Annual Stress Test Baseline, Adverse, and Severely Adverse Scenarios

October 23, 2014

Brief Description of the Scenarios

The ***baseline scenario*** tracks the average projections from surveys of economic forecasters. The baseline scenario for the United States is for a sustained, moderate expansion in economic activity. Real Gross Domestic Product (GDP) grows at an average rate of just under 3 percent per year over the scenario; the unemployment rate declines modestly, reaching 5¼ percent by the end of the scenario in the fourth quarter of 2017; and Consumer Price Index (CPI) inflation averages just over 2 percent per year. Accompanying this moderate economic expansion is a gradual normalization in Treasury yields across the maturity spectrum. Asset prices are assumed to increase modestly. The baseline scenario for economic activity, inflation, and exchange rates outside the United States is characterized by an expansion in activity, albeit with divergent growth patterns.

The ***adverse scenario*** is characterized by a global weakening in economic activity and an expected increase in U.S. inflationary pressures that, overall, result in a rapid increase in both short- and long-term U.S. Treasury rates. This results in a yield curve that is both higher and flatter relative to the baseline. In this scenario, bank funding costs react strongly to rising short-term rates as deposits are assumed to be drawn to institutional money funds and other higher yielding assets. Outside the United States, the adverse scenario features recessions in the euro area, the United Kingdom, and Japan, and below-trend growth in developing Asia.

The ***severely adverse*** scenario features a substantial weakening in global economic activity, accompanied by large reductions in asset prices. In the scenario, the U.S. corporate sector experiences increases in financial distress that are even larger than would be expected in a severe recession, as spreads on high-yield corporate bonds, leveraged loans, and collateralized loan obligations (CLOs) backed by leveraged loans, widen to levels the same as the peaks reached in the 2007–2009 recession. The scenario also includes a rise in oil prices (Brent crude) to approximately $110 per barrel. The international component of the severely adverse scenario features severe recessions in the euro area, the United Kingdom, and Japan; and below-trend growth in developing Asia. For economies that are heavily dependent on imported oil—including developing Asia, Japan, and the euro area—this economic weakness is exacerbated by the rise in oil 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 OCC.[1] This note provides a narrative on the three scenarios to be used for the stress test. These scenarios were developed in coordination with the Federal Reserve Board and the Federal Deposit Insurance Corporation.[2]

The scenarios start in the fourth quarter of 2014 (2014:Q4) and extend through the fourth quarter of 2017 (2017:Q4). Each scenario includes 28 variables. 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 changes (at an annual rate) in the CPI;
- **Four aggregate measures of asset prices or financial conditions:** indices of house prices, commercial property 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, fixed-rate, 30-year 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/foreign currency exchange rate.
- **The four countries or country blocks included:** the euro area (the 18 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 SAR, 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 shown in this

[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).

document and are also provided as an Excel spreadsheet on the OCC's Web site 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 firms with significant trading activity by December 1, 2014. These firms will be required to apply the global market shocks to their trading and counterparty positions as of October 6, 2014.

Baseline Scenario

The baseline scenario is very similar to the average projections from surveys of economic forecasters. For example, the outlook for U.S. real activity and inflation in the baseline is in line with the October 2014 consensus projections from *Blue Chip Economic Indicators*.

The baseline scenario for the United States is for a sustained, moderate expansion in economic activity. Real GDP grows at an average rate of just under 3 percent per year over the scenario; the unemployment rate declines modestly, reaching 5¼ percent by the end of the scenario in the fourth quarter of 2017; and CPI inflation averages just over 2 percent per year.

Accompanying this moderate economic expansion is a gradual normalization in Treasury yields across the maturity spectrum. Short-term Treasury rates begin to increase in the second quarter of 2015 and rise steadily thereafter, reaching just over 3 percent by the end of 2017. Five- and ten-year yields increase from the start of the scenario period and reach 4 percent and 4¼ percent, respectively, by the fourth quarter of 2017. Spreads on investment-grade corporate bonds change little over the scenario period, as do spreads on residential mortgages and other consumer loans. As a result, yields on BBB-rated corporate bonds and mortgage rates both increase roughly in line with long-term Treasury yields, and the prime rate increases roughly in line with short-term Treasury rates.

Consistent with these developments, asset prices are assumed to increase modestly in the baseline scenario. Equity prices, nominal house prices, and commercial property prices all rise steadily throughout the scenario; in addition, equity market volatility is assumed to remain at low levels.

The baseline outlook for the international variables is similar to that reported in the October 2014 *Blue Chip Economic Indicators* and the International Monetary Fund's October 2014 *World Economic Outlook*. The baseline scenario for economic activity and inflation outside the United States features an expansion in activity, albeit one that proceeds at different rates across the four countries or country blocks being considered. The outlook for real GDP growth in developing Asia is 6¼ percent per year; the expansion in real output in the United Kingdom proceeds at 2½ percent per year; and real GDP growth in the euro area and Japan is assumed to average 1½ percent per year and 1¼ percent per year, respectively.

Adverse Scenario

This adverse scenario is qualitatively different from last year's adverse scenario released in November 2013. The main difference lies in the evolution of Treasury yields; in particular, the adverse scenario issued last year featured a general aversion of investors to long-term fixed-

income assets worldwide that in turn resulted in a sharp rise in long-term interest rates and hence a steeper yield curve than in the corresponding baseline scenario. By contrast, in this year's adverse scenario, the hypothetical pick-up in U.S. inflation results in a yield curve that is higher and flatter than in the baseline. (This year's adverse scenario is broadly similar to the 2013 adverse scenario released in November 2012.)

Scenario: This year's adverse scenario is characterized by a global weakening in economic activity and an increase in U.S. inflationary pressures that, overall, result in a rapid increase in both short- and long-term U.S. Treasury rates. In the scenario, bank funding costs react strongly to rising short-term rates, as described in greater detail in Additional Key Features of the Adverse Scenario, below. This scenario is not a forecast; rather, it is a hypothetical scenario designed to assess the strength of banking organizations and their resilience to an unfavorable economic environment.

In the adverse scenario, the United States experiences a mild recession that begins in the fourth quarter of 2014 and lasts through the second quarter of 2015. During this period, the level of real GDP falls approximately ½ percent relative to its level in the third quarter of 2014 and the unemployment rate increases to just over 7 percent. At the same time, the U.S. economy experiences a considerable rise in core inflation that results in a headline CPI inflation rate of 4 percent by the third quarter of 2015; headline inflation remains elevated thereafter. Short-term interest rates rise quickly as a result, reaching a little over 2½ percent by the end of 2015 and 5¼ percent by the end of 2017. Longer-term Treasury yields increase by less, resulting in a yield curve throughout the scenario period that is both higher and flatter relative to the baseline. Corporate financial conditions tighten, reflecting both higher long-term Treasury yields and somewhat wider investment-grade corporate bond spreads. Household financial conditions are assumed to tighten broadly in line with movements in similar-maturity Treasury yields.

The recovery that begins in the second half of 2015 is quite sluggish, and the unemployment rate continues to increase, reaching 8 percent in the fourth quarter of 2016, and flattens thereafter. Equity prices fall both during and after the recession, and by the end of the scenario are about 25 percent lower than in the third quarter of 2014; equity market volatility also rises somewhat. House prices and commercial real estate prices decline by approximately 13 and 16 percent, respectively, relative to their level in the third quarter of 2014.

Outside the United States, the adverse scenario features recessions in the euro area, the United Kingdom, and Japan, and below-trend growth in developing Asia. This weakness in economic activity results in a period of deflation for some countries or country blocks: the euro area experiences modest price declines for the first year of the scenario, and in Japan there is a sustained period of deflation with price declines that are steeper than those for the euro area. The exchange value of the dollar is little changed vis-à-vis the euro, the pound sterling, and the currencies of developing Asia relative to the baseline scenario; the dollar is assumed to depreciate against the yen, reflecting flight-to-safety capital flows.

Additional Key Features of the Adverse Scenario

The economic slowdown in the euro area should be interpreted as a broad-based contraction in euro-area demand, rather than as a development that is concentrated in a few euro-area countries. Similarly, the slowdown in developing Asia featured in this year's adverse scenario should be interpreted as a weakening in economic conditions across all emerging market economies and not simply as a phenomenon specific to the developing Asia region. Regarding property prices, the decline in aggregate U.S. house prices described earlier should be viewed as particularly relevant for states or metropolitan areas that have experienced brisk gains in house prices during the past couple of years. The decline in U.S. property prices should be interpreted as being representative of risks to property prices among those foreign economies where property prices are currently elevated.

As described earlier, firms should interpret the rise in short-term interest rates embodied in this year's adverse scenario as crystallizing certain risks to banks' funding costs. In particular, commercial deposits should be viewed as being unusually drawn to institutional money funds, which re-price promptly in response to changes in short-term Treasury rates. Consumer deposits should also be assumed to be drawn to higher-yielding alternatives.

Severely Adverse Scenario

This year's severely adverse scenario is similar to last year's severely adverse scenario released in November 2013. The significant differences from last year include the somewhat larger widening in corporate bond spreads and the increase in the price of oil that are assumed in this year's scenario.

Scenario: The severely adverse scenario features a substantial weakening in global economic activity, accompanied by large reductions in asset prices. In the scenario, the U.S. corporate sector experiences increases in financial distress that are even larger than would be expected in a severe recession, together with a widening in corporate bond spreads and a decline in equity prices. The scenario also includes a rise in oil prices (Brent crude) to approximately $110 per barrel. These elements of the scenario are described in greater detail in Additional Key Features of the Severely Adverse Scenario, below. As with the other scenarios described in this document, this scenario is not a forecast, but rather a hypothetical sequence of events designed to assess the strength of banking organizations and their resilience to a severely adverse economic environment.

The severely adverse scenario for the United States is characterized by a deep and prolonged recession in which the unemployment rate increases by 4 percentage points from its level in the third quarter of 2014, peaking at 10 percent in the middle of 2016. In terms of both the peak level reached by the unemployment rate and its total increase, this shock is of a similar magnitude to those experienced in severe U.S. contractions during the past half-century. By the end of 2015, the level of real GDP is a little more than 4½ percent lower than its level in the third quarter of 2014; it begins to recover thereafter. Despite this decline in real activity, higher oil prices cause the annualized rate of change in the CPI to reach 4¼ percent in the near term, before subsequently falling back.

In response to this economic contraction—and despite the higher near-term path of CPI inflation—Treasury yields of all maturities are significantly lower throughout the scenario than in the baseline. Short-term interest rates remain near zero through 2017; long-term Treasury yields drop to 1 percent in the fourth quarter of 2014 and then edge up slowly over the remainder of the scenario period. Driven by the assumed decline in corporate credit quality, spreads on investment-grade corporate bonds jump from about 170 basis points to 500 basis points at their peak. As a result, despite lower long-term Treasury yields, corporate financial conditions tighten significantly in 2015 and the yield on investment-grade corporate bonds is higher than the baseline until the fourth quarter of 2016. Mortgage rates also increase over the course of 2015, driven by some widening in spreads.

Consistent with these developments, asset prices contract sharply in the scenario. Equity prices fall by approximately 60 percent from the fourth quarter of 2014 through the fourth quarter of 2015, and equity market volatility increases sharply. House prices decline by 25 percent during the scenario period relative to their level in the third quarter of 2014, while commercial real estate prices are more than 30 percent lower at their trough.

The international component of the severely adverse scenario features severe recessions in the euro area, the United Kingdom, and Japan; and below-trend growth in developing Asia. For economies that are heavily dependent on imported oil—including developing Asia, Japan, and the euro area—this economic weakness is exacerbated by the rise in oil prices featured in this scenario. The euro-area recession begins in the fourth quarter of 2014, and the economy continues to contract through the fourth quarter of 2015; the level of euro-area real GDP contracts by 5 percent during the recession. The United Kingdom also experiences a recession in 2015 and its real GDP falls by almost 3½ percent relative to the level in the third quarter of 2014. Economic activity is assumed to weaken materially for two quarters in developing Asia before rebounding strongly, while the adverse effects on Japanese real GDP are assumed to persist so that the level of Japan's real GDP is approximately10½ percent lower by the end of the second quarter of 2016 than in the third quarter of 2014.

Reflecting flight-to-safety capital flows associated with the scenario's global recession, the U.S. dollar is assumed to appreciate strongly against the euro and the currencies of developing Asia, and to appreciate more modestly against the pound sterling. The dollar is assumed to depreciate modestly against the yen, also reflecting flight-to-safety capital flows.

Additional Key Features of the Severely Adverse Scenario

As with the adverse scenario, the economic slowdown in the euro area should be interpreted as a broad-based contraction in euro-area demand, rather than a development concentrated in a few euro-area countries. In this year's severely adverse scenario, part of the sharp slowdown in activity in developing Asia reflects the region's relatively high degree of oil dependence. As such, not all of the severe weakening in economic conditions in developing Asia is shared by other emerging market economies. As is the case for the adverse scenario, the decline in aggregate U.S. house prices described in the severely adverse scenario should be viewed as being particularly relevant for states or metropolitan areas that have experienced brisk gains in house prices during the past couple of years; and the large decline in U.S. property prices assumed in the scenario should be interpreted as being representative of risks to property prices in those foreign economies where property prices are elevated.

As mentioned above, in this year's severely adverse scenario, U.S. corporate credit quality deteriorates sharply. As in last year's scenario, this deterioration is particularly concentrated in riskier firms. Investors pull back from a variety of assets linked to risky corporate borrowers and, in particular, highly leveraged corporations. Spreads on assets linked to these corporations, particularly high-yield bonds, leveraged loans, and CLOs backed by leveraged loans, widen to levels the same as the peaks reached in the 2007–2009 recession.

Global Market Shock Components for Adverse and Severely Adverse Scenarios

By December 1, 2014, the OCC will provide to certain firms global market shock components of adverse and severely adverse scenarios to be used for the current stress test.[3] 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 (October 6, 2014 for the current stress testing cycle) to project mark-to-market losses.[4]

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.

The market shock component for the **severely adverse scenario** is built around a sudden sharp increase in general risk premiums and credit risk, combined with significant market illiquidity, associated, in part, with the distress of one or more large leveraged entities that rapidly sell a variety of assets into an already fragile market. Under the scenario, severe declines in the value of credit positions have immediate implications for less liquid products as investors attempt to rapidly exit these positions—specifically, private equity, securitizations and exposures to emerging markets. While most declines are comparable to those experienced in 2008, products with favorable current market valuations are assumed to experience greater declines. Notably, mortgage-backed securities are among the assets being liquidated by distressed, leveraged entities, causing significant increases in the option-adjusted spreads on agency mortgage-backed securities.

Globally, government yield curves undergo marked shifts in level and shape due to market participants' risk aversion. This flight-to-quality pushes rates down across the term structure in the United States and certain European countries, while emerging markets and countries that are part of the so-called European periphery experience sharp increases in government yields. The

---

[3] The global market shock components include 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, in some cases, the value of the position itself (e.g., the market value of private-equity positions). See 12 CFR 46.5(c).
[4] Currently, five national banks are subject to global market shocks: Bank of America Corporation; Citigroup Inc.; JPMorgan Chase & Co.; Morgan Stanley; and Wells Fargo & Company.

magnitudes of the increases in rates vary, with jumps in European periphery spreads, and emerging markets rates approximating the moves experienced during 2011 and 2008, respectively. Countries that are affected by the flight-to-quality also experience currency appreciation. Fears of a prolonged and potentially more acute recession in Europe drive up sovereign credit default swap (CDS) spreads in a manner generally consistent with the experience of 2011.

The core of the global market shock component for the **adverse scenario** consists of market shocks that are, by and large, similar in structure, but not as severe as those assumed in the severely adverse scenario. However, rates across the term structure in the United States and Europe increase, as the flight-to-quality mainly affects the short end of the yield curve while an aversion to long-term assets prevails. In addition, the increase in implied volatilities for equities is more subdued than what is typically associated with the level of the equity price declines in the adverse scenario.

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.[5]
- 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.

Taken together, the extreme movements in risk factors described in the market shock and the severe economic downturn in the macro scenario describe a major financial dislocation, featuring large declines in asset prices and large increases in asset price volatility and credit spreads, followed by a severe economic contraction, circumstances reminiscent of the experience during the recent financial crisis. While interest rates generally increase in the global trading shock components, and most rates fall in the initial quarters in the severely adverse macroeconomic scenario, these combinations are not inconsistent with the experience during the recent financial crisis, when interest rates increased sharply on certain days even as they ultimately fell on net. Indeed, some of the largest increases observed in Treasury rates occurred in the depths of the financial crisis, amid an environment of reduced liquidity and heightened investor uncertainty.

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