CHAPTER 4

BANK CAPITAL

COVID-19 CHALLENGES AND POLICY RESPONSES

Chapter 4 at a Glance

- The coronavirus disease (COVID-19) crisis may pose challenges to the capital of banks, even though they entered the crisis with higher capital ratios than before the global financial crisis and despite the large policy interventions aimed at containing the economic fallout from the current crisis.
- Forward-looking simulations based on a new global stress test tool show that in a baseline scenario consistent with the October 2020 *World Economic Outlook* (WEO) bank capital falls sharply but recovers quickly, while an adverse scenario suggests sustained damage to average capital ratios.
- In the adverse scenario, a weak tail of banks, corresponding to 8.3 percent of banking system assets, would fail to meet minimum regulatory requirements, and the capital shortfall relative to broad statutory regulatory thresholds reaches $220 billion.
- In absence of the bank-specific mitigation policies already implemented, the weak tail of banks would reach 14 percent of banking system assets, and the global capital shortfall would be $420 billion.
- Bank-specific mitigation policies would help reduce financial stability risks if the crisis recedes promptly but may pose risks to banks' capital adequacy if the crisis proves to be longer lasting.

Will Banks Remain Adequately Capitalized?

Banks entered the current COVID-19 crisis with higher levels of capital than before the global financial crisis, and policymakers have quickly deployed an array of policies to support economic activity and the ability of banks to lend. However, the sheer size of the shock and the likely increase in defaults from firms and households may pose challenges to banks' profitability and capital positions. A forward-looking simulation of the trajectory of capital ratios in a sample of about 350 banks from 29 jurisdictions, accounting for 73 percent of global banking assets, shows that such ratios would decline as a result of the COVID-19 crisis, but remain, on average, comfortably above regulatory minimums. However, there is heterogeneity across and within regions, and a weak tail of banks, accounting for 8.3 percent of banking assets in the sample, might fail to meet minimum regulatory capital requirements in an adverse scenario. Government loan guarantees and other bank-specific policies that adjust the calculation of capital ratios help relieve the decline of reported capital ratios and reduce the incidence of bank capital shortfalls. In considering the duration of these and other measures, policymakers should pay attention to the intertemporal trade-off they pose, as policies that reduce the financial stability risks of a transitory shock may increase vulnerabilities related to banks' loss-absorbing capacity and overall indebtedness if the crisis proves to be persistent. Policies aimed at limiting capital distributions and ensuring adequate funding for deposit guarantee programs, as well as contingency plans that lay out how to respond to possible pressures, would help deal with the consequences of a potentially adverse scenario.

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Introduction

In many respects, the COVID-19 crisis presents the largest shock that banks have experienced since the Great Depression (see the October 2020 WEO). Authorities have adopted unprecedented policy measures to blunt the impact of this shock. Governments have introduced substantial fiscal support to

households and businesses (see the October 2020 *Fiscal Monitor*), monetary policy rates have been cut worldwide, and many central banks have implemented large asset purchase programs to support markets and to maintain the credit flow to the real economy (see the April 2020 *Global Financial Stability Report* [GFSR]).

Importantly, policymakers have taken steps to avoid the procyclical credit crunch that was evident during the global financial crisis, encouraging banks to use the flexibility embedded in the global regulatory framework to deal with the temporary consequences of the COVID-19 shock and thus stifle negative feedback loops that could amplify the impact of the crisis. Following a decade during which banks aggressively built their capital positions, standard setting bodies have issued guidance to support national authorities in their policy response to the pandemic. Policymakers have released capital buffers to sustain the flow of credit to households and firms. Banks have also been allowed, for loans whose deterioration is attributed to the shock, to defer the recognition of bad debts and the reporting of loan loss provisions and to waive the increase in risk-asset weightings and the deduction of provision charges from capital. Banks have also been compelled (by regulation or strong administrative guidance) to cancel capital distributions.

Despite the large negative impact of the pandemic on the global economy during recent quarters, banking systems have so far been able to weather these economic difficulties, due in part to aggressive policy support. Following an initial plunge, bank equity prices have partially recovered. While banks' assessment of borrower credit quality has naturally deteriorated, bank credit expanded in March as corporate borrowers drew on committed credit lines and has since remained stable. Nonetheless, credit conditions have remained tight. Despite significantly increased loan loss provisions in virtually all systems, most banks continue to report positive earnings, and capital positions have declined only modestly over the initial quarters of the crisis.

This chapter addresses two central questions.

- How prepared are banks to withstand continued challenging economic conditions in the coming years?
- How much would bank-specific regulatory policies recently implemented help them face these scenarios?

The chapter also discusses policy options to deal with the potential challenges that banks could face in the baseline and adverse scenarios, and highlights the intertemporal trade-off that arises from targeted policies that encourage banks to use the flexibility embedded in the regulatory regime to sustain the flow of credit to borrowers facing liquidity problems in response to a transitory shock.

Initial Impact of COVID-19 on the Global Banking Industry

After spending the past decade building capital and liquidity buffers following the regulatory reforms put in place after the global financial crisis, banks came into the COVID-19 crisis in much better shape than they did before previous crises (Figure 4.1, panel 1). However, bank profitability was already challenged in many jurisdictions amid the prolonged period of low interest rates and low term spreads in recent years (Figure 4.1, panel 2). This low-interest-rate environment is likely to persist for several years, as policymakers have engaged in further expansive monetary policies to support the flow of credit to the real economy (see the April 2020 GFSR).

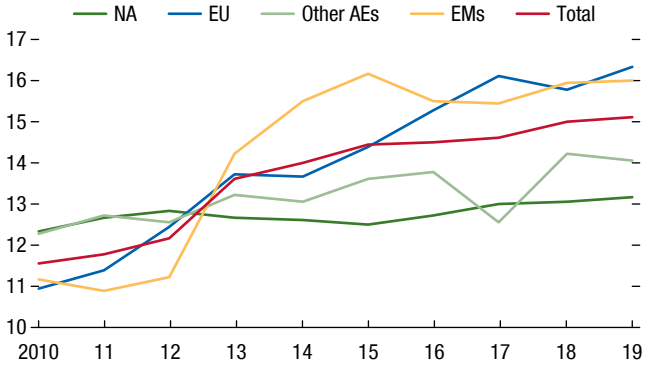
Despite the stronger initial position of banks and the aggressive response of policymakers, the initial stage of the COVID-19 crisis has confronted banks with significant challenges. The initial contractionary shock triggered a scramble for liquidity. In the United States, corporate borrowers aggressively drew on committed credit lines, causing a sudden increase in loans that drove down bank capital ratios.[1] Since then, bank credit in the United States and Europe has remained largely flat. Crucial elements of financial system plumbing (for example, repo and US Treasury markets) encountered liquidity challenges, as did emerging market banks in US funding markets, and financial markets were severely stressed for several weeks. Increased loan loss provisioning—particularly among US banks, for which the onset of the crisis coincided with

[1]Risk weights for undrawn credit lines are in the range of 20–50 percent, whereas those for drawn credit lines are 100 percent. Therefore, the large drawdown of committed credit lines has an immediate material impact on risk-weighted assets, the denominator of bank capital ratios.

Figure 4.1. Historical Context: Magnitude of the Current Crisis and the Ex Ante Position of Banks

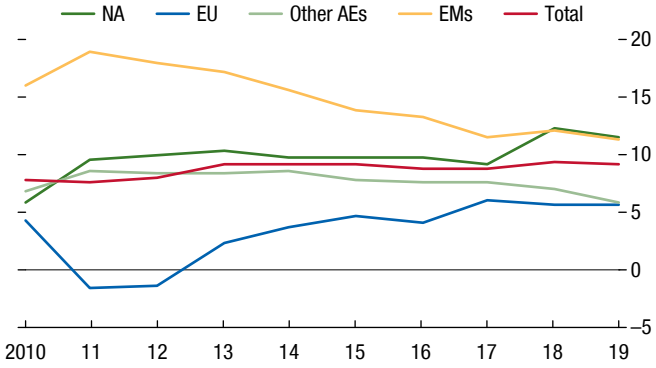
Banks, particularly in Europe and in emerging market economies, massively improved their capital positions in the last decade ...

1. Average Tier 1 Ratio, by Region
(Percent)



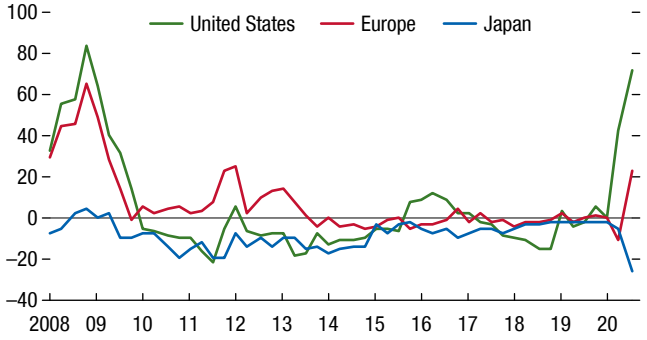
... despite low profitability challenging capital accretion in some regions.

2. Average Return on Equity, by Region
(Percent)



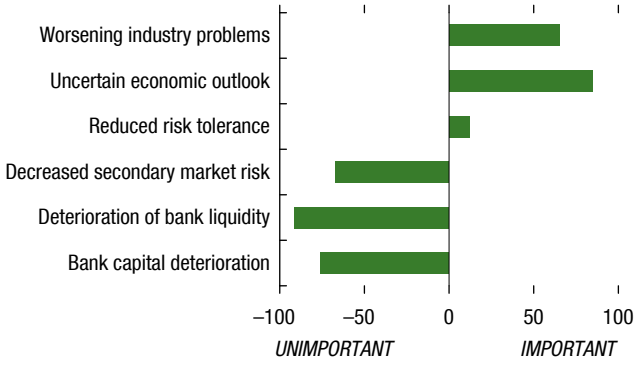
Bank lending standards tightened sharply—to near the 2008 peak in the United States.

3. Bank Lending Standards: Net Tightness
(Percentage points)



Banks attribute tightening to deteriorating borrower conditions, not to capital or liquidity constraints.

4. Causes of Bank Credit Tightening
(Percentage points)



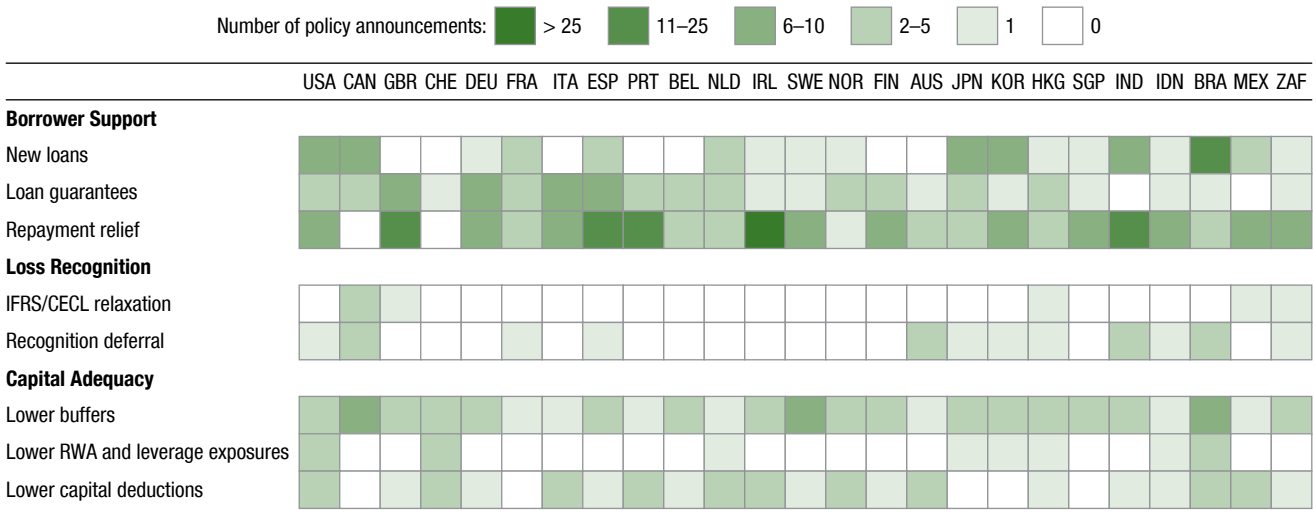
Source: Haver Analytics.
Note: Bank lending standards for Europe are based on the European Central Bank's one-quarter forward expectations, while both the U.S. and Japan are based on the most recent quarter. Other AEs = other advanced economies, including Japan, Australia, Hong Kong SAR, and Singapore; EMs = emerging markets; EU = Europe, including the United Kingdom and continental Europe; NA = North America, including United States and Canada.

a transition to "expected credit loss" accounting standards—weighed on bank financial results in the first quarter of 2020.[2] In the second quarter, financial market stress subsided, but most banks took sharply higher loan loss provisions and tightened lending standards as the economic outlook continued to deteriorate (Figure 4.1, panel 3), with

[2]The transition to expected credit losses in the United States became effective on January 1, 2020, and virtually all US banks chose to book large provisions for "transitional" increases in loan loss reserves. In one extreme example, Citi took a $4.2 billion current expected credit losses transitional charge, more than half of the $7 billion total 2020 first-quarter loan loss provision. The Federal Reserve promulgated a regulation allowing banks to defer transition-related provisions, but most large banks chose to retain the transition charges recognized on January 1. However, US bank regulations mitigate the impact of this transition charge on bank capital. Before the COVID-19 outbreak, the Federal Reserve announced a rule allowing banks to phase in the impact of current expected credit losses transition provisions over three years. During the first quarter of 2020, the regulator lengthened the phase-in path to zero capital charges over two years, followed by a three-year phase-in path.

Figure 4.2. Mitigation Policies Announced since February 1, 2020, by Category and Jurisdiction

Among the wide range of policy responses to the COVID-19 shock and slowdown, this chapter focuses on three that relate most directly.



Sources: Financial Stability Board; KBW; Yale School of Management; and IMF staff estimates.
Note: The intensity of the colors in the figure denotes only the number of measures announced but has no bearing on the absolute or relative economic magnitude of those policies. For instance, a single large policy announcement in one jurisdiction could surpass in economic relevance many announcements by a different jurisdiction. The figure includes policy announcements up to July 10, 2020. Austria, Denmark, Greece, and Luxembourg are not included in the analysis due to incomplete data. See Online Annex 4.1, www.imf.org/en/Publications/GFSR, for an explanation of the data and methodology on which this policy taxonomy is based. The row labeled "Lower buffers" also includes public announcements by authorities explicitly encouraging banks to use the flexibility embedded in the regulatory framework to use the capital conservation buffer to support lending, although these statements do not entail a formal change in the rulebook. Data labels use International Organization for Standardization (ISO) country codes. CECL = current expected credit loss; IFRS = International Financial Reporting Standards; RWA = risk-weighted assets.

loan officers in the United States reporting the tightest credit standards since 2005.

As improved liquidity conditions relieved borrowers' appetite for precautionary borrowing, the first-quarter spurt of loan growth slowed or reversed for most banks. This relieved risk-weighted asset pressure on capital ratios (Figure 4.1, panel 4). During the second quarter of 2020, some major banks (particularly in the United States) also reported large capital-market-driven gains.

The Reactions of Financial Sector Authorities to the COVID-19 Crisis

Governments around the world have responded to the economic disruption of the COVID-19 crisis with policies of unprecedented scope and magnitude to support the real economy, prevent permanent damage to the balance sheets of firms and households, and maintain the flow of credit to the real economy. These policies extend from broad macroeconomic policies to specific measures that directly address bank balance sheet management (Figure 4.2).

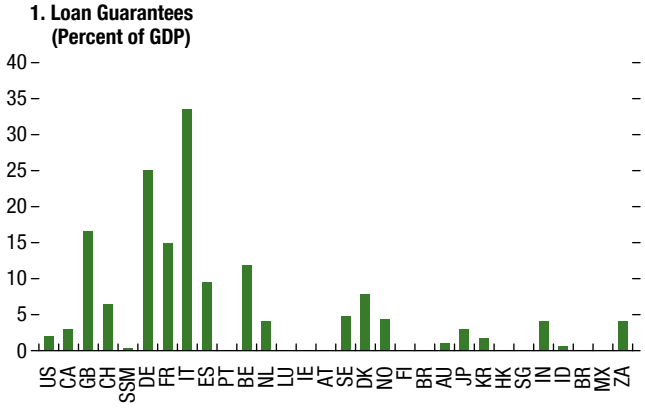
This chapter focuses specifically on the impact of government loan guarantee programs and capital adequacy policies that can be directly quantified (henceforth, "bank-specific" policies). Other policies have an indirect effect on banks' capital adequacy. For example, fiscal stimulus and monetary policy indirectly support banks' financial results through macroeconomic channels. Policies to support bank funding could affect bank capital by lowering costs and allowing banks to sustain their level of activity. Policies intended to support borrowers' repayment ability, including repayment moratoria, may reduce banks' need to set aside provisions for loan losses—and thus bolster capital—by lowering the probability that a borrower will enter default (probability of default). Nonetheless, some of these policies may also simply postpone loss recognition.

Within the risk-based capital framework, the policies analyzed in this chapter can alter the capital space through three channels.

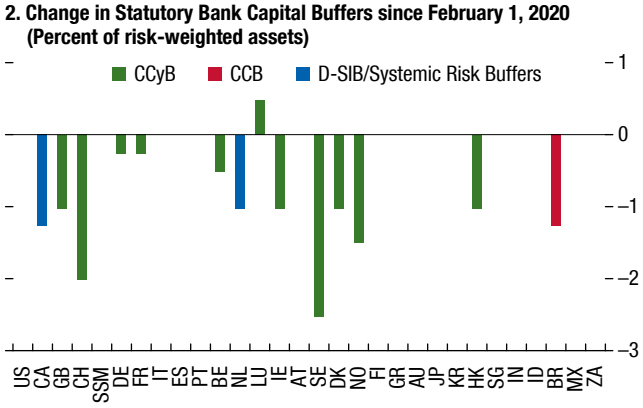
- **Increasing capital levels:** This has been promoted mainly through restrictions (often "voluntary" guidance) on distribution of profits through dividends and share buybacks. Most of these come with specific end dates (typically not later than the end of 2020).

Figure 4.3. Magnitude of Announced Mitigation Policies

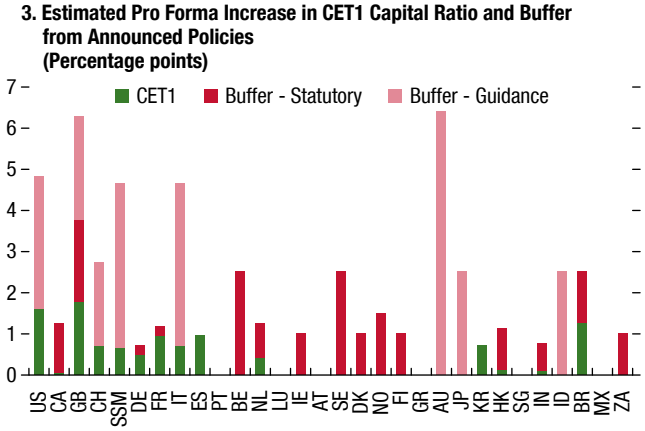
The magnitude of loan guarantees varies widely across countries.



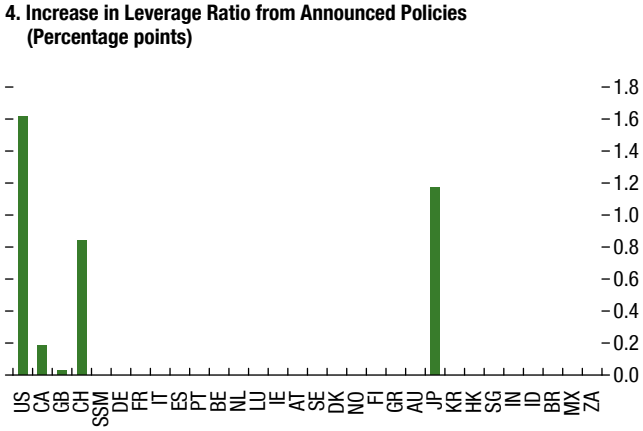
Many jurisdictions have relaxed statutory capital buffer requirements to support banks' credit underwriting.



Some jurisdictions have also taken steps to improve reported capital ratios or lower required capital buffers.



A few countries highly sensitive to capital market depth have also taken steps to improve leverage ratios.



Sources: Bloomberg Finance L.P.; Financial Stability Board; IMF (2020b); KBW; SNL Financial; Yale School of Management; and IMF staff estimates.
Note: Figures include the 29 countries captured in the bank stress test, plus data on the SSM as a supervisory jurisdiction. "Loan guarantees" is based on the announced programs, not actual take-up of guaranteed loans. Loan guarantee data are not captured for Austria, Finland, Greece, Hong Kong SAR, Ireland, Luxembourg, and Portugal. D-SIB surcharges are not captured as a separate buffer in several jurisdictions, mainly because D-SIB requirements are often expressed in terms of the overall CET1 ratio. Countries are identified by two-digit International Organization for Standardization (ISO) code and indicate policies pronounced by the European Central Bank and the European Banking Authority. Figures for individual European countries indicate local policies distinct from those announced by European authorities. CCB = capital conservation buffer; CET1 = common equity Tier 1; CCyB = countercyclical capital buffer; D-SIB = domestic systemically important bank; SSM = Single Supervisory Mechanism.

Policymakers have issued such guidance for the large European banks and for all banks in Brazil, Italy, Spain, Switzerland, the United Kingdom, and other countries. Government loan guarantees can also boost capital levels by reducing the loss that a bank experiences when a borrower defaults and the need to set aside loan loss provisions for this event (loss given default).

- **Lowering risk-weighted assets or "leverage exposure"—the capital ratio denominators:** National regulators have typically waived risk-asset weights for loans covered by government guarantees (Figure 4.3, panel 1).[3] In some instances, policymakers have also reduced risk weights on banks' exposures to targeted borrowers, often small businesses, to encourage credit to this segment. A few countries—Japan, the United Kingdom, and the United States—have exempted central bank reserves, and the latter

[3]This is distinct from the effect of government guarantees on the borrowers' "point-in-time" probability of default resulting from improved access to funding—which is captured in the analysis of the corporate sector—and from their effect on the "loss given default," previously discussed and quantified in the next section.

two have exempted holdings of government bond holdings, from banks' leverage exposure measures (the denominator of the leverage ratio). These policies are intended to facilitate large asset purchase programs and to encourage banks to continue to intermediate in government bond markets.

- **Releasing some capital buffers:** In many jurisdictions, policymakers have increased banks' overall space between reported and regulatory capital levels by releasing the countercyclical capital buffer that is designed to be used during downturns (Figure 4.3, panel 2). In some instances, policymakers have formally released required capital buffers, effecting a reduction in *statutory* capital buffers. In other cases, policymakers have publicly reminded banks that some buffers—typically the capital conservation buffer of 2.5 percent of total capital aimed at preventing banks from breaching the minimum regulatory capital adequacy ratio—could be used to support lending and be gradually rebuilt through retained earnings as conditions improve. This chapter characterizes the latter as reductions in the "*guidance* buffer" that determines de facto minimum capital levels.

These policies combined are estimated to have already improved banks' reported common equity Tier 1 (CET1) ratios and, either by statute or by guidance releasing some capital buffer requirements, regulators have further expanded the capital space between banks' current positions and broad regulatory capital levels (Figure 4.3, panel 3).[4] In addition, although this section focuses on the CET1 capital position because that is the binding constraint for most banking systems where bank market-making activity is not large, policymakers in a few jurisdictions (Japan, Switzerland, United States) have also eased constraints on banks' leverage ratios, typically by excluding government bonds, central bank reserves, or other low-risk assets from the leverage exposure denominator (Figure 4.3, panel 4).

Bank Capital Ratios in the Wake of COVID-19 and the Role of Policies

This chapter assesses the consequences of the COVID-19 crisis for the future capital ratios of global banking systems in a forward-looking manner using the latest baseline projection of the economic outlook and the adverse scenario outlined in the October 2020 WEO (Figure 4.4). These two scenarios provide a broad assessment of the potential paths of the pandemic; however, given the unprecedented nature of the shock, uncertainty remains.

These macro scenarios implicitly incorporate the effects of broad macroeconomic and monetary policy interventions, including interest rate cuts, unconventional monetary policies, fiscal measures, social safety net packages, and other policies that support the real economy. By improving the liquidity of borrowers, these policies indirectly affect the condition of banks. However, the consequences of bank-specific policies for the distribution of banks' capital may not be fully captured in macro aggregates. The chapter also assumes that the accounting impact of bank-specific policies on bank balance sheets is not fully captured in macro trajectories.

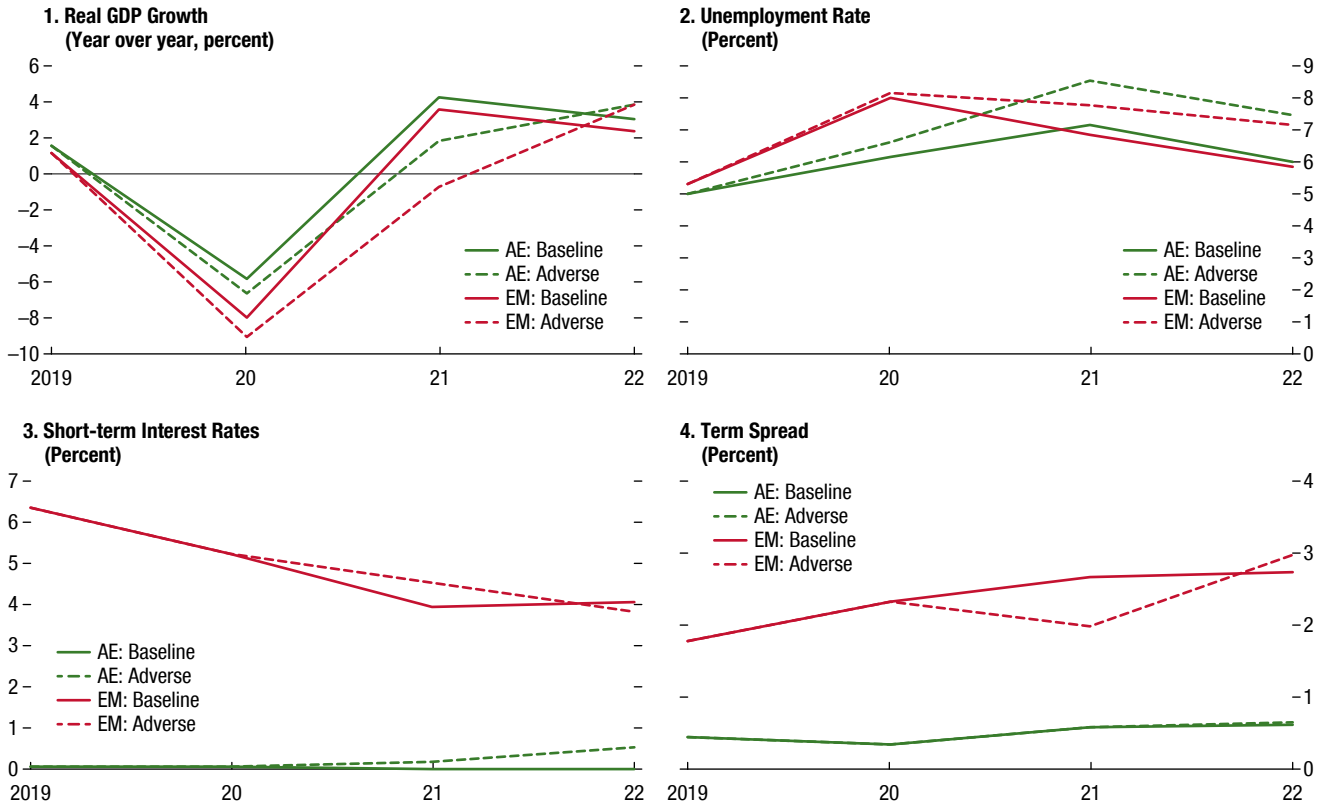
The assessment relies on a recently developed global stress test (see Online Annex 4.1) that uses publicly available data on the financial statements of about 350 banks in 29 major banking systems—accounting for 73 percent of global banking sector assets—to estimate how key components of banks' financial statements react to macroeconomic variables.[5] The future paths of these variables are embedded in the scenarios used to conduct a forward-looking simulation of the evolution of the profitability and capital position of each of the banks in the sample, which is then aggregated across different regions and across global systemically important banks.

The stress test exercise relies on publicly available data. While this allows for a global assessment of the prospective health of the banking system, it comes at the cost of lower data granularity and higher reliance on statistical methods than in supervisory stress tests. This narrows the types of policies that can be analyzed in this context and also requires several assumptions to map the impact of those policies to

[4]Capital requirements that include all statutory buffers (but exclude recent statutory reductions) are defined in this chapter as "statutory broad capital requirements." Capital requirements that exclude buffers released by recent informal guidance statements are defined as "guidance capital requirements."

[5]Online Annex 4.1 is available at www.imf.org/en/Publications/GFSR. The jurisdictions included are Australia, Austria, Belgium, Brazil, Canada, Denmark, Finland, France, Germany, Greece, Hong Kong SAR, India, Indonesia, Ireland, Italy, Japan, Korea, Luxembourg, Mexico, The Netherlands, Norway, Portugal, Singapore, South Africa, Spain, Sweden, Switzerland, the United Kingdom, and the United States. In each jurisdiction, the largest banks covering up to 80 percent of banking assets are included. Therefore, the simulation does not include the consequences of the scenarios for the solvency of small banks.

Figure 4.4. Scenarios for Stress Test Simulation



Source: IMF, October 2020 *World Economic Outlook*.
Note: Median across sample countries in each group. AE = advanced economy; EM = emerging market.

banks' financial statements.[6] The base model is augmented by a satellite model that explicitly considers the contribution of corporate and consumer risk to banks' loan loss provisions and is used to estimate the impact of government guarantees (see Box 4.1).[7]

[6]Given the lower granularity of the data, the global stress test also relies more heavily on econometric methods than standard supervisory stress tests and is simpler than models that would typically be used by authorities. It is a stand-alone solvency stress test that does not consider interaction with other risks, such as liquidity and contagion risks or macro-feedback effects, such as between the banking sector and the sovereign, which might amplify the impact of initial shocks, nor does it take into consideration spillovers across interconnected banking systems. Also, the exercise does not allow for behavioral responses by banks that may change their balance sheets. The model also assumes that bank balance sheets remain static during the simulation period, which does not allow banks to reach lower levels of capital by deleveraging (see Online Annex 4.1).

[7]The COVID-19 crisis has had a heterogenous impact across sectors beyond nonfinancial corporations and households. For instance, the transportation and entertainment industries have suffered disproportionately from the social distancing measures implemented to mitigate the spread of the disease. For this reason, it would be desirable to incorporate further sectoral disaggregation in the analysis, but more granular decompositions of banks loan portfolios are typically available only for a small subset of banks.

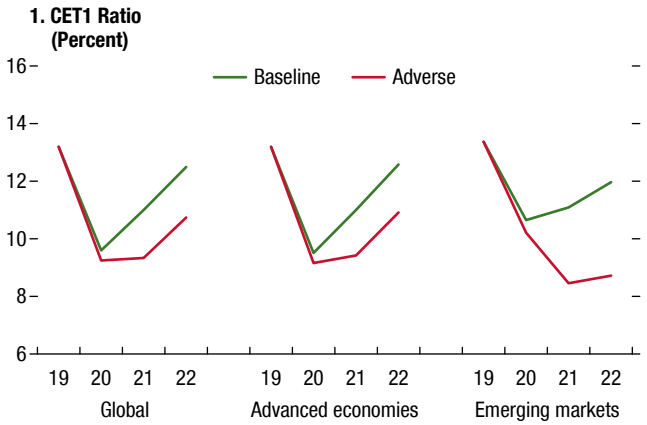
Consequences of COVID-19 for Bank Capital before Bank-Specific Mitigation

The consequences of each scenario for banking systems' future capital ratios are first simulated without adjusting for how the bank-specific mitigation policies discussed earlier alter the recognition of provisions, calculation of risk-weighted assets, or flexibility in using existing capital buffers.

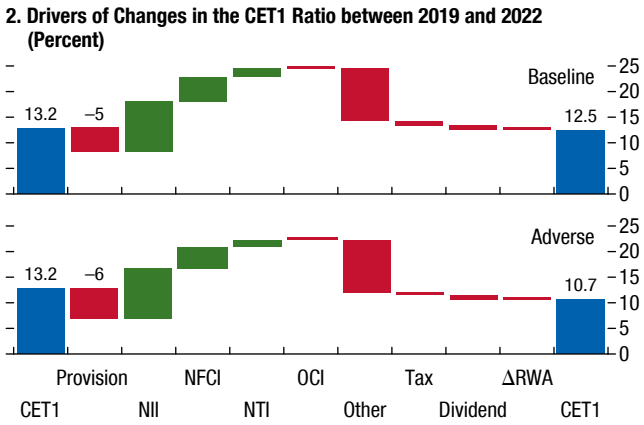
The results of the stress test show a significant decline in CET1 of the global banking system, reaching minimum levels of 9.6 percent in the baseline scenario and 9.3 percent in the adverse scenario—a drop of 3.6 percentage points and 3.9 percentage points, respectively, below the CET1 level in 2019. The trajectory of aggregate CET1 recovery also varies importantly across scenarios. In the baseline scenario, CET1 steadily recovers after reaching a trough in 2020, but is still 0.7 percentage points below its initial level at the end of the simulation in 2022. In contrast, the capital position decline is much more persistent in the adverse scenario, with CET1 levels remaining 2.4 percentage points below their initial levels by 2022 (Figure 4.5, panel 1).

Figure 4.5. Bank Solvency under COVID-19 without Policy Mitigation

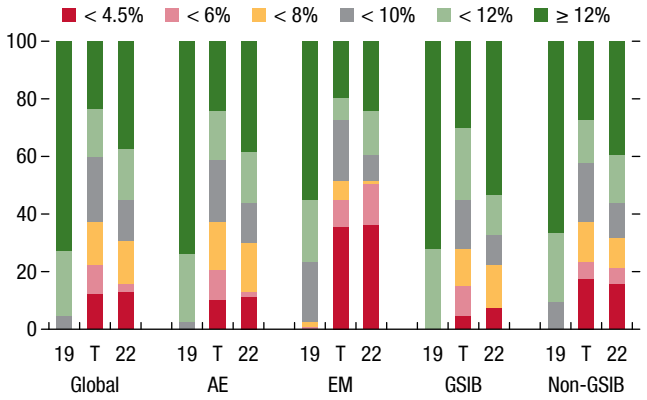
Banks' capital ratios fall significantly ...



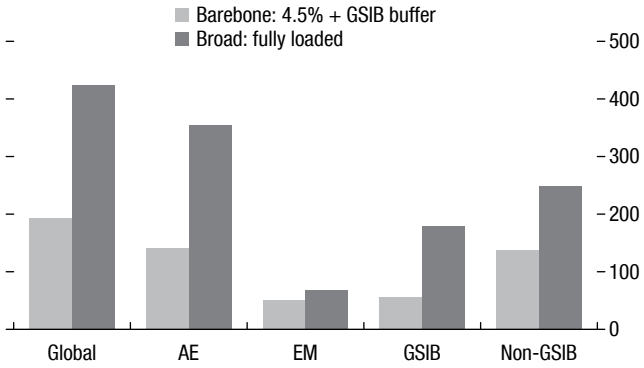
... driven by large provision costs.



Near fifteen percent of the global banking system will fall below 4.5% CET1 ratio.



The maximum capital shortfall against a broad statutory capital requirement could reach over $400 billion.



Sources: Haver Analytics; SNL Financial; and IMF staff estimates.
Note: In panel 2, green and red bars denote increases and decreases in capital, respectively. AE = advanced economies, which comprise euro area, low-rate AEs, North Atlantic, and other AEs; CET1 = common equity Tier 1; EM = emerging markets; GSIB = global systemically important bank; NFCI = net fee and commission income; NII = net interest income; NTI = net trading income; OCI = other comprehensive income; Other = several financial accounts, including operating expenses and non-operating items; RWA = risk-weighted assets.

The decline in the CET1 ratio over the simulation horizon stems mainly from an increase in loan loss provisions (Figure 4.5, panel 2). In the baseline scenario, higher loan loss provision expenses contribute to a 5 percentage point decline in CET1, whereas in the adverse scenario their contribution is 6 percentage points. This is directly related to the different trajectories of economic activity in the two scenarios, where the rebound projected in the baseline scenario for 2021 results in lower provisioning expenses. In contrast, the increase in risk-weighted assets plays only a minor role in driving the changes in CET1.

The sizes of the aggregate decline and the contribution of different components vary across regions. The maximum decline in CET1 in the baseline scenario is much larger in advanced economies (Figure 4.5, panel 1). The situation reverses, however, in the adverse scenario, where advanced economies see a maximum decline in CET1 of about 4.0 percentage points, compared with 4.9 percentage points for emerging markets. This difference is a result mainly of higher provision costs in emerging markets due to the relative economic underperformance of this

group of countries in the adverse scenario and the varying sensitivity of banks in these economies to macro-financial conditions.

The trajectory of aggregate capital ratios masks significant heterogeneity across banks. Even at their trough, and in the adverse scenario, more than half of the banks in the sample (by assets) have CET1 ratios above 10 percent—much higher than the minimum requirement of 4.5 percent. But banks accounting for 13 percent of assets in the sample fall below 4.5 percent in the adverse scenario, with an additional 3 percent of assets below 6 percent (Figure 4.5, panel 3). The weak tail of banks—defined as those with CET1 ratio below 4.5 percent plus their GSIB buffer—amounts to 14 percent by assets. In the baseline scenario, the weak tail is 5 percent.

In the adverse scenario, there is also heterogeneity across regions and between global systemically important banks and other banks. Global systemically important banks fare better than the average bank, in part because of their stronger initial capital ratios resulting from their mandatory systemic buffers. However, 8 percent of these banks' assets end the simulation period with capital ratios below 4.5 percent. Among non–global systemically important banks, 16 percent of bank assets fail to maintain a 4.5 percent CET1 ratio. Banks from emerging markets are the most severely affected, with almost 40 percent of total banking assets ending the simulation period with CET1 ratios below 4.5 percent. Banks from advanced economies fare better, although there is still a 12 percent of banks' assets below 4.5 percent by 2022.

Across regions and types of banks, the main difference between banks that fail to meet regulatory minimums and the rest of banks is the initial level of CET1. Banks that fall below 4.5 percent CET1 ratio plus GSIB buffer during the simulation period are mainly distinguished by their lower initial capital levels—about 0.8 percentage point below those that maintain their ratios above regulatory minimum levels. Also, banks with a high propensity to fall below minimum capital standards generate meaningfully lower returns than peers that maintain adequate capital throughout adverse conditions.

The importance of the weak tail of banks can also be assessed by estimating the capital shortfall, which is the difference between simulated CET1 ratios and those set by regulation. The shortfall is measured against two benchmarks: the regulatory minimum for CET1—corresponding to a ratio of 4.5 percent plus the bank-specific capital surcharge for each global systemically important bank—and a broad regulatory threshold that also includes the current statutory levels of the capital conservation buffer and the countercyclical buffer in place as of June 2020.[8] The first threshold defines a "barebones capital shortfall" with respect to a level of capital at which supervisory action would take place. The second threshold defines a "broad capital shortfall" relative to a capital ratio that includes the statutory buffers currently in effect.[9] Banks facing a shortfall relative to this broad statutory threshold have the capital space to provide credit by using remaining statutory buffers as envisioned by the international regulatory framework, particularly where regulators have issued guidance announcements making those buffers available. However, they may feel less willing to expand lending activity for precautionary reasons or because of market pressure.

The two measures of capital shortfall in the adverse scenario show important variation across groups of banks (Figure 4.5, panel 4). At the global level, the barebones capital shortfall is about $200 billion, and the broad capital shortfall reaches about $420 billion (0.6 percent of sample banking assets). In both cases, global systemically important banks capture an important part of the shortfall, which is largely explained by the size of these institutions. The differences across regions are driven by differences in the size of their banking systems, with the level of capital shortfalls being much larger for advanced economies. When considering the broad measure, the global shortfall represents 0.8 percent of the GDP of countries where at least one bank has a capital shortfall. Across those countries, the average broad shortfall is 1.1 percent of GDP.

[8]For large US banks this includes the stressed capital ratio levels recently defined by the Federal Reserve instead of the countercyclical capital buffer and the capital conservation buffer. While many jurisdictions have recently released the countercyclical capital buffer, the buffer is above zero in a few. The calculation does not include the effect of "guidance" statements regarding banks' ability to use remaining statutory buffers.

[9]The calculation assumes that countercyclical capital buffers will remain at current levels—0 percent in almost all countries—and does not assume that this buffer will revert to a pre-pandemic or "normalized" level that is difficult to determine a priori.

Effect of Bank-Specific Policies on Capital Ratios

As discussed, authorities have implemented policies aimed at giving banks flexibility to maintain the flow of credit to the real economy. These policies, which include government loan guarantees and capital adequacy policies, affect the need to set aside provisions and the way in which capital ratios are computed and should therefore also improve measured bank capital ratios over the next three years.

The mitigating impact of some of these policies can be quantified in the stress testing exercise as follows:

- *Government guarantees:* The impact of government guarantees on banks' provisions is captured by their impact on banks' expected losses. These losses are the product of banks' exposure to firms, the probability of default of those firms, and the loss experienced by banks when firms default. Government guarantees can be understood as reducing the latter term—known as the "loss given default"—because, under these conditions, the guarantee would be executed. Because of lack of data on the extent to which banks originate guaranteed loans, all banks in a country are assumed to benefit equally from the guarantee in a proportion equal to the ratio of government guarantees to total corporate loans. Because announced guarantee programs apply mostly to new loans, this assumption likely overestimates their initial impact. It is also assumed that guarantees are used to the full extent of announced amounts (full uptake).[10] In the model, a lower uptake of government guarantees would lead to a proportional increase in provision expenses and therefore a proportionally lower impact of the policy on loan loss provision expenses.
- *Capital adequacy policies:* The three categories of capital adequacy policies are quantified from the estimated impact of each announced policy on each bank. For example, the effect of canceling dividends is quantified from stress test model forecasts. The release of capital buffers is estimated by multiplying the percentage reduction by forecast risk-weighted assets. Changes to the calculation of risk-weighted assets similarly apply to the announced change to the relevant exposure class. In a very few instances, bank-specific policies are applied on a bank-specific basis.[11] These increments are integrated into each bank's balance sheet positions at the end of each period.

In quantifying the impact of these policies, it is assumed that they are maintained over the three-year horizon of the scenario, unless an explicit expiration date was mentioned when the policy was announced. Although this assumption avoids speculating about the timing of withdrawal of some of these policies, it may be too benign, especially in the baseline scenario, in which authorities might decide to withdraw them as the economy recovers during the latter part of the simulation window.

Bank-specific mitigation policies improve average capital ratios across countries and scenarios. In the adverse scenario, the CET1 ratio for advanced economies is about 110 basis points higher at the end of the simulation when both government loan guarantees and capital adequacy policies are considered. In the simulations, the improvement in capital ratios is a result largely of the decline in provision expenses because of government loan guarantees; capital adequacy policies explain about a third of the overall improvement in CET1 at the end of the simulation period in advanced economies (Figure 4.6, panels 1 and 2). In the sample of emerging market economies, capital adequacy policies do not play a meaningful role, as these policies are largely absent in this sample. Given the estimated impact of loan guarantees, the final uptake of these policies—the extent to which the announced guarantee programs are used—could be an important driver of the final solvency position of the banking system. As discussed, an ultimate uptake of half the announced amount would reduce the mitigating effect of the policy roughly by half.

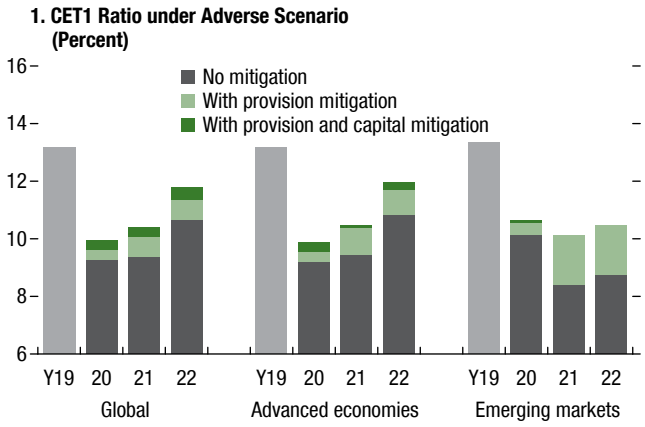
Government loan guarantees and capital mitigation policies reduce the share of bank assets with CET1 ratios below 4.5 percent in the adverse scenario from 13 percent without mitigation policies to 8 percent when those policies are in place (Figure 4.6, panel 3, compared with Figure 4.5, panel 3). Among global systemically important banks, these policies reduce the share of assets with CET1 below 4.5 percent from 8 percent to 3 percent. This decline is also important for non–global systemically important banks, going

[10]Many of these programs were announced only a few months ago, so the extent to which the guarantees will be used by banks to originate loans is still unclear.

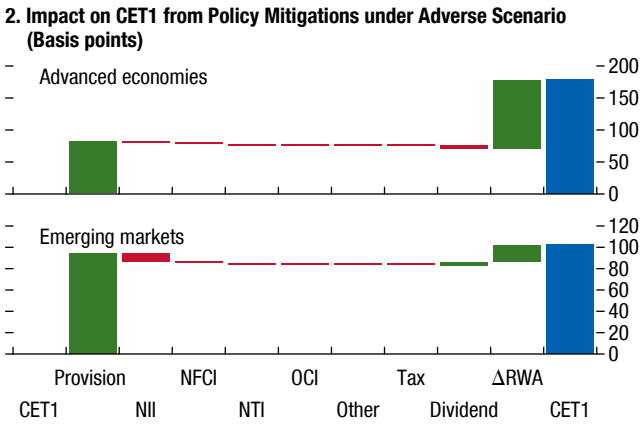
[11]Online Annex 4.1 describes the estimation of policy mitigation effects in greater detail.

Figure 4.6. Bank Solvency under COVID-19 with Policy Mitigation

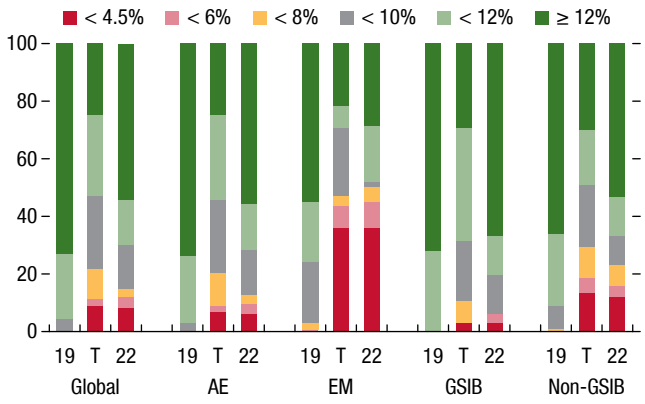
Policy mitigations would cushion some of the capital depletion ...



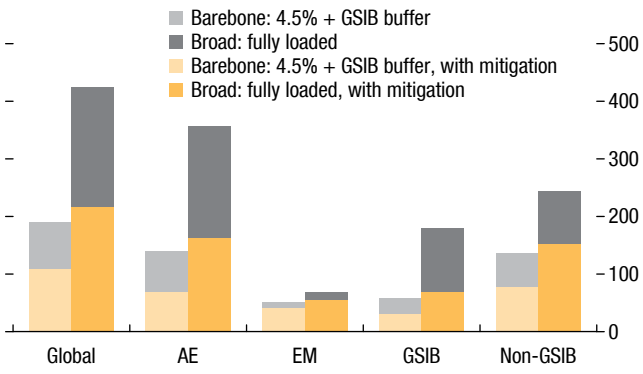
... especially provision policies.



Policy support would reduce the weak tail of banks by 5 percent ...



... and the capital shortfall by over $200 billion.



Source: Haver Analytics.
Note: Provision mitigation policies include guarantees only. Estimation of the impact of capital mitigation is explained in Online Annex 4.1. AE = advanced economies; CET1 = common equity Tier 1; EM = emerging markets; GSIB = global systemically important bank; NFCI = net fee and commission income; NII = net interest income; NTI = net trading income; OCI = other comprehensive income; Other = several financial accounts, including trading and investment income, operating expenses, and non-operating items; RWA = risk-weighted assets.

from 16 percent to 12 percent. In advanced economies, the policies analyzed shrink this segment of banks from 12 percent to 6 percent, and in emerging markets, the consideration of these policies in the simulation has only a small effect on the troubled tail of banks. Overall, the weak tail of banks, whose CET1 ratio fall below 4.5 percent plus GSIB buffers, declines from 14 percent to 8.3 percent of bank assets.

The mitigating role of bank-specific policies also maps into lower barebones and broad capital shortfalls (Figure 4.6, panel 4), with an especially remarkable decline for global systemically important banks. Across banks, the broad capital shortfall is about $220 billion, half of which corresponds to the barebones shortfall. In economies where banks with shortfalls are headquartered, the broad shortfall represents about 0.4 percent of their combined GDP, and, across countries, the average shortfall is about 0.7 percent of GDP. In terms of the initial CET1 ratios of those banks that experience a shortfall during the simulation, in the adverse scenario the global shortfall reaches 6.5 percent and the average is 7.7 percent. All in all, the bank-specific policies quantified in this chapter mitigate the impact of the adverse scenario on bank capital ratios, but the impact is still sizable, and a share of global systemically important bank assets would still be part of the weak tail of banks, even when maximizing the impact of these policies on capital ratios. The capital shortfall

relative to a minimum capital standard that treats all guidance statements as reducing capital buffers is lower—about $110 billion, or about 0.2 percent of global GDP. However, reduction of capital levels to the extent of these informal capital releases would likely be unsustainable.

Some policies that are more challenging to quantify would also lead to an improvement in bank capital ratios. Most important, several countries have provided guidance on loan classification, provisioning, and disclosure, and have revised the automatic reclassification for restructured loans. Others have gone further and changed the criteria for the reclassification of loans or frozen those classifications. The effects of these policies on loan loss provisions, in principle, are captured through GDP effects of continued credit flow. However, the changes in reclassification criteria for credit also spare it from increased risk-asset weighting. Because the quantity of loans that would have been reclassified in the absence of these measures cannot be quantified in advance and is generally not reported, the stress test model cannot capture the risk-weighted asset savings associated with these policies.

Overall, while the bank-specific policies quantified in this section help improve banks' capital ratios over the simulation period, the main contribution of the broad policy packages implemented by authorities likely comes from the support they provide to the macroeconomy. This is because the increase in loan loss provision expenses in response to the macroeconomic scenario is the main driver of the simulated decline in capital ratios, even after accounting for the bank-specific mitigation policies. A more adverse macroeconomic scenario, as would be the case in the absence of the broad support measures implemented, would have likely resulted in significantly lower capital ratios. Although counterfactual forecasts for the trajectory of the global economy in the absence of broad support policies are not available, the important difference in simulated capital ratios between the baseline and adverse scenarios suggests how broad macroeconomic support has likely helped banks' capital adequacy.

The policies discussed in this section support the solvency of banks, but they also pose intertemporal trade-offs that could become relevant in the future. Delaying provision expenses because of temporary liquidity shocks to borrowers can help prevent borrowers' liquidity challenges from immediately turning into insolvency, thus reducing lending procyclicality and supporting banks' profitability and solvency. Similarly, the use of capital buffers creates lending space to support the real economy. Hence, these policies can help bridge the impact of the COVID-19 shock and reduce the chances that a transitory shock will have permanent consequences for financial stability and the global economy. However, if the pandemic and the containment measures last longer than initially expected, ultimately affecting the solvency of borrowers despite the mitigating role of these policies, banks will need larger future provisions and will have lower buffers against future shocks, including from a meaningful second wave of the virus. Maintenance of generous guarantee programs over an extended period of time could also jeopardize fiscal solvency if defaults eventually materialize and could lead to further bank losses related to their sovereign exposures. Furthermore, given the unusual degree of uncertainty around the depth and duration of the COVID-19 recession, a severely adverse scenario with stronger consequences for the banking sector cannot be ruled out.

Summary and Policy Discussion

COVID-19 has had important consequences for the global banking sector and will pose further challenges. Should a quick rebound in economic activity not materialize, corporate and household solvency problems will likely deteriorate further and collateral values may decline, resulting in greater credit losses and posing challenges for banks globally. These challenges could interact with other, more structural challenges, such as the low profitability observed in some regions in an environment of persistently low interest rates and term spreads, a scenario that has become increasingly likely in the wake of the pandemic.

The simulations presented in this chapter show that, on aggregate, the banking systems analyzed would remain solvent in coming years, although there is heterogeneity across and within regions. The aggregate solvency is partly due to the buffers accumulated as a result of the regulatory reforms introduced after the global financial crisis. In fact, banks analyzed in this chapter had a median CET1 ratio of 11.9 in 2007, compared with 16.2 percent in 2019. This improvement in the initial solvency conditions carries over to the minimum CET1 ratios achieved in response to the COVID-19 crisis.

Nonetheless, while aggregate capital ratios remain above regulatory minimums, at a global level and within regions there is a weak tail of banks that could see their solvency challenged. The size of this tail depends largely on the depth and persistence of the crisis, becoming sizable across almost all regions and groups of banks in an adverse scenario with a persistent decline in economic activity. Some global systemically important banks are also part of this weak tail, which could have broader repercussions for financial stability in an adverse scenario.

Policies adopted by governments, central banks, and bank regulators have helped ease banks' challenges amid the COVID-19 crisis. Direct support to borrowers (both firms and households)—and liquidity provision to key markets, banks, and other financial intermediaries—have had a marked effect on bank capital ratios through the resultant improvement in macroeconomic conditions. On top of this support, government loan guarantees and capital adequacy policies have provided a second line of defense that has eased and will likely continue to ease pressures, as shown in the quantitative forward-looking analysis of this chapter.

The majority of regulatory responses taken so far are consistent with the core standards implemented after the global financial crisis and with internationally agreed guiding principles. National authorities have taken capital and liquidity measures using the flexibility embedded in the prudential framework to help support lending to the real economy. Authorities have clarified the usability of capital and liquidity buffers, encouraged banks to use these buffers to absorb losses and sustain credit, and restricted capital distributions to preserve capital. However, in several cases, regulatory easing was achieved by lowering minimum requirements below Basel framework levels. Such deviations risk undermining the credibility of the internationally agreed standards, could contribute to market segmentation, and may increase the risks to bank safety and soundness. Standard setting bodies (like the Basel Committee) and national authorities have also encouraged banks to work constructively and prudently with borrowers and have issued guidance on how to treat restructured loans and public and private moratoria for prudential asset classification and provision. Nonetheless, some measures that run contrary to these recommendations have been observed, such as the freezing of asset classification status and provisioning requirements. These measures affect the reliability of financial statements and capital ratios, and risk undermining the confidence in the banking system. Moreover, they may lead to lending to insolvent borrowers while not recognizing loan losses, which may not only jeopardize the financial soundness of banks but also the recovery as credit is diverted from productive uses.

Looking ahead, the benefits of these policies in easing banks' capital constraints and maintaining the flow of credit to the real economy should be carefully balanced against their potential medium-term risks to financial stability. Although using the flexibility embedded in the prudential framework in accordance with recommendations made by standard setters could help reduce procyclicality and negative feedback loops in response to temporary liquidity shocks, relaxing loan classification and provisioning rules undermines transparency and data reliability as financial statements and prudential ratios may no longer adequately reflect the true strength of banks. A decline in the quality of information could lead to a loss of confidence in the banking system, with adverse implications for stability. It is thus important that some of these measures be carefully phased out as the economy recovers, especially in the baseline scenario. It is also essential that, in any scenario, banks promptly recognize losses for borrowers that become insolvent as evidence of impairment becomes available. More broadly, phasing out government support, including government guarantees, too quickly would lead to lasting damage to the economy, but phasing it out too late could risk damaging public finances or unduly keeping insolvent borrowers afloat.

Despite the mitigating effect of government policies, in the adverse scenario simulated in this chapter, there is a weak tail of banks that fail (or nearly fail) to meet minimum regulatory requirements. This finding highlights the usefulness of forward-looking stress tests to assess the health of banking systems and to guide prospective policy responses to the current crisis. When conducted by regulators or supervisors, this type of assessment would rely on more granular data than used in this global exercise, and thus would provide additional richness.

Once the assessment is done, however, what should authorities do about banks that could become troubled? The answer to this question should take into consideration country-specific circumstances. Acting now to strengthen the financial safety net, including deposit guarantee programs, resolution regimes, and

central bank liquidity facilities, is key. Capital preservation measures will help, including temporarily limiting the distribution of dividends, as some countries have already done. For countries that allowed banks to draw down capital buffers, the stress test results will help guide the timing and pace at which these exceptional measures can be unwound. Supervisors could use this information to reassess forward-looking capital plans and take measures aimed at preserving and supporting plans to rebuild capital gradually for the most vulnerable entities to ensure confidence, avoid procyclicality, and preserve financial stability.[12] Preparing contingency plans that detail how the authorities will respond to possible future pressures is critical to support effective policy responses if the adverse scenario materializes.

[12]For a broader discussion of the banking regulatory and supervisory actions to deal with COVID-19, see IMF (2020a).

Box 4.1. The Role of Corporate and Consumer Risk in the Evolution of Banks' Loan Loss Provisions

The COVID-19 crisis is likely to impact the credit risk of both firms and households. Households and firms may have different effects on bank provisioning and capital, according to the severity of the shock and the composition of the lending portfolios. Disentangling the impact of these two sources of credit risk is important to evaluate the policy response to the crisis as both the magnitude and type of support measures differ across these two sectors.

A satellite model of loan loss provisions that considers the mix of bank loans across corporate (firms) and consumer (households) loans was developed to complement the core global stress test model. This model relies on the local projection method to decompose bank loan loss provisions into a component related to household risk (captured by the unemployment rate or changes in house prices) and another related to corporate loans risk (captured by a measure of the probability of default of the corporate sector). It provides a starting point for a more nuanced discussion of the implications of bank business models for future financial performance and for tackling the impact of mitigation policies that target specific sectors (see Online Annex 4.1 for additional details).

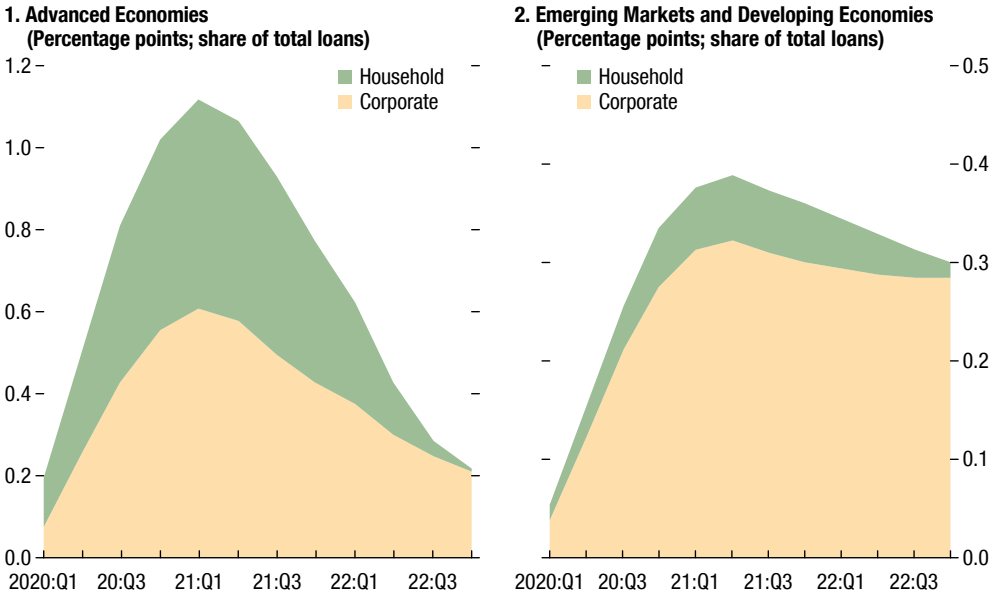
This box has been prepared by Nicola Pierri and Tomohiro Tsuruga.

A forward-looking simulation of the evolution of loan loss provisions (as a share of total loans) in the baseline scenario of the *World Economic Outlook* and the share of them explained by corporate and consumer risk shows that the crisis generates a strong but gradual response that peaks during the first half of 2021 (Figure 4.1.1). At its peak, the increase in the loan loss provision ratio is about 1 percentage point in advanced economies and about 0.4 percentage point in emerging market economies.

Most of the increase is due to heightened corporate risk, although households play a significant role in advanced economies because of their larger share on advanced economy banks' portfolios. These results show that the level and composition of total provisions depends on the mix of bank loan portfolios and on the relative size of the shocks to firms and households. The analysis highlights the importance of considering the loan mix for the assessment of the impact of the crisis and the analysis of policy responses. In the chapter, these insights are carried to the global stress testing model to assess the impact of policies that affect a specific sector, such as the government loan guarantees that tend to be focused on corporate loans. If data were available, this type of analysis could also be used to further disaggregate the impact of the crisis on different productive sectors.

Figure 4.1.1. Additional Quarterly Provisioning

(As share of loans)



Sources: Fitch Connect; S&P Global Market Intelligence; and IMF staff estimates.

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