



**National Association *of*  
Insurance Commissioners**

**FOR EXPOSURE**

**2019 NAIC LIQUIDITY STRESS TEST FRAMEWORK  
For Life Insurers Meeting the Scope Criteria**

**December 2019**

**DRAFT**

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## 1. Introduction

### 1.1 Macroprudential Implications of a Liquidity Stress

Beginning mid-year 2017, the NAIC embarked on a project to develop a liquidity stress test (LST) framework. While the NAIC has existing tools and processes for assessing liquidity risk at a legal entity level (i.e., “inward” impacts to the insurer), there was recognition that the NAIC toolbox could be further enhanced with the addition of more granular data in the annual statement and a tool that would enable an assessment of macroprudential impacts on the broader financial markets (i.e., “outward” impacts) of a liquidity stress affecting a number of insurers simultaneously.

Post-financial crisis, there were several attempts to assess potential market impacts emanating from a liquidity stress in the insurance sector. Many of these analyses relied heavily on anecdotal assumptions and observations from behaviors of other financial sectors. In order to provide more evidence-based analyses, the NAIC decided to develop an LST for large life insurers that would aim to capture the impact on the broader financial markets (i.e., outward impacts) of aggregate asset sales under a liquidity stress.

The stress test will be run annually and the findings, on an aggregate basis, reported annually as part of the NAIC’s continuous macroprudential monitoring efforts. The NAIC’s pursuit of the LST should not suggest any pre-judgement of the outcomes. The NAIC believes there is value to the exercise whether it points to vulnerabilities of certain asset classes or markets or, alternatively, suggests that even a severe liquidity stress affecting the insurance sector is unlikely to have material impacts on financial markets. The NAIC LST is intended to supplement, not replace, a firm-specific liquidity risk management framework. The NAIC has not yet discussed steps that might be taken to address any identified vulnerabilities but acknowledges that any recommendations may require collaboration with other financial regulators.

This initial exposure document focuses on the LST itself which is one component of a broader LST framework. A more comprehensive framework, still to be developed, will additionally address model laws to establish regulatory authority, confidentiality and other policy considerations.

Once the LST framework is further developed by the Subgroup and Task Force, a proposal will be sent to the Financial Condition (E) Committee as per the adopted charges.

The NAIC's proposed 2019 LST is contained in the pages that follow and is exposed for a public comment period ending Feb. 10, 2020. The NAIC recognizes that, at least in the early years, the stress testing process and analyses will be iterative. We expect refinements to the LST as the framework is developed, especially after the first year's implementation

## 2. Background

### 2.1 NAIC Macroprudential Initiative

The NAIC's Macroprudential Initiative (MPI) commenced in 2017. It recognized the post-financial crisis reforms that became part of our Solvency Modernization Initiative (SMI) that continue to serve us well today. However, in the ensuing years since those reforms, insurers have had to contend with sustained low interest rates, changing demographics and rapid advancements in communication and technology. They have responded by offering new products, adjusting investment strategies, making structural changes and expanding into new global markets. There are new market players, new distribution channels, and a complex web of interconnections between financial market players.

What has not changed since the financial crisis is the scrutiny on the insurance sector in terms of understanding how insurers react to financial stress, and how that reaction can affect, via various transmission channels, policyholders, other insurers, financial market participants and the broader public.

The proposed work on macroprudential measures is reflective of state insurance regulators' commitment to ensure that the companies they regulate remain financially strong for the protection of policyholders, while serving as a stabilizing force to contribute to financial stability, including in stressed financial markets. To that end, the NAIC's three-year strategic plan (2018-2020), State Ahead, reflects the objective of evaluating gaps and regulatory opportunities arising from macroprudential surveillance, and develop appropriate regulatory responses.

The NAIC's work on macroprudential surveillance is overseen by the Financial Stability (EX) Task Force of the Executive (EX) Committee. In April 2017, the Task Force was asked to consider new and improved tools to better monitor and respond to both the impact of external financial and economic risks on supervised firms, as well as the risks emanating from or amplified by these firms that might be transmitted externally. The Task Force, in turn, focused its efforts on potential enhancements to liquidity risk, among other areas. More specifically, the Task Force was requested to further develop the U.S. regulatory framework on liquidity risk with a focus on life insurers due to the long-term cash-buildup involved in many life insurance contracts and the potential for large-scale liquidation of assets.

## 2.2 Liquidity Assessment Subgroup

To carry out its work on liquidity, the Task Force established the Liquidity Assessment (EX) Subgroup mid-year 2017.

### 2.2.1 Mandate

The Subgroup's charges and workplan reflect the following assignments:

- Review existing public and regulator-only data related to liquidity risk, identify any gaps based on regulatory needs and determine the scope of application, and propose recommendations to enhance disclosures.
- Develop an LST framework proposal for the Financial Condition (E) Committee's consideration, including the proposed universe of companies to which the framework will apply (e.g., large life insurers).
- Once the stress testing framework is completed, consider potential further enhancements or additional disclosures.

In addition, a small informal study group comprised of state insurance regulators, industry participants and NAIC staff was formed to consider the specific data needs and technical aspects of the project. The study group is NOT an official NAIC working group. All recommendations from the study group must be vetted and considered by the Liquidity Assessment (EX) Subgroup and/or the Financial Stability (EX) Task Force according to NAIC procedures.

### 2.2.2 Data Gaps

Prior to undertaking work on the LST, the Subgroup constructed an inventory list of existing life insurer disclosures as of 2018 that contribute to an understanding of liquidity risk. When assessing the current state, the Subgroup recognized the availability of significant detailed investment-related disclosures but contrasted it to the relatively sparse liability-related disclosures. To remedy this imbalance, a blanks proposal was constructed to significantly increase the disclosures for life insurance products.

Specifically, the Analysis of Operations by Line of Business schedule was expanded from a single exhibit to five exhibits, one each for Individual Life, Group Life, Individual Annuity, Group Annuity, and Accident and Health (A&H). The Analysis of Increase in Reserves schedule was similarly expanded. Within each of the five new exhibits, columns were added for more detailed product reporting. For example, columns were added to the Individual and Group Life exhibits to capture universal life insurance and universal life insurance with secondary guarantees (ULSG), and columns were added to the Individual and Group Annuity exhibits to capture variable annuities and variable annuities with guaranteed benefits. In addition, two new lines were added to the now five exhibits of the Analysis of Increase in Reserves schedule: one capturing the cash surrender value of the products outstanding and another capturing the amount of policy loans available (less amounts already loaned).

A new addition was also proposed to the Life Notes to Financial Statement. The new Note 33 considered the type of liquidity concerns disclosed in Note 32 for annuities and deposit-type contracts and added disclosures for life insurance products not covered in Note 32.

These proposals were exposed and commented upon several times by the Liquidity Assessment (EX) Subgroup, the Financial Stability (EX) Task Force and the Blanks (E) Working Group. Ultimately, they were adopted by NAIC Plenary for inclusion in the 2019 life annual statement blank. As an interim step, The Financial Stability (EX) Task Force performed a data call requesting a few key lines of information from the newly adopted 2019 format of the Analysis of Operations by Line of Business schedule and the Analysis of Increase in Reserves schedule, as well as the new Note 33, but populated with 2018 year-end data. This data call was completed in July 2019.

### 2.2.3 Discussions with Insurers

During the latter part of 2017 and the first quarter of 2018, the Subgroup conducted calls with several large life insurers who agreed to share their internal liquidity risk assessment processes. The dialogue provided extremely helpful input and informed the establishment of the initial direction of the LST framework.

Feedback from these discussions include:

- Scope criteria should be risk-focused, not solely based on size.
- The stress test should align with internal management reporting and leverage the Own Risk and Solvency Assessment (ORSA).
- The stress test should be principle-based and complement a company's internal stress testing methodology.
- Regulatory guidance should be provided to help define liquidity sources and uses, products/activities with liquidity risk, time horizons, level of aggregation, reporting frequency, and establishing stress scenarios.
- Public disclosure of results should be carefully considered to avoid exacerbating a liquidity crisis.

Regarding the specifics of liquidity assessments/stress test approaches, significant diversity in practice existed. Key observations in this regard included:

- Liquidity tests are performed at the material entity level and at the holding company level. Definitions of material entities differ.
- Most firms determine some sort of coverage ratio (Liquidity Sources)/(Liquidity Uses) for base and stress scenarios and monitor results to ensure they align with the firm's (internal) risk appetite. Categories of liquidity sources and uses differ across firms, and assumptions vary depending on time horizon. Some insurers determine coverage ratios using balance sheet values, applying different haircuts by asset class, time horizon and type of stress. Other insurers determine liquidity coverage gaps (Liquidity Inflows – Liquidity Outflows) using a cash-flow approach.



- Stress scenarios vary by company, reflecting a combination of market-driven, as well as idiosyncratic and insurer-specific, scenarios.
- Time horizons tested also varied, typically ranging from seven days to one year.

### 3. Scope Criteria for Determining Groups Subject to Stress Test

In determining the scope of companies subject to the LST, consideration was given to activities assumed to be correlated with liquidity risk. Another consideration was the desirability of tying data used in the criteria back to the statutory financial statements. Ultimately, six activities were identified: 1) fixed and indexed annuities; 2) funding agreements; 3) derivatives; 4) securities lending; 5) repurchase agreements; and 6) borrowed money. Minimum thresholds were established for each of these six activities. A life insurance legal entity or life insurance group exceeding the threshold for any of the six activities is subject to the stress test. (See Annex 1 for more details.) For 2019, 23 insurance groups met the criteria.

While the scope criteria only uses statutory annual statement data, the stress test is not similarly limited. Thus, the stress test will consider many more liquidity risk elements than the scope criteria, and internal company data will be the source for many of those liquidity risk elements.

Just as the LST structure and methodology may change over time, the scope criteria may also be modified, for example, in response to new data points in the NAIC annual statement blank.

Using the agreed criteria, NAIC staff obtained the amounts for all life insurance legal entities from the 2018 annual statutory financial statements (filed by March 1, 2019). If two or more life insurers are part of an insurance group with an NAIC group code, then the numbers for each of those legal entity life insurers will be summed together to represent an insurance group result. Thus, a legal entity life insurer not in an insurance group can meet the threshold on its own, or the sum of legal entity life insurers in a group can meet the threshold.

In establishing whether an insurer or group met or exceeded the threshold criteria, the Subgroup members supported using the most current single year activity rather than a multi-year average. This resulted in coverage amounts ranging from 60% to 80% of the industry total for each activity

based on 2018 data. In the future, regulatory judgment will be used to address an insurer's exit from or entry to the scope of insurers subject to the LST.

## 4. Stress Testing Structure

### 4.1 Liquidity Stress Test Summary

The stress test employs a company cash-flow projection approach incorporating liquidity sources and uses over various time horizons under a baseline assumption and some number of stress scenarios (For 2019, there are two stress scenarios and also an insurer-specific request for information.) The available assets are then recorded by asset category. The LST then calls for identification of expected asset sales by category to cure any cash-flow deficits (liquidity uses exceed liquidity sources) under the stress scenarios.

The stress scenarios may vary from year-to-year and contain variations referred to as "what-if" scenarios. The following sections provide a further description of the LST's key components.

### 4.2 Entities to Be Included in Stress Tests

The scope of entities included within an insurance group for the purposes of LST to assess the potential for large-scale liquidation of assets should include:

- Life insurance legal entities.
- Where applicable, their holding companies that could be a source of liquidity to the life insurance legal entities.
- Non-life insurance entities and non-insurance entities with material sources of liquidity, or that carry out material liquidity risk-bearing activities and could, directly or indirectly, pose similar risk of large-scale liquidation of assets.

For 2019, the legal entities identified in the bullets above, per a company's ORSA, must be considered as material or identified as carrying out material liquidity risk-bearing activities and, hence, subject to internal LST requirements. Although a legal entity in the group may not be required to perform the stress test due to materiality considerations, those entities' cash impacts on entities performing the stress test must be captured in the sources and uses templates. Based

on the results of the 2019 initial stress test exercise, the Subgroup will determine if additional materiality criteria should be developed to ensure better comparability amongst insurers.

### 4.3 Cash-Flow Approach

The LST is anchored by a cash-flow approach, using companies' actual cash-flow projections of sources and uses of liquidity over various time horizons based upon experience and expectations. This contrasts with a balance sheet approach, which employs static balance sheet amounts and generic assumptions about asset liquidity. While a balance sheet approach is easier to apply and provides calculation consistency (and thus the perception of increased comparability), its "one-size-fits-all" approach could result in a misleading assessment of liquidity risk and fail to capture certain asset activities or product features under different stress scenarios and time horizons. The cash-flow approach is deemed more dynamic and may capture liquidity risk impacts more precisely.

### 4.4 Liquidity Sources and Uses

The insurer should produce cash-flow projections for sources of liquidity and uses of liquidity that cover: operating items, investment and derivatives, capital items, and funding arrangements. (See Annex 2: Sources and Uses template.) To clarify an issue regarding funding arrangements, the projected cash flows for liquidity sources and uses should include already existing funding arrangements, such as Federal Home Loan Bank (FHLB) draws outstanding in the current time period. Also, specific to the holding company, these projected cash flows for liquidity sources and uses should include non-U.S. impacts as well.

The insurer will produce these liquidity sources and uses cash-flow projections in a baseline, normal course of business scenario, for each time horizon. The insurer will also produce these cash flows based upon a specific number of required stress scenarios for each time horizon. (For 2019, there are two stress scenarios and also an insurer-specific request for information.)

#### **Baseline Assumptions for Cash Flows**

Baseline (pre-stress) cash flows are the insurer-specific cash flows from normal expected operations. Insurers should prepare cash-flow projections under normal operating conditions and report the net cash flows (projected liquidity sources less uses) for each time horizon. These

cash-flow projections should be consistent with those used for internal financial planning and analysis (FP&A), risk management data sets, etc. A positive net cash-flow is presumed in the baseline cash flows since companies are not expected to be operating in a net cash-flow deficiency state.

#### 4.5 Stress Scenarios and Their Assumptions

For year-end 2019, there are two liquidity stress scenarios: 1) a 2008 financial crisis-like scenario; and 2) an interest rate shock/downgrade scenario and the insurers most adverse scenario. There is also an insurer-specific information request. The 2008 financial crisis-like scenario and interest rate shock/downgrade scenario contains a state insurance regulator-provided narrative, state insurance regulator-prescribed assumptions and company-specific assumptions. The insurer-specific information request contains a company-provided narrative. The state insurance regulator-provided narrative will be a qualitative description of the economic scenario in place to highlight the particular risks and sensitivities associated with that stress scenario. The state insurance regulator-prescribed assumptions are specific parameters insurers should incorporate into their modeling for a particular scenario. Company-specific assumptions should be consistent with the information provided in the state insurance regulator-provided narrative and state insurance regulator-prescribed assumptions, and represent the detailed assumptions needed for a specific company's internal model. Examples include debt issuance, lapse sensitivity, new business sensitivity and mortality sensitivity. All key business activities and product types' impact to liquidity should be considered. If the insurer's internal model does not utilize a specific economic and/or example of company-specific assumption included in this document, the internal model does not need to be modified to utilize it. However, if the insurer's internal model does utilize a specific economic and/or example of company-specific assumption included in this document, the insurer must utilize the specific value for that assumption provided in this document. For example, if an insurer's internal model uses Structured Spreads over Treasuries, the company must use the value for that 3-month assumption as presented in the final regulator-prescribed assumptions in quarter 1 of 2020. If there is no specific value for a certain time horizon, the company should use the values for the other time horizon to interpolate a value. For example, if the state insurance regulator-provided assumptions in quarter 1 of 2020 include

values for three-month, six-month, nine month and one year, the insurer should use those values to extrapolate the one-month value. The company is not to utilize its own values for any item provided in the regulator prescribed assumptions.

#### 4.5.1 2008 Financial Crisis-like Severely Adverse Scenario

##### **State Insurance Regulator-Provided Narrative**

Insurers are required to apply a 2008 financial crisis-like scenario as one of the stress scenarios. The following is a summary of market conditions extracted from the Federal Reserve Board's (FRB) *2018 Supervisory Scenarios for Annual Stress Tests Required under the Dodd-Frank Act Stress Testing Rules and the Capital Plan Rule*.

This scenario is characterized by a severe global recession that is accompanied by a global aversion to long-term fixed-income assets. As a result, long-term rates do not fall, and yield curves steepen in the U.S. In turn, these developments lead to a broad-based and deep correction in asset prices, including in the corporate bond and real estate markets.

- Macroeconomic
  - *The real gross domestic product (GDP) begins to decline in the first quarter of 2018 and reaches a trough in the third quarter of 2019 that is 7.5% below the pre-recession peak.*
  - *The unemployment rate approaches 10%*
  - *The headline Consumer Price Index (CPI) falls below 1% at an annual rate in the second quarter of 2018 and rises to about 1.5% at an annual rate by the end of the scenario*
- Interest Rates and Credit Spreads
  - *Short-term Treasury rates fall and remain near zero throughout the stress*
  - *10-year Treasury yields remain unchanged through the scenario period.*
  - *Investment grade (IG) corporate credit spreads widen to 5.75%*
- Asset Valuations
  - *Equity prices decline by roughly 65%*
  - *The Volatility Index (VIX) moves above 60%*

- *Housing prices and commercial real estate prices decline by 30% and 40% respectively, through eight quarters.*
- Description of International Market Conditions
  - *Severe recessions and slowdowns in growth are experienced in the Euro area, United Kingdom (UK), Japan, and developing Asia economies.*
  - *All foreign economies experience a decline in consumer prices.*
  - *The U.S. dollar appreciates against the Euro, British pound, and developing Asia currencies.*
  - *The U.S. dollar depreciates modestly against the Japanese yen, driven by flight-to-safety capital flow.*

### **State Insurance Regulator-Prescribed Assumptions**

Insurers should utilize the specific values for the economic indicators from the FRB's annual *Supervisory Scenarios for Annual Stress Tests Required under the Dodd-Frank Act Stress Testing Rules and the Capital Plan Rule*, Table 1.A. Historical data and Table 4.A. Supervisory severely adverse scenario. For the first year of the stress test, insurers should use the version published in February 2020. (Refer to the tables in Annex 4i.) Specifically, insurers should run the 2008 stress scenario using the values for the Treasury curve, corporate spreads, GDP, unemployment, U.S. inflation (CPI), Housing Price Index (HPI), S&P 500 Index (SPX SPOT), Commercial Real Estate Index (CREI) and VIX index. Q4 2019 values should be used for the baseline and projected values should be used for the 30-day, 90-day and one-year horizons.

In addition, other market indicators are necessary for insurers to apply to stressed cash-flows and to assess the impact on expected asset sales. These are as follows (with details to be found in Annex 4):

- Market capacity assumption.
- Structured spreads over Treasuries.
- SWAP spreads
- Swaption volatility.
- Credit assumptions: Moody's Transition Matrix/Migration rates.
- Credit assumptions: Moody's Default table.

- Credit assumptions: Moody's Recovery Rate table.

### **Market Capacity Assumption**

Insurers should use the table in Annex 4ii to assist in determining asset values and the quantity of assets to be sold in stressed markets. The table incorporates average daily trading volumes from the Securities Industry and Financial Markets Association (SIFMA) for certain assets classes. Insurers should assume 80% of current volumes for stressed scenarios to calculate the price at which they can sell as well as the quantity to sell. Insurers should make their own assumptions for asset categories where no trading volume data is available using other categories as a proxy.

### **Structured Spreads over Treasuries**

Insurers should use the table in Annex 4iii to assist in determining asset values and the quantity of assets to be sold in stressed markets. For baseline values, the industry shall submit year-end spreads to the state insurance regulators shortly after year-end. The state insurance regulators will review and approve the values for use in the table for LST purposes. State insurance regulators shall use structured spread data from the 2007-2009 period provided by JP Morgan added to baseline values to calculate stressed amounts for the 30-day, 90-day and one-year horizons to complete the table.

### **Swap Spreads**

Insurers should use the table in Annex 4iv to assist in determining asset values and the quantity of assets to be sold in stressed markets. Swap spread source data from the FRB's H.15 FRED data should be incorporated into the swap spread table. Stressed spread levels may affect assets prices for expected sales calculations necessary for the stress scenarios.

### **Swaption Volatility**

Insurers should use the table in Annex 4v to assist in determining asset values and the quantity of assets to be sold in stressed markets. Insurers should obtain the information to populate the table from Bloomberg on swaption volatility for various time horizons and expiry. For consistency, insurers should use the table found on Bloomberg at NSV [Go].

### **Moody's Transition Matrix/Migration Rates**

Insurers should use the table in Annex 4vi to assist in determining credit migrations, asset values and the quantity of assets to be sold in stressed markets. The table is imported from Moody's Corporate-Global: Annual default study, Exhibit 36 – Average one-year alphanumeric rating migration rates, 1983–2018. Insurers should use the equivalent Moody's tables for U.S. Public Finance for municipal bonds.

### **Moody's Default Table**

Insurers should use the table in Annex 4vii to assist in determining asset values and the quantity of assets to be sold in stressed markets. The table is imported from Moody's Corporate-Global: Annual default study, Exhibit 43 – Average cumulative issuer-weighted global default rates by letter rating, 1983–2018. Insurers should use the equivalent Moody's tables for U.S. Public Finance for municipal bonds.

### **Moody's Recovery Rate Table**

Insurers should use the table in Annex 4viii to assist in determining asset values and the quantity of assets to be sold in stressed markets. The table is imported from Moody's Corporate-Global: Annual default study, Exhibit 9 – Average corporate debt recovery rates measured by ultimate recoveries, 1987–2018. Insurers should use the equivalent Moody's tables for U.S. Public Finance for municipal bonds.

Additionally, the 2008 stress scenario should be run considering sources other than expected asset sales (e.g., FHLB credit line draws, bank lines of credit and holding company contributions). The insurer must identify the expected asset sales for remaining liquidity deficiencies.

### **“What-if” Variation**

The “what-if” modification to the severely adverse scenario eliminates the ability of the insurer to use other internal and external funding sources to satisfy any liquidity deficiency under stress—for example, no new FHLB draws or other loans, no holding company contributions, and



no inter-affiliate contributions. Thus, expected asset sales will be the primary source of meeting any liquidity deficiency for the “what-if” scenario.

### **Company-Specific Assumptions**

Insurers must construct the assumptions needed for their internal models to run the above 2008 stress scenario. Company-specific assumptions should be consistent with the above scenario as narrative and state insurance regulator-prescribed assumptions. Examples include the inability to roll or issue new debt, potential increases in lapse rates, new business sensitivity and mortality experience.

#### **4.5.2 Interest Rate Spike/Industry Outlook and Downgrade Scenario**

##### **State Insurance Regulator-Provided Narrative**

This scenario contemplates an interest rate spike, equities decrease, and the existence of credit spread stress. Additionally, the nationally recognized statistical rating organization (NRSRO) insurance industry outlook goes from stable to negative with many insurers experiencing a downgrade. A “what-if” modification to this stress scenario is also required. State insurance regulators see value in performing a sovereign debt stress scenario but are not ready to implement it for the 2019 LST. This stress scenario and “what-if” modification will accomplish some of the dynamics that would be included in a sovereign debt stress, and state insurance regulators will utilize those results to build out a sovereign debt stress scenario in the future. In the meantime, insurers should only assume as shocks to their baseline, the interest rate change, equity shock, credit spread and downgrade notches provided in this document for the 2019 LST.

##### **State Insurance Regulator-Prescribed Assumptions**

Insurers should run a scenario that considers the immediate impact of the following interest rate spikes. For the initial exercise, these would be implemented as parallel shifts to the baseline curve:

- +100 basis points (bps) over one month.
- +200 bps over three months (i.e., +100 bps between one and three months).
- +300 bps over 12 months (i.e., +100 bps between three and 12 months).

In addition to the rate spike, the scenario should incorporate the following assumptions:

- A one notch down grade after one month of the insurer's senior debt or financial strength rating.
- A 25% decrease in equities.
- A one in 10 credit spread stress (reflecting the 90th percentile of the biggest annual credit spread increase over one year observed historically).

#### **“What-If Variation”**

The “what-if” modification to the interest rate spike/industry outlook and downgrade scenario includes all state insurance regulator-prescribed assumptions as per above except:

- Instead of a 25% decrease in equities, insurers should assume a 25% increase in equities.
- No credit spread stress should be assumed.

#### **Company-Specific Assumptions**

Insurers must construct the assumptions needed for their internal models to run the above stress scenario. Company-specific assumptions should be consistent with the above narrative and state insurance regulator-prescribed assumptions.

#### **4.5.3 Insurer-Specific Information Request**

##### **Narrative**

This information request requires insurers to provide a detailed narrative of their most severe liquidity stress scenario to obtain greater insight to the drivers of liquidity risk for specific insurers. The most severe scenario should be one that results in the largest liquidity deficiency (sources less uses) from their existing internal LST process. State insurance regulators may use this information to inform future prescribed stress scenarios.

Insurers should provide a comprehensive narrative describing the stress scenario and the economic environment. This stress scenario could be a combination of multiple stressors.

#### 4.6 Available and Expected Asset Sales: 2019 Methodology

Once the stressed sources and uses of liquidity have been established, and the net cash-flows calculated, insurers then project the assets available at the end of the time horizon by asset category. (Please refer to Annex 3: Expected Asset Sales Categories) The valuation of available assets for the baseline scenario utilizes current and projected asset values for a normal operating environment. The valuation of available assets for a stress scenario will be based upon fair value haircuts per the specific stress scenario narrative, its regulatory-prescribed assumptions, or the company assumptions based on the narrative and regulatory-prescribed assumptions (e.g., fair market value haircuts and capacity indicators).

To the extent that stressed cash inflows are insufficient to meet the required cash outflows, the insurer must provide for cash-flows to meet the deficiency. Unless a stress scenario (or “what-if” modification of a stress scenario) indicates otherwise, the insurer can utilize internal and external funding sources (e.g., FHLB new draws), as well as asset sales, to satisfy a liquidity deficiency. Any expected asset sales must be reported in the appropriate column(s) of the template. Insurers decide which categories of available assets to sell, as well as the quantity to sell.

The expected asset sales amounts calculated based on the insurer’s own models should also be subject to portfolio manager and/or chief investment officer (CIO) feedback. The intent is for these asset sales to most accurately represent what actions the insurer could reasonably take in the given scenario, in light of market conditions and the company’s anticipated investment policy and/or strategy. This feedback may take the form of “topside” adjustments to the expected asset sales. To accommodate this, there is an initial expected asset sales column and a final expected asset sales column to highlight how the internal model process generates expected assets sale vs. the final expected asset sales which incorporates the investment portfolio manager’s insights and input.

(Please refer to the example in Annex 3i.).

## 5. Reporting

Insurers should submit data in the reporting template for sources and uses, available assets and expected asset sales. These templates utilize categories for 30-day, 90-day and one-year time horizons. The template further illustrates available assets, expected asset sales and final expected asset sales by asset sub-category to cover any liquidity deficiency (negative amounts of net sources less uses over the prescribed time horizons). Final asset sales should take into consideration portfolio manager input and market conditions that may require an adjustment to the expected asset sales values. A report should be submitted for each legal entity within the group that was subjected to LST.

Additional reporting disclosures (e.g., some of the company assumptions based on the stress scenario narrative and regulatory metrics) will be finalized in early 2020.

The reporting templates and other to-be-determined disclosures are anticipated to be submitted in third quarter 2020 (to be finalized in the future).

## 6. Data Aggregation

Given the NAIC's primary focus on macroprudential impacts of a liquidity stress affecting the life insurance sector, the NAIC will aggregate final expected asset sales data across the insurance groups subject to the LST. The aggregation will be done by asset category. The NAIC aims to compare the aggregated results against various benchmarks, potentially including normal and/or stressed trading volumes and asset values for various asset classes, to determine the impact such sales may have on the capital markets in times of stress. Findings from this analysis may also inform expected asset sale assumptions utilized in future runs of the LST.

As part of its macroprudential surveillance, the state insurance regulators and/or NAIC may reach out to other regulatory agencies to discuss aggregate results that may affect other regulated industries, such as banks, securities brokers and asset managers. State insurance regulators may also coordinate with other agencies to identify appropriate and perhaps coordinated action they may take to prevent or minimize the effect large asset sales may have on the financial markets and overall economy.

## 7. Regulatory Authority and Confidentiality

### 7.1 Regulatory Authority

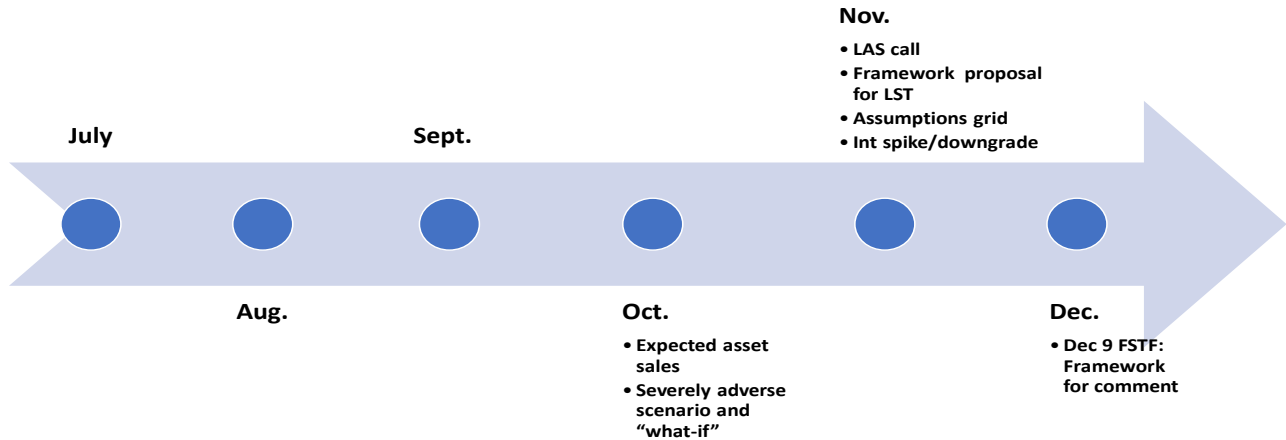
For the 2019 LST, lead state insurance regulators will utilize their examination authority to collect the reporting results from insurers and to keep the data confidential. A long-term solution will be developed at the Financial Stability (EX) Task Force, possibly in coordination with the needs from the group capital calculation (GCC) project.

### 7.2 Protocols for Protecting Individual Firm's Results

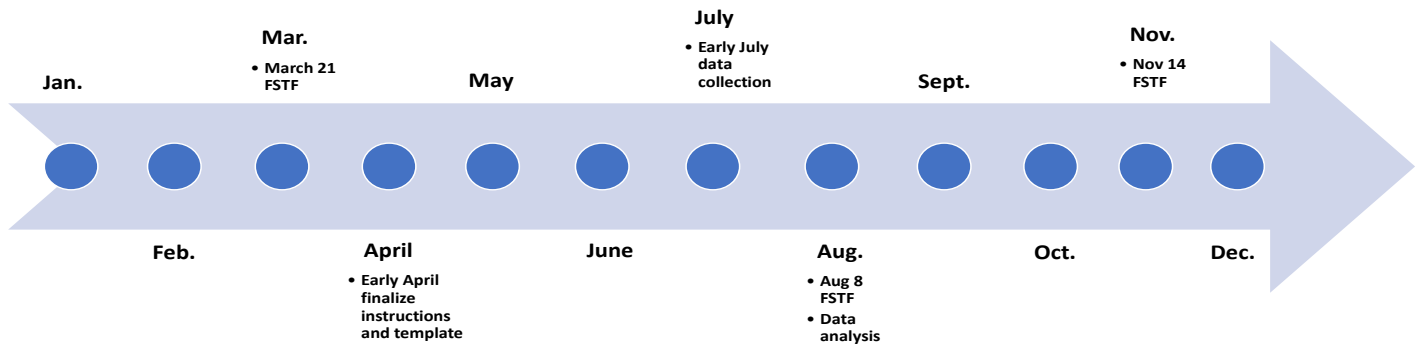
For the 2019 LST, lead state insurance regulators will utilize their examination authority to collect the reporting results from insurers identified by the scope criteria. Existing protocols for collecting confidential/sensitive data for each state and insurer will be utilized. A long-term solution will be developed at the Financial Stability (EX) Task Force, possibly in coordination with the needs from the group capital calculation (GCC) project.

## 8. Timeline

### LST: Milestone Chart: 2019



### LST: Draft Milestone Chart: 2020 (tentative)



## Annex 1: Scope Criteria with Annual Statement Reference

The Subgroup proposes to include in the scope of the LST any insurer/group that exceeds the following thresholds for any of the noted activities (or account balance as a proxy for that activity). The thresholds have been established taking into consideration both the account balance of the insurer/group to the total balance for the life insurance sector, as well as the aggregate account balance of insurers/groups within scope to the aggregate account balance for the life insurance sector.

Account Balances	Threshold in \$B "Greater than"	Reference to 2017 NAIC Life/Accident and Health (A&H) Annual Financial Statement Blank
<b>Fixed and Indexed Annuities</b>	25	<b>Analysis of Increase in Annuity Reserves</b> Page: Supplement 62 Line: Reserves December 31, current year (15) Column: Sum of Individual Fixed Annuities, Individual Indexed Annuities, Group Fixed Annuities and Group Indexed Annuities
<b>Funding Agreements and Guaranteed Investment Contracts (GICs)<sup>i</sup></b>	10	<b>Deposit-Type Contracts</b> Page: Exhibit 7 – Deposit-Type Contracts Line: 9 Column: Guaranteed Investment Contracts (Column 2) + Column: Premium and Other Deposit Funds (Column 6) IF the amount of FHLB Funding Reserves from Note 11.B(4)(b) suggests funding agreements are not reported in Column 2 of Exhibit 7 + Synthetic GICS Page: Exhibit 5 – Interrogatories Line: 7.1
<b>Derivatives—Notional Value (absolute value)</b>	75	<b>Derivatives – Notional Value (absolute value)</b> Pages: Schedule DB, Part A; Schedule DB, Part B, Section 1 Column: Notional Value (sum all)
<b>Securities Lending</b>	2	<b>Securities Lending Collateral Assets</b> Pages: Schedule DL, Part 1; Schedule DL, Part 2 Line: Total (9999999) Column: Fair Value
<b>Repurchase Agreements</b>	1	<b>Repurchase Agreements</b> Page: Notes to Financial Statement Investments Restricted Assets Line: Sum of 05L1C, 05L1D, 05L1E, 05L1F Column: Total (General Account Plus Separate Account)
<b>Borrowed Money (includes commercial papers, letters of credit, etc.)</b>	1	<b>Borrowed Money</b> Page: Liabilities Line: Borrowed Money (22) Column: Current Year

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<sup>i</sup> In performing the addition of the FHLB funding agreement amount to the GICs amount, NAIC staff discovered that the reporting of FHLB funding agreements is not consistent in Exhibit 7, Deposit-Type Contracts. The source of the FHLB amount is Note 11.B(4)(b):

Line: Funding agreements, current year, amount as of the reporting date, borrowing from FHLB, collateral pledged to FHLB Column: Funding Agreement Reserves Established

For some insurers, we were able to match amounts from the FHLB funding agreement footnote to the exact same amount in Exhibit 7, either Column 2 (GICs) or Column 6 (Premiums and Other Deposit Funds). For those insurers where the FHLB amount matched Exhibit 7, Column 2, we did not add the FHLB funding agreement amount to the GICs amount, because that would be double-counting the FHLB funding agreements. For other insurers, even though the amounts did not match exactly, we were able to assume the FHLB funding agreements were reported in either Column 2 or Column 6 (e.g., the amount in Exhibit 7, Column 2 was zero or much smaller than the FHLB note, while the Column 6 amount was larger). However, for several insurers, we were not able to make an informed assumption (e.g., both Column 2 and Column 6 amounts were larger than the FHLB funding agreement amount). To be conservative in these instances, we added the FHLB funding agreement amount to the GICs amount. Overall, for the \$10 billion threshold, adding FHLB funding agreements to GICs does not result in a different list of insurance groups from the list with GICs of more than \$10 billion.



## Annex 2: Sources and Uses

Company Type		HoldCo	Company Type Toggle (choose either HoldCo or OpCo) to identify the relevant cash flows.			
Cash Flow	CF Type	CF Category	Cash Flows in Time Horizon			
			1 Month	3 Months	12 Months	
Sources	Operating	Premiums and Deposits (Renewal / New Business)				
		Cash Charges / Fees				
		Reinsurance Recoverables				
		Expenses – Intercompany Settlements				
		Tax Payments (Inflows)				
		Other Flows				
	Investment and Derivatives	Principal and Interest				
		Dividends / Distributions				
		Initial and Variation Margin Received				
		Other Collateral Received				
		Asset Sales (Pending Settlement)				
		Other Flows				
	Capital	Capital Contributions				
		Commitments				
		Dividends from Subsidiaries				
		Other Flows				
	Funding	Debt Issuance / Refinancing				
		GICs				
		FHLB				
		Repo / Securities Lending				
		Credit Facilities (Incl. Contingency Funding Facilities)				
		Intercompany Loans				
		Commercial Paper				
		Other Flows				
	<b>Total Sources (before Asset Sales)</b>					

Cash Flow	CF Type	CF Category	Cash Flows in Time Horizon			
			1 Month	3 Months	12 Months	
Uses	Operating	Non-Elective Benefits / Claims				
		Elective Benefits / Claims				
		Commissions				
		Reinsurance Payables				
		Expenses - Other				
		Expenses - Intercompany Settlements				
		Insurance Product Commitments				
		Tax Payments (Outflows)				
	Investment and Derivatives	Investment Commitments				
		Initial and Variation Margin Paid				
		Other Collateral Pledged				
		Asset Purchases (Pending Settlement)				
		Other Flows				
	Capital	Shareholder/Policyholder Dividends				
		Capital Contributions to Subsidiaries				
		Dividends to Parent				
		Other Flows				
	Funding	Debt Maturities / Debt Servicing				
		GICs Benefits / Maturities				
		FHLB				
		Repo / Securities Lending				
		Credit Facilities (Incl. Contingency Funding Facilities)				
		Intercompany Loans				
		Other Flows				
	<b>Total Uses</b>					

Note: Certain flows could be settled in securities (e.g. margins on derivatives, capital contributions/dividends, etc.). Alternatively, eligible securities could be pledged to FHLB (or REPO with the street) to raise short-term funding.

### Annex 3: Expected Asset Sales Categories

Asset Category	Asset Sub-Category	Expected Asset Sales in Time Horizon		
		1 Month	3 Months	12 Months
Cash	Cash & Cash Equivalents			
Government Securities	Treasury & Agency Bonds			
	Other IG Sovereigns & Regional Government			
	Below IG Sovereigns & Regional Government			
	Agency CMO			
	Agency MBS			
	Agency CMBS			
Public Bonds	Agency ABS			
	IG Public Corporate Bonds			
	IG Municipal Bonds			
	Below IG Public Corporate Bonds			
Private Bonds	Below IG Municipal Bonds			
	IG Private Placement Bonds			
	IG 144As			
	Below IG Private Placement Bonds			
Non-Agency Structured Debt	Below IG 144As			
	IG CMO			
	IG MBS			
	IG CMBS			
	IG ABS			
	IG CLO			
	Below IG CMO			
	Below IG MBS			
	Below IG CMBS			
	Below IG ABS			
Equity	Below IG CLO			
	Common Stock			
	Preferred Stock			
Other	Other Equity and Alternative Investments			
	Commercial, Residential, Agricultural, Bank and Other Loans			
	Other			
<b>Total Expected Asset Sales</b>				

Summary			
Total Sources (before Asset Sales)			
Total Uses			
Net Sources & Uses (before Asset Sales)			
Total Expected Asset Sales			
Coverage Ratio	0.0	0.0	0.0

Note: Any securities pledged as part of institutional funding agreements (e.g. FHLB) should be excluded and considered encumbered. However, any pre-pledged assets that are not securing credit that has been extended and remains outstanding (i.e., excess) should be considered unencumbered

Annex 3i. Example (reconciliation to portfolio manager review/feedback)

Asset Category	Asset Sub-Category	Amounts Available in Time Horizon			Expected Asset Sales in Time Horizon			Final Asset Sales given PM review			Comments
		1 Month	3 Months	12 Months	1 Month	3 Months	12 Months	1 Month	3 Months	12 Months	
Cash	Cash & Cash Equivalents	488	488	488	488	488	488	488	488	488	
Government Securities	Treasury & Agency Bonds	1,923	2,210	2,210	394	391	2,048	1,188	1,194	2,210	
	Other IG Sovereigns & Regional Government				-	-	-				
	Below IG Sovereigns & Regional Government				-	-	-				
	Agency CMO				-	-	-				
	Agency MBS				-	-	-				
Public Bonds	IG Public Corporate Bonds	2,998	3,534	5,231	615	625	4,847			4,600	
	IG Municipal Bonds	55	87	128	11	15	119			120	
	Below IG Public Corporate Bonds	130	159	214	27	28	198			214	
	Below IG Municipal Bonds	5	6	16	1	1	15			16	
	IG Private Placement Bonds	551	623	1,284	113	110	1,190			1,247	
Private Bonds	IG 144As				-	-	-				
	Below IG Private Placement Bonds	4	7	12	1	1	11			12	
Non-Agency Structured Debt	IG CMO				-	-	-				
	IG MBS				-	-	-				
	IG CMBS				-	-	-				
	IG ABS				-	-	-				
	IG CLO				-	-	-				
	Below IG CMO				-	-	-				
	Below IG MBS				-	-	-				
	Below IG CMBS				-	-	-				
	Below IG ABS				-	-	-				
	Below IG CLO				-	-	-				
Equity	Common Stock	129	121	106	26	21	98			106	
	Preferred Stock				-	-	-				
Other	Other Equity and Alternative Investments				-	-	-				
	Commercial, Residential, Agricultural, Bank and Other Loans				-	-	-				
	Other				-	-	-				
<b>Total Assets Available for Sale</b>		<b>6,283</b>	<b>7,235</b>	<b>9,689</b>	<b>1,676</b>	<b>1,682</b>	<b>9,013</b>	<b>1,676</b>	<b>1,682</b>	<b>9,013</b>	

Summary									
Total Sources (before Asset Sales)	498	1,493	5,973	498	1,493	5,973	498	1,493	5,973
Total Uses	2,174	3,175	14,986	2,174	3,175	14,986	2,174	3,175	14,986
Net Sources & Uses (before Asset Sales)	(1,676)	(1,682)	(9,013)	(1,676)	(1,682)	(9,013)	(1,676)	(1,682)	(9,013)
Cash	488	488	488	488	488	488	488	488	488
Total Assets Available for Sale	6,283	7,235	9,689	1,676	1,682	9,013	1,676	1,682	9,013
% Asset Sales	20.50%	17.70%	92.65%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
<b>Coverage Ratio</b>	<b>311.91%</b>	<b>274.90%</b>	<b>104.51%</b>						

## Annex 4: Regulatory Prescribed Assumptions

## Annex 4i. Economic and Market Variables: Federal Reserve's 2008 Severely Adverse Scenario

## Placeholder-Illustrative Example only

Table 1.A. Historical data: Domestic variables, Q1:2000–Q4:2017

Percent, unless otherwise indicated.

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	Level			
													Dow Jones Total Stock Market Index	House Price Index	Commercial Real Estate Price Index	Market Volatility Index
Q1 2000	1.2	4.3	8.1	11.8	4.0	4.0	5.5	6.6	6.7	8.2	8.3	8.7	14,296	102	127	27.0
Q2 2000	7.8	10.2	4.2	6.1	3.9	3.2	5.7	6.5	6.4	8.5	8.3	9.2	13,619	105	125	33.5
Q3 2000	0.5	3.1	4.8	7.4	4.0	3.7	6.0	6.1	6.1	8.1	8.0	9.5	13,613	107	139	21.9
Q4 2000	2.3	4.5	1.4	3.6	3.9	2.9	6.0	5.6	5.8	7.9	7.6	9.5	12,176	110	144	31.7
Q1 2001	-1.1	1.4	3.5	6.3	4.2	3.9	4.8	4.9	5.3	7.4	7.0	8.6	10,646	112	143	32.8
Q2 2001	2.1	5.1	-0.3	1.6	4.4	2.8	3.7	4.9	5.5	7.5	7.1	7.3	11,407	114	142	34.7
Q3 2001	-1.3	0.0	9.8	10.1	4.8	1.1	3.2	4.6	5.3	7.3	7.0	6.6	9,563	116	143	43.7
Q4 2001	1.1	2.3	-4.9	-4.6	5.5	-0.3	1.9	4.2	5.1	7.2	6.8	5.2	10,708	118	139	35.3
Q1 2002	3.7	5.1	10.1	10.9	5.7	1.3	1.7	4.5	5.4	7.6	7.0	4.8	10,776	120	140	26.1
Q2 2002	2.2	3.8	2.0	5.2	5.8	3.2	1.7	4.5	5.4	7.6	6.8	4.8	9,384	123	140	28.4
Q3 2002	2.0	3.8	-0.5	1.5	5.7	2.2	1.6	3.4	4.5	7.3	6.3	4.8	7,774	127	142	45.1
Q4 2002	0.3	2.4	1.9	3.8	5.9	2.4	1.3	3.1	4.3	7.0	6.1	4.5	8,343	129	144	42.6
Q1 2003	2.1	4.6	1.1	4.0	5.9	4.2	1.2	2.9	4.2	6.5	5.8	4.3	8,052	132	151	34.7
Q2 2003	3.8	5.1	5.9	6.3	6.1	-0.7	1.0	2.6	3.8	5.7	5.5	4.2	9,342	135	151	29.1
Q3 2003	6.9	9.3	6.7	9.3	6.1	3.0	0.9	3.1	4.4	6.0	6.0	4.0	9,650	139	149	22.7
Q4 2003	4.8	6.8	1.6	3.3	5.8	1.5	0.9	3.2	4.4	5.8	5.9	4.0	10,800	143	147	21.1
Q1 2004	2.3	5.9	2.9	6.1	5.7	3.4	0.9	3.0	4.1	5.5	5.6	4.0	11,039	148	153	21.6
Q2 2004	3.0	6.6	4.0	7.0	5.6	3.2	1.1	3.7	4.7	6.1	6.1	4.0	11,145	154	164	20.0
Q3 2004	3.7	6.3	2.1	4.5	5.4	2.6	1.5	3.5	4.4	5.8	5.9	4.4	10,894	159	175	19.3
Q4 2004	3.5	6.4	5.1	8.5	5.4	4.4	2.0	3.5	4.3	5.4	5.7	4.9	11,951	165	178	16.6
Q1 2005	4.3	8.3	-3.8	-1.8	5.3	2.0	2.5	3.9	4.4	5.4	5.8	5.4	11,637	172	179	14.7
Q2 2005	2.1	5.1	3.2	6.0	5.1	2.7	2.9	3.9	4.2	5.5	5.7	5.9	11,857	179	185	17.7
Q3 2005	3.4	7.3	2.1	6.6	5.0	6.2	3.4	4.0	4.3	5.5	5.8	6.4	12,283	185	190	14.2
Q4 2005	2.3	5.4	3.4	6.6	5.0	3.8	3.8	4.4	4.6	5.9	6.2	7.0	12,497	191	199	16.5
Q1 2006	4.9	8.2	9.5	11.5	4.7	2.1	4.4	4.6	4.7	6.0	6.2	7.4	13,122	194	204	14.6
Q2 2006	1.2	4.5	0.6	3.7	4.6	3.7	4.7	5.0	5.2	6.5	6.6	7.9	12,809	193	213	23.8
Q3 2006	0.4	3.2	1.2	4.1	4.6	3.8	4.9	4.8	5.0	6.4	6.6	8.3	13,322	192	220	18.6
Q4 2006	3.2	4.6	5.3	4.6	4.4	-1.6	4.9	4.6	4.7	6.1	6.2	8.3	14,216	191	222	12.7
Q1 2007	0.2	4.8	2.6	6.5	4.5	4.0	5.0	4.6	4.8	6.1	6.2	8.3	14,354	189	230	19.6
Q2 2007	3.1	5.4	0.8	4.0	4.5	4.6	4.7	4.7	4.9	6.3	6.4	8.3	15,163	184	239	18.9
Q3 2007	2.7	4.2	1.1	3.4	4.7	2.6	4.3	4.5	4.8	6.5	6.6	8.2	15,318	178	247	30.8
Q4 2007	1.4	3.2	0.3	4.4	4.8	5.0	3.4	3.8	4.4	6.4	6.2	7.5	14,754	172	249	31.1
Q1 2008	-2.7	-0.5	2.9	6.5	5.0	4.4	2.1	2.8	3.9	6.5	5.9	6.2	13,284	165	236	32.2
Q2 2008	2.0	4.0	8.7	13.3	5.3	5.3	1.6	3.2	4.1	6.8	6.1	5.1	13,016	157	224	24.1
Q3 2008	-1.9	0.8	-8.9	-5.1	6.0	6.3	1.5	3.1	4.1	7.2	6.3	5.0	11,826	150	231	46.7
Q4 2008	-8.2	-7.7	2.6	-3.2	6.9	-8.9	0.3	2.2	3.7	9.4	5.9	4.1	9,057	142	219	80.9
Q1 2009	-5.4	-4.5	-0.8	-3.0	8.3	-2.7	0.2	1.9	3.2	9.0	5.1	3.3	8,044	138	208	56.7
Q2 2009	-0.5	-1.2	2.9	4.7	9.3	2.1	0.2	2.3	3.7	8.2	5.0	3.3	9,343	138	180	42.3

Table 1.A.—*continued*

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	Level			
													Dow Jones Total Stock Market Index	House Price Index	Commercial Real Estate Price Index	Market Volatility Index
Q3 2009	1.3	1.2	-4.3	-1.9	9.6	3.5	0.2	2.5	3.8	6.8	5.2	3.3	10,813	138	160	31.3
Q4 2009	3.9	5.2	-0.5	2.2	9.9	3.2	0.1	2.3	3.7	6.1	4.9	3.3	11,385	139	160	30.7
Q1 2010	1.7	3.2	0.4	1.8	9.8	0.6	0.1	2.4	3.9	5.8	5.0	3.3	12,032	139	152	27.3
Q2 2010	3.9	5.8	5.3	5.8	9.6	-0.1	0.1	2.3	3.6	5.6	4.9	3.3	10,646	138	165	45.8
Q3 2010	2.7	4.6	2.0	3.2	9.5	1.2	0.2	1.6	2.9	5.1	4.4	3.3	11,814	135	165	32.9
Q4 2010	2.5	4.7	2.8	5.0	9.5	3.3	0.1	1.5	3.0	5.0	4.4	3.3	13,131	134	167	23.5
Q1 2011	-1.5	0.2	5.0	8.2	9.0	4.3	0.1	2.1	3.5	5.4	4.8	3.3	13,909	133	172	29.4
Q2 2011	2.9	6.0	-0.6	3.5	9.1	4.6	0.0	1.8	3.3	5.1	4.7	3.3	13,843	132	173	22.7
Q3 2011	0.8	3.3	2.1	4.3	9.0	2.6	0.0	1.1	2.5	4.9	4.3	3.3	11,677	133	172	48.0
Q4 2011	4.6	5.2	0.2	1.6	8.6	1.8	0.0	1.0	2.1	5.0	4.0	3.3	13,019	133	178	45.5
Q1 2012	2.7	4.9	6.7	9.2	8.3	2.3	0.1	0.9	2.1	4.7	3.9	3.3	14,627	134	180	23.0
Q2 2012	1.9	3.8	3.1	4.4	8.2	0.8	0.1	0.8	1.8	4.5	3.8	3.3	14,100	138	181	26.7
Q3 2012	0.5	2.7	-0.2	1.1	8.0	1.8	0.1	0.7	1.6	4.2	3.6	3.3	14,895	140	187	20.5
Q4 2012	0.1	1.7	10.9	13.3	7.8	2.7	0.1	0.7	1.7	3.9	3.4	3.3	14,835	143	187	22.7
Q1 2013	2.8	4.4	-15.7	-14.5	7.7	1.6	0.1	0.8	1.9	4.0	3.5	3.3	16,396	147	190	19.0
Q2 2013	0.8	1.6	2.4	2.5	7.5	-0.5	0.1	0.9	2.0	4.1	3.7	3.3	16,771	151	199	20.5
Q3 2013	3.1	5.1	2.4	3.9	7.2	2.2	0.0	1.5	2.7	4.9	4.4	3.3	17,718	155	208	17.0
Q4 2013	4.0	6.1	0.9	2.6	6.9	1.6	0.1	1.4	2.8	4.8	4.3	3.3	19,413	158	212	20.3
Q1 2014	-0.9	0.7	4.3	6.5	6.7	2.6	0.0	1.6	2.8	4.6	4.4	3.3	19,711	160	211	21.4
Q2 2014	4.6	7.0	5.3	7.1	6.2	1.9	0.0	1.7	2.7	4.3	4.2	3.3	20,569	161	220	17.0
Q3 2014	5.2	7.1	4.2	5.5	6.1	1.0	0.0	1.7	2.5	4.2	4.1	3.3	20,459	163	223	17.0
Q4 2014	2.0	2.6	5.9	5.7	5.7	-0.7	0.0	1.6	2.3	4.2	4.0	3.3	21,425	166	234	26.3
Q1 2015	3.2	3.2	4.3	2.6	5.6	-2.5	0.0	1.5	2.0	4.0	3.7	3.3	21,708	168	249	22.4
Q2 2015	2.7	5.0	3.8	5.6	5.4	2.4	0.0	1.5	2.2	4.2	3.8	3.3	21,631	170	251	18.9
Q3 2015	1.6	3.0	1.8	3.2	5.1	1.5	0.0	1.6	2.3	4.5	4.0	3.3	19,959	172	257	40.7
Q4 2015	0.5	1.3	2.9	3.1	5.0	0.4	0.1	1.6	2.2	4.6	3.9	3.3	21,101	175	254	24.4
Q1 2016	0.6	0.8	0.2	0.9	4.9	0.1	0.3	1.4	2.0	4.6	3.7	3.5	21,179	177	245	28.1
Q2 2016	2.2	4.7	1.9	4.0	4.9	2.3	0.3	1.3	1.8	4.1	3.6	3.5	21,621	179	248	25.8
Q3 2016	2.8	4.2	0.7	2.5	4.9	1.8	0.3	1.2	1.6	3.7	3.4	3.5	22,469	182	266	18.1
Q4 2016	1.8	3.8	-1.8	0.1	4.7	3.0	0.4	1.7	2.2	4.1	3.8	3.5	23,277	184	269	22.5
Q1 2017	1.2	3.3	2.9	5.2	4.7	3.1	0.6	2.0	2.5	4.2	4.2	3.8	24,508	187	262	13.1
Q2 2017	3.1	4.1	2.7	3.0	4.3	-0.3	0.9	1.8	2.3	4.0	4.0	4.0	25,125	190	272	16.0
Q3 2017	3.2	5.3	0.5	2.1	4.3	2.0	1.0	1.8	2.3	3.9	3.9	4.3	26,149	193	275	16.0
Q4 2017	2.7	5.0	1.9	5.6	4.1	3.7	1.2	2.1	2.4	4.0	3.9	4.3	27,673	194	279	13.1

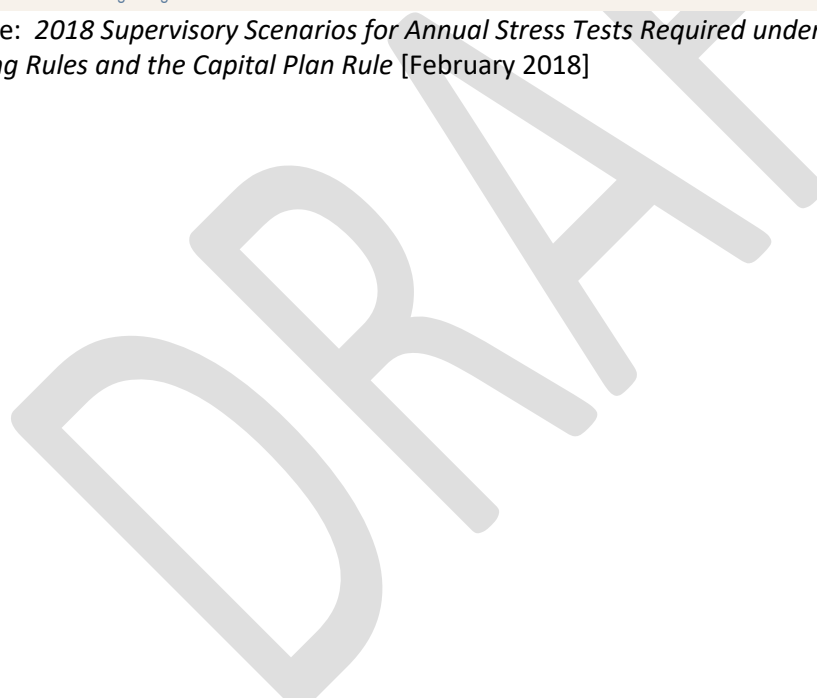
Note: Refer to [Notes Regarding Scenario Variables](#) for more information on the definitions and sources of historical observations of the variables in the table.

Table 4.A. Supervisory severely adverse scenario: Domestic variables, Q1:2018–Q1:2021  
Percent, unless otherwise indicated.

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	Level			
													Dow Jones Total Stock Market Index	House Price Index	Commercial Real Estate Price Index	Market Volatility Index
Q1 2018	-4.7	-2.3	1.4	3.0	5.0	1.4	0.1	1.9	2.4	7.1	5.3	3.3	13,466	186	262	50.7
Q2 2018	-8.9	-7.1	-4.2	-3.1	6.5	0.9	0.1	1.9	2.4	7.7	5.7	3.3	11,631	171	234	62.4
Q3 2018	-6.8	-5.1	-5.1	-3.8	7.6	1.2	0.1	1.9	2.4	7.9	5.8	3.3	10,575	159	212	59.5
Q4 2018	-4.7	-3.0	-3.9	-2.5	8.5	1.3	0.1	1.9	2.4	8.0	5.9	3.3	10,306	151	195	52.8
Q1 2019	-3.6	-1.8	-2.9	-1.5	9.3	1.5	0.1	1.9	2.4	8.1	6.0	3.2	9,689	143	181	47.4
Q2 2019	-1.3	0.3	-2.4	-1.0	9.7	1.5	0.1	1.9	2.4	7.9	6.0	3.2	10,100	139	173	37.9
Q3 2019	-0.2	1.4	-1.4	-0.1	10.0	1.5	0.1	1.9	2.4	7.5	5.8	3.2	10,949	136	167	29.7
Q4 2019	2.8	4.3	-0.1	1.5	9.9	1.8	0.1	1.9	2.4	7.1	5.7	3.2	12,031	136	167	23.5
Q1 2020	3.5	4.8	1.9	3.4	9.7	1.8	0.1	1.9	2.4	6.7	5.5	3.2	13,234	136	167	19.8
Q2 2020	4.0	5.2	2.3	3.7	9.5	1.7	0.1	1.9	2.4	6.3	5.3	3.2	14,713	137	170	17.5
Q3 2020	4.2	5.3	2.7	4.1	9.2	1.6	0.1	1.9	2.4	5.9	5.1	3.2	16,323	139	172	16.0
Q4 2020	4.5	5.5	3.1	4.3	8.9	1.6	0.1	1.9	2.4	5.5	4.9	3.2	18,143	141	176	15.0
Q1 2021	4.5	5.4	3.3	4.5	8.6	1.5	0.1	1.9	2.4	5.0	4.7	3.2	20,168	143	180	14.4

Note: Refer to [Notes Regarding Scenario Variables](#) for more information on the definitions and sources of historical observations of the variables in the table.

Source: *2018 Supervisory Scenarios for Annual Stress Tests Required under the Dodd-Frank Act Stress Testing Rules and the Capital Plan Rule* [February 2018]



## Annex 4ii. Market Capacity Assumption

## Placeholder-Illustrative Example only

Average Daily Trading Volume by Asset Class					
Asset Category	Asset Sub-Category	Name in 2019 SIFMA Factbook	Year in 2019 SIFMA Factbook	Average Daily Trading Volume (\$ billions)	Volume -Assume 80% Haircut
Cash	Cash & Cash Equivalents				
Government Securities	Treasury & Agency Bonds	16; U.S. BOND MARKET AVERAGE DAILY TRADING VOLUME; Treasury + Federal Agency Securities	2008	657.51	526.01
	Other IG Sovereigns & Regional Government				
	Below IG				
	Agency CMO				
	Agency MBS	16; U.S. BOND MARKET AVERAGE DAILY TRADING VOLUME; Agency MBS	2008	344.92	275.94
	Agency CMBS				
	Agency ABS				
Public Bonds	IG Public Corporate Bonds	16; U.S. BOND MARKET AVERAGE DAILY TRADING VOLUME; Corporate Bonds	2008	14.32	11.46
	IG Municipal Bonds	16; U.S. BOND MARKET AVERAGE DAILY TRADING VOLUME; Municipal Bonds	2008	19.37	15.50
	Below IG Public				
	Below IG Municipal				
Private Bonds	IG Private				
	IG 144As				
	Below IG Private				
	Below IG 144As				
Non-Agency Structured Debt	IG CMO				
	IG MBS	16; U.S. BOND MARKET AVERAGE DAILY TRADING VOLUME; Non-Agency MBS	2011	4.44	3.55
	IG CMBS				
	IG ABS	16; U.S. BOND MARKET AVERAGE DAILY TRADING	2011	1.47	1.18
	IG CLO				
	Below IG CMO				
	Below IG MBS				
	Below IG CMBS				
	Below IG ABS				
	Below IG CLO				
Equity	Common Stock	19; U.S. EQUITY MARKETS AVERAGE DAILY TRADING VOLUME– CHART; U.S. equity	2009	220.47	176.37
	Preferred Stock				
	Other Equity and				
Other	Commercial, Residential,				
	Other				

## Annex 4iii. Structured spreads over Treasuries

**Placeholder-Illustrative Example only**

Structured Spreads Over Treasuries						
Asset Type	Baseline	1 Mo.	3 Mo.	6 Mo.	9 Mo.	12 Mo.
Agency MBS	X	X	X	X	X	X
Non-Agency MBS	X	X	X	X	X	X
CMBS	X	X	X	X	X	X
CLO/CDO	X	X	X	X	X	X
ABS-Cards	X	X	X	X	X	X
ABS-Auto	X	X	X	X	X	X

## Annex 4iv. Swap Spreads

**Placeholder-Illustrative Example only**

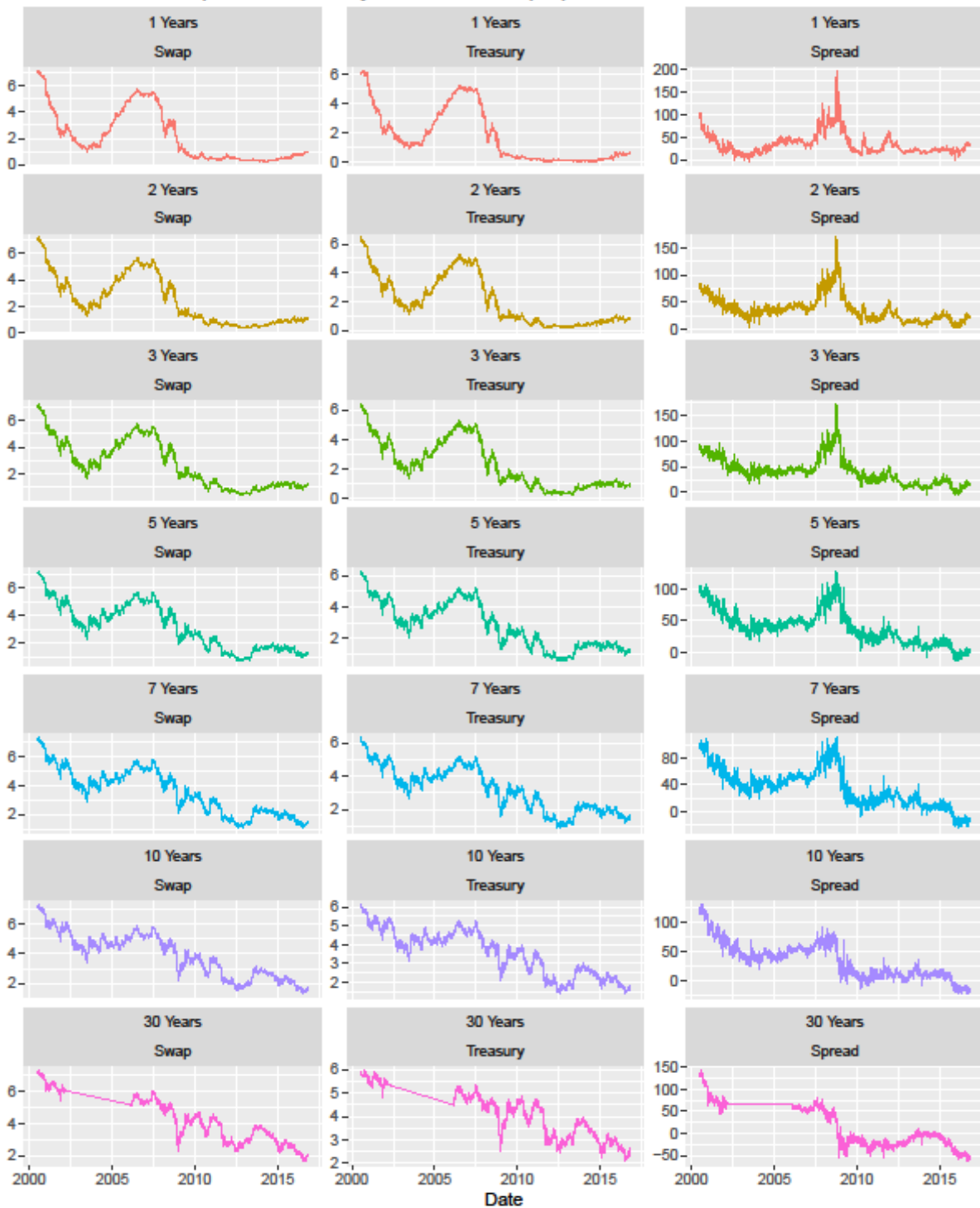
Swap Spreads <sup>1,2</sup>						
Maturity	Baseline	1 Mo.	3 Mo.	6 Mo.	9 Mo.	12 Mo.
3 Mo.	X	X	X	X	X	X
5 Yr	X	X	X	X	X	X
10 Yr	X	X	X	X	X	X
20 Yr	X	X	X	X	X	X
30 Yr	X	X	X	X	X	X

1 - (Nominal) Swap Spreads (in BPS)

2 - IR Par Swap Spreads for USD, EUR, JPY, GBP, AUD and CAD



### Timeseries of Swap Rates, Treasury Rates, and Swap Spreads



Swap and Treasury rates from H.15 (via FRED). Spread paid by fixed-rate payer on an interest rate swap over constant maturity Treasury at the given maturities.

Source: Federal Reserve

Annex 4v. Implied Volatility of IR Swaptions

**Placeholder-Illustrative Example only**

Implied Volatility		
Implied Normal Volatility of IR Swaption by Tenor and Expiry		
Time Horizon 0		
Tenor/Expiry	3Y	7Y
3 Mo.	X	X
3Y	X	X
5Y	X	X
7Y	X	X
10Y	X	X

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Annex 4vi. Credit Assumptions: Moody’s Transition Matrix/Migration Rates  
**Placeholder-Illustrative Example only**

Exhibit 36. Average one-year alphanumeric rating migration rates, 1983-2018

From\To	Aaa	Aa1	Aa2	Aa3	A1	A2	A3	Baa1	Baa2	Baa3	Ba1	Ba2	Ba3	B1	B2	B3	Caa1	Caa2	Caa3	Ca-C	WR	Def
Aaa	86.92%	5.39%	2.32%	0.55%	0.29%	0.15%	0.02%	0.06%	0.00%	0.02%	0.01%	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	4.25%	0.00%
Aa1	1.70%	76.66%	8.04%	5.90%	1.43%	0.91%	0.18%	0.12%	0.08%	0.01%	0.04%	0.00%	0.01%	0.04%	0.03%	0.01%	0.02%	0.02%	0.00%	0.00%	4.82%	0.00%
Aa2	1.04%	4.33%	73.29%	10.31%	3.52%	1.65%	0.41%	0.09%	0.16%	0.07%	0.03%	0.02%	0.00%	0.03%	0.01%	0.02%	0.00%	0.02%	0.00%	0.00%	5.01%	0.00%
Aa3	0.15%	1.07%	4.18%	75.15%	8.79%	3.60%	0.84%	0.24%	0.25%	0.12%	0.03%	0.03%	0.01%	0.01%	0.00%	0.00%	0.00%	0.01%	0.00%	0.00%	5.48%	0.04%
A1	0.05%	0.10%	1.06%	5.12%	75.75%	7.73%	2.84%	0.62%	0.45%	0.20%	0.18%	0.13%	0.05%	0.06%	0.01%	0.01%	0.02%	0.01%	0.01%	0.00%	5.56%	0.07%
A2	0.06%	0.03%	0.21%	1.05%	5.83%	76.17%	7.37%	2.60%	1.02%	0.38%	0.18%	0.14%	0.17%	0.05%	0.03%	0.01%	0.02%	0.02%	0.01%	0.00%	4.61%	0.05%
A3	0.04%	0.04%	0.10%	0.30%	1.52%	6.39%	75.08%	6.84%	2.74%	0.89%	0.36%	0.16%	0.13%	0.11%	0.04%	0.02%	0.03%	0.01%	0.00%	0.02%	5.15%	0.05%
Baa1	0.02%	0.02%	0.08%	0.12%	0.21%	1.63%	6.75%	75.05%	6.98%	2.34%	0.65%	0.34%	0.22%	0.27%	0.06%	0.03%	0.05%	0.03%	0.01%	0.02%	5.01%	0.12%
Baa2	0.04%	0.04%	0.02%	0.06%	0.17%	0.58%	1.97%	6.63%	75.27%	6.49%	1.37%	0.64%	0.45%	0.34%	0.20%	0.09%	0.11%	0.01%	0.02%	0.01%	5.34%	0.16%
Baa3	0.03%	0.01%	0.02%	0.04%	0.07%	0.18%	0.48%	1.90%	8.85%	72.74%	4.81%	2.10%	0.99%	0.72%	0.29%	0.25%	0.15%	0.07%	0.06%	0.04%	6.00%	0.23%
Ba1	0.02%	0.00%	0.02%	0.02%	0.15%	0.14%	0.21%	0.72%	2.50%	10.25%	65.29%	5.18%	4.12%	1.63%	0.64%	0.52%	0.13%	0.23%	0.05%	0.12%	7.66%	0.42%
Ba2	0.00%	0.00%	0.02%	0.03%	0.09%	0.12%	0.16%	0.37%	0.70%	3.83%	8.01%	63.92%	6.58%	3.72%	1.40%	0.96%	0.31%	0.21%	0.09%	0.14%	8.64%	0.71%
Ba3	0.00%	0.01%	0.01%	0.01%	0.06%	0.17%	0.18%	0.09%	0.46%	0.78%	2.88%	6.80%	64.34%	7.08%	3.27%	1.88%	0.63%	0.42%	0.10%	0.13%	9.40%	1.30%
B1	0.01%	0.01%	0.02%	0.01%	0.05%	0.03%	0.08%	0.09%	0.21%	0.34%	0.72%	2.88%	6.65%	63.68%	6.09%	4.43%	1.29%	0.72%	0.21%	0.25%	10.35%	1.88%
B2	0.00%	0.01%	0.00%	0.01%	0.02%	0.02%	0.09%	0.11%	0.13%	0.26%	0.22%	0.70%	2.05%	7.44%	61.95%	7.87%	3.60%	1.79%	0.43%	0.48%	9.97%	2.83%
B3	0.01%	0.00%	0.02%	0.00%	0.03%	0.03%	0.06%	0.04%	0.04%	0.10%	0.14%	0.23%	0.60%	2.37%	6.33%	60.40%	7.28%	3.29%	1.13%	0.83%	12.46%	4.62%
Caa1	0.00%	0.01%	0.00%	0.00%	0.00%	0.01%	0.00%	0.02%	0.01%	0.03%	0.06%	0.12%	0.24%	0.42%	1.39%	7.74%	59.35%	8.41%	2.63%	1.30%	14.09%	4.16%
Caa2	0.00%	0.00%	0.02%	0.00%	0.02%	0.01%	0.00%	0.00%	0.05%	0.09%	0.04%	0.05%	0.15%	0.42%	0.81%	2.34%	7.86%	54.87%	5.98%	2.97%	15.48%	8.82%
Caa3	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.06%	0.03%	0.04%	0.18%	0.17%	1.04%	3.17%	8.61%	44.82%	8.76%	14.75%	18.37%
Ca-C	0.00%	0.00%	0.00%	0.00%	0.00%	0.02%	0.03%	0.00%	0.00%	0.00%	0.23%	0.14%	0.21%	0.10%	0.29%	1.82%	2.11%	3.43%	4.51%	38.16%	21.84%	27.12%

Source: Moody’s

## Annex 4vii. Credit Assumptions: Moody's Default Table

Placeholder-Illustrative Example only

Rating\Year	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Aaa	0.00%	0.01%	0.01%	0.04%	0.06%	0.10%	0.13%	0.13%	0.13%	0.13%	0.13%	0.13%	0.13%	0.13%	0.13%	0.13%	0.13%	0.13%	0.13%	0.13%
Aa	0.02%	0.06%	0.12%	0.20%	0.30%	0.39%	0.48%	0.57%	0.65%	0.74%	0.84%	0.97%	1.11%	1.20%	1.29%	1.38%	1.50%	1.66%	1.89%	2.09%
A	0.06%	0.17%	0.35%	0.54%	0.77%	1.03%	1.30%	1.58%	1.87%	2.14%	2.41%	2.67%	2.96%	3.30%	3.68%	4.07%	4.46%	4.87%	5.22%	5.57%
Baa	0.17%	0.44%	0.75%	1.12%	1.50%	1.90%	2.27%	2.64%	3.02%	3.42%	3.87%	4.34%	4.85%	5.33%	5.80%	6.35%	6.92%	7.46%	7.93%	8.26%
Ba	0.87%	2.47%	4.38%	6.39%	8.18%	9.77%	11.21%	12.57%	13.91%	15.26%	16.43%	17.60%	18.67%	19.73%	20.86%	21.91%	22.81%	23.68%	24.65%	25.28%
B	3.31%	7.88%	12.57%	16.84%	20.71%	24.19%	27.29%	29.93%	32.26%	34.22%	35.87%	37.32%	38.71%	40.24%	41.67%	43.03%	44.29%	45.49%	46.50%	47.52%
Caa-C	9.70%	17.32%	23.84%	29.34%	33.93%	37.51%	40.63%	43.53%	46.19%	48.19%	49.75%	50.52%	51.00%	51.09%	51.29%	51.66%	51.77%	51.77%	51.77%	51.77%
IG	0.09%	0.24%	0.43%	0.66%	0.90%	1.16%	1.41%	1.66%	1.91%	2.16%	2.43%	2.70%	3.00%	3.29%	3.60%	3.93%	4.26%	4.61%	4.93%	5.20%
SG	4.12%	8.37%	12.42%	16.02%	19.12%	21.76%	24.07%	26.09%	27.91%	29.51%	30.85%	32.05%	33.16%	34.29%	35.41%	36.46%	37.37%	38.24%	39.10%	39.79%
All	1.63%	3.26%	4.76%	6.04%	7.12%	8.03%	8.80%	9.47%	10.08%	10.61%	11.10%	11.55%	11.99%	12.43%	12.87%	13.31%	13.72%	14.14%	14.52%	14.84%

Source: Moody's

## Annex 4viii. Credit Assumptions: Moody's Recovery Rate Table

Placeholder-Illustrative Example only

## Average corporate debt recovery rates measured by ultimate recoveries, 1987-2018

Priority Position	Emergence Year			Default Year		
	2018	2017	1987-2018	2018	2017	1987-2018
Loans	85.0%	83.3%	80.3%	85.0%	84.3%	80.3%
Senior Secured Bonds	53.8%	68.0%	62.2%	55.0%	65.7%	62.2%
Senior Unsecured Bonds	38.5%	56.4%	47.7%	35.5%	58.3%	47.7%
Subordinated Bonds	0.0%	51.2%	28.0%	n.a.	62.9%	28.0%

Source: Moody's