense (REO)										
2	Net charge-offs										
3	Credit losses										
4	Provision for credit losses										
5	Credit Expenses¹										
LOAN LOSS RESERVE (\$s in millions)											
6	Beginning loan loss reserve										
7	Net charge-offs										
8	Provison (benefit) for loan losses										
9	Other										
10	Ending Total Loan Loss Reserve										
11	Unpaid Principal Balance (\$s in millions)										

¹ Amount depicts the summation of foreclosed property expense and provision for credit losses.

Enterprise Dodd-Frank Act Stress Test Template (Disclosure to FHFA ONLY)

(\$s in millions)

Multifamily - Income Statement (SEVERELY ADVERSE)	Most Recent Quarter	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Nine Quarter Cumulative Total
1 Net interest income ¹											
2 Management and guaranty fee income											
3 Other non-interest income											
4 Total revenue											
5 REO (foreclosed property exp.)											
6 Other expenses ²											
7 Pre-provision net revenue											
8 (Provision) benefit for credit losses											
9 Derivatives gains (losses)											
10 Gains (losses) on loans											
11 Other fair value gains (losses)											
12 Global market shock impact on trading securities and held-for-sale loans											
13 Pre-Tax income (loss)											
14 Provision (benefit) for federal income taxes											
15 Extraordinary gains (losses), net of tax effect											
16 Net income (loss)											
17 Global market shock impact on available-for-sale securities											
18 Other comprehensive income											
19 Comprehensive income (loss)											

¹ Includes net interest income on multifamily whole loans, GSE multifamily MBS held in the retained portfolio, CMBS, and multifamily MRBs.

² Includes operational risk losses, administrative expenses, gains from partnership investments, and security impairments.

**Enterprise Dodd-Frank Act Stress Test Template
(Disclosure to FHFA ONLY)**

Multifamily Credit Overview - Quarterly (SEVERELY ADVERSE)	Most Recent Quarter	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Nine Quarter Cumulative Total
TOTAL PORTFOLIO											
CREDIT EXPENSES (\$s in millions)											
1	Foreclosed property expense (REO)										
2	Net charge-offs										
3	Credit losses										
4	Provision for credit losses										
5	Credit Expenses ¹										
LOAN LOSS RESERVE (\$s in millions)											
6	Beginning loan loss reserve										
7	Net charge-offs										
8	Provision (benefit) for loan losses										
9	Other										
10	Ending Total Loan Loss Reserve										
11	Unpaid Principal Balance (\$s in millions)										

¹ Amount depicts the summation of foreclosed property expense and provision for credit losses.

Enterprise Dodd-Frank Act Stress Test Template (Disclosure to FHFA ONLY)

<u>Multifamily Key Metrics (SEVERELY ADVERSE)</u>	Most Recent Quarter	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Nine Quarter Cumulative Total
(\$s in millions)											
1 Total multifamily market volume (industry)											
2 Enterprise market share percentage											
3 New acquisition volume											
4 Liquidation volume ¹											
5 Securitization volume											
6 Effective guaranty fee rate ² (bps)											
7 Guaranty portfolio balance											
8 Loans and securities held in portfolio											

¹ Includes property sales and other run-off/prepayments.

² Guaranty fee income divided by weighted average portfolio balance.

**Enterprise Dodd-Frank Act Stress Test Template
(Disclosure to FHFA ONLY)**

Single-Family Credit Overview - Quarterly (SEVERELY ADVERSE)	Most Recent Quarter	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Nine Quarter Cumulative Total
	TOTAL PORTFOLIO										
CREDIT EXPENSES (\$s in millions)											
1	Foreclosed property expense (REO)										
2	Net charge-offs										
3	Credit losses										
4	Provision for credit losses										
5	Credit Expenses¹										
LOAN LOSS RESERVE (\$s in millions)											
6	Beginning loan loss reserve										
7	Net charge-offs										
8	Provision (benefit) for loan losses/guaranty losses										
9	Other										
10	Ending Total Loan Loss Reserve										
Memo:											
11	FAS 5 Loan Loss Reserve										
12	FAS 114 Loan Loss Reserve										
13	Concessions in FAS 114 Loan Loss Reserve ²										
14	Unpaid Principal Balance (\$s in millions)										
CURRENT BOOK (as of 12/31/19)											
CREDIT EXPENSES (\$s in millions)											
15	Foreclosed property expense (REO)										
16	Net charge-offs										
17	Credit losses										
18	Provision for credit losses										
19	Credit Expenses¹										
LOAN LOSS RESERVE (\$s in millions)											
20	Beginning loan loss reserve										
21	Net charge-offs										
22	Provision (benefit) for loan losses/guaranty losses										
23	Other										
24	Ending Loan Loss Reserve - Current Book										
25	Unpaid Principal Balance (\$s in millions)										
NEW BUSINESS											
CREDIT EXPENSES (\$s in millions)											
26	Foreclosed property expense (REO)										
27	Net charge-offs										
28	Credit losses										
29	Provision for credit losses										
30	Credit Expenses¹										
LOAN LOSS RESERVE (\$s in millions)											
31	Beginning loan loss reserve										
32	Net charge-offs										
33	Provision (benefit) for loan losses/guaranty losses										
34	Other										
35	Ending Loan Loss Reserve - New Business										
36	Unpaid Principal Balance (\$s in millions)										

¹ Amount depicts the summation of foreclosed property expense, provision for credit losses, and SOP 03-3 losses.
² Amount includes the impact of all troubled debt restructuring (TDR) related impairments.

**Enterprise Dodd-Frank Act Stress Test Template
(Disclosure to FHFA ONLY)**

Single-Family Credit Overview - Quarterly (SEVERELY ADVERSE)	Most Recent										
	Quarter	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	
SERIOUSLY DELINQUENT LOAN ACTIVITY (count in '000s)											
1	Beginning seriously delinquent loans										
2	Seriously delinquent inflows - new SDQ										
3	Seriously delinquent inflows - cured										
4	Seriously delinquent cured by modification										
5	Seriously delinquent - cured										
6	Seriously delinquent to default										
7	Seriously delinquent to payoff										
8	Ending Seriously Delinquent Loans										
9	Ending seriously delinquent rate (%)										
10	Aggregate UPB of seriously delinquent loans (\$s in millions)										
<hr/>											
11	Loan modifications (count in 000s)										
	(\$s in millions)										
PRIVATE MORTGAGE INSURERS - OVERVIEW (Nine Quarter Cumulative Totals)											
		Arch Mortgage Insurance Company	Essent Guaranty, Inc.	Genworth Mortgage Insurance Corporation	Mortgage Guaranty Insurance Corporation	PMI Mortgage Insurance Co.	Radian Guaranty Inc.	Republic Mortgage Insurance Company	Triad Guaranty Insurance Corporation	United Guaranty Residential Insurance Co.	Other
12	Expected Gross Claims to MI Companies ¹										
13	Less: Reinsurance Proceeds										
14	Subtotal (net of reinsurance)										
15	Less: Haircut Amount										
16	Expected Net Claims from MI Companies¹										
17	Gross MI Benefit included in ending Loan Loss Reserves ²										
18	Less: Haircut Amount ³										
19	Net MI Benefit included in ending Loan Loss Reserves ²										
20	Total Net MI Benefit										

¹ Represents amount related to loans that default during the nine-quarter projection period.
² Represents amount of MI benefit included in loan loss reserves at the end of the nine-quarter projection period.
³ Represents amount Gross MI benefit included in loan loss reserves at the end of the nine-quarter projection period is reduced due to MI Haircut.

NOTE: Seriously delinquent loans are 90 days or more delinquent, or in the process of foreclosure.

Enterprise Dodd-Frank Act Stress Test Template (Disclosure to FHFA ONLY)

Single-Family Credit Summary (SEVERELY ADVERSE)

Delinquency Status - CURRENT BOOK

(\$s in millions)

End of Quarter Unpaid Principal Balance (UPB)

		Most Recent Quarter									
Loan Status			Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9
MODIFIED LOANS											
1	Current										
2	Less than 90 days delinquent										
3	Seriously delinquent (90 days or more delinquent or in the process of foreclosure)										
4	Total										
NON-MODIFIED LOANS											
5	Current										
6	Less than 90 days delinquent										
7	Seriously delinquent (90 days or more delinquent or in the process of foreclosure)										
8	Total										

(\$s in millions)

Loan Loss Reserve

		Most Recent Quarter									
Loan Status			Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9
MODIFIED LOANS											
9	Current										
10	Less than 90 days delinquent										
11	Seriously delinquent (90 days or more delinquent or in the process of foreclosure)										
12	Total										
NON-MODIFIED LOANS											
13	Current										
14	Less than 90 days delinquent										
15	Seriously delinquent (90 days or more delinquent or in the process of foreclosure)										
16	Total										

(\$s in millions)

End of Quarter Projected Charge-Offs (Undiscounted \$s)

		Most Recent Quarter									Nine Quarter Cumulative Total
Loan Status			Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9
17	Modified										
18	Non-Modified										

**Enterprise Dodd-Frank Act Stress Test Template
(Disclosure to FHFA ONLY)**

Single-Family Credit Summary (SEVERELY ADVERSE)

Mark-to-Market Loan-to-Value - CURRENT BOOK

(\$s in millions)

		End of Quarter Unpaid Principal Balance (UPB)								
Loan Status	Most Recent Quarter	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9
1 <=80%										
2 >80% - 100%										
3 >100%										
4 Total										

(\$s in millions)

		Loan Loss Reserve								
Loan Status	Most Recent Quarter	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9
5 <=80%										
6 >80% - 100%										
7 >100%										
8 Total										

(\$s in millions)

		End of Quarter Projected Charge-Offs (Undiscounted \$s)									
Loan Status	Most Recent Quarter	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Nine Quarter Cumulative Total
9 <=80%											
10 >80% - 100%											
11 >100%											

**Enterprise Dodd-Frank Act Stress Test Template
(Disclosure to FHFA ONLY)**

Single-Family Credit Summary (SEVERELY ADVERSE)

Vintage Status - CURRENT BOOK

(\$s in millions)

		End of Quarter Unpaid Principal Balance (UPB)								
Loan Status	Most Recent Quarter	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9
1	2004 and prior									
2	2005									
3	2006									
4	2007									
5	2008									
6	2009									
7	2010									
8	2011									
9	2012									
10	2013									
11	2014									
12	2015									
13	2016									
14	2017									
15	2018									
16	2019									

(\$s in millions)

		Loan Loss Reserve								
Loan Status	Most Recent Quarter	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9
17	2004 and prior									
18	2005									
19	2006									
20	2007									
21	2008									
22	2009									
23	2010									
24	2011									
25	2012									
26	2013									
27	2014									
28	2015									
29	2016									
30	2017									
31	2018									
32	2019									

(\$s in millions)

		End of Quarter Projected Charge-Offs (Undiscounted \$s)									
Loan Status	Most Recent Quarter	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Nine Quarter Cumulative Total
33	2004 and prior										
34	2005										
35	2006										
36	2007										
37	2008										
38	2009										
39	2010										
40	2011										
41	2012										
42	2013										
43	2014										
44	2015										
45	2016										
46	2017										
47	2018										
48	2019										

Enterprise Dodd-Frank Act Stress Test Template (Disclosure to FHFA ONLY)

(\$s in millions)

Single-Family - 9 Quarter Cumulative Credit Losses (SEVERELY ADVERSE)

		Loan-To-Value											
		<30	30 - 60	61 - 70	71 - 75	76 - 80	81 - 85	86 - 90	91 - 95	96 - 100	101 - 110	111 - 120	>120
Credit Score	<620												
	620 - 640												
	641 - 660												
	661 - 680												
	681 - 700												
	701 - 720												
	721 - 740												
	741 - 760												
	761 - 780												
	>780												

Credit losses represent the summation of net charge-offs and foreclosed property expenses (REO).

Use LTV and credit score as of December 31, 2019.

Enterprise Dodd-Frank Act Stress Test Template (Disclosure to FHFA ONLY)

(\$s in millions)

Single-Family - Loan Loss Reserves (SEVERELY ADVERSE)

Loan Loss Reserves as of 12/31/19

		Loan-To-Value											
		<30	30 - 60	61 - 70	71 - 75	76 - 80	81 - 85	86 - 90	91 - 95	96 - 100	101 - 110	111 - 120	>120
Credit Score	<620												
	620 - 640												
	641 - 660												
	661 - 680												
	681 - 700												
	701 - 720												
	721 - 740												
	741 - 760												
	761 - 780												
	>780												

Use LTV and credit score as of December 31, 2019

Loan Loss Reserves at 3/31/22 (end of nine quarters)

		Loan-To-Value											
		<30	30 - 60	61 - 70	71 - 75	76 - 80	81 - 85	86 - 90	91 - 95	96 - 100	101 - 110	111 - 120	>120
Credit Score	<620												
	620 - 640												
	641 - 660												
	661 - 680												
	681 - 700												
	701 - 720												
	721 - 740												
	741 - 760												
	761 - 780												
	>780												

Use LTV and credit score as of December 31, 2019

**Enterprise Dodd-Frank Act Stress Test Template
(Disclosure to FHFA ONLY)**

**Single-Family Credit Summary (SEVERELY ADVERSE)
Vintage and MTMLTV Status - CURRENT BOOK**

(\$s in millions)	Loan Status at 12/31/19	End of Quarter (UPB) Most Recent Quarter	Cumulative Unpaid Principal Balance (UPB)							End of Quarter (UPB) Q9
			Inflows	Cumulative Defaults ¹	Cumulative Prepays ²	Run-off ³	Other ⁴	Migrate to <=80%	Migrate to 80% - 100%	
	<=80%									
	80% - 100%									
	>100%									
	<=80%									
	80% - 100%									
	>100%									
	<=80%									
	80% - 100%									
	>100%									

(\$s in millions)	Loan Status at 12/31/19	Loan Loss Reserves				
		Beginning	Cumulative Charge-offs	Provision for Credit Losses	Other	Ending
	<=80%					
	80% - 100%					
	>100%					
	<=80%					
	80% - 100%					
	>100%					
	<=80%					
	80% - 100%					
	>100%					

¹ Amount depicts principal balance of loans that are in the process of foreclosure.
² Amount depicts principal balance of loans that have prepaid through refinance.
³ Amount depicts reduction in principal balance due to amortization.
⁴ Amount includes NPL sales and other miscellaneous items.

**Enterprise Dodd-Frank Act Stress Test Template
(Disclosure to FHFA ONLY)**

**Single-Family Credit Summary (SEVERELY ADVERSE)
Vintage and Delinquency Status - CURRENT BOOK**

(\$s in millions)			End of Quarter (UPB) Most Recent Quarter	Cumulative Unpaid Principal Balance (UPB)								End of Quarter (UPB) Q9		
				Inflows	Cumulative Defaults ¹	Cumulative Prepays ²	Run-off ³	Other ⁴	Migrate to Modified Current	Migrate to Modified <90 Days	Migrate to Modified SDQ		Migrate to Non-Modified Current	Migrate to Non-Modified <90 Days
2004 and prior	Loan Status at 12/31/19	Current												
		Modified <90 Days SDQ												
2005 - 2008	Loan Status at 12/31/19	Current												
		Modified <90 Days SDQ												
2009 and Later	Loan Status at 12/31/19	Current												
		Modified <90 Days SDQ												
	Loan Status at 12/31/19	Current												
		Non-Modified <90 Days SDQ												

(\$s in millions)			Loan Loss Reserves				
			Beginning	Cumulative Charge-offs	Provision for Credit Losses	Other	Ending
2004 and prior	Loan Status at 12/31/19	Current					
		Modified <90 Days SDQ					
2005 - 2008	Loan Status at 12/31/19	Current					
		Modified <90 Days SDQ					
2009 and Later	Loan Status at 12/31/19	Current					
		Modified <90 Days SDQ					
	Loan Status at 12/31/19	Current					
		Non-Modified <90 Days SDQ					

¹ Amount depicts principal balance of loans that are in the process of foreclosure.
² Amount depicts principal balance of loans that have prepaid through refinancing.
³ Amount depicts reduction in principal balance due to amortization.
⁴ Amount includes NPL sales and other miscellaneous items.

**Enterprise Dodd-Frank Act Stress Test Template
(Disclosure to FHFA ONLY)**

**Single-Family Credit Summary (SEVERELY ADVERSE)
MTMLTV and Delinquency Status - CURRENT BOOK**

(\$s in millions)			End of Quarter (UPB)		Cumulative Unpaid Principal Balance (UPB)								End of Quarter (UPB)		
			Most Recent Quarter	Q9	Inflows	Cumulative Defaults ¹	Cumulative Prepays ²	Run-off ³	Other ⁴	Migrate to Modified Current	Migrate to Modified <90 Days	Migrate to Modified SDQ	Migrate to Non-Modified Current	Migrate to Non-Modified <90 Days	Migrate to Non-Modified SDQ
<=80%	Modified	Current <90 Days SDQ													
	Non-Modified	Current <90 Days SDQ													
80% - 100%	Modified	Current <90 Days SDQ													
	Non-Modified	Current <90 Days SDQ													
>100%	Modified	Current <90 Days SDQ													
	Non-Modified	Current <90 Days SDQ													

(\$s in millions)			Loan Loss Reserves				
			Beginning	Cumulative Charge-offs	Provision for Credit Losses	Other	Ending
<=80%	Modified	Current <90 Days SDQ					
	Non-Modified	Current <90 Days SDQ					
80% - 100%	Modified	Current <90 Days SDQ					
	Non-Modified	Current <90 Days SDQ					
>100%	Modified	Current <90 Days SDQ					
	Non-Modified	Current <90 Days SDQ					

¹ Amount depicts principal balance of loans that are in the process of foreclosure.
² Amount depicts principal balance of loans that have prepaid through refinance.
³ Amount depicts reduction in principal balance due to amortization.
⁴ Amount includes NPL sales and other miscellaneous items.

**Enterprise Dodd-Frank Act Stress Test Template
(Disclosure to FHFA ONLY)**

Credit Risk Transfers - Quarterly (SEVERELY ADVERSE)		Most Recent Quarter	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Nine Quarter Cumulative Total
(\$s in millions)												
Single-Family												
CAS/STACR (Non-REMIC/Non-Trust)												
1	Interest Expense											
2	Fair Value Gain (Loss)											
3	Other Expenses											
4	Recoveries											
CAS/STACR (REMIC/Trust)												
5	Credit Expense											
6	Other Expenses											
7	Recoveries											
CIRT/ACIS												
8	Premium Expense											
9	Other Expenses											
10	Recoveries											
OTHER												
11	Fair Value Gain (Loss)											
12	Other Expenses											
13	Recoveries											
14	Total Single-Family Income (Loss)											
Multifamily												
CIRT/ACIS												
15	Premium Expense											
16	Other Expenses											
17	Recoveries											
18	Total Multifamily Income (Loss)											
19	Total Income (Loss)											
Reference Pool												
20	CAS/STACR REMIC/Trust Debt Issuances											
21	CIRT/ACIS Transactions											
22	Other Transactions											
23	Reference Pool (Quarter)											
24	Outstanding Reference Pool											

Enterprise Dodd-Frank Act Stress Test Template - SEVERELY ADVERSE (Disclosure to the Public)

Cumulative Projected Financial Metrics (Q1 2020 - Q1 2022)

Results without establishing valuation allowance on deferred tax assets		Impact of establishing valuation allowance on deferred tax assets	Results with establishing valuation allowance on deferred tax assets	
Billions of dollars	Percent of average assets ⁶		Billions of dollars	Percent of average assets ⁶

- 1 Pre-provision net revenue¹
- 2 (Provision) benefit for credit losses
- 3 Mark-to-market gains (losses)²
- 4 Global market shock impact on trading securities
and counterparty
- 5 Net income before taxes
- 6 (Provision) benefit for taxes
- 7 Other comprehensive income (loss)³
- 8 Total comprehensive income (loss)
- 9 Dividends paid

- 10 PSPA funding commitment as of December 31, 2019
- 11 Treasury draws required
- 12 Remaining PSPA funding commitment

- 13 Credit losses⁴
- 14 Credit losses (% of average portfolio balance)⁵

¹ Includes net interest income, security impairments, operational risk losses, foreclosed property income (expense), and other non-interest income/expenses.

² Includes fair value gains (losses) on derivative and trading securities, and other gains (losses) on investment securities.

³ Includes global market shock impact on available-for-sale securities.

⁴ Credit losses are defined as charge-offs, net plus foreclosed property expenses.

⁵ Average portfolio balance over the nine-quarter planning horizon.

⁶ Average total assets over the nine-quarter planning horizon.

Appendix 3: Baseline Scenario – Domestic

Date	Real GDP growth	Nominal GDP growth	Real disposable income growth	Nominal disposable income growth	Unemployment rate	CPI inflation rate	3-month Treasury rate	5-year Treasury yield	10-year Treasury yield	BBB corporate yield	Mortgage rate	Prime rate	Dow Jones Total Stock Market Index (Level)	House Price Index (Level)	Commercial Real Estate Price Index (Level)	Market Volatility Index (Level)
2005 Q1	4.5	7.9	-4.6	-2.4	5.3	2.0	2.5	3.9	4.4	5.2	5.8	5.4	11,637.3	171.9	179.0	14.7
2005 Q2	1.9	4.7	3.9	6.4	5.1	2.7	2.9	3.9	4.2	5.4	5.7	5.9	11,856.7	178.7	184.9	17.7
2005 Q3	3.6	7.4	1.2	5.6	5.0	6.2	3.4	4.0	4.3	5.4	5.8	6.4	12,282.9	184.9	190.4	14.2
2005 Q4	2.5	5.9	5.2	8.6	5.0	3.8	3.8	4.4	4.6	5.8	6.2	7.0	12,497.2	190.2	198.2	16.5
2006 Q1	5.4	8.4	8.0	10.2	4.7	2.1	4.4	4.6	4.7	5.8	6.2	7.4	13,121.6	193.4	203.6	14.6
2006 Q2	0.9	4.4	1.0	4.3	4.6	3.7	4.7	5.0	5.2	6.3	6.6	7.9	12,808.9	192.7	212.0	23.8
2006 Q3	0.6	3.5	1.0	4.0	4.6	3.8	4.9	4.8	5.0	6.3	6.6	8.3	13,322.5	191.3	220.0	18.6
2006 Q4	3.5	5.0	5.4	4.7	4.4	-1.6	4.9	4.6	4.7	6.0	6.2	8.3	14,215.8	190.8	221.8	12.7
2007 Q1	0.9	5.0	3.4	7.4	4.5	4.0	5.0	4.6	4.8	6.0	6.2	8.3	14,354.0	188.6	229.7	19.6
2007 Q2	2.3	5.0	1.0	4.3	4.5	4.6	4.7	4.7	4.9	6.2	6.4	8.3	15,163.1	183.2	238.9	18.9
2007 Q3	2.2	4.3	0.4	2.6	4.7	2.6	4.3	4.5	4.8	6.5	6.6	8.2	15,317.8	177.7	246.7	30.8
2007 Q4	2.5	4.1	0.3	4.3	4.8	5.0	3.4	3.8	4.4	6.3	6.2	7.5	14,753.6	172.1	247.2	31.1
2008 Q1	-2.3	-0.8	1.1	4.6	5.0	4.4	2.1	2.8	3.9	6.4	5.9	6.2	13,284.1	165.1	234.9	32.2
2008 Q2	2.1	4.3	7.5	12.0	5.3	5.3	1.6	3.2	4.1	6.7	6.1	5.1	13,016.4	157.4	224.0	24.1
2008 Q3	-2.1	0.8	-8.1	-4.3	6.0	6.3	1.5	3.1	4.1	7.1	6.3	5.0	11,826.0	150.2	230.1	46.7
2008 Q4	-8.4	-7.2	3.5	-2.5	6.9	-8.9	0.3	2.2	3.7	9.7	5.8	4.1	9,056.7	142.6	218.7	80.9
2009 Q1	-4.4	-4.5	-1.7	-4.0	8.3	-2.7	0.2	1.9	3.2	9.1	5.1	3.3	8,044.2	138.4	208.4	56.7
2009 Q2	-0.6	-1.2	4.4	6.3	9.3	2.1	0.2	2.3	3.7	8.1	5.0	3.3	9,342.8	138.3	179.7	42.3
2009 Q3	1.5	1.9	-4.4	-1.8	9.6	3.5	0.2	2.5	3.8	6.5	5.2	3.3	10,812.8	138.9	161.0	31.3
2009 Q4	4.5	5.9	-0.1	3.0	9.9	3.2	0.1	2.3	3.7	5.8	4.9	3.3	11,385.1	139.4	158.3	30.7
2010 Q1	1.5	2.6	2.3	3.7	9.8	0.6	0.1	2.4	3.9	5.6	5.0	3.3	12,032.5	139.4	153.6	27.3
2010 Q2	3.7	5.7	6.8	7.2	9.6	-0.1	0.1	2.3	3.6	5.4	4.9	3.3	10,645.8	138.5	165.8	45.8
2010 Q3	3.0	4.2	2.9	3.6	9.5	1.2	0.2	1.6	2.9	4.8	4.4	3.3	11,814.0	135.9	166.5	32.9
2010 Q4	2.0	4.3	2.3	4.8	9.5	3.3	0.1	1.5	3.0	4.7	4.4	3.3	13,131.5	134.6	167.1	23.5
2011 Q1	-1.0	1.2	4.1	7.8	9.0	4.3	0.1	2.1	3.5	5.0	4.8	3.3	13,908.5	133.3	170.8	29.4
2011 Q2	2.9	5.6	-0.9	3.1	9.1	4.6	0.0	1.8	3.3	4.8	4.7	3.3	13,843.5	132.9	173.5	22.7
2011 Q3	-0.1	2.5	1.8	3.7	9.0	2.6	0.0	1.1	2.5	4.5	4.3	3.3	11,676.5	133.5	169.2	48.0
2011 Q4	4.7	5.4	1.2	2.6	8.6	1.8	0.0	1.0	2.1	4.8	4.0	3.3	13,019.3	133.5	176.0	45.5
2012 Q1	3.2	5.8	7.7	10.7	8.3	2.3	0.1	0.9	2.1	4.4	3.9	3.3	14,627.5	135.0	181.1	23.0
2012 Q2	1.7	3.3	3.7	4.7	8.2	0.8	0.1	0.8	1.8	4.3	3.8	3.3	14,100.2	138.2	179.5	26.7
2012 Q3	0.5	2.6	-2.8	-1.7	8.0	1.8	0.1	0.7	1.6	3.9	3.6	3.3	14,894.7	141.0	184.4	20.5
2012 Q4	0.5	2.5	11.5	14.1	7.8	2.7	0.1	0.7	1.7	3.6	3.4	3.3	14,834.9	144.0	184.3	22.7
2013 Q1	3.6	5.3	-15.1	-13.9	7.7	1.6	0.1	0.8	1.9	3.7	3.5	3.3	16,396.2	147.6	187.2	19.0
2013 Q2	0.5	1.7	3.0	3.3	7.5	-0.4	0.1	0.9	2.0	3.8	3.7	3.3	16,771.3	151.5	196.5	20.5
2013 Q3	3.2	5.2	1.7	3.4	7.2	2.2	0.0	1.5	2.7	4.7	4.4	3.3	17,718.3	155.2	206.9	17.0
2013 Q4	3.2	5.7	1.6	3.3	6.9	1.5	0.1	1.4	2.8	4.5	4.3	3.3	19,413.2	158.3	211.1	20.3

Appendix 3: Baseline Scenario – Domestic (Cont.)

Date	Real GDP growth	Nominal GDP growth	Real disposable income growth	Nominal disposable income growth	Unemployment rate	CPI inflation rate	3-month Treasury rate	5-year Treasury yield	10-year Treasury yield	BBB corporate yield	Mortgage rate	Prime rate	Dow Jones Total Stock Market Index (Level)	House Price Index (Level)	Commercial Real Estate Price Index (Level)	Market Volatility Index (Level)
2014 Q1	-1.1	0.5	5.7	7.7	6.7	2.5	0.0	1.6	2.8	4.4	4.4	3.3	19,711.2	160.3	209.5	21.4
2014 Q2	5.5	7.9	5.6	7.6	6.2	2.1	0.0	1.7	2.7	4.0	4.2	3.3	20,568.7	161.4	214.7	17.0
2014 Q3	5.0	6.8	4.8	5.9	6.1	1.0	0.0	1.7	2.5	3.9	4.1	3.3	20,458.8	163.6	218.7	17.0
2014 Q4	2.3	2.9	5.4	4.9	5.7	-1.0	0.0	1.6	2.3	4.0	4.0	3.3	21,424.6	166.1	226.6	26.3
2015 Q1	3.2	3.0	4.6	2.8	5.5	-2.6	0.0	1.5	2.0	3.9	3.7	3.3	21,707.6	168.2	241.4	22.4
2015 Q2	3.0	5.3	3.0	5.1	5.4	2.8	0.0	1.5	2.2	3.9	3.8	3.3	21,630.9	170.2	244.9	18.9
2015 Q3	1.3	2.8	3.0	4.1	5.1	1.6	0.0	1.6	2.3	4.3	4.0	3.3	19,959.3	172.6	247.1	40.7
2015 Q4	0.1	0.1	1.3	0.9	5.0	0.0	0.1	1.6	2.2	4.4	3.9	3.3	21,100.9	175.1	247.1	24.4
2016 Q1	2.0	1.6	2.7	2.9	4.9	-0.2	0.3	1.4	2.0	4.5	3.7	3.5	21,179.4	177.2	239.1	28.1
2016 Q2	1.9	4.7	-0.4	2.0	4.9	2.9	0.3	1.3	1.8	3.9	3.6	3.5	21,621.5	179.3	244.7	25.8
2016 Q3	2.2	3.7	1.8	3.5	4.9	1.9	0.3	1.2	1.6	3.5	3.4	3.5	22,468.6	181.8	257.4	18.1
2016 Q4	2.0	4.0	2.4	4.3	4.8	2.6	0.4	1.7	2.2	3.9	3.8	3.5	23,276.7	184.7	259.5	22.5
2017 Q1	2.3	4.2	4.9	7.1	4.6	2.8	0.6	2.0	2.5	4.0	4.2	3.8	24,508.3	187.1	256.5	13.1
2017 Q2	2.2	3.5	2.7	3.6	4.4	0.4	0.9	1.8	2.3	3.8	4.0	4.0	25,125.0	189.7	265.3	16.0
2017 Q3	3.2	5.4	2.3	4.1	4.3	2.2	1.0	1.8	2.3	3.7	3.9	4.3	26,148.5	192.9	270.4	16.0
2017 Q4	3.5	6.4	3.7	6.5	4.1	3.1	1.2	2.1	2.4	3.7	3.9	4.3	27,673.2	196.1	279.3	13.1
2018 Q1	2.6	5.0	6.9	9.6	4.1	3.2	1.6	2.5	2.8	4.1	4.3	4.5	27,383.0	199.2	274.3	37.3
2018 Q2	3.5	7.1	2.7	4.9	3.9	2.1	1.8	2.8	2.9	4.5	4.5	4.8	28,313.8	201.5	288.4	23.6
2018 Q3	2.9	4.8	3.3	4.9	3.8	2.0	2.0	2.8	2.9	4.5	4.6	5.0	30,189.6	203.3	278.9	16.1
2018 Q4	1.1	2.9	2.8	4.2	3.8	1.5	2.3	2.9	3.0	4.8	4.8	5.3	25,724.5	204.8	280.3	36.1
2019 Q1	3.1	3.9	4.5	4.9	3.9	0.9	2.4	2.5	2.7	4.5	4.4	5.5	29,193.9	206.3	289.4	25.5
2019 Q2	2.0	4.7	1.5	3.9	3.6	2.9	2.3	2.1	2.4	4.0	4.0	5.5	30,243.8	208.1	302.6	20.6
2019 Q3	2.1	3.8	2.9	4.5	3.6	1.8	2.0	1.7	1.8	3.4	3.7	5.3	30,441.8	210.2	310.9	24.6
2019 Q4	2.0	4.0	2.1	4.5	3.5	2.6	1.6	1.6	1.8	3.3	3.7	4.8	33,035.4	211.5	316.0	20.6
2020 Q1	1.6	3.7	2.2	4.1	3.6	2.2	1.6	1.7	1.8	3.3	3.6	4.8	33,381.4	212.9	318.7	22.8
2020 Q2	1.9	4.0	2.0	3.8	3.6	2.1	1.5	1.7	1.9	3.4	3.6	4.7	33,753.8	214.2	322.8	24.5
2020 Q3	1.8	3.9	1.9	3.6	3.6	2.0	1.5	1.7	1.9	3.5	3.6	4.7	34,123.0	215.5	326.8	25.3
2020 Q4	1.9	4.0	2.1	3.7	3.7	1.9	1.4	1.8	2.0	3.5	3.5	4.6	34,508.1	216.9	330.9	25.8
2021 Q1	1.9	4.0	2.2	4.0	3.7	2.1	1.4	1.8	2.0	3.6	3.6	4.6	34,894.5	218.3	335.1	25.9
2021 Q2	1.9	4.1	2.0	3.8	3.7	2.1	1.4	1.9	2.1	3.7	3.6	4.6	35,292.4	219.6	339.3	26.1
2021 Q3	1.9	4.1	2.0	3.8	3.8	2.1	1.5	2.0	2.1	3.8	3.7	4.6	35,693.8	221.0	343.6	26.3
2021 Q4	2.0	4.2	2.0	3.8	3.8	2.1	1.5	2.0	2.2	3.8	3.7	4.6	36,106.5	222.4	347.9	26.3
2022 Q1	2.0	4.2	2.0	3.9	3.9	2.3	1.6	2.1	2.2	3.9	3.8	4.7	36,525.8	224.1	350.5	26.6
2022 Q2	2.0	4.1	2.0	3.9	3.9	2.2	1.6	2.1	2.4	4.0	3.9	4.7	36,947.1	225.8	353.1	26.4
2022 Q3	2.0	4.1	2.0	3.9	3.9	2.2	1.7	2.1	2.5	4.2	4.0	4.8	37,373.3	227.5	355.8	26.4
2022 Q4	2.0	4.1	2.0	3.9	3.9	2.2	1.7	2.2	2.6	4.3	4.1	4.8	37,804.4	229.2	358.5	26.5
2023 Q1	2.0	4.1	2.0	3.9	3.9	2.2	1.8	2.2	2.7	4.3	4.1	4.8	38,240.1	230.9	361.2	26.5

Appendix 4: Baseline Scenario – International

Date	Euro area real GDP growth	Euro area inflation	Euro area bilateral dollar exchange rate (USD/euro)	Developing Asia real GDP growth	Developing Asia inflation	Developing Asia bilateral dollar exchange rate (F/USD, index)	Japan real GDP growth	Japan inflation	Japan bilateral dollar exchange rate (yen/USD)	U.K. real GDP growth	U.K. inflation	U.K. bilateral dollar exchange rate (USD/pound)
2005 Q1	0.9	1.4	1.3	10.6	2.9	98.5	2.0	-1.2	107.2	3.4	2.5	1.9
2005 Q2	2.5	2.2	1.2	8.7	1.5	98.9	2.7	-1.0	110.9	5.1	1.9	1.8
2005 Q3	3.0	3.1	1.2	9.4	2.4	98.5	3.9	-1.0	113.3	4.6	2.7	1.8
2005 Q4	2.5	2.5	1.2	11.6	1.6	98.1	0.7	0.1	117.9	6.1	1.4	1.7
2006 Q1	3.6	1.7	1.2	10.9	2.4	96.7	0.7	1.2	117.5	1.6	1.9	1.7
2006 Q2	4.4	2.5	1.3	7.2	3.2	96.6	1.0	0.4	114.5	1.0	3.0	1.8
2006 Q3	2.4	2.0	1.3	10.1	2.2	96.2	-0.7	0.4	118.0	0.4	3.3	1.9
2006 Q4	4.8	0.9	1.3	11.4	3.6	94.5	5.3	-0.5	119.0	2.1	2.6	2.0
2007 Q1	2.5	2.3	1.3	13.9	3.6	93.9	3.0	-0.7	117.6	3.8	2.6	2.0
2007 Q2	2.8	2.3	1.4	10.6	4.9	91.8	0.5	0.4	123.4	2.5	1.7	2.0
2007 Q3	1.8	2.1	1.4	8.6	7.6	90.5	-2.0	0.3	115.0	3.1	0.2	2.0
2007 Q4	2.3	4.9	1.5	13.1	5.9	89.4	1.9	2.2	111.7	1.9	4.0	2.0
2008 Q1	1.8	4.2	1.6	7.1	8.1	88.0	1.1	1.2	99.9	2.2	3.7	2.0
2008 Q2	-1.4	3.2	1.6	6.0	6.3	88.7	-1.5	1.8	106.2	-2.2	5.7	2.0
2008 Q3	-2.2	3.2	1.4	2.9	3.0	91.6	-5.0	3.4	105.9	-6.1	5.8	1.8
2008 Q4	-6.7	-1.4	1.4	0.6	-1.1	92.3	-9.4	-2.1	90.8	-8.0	0.5	1.5
2009 Q1	-12.0	-1.0	1.3	4.2	-1.4	94.3	-17.8	-3.6	99.2	-6.8	-0.1	1.4
2009 Q2	-0.1	0.0	1.4	15.0	2.3	92.3	8.6	-1.6	96.4	-1.0	2.2	1.6
2009 Q3	1.5	1.1	1.5	12.6	4.1	91.3	0.1	-1.4	89.5	0.3	3.5	1.6
2009 Q4	2.1	1.6	1.4	9.7	5.0	90.7	5.7	-1.5	93.1	1.2	3.0	1.6
2010 Q1	1.5	1.8	1.4	9.6	4.4	89.8	3.5	1.0	93.4	2.6	4.0	1.5
2010 Q2	4.0	1.9	1.2	9.5	3.4	91.1	5.5	-1.4	88.5	4.1	3.2	1.5
2010 Q3	1.8	1.6	1.4	8.8	4.2	88.4	7.4	-1.9	83.5	2.7	2.3	1.6
2010 Q4	2.5	2.6	1.3	9.6	7.5	87.4	-3.2	1.3	81.7	0.3	4.0	1.5
2011 Q1	3.4	3.7	1.4	9.6	6.2	86.5	-5.5	-0.1	82.8	2.5	6.7	1.6
2011 Q2	0.0	3.1	1.5	6.9	5.4	85.3	-2.6	-0.7	80.6	0.4	4.7	1.6
2011 Q3	0.4	1.3	1.3	5.5	5.3	87.4	10.3	0.3	77.0	1.2	3.7	1.6
2011 Q4	-1.4	3.5	1.3	6.6	3.0	87.3	-0.6	-0.6	77.0	0.7	3.4	1.6
2012 Q1	-0.9	2.9	1.3	7.6	3.2	86.3	4.9	2.2	82.4	2.6	2.1	1.6
2012 Q2	-1.3	2.2	1.3	5.8	3.9	88.1	-2.8	-1.4	79.8	-0.3	2.0	1.6
2012 Q3	-0.4	1.5	1.3	6.6	2.2	86.3	-1.5	-1.9	77.9	5.0	2.2	1.6
2012 Q4	-1.7	2.5	1.3	7.3	3.5	86.0	1.0	0.1	86.6	-0.6	4.0	1.6
2013 Q1	-1.5	1.3	1.3	6.7	4.6	86.3	5.0	0.6	94.2	2.6	2.9	1.5
2013 Q2	2.1	0.2	1.3	6.2	2.8	87.2	3.2	0.0	99.2	2.2	1.7	1.5
2013 Q3	1.2	1.1	1.4	7.7	3.5	86.6	3.4	2.7	98.3	3.8	2.1	1.6
2013 Q4	0.9	0.5	1.4	7.0	4.0	85.8	-0.2	2.6	105.3	2.1	1.5	1.7

Appendix 4: Baseline Scenario – International (Cont.)

Date	Euro area real GDP growth	Euro area inflation	Euro area bilateral dollar exchange rate (USD/euro)	Developing Asia real GDP growth	Developing Asia inflation	Developing Asia bilateral dollar exchange rate (F/USD, index)	Japan real GDP growth	Japan inflation	Japan bilateral dollar exchange rate (yen/USD)	U.K. real GDP growth	U.K. inflation	U.K. bilateral dollar exchange rate (USD/pound)
2014 Q1	1.9	1.0	1.4	5.8	1.4	86.9	4.0	1.0	103.0	2.7	1.9	1.7
2014 Q2	0.8	-0.4	1.4	7.3	2.6	86.6	-7.4	8.3	101.3	2.6	1.4	1.7
2014 Q3	1.9	0.1	1.3	6.6	2.4	87.0	0.4	1.8	109.7	2.3	0.8	1.6
2014 Q4	1.7	-0.1	1.2	6.1	1.1	88.1	2.0	-0.9	119.9	2.3	-0.4	1.6
2015 Q1	3.0	-0.7	1.1	5.7	0.9	88.1	5.5	0.5	120.0	2.1	-1.1	1.5
2015 Q2	1.6	2.4	1.1	6.8	2.7	88.4	0.5	0.8	122.1	2.9	0.7	1.6
2015 Q3	1.9	-0.2	1.1	6.6	2.7	91.1	-0.2	0.4	119.8	1.7	0.7	1.5
2015 Q4	1.7	-0.4	1.1	6.1	1.3	92.3	-1.6	-0.9	120.3	3.0	0.0	1.5
2016 Q1	2.4	-1.4	1.1	7.5	3.1	91.8	1.9	-0.4	112.4	0.7	0.0	1.4
2016 Q2	1.1	1.4	1.1	7.3	2.8	94.2	0.7	0.0	102.8	2.1	0.7	1.3
2016 Q3	1.8	1.2	1.1	6.4	1.1	93.7	1.1	-0.5	101.2	1.8	2.1	1.3
2016 Q4	3.1	1.7	1.1	5.9	1.9	97.6	0.9	2.0	116.8	2.6	2.0	1.2
2017 Q1	2.6	2.7	1.1	6.3	1.4	95.2	4.6	-0.3	111.4	2.3	3.8	1.3
2017 Q2	2.9	0.4	1.1	6.4	1.9	94.8	1.6	0.3	112.4	1.0	3.1	1.3
2017 Q3	3.1	1.0	1.2	7.1	2.2	93.7	2.7	0.5	112.6	1.4	2.3	1.3
2017 Q4	3.2	1.5	1.2	6.0	2.9	91.1	1.2	1.5	112.7	1.6	2.9	1.4
2018 Q1	1.1	2.2	1.2	6.7	2.8	89.1	-1.9	2.7	106.2	0.2	2.6	1.4
2018 Q2	1.4	2.1	1.2	6.2	1.3	93.5	2.1	-1.8	110.7	2.1	1.9	1.3
2018 Q3	0.8	2.6	1.2	5.5	2.9	97.2	-2.4	2.4	113.5	2.4	2.7	1.3
2018 Q4	1.4	0.8	1.1	5.6	1.6	96.2	1.0	0.3	109.7	0.9	1.9	1.3
2019 Q1	1.8	0.3	1.1	5.4	1.4	94.8	2.6	0.4	110.7	2.5	1.1	1.3
2019 Q2	0.6	2.0	1.1	5.2	4.1	96.4	2.0	0.1	107.8	-0.7	2.5	1.3
2019 Q3	1.1	0.7	1.1	4.5	3.6	99.8	1.8	0.5	108.1	1.7	1.8	1.2
2019 Q4	1.1	1.1	1.1	5.4	7.1	98.0	0.8	0.6	108.7	1.1	0.2	1.3
2020 Q1	1.1	1.3	1.1	5.3	3.0	98.3	0.8	0.6	108.5	1.1	1.7	1.3
2020 Q2	1.1	1.3	1.1	5.3	2.7	98.6	0.7	0.7	108.4	1.2	1.8	1.3
2020 Q3	1.1	1.4	1.1	5.3	2.4	98.8	0.7	0.7	108.2	1.2	1.8	1.3
2020 Q4	1.2	1.4	1.1	5.3	2.4	99.1	0.7	0.7	108.1	1.3	1.8	1.3
2021 Q1	1.3	1.4	1.1	5.4	2.5	99.0	0.7	0.7	108.0	1.3	1.8	1.3
2021 Q2	1.3	1.4	1.2	5.4	2.7	99.0	0.6	0.8	107.9	1.3	1.8	1.4
2021 Q3	1.3	1.5	1.2	5.4	2.8	98.9	0.6	0.8	107.8	1.4	1.9	1.4
2021 Q4	1.3	1.5	1.2	5.4	2.9	98.8	0.6	0.8	107.7	1.4	1.9	1.4
2022 Q1	1.3	1.6	1.2	5.4	3.0	98.8	0.6	0.8	107.7	1.4	1.9	1.4
2022 Q2	1.2	1.6	1.2	5.3	3.0	98.8	0.6	0.9	107.7	1.4	1.9	1.4
2022 Q3	1.2	1.6	1.2	5.3	3.1	98.8	0.6	0.9	107.7	1.4	1.9	1.4
2022 Q4	1.2	1.7	1.2	5.3	3.1	98.8	0.6	0.9	107.7	1.4	1.9	1.4
2023 Q1	1.2	1.7	1.2	5.3	3.1	98.8	0.6	0.9	107.7	1.4	1.9	1.4

Appendix 5: Severely Adverse Scenario - Domestic

Date	Real GDP growth	Nominal GDP growth	Real disposable income growth	Nominal disposable income growth	Unemployment rate	CPI inflation rate	3-month Treasury rate	5-year Treasury yield	10-year Treasury yield	BBB corporate yield	Mortgage rate	Prime rate	Dow Jones Total Stock Market Index (Level)	House Price Index (Level)	Commercial Real Estate Price Index (Level)	Market Volatility Index (Level)
2005 Q1	4.5	7.9	-4.6	-2.4	5.3	2.0	2.5	3.9	4.4	5.2	5.8	5.4	11,637.3	171.9	179.0	14.7
2005 Q2	1.9	4.7	3.9	6.4	5.1	2.7	2.9	3.9	4.2	5.4	5.7	5.9	11,856.7	178.7	184.9	17.7
2005 Q3	3.6	7.4	1.2	5.6	5.0	6.2	3.4	4.0	4.3	5.4	5.8	6.4	12,282.9	184.9	190.4	14.2
2005 Q4	2.5	5.9	5.2	8.6	5.0	3.8	3.8	4.4	4.6	5.8	6.2	7.0	12,497.2	190.2	198.2	16.5
2006 Q1	5.4	8.4	8.0	10.2	4.7	2.1	4.4	4.6	4.7	5.8	6.2	7.4	13,121.6	193.4	203.6	14.6
2006 Q2	0.9	4.4	1.0	4.3	4.6	3.7	4.7	5.0	5.2	6.3	6.6	7.9	12,808.9	192.7	212.0	23.8
2006 Q3	0.6	3.5	1.0	4.0	4.6	3.8	4.9	4.8	5.0	6.3	6.6	8.3	13,322.5	191.3	220.0	18.6
2006 Q4	3.5	5.0	5.4	4.7	4.4	-1.6	4.9	4.6	4.7	6.0	6.2	8.3	14,215.8	190.8	221.8	12.7
2007 Q1	0.9	5.0	3.4	7.4	4.5	4.0	5.0	4.6	4.8	6.0	6.2	8.3	14,354.0	188.6	229.7	19.6
2007 Q2	2.3	5.0	1.0	4.3	4.5	4.6	4.7	4.7	4.9	6.2	6.4	8.3	15,163.1	183.2	238.9	18.9
2007 Q3	2.2	4.3	0.4	2.6	4.7	2.6	4.3	4.5	4.8	6.5	6.6	8.2	15,317.8	177.7	246.7	30.8
2007 Q4	2.5	4.1	0.3	4.3	4.8	5.0	3.4	3.8	4.4	6.3	6.2	7.5	14,753.6	172.1	247.2	31.1
2008 Q1	-2.3	-0.8	1.1	4.6	5.0	4.4	2.1	2.8	3.9	6.4	5.9	6.2	13,284.1	165.1	234.9	32.2
2008 Q2	2.1	4.3	7.5	12.0	5.3	5.3	1.6	3.2	4.1	6.7	6.1	5.1	13,016.4	157.4	224.0	24.1
2008 Q3	-2.1	0.8	-8.1	-4.3	6.0	6.3	1.5	3.1	4.1	7.1	6.3	5.0	11,826.0	150.2	230.1	46.7
2008 Q4	-8.4	-7.2	3.5	-2.5	6.9	-8.9	0.3	2.2	3.7	9.7	5.8	4.1	9,056.7	142.6	218.7	80.9
2009 Q1	-4.4	-4.5	-1.7	-4.0	8.3	-2.7	0.2	1.9	3.2	9.1	5.1	3.3	8,044.2	138.4	208.4	56.7
2009 Q2	-0.6	-1.2	4.4	6.3	9.3	2.1	0.2	2.3	3.7	8.1	5.0	3.3	9,342.8	138.3	179.7	42.3
2009 Q3	1.5	1.9	-4.4	-1.8	9.6	3.5	0.2	2.5	3.8	6.5	5.2	3.3	10,812.8	138.9	161.0	31.3
2009 Q4	4.5	5.9	-0.1	3.0	9.9	3.2	0.1	2.3	3.7	5.8	4.9	3.3	11,385.1	139.4	158.3	30.7
2010 Q1	1.5	2.6	2.3	3.7	9.8	0.6	0.1	2.4	3.9	5.6	5.0	3.3	12,032.5	139.4	153.6	27.3
2010 Q2	3.7	5.7	6.8	7.2	9.6	-0.1	0.1	2.3	3.6	5.4	4.9	3.3	10,645.8	138.5	165.8	45.8
2010 Q3	3.0	4.2	2.9	3.6	9.5	1.2	0.2	1.6	2.9	4.8	4.4	3.3	11,814.0	135.9	166.5	32.9
2010 Q4	2.0	4.3	2.3	4.8	9.5	3.3	0.1	1.5	3.0	4.7	4.4	3.3	13,131.5	134.6	167.1	23.5
2011 Q1	-1.0	1.2	4.1	7.8	9.0	4.3	0.1	2.1	3.5	5.0	4.8	3.3	13,908.5	133.3	170.8	29.4
2011 Q2	2.9	5.6	-0.9	3.1	9.1	4.6	0.0	1.8	3.3	4.8	4.7	3.3	13,843.5	132.9	173.5	22.7
2011 Q3	-0.1	2.5	1.8	3.7	9.0	2.6	0.0	1.1	2.5	4.5	4.3	3.3	11,676.5	133.5	169.2	48.0
2011 Q4	4.7	5.4	1.2	2.6	8.6	1.8	0.0	1.0	2.1	4.8	4.0	3.3	13,019.3	133.5	176.0	45.5
2012 Q1	3.2	5.8	7.7	10.7	8.3	2.3	0.1	0.9	2.1	4.4	3.9	3.3	14,627.5	135.0	181.1	23.0
2012 Q2	1.7	3.3	3.7	4.7	8.2	0.8	0.1	0.8	1.8	4.3	3.8	3.3	14,100.2	138.2	179.5	26.7
2012 Q3	0.5	2.6	-2.8	-1.7	8.0	1.8	0.1	0.7	1.6	3.9	3.6	3.3	14,894.7	141.0	184.4	20.5
2012 Q4	0.5	2.5	11.5	14.1	7.8	2.7	0.1	0.7	1.7	3.6	3.4	3.3	14,834.9	144.0	184.3	22.7
2013 Q1	3.6	5.3	-15.1	-13.9	7.7	1.6	0.1	0.8	1.9	3.7	3.5	3.3	16,396.2	147.6	187.2	19.0
2013 Q2	0.5	1.7	3.0	3.3	7.5	-0.4	0.1	0.9	2.0	3.8	3.7	3.3	16,771.3	151.5	196.5	20.5
2013 Q3	3.2	5.2	1.7	3.4	7.2	2.2	0.0	1.5	2.7	4.7	4.4	3.3	17,718.3	155.2	206.9	17.0
2013 Q4	3.2	5.7	1.6	3.3	6.9	1.5	0.1	1.4	2.8	4.5	4.3	3.3	19,413.2	158.3	211.1	20.3

Appendix 5: Severely Adverse Scenario – Domestic (Cont.)

Date	Real GDP growth	Nominal GDP growth	Real disposable income growth	Nominal disposable income growth	Unemployment rate	CPI inflation rate	3-month Treasury rate	5-year Treasury yield	10-year Treasury yield	BBB corporate yield	Mortgage rate	Prime rate	Dow Jones Total Stock Market Index (Level)	House Price Index (Level)	Commercial Real Estate Price Index (Level)	Market Volatility Index (Level)
2014 Q1	-1.1	0.5	5.7	7.7	6.7	2.5	0.0	1.6	2.8	4.4	4.4	3.3	19,711.2	160.3	209.5	21.4
2014 Q2	5.5	7.9	5.6	7.6	6.2	2.1	0.0	1.7	2.7	4.0	4.2	3.3	20,568.7	161.4	214.7	17.0
2014 Q3	5.0	6.8	4.8	5.9	6.1	1.0	0.0	1.7	2.5	3.9	4.1	3.3	20,458.8	163.6	218.7	17.0
2014 Q4	2.3	2.9	5.4	4.9	5.7	-1.0	0.0	1.6	2.3	4.0	4.0	3.3	21,424.6	166.1	226.6	26.3
2015 Q1	3.2	3.0	4.6	2.8	5.5	-2.6	0.0	1.5	2.0	3.9	3.7	3.3	21,707.6	168.2	241.4	22.4
2015 Q2	3.0	5.3	3.0	5.1	5.4	2.8	0.0	1.5	2.2	3.9	3.8	3.3	21,630.9	170.2	244.9	18.9
2015 Q3	1.3	2.8	3.0	4.1	5.1	1.6	0.0	1.6	2.3	4.3	4.0	3.3	19,959.3	172.6	247.1	40.7
2015 Q4	0.1	0.1	1.3	0.9	5.0	0.0	0.1	1.6	2.2	4.4	3.9	3.3	21,100.9	175.1	247.1	24.4
2016 Q1	2.0	1.6	2.7	2.9	4.9	-0.2	0.3	1.4	2.0	4.5	3.7	3.5	21,179.4	177.2	239.1	28.1
2016 Q2	1.9	4.7	-0.4	2.0	4.9	2.9	0.3	1.3	1.8	3.9	3.6	3.5	21,621.5	179.3	244.7	25.8
2016 Q3	2.2	3.7	1.8	3.5	4.9	1.9	0.3	1.2	1.6	3.5	3.4	3.5	22,468.6	181.8	257.4	18.1
2016 Q4	2.0	4.0	2.4	4.3	4.8	2.6	0.4	1.7	2.2	3.9	3.8	3.5	23,276.7	184.7	259.5	22.5
2017 Q1	2.3	4.2	4.9	7.1	4.6	2.8	0.6	2.0	2.5	4.0	4.2	3.8	24,508.3	187.1	256.5	13.1
2017 Q2	2.2	3.5	2.7	3.6	4.4	0.4	0.9	1.8	2.3	3.8	4.0	4.0	25,125.0	189.7	265.3	16.0
2017 Q3	3.2	5.4	2.3	4.1	4.3	2.2	1.0	1.8	2.3	3.7	3.9	4.3	26,148.5	192.9	270.4	16.0
2017 Q4	3.5	6.4	3.7	6.5	4.1	3.1	1.2	2.1	2.4	3.7	3.9	4.3	27,673.2	196.1	279.3	13.1
2018 Q1	2.6	5.0	6.9	9.6	4.1	3.2	1.6	2.5	2.8	4.1	4.3	4.5	27,383.0	199.2	274.3	37.3
2018 Q2	3.5	7.1	2.7	4.9	3.9	2.1	1.8	2.8	2.9	4.5	4.5	4.8	28,313.8	201.5	288.4	23.6
2018 Q3	2.9	4.8	3.3	4.9	3.8	2.0	2.0	2.8	2.9	4.5	4.6	5.0	30,189.6	203.3	278.9	16.1
2018 Q4	1.1	2.9	2.8	4.2	3.8	1.5	2.3	2.9	3.0	4.8	4.8	5.3	25,724.5	204.8	280.3	36.1
2019 Q1	3.1	3.9	4.5	4.9	3.9	0.9	2.4	2.5	2.7	4.5	4.4	5.5	29,193.9	206.3	289.4	25.5
2019 Q2	2.0	4.7	1.5	3.9	3.6	2.9	2.3	2.1	2.4	4.0	4.0	5.5	30,243.8	208.1	302.6	20.6
2019 Q3	2.1	3.8	2.9	4.5	3.6	1.8	2.0	1.7	1.8	3.4	3.7	5.3	30,441.8	210.2	310.9	24.6
2019 Q4	2.0	4.0	2.1	4.5	3.5	2.6	1.6	1.6	1.8	3.3	3.7	4.8	33,035.4	211.5	316.0	20.6
2020 Q1	-5.3	-3.8	-5.5	-4.2	4.5	1.7	0.1	0.5	0.7	5.2	3.9	3.4	22,262.4	205.4	307.7	69.1
2020 Q2	-9.9	-8.7	-7.3	-6.6	6.1	1.1	0.1	0.6	0.9	6.1	4.2	3.4	18,622.5	198.0	299.4	70.0
2020 Q3	-7.6	-6.5	-5.0	-4.4	7.4	1.0	0.1	0.6	1.0	6.5	4.4	3.3	16,910.4	190.7	288.4	66.0
2020 Q4	-5.3	-4.1	-3.4	-2.7	8.4	1.1	0.1	0.7	1.1	6.6	4.4	3.3	16,517.7	181.9	271.8	60.3
2021 Q1	-4.1	-2.9	-2.7	-1.8	9.2	1.3	0.1	0.8	1.2	6.2	4.4	3.3	17,151.2	173.5	255.2	51.2
2021 Q2	-1.6	-0.3	-1.5	-0.4	9.7	1.4	0.1	0.9	1.3	5.9	4.3	3.3	18,193.4	165.8	238.6	44.9
2021 Q3	-0.4	1.1	-0.7	0.4	10.0	1.5	0.1	1.0	1.4	5.6	4.2	3.3	19,439.6	158.4	222.0	40.1
2021 Q4	2.9	4.4	1.0	2.4	9.9	1.7	0.1	1.0	1.5	5.2	4.1	3.2	20,915.1	154.3	210.9	36.2
2022 Q1	3.7	5.2	1.7	3.2	9.7	1.8	0.1	1.1	1.6	4.9	4.0	3.2	22,661.5	153.0	205.4	32.7
2022 Q2	4.2	5.6	1.9	3.3	9.5	1.8	0.1	1.2	1.8	4.6	4.0	3.2	24,497.3	154.2	205.4	29.4
2022 Q3	4.5	5.9	2.0	3.5	9.2	1.8	0.1	1.3	1.9	4.4	3.9	3.2	26,589.0	155.6	205.5	26.2
2022 Q4	4.7	6.1	2.1	3.6	8.8	1.8	0.1	1.4	2.1	4.1	3.9	3.2	28,904.8	158.1	207.7	23.0
2023 Q1	4.7	6.1	2.1	3.5	8.5	1.7	0.1	1.5	2.2	3.7	3.8	3.2	31,454.3	160.7	210.5	20.0

Appendix 6: Severely Adverse Scenario – International

Date	Euro area real GDP growth	Euro area inflation	Euro area bilateral dollar exchange rate (USD/euro)	Developing Asia real GDP growth	Developing Asia inflation	Developing Asia bilateral dollar exchange rate (F/USD, index)	Japan real GDP growth	Japan inflation	Japan bilateral dollar exchange rate (yen/USD)	U.K. real GDP growth	U.K. inflation	U.K. bilateral dollar exchange rate (USD/pound)
2005 Q1	0.9	1.4	1.3	10.6	2.9	98.5	2.0	-1.2	107.2	3.4	2.5	1.9
2005 Q2	2.5	2.2	1.2	8.7	1.5	98.9	2.7	-1.0	110.9	5.1	1.9	1.8
2005 Q3	3.0	3.1	1.2	9.4	2.4	98.5	3.9	-1.0	113.3	4.6	2.7	1.8
2005 Q4	2.5	2.5	1.2	11.6	1.6	98.1	0.7	0.1	117.9	6.1	1.4	1.7
2006 Q1	3.6	1.7	1.2	10.9	2.4	96.7	0.7	1.2	117.5	1.6	1.9	1.7
2006 Q2	4.4	2.5	1.3	7.2	3.2	96.6	1.0	0.4	114.5	1.0	3.0	1.8
2006 Q3	2.4	2.0	1.3	10.1	2.2	96.2	-0.7	0.4	118.0	0.4	3.3	1.9
2006 Q4	4.8	0.9	1.3	11.4	3.6	94.5	5.3	-0.5	119.0	2.1	2.6	2.0
2007 Q1	2.5	2.3	1.3	13.9	3.6	93.9	3.0	-0.7	117.6	3.8	2.6	2.0
2007 Q2	2.8	2.3	1.4	10.6	4.9	91.8	0.5	0.4	123.4	2.5	1.7	2.0
2007 Q3	1.8	2.1	1.4	8.6	7.6	90.5	-2.0	0.3	115.0	3.1	0.2	2.0
2007 Q4	2.3	4.9	1.5	13.1	5.9	89.4	1.9	2.2	111.7	1.9	4.0	2.0
2008 Q1	1.8	4.2	1.6	7.1	8.1	88.0	1.1	1.2	99.9	2.2	3.7	2.0
2008 Q2	-1.4	3.2	1.6	6.0	6.3	88.7	-1.5	1.8	106.2	-2.2	5.7	2.0
2008 Q3	-2.2	3.2	1.4	2.9	3.0	91.6	-5.0	3.4	105.9	-6.1	5.8	1.8
2008 Q4	-6.7	-1.4	1.4	0.6	-1.1	92.3	-9.4	-2.1	90.8	-8.0	0.5	1.5
2009 Q1	-12.0	-1.0	1.3	4.2	-1.4	94.3	-17.8	-3.6	99.2	-6.8	-0.1	1.4
2009 Q2	-0.1	0.0	1.4	15.0	2.3	92.3	8.6	-1.6	96.4	-1.0	2.2	1.6
2009 Q3	1.5	1.1	1.5	12.6	4.1	91.3	0.1	-1.4	89.5	0.3	3.5	1.6
2009 Q4	2.1	1.6	1.4	9.7	5.0	90.7	5.7	-1.5	93.1	1.2	3.0	1.6
2010 Q1	1.5	1.8	1.4	9.6	4.4	89.8	3.5	1.0	93.4	2.6	4.0	1.5
2010 Q2	4.0	1.9	1.2	9.5	3.4	91.1	5.5	-1.4	88.5	4.1	3.2	1.5
2010 Q3	1.8	1.6	1.4	8.8	4.2	88.4	7.4	-1.9	83.5	2.7	2.3	1.6
2010 Q4	2.5	2.6	1.3	9.6	7.5	87.4	-3.2	1.3	81.7	0.3	4.0	1.5
2011 Q1	3.4	3.7	1.4	9.6	6.2	86.5	-5.5	-0.1	82.8	2.5	6.7	1.6
2011 Q2	0.0	3.1	1.5	6.9	5.4	85.3	-2.6	-0.7	80.6	0.4	4.7	1.6
2011 Q3	0.4	1.3	1.3	5.5	5.3	87.4	10.3	0.3	77.0	1.2	3.7	1.6
2011 Q4	-1.4	3.5	1.3	6.6	3.0	87.3	-0.6	-0.6	77.0	0.7	3.4	1.6
2012 Q1	-0.9	2.9	1.3	7.6	3.2	86.3	4.9	2.2	82.4	2.6	2.1	1.6
2012 Q2	-1.3	2.2	1.3	5.8	3.9	88.1	-2.8	-1.4	79.8	-0.3	2.0	1.6
2012 Q3	-0.4	1.5	1.3	6.6	2.2	86.3	-1.5	-1.9	77.9	5.0	2.2	1.6
2012 Q4	-1.7	2.5	1.3	7.3	3.5	86.0	1.0	0.1	86.6	-0.6	4.0	1.6
2013 Q1	-1.5	1.3	1.3	6.7	4.6	86.3	5.0	0.6	94.2	2.6	2.9	1.5
2013 Q2	2.1	0.2	1.3	6.2	2.8	87.2	3.2	0.0	99.2	2.2	1.7	1.5
2013 Q3	1.2	1.1	1.4	7.7	3.5	86.6	3.4	2.7	98.3	3.8	2.1	1.6
2013 Q4	0.9	0.5	1.4	7.0	4.0	85.8	-0.2	2.6	105.3	2.1	1.5	1.7

Appendix 6: Severely Adverse Scenario – International (Cont.)

Date	Euro area real GDP growth	Euro area inflation	Euro area bilateral dollar exchange rate (USD/euro)	Developing Asia real GDP growth	Developing Asia inflation	Developing Asia bilateral dollar exchange rate (F/USD, index)	Japan real GDP growth	Japan inflation	Japan bilateral dollar exchange rate (yen/USD)	U.K. real GDP growth	U.K. inflation	U.K. bilateral dollar exchange rate (USD/pound)
2014 Q1	1.9	1.0	1.4	5.8	1.4	86.9	4.0	1.0	103.0	2.7	1.9	1.7
2014 Q2	0.8	-0.4	1.4	7.3	2.6	86.6	-7.4	8.3	101.3	2.6	1.4	1.7
2014 Q3	1.9	0.1	1.3	6.6	2.4	87.0	0.4	1.8	109.7	2.3	0.8	1.6
2014 Q4	1.7	-0.1	1.2	6.1	1.1	88.1	2.0	-0.9	119.9	2.3	-0.4	1.6
2015 Q1	3.0	-0.7	1.1	5.7	0.9	88.1	5.5	0.5	120.0	2.1	-1.1	1.5
2015 Q2	1.6	2.4	1.1	6.8	2.7	88.4	0.5	0.8	122.1	2.9	0.7	1.6
2015 Q3	1.9	-0.2	1.1	6.6	2.7	91.1	-0.2	0.4	119.8	1.7	0.7	1.5
2015 Q4	1.7	-0.4	1.1	6.1	1.3	92.3	-1.6	-0.9	120.3	3.0	0.0	1.5
2016 Q1	2.4	-1.4	1.1	7.5	3.1	91.8	1.9	-0.4	112.4	0.7	0.0	1.4
2016 Q2	1.1	1.4	1.1	7.3	2.8	94.2	0.7	0.0	102.8	2.1	0.7	1.3
2016 Q3	1.8	1.2	1.1	6.4	1.1	93.7	1.1	-0.5	101.2	1.8	2.1	1.3
2016 Q4	3.1	1.7	1.1	5.9	1.9	97.6	0.9	2.0	116.8	2.6	2.0	1.2
2017 Q1	2.6	2.7	1.1	6.3	1.4	95.2	4.6	-0.3	111.4	2.3	3.8	1.3
2017 Q2	2.9	0.4	1.1	6.4	1.9	94.8	1.6	0.3	112.4	1.0	3.1	1.3
2017 Q3	3.1	1.0	1.2	7.1	2.2	93.7	2.7	0.5	112.6	1.4	2.3	1.3
2017 Q4	3.2	1.5	1.2	6.0	2.9	91.1	1.2	1.5	112.7	1.6	2.9	1.4
2018 Q1	1.1	2.2	1.2	6.7	2.8	89.1	-1.9	2.7	106.2	0.2	2.6	1.4
2018 Q2	1.4	2.1	1.2	6.2	1.3	93.5	2.1	-1.8	110.7	2.1	1.9	1.3
2018 Q3	0.8	2.6	1.2	5.5	2.9	97.2	-2.4	2.4	113.5	2.4	2.7	1.3
2018 Q4	1.4	0.8	1.1	5.6	1.6	96.2	1.0	0.3	109.7	0.9	1.9	1.3
2019 Q1	1.8	0.3	1.1	5.4	1.4	94.8	2.6	0.4	110.7	2.5	1.1	1.3
2019 Q2	0.6	2.0	1.1	5.2	4.1	96.4	2.0	0.1	107.8	-0.7	2.5	1.3
2019 Q3	1.1	0.7	1.1	4.5	3.6	99.8	1.8	0.5	108.1	1.7	1.8	1.2
2019 Q4	1.1	1.1	1.1	5.4	7.1	98.0	0.8	0.6	108.7	1.1	0.2	1.3
2020 Q1	-6.9	1.2	1.0	-1.5	3.7	104.1	-4.5	-0.1	107.5	-5.1	1.3	1.2
2020 Q2	-8.0	0.7	1.0	-1.2	2.4	107.9	-7.2	-0.7	106.2	-6.2	0.7	1.2
2020 Q3	-5.9	0.4	1.0	0.9	0.9	109.3	-8.3	-1.5	106.4	-5.0	0.1	1.2
2020 Q4	-4.0	-0.2	1.0	2.4	-1.6	109.7	-8.8	-2.4	105.0	-3.6	0.0	1.2
2021 Q1	-1.9	-0.6	1.0	4.7	-2.2	107.9	-3.3	-2.6	107.3	-1.7	-0.1	1.2
2021 Q2	-0.3	-0.8	1.0	5.7	-2.3	106.4	-1.5	-2.4	107.1	-0.2	-0.1	1.2
2021 Q3	0.8	-0.7	1.0	6.1	-2.0	104.9	-0.6	-2.1	107.1	0.8	0.1	1.2
2021 Q4	1.5	-0.4	1.1	6.2	-1.5	103.7	0.0	-1.5	107.2	1.6	0.4	1.2
2022 Q1	1.8	-0.1	1.1	6.1	-0.9	102.6	0.5	-1.2	107.4	2.1	0.6	1.2
2022 Q2	2.0	0.1	1.1	6.1	-0.4	101.8	0.8	-0.8	107.5	2.3	0.8	1.2
2022 Q3	2.0	0.3	1.1	6.1	0.1	101.1	1.0	-0.6	107.7	2.4	1.0	1.2
2022 Q4	1.9	0.5	1.1	6.2	0.6	100.5	1.1	-0.4	107.7	2.4	1.2	1.2
2023 Q1	1.8	0.7	1.1	6.3	0.9	100.0	1.0	-0.2	107.6	2.4	1.3	1.2

Appendix 7: Global Market Shock – Severely Adverse

Securitized Products

Trading, PE & Other Fair Value Assets
Securitized Products

Relative MV Shock Based on Current Rating (%)	RMBS															
	Non-Agency Prime		Sub-prime	Option ARMS	Other AltA	Unspec Non-Prime	HELOC	RMBS CDO	RMBS CDS	Credit Basket	PrimeX	ABX / TABX	Prime Whole Loans	Non-Prime Whole Loans	European RMBS	Other / Unspecified
	Prime	Sub-prime	Option ARMS	Other AltA	Unspec Non-Prime	HELOC	RMBS CDO	RMBS CDS	Credit Basket	PrimeX	ABX / TABX	Prime Whole Loans	Non-Prime Whole Loans	European RMBS	Other / Unspecified	
AAA Total																
> 9Y	-23.9%	-23.9%	-23.9%	-23.9%	-23.9%	-23.9%	-29.8%	-20.3%	-20.3%	-20.3%	-20.3%	-39.3%	-51.6%	-23.9%	-29.8%	
> 6Y and <= 9Y	-23.9%	-23.9%	-23.9%	-23.9%	-23.9%	-23.9%	-29.8%	-20.3%	-20.3%	-20.3%	-20.3%	-31.5%	-39.1%	-23.9%	-29.8%	
> 3Y and <= 6Y	-24.1%	-24.1%	-24.1%	-24.1%	-24.1%	-24.1%	-30.1%	-20.4%	-20.4%	-20.4%	-20.4%	-31.7%	-39.2%	-24.1%	-30.1%	
<= 3Y	-9.5%	-11.2%	-11.2%	-11.2%	-11.2%	-11.2%	-14.0%	-9.5%	-9.5%	-8.1%	-9.5%	-18.5%	-29.0%	-9.5%	-14.0%	
Unspecified Vintage	-24.1%	-24.1%	-24.1%	-24.1%	-24.1%	-24.1%	-30.1%	-20.4%	-20.4%	-20.4%	-20.4%	-39.3%	-51.6%	-24.1%	-30.1%	
AA Total																
> 9Y	-23.9%	-23.9%	-23.9%	-23.9%	-23.9%	-23.9%	-29.8%	-20.3%	-20.3%	-20.3%	-20.3%	-39.3%	-51.6%	-23.9%	-29.8%	
> 6Y and <= 9Y	-25.6%	-28.9%	-28.9%	-28.9%	-28.9%	-28.9%	-36.1%	-24.6%	-24.6%	-21.8%	-24.6%	-31.5%	-39.1%	-25.6%	-36.1%	
> 3Y and <= 6Y	-30.8%	-30.8%	-30.8%	-30.8%	-30.8%	-30.8%	-38.5%	-26.2%	-26.2%	-26.2%	-26.2%	-31.7%	-39.2%	-30.8%	-38.5%	
<= 3Y	-28.5%	-28.9%	-28.9%	-28.9%	-28.9%	-28.9%	-36.1%	-24.6%	-24.6%	-24.2%	-24.6%	-18.5%	-29.0%	-28.5%	-36.1%	
Unspecified Vintage	-30.8%	-30.8%	-30.8%	-30.8%	-30.8%	-30.8%	-38.5%	-26.2%	-26.2%	-26.2%	-26.2%	-39.3%	-51.6%	-30.8%	-38.5%	
A Total																
> 9Y	-23.9%	-24.6%	-24.6%	-24.6%	-24.6%	-24.6%	-30.8%	-20.9%	-20.9%	-20.3%	-20.9%	-39.3%	-51.6%	-23.9%	-30.8%	
> 6Y and <= 9Y	-25.6%	-30.8%	-30.8%	-30.8%	-30.8%	-30.8%	-38.5%	-26.2%	-26.2%	-21.8%	-26.2%	-31.5%	-39.1%	-25.6%	-38.5%	
> 3Y and <= 6Y	-38.5%	-38.5%	-38.5%	-38.5%	-38.5%	-38.5%	-48.2%	-32.8%	-32.8%	-32.8%	-32.8%	-31.7%	-39.2%	-38.5%	-48.2%	
<= 3Y	-42.7%	-42.7%	-42.7%	-42.7%	-42.7%	-42.7%	-53.4%	-36.3%	-36.3%	-36.3%	-36.3%	-18.5%	-29.0%	-42.7%	-53.4%	
Unspecified Vintage	-42.7%	-42.7%	-42.7%	-42.7%	-42.7%	-42.7%	-53.4%	-36.3%	-36.3%	-36.3%	-36.3%	-39.3%	-51.6%	-42.7%	-53.4%	
BBB Total																
> 9Y	-23.9%	-29.0%	-29.0%	-29.0%	-29.0%	-29.0%	-36.2%	-24.6%	-24.6%	-20.3%	-24.6%	-39.3%	-51.6%	-23.9%	-36.2%	
> 6Y and <= 9Y	-52.7%	-52.7%	-52.7%	-52.7%	-52.7%	-52.7%	-65.9%	-44.8%	-44.8%	-44.8%	-44.8%	-31.5%	-39.1%	-52.7%	-65.9%	
> 3Y and <= 6Y	-52.7%	-52.7%	-52.7%	-52.7%	-52.7%	-52.7%	-65.9%	-44.8%	-44.8%	-44.8%	-44.8%	-31.7%	-39.2%	-52.7%	-65.9%	
<= 3Y	-56.5%	-56.5%	-56.5%	-56.5%	-56.5%	-56.5%	-70.6%	-48.0%	-48.0%	-48.0%	-48.0%	-18.5%	-29.0%	-56.5%	-70.6%	
Unspecified Vintage	-56.5%	-56.5%	-56.5%	-56.5%	-56.5%	-56.5%	-70.6%	-48.0%	-48.0%	-48.0%	-48.0%	-39.3%	-51.6%	-56.5%	-70.6%	
BB Total																
> 9Y	-23.9%	-33.2%	-33.2%	-33.2%	-33.2%	-33.2%	-41.6%	-28.3%	-28.3%	-20.3%	-28.3%	-39.3%	-51.6%	-23.9%	-41.6%	
> 6Y and <= 9Y	-62.5%	-62.5%	-62.5%	-62.5%	-62.5%	-62.5%	-78.2%	-53.1%	-53.1%	-53.1%	-53.1%	-31.5%	-39.1%	-62.5%	-78.2%	
> 3Y and <= 6Y	-62.5%	-62.5%	-62.5%	-62.5%	-62.5%	-62.5%	-78.2%	-53.1%	-53.1%	-53.1%	-53.1%	-31.7%	-39.2%	-62.5%	-78.2%	
<= 3Y	-62.5%	-62.5%	-62.5%	-62.5%	-62.5%	-62.5%	-78.2%	-53.1%	-53.1%	-53.1%	-53.1%	-18.5%	-29.0%	-62.5%	-78.2%	
Unspecified Vintage	-62.5%	-62.5%	-62.5%	-62.5%	-62.5%	-62.5%	-78.2%	-53.1%	-53.1%	-53.1%	-53.1%	-39.3%	-51.6%	-62.5%	-78.2%	
B Total																
> 9Y	-23.9%	-36.1%	-36.1%	-36.1%	-36.1%	-36.1%	-45.1%	-30.7%	-30.7%	-20.3%	-30.7%	-39.3%	-51.6%	-23.9%	-45.1%	
> 6Y and <= 9Y	-70.6%	-70.6%	-70.6%	-70.6%	-70.6%	-70.6%	-85.0%	-60.0%	-60.0%	-60.0%	-60.0%	-31.5%	-39.1%	-70.6%	-85.0%	
> 3Y and <= 6Y	-70.6%	-70.6%	-70.6%	-70.6%	-70.6%	-70.6%	-85.0%	-60.0%	-60.0%	-60.0%	-60.0%	-31.7%	-39.2%	-70.6%	-85.0%	
<= 3Y	-70.6%	-70.6%	-70.6%	-70.6%	-70.6%	-70.6%	-85.0%	-60.0%	-60.0%	-60.0%	-60.0%	-18.5%	-29.0%	-70.6%	-85.0%	
Unspecified Vintage	-70.6%	-70.6%	-70.6%	-70.6%	-70.6%	-70.6%	-85.0%	-60.0%	-60.0%	-60.0%	-60.0%	-39.3%	-51.6%	-70.6%	-85.0%	
<B Total																
> 9Y	-28.1%	-51.6%	-51.6%	-51.6%	-51.6%	-51.6%	-64.5%	-43.8%	-43.8%	-23.9%	-43.8%	-39.3%	-51.6%	-28.1%	-64.5%	
> 6Y and <= 9Y	-70.6%	-70.6%	-70.6%	-70.6%	-70.6%	-70.6%	-85.0%	-60.0%	-60.0%	-60.0%	-60.0%	-31.5%	-39.1%	-70.6%	-85.0%	
> 3Y and <= 6Y	-70.6%	-70.6%	-70.6%	-70.6%	-70.6%	-70.6%	-85.0%	-60.0%	-60.0%	-60.0%	-60.0%	-31.7%	-39.2%	-70.6%	-85.0%	
<= 3Y	-70.6%	-70.6%	-70.6%	-70.6%	-70.6%	-70.6%	-85.0%	-60.0%	-60.0%	-60.0%	-60.0%	-18.5%	-29.0%	-70.6%	-85.0%	
Unspecified Vintage	-70.6%	-70.6%	-70.6%	-70.6%	-70.6%	-70.6%	-85.0%	-60.0%	-60.0%	-60.0%	-60.0%	-39.3%	-51.6%	-70.6%	-85.0%	
NR Total																
> 9Y	-28.1%	-51.6%	-51.6%	-51.6%	-51.6%	-51.6%	-64.5%	-43.8%	-43.8%	-23.9%	-43.8%	-39.3%	-51.6%	-28.1%	-64.5%	
> 6Y and <= 9Y	-70.6%	-70.6%	-70.6%	-70.6%	-70.6%	-70.6%	-85.0%	-60.0%	-60.0%	-60.0%	-60.0%	-31.5%	-39.1%	-70.6%	-85.0%	
> 3Y and <= 6Y	-70.6%	-70.6%	-70.6%	-70.6%	-70.6%	-70.6%	-85.0%	-60.0%	-60.0%	-60.0%	-60.0%	-31.7%	-39.2%	-70.6%	-85.0%	
<= 3Y	-70.6%	-70.6%	-70.6%	-70.6%	-70.6%	-70.6%	-85.0%	-60.0%	-60.0%	-60.0%	-60.0%	-18.5%	-29.0%	-70.6%	-85.0%	
Unspecified Vintage	-70.6%	-70.6%	-70.6%	-70.6%	-70.6%	-70.6%	-85.0%	-60.0%	-60.0%	-60.0%	-60.0%	-39.3%	-51.6%	-70.6%	-85.0%	

Securitized Products

Trading, PE & Other Fair Value Assets
Securitized Products

	ABS							CMBS							Corporate CDO / CLO		Warehouse		Other / Unspecified
	Autos	Credit Cards	Student Loans	ABS CDS	Credit Basket	Index Tranches	Other / Unspecified	Cash Non-Agency CMBS	CMBS CDS	CMBS CDO	Credit Basket	Index Tranches	Whole Loans	Other / Unspecified	CLO	Other / Unspecified	Total Size	Total Protection	
Relative MV Shock Based on Current Rating (%)																			
AAA Total																			
> 9Y	-10.1%	-3.4%	-18.5%	-18.5%	-18.5%	-18.5%	-18.5%	-20.3%	-17.2%	-25.4%	-17.2%	-17.2%	-29.0%	-25.4%	-18.2%	-18.2%	-51.6%	51.6%	-29.8%
> 6Y and <= 9Y	-10.1%	-3.4%	-18.5%	-18.5%	-18.5%	-18.5%	-18.5%	-17.8%	-15.1%	-22.3%	-15.1%	-15.1%	-27.4%	-22.3%	-18.2%	-18.2%	-39.1%	39.1%	-29.8%
> 3Y and <= 6Y	-10.1%	-3.4%	-18.5%	-18.5%	-18.5%	-18.5%	-18.5%	-34.1%	-29.0%	-42.7%	-29.0%	-29.0%	-37.8%	-42.7%	-18.2%	-18.2%	-39.2%	39.2%	-42.7%
<= 3Y	-20.9%	-2.0%	-10.1%	-20.9%	-20.9%	-20.9%	-20.9%	-43.7%	-37.1%	-54.6%	-37.1%	-37.1%	-43.9%	-54.6%	-23.0%	-23.0%	-43.9%	43.9%	-54.6%
Unspecified Vintage	-20.9%	-3.4%	-18.5%	-20.9%	-20.9%	-20.9%	-20.9%	-43.7%	-37.1%	-54.6%	-37.1%	-37.1%	-43.9%	-54.6%	-23.0%	-23.0%	-51.6%	51.6%	-54.6%
AA Total																			
> 9Y	-10.1%	-5.4%	-18.5%	-18.5%	-18.5%	-18.5%	-18.5%	-23.4%	-19.9%	-29.2%	-19.9%	-19.9%	-29.0%	-29.2%	-45.5%	-45.5%	-51.6%	51.6%	-45.5%
> 6Y and <= 9Y	-10.1%	-5.4%	-18.5%	-18.5%	-18.5%	-18.5%	-18.5%	-37.9%	-32.2%	-47.4%	-32.2%	-32.2%	-27.4%	-47.4%	-45.5%	-45.5%	-39.1%	39.1%	-47.4%
> 3Y and <= 6Y	-10.1%	-5.4%	-19.9%	-19.9%	-19.9%	-19.9%	-19.9%	-61.4%	-52.2%	-76.8%	-52.2%	-52.2%	-37.8%	-76.8%	-45.5%	-45.5%	-39.2%	39.2%	-76.8%
<= 3Y	-20.9%	-5.4%	-15.7%	-20.9%	-20.9%	-20.9%	-20.9%	-67.7%	-57.5%	-84.6%	-57.5%	-57.5%	-43.9%	-84.6%	-53.4%	-53.4%	-43.9%	43.9%	-84.6%
Unspecified Vintage	-20.9%	-5.4%	-19.9%	-20.9%	-20.9%	-20.9%	-20.9%	-67.7%	-57.5%	-84.6%	-57.5%	-57.5%	-43.9%	-84.6%	-53.4%	-53.4%	-51.6%	51.6%	-84.6%
A Total																			
> 9Y	-10.1%	-5.4%	-18.5%	-18.5%	-18.5%	-18.5%	-18.5%	-51.0%	-43.3%	-63.7%	-43.3%	-43.3%	-29.0%	-63.7%	-60.2%	-60.2%	-51.6%	51.6%	-68.0%
> 6Y and <= 9Y	-10.1%	-5.4%	-18.5%	-18.5%	-18.5%	-18.5%	-18.5%	-37.9%	-32.2%	-47.4%	-32.2%	-32.2%	-27.4%	-47.4%	-60.2%	-60.2%	-39.1%	39.1%	-68.0%
> 3Y and <= 6Y	-10.1%	-5.4%	-19.9%	-19.9%	-19.9%	-19.9%	-19.9%	-61.4%	-52.2%	-76.8%	-52.2%	-52.2%	-37.8%	-76.8%	-60.2%	-60.2%	-39.2%	39.2%	-76.8%
<= 3Y	-20.9%	-5.4%	-15.7%	-20.9%	-20.9%	-20.9%	-20.9%	-69.3%	-58.9%	-85.0%	-58.9%	-58.9%	-43.9%	-85.0%	-68.0%	-68.0%	-43.9%	43.9%	-85.0%
Unspecified Vintage	-20.9%	-5.4%	-19.9%	-20.9%	-20.9%	-20.9%	-20.9%	-69.3%	-58.9%	-85.0%	-58.9%	-58.9%	-43.9%	-85.0%	-68.0%	-68.0%	-51.6%	51.6%	-85.0%
BBB Total																			
> 9Y	-15.8%	-11.4%	-23.7%	-23.7%	-23.7%	-23.7%	-23.7%	-51.0%	-43.3%	-63.7%	-43.3%	-43.3%	-29.0%	-63.7%	-67.4%	-67.4%	-51.6%	51.6%	-67.4%
> 6Y and <= 9Y	-15.8%	-11.4%	-23.7%	-23.7%	-23.7%	-23.7%	-23.7%	-64.1%	-54.5%	-80.1%	-54.5%	-54.5%	-27.4%	-80.1%	-67.4%	-67.4%	-39.1%	39.1%	-80.1%
> 3Y and <= 6Y	-15.8%	-11.4%	-25.0%	-25.0%	-25.0%	-25.0%	-25.0%	-63.1%	-53.7%	-78.9%	-53.7%	-53.7%	-37.8%	-78.9%	-67.4%	-67.4%	-39.2%	39.2%	-78.9%
<= 3Y	-20.9%	-5.4%	-15.7%	-20.9%	-20.9%	-20.9%	-20.9%	-75.7%	-64.3%	-85.0%	-64.3%	-64.3%	-43.9%	-85.0%	-73.4%	-73.4%	-43.9%	43.9%	-85.0%
Unspecified Vintage	-20.9%	-11.4%	-25.0%	-25.0%	-25.0%	-25.0%	-25.0%	-75.7%	-64.3%	-85.0%	-64.3%	-64.3%	-43.9%	-85.0%	-73.4%	-73.4%	-51.6%	51.6%	-85.0%
BB Total																			
> 9Y	-33.7%	-30.2%	-39.9%	-39.9%	-39.9%	-39.9%	-39.9%	-77.8%	-66.1%	-85.0%	-66.1%	-66.1%	-29.0%	-85.0%	-81.9%	-81.9%	-51.6%	51.6%	-85.0%
> 6Y and <= 9Y	-33.7%	-30.2%	-39.9%	-39.9%	-39.9%	-39.9%	-39.9%	-77.8%	-66.1%	-85.0%	-66.1%	-66.1%	-27.4%	-85.0%	-81.9%	-81.9%	-39.1%	39.1%	-85.0%
> 3Y and <= 6Y	-33.7%	-30.2%	-40.9%	-40.9%	-40.9%	-40.9%	-40.9%	-71.3%	-60.6%	-85.0%	-60.6%	-60.6%	-37.8%	-85.0%	-81.9%	-81.9%	-39.2%	39.2%	-85.0%
<= 3Y	-33.7%	-20.7%	-29.3%	-33.7%	-33.7%	-33.7%	-33.7%	-75.7%	-64.3%	-85.0%	-64.3%	-64.3%	-43.9%	-85.0%	-83.6%	-83.6%	-43.9%	43.9%	-85.0%
Unspecified Vintage	-33.7%	-30.2%	-40.9%	-40.9%	-40.9%	-40.9%	-40.9%	-77.8%	-66.1%	-85.0%	-66.1%	-66.1%	-43.9%	-85.0%	-83.6%	-83.6%	-51.6%	51.6%	-85.0%
B Total																			
> 9Y	-33.7%	-30.2%	-39.9%	-39.9%	-39.9%	-39.9%	-39.9%	-77.8%	-66.1%	-85.0%	-66.1%	-66.1%	-29.0%	-85.0%	-81.9%	-81.9%	-51.6%	51.6%	-85.0%
> 6Y and <= 9Y	-33.7%	-30.2%	-39.9%	-39.9%	-39.9%	-39.9%	-39.9%	-85.0%	-73.7%	-85.0%	-73.7%	-73.7%	-27.4%	-85.0%	-81.9%	-81.9%	-39.1%	39.1%	-85.0%
> 3Y and <= 6Y	-33.7%	-30.2%	-40.9%	-40.9%	-40.9%	-40.9%	-40.9%	-81.3%	-69.1%	-85.0%	-69.1%	-69.1%	-37.8%	-85.0%	-81.9%	-81.9%	-39.2%	39.2%	-85.0%
<= 3Y	-33.7%	-20.7%	-29.3%	-33.7%	-33.7%	-33.7%	-33.7%	-81.3%	-69.1%	-85.0%	-69.1%	-69.1%	-43.9%	-85.0%	-83.6%	-83.6%	-43.9%	43.9%	-85.0%
Unspecified Vintage	-33.7%	-30.2%	-40.9%	-40.9%	-40.9%	-40.9%	-40.9%	-85.0%	-73.7%	-85.0%	-73.7%	-73.7%	-43.9%	-85.0%	-83.6%	-83.6%	-51.6%	51.6%	-85.0%
<B Total																			
> 9Y	-33.7%	-30.2%	-39.9%	-39.9%	-39.9%	-39.9%	-39.9%	-77.8%	-66.1%	-85.0%	-66.1%	-66.1%	-29.0%	-85.0%	-81.9%	-81.9%	-51.6%	51.6%	-85.0%
> 6Y and <= 9Y	-33.7%	-30.2%	-39.9%	-39.9%	-39.9%	-39.9%	-39.9%	-85.0%	-73.7%	-85.0%	-73.7%	-73.7%	-27.4%	-85.0%	-81.9%	-81.9%	-39.1%	39.1%	-85.0%
> 3Y and <= 6Y	-33.7%	-30.2%	-40.9%	-40.9%	-40.9%	-40.9%	-40.9%	-81.3%	-69.1%	-85.0%	-69.1%	-69.1%	-37.8%	-85.0%	-81.9%	-81.9%	-39.2%	39.2%	-85.0%
<= 3Y	-33.7%	-20.7%	-29.3%	-33.7%	-33.7%	-33.7%	-33.7%	-81.3%	-69.1%	-85.0%	-69.1%	-69.1%	-43.9%	-85.0%	-83.6%	-83.6%	-43.9%	43.9%	-85.0%
Unspecified Vintage	-33.7%	-30.2%	-40.9%	-40.9%	-40.9%	-40.9%	-40.9%	-85.0%	-73.7%	-85.0%	-73.7%	-73.7%	-43.9%	-85.0%	-83.6%	-83.6%	-51.6%	51.6%	-85.0%
NR Total																			
> 9Y	-33.7%	-30.2%	-39.9%	-39.9%	-39.9%	-39.9%	-39.9%	-77.8%	-66.1%	-85.0%	-66.1%	-66.1%	-29.0%	-85.0%	-81.9%	-81.9%	-51.6%	51.6%	-85.0%
> 6Y and <= 9Y	-33.7%	-30.2%	-39.9%	-39.9%	-39.9%	-39.9%	-39.9%	-85.0%	-73.7%	-85.0%	-73.7%	-73.7%	-27.4%	-85.0%	-81.9%	-81.9%	-39.1%	39.1%	-85.0%
> 3Y and <= 6Y	-33.7%	-30.2%	-40.9%	-40.9%	-40.9%	-40.9%	-40.9%	-81.3%	-69.1%	-85.0%	-69.1%	-69.1%	-37.8%	-85.0%	-81.9%	-81.9%	-39.2%	39.2%	-85.0%
<= 3Y	-33.7%	-20.7%	-29.3%	-33.7%	-33.7%	-33.7%	-33.7%	-81.3%	-69.1%	-85.0%	-69.1%	-69.1%	-43.9%	-85.0%	-83.6%	-83.6%	-43.9%	43.9%	-85.0%
Unspecified Vintage	-33.7%	-30.2%	-40.9%	-40.9%	-40.9%	-40.9%	-40.9%	-85.0%	-73.7%	-85.0%	-73.7%	-73.7%	-43.9%	-85.0%	-83.6%	-83.6%	-51.6%	51.6%	-85.0%

Municipals

Trading, PE & Other Fair Value Assets Munis

Spread Widening (bps)

Bonds

AAA	31.0
AA	38.5
A	73.9
BBB	284.9
BB	598.3
B	940.2
<B	1,339.0
NR	1,339.0

Loans

AAA	31.0
AA	38.5
A	73.9
BBB	284.9
BB	598.3
B	940.2
<B	1,339.0
NR	1,339.0

CDS

AAA	28.2
AA	35.0
A	67.2
BBB	259.0
BB	543.9
B	854.7
<B	1,217.3
NR	1,217.3

Indices

AAA	28.2
AA	35.0
A	67.2
BBB	259.0
BB	543.9
B	854.7
<B	1,217.3
NR	1,217.3

Other / Unspecified Munis

AAA	28.2
AA	35.0
A	67.2
BBB	259.0
BB	543.9
B	854.7
<B	1,217.3
NR	1,217.3

Agencies

Trading, PE & Other Fair Value Assets

Agencies

OAS Widening (bps)

US Residential Agency Products

IOs	397.0
POs	76.0
Other CMOs	89.0
Pass-Throughs	80.0
Agency Debt/Debentures	73.0
IOS Index	397.0
POS Index	76.0
MBX Index	60.0
Other Agency Derivatives	73.0
TBA's	60.0
Reverse Mortgages	89.0
Residential Other / Unspecified	60.0

US Commercial Agency Products

Cash Agency CMBS	73.0
Agency CMBS Derivatives	73.0
Commercial Other / Unspecified	73.0

Non-US Agency Products

AAA	55.0
AA	80.0
A	226.0
BBB	298.0
BB	419.0
B	524.0
<B	629.0
NR	943.0

Rates DV01

DFAST 2020 Market Shocks: Severely Adverse Scenario
Rates DV01

Rates Shocks (bps)	MATURITY												
	1M	3M	6M	9M	1Y	2Y	3Y	5Y	7Y	10Y	15Y	20Y	30Y
AUD Directional Risks													
Governments	(47.3)	(45.5)	(43.3)	(41.5)	(40.0)	(36.1)	(34.0)	(32.0)	(31.0)	(30.4)	(29.8)	(29.6)	(29.3)
Agencies	(47.3)	(45.5)	(43.3)	(41.5)	(40.0)	(36.1)	(34.0)	(32.0)	(31.0)	(30.4)	(29.8)	(29.6)	(29.3)
Municipals	(47.3)	(45.5)	(43.3)	(41.5)	(40.0)	(36.1)	(34.0)	(32.0)	(31.0)	(30.4)	(29.8)	(29.6)	(29.3)
Swaps / Discounting Curve	(32.5)	(31.4)	(30.0)	(28.9)	(28.2)	(26.7)	(26.7)	(27.6)	(28.7)	(29.9)	(31.1)	(31.7)	(32.4)
Instruments shocked by MV**													
Other	(32.5)	(31.4)	(30.0)	(28.9)	(28.2)	(26.7)	(26.7)	(27.6)	(28.7)	(29.9)	(31.1)	(31.7)	(32.4)

AUD Basis Risks (Do not include the swap/discounting curve specified above)

OIS Basis													
1m Basis													
3m Basis													
6m Basis													
12m Basis													
Other Basis													

CAD Directional Risks

Governments	(53.2)	(52.4)	(51.3)	(50.3)	(49.4)	(46.4)	(44.3)	(41.5)	(40.0)	(38.6)	(37.5)	(37.0)	(36.4)
Agencies	(53.2)	(52.4)	(51.3)	(50.3)	(49.4)	(46.4)	(44.3)	(41.5)	(40.0)	(38.6)	(37.5)	(37.0)	(36.4)
Municipals	(53.2)	(52.4)	(51.3)	(50.3)	(49.4)	(46.4)	(44.3)	(41.5)	(40.0)	(38.6)	(37.5)	(37.0)	(36.4)
Swaps / Discounting Curve	(38.7)	(39.0)	(39.3)	(39.6)	(39.9)	(40.5)	(40.8)	(40.9)	(40.8)	(40.7)	(40.6)	(40.5)	(40.4)
Instruments shocked by MV**													
Other	(38.7)	(39.0)	(39.3)	(39.6)	(39.9)	(40.5)	(40.8)	(40.9)	(40.8)	(40.7)	(40.6)	(40.5)	(40.4)

CAD Basis Risks (Do not include the swap/discounting curve specified above)

OIS Basis													
1m Basis													
3m Basis													
6m Basis													
12m Basis													
Other Basis													

CHF Directional Risks

Governments	(2.1)	(2.1)	(2.2)	(2.2)	(2.2)	(2.4)	(2.5)	(2.7)	(2.9)	(3.1)	(3.3)	(3.5)	(3.7)
Agencies	(2.1)	(2.1)	(2.2)	(2.2)	(2.2)	(2.4)	(2.5)	(2.7)	(2.9)	(3.1)	(3.3)	(3.5)	(3.7)
Municipals	(2.1)	(2.1)	(2.2)	(2.2)	(2.2)	(2.4)	(2.5)	(2.7)	(2.9)	(3.1)	(3.3)	(3.5)	(3.7)
Swaps / Discounting Curve	12.7	12.1	11.4	10.6	9.9	7.5	5.4	2.3	0.2	(2.0)	(4.1)	(5.3)	(6.5)
Instruments shocked by MV**													
Other	12.7	12.1	11.4	10.6	9.9	7.5	5.4	2.3	0.2	(2.0)	(4.1)	(5.3)	(6.5)

CHF Basis Risks (Do not include the swap/discounting curve specified above)

OIS Basis													
1m Basis													
3m Basis													
6m Basis													
12m Basis													
Other Basis													

Rates DV01 (Continued)

DKK Directional Risks

Governments	(14.4)	(14.3)	(14.3)	(14.2)	(14.1)	(13.9)	(13.7)	(13.4)	(13.2)	(13.0)	(12.8)	(12.8)	(12.7)
Agencies	(14.4)	(14.3)	(14.3)	(14.2)	(14.1)	(13.9)	(13.7)	(13.4)	(13.2)	(13.0)	(12.8)	(12.8)	(12.7)
Municipals	(14.4)	(14.3)	(14.3)	(14.2)	(14.1)	(13.9)	(13.7)	(13.4)	(13.2)	(13.0)	(12.8)	(12.8)	(12.7)
Swaps / Discounting Curve	0.3	(0.2)	(1.1)	(1.8)	(2.6)	(5.0)	(7.0)	(9.7)	(11.4)	(13.0)	(14.5)	(15.2)	(15.9)
Instruments shocked by MV**													
Other	0.3	(0.2)	(1.1)	(1.8)	(2.6)	(5.0)	(7.0)	(9.7)	(11.4)	(13.0)	(14.5)	(15.2)	(15.9)

DKK Basis Risks (Do not include the swap/discounting curve specified above)

OIS Basis													
1m Basis													
3m Basis													
6m Basis													
12m Basis													
Other Basis													

EUR Directional Risks

Governments: Austria	(13.4)	(13.2)	(13.0)	(12.8)	(12.7)	(12.3)	(12.1)	(11.9)	(11.8)	(11.7)	(11.6)	(11.6)	(11.6)
Governments: Belgium	(9.3)	(9.1)	(8.8)	(8.6)	(8.4)	(7.6)	(7.1)	(6.4)	(6.0)	(5.6)	(5.3)	(5.2)	(5.0)
Governments: Finland	(11.7)	(11.5)	(11.3)	(11.0)	(10.8)	(10.3)	(10.0)	(9.6)	(9.5)	(9.4)	(9.3)	(9.2)	(9.2)
Governments: France	(9.5)	(9.4)	(9.1)	(8.9)	(8.7)	(7.9)	(7.4)	(6.6)	(6.2)	(5.8)	(5.4)	(5.3)	(5.1)
Governments: Germany	(6.4)	(6.3)	(6.1)	(6.0)	(5.8)	(5.4)	(5.0)	(4.5)	(4.3)	(4.0)	(3.8)	(3.7)	(3.6)
Governments: Greece	211.1	205.9	198.9	192.5	186.7	168.6	156.2	141.0	132.7	125.8	120.3	117.5	114.7
Governments: Ireland	153.7	150.0	144.9	140.2	135.9	122.0	112.0	99.3	92.0	85.8	80.8	78.2	75.6
Governments: Italy	203.6	199.0	192.7	187.0	181.9	165.9	155.0	142.0	134.9	129.2	124.6	122.3	120.0
Governments: Netherlands	(15.8)	(15.3)	(14.8)	(14.2)	(13.8)	(12.2)	(11.0)	(9.5)	(8.6)	(7.8)	(7.2)	(6.8)	(6.5)
Governments: Portugal	324.7	315.8	303.6	292.7	282.9	252.7	232.5	208.6	195.9	185.6	177.5	173.4	169.3
Governments: Spain	162.3	159.0	154.3	150.1	146.2	133.8	125.0	114.0	107.8	102.6	98.3	96.2	94.0
Governments: Other	(12.1)	(11.9)	(11.6)	(11.4)	(11.2)	(10.6)	(10.2)	(9.6)	(9.3)	(9.1)	(8.9)	(8.8)	(8.7)
Agencies	(12.1)	(11.9)	(11.6)	(11.4)	(11.2)	(10.6)	(10.2)	(9.6)	(9.3)	(9.1)	(8.9)	(8.8)	(8.7)
Municipals	(12.1)	(11.9)	(11.6)	(11.4)	(11.2)	(10.6)	(10.2)	(9.6)	(9.3)	(9.1)	(8.9)	(8.8)	(8.7)
Swaps / Discounting Curve	15.0	12.0	6.0	2.1	1.1	0.4	(0.2)	(1.5)	(2.6)	(4.0)	(5.7)	(6.8)	(8.1)
Instruments shocked by MV**													
Other	15.0	12.0	6.0	2.1	1.1	0.4	(0.2)	(1.5)	(2.6)	(4.0)	(5.7)	(6.8)	(8.1)

EUR Basis Risks (Do not include the swap/discounting curve specified above)

OIS Basis	(13.0)	(13.0)	(12.0)	(12.0)	(11.0)	(11.0)	(10.0)	(9.5)	(9.0)	(8.0)	(6.0)	(5.0)	(5.0)
1m Basis	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	(0.1)	0.0	0.0	0.0	0.1	0.1	0.1	0.1
3m Basis													
6m Basis	11.0	11.0	11.0	10.0	10.0	8.0	7.0	6.0	5.0	5.0	4.0	3.0	1.0
12m Basis	21.0	21.0	21.0	20.0	20.0	18.0	17.0	14.0	10.0	7.0	6.0	4.0	3.0
Other Basis													

GBP Directional Risks

Governments	(14.8)	(14.5)	(14.1)	(13.7)	(13.3)	(12.2)	(11.5)	(10.7)	(10.3)	(10.0)	(9.7)	(9.6)	(9.5)
Agencies	(14.8)	(14.5)	(14.1)	(13.7)	(13.3)	(12.2)	(11.5)	(10.7)	(10.3)	(10.0)	(9.7)	(9.6)	(9.5)
Municipals	(14.8)	(14.5)	(14.1)	(13.7)	(13.3)	(12.2)	(11.5)	(10.7)	(10.3)	(10.0)	(9.7)	(9.6)	(9.5)
Swaps / Discounting Curve	12.0	12.0	2.0	(4.0)	(6.2)	(6.6)	(7.2)	(8.2)	(9.1)	(10.0)	(10.9)	(11.4)	(12.0)
Instruments shocked by MV**													
Other	12.0	12.0	2.0	(4.0)	(6.2)	(6.6)	(7.2)	(8.2)	(9.1)	(10.0)	(10.9)	(11.4)	(12.0)

GBP Basis Risks (Do not include the swap/discounting curve specified above)

OIS Basis	(12.0)	(12.0)	(12.0)	(12.0)	(12.0)	(11.0)	(10.0)	(9.0)	(9.0)	(9.0)	(8.0)	(7.0)	(7.0)
1m Basis	(3.0)	(2.7)	(2.7)	(2.6)	(2.6)	(2.6)	(2.6)	(2.6)	(2.6)	(2.6)	(2.6)	(2.5)	(2.3)
3m Basis													
6m Basis	8.0	8.0	8.0	8.0	7.0	7.0	7.0	7.0	7.0	7.0	5.0	3.0	2.2
12m Basis	23.0	23.0	22.0	22.0	22.0	20.0	18.0	16.0	13.0	11.0	8.0	6.0	5.0
Other Basis													

Rates DV01 (Continued)

JPY Directional Risks

Governments	(2.3)	(2.5)	(2.7)	(3.0)	(3.2)	(3.9)	(4.5)	(5.4)	(6.0)	(6.6)	(7.2)	(7.5)	(7.8)
Agencies	(2.3)	(2.5)	(2.7)	(3.0)	(3.2)	(3.9)	(4.5)	(5.4)	(6.0)	(6.6)	(7.2)	(7.5)	(7.8)
Municipals	(2.3)	(2.5)	(2.7)	(3.0)	(3.2)	(3.9)	(4.5)	(5.4)	(6.0)	(6.6)	(7.2)	(7.5)	(7.8)
Swaps / Discounting Curve	9.9	9.0	5.2	(1.1)	(1.7)	(2.6)	(3.3)	(4.4)	(5.2)	(6.0)	(6.8)	(7.3)	(7.8)
Instruments shocked by MV**													
Other	9.9	9.0	5.2	(1.1)	(1.7)	(2.6)	(3.3)	(4.4)	(5.2)	(6.0)	(6.8)	(7.3)	(7.8)

JPY Basis Risks (Do not include the swap/discounting curve specified above)

OIS Basis													
1m TIBOR Basis	(0.4)	(0.3)	(0.2)	0.2	0.1	0.2	0.2	0.3	0.3	0.4	0.7	0.9	1.1
3m TIBOR Basis													
6m TIBOR Basis	(0.5)	(0.3)	(0.3)	0.2	0.2	0.1	0.1	0.2	0.2	0.3	0.3	0.3	0.2
12m TIBOR Basis													
1m LIBOR Basis	(0.4)	(0.3)	(0.2)	0.2	0.1	0.2	0.2	0.3	0.3	0.4	0.7	0.9	1.1
3m LIBOR Basis													
6m LIBOR Basis	(0.5)	(0.3)	(0.3)	0.2	0.2	0.1	0.1	0.2	0.2	0.3	0.3	0.3	0.2
12m LIBOR Basis													
Other Basis													

NOK Directional Risks

Governments	(7.3)	(7.7)	(8.3)	(8.7)	(9.1)	(10.2)	(10.8)	(11.4)	(11.7)	(11.9)	(12.0)	(12.1)	(12.2)
Agencies	(7.3)	(7.7)	(8.3)	(8.7)	(9.1)	(10.2)	(10.8)	(11.4)	(11.7)	(11.9)	(12.0)	(12.1)	(12.2)
Municipals	(7.3)	(7.7)	(8.3)	(8.7)	(9.1)	(10.2)	(10.8)	(11.4)	(11.7)	(11.9)	(12.0)	(12.1)	(12.2)
Swaps / Discounting Curve	5.6	1.7	(2.5)	(5.3)	(7.4)	(11.6)	(13.4)	(14.9)	(15.6)	(16.1)	(16.5)	(16.7)	(16.9)
Instruments shocked by MV**													
Other	5.6	1.7	(2.5)	(5.3)	(7.4)	(11.6)	(13.4)	(14.9)	(15.6)	(16.1)	(16.5)	(16.7)	(16.9)

NOK Basis Risks (Do not include the swap/discounting curve specified above)

OIS Basis													
1m Basis													
3m Basis													
6m Basis													
12m Basis													
Other Basis													

NZD Directional Risks

Governments	(20.6)	(20.4)	(20.0)	(19.8)	(19.6)	(19.0)	(18.7)	(18.4)	(18.3)	(18.2)	(18.1)	(18.1)	(18.1)
Agencies	(20.6)	(20.4)	(20.0)	(19.8)	(19.6)	(19.0)	(18.7)	(18.4)	(18.3)	(18.2)	(18.1)	(18.1)	(18.1)
Municipals	(20.6)	(20.4)	(20.0)	(19.8)	(19.6)	(19.0)	(18.7)	(18.4)	(18.3)	(18.2)	(18.1)	(18.1)	(18.1)
Swaps / Discounting Curve	(8.8)	(13.2)	(16.9)	(18.9)	(20.0)	(21.7)	(22.1)	(22.5)	(22.6)	(22.7)	(22.8)	(22.8)	(22.9)
Instruments shocked by MV**													
Other	(8.8)	(13.2)	(16.9)	(18.9)	(20.0)	(21.7)	(22.1)	(22.5)	(22.6)	(22.7)	(22.8)	(22.8)	(22.9)

NZD Basis Risks (Do not include the swap/discounting curve specified above)

OIS Basis													
1m Basis													
3m Basis													
6m Basis													
12m Basis													
Other Basis													

Rates DV01 (Continued)

SEK Directional Risks

Governments	(27.9)	(27.2)	(26.2)	(25.4)	(24.7)	(22.4)	(20.9)	(19.3)	(18.4)	(17.7)	(17.2)	(16.9)	(16.6)
Agencies	(27.9)	(27.2)	(26.2)	(25.4)	(24.7)	(22.4)	(20.9)	(19.3)	(18.4)	(17.7)	(17.2)	(16.9)	(16.6)
Municipals	(27.9)	(27.2)	(26.2)	(25.4)	(24.7)	(22.4)	(20.9)	(19.3)	(18.4)	(17.7)	(17.2)	(16.9)	(16.6)
Swaps / Discounting Curve	(13.3)	(13.5)	(13.9)	(14.2)	(14.5)	(15.6)	(16.5)	(17.8)	(18.6)	(19.3)	(19.9)	(20.1)	(20.4)
Instruments shocked by MV**													
Other	(13.3)	(13.5)	(13.9)	(14.2)	(14.5)	(15.6)	(16.5)	(17.8)	(18.6)	(19.3)	(19.9)	(20.1)	(20.4)

SEK Basis Risks (Do not include the swap/discounting curve specified above)

OIS Basis													
1m Basis													
3m Basis													
6m Basis													
12m Basis													
Other Basis													

USD Directional Risks

Governments	(93.8)	(91.9)	(89.3)	(86.9)	(84.7)	(77.7)	(72.8)	(66.6)	(63.1)	(60.2)	(57.8)	(56.6)	(55.5)
Agencies	(93.8)	(91.9)	(89.3)	(86.9)	(84.7)	(77.7)	(72.8)	(66.6)	(63.1)	(60.2)	(57.8)	(56.6)	(55.5)
Municipals	(93.8)	(91.9)	(89.3)	(86.9)	(84.7)	(77.7)	(72.8)	(66.6)	(63.1)	(60.2)	(57.8)	(56.6)	(55.5)
Swaps / Discounting Curve	29.0	29.0	11.5	(28.5)	(53.4)	(53.9)	(54.5)	(55.8)	(56.8)	(57.9)	(58.9)	(59.4)	(59.9)
Instruments shocked by MV**													
Other	29.0	29.0	11.5	(28.5)	(53.4)	(53.9)	(54.5)	(55.8)	(56.8)	(57.9)	(58.9)	(59.4)	(59.9)

USD Basis Risks (Do not include the swap/discounting curve specified above)

Prime Basis	15.0	14.0	13.0	12.0	11.0	8.0	5.0	4.0	1.2	1.2	1.0	1.0	1.0
CP Basis	(13.7)	(13.5)	(12.9)	(13.0)	(13.3)	(9.7)	(8.6)	(5.6)	(2.9)	(2.0)	(2.0)	(2.0)	(2.0)
OIS Basis	(20.0)	(19.0)	(18.0)	(17.0)	(16.5)	(15.4)	(8.0)	(6.0)	(3.8)	(3.5)	(3.5)	(3.5)	(3.5)
1m Basis	(18.0)	(18.0)	(16.0)	(15.0)	(14.0)	(10.0)	(8.0)	(6.0)	(5.0)	(4.0)	(3.0)	(2.0)	(2.0)
3m Basis													
6m Basis	11.0	11.0	11.0	11.0	11.0	10.0	9.0	8.0	7.0	6.0	4.0	4.0	4.0
12m Basis	18.0	18.0	17.0	16.0	15.0	14.0	13.0	12.0	10.0	10.0	8.4	7.5	5.5
Other Basis													

Absolute increase in Muni SIFMA/Libor Ratio (Pts)	23.0	23.0	20.0	20.0	19.2	19.5	20.1	21.3	21.2	20.1	15.1	12.1	8.5
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Other Advanced Economies Directional Risks

Governments	(93.8)	(91.9)	(89.3)	(86.9)	(84.7)	(77.7)	(72.8)	(66.6)	(63.1)	(60.2)	(57.8)	(56.6)	(55.5)
Agencies	(93.8)	(91.9)	(89.3)	(86.9)	(84.7)	(77.7)	(72.8)	(66.6)	(63.1)	(60.2)	(57.8)	(56.6)	(55.5)
Municipals	(93.8)	(91.9)	(89.3)	(86.9)	(84.7)	(77.7)	(72.8)	(66.6)	(63.1)	(60.2)	(57.8)	(56.6)	(55.5)
Swaps / Discounting Curve	29.0	29.0	11.5	(28.5)	(53.4)	(53.9)	(54.5)	(55.8)	(56.8)	(57.9)	(58.9)	(59.4)	(59.9)
Instruments shocked by MV**													
Other	29.0	29.0	11.5	(28.5)	(53.4)	(53.9)	(54.5)	(55.8)	(56.8)	(57.9)	(58.9)	(59.4)	(59.9)

Rates DV01 (Continued)

Directional Risks: Emerging Europe

BGN	105.3	104.4	103.1	101.9	100.7	96.3	92.6	86.8	82.4	77.8	73.2	70.6	67.8
CZK	105.3	104.4	103.1	101.9	100.7	96.3	92.6	86.8	82.4	77.8	73.2	70.6	67.8
HRK	105.3	104.4	103.1	101.9	100.7	96.3	92.6	86.8	82.4	77.8	73.2	70.6	67.8
HUF	105.3	104.4	103.1	101.9	100.7	96.3	92.6	86.8	82.4	77.8	73.2	70.6	67.8
PLN	79.7	78.8	77.6	76.4	75.3	71.5	68.4	64.0	61.1	58.3	55.8	54.5	53.1
RON	105.3	104.4	103.1	101.9	100.7	96.3	92.6	86.8	82.4	77.8	73.2	70.6	67.8
RUB	105.3	104.4	103.1	101.9	100.7	96.3	92.6	86.8	82.4	77.8	73.2	70.6	67.8
Other Emerging Europe	105.3	104.4	103.1	101.9	100.7	96.3	92.6	86.8	82.4	77.8	73.2	70.6	67.8

Directional Risks: Latin America & Caribbean

ARS	160.9	180.2	204.8	225.2	242.2	287.2	311.4	334.5	345.0	353.0	359.2	362.3	365.4
BRL	160.9	180.2	204.8	225.2	242.2	287.2	311.4	334.5	345.0	353.0	359.2	362.3	365.4
CLP	160.9	180.2	204.8	225.2	242.2	287.2	311.4	334.5	345.0	353.0	359.2	362.3	365.4
COP	160.9	180.2	204.8	225.2	242.2	287.2	311.4	334.5	345.0	353.0	359.2	362.3	365.4
MXN	160.9	180.2	204.8	225.2	242.2	287.2	311.4	334.5	345.0	353.0	359.2	362.3	365.4
PEN	160.9	180.2	204.8	225.2	242.2	287.2	311.4	334.5	345.0	353.0	359.2	362.3	365.4
VEF	160.9	180.2	204.8	225.2	242.2	287.2	311.4	334.5	345.0	353.0	359.2	362.3	365.4
Other Latam & Caribbean	160.9	180.2	204.8	225.2	242.2	287.2	311.4	334.5	345.0	353.0	359.2	362.3	365.4

Directional Risks: Asia Ex-Japan

CNY	(36.8)	(33.5)	(28.9)	(24.7)	(20.9)	(8.3)	0.7	12.5	19.3	25.2	30.0	32.5	34.9
HKD	(26.5)	(25.9)	(25.0)	(24.2)	(23.6)	(21.7)	(20.6)	(19.4)	(18.9)	(18.4)	(18.1)	(17.9)	(17.7)
IDR	(24.0)	(23.0)	(21.6)	(20.4)	(19.4)	(16.2)	(14.1)	(11.6)	(10.2)	(9.0)	(8.1)	(7.6)	(7.2)
INR	(24.0)	(23.0)	(21.6)	(20.4)	(19.4)	(16.2)	(14.1)	(11.6)	(10.2)	(9.0)	(8.1)	(7.6)	(7.2)
KRW	(4.1)	(4.0)	(3.9)	(3.8)	(3.7)	(3.5)	(3.3)	(3.0)	(2.9)	(2.8)	(2.6)	(2.6)	(2.5)
MYR	(24.0)	(23.0)	(21.6)	(20.4)	(19.4)	(16.2)	(14.1)	(11.6)	(10.2)	(9.0)	(8.1)	(7.6)	(7.2)
PHP	(24.0)	(23.0)	(21.6)	(20.4)	(19.4)	(16.2)	(14.1)	(11.6)	(10.2)	(9.0)	(8.1)	(7.6)	(7.2)
SGD	(22.1)	(21.8)	(21.5)	(21.2)	(20.9)	(19.9)	(19.3)	(18.5)	(18.0)	(17.6)	(17.3)	(17.1)	(17.0)
THB	(10.6)	(9.7)	(8.6)	(7.6)	(6.8)	(4.6)	(3.4)	(2.2)	(1.6)	(1.2)	(0.8)	(0.7)	(0.5)
TWD	(26.5)	(25.9)	(25.0)	(24.2)	(23.6)	(21.7)	(20.6)	(19.4)	(18.9)	(18.4)	(18.1)	(17.9)	(17.7)
Other Asia Ex-Japan	(24.0)	(23.0)	(21.6)	(20.4)	(19.4)	(16.2)	(14.1)	(11.6)	(10.2)	(9.0)	(8.1)	(7.6)	(7.2)

Directional Risks: Middle East/North Africa

ILS	(6.6)	(6.4)	(6.0)	(5.7)	(5.4)	(4.5)	(4.0)	(3.4)	(3.1)	(2.9)	(2.7)	(2.6)	(2.6)
TRY	69.0	71.5	74.8	77.5	79.8	86.2	89.9	93.6	95.3	96.6	97.6	98.1	98.6
Other Middle East/Africa	69.0	71.5	74.8	77.5	79.8	86.2	89.9	93.6	95.3	96.6	97.6	98.1	98.6

Directional Risks: Sub-Saharan Africa

ZAR	171.8	171.8	171.9	171.9	171.9	172.0	172.1	172.2	172.3	172.5	172.7	172.9	173.1
Other Sub-Saharan Africa	171.8	171.8	171.9	171.9	171.9	172.0	172.1	172.2	172.3	172.5	172.7	172.9	173.1

Relative Normal Interest Rate Shocks

Rates Vega

Relative Normal Interest Rate Shocks (%)

		MATURITY														
		1M	3M	6M	9M	1Y	2Y	3Y	5Y	7Y	10Y	15Y	20Y	25Y	30Y	
AUD	EXPIRY	1M	83.9%	83.1%	81.9%	80.9%	79.8%	67.2%	54.4%	52.2%	46.9%	43.6%	41.1%	39.7%	39.0%	38.3%
		3M	79.8%	79.1%	78.1%	77.1%	76.1%	63.6%	53.5%	48.9%	43.0%	39.0%	36.7%	35.4%	34.6%	34.1%
		6M	74.4%	73.7%	72.8%	71.9%	70.9%	57.7%	51.5%	46.9%	41.9%	38.1%	35.8%	34.7%	33.9%	33.4%
		9M	70.5%	69.8%	68.9%	68.0%	67.1%	55.7%	50.1%	45.5%	40.8%	37.5%	35.2%	34.0%	33.2%	32.5%
		1Y	66.2%	65.6%	64.7%	63.8%	63.0%	54.5%	48.6%	44.3%	39.9%	37.0%	34.8%	33.5%	32.6%	32.1%
		2Y	58.0%	57.4%	56.5%	55.7%	54.9%	50.3%	44.1%	39.5%	37.0%	34.9%	32.4%	30.9%	30.0%	29.5%
		3Y	50.3%	49.7%	48.9%	48.2%	47.4%	46.1%	40.3%	35.9%	33.9%	31.9%	29.3%	27.9%	27.1%	26.4%
		5Y	42.0%	41.5%	40.6%	39.8%	39.1%	38.4%	34.6%	31.0%	29.2%	27.3%	24.6%	23.1%	22.2%	21.7%
		7Y	39.3%	38.8%	38.1%	37.3%	36.6%	34.1%	31.1%	27.3%	25.9%	23.7%	21.1%	19.6%	18.6%	18.0%
		10Y	35.7%	35.1%	34.4%	33.7%	32.9%	30.1%	27.6%	23.8%	22.3%	20.3%	17.7%	16.1%	15.2%	14.6%
		15Y	32.4%	31.8%	30.9%	30.2%	29.4%	26.6%	24.2%	20.6%	18.7%	16.7%	14.0%	12.5%	11.5%	10.9%
		20Y	30.5%	30.0%	29.0%	28.3%	27.6%	24.8%	22.3%	18.8%	16.9%	14.8%	12.1%	10.6%	9.6%	9.0%
	30Y	28.5%	27.9%	27.2%	26.5%	25.7%	22.9%	20.5%	16.8%	15.0%	12.9%	10.2%	8.6%	7.7%	7.1%	
EUR	EXPIRY	1M	72.9%	72.9%	72.9%	72.9%	73.4%	63.1%	52.3%	40.1%	32.5%	26.4%	22.2%	20.2%	19.5%	18.8%
		3M	68.2%	68.2%	68.7%	68.7%	68.7%	59.6%	50.2%	41.0%	34.5%	28.5%	24.7%	22.3%	21.5%	20.8%
		6M	64.0%	64.0%	64.5%	64.5%	64.5%	56.5%	47.7%	38.5%	32.5%	27.1%	23.8%	21.7%	21.1%	20.5%
		9M	57.0%	57.0%	57.5%	57.5%	57.5%	50.8%	43.6%	35.4%	29.8%	25.3%	22.4%	20.6%	20.0%	19.5%
		1Y	50.5%	50.5%	51.0%	51.0%	51.0%	46.8%	39.5%	32.7%	27.8%	23.3%	21.2%	19.6%	19.0%	18.5%
		2Y	34.6%	34.6%	34.6%	35.0%	35.0%	31.8%	27.9%	23.8%	21.1%	18.7%	17.3%	16.2%	15.8%	15.5%
		3Y	23.7%	24.0%	24.0%	24.0%	24.0%	22.7%	20.9%	18.7%	17.2%	15.8%	15.1%	14.4%	14.2%	13.9%
		5Y	15.0%	15.0%	15.0%	15.0%	15.2%	14.9%	14.8%	14.0%	13.4%	13.0%	12.7%	12.5%	12.5%	12.3%
		7Y	11.8%	12.0%	12.0%	12.0%	12.0%	12.1%	12.1%	12.0%	11.9%	11.6%	11.8%	11.7%	11.8%	11.8%
		10Y	10.0%	10.0%	10.2%	10.2%	10.2%	10.3%	10.4%	10.6%	10.7%	10.7%	11.1%	11.3%	11.5%	11.6%
		15Y	9.6%	9.6%	9.6%	9.6%	9.6%	9.8%	10.0%	10.2%	10.3%	10.4%	10.9%	11.2%	11.5%	11.7%
		20Y	9.4%	9.6%	9.6%	9.6%	9.6%	9.8%	10.0%	10.0%	10.3%	10.5%	11.1%	11.4%	11.8%	12.2%
	30Y	9.6%	9.6%	9.8%	9.8%	9.8%	9.9%	10.0%	10.3%	10.7%	11.1%	11.8%	12.2%	12.6%	13.0%	
GBP	EXPIRY	1M	46.4%	46.2%	46.0%	45.5%	45.3%	34.6%	29.6%	23.4%	20.8%	18.2%	13.6%	9.9%	7.0%	4.6%
		3M	52.8%	52.6%	52.4%	51.9%	51.6%	40.2%	34.5%	28.1%	25.1%	21.4%	16.4%	12.2%	9.0%	6.2%
		6M	53.3%	53.0%	52.6%	52.3%	51.9%	43.4%	38.2%	30.7%	27.6%	23.6%	18.4%	14.0%	10.5%	7.5%
		9M	52.0%	51.8%	51.6%	51.3%	50.9%	43.8%	39.0%	31.9%	28.6%	24.2%	18.9%	14.3%	10.8%	7.8%
		1Y	51.4%	51.1%	50.9%	50.4%	50.2%	42.9%	38.6%	32.0%	28.3%	23.8%	18.6%	14.1%	10.6%	7.5%
		2Y	40.2%	40.0%	39.8%	39.4%	39.2%	35.5%	32.2%	27.5%	24.2%	20.1%	15.1%	10.6%	6.8%	3.9%
		3Y	33.0%	32.8%	32.6%	32.2%	32.0%	30.0%	27.5%	23.5%	20.7%	17.1%	11.9%	7.5%	3.7%	0.5%
		5Y	26.2%	26.0%	25.9%	25.5%	25.3%	24.3%	22.7%	19.3%	17.0%	13.7%	8.5%	7.4%	3.7%	0.5%
		7Y	23.4%	23.2%	23.1%	22.9%	22.6%	21.9%	20.4%	17.8%	15.6%	12.1%	7.0%	7.1%	3.6%	0.5%
		10Y	21.6%	21.5%	21.3%	21.0%	20.8%	20.2%	18.9%	16.6%	14.4%	11.0%	5.8%	5.9%	3.4%	0.4%
		15Y	20.8%	20.6%	20.5%	20.1%	20.0%	19.3%	18.1%	15.8%	13.7%	10.3%	4.8%	4.9%	3.0%	0.4%
		20Y	21.4%	21.2%	21.0%	20.7%	20.5%	19.5%	18.4%	16.0%	13.6%	10.2%	4.4%	4.6%	2.6%	0.2%
	30Y	22.6%	22.4%	22.0%	21.8%	21.6%	20.6%	19.5%	16.8%	14.2%	10.5%	4.2%	2.9%	1.6%	0.0%	
JPY	EXPIRY	1M	61.6%	61.6%	61.6%	61.6%	61.6%	58.5%	55.7%	49.7%	47.1%	43.6%	40.9%	36.8%	38.0%	38.9%
		3M	50.6%	50.6%	50.6%	50.6%	50.6%	51.6%	51.2%	49.2%	47.5%	45.4%	44.6%	40.9%	42.3%	43.3%
		6M	49.8%	49.8%	49.8%	49.8%	49.8%	50.7%	50.4%	51.2%	50.4%	48.4%	46.0%	41.2%	42.7%	43.8%
		9M	47.4%	47.4%	47.4%	47.4%	47.4%	48.6%	48.8%	49.8%	48.9%	47.5%	45.5%	40.6%	42.1%	43.2%
		1Y	45.4%	45.4%	45.4%	45.4%	45.4%	45.9%	47.0%	48.2%	47.7%	46.8%	44.5%	39.2%	40.6%	41.7%
		2Y	38.0%	38.0%	38.0%	37.4%	38.0%	38.3%	39.1%	40.8%	41.2%	40.6%	38.9%	34.0%	35.4%	36.5%
		3Y	33.7%	33.7%	33.7%	33.7%	33.7%	34.1%	34.6%	36.1%	35.9%	36.0%	35.4%	31.2%	32.6%	33.6%
		5Y	29.7%	29.7%	29.7%	29.2%	29.2%	29.4%	29.3%	29.6%	30.2%	30.7%	31.3%	28.8%	30.2%	31.2%
		7Y	27.7%	27.7%	27.7%	27.7%	27.7%	28.1%	27.7%	27.1%	27.5%	28.2%	28.8%	27.5%	28.9%	29.9%
		10Y	24.7%	24.7%	24.7%	24.7%	24.7%	23.9%	24.3%	24.6%	25.2%	25.5%	27.2%	26.7%	28.0%	29.0%
		15Y	22.2%	22.2%	22.2%	22.2%	22.2%	21.9%	22.1%	22.7%	23.6%	23.7%	25.7%	26.2%	27.5%	28.5%
		20Y	20.4%	20.4%	20.4%	20.4%	20.4%	20.8%	21.0%	21.3%	22.0%	22.5%	24.7%	25.2%	26.5%	27.4%
	30Y	20.8%	20.8%	20.8%	20.4%	20.4%	20.8%	21.0%	21.3%	22.3%	22.5%	24.7%	25.2%	26.5%	27.4%	

Relative Normal Interest Rate Shocks (Continued)

USD

EXPIRY	1M	55.9%	54.8%	53.2%	52.0%	50.8%	44.8%	41.9%	40.1%	40.3%	40.9%	41.0%	41.0%	41.1%	41.2%
	3M	54.7%	53.6%	52.0%	50.6%	49.4%	44.2%	41.2%	39.8%	40.2%	41.1%	41.2%	41.3%	42.3%	43.5%
	6M	51.2%	50.0%	48.4%	47.0%	45.9%	41.1%	39.6%	37.9%	37.9%	38.5%	39.4%	40.2%	40.1%	39.9%
	9M	47.4%	46.2%	44.6%	43.2%	42.0%	38.6%	37.0%	35.2%	35.3%	35.9%	36.9%	37.7%	38.5%	39.1%
	1Y	46.0%	44.8%	43.1%	41.7%	40.5%	36.9%	34.4%	32.9%	32.9%	33.5%	34.0%	34.5%	34.8%	35.3%
	2Y	37.6%	36.4%	34.6%	33.3%	32.0%	28.8%	27.3%	25.2%	25.1%	25.3%	26.3%	27.1%	27.5%	27.7%
	3Y	32.5%	31.2%	29.5%	28.1%	26.7%	23.7%	21.8%	20.2%	19.9%	20.2%	21.2%	21.7%	22.1%	22.3%
	5Y	26.9%	25.5%	23.9%	22.5%	21.3%	18.1%	16.2%	14.8%	14.7%	15.0%	16.0%	16.5%	16.8%	17.1%
	7Y	24.5%	23.3%	21.6%	20.1%	18.9%	15.7%	13.7%	12.4%	12.4%	12.7%	13.7%	14.5%	14.7%	15.0%
	10Y	23.6%	22.4%	20.5%	19.0%	17.8%	14.4%	12.4%	11.0%	10.9%	11.2%	12.2%	12.9%	13.0%	13.3%
	15Y	23.7%	22.4%	20.5%	19.0%	17.5%	13.7%	11.7%	10.1%	10.0%	10.4%	10.9%	11.7%	11.7%	11.9%
20Y	24.4%	22.9%	21.0%	19.2%	17.8%	13.5%	11.5%	10.0%	9.9%	10.1%	11.0%	11.0%	11.3%	11.5%	
30Y	24.6%	23.0%	21.0%	19.2%	17.6%	13.5%	11.3%	9.8%	9.3%	9.4%	11.3%	11.2%	11.5%	11.5%	

US MBS Vega

Other Advanced Economies

EXPIRY	1M	54.2%	53.7%	52.9%	52.1%	51.6%	43.9%	36.1%	36.2%	33.6%	32.4%	31.5%	30.4%	29.5%	28.8%
	3M	51.0%	50.5%	49.8%	49.0%	48.6%	41.0%	35.0%	33.4%	30.5%	28.6%	27.8%	26.8%	26.0%	25.3%
	6M	46.5%	46.1%	45.1%	44.7%	44.0%	36.1%	32.9%	31.2%	28.9%	27.4%	26.5%	25.6%	24.8%	24.0%
	9M	42.8%	42.3%	41.7%	41.0%	40.5%	33.9%	31.0%	29.5%	27.5%	26.2%	25.4%	24.4%	23.5%	22.9%
	1Y	39.2%	38.7%	37.9%	37.4%	36.8%	32.1%	29.1%	27.7%	25.9%	25.1%	24.1%	23.3%	22.4%	21.6%
	2Y	31.0%	30.6%	30.0%	29.4%	28.8%	26.4%	23.6%	22.0%	21.6%	21.1%	20.0%	19.1%	18.2%	17.5%
	3Y	25.2%	24.8%	24.3%	23.7%	23.3%	22.6%	20.0%	18.8%	18.5%	18.0%	17.1%	16.0%	15.1%	14.4%
	5Y	20.3%	19.9%	19.4%	18.8%	18.5%	18.1%	16.4%	15.5%	15.3%	14.9%	14.0%	12.9%	11.9%	11.2%
	7Y	19.4%	19.0%	18.5%	17.9%	17.4%	16.1%	15.0%	13.9%	14.1%	13.5%	12.4%	11.5%	10.5%	9.8%
	10Y	18.3%	17.9%	17.4%	16.8%	16.3%	14.9%	14.0%	12.9%	13.0%	12.7%	11.7%	10.6%	9.6%	8.8%
	15Y	17.6%	17.2%	16.5%	16.1%	15.5%	14.1%	13.3%	12.2%	12.1%	11.9%	10.8%	9.8%	8.8%	7.9%
20Y	17.2%	16.8%	16.1%	15.7%	15.2%	13.8%	12.9%	11.8%	11.7%	11.5%	10.4%	9.4%	8.4%	7.5%	
30Y	16.8%	16.3%	15.7%	15.2%	14.8%	13.4%	12.5%	11.5%	11.3%	11.1%	10.0%	9.0%	8.1%	7.1%	

Total Emerging Europe

EXPIRY	1M	59.7%	59.5%	59.1%	58.7%	58.4%	57.6%	60.0%	65.4%	71.9%	76.6%	69.0%	63.3%	60.5%	58.4%
	3M	59.7%	59.5%	59.1%	58.7%	58.3%	57.9%	60.4%	66.0%	72.4%	76.5%	68.3%	62.6%	59.7%	57.7%
	6M	59.8%	59.6%	59.2%	58.8%	58.4%	58.4%	61.0%	66.9%	73.2%	76.2%	67.2%	61.4%	58.4%	56.5%
	9M	61.0%	60.8%	60.4%	60.0%	59.6%	59.6%	62.3%	68.2%	74.4%	76.1%	66.2%	60.3%	57.2%	55.6%
	1Y	63.3%	63.1%	62.7%	62.3%	61.9%	61.1%	63.6%	69.9%	76.0%	76.3%	65.4%	59.4%	56.2%	54.4%
	2Y	68.4%	67.9%	67.4%	66.9%	66.4%	65.8%	68.7%	75.5%	80.3%	74.9%	61.1%	55.0%	52.0%	50.4%
	3Y	74.1%	73.9%	73.0%	72.5%	71.9%	71.7%	75.9%	81.8%	80.5%	70.3%	56.9%	51.1%	47.8%	46.5%
	5Y	96.4%	95.6%	94.8%	94.0%	93.2%	91.7%	92.4%	85.4%	74.7%	58.3%	48.1%	43.2%	40.4%	39.8%
	7Y	107.6%	107.1%	106.1%	105.1%	104.1%	98.0%	83.8%	70.1%	56.5%	47.3%	40.1%	36.4%	34.5%	33.9%
	10Y	68.0%	67.3%	66.6%	65.9%	65.3%	60.3%	51.5%	43.4%	39.6%	35.7%	31.9%	29.1%	28.4%	27.8%
	15Y	46.4%	46.2%	45.7%	45.1%	44.6%	40.3%	38.6%	35.0%	33.2%	30.3%	26.6%	25.4%	24.3%	23.8%
20Y	46.3%	45.7%	45.2%	44.6%	44.1%	40.2%	38.3%	35.1%	32.2%	28.7%	26.9%	25.1%	23.7%	22.6%	
30Y	57.2%	56.8%	56.1%	55.3%	54.6%	49.7%	47.9%	43.7%	40.5%	36.3%	31.1%	27.6%	25.0%	23.5%	

Total Latam & Caribbean

EXPIRY	1M	96.9%	96.6%	96.1%	95.7%	95.2%	99.1%	89.2%	83.8%	67.3%	81.8%	75.3%	70.8%	67.4%	65.3%
	3M	94.0%	93.7%	93.2%	92.8%	92.5%	95.7%	85.7%	80.2%	64.4%	78.4%	72.5%	68.5%	65.5%	63.9%
	6M	103.6%	103.2%	102.7%	102.4%	101.9%	97.0%	83.6%	81.0%	61.3%	57.7%	53.3%	50.4%	48.1%	46.9%
	9M	96.3%	95.9%	95.5%	95.0%	94.6%	91.6%	80.1%	78.9%	62.1%	63.5%	58.6%	55.3%	52.9%	51.6%
	1Y	88.7%	88.4%	87.9%	87.5%	87.1%	85.2%	75.9%	76.4%	63.4%	74.4%	68.6%	64.8%	61.9%	60.5%
	2Y	74.8%	74.6%	74.2%	73.8%	73.4%	63.8%	66.8%	59.9%	60.3%	50.4%	46.5%	43.8%	41.8%	41.1%
	3Y	67.6%	67.4%	67.1%	66.7%	66.3%	59.5%	60.0%	53.9%	54.9%	50.3%	46.4%	43.5%	41.7%	41.1%
	5Y	56.2%	56.1%	55.7%	55.4%	55.1%	52.5%	49.5%	44.9%	45.7%	52.3%	48.2%	44.8%	42.9%	42.8%
	7Y	49.8%	49.7%	49.3%	49.0%	48.7%	46.7%	44.1%	40.4%	40.7%	43.1%	39.4%	36.8%	35.7%	35.6%
	10Y	42.7%	42.6%	42.3%	42.0%	41.7%	40.4%	37.7%	36.7%	35.4%	34.1%	30.7%	28.8%	28.7%	28.6%
	15Y	37.6%	37.4%	37.1%	36.8%	36.6%	35.5%	33.3%	32.5%	30.6%	28.9%	26.7%	26.8%	26.8%	26.9%
20Y	32.3%	32.2%	31.9%	31.6%	31.4%	30.6%	28.7%	28.1%	27.7%	27.0%	28.4%	28.8%	28.8%	28.8%	
30Y	90.1%	89.5%	88.6%	88.0%	87.2%	84.6%	79.1%	76.7%	75.0%	72.1%	66.5%	61.7%	58.2%	55.4%	

Relative Normal Interest Rate Shocks (Continued)

Total Asia Ex-Japan

EXPIRY	1M	88.4%	88.1%	87.8%	87.5%	87.2%	72.1%	61.2%	46.3%	43.4%	39.2%	37.1%	34.9%	35.1%	35.6%
	3M	74.2%	73.9%	73.7%	73.4%	72.9%	65.0%	57.1%	46.5%	44.1%	39.3%	36.7%	35.6%	36.4%	37.4%
	6M	72.8%	72.8%	72.2%	72.0%	71.7%	64.6%	57.7%	48.5%	45.7%	41.1%	38.3%	37.0%	37.6%	38.0%
	9M	70.5%	70.3%	70.0%	69.7%	69.5%	63.6%	57.3%	48.4%	45.9%	42.2%	40.1%	38.7%	39.1%	39.8%
	1Y	69.5%	69.2%	69.0%	68.7%	68.5%	63.6%	57.5%	49.8%	47.8%	42.9%	41.6%	38.7%	38.6%	38.7%
	2Y	65.1%	65.1%	64.9%	64.4%	64.1%	60.5%	57.6%	52.9%	48.5%	44.0%	43.0%	42.8%	40.6%	38.4%
	3Y	59.0%	58.8%	58.5%	58.3%	58.1%	56.5%	54.4%	51.1%	49.3%	46.3%	43.7%	43.4%	42.5%	41.9%
	5Y	53.6%	53.4%	53.1%	52.9%	52.7%	52.0%	50.2%	49.0%	47.4%	45.0%	44.0%	42.3%	40.8%	39.7%
	7Y	48.0%	47.8%	47.6%	47.3%	47.1%	45.9%	46.1%	45.3%	44.1%	41.6%	40.3%	38.3%	37.5%	37.1%
	10Y	48.7%	48.5%	48.2%	48.0%	47.7%	44.4%	42.7%	40.7%	38.7%	36.4%	35.0%	35.8%	34.7%	34.1%
	15Y	59.6%	59.2%	58.9%	58.6%	58.3%	55.4%	52.2%	49.8%	43.1%	37.5%	34.6%	34.4%	32.8%	31.8%
	20Y	53.5%	53.5%	53.2%	52.5%	52.2%	49.2%	46.2%	42.9%	38.6%	34.5%	32.1%	31.7%	30.5%	29.0%
30Y	55.7%	55.3%	54.9%	54.6%	54.2%	51.1%	47.7%	44.4%	39.9%	35.6%	32.5%	31.4%	29.4%	27.9%	

Total ME/N. Africa

EXPIRY	1M	59.7%	59.5%	59.1%	58.7%	58.4%	57.6%	60.0%	65.4%	71.9%	76.6%	69.0%	63.3%	60.5%	58.4%
	3M	59.7%	59.5%	59.1%	58.7%	58.3%	57.9%	60.4%	66.0%	72.4%	76.5%	68.3%	62.6%	59.7%	57.7%
	6M	59.8%	59.6%	59.2%	58.8%	58.4%	58.4%	61.0%	66.9%	73.2%	76.2%	67.2%	61.4%	58.4%	56.5%
	9M	61.0%	60.8%	60.4%	60.0%	59.6%	59.6%	62.3%	68.2%	74.4%	76.1%	66.2%	60.3%	57.2%	55.6%
	1Y	63.3%	63.1%	62.7%	62.3%	61.9%	61.1%	63.6%	69.9%	76.0%	76.3%	65.4%	59.4%	56.2%	54.4%
	2Y	68.4%	67.9%	67.4%	66.9%	66.4%	65.8%	68.7%	75.5%	80.3%	74.9%	61.1%	55.0%	52.0%	50.4%
	3Y	74.1%	73.9%	73.0%	72.5%	71.9%	71.7%	75.9%	81.8%	80.5%	70.3%	56.9%	51.1%	47.8%	46.5%
	5Y	96.4%	95.6%	94.8%	94.0%	93.2%	91.7%	92.4%	85.4%	74.7%	58.3%	48.1%	43.2%	40.4%	39.8%
	7Y	107.6%	107.1%	106.1%	105.1%	104.1%	98.0%	83.8%	70.1%	56.5%	47.3%	40.1%	36.4%	34.5%	33.9%
	10Y	68.0%	67.3%	66.6%	65.9%	65.3%	60.3%	51.5%	43.4%	39.6%	35.7%	31.9%	29.1%	28.4%	27.8%
	15Y	46.4%	46.2%	45.7%	45.1%	44.6%	40.3%	38.6%	35.0%	33.2%	30.3%	26.6%	25.4%	24.3%	23.8%
	20Y	46.3%	45.7%	45.2%	44.6%	44.1%	40.2%	38.3%	35.1%	32.2%	28.7%	26.9%	25.1%	23.7%	22.6%
30Y	57.2%	56.8%	56.1%	55.3%	54.6%	49.7%	47.9%	43.7%	40.5%	36.3%	31.1%	27.6%	25.0%	23.5%	

Total Sub-Saharan Africa

EXPIRY	1M	98.5%	97.9%	97.1%	96.0%	95.2%	55.3%	45.9%	29.7%	27.2%	26.5%	24.8%	23.8%	23.2%	22.7%
	3M	65.7%	65.3%	64.5%	64.0%	63.4%	40.5%	36.6%	27.5%	24.7%	23.2%	21.6%	20.8%	20.2%	19.7%
	6M	50.4%	50.1%	49.6%	49.1%	48.7%	35.2%	32.3%	24.6%	22.4%	20.8%	19.5%	18.6%	18.0%	17.6%
	9M	40.5%	40.2%	39.9%	39.4%	39.0%	30.9%	28.6%	23.8%	21.7%	19.9%	18.5%	17.7%	17.1%	16.7%
	1Y	34.8%	34.5%	34.2%	33.8%	33.5%	27.7%	26.0%	23.1%	21.1%	19.0%	17.6%	16.8%	16.2%	15.8%
	2Y	25.3%	25.1%	24.8%	24.5%	24.2%	21.8%	20.6%	18.5%	17.1%	15.6%	14.3%	13.5%	13.0%	12.7%
	3Y	20.8%	20.6%	20.4%	20.1%	19.8%	18.6%	17.4%	15.7%	14.5%	13.4%	12.0%	11.3%	10.8%	10.4%
	5Y	15.7%	15.6%	15.3%	15.1%	14.9%	14.2%	13.4%	12.2%	11.3%	10.4%	9.1%	8.4%	8.0%	7.6%
	7Y	13.7%	13.6%	13.3%	13.1%	12.9%	12.1%	11.5%	10.3%	9.6%	8.9%	7.7%	6.9%	6.4%	6.2%
	10Y	11.8%	11.7%	11.4%	11.2%	11.0%	10.3%	9.7%	8.6%	7.8%	6.8%	5.7%	5.1%	4.7%	4.4%
	15Y	10.9%	10.7%	10.5%	10.3%	10.1%	9.4%	8.8%	7.7%	6.9%	5.9%	4.8%	4.1%	3.7%	3.5%
	20Y	10.4%	10.2%	10.1%	9.8%	9.6%	9.0%	8.3%	7.2%	6.4%	5.4%	4.3%	3.7%	3.3%	3.0%
30Y	9.9%	9.7%	9.6%	9.4%	9.2%	8.5%	7.9%	6.7%	5.9%	4.9%	3.9%	3.2%	2.8%	2.5%	

Absolute Normal Interest Rate Shocks

Rates Vega

Absolute Normal Interest Rate Shocks (bps)

		MATURITY													
		1M	3M	6M	9M	1Y	2Y	3Y	5Y	7Y	10Y	15Y	20Y	25Y	30Y
AUD	1M	33.3	33.0	32.5	32.1	31.7	30.3	29.1	27.3	25.9	24.5	23.1	22.3	21.9	21.5
	3M	32.7	32.4	32.0	31.6	31.2	29.8	28.6	26.8	25.4	24.0	22.6	21.8	21.3	21.0
	6M	32.0	31.7	31.3	30.9	30.5	29.1	27.9	26.0	24.6	23.2	21.8	21.1	20.6	20.3
	9M	31.3	31.0	30.6	30.2	29.8	28.4	27.2	25.3	23.9	22.5	21.1	20.4	19.9	19.5
	1Y	30.6	30.3	29.9	29.5	29.1	27.7	26.5	24.6	23.3	21.8	20.5	19.7	19.2	18.9
	2Y	28.2	27.9	27.5	27.1	26.7	25.3	24.1	22.2	20.9	19.5	18.1	17.3	16.8	16.5
	3Y	26.3	26.0	25.6	25.2	24.8	23.4	22.2	20.3	18.9	17.5	16.1	15.3	14.9	14.5
	5Y	23.4	23.1	22.6	22.2	21.8	20.4	19.2	17.4	16.0	14.6	13.2	12.4	11.9	11.6
	7Y	21.3	21.0	20.6	20.2	19.8	18.4	17.2	15.3	14.0	12.6	11.2	10.4	9.9	9.6
	10Y	19.3	19.0	18.6	18.2	17.8	16.4	15.2	13.3	12.0	10.6	9.2	8.4	7.9	7.6
	15Y	17.5	17.2	16.7	16.3	15.9	14.5	13.3	11.5	10.1	8.7	7.3	6.5	6.0	5.7
	20Y	16.5	16.2	15.7	15.3	14.9	13.5	12.3	10.5	9.1	7.7	6.3	5.5	5.0	4.7
	30Y	15.4	15.1	14.7	14.3	13.9	12.5	11.3	9.4	8.1	6.7	5.3	4.5	4.0	3.7
EUR	1M	14.1	14.1	14.1	14.1	14.2	14.2	14.3	14.4	14.4	14.5	14.4	14.3	14.2	14.1
	3M	13.2	13.2	13.3	13.3	13.3	13.4	13.4	13.5	13.6	13.6	13.6	13.5	13.4	13.3
	6M	12.1	12.1	12.2	12.2	12.2	12.3	12.3	12.4	12.5	12.5	12.5	12.4	12.3	12.2
	9M	11.2	11.2	11.2	11.3	11.3	11.3	11.4	11.5	11.5	11.6	11.5	11.4	11.3	11.2
	1Y	10.4	10.4	10.5	10.5	10.5	10.6	10.6	10.7	10.8	10.8	10.8	10.7	10.6	10.5
	2Y	8.4	8.4	8.4	8.5	8.5	8.6	8.6	8.7	8.8	8.8	8.7	8.6	8.5	8.4
	3Y	7.3	7.4	7.4	7.4	7.4	7.5	7.6	7.7	7.7	7.7	7.7	7.6	7.5	7.4
	5Y	6.4	6.4	6.4	6.4	6.5	6.5	6.6	6.7	6.7	6.8	6.7	6.6	6.5	6.4
	7Y	5.9	6.0	6.0	6.0	6.0	6.1	6.2	6.3	6.3	6.3	6.3	6.2	6.1	6.0
	10Y	5.6	5.6	5.7	5.7	5.7	5.8	5.8	5.9	6.0	6.0	6.0	5.9	5.8	5.7
	15Y	5.4	5.4	5.4	5.4	5.4	5.5	5.6	5.7	5.7	5.7	5.7	5.6	5.5	5.4
	20Y	5.2	5.3	5.3	5.3	5.3	5.4	5.5	5.5	5.6	5.6	5.6	5.5	5.4	5.3
	30Y	5.1	5.1	5.2	5.2	5.2	5.3	5.3	5.4	5.5	5.5	5.5	5.4	5.3	5.2
GBP	1M	20.9	20.8	20.7	20.5	20.4	19.7	19.1	17.7	16.3	14.3	11.0	8.2	5.8	3.8
	3M	21.9	21.8	21.7	21.5	21.4	20.8	20.1	18.8	17.4	15.3	12.1	9.2	6.9	4.9
	6M	22.6	22.5	22.3	22.2	22.0	21.4	20.8	19.4	18.0	15.9	12.7	9.9	7.5	5.5
	9M	22.5	22.4	22.3	22.2	22.0	21.4	20.7	19.4	18.0	15.9	12.7	9.8	7.5	5.5
	1Y	22.1	22.0	21.9	21.7	21.6	21.0	20.3	19.0	17.6	15.5	12.3	9.4	7.1	5.1
	2Y	19.5	19.4	19.3	19.1	19.0	18.4	17.7	16.4	15.0	12.9	9.7	6.8	4.4	2.5
	3Y	17.4	17.3	17.2	17.0	16.9	16.2	15.6	14.2	12.8	10.8	7.5	4.7	2.3	0.3
	5Y	15.1	15.0	14.9	14.7	14.6	13.9	13.3	11.9	10.5	8.5	5.2	4.5	2.2	0.3
	7Y	14.0	13.9	13.8	13.7	13.5	12.9	12.2	10.9	9.5	7.4	4.2	4.2	2.1	0.3
	10Y	13.2	13.1	13.0	12.8	12.7	12.1	11.4	10.1	8.7	6.6	3.4	3.4	1.9	0.2
	15Y	12.6	12.5	12.4	12.2	12.1	11.5	10.8	9.4	8.1	6.0	2.7	2.7	1.6	0.2
	20Y	12.3	12.2	12.1	11.9	11.8	11.1	10.5	9.1	7.7	5.7	2.4	2.4	1.3	0.1
	30Y	12.0	11.9	11.7	11.6	11.5	10.8	10.2	8.8	7.4	5.4	2.1	1.4	0.7	0.0
JPY	1M	9.7	9.7	9.7	9.7	9.7	9.7	9.9	10.2	10.5	11.1	11.9	12.5	12.9	13.2
	3M	9.3	9.3	9.3	9.3	9.3	9.3	9.5	9.8	10.1	10.7	11.5	12.1	12.5	12.8
	6M	8.8	8.8	8.8	8.8	8.8	8.8	8.9	9.2	9.6	10.2	11.0	11.5	11.9	12.2
	9M	8.3	8.3	8.3	8.3	8.3	8.4	8.5	8.8	9.1	9.7	10.5	11.1	11.5	11.8
	1Y	7.9	7.9	7.9	7.9	7.9	7.9	8.1	8.4	8.7	9.3	10.1	10.7	11.1	11.4
	2Y	6.8	6.8	6.8	6.7	6.8	6.8	6.9	7.2	7.6	8.2	8.9	9.5	9.9	10.2
	3Y	6.1	6.1	6.1	6.1	6.1	6.2	6.3	6.6	6.9	7.5	8.3	8.9	9.3	9.6
	5Y	5.6	5.6	5.6	5.5	5.5	5.6	5.7	6.0	6.4	6.9	7.7	8.3	8.7	9.0
	7Y	5.4	5.4	5.4	5.4	5.4	5.5	5.6	5.9	6.2	6.8	7.6	8.2	8.6	8.9
	10Y	5.4	5.4	5.4	5.4	5.4	5.4	5.6	5.9	6.2	6.8	7.6	8.2	8.6	8.9
	15Y	5.5	5.5	5.5	5.5	5.5	5.5	5.6	5.9	6.3	6.9	7.6	8.2	8.6	8.9
	20Y	5.5	5.5	5.5	5.5	5.5	5.6	5.7	6.0	6.3	6.9	7.7	8.3	8.7	9.0
	30Y	5.6	5.6	5.6	5.5	5.5	5.6	5.7	6.0	6.4	6.9	7.7	8.3	8.7	9.0

Absolute Normal Interest Rate Shocks (Continued)

USD

EXPIRY	1M	41.4	40.6	39.4	38.5	37.6	35.3	34.1	33.1	33.0	33.1	33.3	33.5	33.5	33.6
	3M	39.3	38.5	37.3	36.3	35.5	33.2	31.9	31.0	30.9	31.0	31.2	31.4	31.4	31.5
	6M	36.5	35.6	34.5	33.5	32.7	30.4	29.1	28.2	28.1	28.2	28.4	28.5	28.6	28.7
	9M	34.1	33.2	32.1	31.1	30.2	27.9	26.7	25.8	25.6	25.7	26.0	26.1	26.2	26.2
	1Y	31.9	31.1	29.9	28.9	28.1	25.8	24.5	23.6	23.5	23.6	23.8	24.0	24.0	24.1
	2Y	25.7	24.9	23.7	22.8	21.9	19.6	18.4	17.4	17.3	17.4	17.6	17.8	17.9	17.9
	3Y	22.1	21.2	20.1	19.1	18.2	15.9	14.7	13.8	13.6	13.7	14.0	14.1	14.2	14.2
	5Y	18.3	17.4	16.3	15.3	14.5	12.2	10.9	10.0	9.9	10.0	10.2	10.3	10.4	10.5
	7Y	16.6	15.8	14.6	13.6	12.8	10.5	9.2	8.3	8.2	8.3	8.5	8.7	8.7	8.8
	10Y	15.4	14.6	13.4	12.4	11.6	9.3	8.0	7.1	7.0	7.1	7.3	7.5	7.5	7.6
	15Y	14.5	13.7	12.5	11.6	10.7	8.4	7.2	6.2	6.1	6.2	6.4	6.6	6.6	6.7
20Y	14.1	13.2	12.1	11.1	10.3	7.9	6.7	5.8	5.7	5.8	6.0	6.1	6.2	6.3	
30Y	13.7	12.8	11.7	10.7	9.8	7.5	6.3	5.4	5.2	5.3	5.6	5.7	5.8	5.8	

US MBS Vega

Other Advanced Economies

EXPIRY	1M	21.5	21.3	21.0	20.7	20.5	19.8	19.3	18.9	18.6	18.2	17.7	17.1	16.6	16.2
	3M	20.9	20.7	20.4	20.1	19.9	19.2	18.7	18.3	18.0	17.6	17.1	16.5	16.0	15.6
	6M	20.0	19.8	19.4	19.2	18.9	18.2	17.8	17.3	17.0	16.7	16.1	15.6	15.1	14.6
	9M	19.0	18.8	18.5	18.2	18.0	17.3	16.8	16.4	16.1	15.7	15.2	14.6	14.1	13.7
	1Y	18.1	17.9	17.5	17.3	17.0	16.3	15.9	15.4	15.1	14.8	14.2	13.7	13.2	12.7
	2Y	15.1	14.9	14.6	14.3	14.0	13.3	12.9	12.4	12.2	11.8	11.2	10.7	10.2	9.8
	3Y	13.2	13.0	12.7	12.4	12.2	11.5	11.0	10.6	10.3	9.9	9.4	8.8	8.3	7.9
	5Y	11.3	11.1	10.8	10.5	10.3	9.6	9.1	8.7	8.4	8.0	7.5	6.9	6.4	6.0
	7Y	10.5	10.3	10.0	9.7	9.4	8.7	8.3	7.8	7.6	7.2	6.6	6.1	5.6	5.2
	10Y	9.9	9.7	9.4	9.1	8.8	8.1	7.7	7.2	7.0	6.6	6.1	5.5	5.0	4.6
	15Y	9.5	9.3	8.9	8.7	8.4	7.7	7.3	6.8	6.5	6.2	5.6	5.1	4.6	4.1
20Y	9.3	9.1	8.7	8.5	8.2	7.5	7.1	6.6	6.3	6.0	5.4	4.9	4.4	3.9	
30Y	9.1	8.8	8.5	8.2	8.0	7.3	6.9	6.4	6.1	5.8	5.2	4.7	4.2	3.7	

Total Emerging Europe

EXPIRY	1M	32.2	32.1	31.9	31.7	31.5	30.7	30.0	28.8	27.8	26.5	24.9	23.8	23.0	22.4
	3M	31.8	31.7	31.5	31.3	31.1	30.3	29.6	28.4	27.4	26.1	24.5	23.4	22.6	22.0
	6M	31.2	31.1	30.9	30.7	30.5	29.7	29.0	27.8	26.8	25.5	23.9	22.8	22.0	21.4
	9M	30.6	30.5	30.3	30.1	29.9	29.2	28.5	27.2	26.2	24.9	23.3	22.2	21.4	20.9
	1Y	30.1	30.0	29.8	29.6	29.4	28.6	27.9	26.7	25.7	24.4	22.8	21.7	20.9	20.3
	2Y	28.2	28.0	27.8	27.6	27.4	26.7	26.0	24.7	23.7	22.4	20.8	19.7	19.0	18.4
	3Y	26.5	26.4	26.1	25.9	25.7	25.0	24.3	23.1	22.0	20.8	19.2	18.1	17.3	16.7
	5Y	23.9	23.7	23.5	23.3	23.1	22.4	21.7	20.5	19.4	18.1	16.6	15.4	14.7	14.1
	7Y	21.9	21.8	21.6	21.4	21.2	20.4	19.7	18.5	17.5	16.2	14.6	13.5	12.7	12.1
	10Y	19.9	19.7	19.5	19.3	19.1	18.4	17.7	16.5	15.4	14.2	12.6	11.5	10.7	10.1
	15Y	17.8	17.7	17.5	17.3	17.1	16.3	15.7	14.4	13.4	12.1	10.5	9.4	8.6	8.1
20Y	16.7	16.5	16.3	16.1	15.9	15.2	14.5	13.3	12.2	10.9	9.4	8.3	7.5	6.9	
30Y	15.4	15.3	15.1	14.9	14.7	13.9	13.3	12.0	11.0	9.7	8.1	7.0	6.2	5.7	

Total Latam & Caribbean

EXPIRY	1M	87.1	86.8	86.4	86.0	85.6	84.2	82.8	80.3	78.0	75.0	71.1	68.0	65.7	63.8
	3M	86.2	85.9	85.5	85.1	84.8	83.3	81.9	79.4	77.1	74.1	70.2	67.1	64.8	63.0
	6M	84.9	84.6	84.2	83.9	83.5	82.0	80.6	78.1	75.8	72.9	68.9	65.9	63.5	61.7
	9M	83.7	83.4	83.0	82.6	82.2	80.8	79.4	76.8	74.6	71.6	67.6	64.6	62.3	60.4
	1Y	82.5	82.2	81.8	81.4	81.0	79.6	78.2	75.6	73.4	70.4	66.4	63.4	61.1	59.2
	2Y	78.0	77.8	77.4	77.0	76.6	75.1	73.8	71.2	68.9	66.0	62.0	59.0	56.6	54.8
	3Y	74.1	73.9	73.5	73.1	72.7	71.3	69.9	67.3	65.1	62.1	58.1	55.1	52.8	50.9
	5Y	67.7	67.5	67.1	66.7	66.3	64.8	63.4	60.9	58.6	55.7	51.7	48.7	46.3	44.5
	7Y	62.7	62.5	62.1	61.7	61.3	59.8	58.4	55.9	53.6	50.7	46.7	43.7	41.3	39.5
	10Y	57.1	56.9	56.5	56.1	55.7	54.2	52.8	50.3	48.0	45.1	41.1	38.1	35.7	33.9
	15Y	51.1	50.8	50.4	50.0	49.7	48.2	46.8	44.3	42.0	39.0	35.1	32.0	29.7	27.9
20Y	47.4	47.2	46.8	46.4	46.0	44.5	43.1	40.6	38.3	35.4	31.4	28.4	26.0	24.2	
30Y	43.4	43.1	42.7	42.4	42.0	40.5	39.1	36.6	34.3	31.3	27.4	24.3	22.0	20.2	

Absolute Normal Interest Rate Shocks (Continued)

Total Asia Ex-Japan

EXPIRY	1M	28.7	28.6	28.5	28.4	28.3	27.8	27.4	26.6	25.9	25.0	23.8	22.8	22.0	21.4
	3M	28.5	28.4	28.3	28.2	28.0	27.6	27.2	26.4	25.7	24.8	23.5	22.6	21.8	21.2
	6M	28.1	28.1	27.9	27.8	27.7	27.3	26.9	26.1	25.4	24.5	23.2	22.2	21.5	20.8
	9M	27.8	27.7	27.6	27.5	27.4	27.0	26.5	25.8	25.1	24.2	22.9	21.9	21.1	20.5
	1Y	27.5	27.4	27.3	27.2	27.1	26.6	26.2	25.5	24.8	23.8	22.6	21.6	20.8	20.2
	2Y	26.3	26.3	26.2	26.0	25.9	25.5	25.1	24.3	23.6	22.7	21.4	20.4	19.7	19.0
	3Y	25.3	25.2	25.1	25.0	24.9	24.4	24.0	23.2	22.6	21.6	20.4	19.4	18.6	18.0
	5Y	23.5	23.4	23.3	23.2	23.1	22.6	22.2	21.4	20.7	19.8	18.6	17.6	16.8	16.2
	7Y	22.0	21.9	21.8	21.7	21.6	21.1	20.7	19.9	19.2	18.3	17.1	16.1	15.3	14.7
	10Y	20.2	20.1	20.0	19.9	19.8	19.3	18.9	18.2	17.5	16.5	15.3	14.3	13.5	12.9
	15Y	18.1	18.0	17.9	17.8	17.7	17.3	16.8	16.1	15.4	14.5	13.2	12.2	11.4	10.8
	20Y	16.7	16.7	16.6	16.4	16.3	15.9	15.5	14.7	14.0	13.1	11.8	10.8	10.1	9.4
30Y	15.1	15.0	14.9	14.8	14.7	14.3	13.8	13.1	12.4	11.5	10.2	9.2	8.4	7.8	

Total ME/N. Africa

EXPIRY	1M	32.2	32.1	31.9	31.7	31.5	30.7	30.0	28.8	27.8	26.5	24.9	23.8	23.0	22.4
	3M	31.8	31.7	31.5	31.3	31.1	30.3	29.6	28.4	27.4	26.1	24.5	23.4	22.6	22.0
	6M	31.2	31.1	30.9	30.7	30.5	29.7	29.0	27.8	26.8	25.5	23.9	22.8	22.0	21.4
	9M	30.6	30.5	30.3	30.1	29.9	29.2	28.5	27.2	26.2	24.9	23.3	22.2	21.4	20.9
	1Y	30.1	30.0	29.8	29.6	29.4	28.6	27.9	26.7	25.7	24.4	22.8	21.7	20.9	20.3
	2Y	28.2	28.0	27.8	27.6	27.4	26.7	26.0	24.7	23.7	22.4	20.8	19.7	19.0	18.4
	3Y	26.5	26.4	26.1	25.9	25.7	25.0	24.3	23.1	22.0	20.8	19.2	18.1	17.3	16.7
	5Y	23.9	23.7	23.5	23.3	23.1	22.4	21.7	20.5	19.4	18.1	16.6	15.4	14.7	14.1
	7Y	21.9	21.8	21.6	21.4	21.2	20.4	19.7	18.5	17.5	16.2	14.6	13.5	12.7	12.1
	10Y	19.9	19.7	19.5	19.3	19.1	18.4	17.7	16.5	15.4	14.2	12.6	11.5	10.7	10.1
	15Y	17.8	17.7	17.5	17.3	17.1	16.3	15.7	14.4	13.4	12.1	10.5	9.4	8.6	8.1
	20Y	16.7	16.5	16.3	16.1	15.9	15.2	14.5	13.3	12.2	10.9	9.4	8.3	7.5	6.9
30Y	15.4	15.3	15.1	14.9	14.7	13.9	13.3	12.0	11.0	9.7	8.1	7.0	6.2	5.7	

Total Sub-Saharan Africa

EXPIRY	1M	35.9	35.7	35.4	35.0	34.7	33.6	32.5	30.8	29.4	27.9	26.1	25.1	24.4	23.9
	3M	35.1	34.9	34.5	34.2	33.9	32.8	31.7	30.0	28.6	27.1	25.3	24.3	23.6	23.1
	6M	34.0	33.8	33.4	33.1	32.8	31.6	30.6	28.9	27.5	25.9	24.2	23.1	22.4	21.9
	9M	32.9	32.7	32.4	32.0	31.7	30.6	29.5	27.8	26.4	24.9	23.1	22.1	21.4	20.9
	1Y	32.0	31.7	31.4	31.1	30.8	29.6	28.6	26.8	25.5	23.9	22.2	21.1	20.4	19.9
	2Y	28.7	28.5	28.1	27.8	27.5	26.3	25.3	23.6	22.2	20.6	18.9	17.8	17.1	16.7
	3Y	26.2	26.0	25.7	25.4	25.0	23.9	22.8	21.1	19.7	18.2	16.4	15.4	14.7	14.2
	5Y	22.9	22.7	22.4	22.0	21.7	20.6	19.5	17.8	16.4	14.9	13.1	12.1	11.4	10.9
	7Y	20.9	20.7	20.3	20.0	19.7	18.5	17.5	15.8	14.4	12.8	11.1	10.0	9.3	8.9
	10Y	19.1	18.9	18.5	18.2	17.9	16.7	15.7	14.0	12.6	11.0	9.3	8.2	7.6	7.1
	15Y	17.6	17.4	17.0	16.7	16.4	15.2	14.2	12.5	11.1	9.5	7.8	6.7	6.0	5.6
	20Y	16.8	16.6	16.3	15.9	15.6	14.5	13.4	11.7	10.3	8.8	7.0	6.0	5.3	4.8
30Y	16.0	15.8	15.5	15.2	14.9	13.7	12.7	10.9	9.6	8.0	6.3	5.2	4.5	4.0	

Other Rates

Absolute Change in Inflation (bps)

Currency	MATURITY												
	1M	3M	6M	9M	1Y	2Y	3Y	5Y	7Y	10Y	15Y	20Y	30Y
AUD	(7.2)	(7.2)	(7.2)	(7.3)	(7.3)	(7.4)	(7.5)	(7.6)	(7.7)	(7.8)	(7.8)	(7.8)	(7.9)
EUR	(8.9)	(8.9)	(8.9)	(8.9)	(8.9)	(8.9)	(8.8)	(8.8)	(8.8)	(8.8)	(8.7)	(8.7)	(8.7)
GBP	(11.2)	(11.2)	(11.3)	(11.3)	(11.3)	(11.4)	(11.6)	(11.7)	(11.9)	(12.0)	(12.2)	(12.3)	(12.4)
JPY	0.0	0.0	(0.1)	(0.2)	(0.3)	(0.5)	(0.8)	(1.2)	(1.6)	(2.0)	(2.4)	(2.7)	(3.1)
USD	(60.5)	(60.1)	(59.5)	(59.0)	(58.5)	(56.7)	(55.0)	(52.4)	(50.4)	(48.1)	(45.7)	(44.3)	(42.7)
Other	(60.5)	(60.1)	(59.5)	(59.0)	(58.5)	(56.7)	(55.0)	(52.4)	(50.4)	(48.1)	(45.7)	(44.3)	(42.7)

Absolute Change in Cross-Currency vs. USD Basis (bps)

(move in bps of spread on non-USD leg)

Currency	MATURITY												
	1M	3M	6M	9M	1Y	2Y	3Y	5Y	7Y	10Y	15Y	20Y	30Y
AUD	(10.0)	(10.0)	(9.5)	(9.0)	(9.0)	(9.0)	(9.0)	(9.0)	(9.0)	(9.0)	(8.0)	(6.0)	(4.0)
EUR	(33.0)	(33.0)	(32.0)	(28.0)	(21.0)	(19.0)	(18.0)	(17.0)	(17.0)	(15.0)	(12.0)	(9.0)	(5.0)
GBP	(17.0)	(17.0)	(15.0)	(14.0)	(12.0)	(12.0)	(12.0)	(10.0)	(10.0)	(10.0)	(8.0)	(5.0)	(5.0)
JPY	(24.0)	(24.0)	(22.0)	(18.0)	(15.0)	(14.0)	(14.0)	(13.0)	(13.0)	(12.0)	(10.0)	(8.0)	(5.0)
Other	(33.0)	(33.0)	(32.0)	(28.0)	(21.0)	(19.0)	(18.0)	(17.0)	(17.0)	(15.0)	(12.0)	(9.0)	(5.0)

Appendix 8: Data Notes

Sources for data through 2019:Q4 (as released through January 18, 2020). The 2019:Q4 values of variables marked with an asterisk (*) are projected.

U.S. real GDP growth*: Percent change in real gross domestic product, chained (2009) dollars, expressed at an annualized rate, Bureau of Economic Analysis (NIPA table 1.1.6, line 1).

U.S. nominal GDP growth*: Percent change in gross domestic product (current dollars), expressed at an annualized rate, Bureau of Economic Analysis (NIPA table 1.1.5, line 1).

U.S. real disposable income growth*: Percent change in disposable personal income (current dollars) divided by the price index for personal consumption expenditures, expressed at an annualized rate, Bureau of Economic Analysis (NIPA table 2.1, line 27, and NIPA table 1.1.4, line 2).

U.S. nominal disposable income growth*: Percent change in disposable personal income (current dollars), expressed at an annualized rate, Bureau of Economic Analysis (NIPA table 2.1, line 27).

U.S. unemployment rate: Quarterly average of seasonally-adjusted monthly data for the unemployment rate of the civilian, noninstitutional population of age 16 years and older, Bureau of Labor Statistics (series LNS14000000).

U.S. CPI inflation: Percent change in the quarterly average of seasonally adjusted monthly data for the CPI for all urban consumers (CPI-U), expressed at an annualized rate, Bureau of Labor Statistics (series CUSR0000SAO).

U.S. 3-month Treasury rate: Quarterly average of 3-month Treasury bill secondary market rate on a discount basis, H.15 Release, Selected Interest Rates, Federal Reserve Board (series RIFSGFSM03_N.B).

U.S. 5-year Treasury yield: Quarterly average of the yield on 5-year U.S. Treasury notes, constructed for the FRB/U.S. model by Federal Reserve staff based on the Svensson smoothed term structure model; see Lars E. O. Svensson (1995), "Estimating Forward Interest Rates with the Extended Nelson-Siegel Method," *Quarterly Review*, no. 3, Sveriges Riksbank, pp. 13–26.

U.S. 10-year Treasury yield: Quarterly average of the yield on 10-year U.S. Treasury notes, constructed for the FRB/U.S. model by Federal Reserve staff based on the Svensson smoothed term structure model; see id.

U.S. BBB corporate yield: Quarterly average of ICE BofAML US Corporate 7-10 Year Yield-to-Maturity Index, ICE Data Indices, LLC, used with permission. (C4A4 series).

U.S. mortgage rate: Quarterly average of weekly series for the interest rate of a conventional, conforming, 30-year fixed-rate mortgage, obtained from the Primary Mortgage Market Survey of the Federal Home Loan Mortgage Corporation.

U.S. prime rate: Quarterly average of monthly series, H.15 Release (Selected Interest Rates), Federal Reserve Board (series RIFSPBLP_N.M).

U.S. Dow Jones Total Stock Market (Float Cap) Index: End-of-quarter value via Bloomberg Finance L.P.

U.S. House Price Index*: Price Index for Owner-Occupied Real Estate, CoreLogic National, Z.1 Release (Financial Accounts of the United States), Federal Reserve Board (series FL075035243.Q).

U.S. Commercial Real Estate Price Index*: Commercial Real Estate Price Index, Z.1 Release (Financial Accounts of the United States), Federal Reserve Board (series FL075035503.Q divided by 1000).

U.S. Market Volatility Index (VIX): VIX converted to quarterly frequency using the maximum close-of-day value in any quarter, Chicago Board Options Exchange via Bloomberg Finance LP.

Euro area real GDP growth*: Percent change in real gross domestic product at an annualized rate, staff calculations based on Statistical Office of the European Communities via Haver, extended back using ECB Area Wide Model dataset (ECB Working Paper series no. 42).

Euro area inflation: Percent change in the quarterly average of the harmonized index of consumer prices at an annualized rate, staff calculations based on Statistical Office of the European Communities via Haver.

Developing Asia real GDP growth*: Percent change in real gross domestic product at an annualized rate, staff calculations based on data from Bank of Korea via Haver; National Bureau of Statistics of China via Haver; Indian Central Statistics Office via Haver; Census and Statistics Department of Hong Kong via Haver; and Taiwan Directorate-General of Budget, Accounting and Statistics via Haver.

Developing Asia inflation*: Percent change in the quarterly average of the consumer price index, or local equivalent, at an annualized rate, staff calculations based on data from National Bureau of Statistics of China via Haver; Indian Ministry of Statistics and Programme Implementation via Haver; Labour Bureau of India via Haver; National Statistical Office of the Republic of Korea via Haver; Census and Statistics Department of Hong Kong via Haver; and Taiwan Directorate-General of Budget, Accounting and Statistics via Haver.

Japan real GDP growth*: Percent change in gross domestic product at an annualized rate from 1980 to present and percent change in gross domestic expenditure at an annualized rate prior to 1980, Cabinet Office of Japan via Haver.

Japan inflation*: Percent change in the quarterly average of the consumer price index at an annualized rate, based on data from the Ministry of Internal Affairs and Communications via Haver.

U.K. real GDP growth*: Percent change in gross domestic product at an annualized rate, U.K. Office for National Statistics via Haver.

U.K. inflation: Percent change in the quarterly average of the consumer price index at an annualized rate from 1988 to present and percent change in the quarterly average of the retail prices index prior to 1988, staff calculations based on data from the U.K. Office for National Statistics via Haver.

Exchange rates: End-of-quarter exchange rates, H.10 Release (Foreign Exchange Rates), Federal Reserve Board.