

Deep Dive: DFAST 2023 Stress Test Scenarios

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On February 9, 2023, the Federal Reserve released two scenarios, the baseline and the severely adverse, as well as the Global Market Shock (GMS) add-on component for organizations with large trading operations. The main innovation in this year's scenarios was the introduction of an additional "exploratory" market shock to evaluate trading losses due to increased inflationary pressures; it will only be applied to the U.S. global systemically important banks (GSIBs). The results of the exploratory market shock component will not impact GSIBs' capital requirements and it is likely intended to test the feasibility of multiple scenarios in future stress tests.

The severely adverse scenario is designed to assess a bank's ability to withstand a severe economic crisis. The stress capital buffer, which restricts a company's ability to distribute capital if it falls below a certain level, is calculated based on the decline in its common equity tier 1 (CET1) capital ratio under the severely adverse scenario. Therefore, a larger decline in the capital ratio leads to higher capital requirements.

The 2023 stress scenario is more challenging than the one from the previous year and features a higher rise in unemployment, a larger decrease in real GDP growth and a significant drop in house prices. Despite the anticipated rise in loan losses, aggregate pre-provision net revenue may increase mainly due to stronger net interest income, but results are somewhat mixed and depend on whether model coefficients are updated. Additionally, some of the GMS risk factors (such as Treasury rates, S&P 500 and MBS spreads) are less severe compared to the previous year, and the advanced approaches banks are expected to see an increase in the fair value of their available-for-sale securities. Overall, we project that the severely adverse scenario will result in a marginally higher reduction in projected bank capital ratios compared to the results of last year's stress tests (as shown in Exhibit 5). Moreover, differences in losses between the two market shocks will highlight the banks' sensitivity to interest rate risk in their trading books.

It is important to note that regular updates to the pre-provision net revenue models could have a significant impact on stress test projections, particularly due to the expansion of banks' balance sheets during the pandemic. The impact of these updates will not be known until March, when the Federal Reserve releases updated 2023 supervisory stress test methodology. Moreover, the analysis of the 2023 stress scenario uses third-quarter 2022 data on bank balance sheets, as fourth-quarter data is not yet available.

THE 2023 STRESS SCENARIO IS MORE SEVERE RELATIVE TO LAST YEAR'S . . .

This year's severely adverse scenario includes, on a start-to-stress basis:

- A nearly 6½ percentage point increase in the unemployment rate.
- An 8¾ percent fall in real GDP.
- A 3½ percentage point increase in corporate BBB spreads.
- A 38 percent decline in house prices.
- A 40 percent drop in commercial real estate prices.
- A 45 percent drop in the stock market.
- A 75 peak value in the volatility index.

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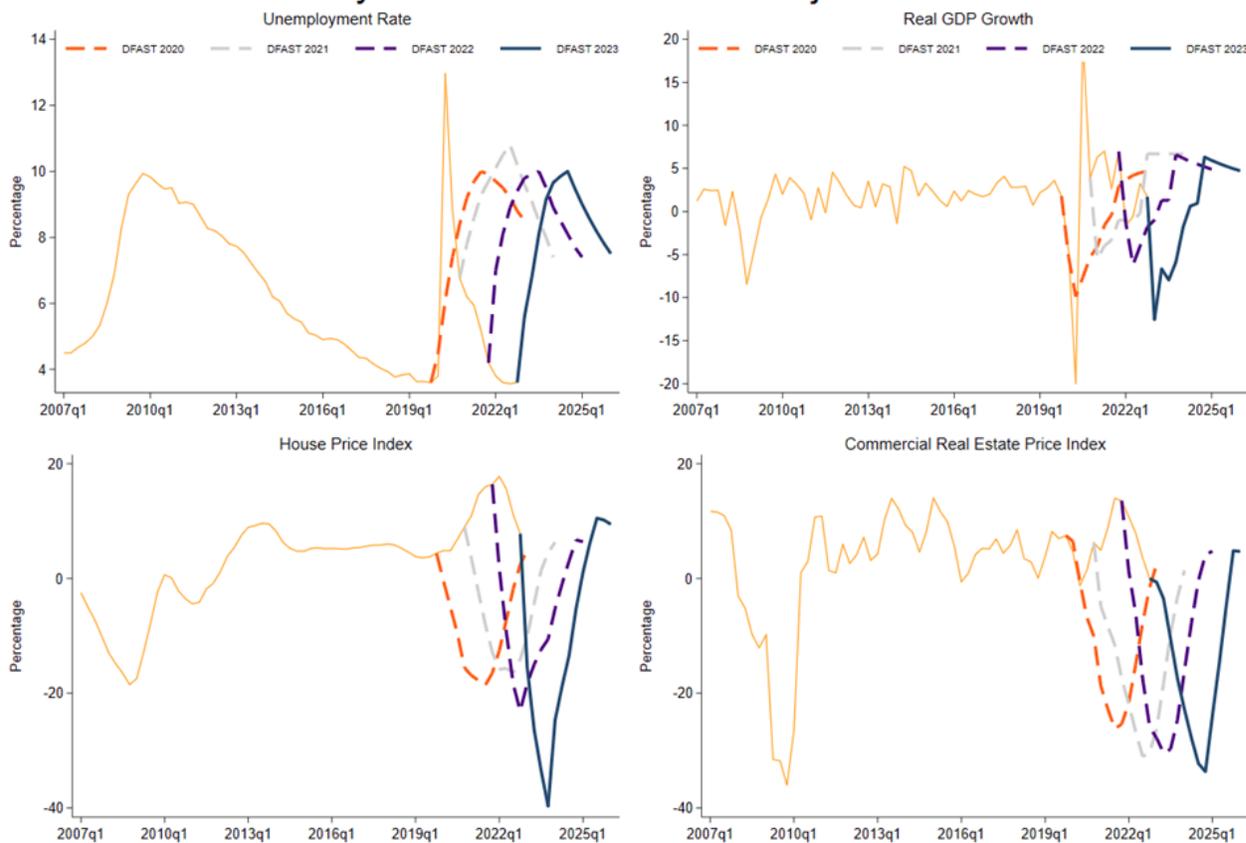
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The 2023 severely adverse scenario, similar to that of 2022, involves a severe global recession with a significant drop in both residential and commercial real estate prices, which spills over to the corporate sector. In addition, as required by the Fed's scenario design policy for an unemployment rate of at least 10 percent, the scenario also includes an increased unemployment rate that is $\frac{3}{4}$ of a percentage point higher than DFAST 2022, and a further decline in real GDP by 5 percentage points compared to last year's severely adverse scenario.

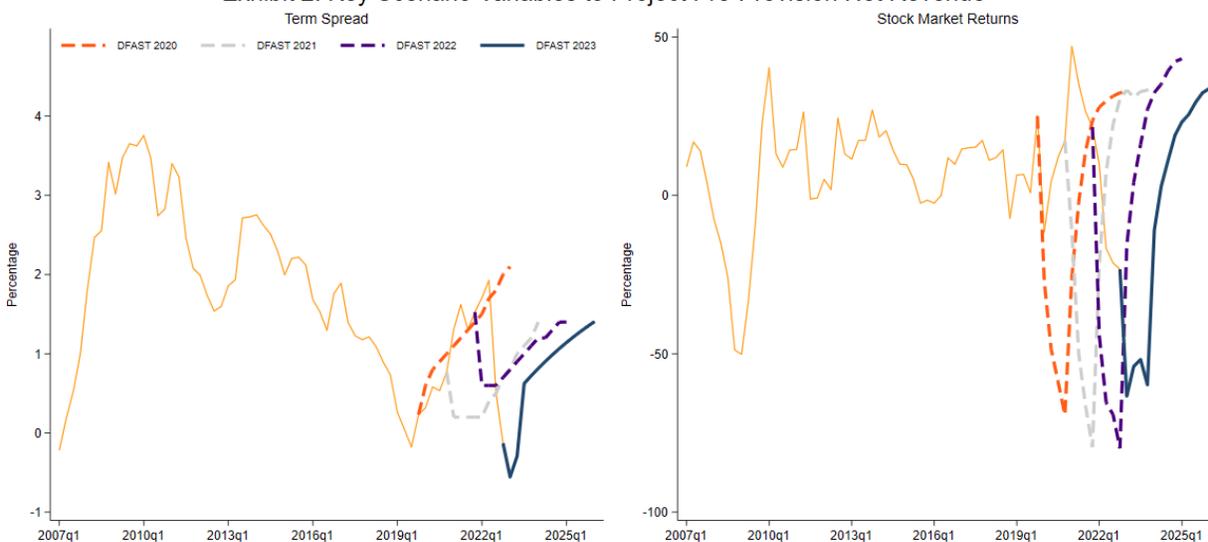
Exhibit 1: Key Scenario Variables to Project Loan Losses



Source: Federal Reserve Board.

Exhibit 1 shows four important macroeconomic variables that tend to drive projected loan losses: the unemployment rate, real GDP growth, the house price index (HPI) and the CRE price index. As shown in the top left panel of Exhibit 1, the increase in the unemployment rate under stress is larger in the 2023 severely adverse scenario than the 2022 scenario, and about the same as in the 2020 scenario. The panel on the right shows a more severe decline in real GDP growth relative to last year's scenario. The path for the HPI is much more severe in the 2023 severely adverse scenario relative to the paths in all prior three severely adverse scenarios. Therefore, we expect residential real estate loan losses to increase significantly. The path of the CRE price index is depicted in the bottom right panel of Exhibit 1. The peak YoY decline in 2023 is more severe compared with the prior three severely adverse scenarios. Finally, the BBB spread (not shown) widens from 2.1 to 5.75 percentage points and stays elevated for nearly a year in the June 2023 scenario, but it is slightly less severe compared with prior years.

Exhibit 2: Key Scenario Variables to Project Pre-Provision Net Revenue



Source: Federal Reserve Board.

The key macroeconomic variables that drive projected pre-provision net revenue are the term spread and stock market returns (Exhibit 2).¹ The lower term spread in this year’s severely adverse scenario relative to last year’s creates more of a headwind for bank profitability, as we discuss in the next section. Equity prices fall 45 percent, less than in the 2021 scenario, but remain depressed for a longer period of time.

LOAN LOSSES AND PROVISIONS ARE PROJECTED TO INCREASE . . .

Merely observing the paths of the macroeconomic variables over the stress horizon provides an inadequate understanding of the impact these scenarios have on bank performance. Top-down time-series models rectify this issue by linking a subset of the variables in the supervisory scenarios to industry-level bank performance measures. Hence, we utilize BPI’s top-down models to estimate the impact of the severely adverse scenario on the projections of aggregate loan losses and PPNR under the supervisory stress tests.

Overall, we anticipate the projections of loan losses under the 2023 stress scenarios to be moderately higher compared to the results of previous years’ stress tests, including 2020. The total loan losses are estimated to reach \$415 billion for the 22 firms that participated in all three stress tests (Table 1). In particular, there is a significant increase in losses for residential real estate loans driven by the sharp decline in house prices in this year’s scenario.

The last row in Table 1 shows projected provisions increasing approximately \$35 billion cumulatively over the nine quarters of the stress planning horizon relative to DFAST 2022. We also estimate that provisions will be close to the same level as total losses, but this estimate does not consider the increase in allowances for credit losses recorded in the fourth quarter of 2022 due to the slighter higher odds of a recession in 2023. Hence, when we revise these projections using fourth-quarter regulatory data, it is likely that provisions for loan losses will be revised downwards.

¹ Our models also include real GDP growth and the change in market volatility.

Table 1: Projected Loans Losses (2023:Q1–2025:Q1)

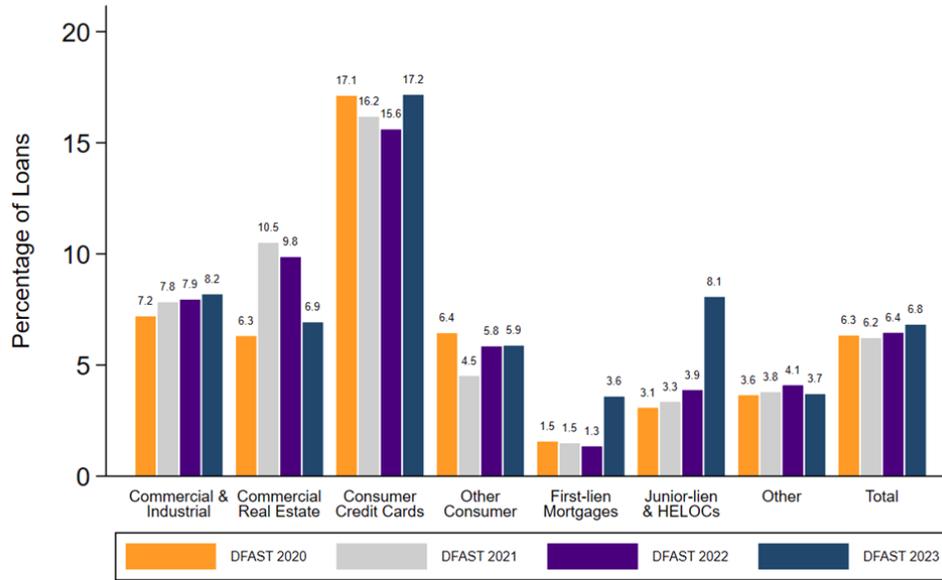
Loan Type	Projected DFAST 2023	DFAST 2022	DFAST 2021	DFAST 2020
Commercial and Industrial	114.7	97.7	85.7	90.9
Commercial Real Estate	50.2	64.2	61.1	38.9
First-lien Mortgages	43.3	14.4	15.0	16.2
Junior Liens and HELOCs	11.5	5.2	4.9	5.9
Credit Cards	108.2	96.2	90.6	117.8
Other Consumer	29.7	30.2	23.2	30.3
Other Loans	63.0	71.7	55.4	48.3
Total Losses	420.6	379.6	335.9	348.3

Provisions	414.7	379.7	278.2	391.4
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Note: All values are in billions of U.S. dollars. Projections include only the 22 banks that participated in all the last four stress tests to ensure comparability.

Exhibit 3 plots the projected loan loss rates over the past four stress testing exercises. The aggregate loss rate is expected to rise from 6.4 percent in DFAST 2022 to 6.8 percent in this year’s stress test. The loss rate for C&I (commercial and industrial) loans is predicted to increase by 30 basis points due to a higher unemployment rate and a more severe outlook for real GDP. The loss rate for CRE (commercial real estate) loans is expected to decline compared to last year’s DFAST, mainly due to a decrease in CRE loss rates at launch, likely reflecting improvements in the banks’ own portfolios. In contrast, a sharp rise in the loss rate for residential real estate loans is anticipated, driven by the nonlinear nature of BPI’s top-down model and the sharp decline in house prices. The loss rates of other loan categories are expected to remain little changed from DFAST 2022.

Exhibit 3: Loan Loss Rates



Source: Federal Reserve Board Dodd-Frank Act Stress Tests, BPI calculations.

Note: Adjusted Total Loans and C&I Loans Loss Rates to account for outstanding PPP Loans.

PPNR PROJECTIONS ARE MIXED AND DEPEND ON WHETHER MODEL COEFFICIENTS ARE UPDATED . . .

Overall, PPNR is expected to increase relative to the stress test of 2022 (Table 2). In aggregate, the 22 firms that participated in all four stress tests are projected to generate \$346.1 billion over the nine quarters of the planning horizon. This projection assumes the model coefficients are updated to partially mitigate the impact of transitory deposit growth on banks' noninterest expenses. If the model coefficients for noninterest income and noninterest expense are not adjusted with more recent data, PPNR would decrease by an additional \$80 billion to \$264 billion due to an inflation of noninterest expenses and the underlying weakness in noninterest income projections.

Table 2: Projected Pre-Provision Net Revenue (2023:Q1–2025:Q1)

PPNR Subcomponents	Projected DFAST 2023	DFAST 2022	DFAST 2021	DFAST 2020
Net Interest Income	706.1	670.5	624.2	675.8
Noninterest Income	702.6	776.1	729.5	664.1
Noninterest Expense	1062.6	1112.3	1061.5	982.7
Pre-Provision Net Revenue	346.1	334.3	292.2	357.2

Note: All values are in billions of U.S. dollars. Projections include only the 22 banks that participated in all the last four stress tests to ensure comparability.

The recent strong performance of banks' net interest margins continues over the stress horizon, thanks to the backward looking component of supervisory models. This contributes to higher projections for net interest income in this year's stress tests, even though term spreads are lower. However, this improvement is offset by a decrease in noninterest income, partly due to the return to normal in investment banking fees and weaker equity prices and real GDP growth. Noninterest expenses are projected to decrease, largely due to changes in model coefficients and prolonged weakness in equity prices over the stress horizon and weaker real GDP growth.

The GMS seems less severe compared to last year's test. . . Differences in losses between the two market shocks will highlight the banks' sensitivity to interest rate risk in their trading books.

Banks with significant trading operations are subject to the Global Market Shock (GMS) component in stress tests. The GMS consists of thousands of large movements in market prices and rates, which are generally calibrated to the market moves seen in the second half of 2008. This year's severely adverse scenario also includes an exploratory market shock (EMS) with the objective of evaluating the banks' trading risk profiles in the event of rising inflation expectations.

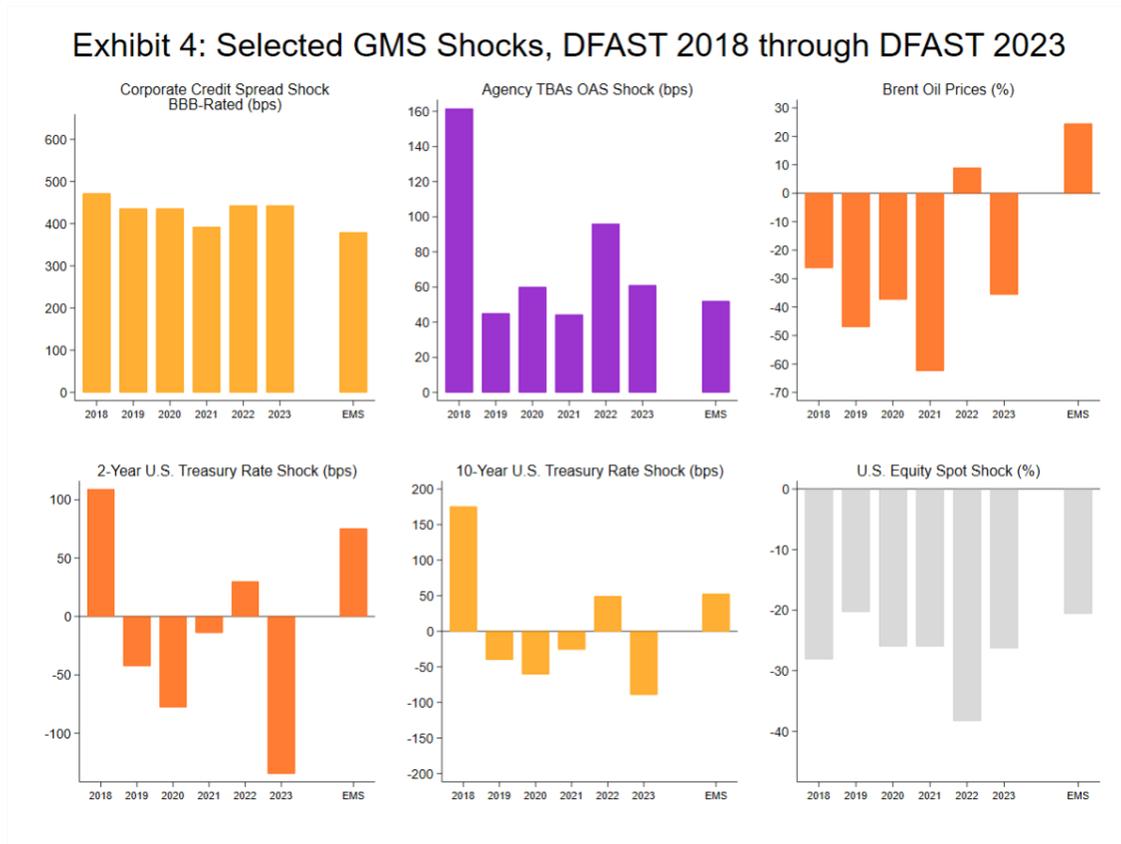


Exhibit 4 shows shocks to a set of risk factors across various critical asset classes, such as corporate bond spreads, mortgage-backed securities spreads, commodity prices, interest rates and the S&P 500 Index. The GMS scenario for 2023 differs from last year's, particularly regarding the shocks to interest rates and commodity prices. Additionally, this year's spot shock to equities is milder compared to last year's stress tests.

It is noteworthy that the EMS assumes a vastly different shock to interest rates and seems to be designed specifically to assess the banks' sensitivity to interest rate risk in their trading books.

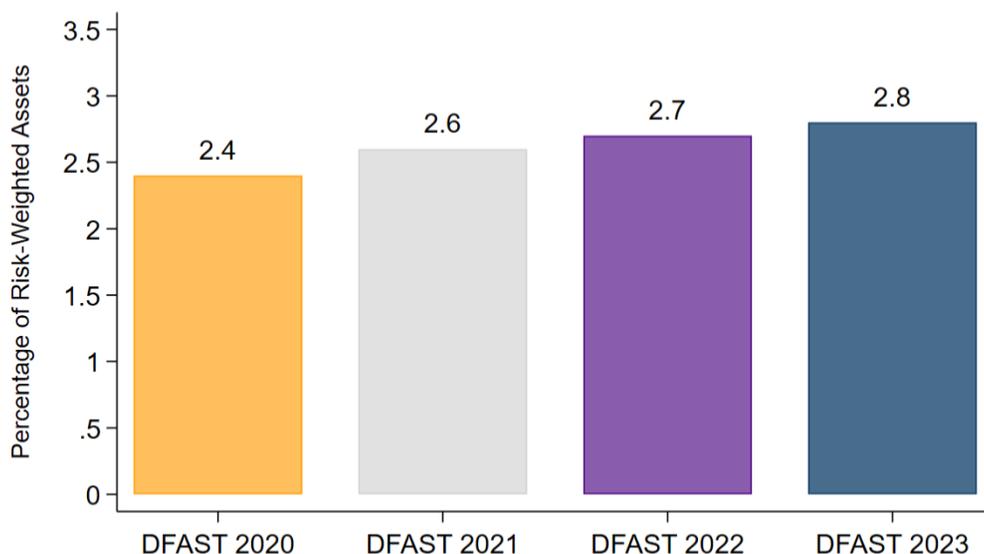
THE PROJECTED PEAK DECLINE IN CAPITAL RATIOS IS MODESTLY HIGHER COMPARED TO 2022'S STRESS TESTS

Our analysis employs the projections described above to estimate the impact of the severely adverse scenario on the peak decline in each bank's CET1 capital ratio under the supervisory stress test. In making these estimates, we have to make additional assumptions regarding other significant components of the stress tests, such as trading and counterparty losses, operational risk losses, and changes in accumulated other comprehensive income. For the purposes of the analysis, we assume:

- Operational risk losses remain unchanged compared to last year's stress tests;
- Trading and counterparty losses decrease 5 percent;
- A 25 percent reduction in year-to-date unrealized losses on available for sale securities to account for the lower interest rates in the stress scenario for banks not subject to the AOCI filter.

Furthermore, our analysis starts with third-quarter 2022 data, as the fourth-quarter data for 2022 is not yet available. The Federal Reserve will release the stress test results in June 2023 based on fourth-quarter 2022 data, which will impact our results. For example, since allowances for credit losses rose in the fourth quarter of last year, projected provisions for loan and lease losses in the stress tests will likely be lower, assuming other factors remain constant.

Exhibit 5: Projected Peak Decline in Aggregate CET1 Capital Ratio



Source: Federal Reserve Board Dodd-Frank Act Stress Tests, BPI calculations.

Note: Samples include only the 22 banks that participated in the 2020, 2021, 2022, and 2023 stress tests, to ensure comparability.

As illustrated in Exhibit 5, based on these assumptions, the aggregate CET1 capital ratio decreases from 11.9 percent in the third quarter of 2021 to a projected minimum of 9.1 percent under the 2023 severely adverse scenario (a 2.8-percentage point decline, as indicated by the dark blue bar) for the 22 banks in our sample. The decline in the aggregate CET1 ratio during the 2022 stress tests was 2.7 percentage points for the same group of banks, while the decline in the 2021 stress tests was 2.6 percentage points. If these assumptions are accurate, banks' stress capital buffers are expected to increase by a modest amount.

CONCLUSION

Based on our models, the severely adverse scenario this year is expected to result in modest changes in the capital requirements of large U.S. banks at the aggregate level. However, some of the improvement in the projections of pre-provision net revenue is due to an update of the coefficients of supervisory models to reduce the impact of deposit growth driven by quantitative easing (QE) on the supervisory projections of noninterest expenses. Additionally, we have also assumed slightly lower trading and counterparty losses, as well as increases in the fair value of banks' available-for-sale securities for advanced approaches banks.