Annual Stress Test Baseline, Adverse, and Severely Adverse Scenarios

February 2, 2018

Brief Description of the Scenarios

The ***baseline scenario*** for the United States is a moderate economic expansion. Real Gross Domestic Product (GDP) grows on average between 2 and 2½ percent over the scenario period, with slightly stronger growth during 2018. The unemployment rate initially declines to below 4 percent before rising slowly and Consumer Price Index (CPI) inflation rises to a little under 2½ percent at an annual rate before dropping back to about 2¼ percent. Accompanying the moderate expansion, Treasury yields are assumed to rise modestly across the maturity spectrum. Equity prices rise by an average of about 5 percent per year. The baseline scenario for international economic activity and inflation features an expansion in activity, albeit one that proceeds at different rates across countries.

The ***adverse scenario*** is characterized by weakening economic activity across all countries included in the scenario. The economic downturn is accompanied by rapid declines in long-term rates and flattening yield curves in the United States and elsewhere. The U.S. economy experiences a moderate recession and the unemployment rate rises steadily, peaking at 7 percent in the third quarter of 2019. Financial conditions tighten for corporations and households during the recession and asset prices decline in the adverse scenario.

The ***severely adverse scenario*** is characterized by a severe global recession that is accompanied by a global aversion to long-term fixed-income assets that brings about a steepening yield curve. U.S. real GDP declines 7½ percent from its pre-recession peak, with unemployment reaching 10 percent and CPI inflation briefly falling below 1 percent at an annual rate. Asset prices fall sharply in this scenario. The international component of the severely adverse scenario features severe recessions in the euro area, the United Kingdom, and especially Japan, and a shallow and brief recession in developing Asia. As a result of the sharp contraction in economic activity, all foreign economies included in the scenario experience a decline in consumer prices.

It is important to recognize that these scenarios are not forecasts. Rather, they are designed to assess the strength and resilience of covered institutions in varying economic environments.

Baseline, Adverse, and Severely Adverse Scenarios

The annual stress test required by the Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010 (DFA) as implemented by the Annual Stress Test final rule published on October 9, 2012, requires national banks and federal savings associations with total consolidated assets of more than $10 billion (covered institutions) to conduct annual stress tests using a minimum of three scenarios (baseline, adverse, and severely adverse) provided by the Office of the Comptroller of the Currency (OCC).[1] This note provides a narrative on the three scenarios to be used for the stress test. The OCC developed these scenarios in coordination with the Federal Reserve Board and the Federal Deposit Insurance Corporation.[2]

The scenarios start in the first quarter of 2018 and extend through the first quarter of 2021. Each scenario includes 28 variables; this set of variables is the same as the set provided in last year's supervisory scenarios. The variables describing economic developments within the United States include:

- **Six measures of economic activity and prices:** percent changes (at an annual rate) in real and nominal GDP; the unemployment rate of the civilian non-institutional population aged 16 years and over; percent changes (at an annual rate) in real and nominal disposable personal income; and the percent change (at an annual rate) in the CPI;
- **Four aggregate measures of asset prices or financial conditions:** indexes of house prices, commercial real estate prices, equity prices, and U.S. stock market volatility; and
- **Six measures of interest rates:** the rate on the 3-month Treasury bill; the yield on the 5-year Treasury bond; the yield on the 10-year Treasury bond; the yield on a 10-year BBB corporate security; the interest rate associated with a conforming, conventional, 30-year fixed-rate mortgage; and the prime rate.

The variables describing international economic conditions in each scenario include three variables in four countries or country blocks:

- **The three variables for each country or country block:** the percent change (at an annual rate) in real GDP, the percent change (at an annual rate) in the CPI or local equivalent, and the level of the U.S. dollar exchange rate.
- **The four countries or country blocks included:** the euro area (the 19 European Union member states that have adopted the euro as their common currency), the United Kingdom, developing Asia (the nominal GDP-weighted aggregate of China, India, South Korea, Hong Kong Special Administrative Region, and Taiwan), and Japan.

The following sections describe the baseline scenario, the adverse scenario, and the severely adverse scenario. Further, this document includes a qualitative summary of the global market shocks that certain banks with significant trading activity will be required to apply to their

[1] 12 CFR part 46.
[2] See 78 FR 64153 (October 28, 2013) (Policy Statement on the Principles for Development and Distribution of Annual Stress Test Scenarios).

trading and counterparty positions as of December 4, 2017. The specific values for all variables included in the scenarios are provided as an Excel spreadsheet on the OCC's website at http://www.occ.treas.gov/tools-forms/forms/bank-operations/stress-test-reporting.html.

Baseline Scenario

The baseline outlook for U.S. real activity, inflation, and interest rates is similar to the January 2018 consensus projections from *Blue Chip Economic Indicators*.[3] This scenario does not represent the forecast of the OCC.

The baseline scenario for the United States is a moderate economic expansion through the projection period. Real GDP grows on average between 2 and 2½ percent over the scenario period, with slightly stronger growth during 2018. The unemployment rate falls below 4 percent in the second half of 2018, remains below 4 percent through the first half of 2020 and rises to a little above 4 percent thereafter. CPI inflation averages 2 percent in 2018 and 2¼ percent through the end of the scenario period.

Accompanying the moderate economic expansion, Treasury yields are assumed to rise modestly across the maturity spectrum for most of the scenario period before leveling off. Short-term Treasury rates increase from about 1½ percent at the beginning of 2018 to about 2½ percent by the second half of 2019, while yields on 10-year Treasury securities rise from 2½ percent to about 3½ percent by the beginning of 2020. The prime rate increases in line with short-term Treasury rates and mortgage rates rise in line with long-term Treasury yields. Reflecting steady growth and stable economic conditions, spreads between yields on investment-grade corporate bonds and yields on long-term Treasury securities widen only slightly over the scenario period. Equity prices rise about 5 percent on average each year over the scenario period. Equity market volatility rises modestly. Nominal house prices rise about 2½ percent in 2018 and 2019, and an average of about 3 percent thereafter. Commercial real estate prices rise about 5 percent in 2018 and 2019, and an average of about 3 percent per year through the end of the scenario period.

The baseline scenario for international variables is similar to that reported in the January 2018 Blue Chip Economic Indicators and the International Monetary Fund's October 2017 *World Economic Outlook*.[4] It features an expansion in international economic activity, albeit one that proceeds at different rates in the four countries or country blocks under consideration. Real GDP growth in developing Asia averages about 6 percent in 2018, slowing slightly to about 5¾ percent per year through the end of the scenario period; similarly, real GDP growth in Japan averages about 1¼ percent in 2018 and slows to slightly less than 1 percent by the end of 2019; real GDP growth in the euro area averages about 2 percent in 2018 and slows gradually to 1½ percent at the end of the scenario period. Finally, growth in the United Kingdom averages about 1½ percent per year through the scenario period.

[3] See Wolters Kluwer Legal and Regulatory Solutions (2018), "Blue Chip Economic Indicators," vol. 43, no. 1 (January 10).
[4] See International Monetary Fund (2017), "World Economic Outlook," http://www.imf.org/en/Publications/WEO/Issues/2017/09/19/world-economic-outlook-october-2017.

Adverse Scenario

The adverse scenario is characterized by weakening economic activity across all of the economies included in the scenario. This economic downturn is accompanied by rapid declines in long-term rates and flattening yield curves in the United States and the four countries/country blocks in the scenario. It is important to note that this is a hypothetical scenario designed to assess the strength of banking organizations and their resilience to adverse economic conditions. This scenario does not represent a forecast of the OCC.

In the adverse scenario, the U.S. economy experiences a moderate recession that begins in the first quarter of 2018. Real GDP falls slightly more than 2¼ percent from the pre-recession peak in the fourth quarter of 2017 to the recession trough in the first quarter of 2019, while the unemployment rate rises steadily, peaking at 7 percent in the third quarter of 2019. The U.S. recession is accompanied by an initial fall in inflation in the first two quarters of 2018. The rate of increase in consumer prices then rises steadily before leveling off at around 2 percent by the second half of 2019.

Reflecting weak economic conditions, short-term interest rates in the United States decline to nearly zero, where they remain for the rest of the scenario period. Yields on 10-year Treasury securities drop to around ¾ of a percent in the first quarter of 2018 as the yield curve flattens, and then gradually rise to slightly less than 2 percent by the end of the scenario. Financial conditions tighten for corporations and households during the recession. Spreads between investment-grade corporate bond yields and 10-year Treasury yields gradually rise to about 3¾ percentage points by early 2019, while spreads between mortgage rates and 10-year Treasury yields widen to about 2¾ percentage points over the same period.

Asset prices decline in the adverse scenario. Equity prices fall approximately 30 percent by early 2019, accompanied by a rise in equity market volatility. Aggregate house prices and commercial real estate prices experience sustained declines; house prices fall 12 percent and commercial real estate prices fall 15 percent by the first quarter of 2020.

Following the recession in the United States, real activity picks up slowly at first and then gains momentum; growth in real U.S. GDP increases from ¾ of a percent in 2019 to about 3 percent in 2020. The unemployment rate declines modestly, to about 6¼ percent by the end of the scenario period. Consumer price inflation remains at roughly 2 percent through the end of the scenario period. Yields on 10-year Treasury securities continue to rise gradually to slightly less than 2 percent by the end of the scenario period.

Outside of the United States, the adverse scenario features moderate recessions in the euro area and the United Kingdom, a pronounced and protracted recession in Japan, as well as below-trend growth in developing Asia. Weakness in global demand results in slowing inflation in all of the foreign economies under consideration and the onset of deflationary episodes in Japan and—more modestly—developing Asia. Reflecting flight-to-safety capital flows, the U.S. dollar appreciates against the euro, the pound sterling, and the currencies of developing Asia. The dollar depreciates modestly against the yen, also in line with flight-to-safety capital flows.

Comparison of 2018 Adverse Scenario and 2017 Adverse Scenario

The main difference relative to the 2017 adverse scenario is that this year's adverse scenario features lower long-term interest rates and a flatter yield curve across all of the economies included in the scenario. This different profile of interest rates is associated with a less pronounced decline in the U.S. equity price index in this year's scenario.

Additional Key Features of the Adverse Scenario

As in last year's adverse scenario, the slowdown in euro area economic activity reflects a broad-based contraction in euro area demand, not a contraction that is concentrated in a few specific economies. Similarly, the slowdown in developing Asia reflects a weakening in economic conditions across emerging market economies, not merely a weakening in Asia-specific conditions. Declines in aggregate U.S. residential real estate prices and commercial real estate prices should be assumed to be concentrated in regions that have experienced rapid price gains over the past two years. Declines in prices of U.S. housing and commercial real estate should also be assumed to be representative of risks to house prices and commercial real estate prices in foreign regions and economies that have experienced rapid price gains over the past two years.

Severely Adverse Scenario

The severely adverse 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 United States and the four countries/country blocks in the scenario. In turn, these developments lead to a broad-based and deep correction in asset prices—including in the corporate bond and real estate markets. It is important to note that this is a hypothetical scenario designed to assess the strength of banking organizations and their resilience to unfavorable economic conditions. This scenario does not represent a forecast of the OCC.[5]

In this scenario, the level of U.S. real GDP begins to decline in the first quarter of 2018 and reaches a trough in the third quarter of 2019 that is 7½ percent below the pre-recession peak (see Table 4A). The unemployment rate increases almost 6 percentage points, to 10 percent, by the third quarter of 2019. Headline consumer price inflation falls below 1 percent at an annual rate in the second quarter of 2018 and rises to about 1½ percent at an annual rate by the end of the scenario.

As a result of the severe decline in real activity, short-term Treasury rates fall and remain near zero through the end of the scenario period. However, investor aversion to long-term fixed-income assets keeps 10-year Treasury yields unchanged through the scenario period. Financial conditions in corporate and real estate lending markets are stressed severely. The spread between yields on investment-grade corporate bonds and yields on long-term Treasury securities widens to 5¾ percentage points by the start of 2019, while the spread between mortgage rates and 10-year Treasury yields widens to about 3½ percentage points over the same time period.

[5] The set of hypothetical conditions in the severely adverse scenario is distinct from the set of hypothetical conditions in the adverse scenario, unless otherwise noted.

Asset prices drop sharply in this scenario. Equity prices fall 65 percent by early 2019, accompanied by a surge in equity market volatility. The volatility index (VIX) moves above 60 percent in the first half of 2018. Real estate prices also experience large declines, with house prices and commercial real estate prices falling 30 percent and 40 percent, respectively, by the third quarter of 2019.

The international component of this scenario features a sharp global downturn, with severe recessions in the euro area, the United Kingdom, and especially Japan and a shallow and brief recession in developing Asia. As a result of the sharp contraction in economic activity, all foreign economies included in the scenario experience a decline in consumer prices, with Japan experiencing a more significant deflation that persists through the end of the scenario period. As in this year's adverse scenario, the U.S. dollar appreciates against the euro, the pound sterling, and the currencies of developing Asia but depreciates modestly against the yen because of flight-to-safety capital flows.

Comparison of 2018 Severely Adverse Scenario and 2017 Severely Adverse Scenario

This year's severely adverse scenario features a slightly more severe downturn in the U.S. economy as compared to last year's scenario. Furthermore, this year's scenario incorporates a steepening of the yield curve and a deeper correction in prices for a broad set of assets, including equities, housing, and commercial real estate. The international dimension of the scenario shows a recessionary episode that, relative to last year's scenario, is more severe in developing Asia and Japan but less severe in the euro area and the United Kingdom.

Additional Key Features of the Severely Adverse Scenario

As in the adverse scenario, the weakness in euro area economic conditions reflects a broad-based contraction in euro area demand, although this contraction should be assumed to be more protracted in countries with less room for fiscal policy stabilization. The sharp slowdown in developing Asia is distributed unevenly across countries, with decelerations more pronounced in the larger economies. Economic conditions in developing Asia should be assumed to be representative of conditions across emerging market economies.

As in the adverse scenario, declines in aggregate U.S. residential real estate prices and commercial real estate prices should be assumed to be concentrated in regions that have experienced rapid price gains over the past two years. Declines in prices of U.S. housing and commercial real estate should also be assumed to be representative of risks to house prices and commercial real estate prices in foreign regions and economies that have experienced rapid price gains over the past two years.

Global Market Shock Component for Adverse and Severely Adverse Scenarios

The OCC will provide to certain banks global market shock components of adverse and severely adverse scenarios to be used for the current stress test.[6] Under the DFA stress testing rules, large, complex institutions with significant trading activity must apply these components to their trading and counterparty exposures as of a specific date (December 4, 2017 for the current stress testing cycle) to project mark-to-market losses.[7]

The global market shock is a set of instantaneous, hypothetical shocks to a large set of risk factors. Generally, these shocks involve large and sudden changes in asset prices, interest rates, and spreads, reflecting general market distress and heightened uncertainty. It is important to note that global market shocks included in the adverse and severely adverse scenarios are not forecasts, but rather are hypothetical scenarios designed to assess the strength and resilience of banking organizations in the event of sudden and significant deterioration in market environments.

Adverse Scenario

The global market shock component for the adverse scenario simulates a marked decline in the economic outlook for developing Asian markets. As a result, sovereign credit spreads widen and currencies generally depreciate significantly in these markets. This shock spreads to other global markets, which results in increases in general risk premiums and credit risk. U.S. interest rates move lower across the term structure. Due to a sharp reduction in demand from developing Asia, most global commodity prices and currencies of commodity exporters decline significantly. Equity markets decline broadly.

The major difference relative to the 2017 adverse scenario is a regional focus on developing Asia markets. In general, the 2018 adverse scenario includes larger changes in price, spread, and volatility levels across most markets.

Severely Adverse Scenario

The global market shock component for the severely adverse scenario is designed around three main elements: a sudden sharp increase in general risk premiums and credit risk; a rise and steepening of the U.S. yield curve; and a general sell-off of U.S. assets relative to other developed countries. Markets that are more tightly linked to interest rates are more acutely affected. As an example, in general, corporate debt, residential mortgage-backed securities (RMBS) and commercial mortgage-backed securities markets are more severely affected than

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[6] The global market shock component consists of shocks to a large number of risk factors that include a wide range of financial market variables that affect asset prices, such as a credit spread or the yield on a bond, and, also include, in some cases, shocks to the value of a position itself (for example, the market value of private-equity positions). See 12 CFR 46.5(c).

[7] Currently, four national banks are subject to global market shocks: Bank of America, N.A.; Citibank, N.A.; JPMorgan Chase Bank, N.A.; and Wells Fargo Bank, N.A. A bank may use data as of the date that corresponds to its weekly internal risk reporting cycle as long as it falls during the business week of the as-of date for the global market shock (i.e., December 4, 2017 to December 8, 2017). Losses from the global market shock will be assumed to occur in the first quarter of the planning horizon.

U.S. equities. Some markets less closely linked to interest rates experience conditions that are generally comparable to the second half of 2008.

Globally, yield curves for government bonds of most developed countries undergo moderate tightening due to outflows from U.S. asset markets. The U.S. yield curve rises across the term structure, particularly at the long end. Emerging market yield curves generally rise due to heightened risk premiums. The U.S. dollar depreciates relative to other developed market currencies due to investor outflows.

The major differences relative to the 2017 severely adverse scenario include a rise and steepening of the U.S. yield curve; greater depreciation of the U.S. dollar relative to other advanced currencies; and more muted shocks to some credit sensitive assets, such as non-agency RMBS. These differences are intended to reflect a general sell-off in U.S. markets—combined with a less severe stress to illiquid assets.

Please note:

- The global market shock is a separate and additional component of the scenario applied only to the largest banks with complex trading portfolios.
- Changes to risk factors comprising the global trading shock are assumed to occur instantaneously, while the macro scenario describes the evolution of variables over time.[8]

Counterparty Default Component for Supervisory Adverse and Severely Adverse Scenarios

For DFAST 2018, banks that are completing the global market shock must incorporate a counterparty default scenario component in the adverse and severely adverse scenarios.[9] The counterparty default scenario component involves the instantaneous and unexpected default of the bank's largest counterparty.[10]

In connection with the counterparty default scenario component, these banks must estimate and report the potential losses and related effects on capital associated with the instantaneous and unexpected default of the counterparty that would generate the largest losses across their derivatives and securities financing activities, including securities lending, and repurchase or reverse repurchase agreement activities. The counterparty default scenario component is an add-on to the macroeconomic conditions and financial market environment specified in the adverse and severely adverse stress scenarios.

Each bank's largest counterparty will be determined by net stressed losses; estimated by applying the global market shock to revalue non-cash securities financing activity assets

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[8] The global market shock is a component of the macro scenario but is not necessarily directionally consistent with the macro scenario.

[9] These are the same national banks that are subject to the global market shocks, see footnote 7 above.

[10] In selecting its largest counterparty, a bank will not consider certain sovereign entities (Canada, France, Germany, Italy, Japan, the United Kingdom, and the United States) or designated central clearing counterparties or the bank's own affiliates. Note that the largest counterparty of the bank and the largest counterparty of the bank holding company need not be the same entity.

(securities or collateral) posted or received; and for derivatives, to the value of the trade position and non-cash collateral exchanged. The as-of date for the counterparty default scenario component is December 4, 2017—the same date used for the global market shock.