

## Annual Stress Test Baseline and Severely Adverse Scenarios

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### Brief Description of the Scenarios

In the *baseline scenario* for the United States, real Gross Domestic Product (GDP) growth averages 1¾ percent in 2020, rises to 2 percent in 2021, and remains at that level in 2022. The unemployment rate ticks up to about 3¾ percent during 2020, then increases to about 4 percent, and CPI inflation averages between 2 and 2¼ percent each year. Accompanying this moderate expansion, Treasury yields are assumed to rise modestly across the maturity spectrum, though short-term Treasury rates initially decline slightly. Equity prices rise about 4½ percent in 2020 and about 4¾ percent per year thereafter, and equity market volatility rises gradually from 22¾ in early 2020 to 26½ by the end of the scenario period. The baseline scenario for international economic activity and inflation features an expansion in activity, albeit one that proceeds at different rates across countries.

The *severely adverse scenario* is characterized by a severe global recession accompanied by a period of heightened stress in commercial real estate markets and corporate debt markets. U.S. real GDP declines 8½ percent from its pre-recession peak, with unemployment reaching 10 percent and CPI inflation falling as low as 1 percent at an annual rate. Asset prices drop sharply in this scenario. The international component of this scenario features severe recessions in the euro area, United Kingdom, and Japan, and a pronounced deceleration in developing Asia. As a result of the sharp contraction in economic activity, three of the 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 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 certain national banks and federal savings associations to conduct annual stress tests using scenarios provided by the Office of the Comptroller of the Currency (OCC).<sup>1</sup> This note provides a narrative on the two scenarios to be used for this year's 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 2020 and extend through the first quarter of 2023. 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 and the severely adverse scenario. 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>. Further, this document provides a qualitative summary of the global market

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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).

shock that certain banks with significant trading activity will be required to apply to their trading and counterparty positions as of October 18, 2019.

## **Baseline Scenario**

The baseline outlook for U.S. real activity, inflation, and interest rates is similar to the January 2020 consensus projections from *Blue Chip Economic Indicators*.<sup>3</sup> This scenario does not represent a forecast of the OCC.

The baseline scenario for the United States is a moderate economic expansion over the 13-quarter stress test period. Real GDP growth averages 1¾ percent (annual rate) in 2020, picks up to 2 percent by the end of 2021, and remains at that level in 2022. The unemployment rate ticks up to about 3¾ percent by the end of 2020, then increases to about 4 percent in early 2022 and remains at that level for the rest of the scenario period. Quarterly CPI inflation is relatively steady over the 13-quarter period, ranging from 2 to 2¼ percent at an annual rate.

Accompanying the moderate economic expansion, short-term Treasury rates are assumed to initially decline to slightly below 1½ percent by the end of 2020, remain around that level through the end of 2021, and then rise to 1¾ percent by the end of the stress test period. Longer-dated Treasury yields are assumed to rise modestly over time consistent with some steepening of the yield curve. Yields on 10-year Treasury securities rise gradually from 1¾ percent in early 2020 to 2¾ percent at the end of the scenario period. The prime rate moves in line with short-term Treasury rates, while both corporate bond yields and mortgage rates rise in line with long-term Treasury yields. Equity prices rise 4½ percent in 2020 and about 4¾ percent per year thereafter. Equity market volatility, as captured by the VIX, rises gradually from 22¾ in early 2020 to 26½ by the end of the scenario period. Nominal house prices rise 2¼ percent in 2020 and 2021 and about 3¼ percent in 2022. The growth rate of commercial real estate prices averages about 5 percent in 2020 and 2021 and 2¾ percent in 2022.

The baseline paths for the international variables are similar to the trajectories reported in the January 2020 *Blue Chip Economic Indicators* and the International Monetary Fund's October 2019 *World Economic Outlook*.<sup>4</sup> The baseline scenario features a relatively steady expansion in international economic activity, albeit at a different pace across the four country blocs: Real GDP growth in developing Asia averages just over 5¾ percent per year through the scenario period, real GDP growth in the euro area averages about 1¼ percent, and real GDP growth in Japan averages about ¾ percent. Finally, real GDP growth in the United Kingdom averages just over 1¼ percent over the scenario period.

## **Severely Adverse Scenario**

The severely adverse scenario is characterized by a severe global recession accompanied by a period of heightened stress in commercial real estate markets and corporate debt markets. This is

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<sup>3</sup> See Wolters Kluwer Legal and Regulatory Solutions (Jan. 2020), *Blue Chip Economic Indicators*.

<sup>4</sup> See International Monetary Fund, *World Economic Outlook* (October 2019),

<https://www.imf.org/en/Publications/WEO/Issues/2019/10/01/world-economic-outlook-october-2019>.

a hypothetical scenario designed to assess the strength of banking organizations and their resilience to unfavorable economic conditions, and does not represent a forecast of the OCC.

The U.S. unemployment rate climbs to a peak of 10 percent in the third quarter of 2021. In line with the increase in the unemployment rate, real GDP falls about 8½ percent from its pre-recession peak, reaching a trough in the third quarter of 2021. The decline in activity is accompanied by a lower headline CPI inflation rate, which falls to an annual rate of about 1¼ percent after the first quarter of 2020, before gradually rising to average 1¾ percent in 2022.

In line with the severe decline in real activity, the interest rate for 3-month Treasury bills immediately falls near zero and remains at that level through the end of the scenario. The 10-year Treasury yield immediately falls to ¾ percent during the first quarter of 2020 and rises gradually thereafter to 2¼ percent by the end of the stress test period. The result is a gradual steepening of the yield curve over most of the stress test 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 almost 5½ percentage points by the third quarter of 2020, an increase of 4 percentage points relative to the fourth quarter of 2019. The spread between mortgage rates and 10-year Treasury yields widens to 3½ percentage points over the same period.

Asset prices drop sharply in this scenario. Equity prices fall 50 percent through the end of 2020, accompanied by a rise in the VIX, which reaches a peak of 70. House prices and commercial real estate prices also experience large declines of about 28 percent and 35 percent respectively, during the first nine quarters of the scenario.

The international component of this scenario features sharp slowdowns in all country blocs, leading to severe recessions in the euro area, the United Kingdom, and Japan and a pronounced deceleration of activity in developing Asia. As a result of the sharp contraction in economic activity, three of the foreign economies included in the scenario—the euro area, Japan, and developing Asia—experience sharp declines in inflation rates. 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 2020 Severely Adverse Scenario and 2019 Severely Adverse Scenario**

This year's severely adverse scenario features a slightly greater increase in the unemployment rate in the United States compared to last year's severely adverse scenario. In addition, interest rates do not fall as much as in last year's scenario, given their lower starting values. The declines in equity prices, house prices, and commercial real estate prices, are similar to the declines in last year's severely adverse scenario.

### **Additional Key Features of the Severely Adverse Scenario**

Although the weakness in euro area economic conditions reflects a broad-based contraction in euro area demand, this contraction should be assumed to be more protracted in countries with less room for fiscal policy stabilization. Economic conditions in developing Asia should be

assumed to be representative of conditions across emerging market economies.

Stresses in the corporate loan market should be assumed to be more intense for lower-rated firms. Declines in aggregate U.S. residential 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 the Severely Adverse Scenario**

The OCC will provide to certain banks a global market shock component for the severely adverse scenario to be used in the current stress test.<sup>5</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 (October 18, 2019,<sup>6</sup> for the current stress testing cycle) to project mark-to-market losses.<sup>7</sup>

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 severely adverse scenario 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 global market shock component is specified by a large set of risk factors that include, but are not limited to:

- Equity prices of key developed markets and developing and emerging market nations to which trading companies may have exposure, along with selected points along term structures of implied volatilities;
- Foreign exchange rates of most major and some minor currencies, along with selected points along term structures of implied volatilities;
- Selected maturity government rates (e.g., U.S. Treasuries), swap rates, and other key rates for key developed markets and for developing and emerging market nations to which trading companies may have exposure;

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<sup>5</sup> 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 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>6</sup> 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., October 14-18, 2019). Losses from the global market shock will be assumed to occur in the first quarter of the planning horizon.

<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.

- Selected maturities and expiries of implied volatilities that are key inputs to the pricing of interest rate derivatives;
- Selected expiries of futures prices for energy products including crude oil (differentiated by country of origin), natural gas, and power;
- Selected expiries of futures prices for metals and agricultural commodities; and
- Credit spreads or prices for selected credit-sensitive products including: corporate bonds, credit default swaps, and loans by risk; non-agency residential mortgage-backed securities and commercial mortgage-backed securities by risk and vintage; sovereign debt; and municipal bonds.

### ***Global Market Shock - Severely Adverse Scenario***

The 2020 global market shock component for the severely adverse scenario is designed to be generally consistent with a macroeconomic background in which the U.S. economy has entered a sharp recession, characterized by widespread defaults on a range of debt instruments by business borrowers. Under the scenario, weaker obligors struggle to maintain their financial conditions due to material declines in earnings associated with the poor economic environment while rating agencies downgrade large portions of debt outstanding. The historically high levels of nonfinancial corporate debt to GDP amplify the losses resulting from the wave of corporate sector defaults. This dynamic creates feedback effects between the economy and the corporate sector.

Spreads widen sharply for non-investment grade and low investment grade bonds as ratings-sensitive investors anticipate further downgrades and sell assets. Similarly, the leveraged loan market comes under considerable pressure. Open-ended mutual funds and exchange-traded funds (ETFs) that hold leveraged loans and high-yield bonds face heavy redemptions. Due to liquidity mismatches, mutual fund and ETF managers sell their most liquid holdings, leading to more extensive declines in the prices of fixed income securities and other related assets. Price declines on leveraged loans flow through to the prices for collateralized loan obligations (CLOs). CLO prices suffer severe corrections associated with the devaluation of the underlying collateral and selling by concentrated holders desiring to reduce risk.

The broad selloff of corporate bonds and leveraged loans spills over to prices for other risky credit and private equity instruments. Credit spreads for emerging-market corporate credit and sovereign bonds widen due to flight-to-safety considerations. Asset values for private equity experience sizable declines as leveraged firms face lower earnings and a weak economic outlook. Municipal bond spreads widen in line with lower municipal tax revenues associated with the severe weakening of the U.S. economy.

Short-term U.S. Treasury rates fall sharply reflecting an accommodative monetary policy response to the hypothetical economic downturn. Longer-term U.S. Treasury rates fall more modestly as the United States benefits from a flight-to-safety. Short-term U.S. interbank lending rates rise as firms face increased funding pressure from a pull-back in overnight lending, while

longer term swap rates fall in sync with the decreases in long-term U.S. Treasury rates.

Flight-to-safety considerations cause the U.S. dollar to appreciate somewhat against the currencies of most advanced economies, except the Swiss franc and the Japanese yen. The yen appreciates against the U.S. dollar as investors unwind positions and view the yen as a safe-haven currency. The Swiss franc appreciates against the U.S. dollar as investors seek an alternative safe-haven currency. Safe-haven considerations cause traditional precious metals to experience an increase in value while non-precious metals prices fall due to lower demand from the general economic weakness.

### **Comparison of 2020 Severely Adverse Scenario and 2019 Severely Adverse Scenario**

This year's global market shock for the severely adverse scenario emphasizes a heightened stress to highly leveraged markets that causes CLOs and private equity investments to experience larger market value declines relative to 2019. There is a general spike in short-term interbank lending rates instead of a decline, as this year's scenario highlights a severe increase in funding pressures. European equity markets weaken at more modest levels, while U.S. equity markets fall more sharply. In addition, European currencies depreciate less severely against the U.S. dollar, reflecting the more U.S.-focused nature of this year's 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.
- 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 the Supervisory Severely Adverse Scenario**

For DFAST 2020, banks that are completing the global market shock must incorporate a counterparty default scenario component in the severely adverse scenario.<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 will be required to 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

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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.

component is an add-on to the macroeconomic conditions and financial market environment specified in the OCC's severely adverse stress scenario.

The largest counterparty of each bank will be determined by net stressed losses. Net stressed losses are estimated by applying the global market shock to revalue non-cash securities financing transactions (securities or collateral) posted or received and, for derivatives, the trade position and non-cash collateral exchanged. The as-of date for the counterparty default scenario component is October 18, 2019—the same date as the global market shock.<sup>11</sup>

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<sup>11</sup> As with the global market shock, a bank subject to the counterparty default component 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 counterparty default scenario component (i.e., October 14-18, 2019). Losses will be assumed to occur in the first quarter of the planning horizon.