



Assessment of Bank Capital during the Recent Coronavirus Event

June 2020



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Errata

The Federal Reserve revised this report on September 4, 2020, to correct typographical errors in weighted average loan loss rates. The revisions are listed below.

On p. 13, under “Results under the Alternative Downside Scenarios,” the sentence “The weighted average loan loss rate (black dot) for that scenario is 6.4 percent—roughly \$430 billion in loan losses” has been revised to “The weighted average loan loss rate (black dot) for that scenario is 6.3 percent—roughly \$430 billion in loan losses.”

On p. 13, the sentence “In the V-shaped alternative downside scenario (second bar in figure 7), the weighted average loss rate increases to 8.1 percent—almost \$560 billion in loan losses—and the interquartile range of firm-level loss rates is 6.3 percent to 8.7 percent” has been revised to “In the V-shaped alternative downside scenario (second bar in figure 7), the weighted average loss rate increases to 8.2 percent—almost \$560 billion in loan losses—and the interquartile range of firm-level loss rates is 6.3 percent to 8.7 percent.”

On p. 13, the sentence “The U-shaped alternative downside scenario (third bar in figure 7) results in a weighted average loan loss rate that gets up to 10.2 percent—just over \$700 billion in loan losses—and has the most variation in nine-quarter loan loss rates across firms” has been revised to “The U-shaped alternative downside scenario (third bar in figure 7) results in a weighted average loan loss rate that gets up to 10.3 percent—just over \$700 billion in loan losses—and has the most variation in nine-quarter loan loss rates across firms.”

On p. 13, under Figure 7:

- The Severely Adverse weighted average loan loss rate (black dot) has been revised from 6.4 to 6.3.
- The V-shaped weighted average loss rate (black dot) has been revised from 8.1 to 8.2.
- The U-shaped weighted average loan loss rate (black dot) has been revised from 10.2 to 10.3.

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Executive Summary

The banking system has been a source of strength as the economy has deteriorated due to the coronavirus outbreak and response (the “COVID event”), with large increases in loans and consumer deposits.¹ However, there is material uncertainty about the trajectory for the economic recovery and corresponding uncertainty related to its effects on the financial health of banking organizations. While all large banks are sufficiently capitalized at present, the Board is taking additional action to preserve capital and to assess banks’ capital plans more frequently during this time of uncertainty. These actions are intended to ensure banks remain a source of strength in the future.

In particular, the Board will

- suspend share repurchases,
- cap the growth of dividends and impose a limit that does not exceed recent income,
- require banks to re-assess their capital needs and resubmit their capital plans later this year, and
- conduct additional stress analyses later this year as data from banks become available and economic conditions evolve.

The restrictions will apply for the third quarter of 2020 and may be extended by the Board quarter-by-quarter, as the economic situation continues to evolve.

Following the onset of the COVID event, the Federal Reserve undertook a “[sensitivity analysis](#)” to explore the vulnerabilities of banks to the downside risks to the economy posed by the COVID event.² The stress brought on by the COVID event has been larger than anticipated, affected sectors of the economy in a highly unusual way, and could result in an unusual relationship between the economic and financial factors and credit losses, in part because of extraordinary government actions.

The Board constructed three alternative downside scenarios during the first half of April:

- a rapid [V-shaped recovery](#) that regains much of the output and employment lost by the end of this year
- a slower, more [U-shaped recovery](#) in which only a small share of lost output and employment is regained in 2020

¹ According to the Federal Reserve’s H.8 release, large domestic banks’ outstanding loans to nonfinancial businesses increased \$326 billion between February 26 and May 6. These same firms also have deferred payments on residential mortgages or other consumer loans for millions of households that have suffered health and economic hardships due to the disease and its effects on the economy.

² The sensitivity analysis includes the 33 firms required to participate in DFAST 2020. The firms included are Ally Financial Inc.; American Express Company; Bank of America Corporation; The Bank of New York Mellon Corporation; Barclays US LLC; BMO Financial Corp.; BNP Paribas USA, Inc.; Capital One Financial Corporation; Citigroup Inc.; Citizens Financial Group, Inc.; Credit Suisse Holdings (USA), Inc.; DB USA Corporation; Discover Financial Services; Fifth Third Bancorp; The Goldman Sachs Group, Inc.; HSBC North America Holdings Inc.; Huntington Bancshares Incorporated; JPMorgan Chase & Co.; KeyCorp; M&T Bank Corporation; Morgan Stanley; MUFG Americas Holdings Corporation; Northern Trust Corporation; The PNC Financial Services Group, Inc.; RBC US Group Holdings LLC; Regions Financial Corporation; Santander Holdings USA, Inc.; State Street Corporation; TD Group US Holdings LLC; Truist Financial Corporation; U.S. Bancorp; UBS Americas Holding LLC; and Wells Fargo & Company.

- a **W-shaped double dip recession** with a short-lived recovery followed by a severe drop in activity later this year due to a second COVID event

The alternative downside scenarios describe hypothetical sets of events designed to assess the strength of banking organizations to more severe outcomes than a baseline scenario built around a current consensus forecast, such as the Blue Chip Indicators.

Table 1 shows the distribution of post-stress common equity tier 1 (CET1) capital ratios under the three alternative downside scenarios in the sensitivity analysis, as well as the hypothetical severely adverse scenario that was published in February 2020 prior to the COVID event.

Table 1. Minimum CET1 capital ratios in the severely adverse and alternative downside scenarios, 2020:Q1–2022:Q1			
Scenario	Minimum CET1 capital ratio		
	25th percentile	75th percentile	Aggregate
Stress test			
Severely adverse	8.0	12.3	9.9
Sensitivity analysis			
V-shaped	7.5	11.3	9.5
U-shaped	5.5	10.8	8.1
W-shaped	4.8	10.5	7.7

Note: Excludes common distributions. Sample consists of the 33 firms participating in DFAST 2020. These values may differ from the values in figure 5, which represent aggregate CET1 capital ratios at the end of the projection horizon.

Under the V-shaped alternative downside scenario, firms remain well above their regulatory minimum ratios with post-stress capital at a similar level as under the February 2020 scenario. Under the U-shaped and W-shaped alternative downside scenarios, several firms would approach minimum capital ratios.

While this analysis does not constitute a full stress test and includes some conservative assumptions, it demonstrates the wide range of possible outcomes for banks. As a result of their strong current capital levels, the large majority of banks remain sufficiently capitalized over the entirety of the projection horizon in all scenarios. Since the scenarios were developed in early April, certain economic and financial market indicators have improved somewhat. But the path of the economy remains uncertain, so the Board is taking several actions to help ensure that all firms remain sufficiently capitalized until the economy recovers.

Macroeconomic and Financial Conditions

The spread of the COVID event is causing tremendous hardship in the United States and around the world. Measures taken in response to public health concerns have induced a sharp decline in economic activity and a surge in job losses. The unemployment rate in the United States, which had been at a 50-year low at the beginning of 2020, soared to a post-war high.

In response, policymakers in the United States and worldwide have taken extraordinary measures to mitigate the current economic weakness and strengthen the eventual recovery. The Federal Reserve responded swiftly with a series of monetary policy and emergency actions to stabilize markets and bolster the flow of credit to households, businesses, and communities.

Nonetheless, future economic conditions are extraordinarily uncertain. In the months ahead, prospects for the many businesses facing depressed revenues and unemployed workers will largely depend on the course of the COVID event. There is uncertainty about the persistence of the health concerns, the nature and duration of the resulting downturn, and the effect of the unprecedented government responses on borrower behavior.

Strong capital levels at the largest banks have enabled them to support the broader economy during this downturn, and the Federal Reserve is committed to taking actions that will help sustain their crucial role as financial intermediaries even if conditions were to deteriorate significantly.

Rapid Deterioration in the Economy

The severe economic repercussions of the COVID event are possibly most visible in the labor market. Since February, employers shed nearly 20 million jobs from payrolls. The unemployment rate jumped from a 50-year low of 3.5 percent in February to a post–World War II high of 14.7 percent in April, before declining to 13.3 percent in May.³ New claims for unemployment insurance have remained well above one million per week into early June.

In financial markets, as the COVID event began in late February and continued over much of March, equity prices plunged and equity volatility surged. Nominal Treasury yields dropped substantially, with yields on longer-term securities reaching all-time record lows. Spreads of yields of corporate bonds over those of comparable-maturity Treasury securities widened significantly as the credit quality of firms declined and market functioning deteriorated. At the most acute phase of this period, liquidity problems emerged in some critical markets, causing them to stop functioning properly.

Market function has improved, but the COVID event continues to pose severe risks to businesses and households. The sharp reduction in economic activity has forced an already highly leveraged business sector to bridge the downturn by increasing its debt load further. At the same time, corporate earnings are expected to decline substantially. As a result, common

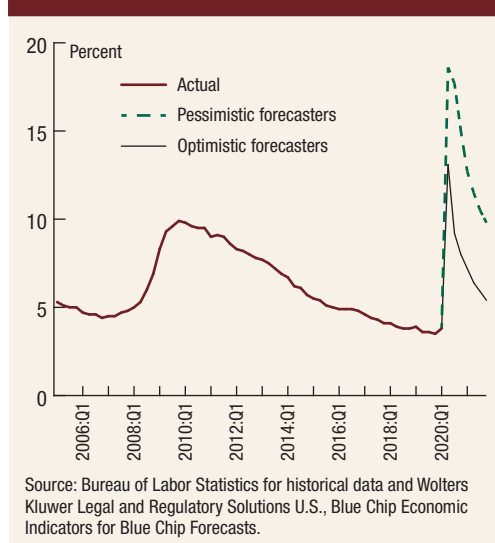
³ See Board of Governors of the Federal Reserve System, *Monetary Policy Report* (Washington: Board of Governors, June 12, 2020), https://www.federalreserve.gov/monetarypolicy/files/20200612_mprfullreport.pdf.

measures of default risk, such as Moody's expected default frequency (EDF), have risen considerably relative to year-end 2019. While household debt vulnerabilities were generally modest before the crisis, the severity of the shock and the associated sudden increase in unemployment and sharp decline in incomes may lead to a significant rise in delinquencies and defaults on household debt. The strains on the balance sheets of businesses and households may create persistent fragilities, which may result in further stress to financial institutions.

High Degree of Uncertainty about the Future Path

As conditions deteriorated throughout the spring, uncertainty among economic forecasters has increased. The depth and duration of the downturn will depend critically on the course of the coronavirus and the nature of response measures. The uncertainty about the outlook implies there are a number of plausible paths the economy may take over the course of the next two years. **Figure 1** shows that the most pessimistic forecasters, as proxied by the average of the 10 highest unemployment rate forecasts from the June 2020 Blue Chip Report, expect the unemployment rate to remain above 10 percent through much of 2021, while the most optimistic forecasters, as proxied by the average of the 10 lowest unemployment rate forecasts from the June 2020 Blue Chip Report, believe it will decline to about 5.5 percent over the same period.⁴

Figure 1. Unemployment rate, actual and June 2020 Blue Chip Forecasts



The speed and severity of the economic downturn and the size and extent of government responses to the crisis have been unprecedented. Despite the subsequent recovery in some financial markets and increased employment in May, uncertainty remains high due to the unpredictable course of the coronavirus and the nature of the response measures in coming months. Questions remain about how quickly households and businesses can recover, even if the constraints imposed on economic activity last spring continue to be relaxed. The combined effect of the health concerns and the government responses present challenges for risk measurement, including for the types of models used by firms and the Federal Reserve in stress tests. The sensitivity of these models to the current situation will likely be known only over time.

⁴ See Wolters Kluwer Legal and Regulatory Solutions U.S., Blue Chip Economic Indicators, June 2020, vol. 45, no. 6.

Sensitivity Analysis

Stress tests are a useful tool to assess bank health under different financial and macroeconomic conditions. They provide a systematic, disciplined framework for assessing whether firms have adequate capital to absorb losses and continue to fulfill their roles as financial intermediaries under various economic scenarios.

The Federal Reserve's 2020 severely adverse scenario was designed in late 2019 and published in early February 2020, before the COVID event had significantly affected the U.S. economy. The 2020 severely adverse scenario features a severe global recession, a rise in the unemployment rate to 10 percent, a 50 percent decline in broad equity prices, a roughly 25 percent decline in residential house prices, and heightened stresses in corporate debt markets and commercial real estate.⁵

By mid-March, it became clear that the COVID event was disrupting U.S. economic activity and that even more extreme downside outcomes than the 2020 severely adverse scenario were plausible, especially for near-term unemployment and gross domestic product (GDP). As a result, the Federal Reserve conducted sensitivity analysis using three alternative downside scenarios and made targeted adjustments to the supervisory stress test framework to credibly reflect even more stressful situations than were implied by current economic and banking conditions.

Alternative Downside Scenarios

To assess the resiliency of large banks in an environment of high uncertainty, the Federal Reserve considered three alternative downside scenarios beyond the severely adverse scenario published in February 2020. The alternative downside scenarios were designed in early April and span the wide range of projections made at that time by professional forecasters for key macroeconomic indicators, such as the unemployment rate and GDP. The alternative downside scenarios also include different paths for the yield on 10-year Treasuries.

The alternative downside scenarios continue to reflect a level of severity that is the same as or highly comparable to that of the supervisory severely adverse scenario for financial variables such as stock prices, and the spreads for the yields on investment-grade corporate bonds and the interest rates on mortgages relative to the yields on Treasuries of comparable maturity. Finally, in the three alternative downside scenarios, both commercial and residential real estate prices follow similarly stressful paths as in the supervisory severely adverse scenario.

Like all stress test scenarios, the three alternative downside scenarios are not forecasts. They describe a hypothetical set of events designed to assess the strength of banking organizations, and are based on various sources of economic forecasts including the Blue Chip forecasts from April 2020.⁶

⁵ See Board of Governors of the Federal Reserve System (2020), *2020 Supervisory Scenarios for Annual Stress Tests Required under the Dodd-Frank Act Stress Testing Rules and the Capital Plan Rule* (Washington: Board of Governors, February 2020), <https://www.federalreserve.gov/newsevents/pressreleases/bcreg20200206a.htm> for additional information and for the details of the supervisory scenarios.

⁶ See Wolters Kluwer Legal and Regulatory Solutions U.S., *Blue Chip Economic Indicators*, April 2020, vol. 45, no. 4.

Key features of the three alternative downside scenarios are summarized in [table 2](#) and [figures 2, 3, 4](#). Table 2 compares the peak unemployment rate, peak-to-trough GDP change, and minimum 10-year Treasury rates across the severely adverse scenario published in February and the three alternative downside scenarios. All three alternative downside scenarios feature higher peak unemployment rates and larger declines in GDP than the severely adverse scenario, but the severity and contours of each of the alternative downside scenarios capture different underlying drivers of stress. Figure 2 shows the paths of unemployment rates in the severely adverse and three alternative downside scenarios, and figure 3 shows the corresponding paths of real GDP growth. Figure 4 shows the paths of the 10-year Treasury rate in the severely adverse and the three alternative downside scenarios. The sections below describe each of the three alternative downside scenarios.

V-Shaped Alternative Downside Scenario

The first alternative downside scenario features a “V-shaped” recession. Relative to the scenario published in February 2020, this alternative downside scenario maintains the same level of financial stress but concentrates the macroeconomic stress early in the projection horizon. The V-shaped alternative downside scenario is characterized by a much deeper recession in the first two quarters of the scenario than the severely adverse, but it then evolves into a sustained recovery in 2021 and 2022.

In the second quarter of 2020, real GDP contracts in this scenario by about 31½ percent at an annualized rate and the unemployment rate soars to a peak of 19½ percent. In the second half of 2020, GDP rises appreciably and the unemployment rate declines considerably. GDP growth remains above trend in 2021 and 2022, but the unemployment rate declines gradually and stays above the low levels of the first quarter of 2020 even at the end of the scenario. The paths of the interest rates on 3-month Treasuries and of the yield on 10-year Treasuries track closely to the corresponding paths for the scenario published in February, with the most notable difference being that the V-shaped alternative downside scenario reflects average rates that prevailed in the first quarter of 2020. By maintaining the same financial stress as in the severely adverse scenario, equity prices would still decline nearly 50 percent from their value on June 1, 2020, and BBB-rated corporate bond spreads in this scenario would peak at 550 basis points compared to the current level of about 300 basis points.

U-Shaped Alternative Downside Scenario

The second alternative downside scenario is characterized by a more persistent, “U-shaped” recession. The path of the economy in this scenario is consistent with the possibility of prolonged social distancing to combat ongoing outbreaks of the virus across the country.

The unemployment rate in this scenario reaches a peak of about 15½ percent and remains close to that level for a few quarters before declining gradually to levels that are still well above the low unemployment rate of the first quarter of 2020. Relatedly, there is no strong rebound in GDP, implying that the level of GDP does not catch up to its old trend within the projection period. The interest rate on 3-month Treasuries reaches its effective lower bound in the second quarter of 2020 and does not start rising until the fourth quarter of 2022. The yield on 10-year Treasuries is lower relative to the severely adverse scenario, resulting in a flatter yield curve.

W-Shaped Alternative Downside Scenario

The third alternative downside scenario is characterized by a “W-shaped” recession in which a second COVID event begins in late 2020 and leads to a second increase in unemployment and drop in GDP.

In this scenario, the annualized growth rate of real GDP dips as low as -37½ percent in the second quarter of 2020, and the unemployment rate rises to 16 percent in the same quarter. Real GDP growth surges in the second half of 2020, implying an almost complete recovery to the pre-crisis level of GDP. However, consistent with a resurgence of cases of the virus in the winter, real GDP growth dips negative for a second time in the first quarter of 2021 to about -12 percent, and the unemployment rate rises back to 14 percent in 2021. The second recession is not as deep but has greater duration, with real GDP receding through the end of 2021 and implying a cumulative contraction of 7½ percent for the span of the second dip. Interest rates on 3-month Treasuries remain at their lower bound for the duration of the scenario. The minimum yield on 10-year Treasuries is even lower than in the U-shaped alternative downside scenario.

Table 2. Select scenario variables in the severely adverse and alternative downside scenarios

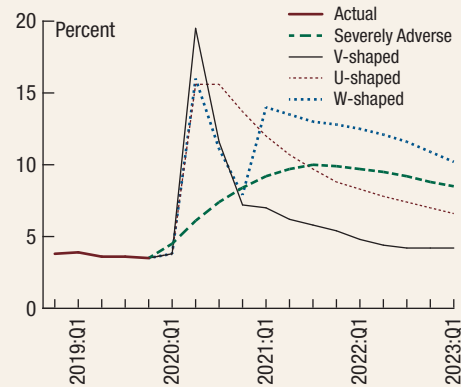
Scenario	Peak unemployment rate	Peak-to-trough GDP change	Lowest 10-year Treasury rate
Severely adverse	10.0	-8.5	0.7
V-shaped scenario	19.5	-10.0	0.8
U-shaped scenario	15.6	-13.8	0.6
W-shaped scenario	16.0	-12.4	0.5

The other financial and real estate variables in all of the alternative downside scenarios reflect similar assumptions as in the original severely adverse scenario. Specifically, the peak-to-trough changes for the indices of stock prices, housing prices, and most commercial real estate prices are the same as those in the severely adverse scenario. Similarly, the BBB-rated corporate bond spread attains the same peak in the alternative downside scenarios as in the severely adverse scenario but has somewhat different contours in the W-shaped alternative downside scenario. Finally, the peak for the U.S. Market Volatility Index (VIX) in the three alternative downside scenarios matches the peak observed in the first quarter of 2020.

These paths of financial and real estate variables in the severely adverse scenario continued to be appropriate given the highly uncertain and still-volatile financial conditions that prevailed in early April when these alternative downside scenarios were finalized. The subsequent recovery in equity and corporate bond markets means that the paths for those variables continue to be quite severe going forward. Likewise, incoming data on commercial and residential real estate prices suggest that the assumptions in the severely adverse scenario remain conservative.

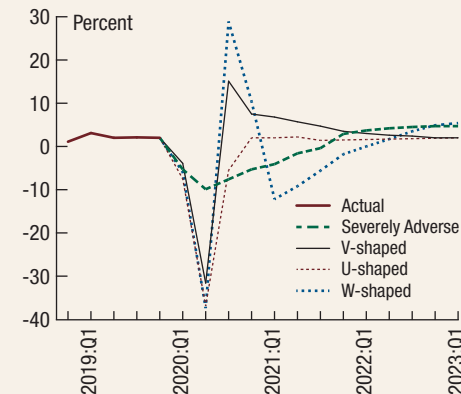
All three alternative downside scenarios included additional stress in the commercial real estate sector. This additional stress captures the unparalleled decline in demand for certain industries, which led to significant increases in commercial real estate vacancy rates. In the three alternative downside scenarios, the nationwide hotel vacancy rate peaks in the second quarter at 80 percent. The assumed retail vacancy rate also rises significantly above its historic levels and has a similar shape to the hotel series. Commercial real estate price and rent indexes are also adjusted to reflect these assumptions in the vacancy rates.

Figure 2. Unemployment rate in the severely adverse and alternative downside scenarios, 2018:Q4–2023:Q1



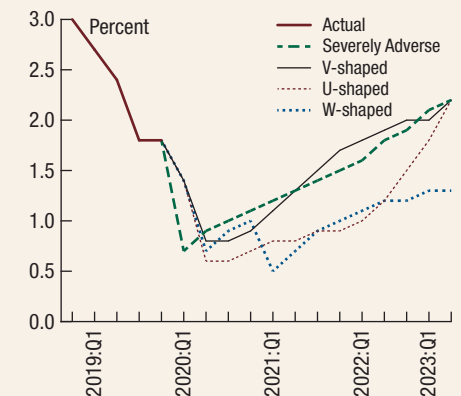
Source: Bureau of Labor Statistics for historical data and Federal Reserve assumptions for the severely adverse and alternative downside scenarios.

Figure 3. Real GDP growth in the severely adverse and alternative downside scenarios, 2018:Q4–2023:Q1



Source: Bureau of Economic Analysis for historical data and Federal Reserve assumptions for the severely adverse and alternative downside scenarios.

Figure 4. 10-year Treasury rate in the severely adverse and alternative downside scenarios, 2018:Q4–2023:Q1



Source: Federal Reserve Board for historical data and Federal Reserve assumptions for the severely adverse and alternative downside scenarios.

In addition to the alternative downside scenarios described above, the Federal Reserve incorporated a few salient features of the market dislocations in the first quarter of 2020 into its sensitivity analysis. They include acute stress in energy and municipal bond markets and in currency, equity and bond markets in foreign countries most affected by the virus, and greater volatility and basis shocks. These changes to the published global market shock have limited effects on the results of the sensitivity analysis.

Targeted Adjustments

As part of the sensitivity analysis, the Federal Reserve made three targeted adjustments to the supervisory stress test to capture material changes in the banking environment since the onset of the crisis in March.⁷ The effect of these changes cannot be captured by updates

to scenarios. Because the 2020 supervisory stress test relies on bank balance sheets reported as

⁷ For more information on the supervisory stress test methodology, see Board of Governors of the Federal Reserve System, *Dodd-Frank Act Stress Test 2020: Supervisory Stress Test Methodology* (Washington: Board of Governors, March 2020), <https://www.federalreserve.gov/publications/files/2020-march-supervisory-stress-test-methodology.pdf>.

of December 31, 2019, it does not capture changes in bank balance sheets since the onset of the COVID event. These adjustments include

- substantial growth in corporate loan balances and increased financial market volatility, each of which led to higher risk-weighted assets (RWAs) in the first quarter of 2020;
- financial stress on corporate borrowers in certain industry sectors that experienced an unparalleled decline in demand immediately following the outbreak; and
- temporary amendments to the tax code under the Coronavirus Aid, Relief, and Economic Security (CARES) Act to permit corporate tax loss carrybacks and remove certain limitations on tax loss carryforwards.⁸

Adjustments to Balance Sheet and RWAs

In the first quarter of 2020, the balance sheets of firms subject to the stress test increased markedly, reflecting in part a significant increase in corporate loans as borrowers drew on lines of credit during the latter half of March.⁹ The observed increase in the balance sheet is not fully reflected in the standard stress testing framework as the Federal Reserve assumes that firms maintain a constant level of assets over the projection horizon. To capture the effect of the larger balance sheet on bank capital ratios, the Federal Reserve assumed that each firm experienced 12 percent growth in corporate loans outstanding in the first quarter, based on available data.¹⁰ The balance sheet is assumed to remain constant for the remainder of the projection horizon. This adjustment increased both firms' balance sheets and RWAs.

Market volatility in the first quarter also increased significantly, and the VIX increased sharply in mid-March. Elevated market volatility across a number of asset classes increased firms' market risk weighted assets (mRWAs). To reflect the effect of this increase, the Federal Reserve assumed mRWAs increased by 30 percent in the first quarter and remained constant thereafter, based on observed growth in total RWAs, assets, and loans.¹¹

Incorporation of Sectoral Stress

As a result of the economic and financial stresses due to the effects of the COVID event, certain industry sectors experienced an unparalleled decline in demand. As noted in the May 2020 Beige Book, declines in consumer spending were "especially severe in the leisure and hospitality sector, with very little activity at travel and tourism businesses."¹² Consistent with this observation, expected default probabilities, which are based on a firm's market value, increased significantly in certain sectors, suggesting heightened credit risk.

⁸ See "Coronavirus Aid, Relief, and Economic Security (CARES) Act – March 2020" available at <https://www.congress.gov/116/bills/s3548/BILLS-116s3548is.pdf>.

⁹ See "Federal Reserve Supervision and Regulation Report – May 2020" available at <https://www.federalreserve.gov/publications/2020-may-supervision-and-regulation-report-banking-system-conditions.htm>.

¹⁰ This increase was estimated using publicly-available data from earnings releases. More recently available data from regulatory reports indicate that while commercial and industrial loan balances declined somewhat in recent weeks, year to date balance growth remains slightly higher than the assumed increase. Source: Assets and Liabilities of Commercial Banks in the United States, H.8, Federal Reserve.

¹¹ This increase was estimated using publicly-available data as of April 24 and reflects the median increase across firms whose data were available. More recently available regulatory data indicates a somewhat smaller increase in mRWAs of around 21 percent. Market RWAs have remained elevated during the second quarter.

¹² See "The Beige Book – May 2020" available at https://www.federalreserve.gov/monetarypolicy/files/BeigeBook_20200527.pdf.

The stress test framework captures a general increase in corporate credit risk from the economic downturn through the financial and economic stress reflected in the scenarios. However, the scenarios are not able to capture an unprecedented decline in demand for certain products and services resulting from the COVID event. For example, the Census Bureau's Small Business Pulse Survey indicated that small businesses in the transportation and warehousing sector and accommodation and food services sector reported an elevated, negative effect on their overall business. To capture unparalleled stress to certain businesses, the Federal Reserve assumed that borrowers in affected industries—such as the retail, travel-related, and accommodation and food industry—experience one-letter-grade downgrades in loan credit ratings.¹³

Temporary Amendments to the Tax Code, Supplementary Leverage Requirements, and CECL Relief

The CARES Act included a provision that temporarily amended the tax code to permit corporate tax loss carrybacks on taxes paid over the previous five years and removed certain limitations on tax loss carryforwards.¹⁴ The Federal Reserve incorporated the elements of this provision of the CARES Act into the calculation of post-stress capital. Because economic conditions were generally benign over the past five years, allowing carrybacks generally leads to lower deferred tax assets from net operating losses (NOLs) generated in 2020 and therefore higher aggregate capital ratios in the sensitivity analysis.

The Federal Reserve also provided temporary relief to firms by allowing them to exclude the on-balance sheet amounts of U.S. Treasury securities and deposits at Federal Reserve Banks from the denominator of the supplementary leverage ratio. Because the sensitivity analysis is focused on the CET1 ratio, that temporary relief has no effect.

The federal banking agencies provided firms with regulatory capital relief related to the recent adoption of the current expected credit loss (CECL) accounting methodology.¹⁵ Because the Federal Reserve maintained the framework used prior to the adoption of CECL for calculating allowances on loans in the supervisory stress test, the adoption of the CECL accounting methodology did not affect the stress test. As a result, no adjustment was needed to account for CECL.

Results under the Alternative Downside Scenarios

In the aggregate, the banks subject to the Federal Reserve's 2020 supervisory stress test are projected to remain above minimum regulatory capital requirements under all three alternative downside scenarios.

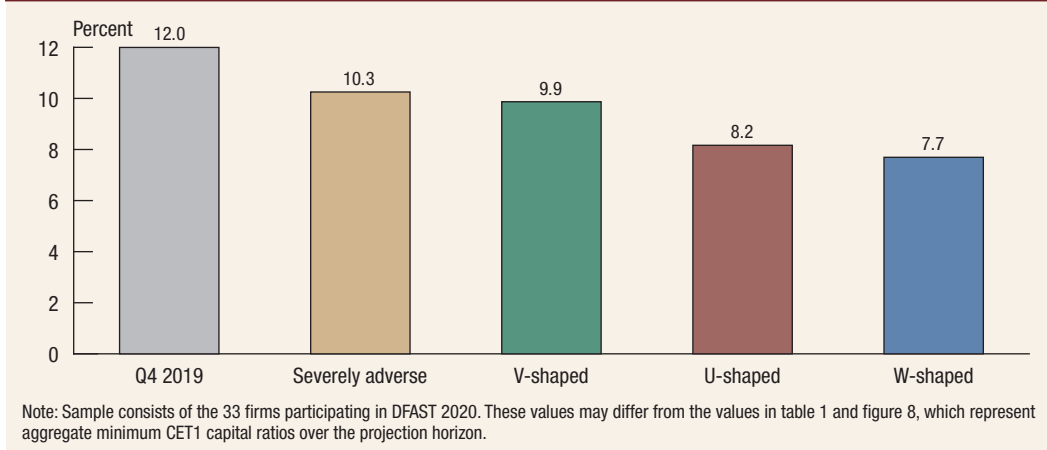
The results from the 2020 severely adverse scenario, which are fully described in the Dodd-Frank Act Stress Test 2020: Supervisory Stress Test Results document, are a base for compar-

¹³ Affected industries were identified as those with a substantial increase in the median expected default frequency (EDF) calculated at the four-digit NAICS level.

¹⁴ Pub. L. No. 116-136 Sec. 2303. A tax loss carryback allows a firm to apply a net operating loss to prior tax returns, thereby lowering the prior taxable income and allowing for a tax refund. A tax loss carryforward applies a tax loss toward future returns, thereby lowering future taxable income.

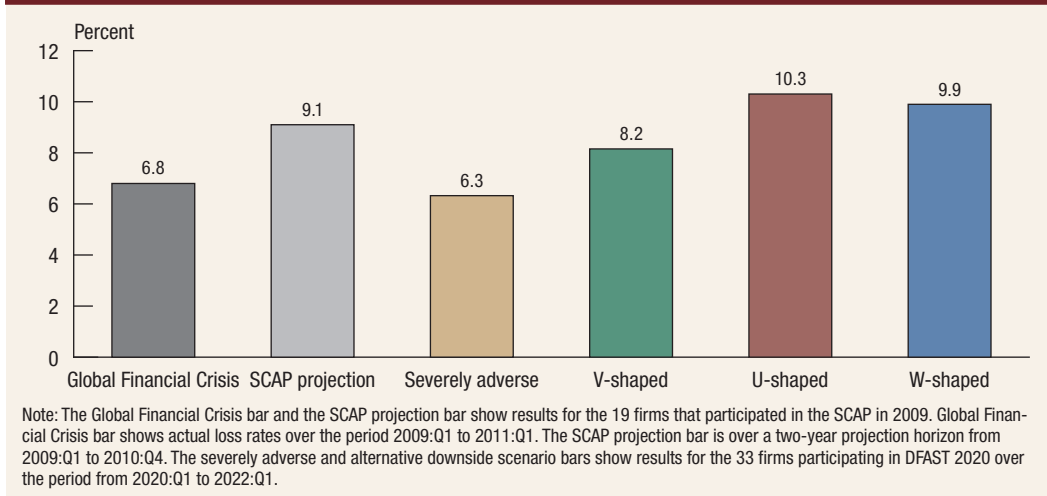
¹⁵ Interagency Press Release: <https://www.federalreserve.gov/newsevents/pressreleases/bcreg20200327a.htm>.

Figure 5. Aggregate CET1 capital ratio, actual 2019:Q4 and projected 2022:Q1 post-stress



ing with the results from the alternative downside scenarios.¹⁶ Figure 5 shows the aggregate actual and post-stress common equity tier 1 ratios under the severely adverse and alternative downside scenarios. Figure 6 compares the projected nine-quarter loan loss rates in the various scenarios explored this year to the worst nine-quarters of loan loss rates during the Global Financial Crisis and to loan loss rates projected in the 2009 Supervisory Capital Assessment Program (SCAP).

Figure 6. Historical and projected nine-quarter loan loss rates



In the severely adverse scenario, the aggregate CET1 ratio declines from 12.0 percent in the fourth quarter of 2019 (first bar of figure 5) to 10.3 percent by the end of the nine-quarter

¹⁶ See Board of Governors of the Federal Reserve System, *Dodd-Frank Act Stress Test 2020: Supervisory Stress Test Results* (Washington: Board of Governors, June 2020), <https://www.federalreserve.gov/publications/files/2020-dfast-results-20200625.pdf>.

projection period (second bar of figure 5).¹⁷ The aggregate loan loss rate under that scenario is 6.3 percent (third bar of figure 6), which is generally consistent with the aggregate loan loss rates projected in recent stress tests.

Results under the Alternative Downside Scenarios

The V-shaped alternative downside scenario, which includes the targeted adjustments and similar financial stress as in the severely adverse scenario, results in a decline in capital similar to the severely adverse scenario. Under the V-shaped alternative downside scenario, the aggregate CET1 ratio declines from 12.0 percent to 9.9 percent (third bar of figure 5). A higher loan loss rate of 8.2 percent in the V-shaped alternative downside scenario relative to the severely adverse (compare the third and fourth bars of figure 6) is partially offset by higher revenues owing to the stronger recovery and the benefits firms would get from the tax carry-back provision in the CARES Act.

The U-shaped and W-shaped alternative downside scenarios, which include the targeted adjustments and similar financial stress as the severely adverse scenario, result in larger projected declines in capital driven by higher loan loss rates of 10.3 percent and 9.9 percent, respectively (fifth and sixth bars of figure 6). Though the timing of losses is different under the U-shaped and W-shaped alternative downside scenarios, the overall nine-quarter declines in capital are similar. In the U-shaped alternative downside scenario, the CET1 ratio declines to 8.2 percent after nine quarters (fourth bar of figure 5). In the W-shaped alternative downside scenario, the CET1 ratio declines to 7.7 percent after nine quarters (fifth bar of figure 5).

Differences in projected loan losses are the primary driver of differences in post-stress capital declines across the various scenarios. The comparison of the historical benchmarks to the loss rates projected under the alternative downside scenarios in figure 6 suggests that banks could experience similar sized loan losses stemming from the COVID event as during the Global Financial Crisis. However, the composition of losses across different types of loans is different, and the wide variation in the magnitude of losses across the alternative downside scenarios highlights the high degree of uncertainty banks face.

In the scenarios in which the unemployment rate remains elevated for a long period of time, losses on credit cards rise beyond their already high levels in the severely adverse scenario, and other secured forms of consumer credit, like auto loans and mortgages, also take on material losses.¹⁸ In all scenarios, the results suggest that corporate credit and commercial real estate would take large losses. That is consistent with the buildup in leverage among nonfinancial corporates in recent years. However, the particular sectors ultimately affected the most will depend on the nature and duration of the stress.

That range of outcomes for different types of loans under the various scenarios translates to variation in outcomes for banks, which have different business models and concentrations. [Figure 7](#) shows the interquartile ranges and weighted average loan loss rates across the

¹⁷ The severely adverse scenario results do not include the effects of targeted adjustments.

¹⁸ As described in greater detail below, the projections of loan losses on consumer loans do not account for the changes to unemployment insurance in the CARES Act or the decline in credit card balances evident in the Federal Reserve's weekly data (Assets and Liabilities of Commercial Banks in the United States, H.8) during April and May.

severely adverse and alternative downside scenarios. The bottom end of the range is the 25th percentile of firm-level loss rates and the top end of the range is the 75th percentile.

The first bar in figure 7 shows the range and average loan loss rates in the severely adverse scenario. The weighted average loan loss rate (black dot) for that scenario is 6.3 percent—roughly \$430 billion in loan losses. The loan loss rate for the firm at the 25th percentile is 5.1 percent (bottom edge of the box), and the loan loss rate for the firm at the 75th percentile is 6.7 percent (top edge of the box). In the V-shaped alternative downside scenario (second bar in figure 7), the weighted average loss rate increases to 8.2 percent—almost \$560 billion in loan losses—and the interquartile range of firm-level loss rates is 6.3 percent to 8.7 percent. The U-shaped alternative downside scenario (third bar in figure 7) results in a weighted average loan loss rate that gets up to 10.3 percent—just over \$700 billion in loan losses—and has the most variation in nine-quarter loan loss rates across firms. In this scenario, the best performing quartile of banks had loan loss rates below 7.9 percent while the worst performing quartile of banks had loss rates above 10.9 percent. While variation in the firm-level loss rates in the W-shaped alternative downside scenario (last bar in figure 7) remains high, with the interquartile range spanning 7.7 to 10.3 percent, the weighted average nine-quarter loan loss rate is slightly lower (9.9 percent—about \$680 billion in loan losses) than under the U-shaped alternative downside scenario.

Although the U-shaped alternative downside scenario has the highest overall nine-quarter loan loss rate, loan losses remain particularly elevated outside the nine-quarter projection horizon under the W-shaped alternative downside scenario, which features a second COVID event. Those higher losses outside of the projection horizon in the W-shaped alternative downside scenario result in higher loan loss provisions toward the end of the projection horizon because the Federal Reserve’s models assume a loan loss allowance sufficient to cover the next four quarters of loan losses. Those higher loan loss provisions in the W-shaped alternative downside scenario result in lower net income and thus lower post-stress capital ratios than the U-shaped alternative downside scenario (last two bars of figure 5), even though loan losses measured within the nine-quarter window are larger in the U-shaped alternative downside scenario (last two bars of figure 6).

This analysis, which does not include the effect of planned distributions, shows that firms have sufficient capital to withstand a short-lived deep recession (the V-shaped alternative downside scenario) or an economic downturn similar in its severity and duration to the last crisis (the severely adverse scenario). However, a delay in the economic recovery brought on by a second COVID event could have significant negative effects on many banks’ capital levels. Figure 8 shows the interquartile ranges and aggregate minimum post-stress capital ratios across severely adverse and alternative downside scenarios.

Figure 7. Distribution of firm-level nine-quarter loan loss rates, interquartile range and weighted average

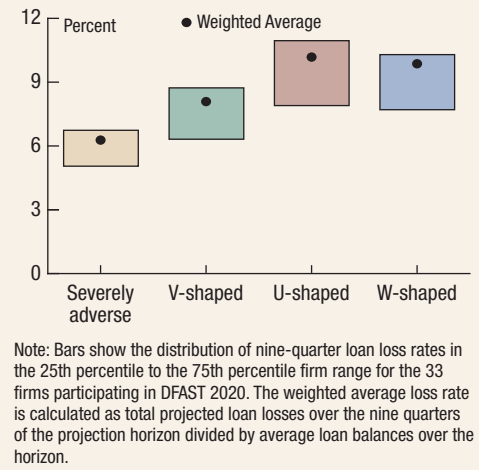
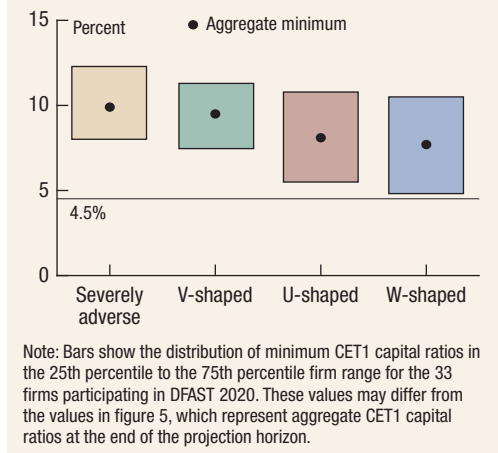


Figure 8. Distribution of firm-level minimum CET1 capital ratios, interquartile range and aggregate minimum



Under the severely adverse or the V-shaped alternative downside scenario, the interquartile ranges of post-stress CET1 ratios remain well above minimum requirements. For example, in the V-shaped alternative downside scenario, the 25th percentile firm-level post-stress CET1 ratio is 7.5 percent (see bottom edge of the box in the second column of figure 8). However, under the U-shaped or W-shaped alternative downside scenarios, a number of firms could experience significant capital depletion and several would approach minimum capital requirements.

Factors Not Included in the Results

This analysis also does not take into account the effects of the unprecedented government support. Government support to borrowers, including unemployment insurance and the

Paycheck Protection Program,¹⁹ may mitigate borrower stress and thereby result in lower losses in certain portfolios. The inherent uncertainty in how the unprecedented government support will affect borrower behavior adds uncertainty to these results. For example, the CARES Act also includes significant increases in unemployment insurance payments relative to their usual levels through July 31, 2020. The sensitivity analysis does not account for this change in unemployment benefits in the assessment of losses on residential real estate loans, auto loans, credit card loans, or other loans to consumers.²⁰ Likewise, the effects of the assistance to businesses through the Paycheck Protection Program, direct payments from the CARES Act, and the Federal Reserve's lending facilities are not incorporated. Further, banks may take management actions that are specifically intended to mitigate losses stemming from more adverse scenarios.

In addition, certain economic and financial market indicators have improved somewhat since the scenarios and targeted adjustments were developed in early April 2020. For example, volatility in equity markets has declined, bank balance sheets have shrunk to some degree, and the unemployment rate in May 2020 was lower than expected.

Finally, this analysis does not account for the capital depletion that would result from common equity distributions over the projection horizon. The inclusion of common equity distributions during the first half of 2020 would have resulted in a reduction in aggregate capital ratios of approximately 50 basis points.

¹⁹ See "Business Loan Program Temporary Changes; Paycheck Protection Program – April 2020" available at <https://www.govinfo.gov/content/pkg/FR-2020-04-15/pdf/2020-07673.pdf>.

²⁰ In addition, the outstanding balances on consumer credit card loans have declined significantly relative to 2019:Q4 and 2020:Q1 as a result of depressed consumer spending during the period of widespread social distancing. At the 25 largest banks, credit card loans outstanding have decreased from \$683 billion on January 1, 2020, to \$616 billion on June 3, 2020. The higher unemployment benefits and decrease in outstanding balances relative to the December 31, 2019 jump-off date for the sensitivity analysis would lead to lower losses on credit card loans than are reflected in the estimates shown.

Supervisory Observations

Background on the 2020 CCAR Exercise

The Federal Reserve’s annual Comprehensive Capital Analysis and Review (CCAR) exercise is an intensive assessment of the practices that the largest U.S. bank holding companies and U.S. intermediate holding companies of foreign banking organizations use to assess their capital needs.²¹ Through this assessment, the Federal Reserve aims to determine whether these firms’ capital planning practices support their ability to determine their forward-looking capital needs such that they would be able to continue operating and lending to households and businesses, even during times of economic and financial distress.

In mid-March and in response to the crisis,²² the CCAR exercise’s qualitative assessment was changed from its usual examination format to a monitoring-based exercise in which supervisors would not issue notices of deficiencies to firms and require that they be addressed within a specified timeframe. This change was undertaken as a result of several factors: to recognize that the capital plans submitted by the firms on April 6, 2020 were based on macroeconomic scenarios that were no longer relevant due to the rapid onset of the COVID event and its corresponding effect on the economy; to minimize burden on the subject firms, given that they were in a live stress situation; and to account for the altered working conditions resulting from the crisis.

The aim of this monitoring-based work was to understand how the 19 firms subject to the qualitative assessment were considering and incorporating the current stress conditions and uncertainty into their real-time capital planning and risk management. Federal Reserve examiners focused on understanding

- the range of scenarios that firms are using to forecast their capital positions,
- the frequency with which firms are updating their forecasts,
- the key inputs and associated assumptions for those forecasts,
- how senior management teams and the boards of directors of firms are using those updated forecasts to inform capital planning and risk management decisions, and
- the financial changes that would justify modifications to firms’ capital and risk management decisions.

²¹ The 18 firms participating in CCAR 2020 are Bank of America Corporation; The Bank of New York Mellon Corporation; Barclays US LLC; Capital One Financial Corporation; Citigroup Inc.; Credit Suisse Holdings (USA), Inc.; DB USA Corporation; The Goldman Sachs Group, Inc.; HSBC North America Holdings Inc.; JPMorgan Chase & Co.; Morgan Stanley; The PNC Financial Services Group, Inc.; State Street Corporation; TD Group US Holdings LLC; Truist Financial Corporation; UBS Americas Holding LLC; U.S. Bancorp; and Wells Fargo & Company. DWS USA Corporation, the second U.S. intermediate holding company subsidiary of Deutsche Bank AG, was also subject to CCAR 2020 and had about \$2 billion in assets as of the end of 2019.

²² See Board of Governors of the Federal Reserve System, “Federal Reserve provides additional information to financial institutions on how its supervisory approach is adjusting in light of the coronavirus,” press release, March 24, 2020, <https://www.federalreserve.gov/newsevents/pressreleases/bcreg20200324a.htm>.

Key Observations from the Work

This year's monitoring-based work revealed a number of observations about capital planning practices during these uncertain times:

- Firms entered the crisis with strong capital positions and well-established capital planning practices. At the onset of the crisis, the vast majority of firms reduced their common stock repurchases to zero in light of the uncertainty in the economic environment and its potential negative effect on the firms' capital positions.
- Firms' views regarding the severity and duration of economic stress continue to evolve. Firms' management teams ascribe a high degree of uncertainty to capital forecasts beyond the current quarter, and many firms are considering various recovery paths.
- Depending upon their business mix and outlooks for the economy, firms are projecting varying capital trends as a result of the crisis. Most firms are not projecting severe declines in their capital levels over the remainder of the year. These capital forecasts tend to be strongly dependent on the assumption of whether there will be additional rounds of economic stimulus.
- Firms' approaches to and timelines for updating their capital forecasts are similarly varied. Most firms have already generated updated multi-quarter capital forecasts, some under a range of scenarios. These scenarios vary in severity. Many firms have noted that they will continue to refresh their full forecasts on a quarterly or semi-annual basis.
- The severe macroeconomic conditions, such as the high unemployment rate arising from the crisis, have resulted in many capital-related models being used outside of their statistical underpinnings, and some firms have struggled to incorporate the effects of the economic stimulus and customer forbearance programs into their capital forecasts. These challenges have prompted many firms to rely upon qualitative approaches, including management judgment, assumptions, and overlays.
- Supervisors remain focused on certain firms that are particularly sensitive to the current economic outlook, whose outlooks are more optimistic than appropriate given current conditions, whose credit cost forecasts have not considered a range of possible outcomes, or whose planning has not been thoughtful.

Decisions regarding LISCC IHCs

In addition to the monitoring work described above, Federal Reserve examiners also reviewed and assessed firms' efforts to address weaknesses identified in previous CCAR exercises. Those weaknesses have included deficiencies in connection with identification of the material risks to which a firm is exposed, projections of stressed losses and revenues, and lack of governance around and oversight of capital planning processes. If unaddressed, those types of weaknesses can call into question the ability of firms to accurately determine their forward-looking capital needs.

This work served as the basis for the Board of Governors' consideration of whether the firms subject to objection on qualitative grounds should receive an objection to their capital

plans.²³ Based upon the review, none of these firms' plans received an objection. These firms have improved their capital planning processes since joining the exercise in 2017, and do not currently exhibit fundamental deficiencies in key capital planning processes. The Board expects these and all firms subject to CCAR to maintain the capital planning gains they have attained and will use its supervisory processes and tools to ensure that firms' practices do not degrade.

²³ Those firms are Barclays US LLC; Credit Suisse Holdings (USA), Inc.; DB USA Corporation; and UBS Americas Holding LLC. DWS USA Corporation's capital plan also did not receive an objection.

Technical Information about the Capital Plan Resubmissions and Distribution Limitations

The Board has determined that the changes in financial markets or the macro-economic outlook could have a material effect on each firm's risk profile and financial condition and require updated capital plans.²⁴ As such, the Board is requiring each firm subject to the Board's capital plan rule to update and resubmit its capital plan to the appropriate Reserve Bank within 45 days after the Board provides updated scenarios.

Requiring resubmission will prohibit each firm from making any capital distribution (excluding any capital distribution arising from the issuance of a capital instrument eligible for inclusion in the numerator of a regulatory capital ratio), unless otherwise approved by the Board. Through the end of the third quarter of 2020, the Board is authorizing each firm to

- make share repurchases relating to issuances of common stock related to employee stock ownership plans;
- provided that the firm does not increase the amount of its common stock dividends, to pay common stock dividends that do not exceed an amount equal to the average of the firm's net income for the four preceding calendar quarters, unless otherwise specified by the Board; and
- make scheduled payments on additional tier 1 and tier 2 capital instruments.

These provisions may be extended by the Board quarter-by-quarter.

²⁴ See 12 C.F.R § 225.8(e)(4)(i)(B)(3).

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