

## Annual Stress Test Baseline, Adverse, and Severely Adverse Scenarios

February 3, 2017 (revised February 10, 2017)

### Brief Description of the Scenarios

The *baseline scenario* for the United States is a moderate economic expansion. Real Gross Domestic Product (GDP) grows at an average rate of about 2¼ percent per year. The unemployment rate declines to 4½ percent 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 steadily 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 a slowing of inflation in the United States and elsewhere. Reflecting weak economic conditions, short-term interest rates in the United States decline to near zero over the projection period. 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, accompanied by a period of heightened stress in corporate loan and commercial real estate markets. U.S. real GDP declines 6½ percent from its pre-recession peak, with unemployment reaching 10 percent and CPI inflation falling as low as 1¼ percent at an annual rate. The international component of the severely adverse scenario features severe recessions in the euro area, the United Kingdom, and Japan, and a marked economic slowdown in developing Asia. As a result of acute economic weakness, 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).<sup>1</sup> 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.<sup>2</sup>

The scenarios start in the first quarter of 2017 and extend through the first quarter of 2020. 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 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:** indices 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-rated corporate security; the interest rate associated with a conforming, conventional, 30-year fixed-rate mortgage; and the prime rate.

For the variables describing international economic conditions, each scenario includes 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. The specific values for all variables included in the scenarios are provided as

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<sup>1</sup> 12 CFR part 46.

<sup>2</sup> See 78 FR 64153 (October 28, 2013) (Policy Statement on the Principles for Development and Distribution of Annual Stress Test Scenarios).

an Excel spreadsheet on the OCC's website at <http://www.occ.treas.gov/tools-forms/forms/bank-operations/stress-test-reporting.html>. Further, the OCC will provide a qualitative summary of the global market shocks to certain banks with significant trading activity by February 15, 2017. These banks will be required to apply the global market shocks to their trading and counterparty positions as of January 3, 2017.

## **Baseline Scenario**

The baseline outlook for U.S. real activity, inflation, and interest rates is similar to the January 2017 consensus projections from *Blue Chip Economic Indicators*.<sup>3</sup> 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 about 2¼ percent per year, with a slightly faster pace of growth over the first half of the scenario period. The unemployment rate initially declines from around 4¾ percent at the start of the scenario period to slightly under 4½ percent in the fourth quarter of 2018. It subsequently rises slightly above that level through the rest of the scenario period. CPI inflation moves to a little under 2½ percent at an annual rate by the end of 2018, before dropping back to about 2¼ percent and remaining near that level through the end of the scenario period.

Accompanying the moderate economic expansion, Treasury yields are assumed to rise steadily across the maturity spectrum through the scenario period. Short-term Treasury rates increase from ½ percent at the beginning of 2017 to about 2¼ percent by the beginning of 2019, while yields on 10-year Treasury securities rise from 2¼ percent to a little more than 3¼ percent over the same period. 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 narrow modestly over the scenario period. Equity prices rise by an average of about 5 percent per year and equity market volatility is assumed to remain near its historical average level. Nominal house prices rise by an average of 2¾ percent per year and commercial real estate prices rise by an average of 4¼ percent per year.

The outlook for the international variables is similar to that reported in the January 2017 *Blue Chip Economic Indicators* and the International Monetary Fund's October 2016 *World Economic Outlook*.<sup>4</sup> The baseline scenario 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 per year over the scenario period; real GDP growth in both the euro area and the United Kingdom averages about 1½ percent per year; and real GDP growth in Japan averages ¾ percent per year.

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<sup>3</sup> See Wolters Kluwer Legal and Regulatory Solutions (2017), "Blue Chip Economic Indicators," vol. 41, no. 1 (January 10).

<sup>4</sup> See International Monetary Fund (2016), "World Economic Outlook," [www.imf.org/external/pubs/ft/weo/2016/02](http://www.imf.org/external/pubs/ft/weo/2016/02).

## 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 a global aversion to long-term fixed-income assets that, despite lower short rates, brings about a near-term rise in long-term rates and steepening 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 2017. Real GDP falls slightly more than 2 percent from the pre-recession peak in the fourth quarter of 2016 to the recession trough in the first quarter of 2018, while the unemployment rate rises steadily, peaking at about 7¼ percent in the third quarter of 2018. The U.S. recession is accompanied by an initial fall in inflation through the third quarter of 2017, with the rate of increase in consumer prices then rising steadily and reaching 2 percent by the middle of 2018.

Reflecting weak economic conditions, short-term interest rates in the United States fall and remain near zero for the rest of the scenario period. With the increase in term premiums, 10-year Treasury yields gradually rise to a little less than 2¾ percent by the second half of 2018. Financial conditions tighten for corporations and households during the recession. Spreads between investment-grade corporate bond yields and 10-year Treasury yields widen to about 3¾ percentage points by the end of 2017, while spreads between mortgage rates and 10-year Treasury yields widen to 2½ percentage points over the same period.

Asset prices decline in the adverse scenario. Equity prices fall approximately 40 percent through the fourth quarter of 2017, accompanied by a rise in equity market volatility. Aggregate house prices and commercial real estate prices experience less sizable but more sustained declines compared to equity prices; house prices fall 12 percent through the first quarter of 2019 and commercial real estate prices fall 15 percent through the fourth quarter of 2018.

Following the recession in the United States, real activity picks up slowly at first and then gains momentum; growth in real U.S. GDP accelerates from an increase of 1 percent at an annual rate in the second quarter of 2018 to an increase of 3 percent at an annual rate by the middle of 2019. The unemployment rate declines modestly, from its peak of about 7¼ percent in the third quarter of 2018 to under 7 percent by the end of the scenario period. Consumer price inflation remains at roughly 2 percent from the middle of 2018 through the end of the scenario period. Ten-year Treasury yields show little change after the second half of 2018 and remain around 2¾ percent.

Outside of the United States, the adverse scenario features recessions in the euro area, the United Kingdom, and Japan, as well as below-trend growth in developing Asia. The declines in activity in the euro area and the United Kingdom are broadly similar and less pronounced than in Japan. Weakness in global demand results in a slowing of inflation in all of the foreign economies under consideration. Japan experiences outright deflation through the first quarter of 2019. 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 2016 Adverse Scenario and 2017 Adverse Scenario**

The main difference relative to the 2016 adverse scenario is that this year's adverse scenario features higher long-term rates and a steeper yield curve across all of the economies during the recession. Another difference from last year's scenario is the incidence and extent of deflationary episodes. The 2016 adverse scenario featured wide-spread deflation across all of the economies included in the scenario. In this year's adverse scenario, deflation is regionally concentrated—more pronounced in Japan, less severe in the euro area and developing Asia and absent in the United Kingdom and United States.

### **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 several 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 several years.

### **Severely Adverse Scenario**

The severely adverse scenario is characterized by a severe global recession that is accompanied by a period of heightened stress in corporate loan markets and commercial 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.<sup>5</sup>

In this scenario, the level of U.S. real GDP begins to decline in the first quarter of 2017 and reaches a trough in the second quarter of 2018 that is about 6½ percent below the pre-recession peak. The unemployment rate increases by about 5¼ percentage points, to 10 percent, by the third quarter of 2018. Headline consumer price inflation falls to about 1¼ percent at an annual rate by the second quarter of 2017 and then rises to about 1¾ percent at an annual rate by the middle of 2018.

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. The 10-year Treasury yield drops to ¾ percent in the

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<sup>5</sup> 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.

first quarter of 2017, rising gradually thereafter to around 1½ percent by the first quarter of 2019 and to about 1¾ percent by the first quarter of 2020. 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 about 5½ percentage points by the end of 2017, an increase of 3½ percentage points relative to the fourth quarter of 2016. The spread between mortgage rates and 10-year Treasury yields widens to over 3½ percentage points over the same time period.

Asset prices drop sharply in this scenario. Equity prices fall by 50 percent through the end of 2017, accompanied by a surge in equity market volatility, which approaches the levels attained in 2008. House prices and commercial real estate prices also experience large declines, with house prices and commercial real estate prices falling by 25 percent and 35 percent, respectively, through the first quarter of 2019.

The international component of this scenario features severe recessions in the euro area, the United Kingdom, and Japan and a marked growth slowdown 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. 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 2016 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 does not feature a path of negative short-term U.S. Treasury rates that was featured in last year's scenario. In addition, this year's severely adverse scenario features a larger decline in commercial real estate prices. The international dimension of the scenarios shows recessionary episodes that, relative to last year's scenario, are more severe in the euro area and United Kingdom but less severe in developing Asia.

### **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 intervention. The sharp slowdown in developing Asia is distributed unevenly across countries, with decelerations more pronounced in the larger economies. The economic slowdown in developing Asia should be assumed to be representative of conditions across emerging market economies. .

Declines in aggregate U.S. commercial and residential real estate prices should be assumed to be concentrated in regions and property types that have experienced rapid price gains over the past several years. In particular, given that prices of multifamily properties have risen rapidly in recent years, they should be assumed to decline by more than the CRE index. 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, particularly

where real estate prices have been growing at a fast pace. Spreads on commercial mortgage-backed securities widen to attain the same peaks reached in the 2007–2009 recession.

### **Global Market Shock Components for Adverse and Severely Adverse Scenarios**

By February 15, 2017, 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.<sup>6</sup> 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 (January 3, 2017 for the current stress testing cycle) to project mark-to-market losses.<sup>7</sup>

The global market shock components are one-time, 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 dislocation 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 an extended low-growth environment and muted market volatility across most asset classes and term structures. Generally, domestic government yields and associated volatility move lower, while swap spreads widen. Due to reduced demand, global commodity prices decline moderately, while MBS and domestic credit spreads widen moderately. Select currency markets also experience small flight-to-quality moves. Equity markets experience a mild correction with a measured increase in volatility.

The 2017 adverse scenario addresses themes similar to those of the 2016 adverse scenario.

#### ***Severely Adverse Scenario***

The severely adverse scenario's global market shock is designed around three main elements: a sudden sharp increase in general risk premiums and credit risk; significant market illiquidity; and the distress of one or more large entities that rapidly sell a variety of assets into an already fragile market. Liquidity deterioration is most severe in those asset markets that are typically less liquid, such as non-agency securitized products, corporate debt and private equity, and is less pronounced in those markets that are typically more liquid, such as foreign exchange, publicly traded equity and U.S. Treasury markets. Markets facing a significant deterioration in liquidity

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<sup>6</sup> The global market shock components consist 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).

<sup>7</sup> 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.

experience conditions that are generally comparable to the peak-to-trough changes in asset valuations during the 2007–2009 period. The severity of deterioration reflects the market conditions that could occur in the event of a significant pullback in market liquidity in which market participants are less able to engage in market transactions that could offset or moderate the price dislocations. Worsening liquidity also leads prices of related assets that would ordinarily be expected to move together to diverge markedly. In particular, the valuation of certain cash market securities and their derivative counterparts fail to move together because the normal market mechanics that would ordinarily result in small pricing differentials are impeded by a lack of market liquidity. Notably, option-adjusted spreads on agency mortgage-backed securities (MBS) increase significantly.

Globally, government bond yield curves undergo shifts in level and shape due to market participants' increased risk aversion. The flight-to-quality and lack of liquidity in affected markets push risk-free rates down in the United States. The yield curves for government bonds generally rally across advanced economies while volatility increases across the term structure. Emerging market countries with deteriorating economic and fiscal accounts would also experience a sharp increase in sovereign spreads.

The major differences between the 2017 and 2016 severely adverse scenarios include (1) dampened shocks to interest rates and other liquid markets; (2) increased shocks to select commodities and equities basis risks and (3) a less severe widening in spreads between agency MBS and to-be-announced (TBA) forwards.

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.<sup>8</sup>

### **Counterparty Default Component for Supervisory Adverse and Severely Adverse Scenarios**

For DFAST 2017, banks that are completing the global market shock must incorporate a counterparty default scenario component in the adverse and severely adverse scenarios.<sup>9</sup> The counterparty default scenario component involves the instantaneous and unexpected default of the bank's largest counterparty.<sup>10</sup>

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

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<sup>8</sup> The global market shock is a component of the macro scenario but is not necessarily directionally consistent with the macro scenario.

<sup>9</sup> These are the same national banks that are subject to the global market shocks, see footnote 7 above.

<sup>10</sup> 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.

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 (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 January 3, 2017—the same date used for the global market shock.