

## LOWER FOR LONGER

*Financial markets have been buffeted by the twists and turns of trade disputes amid growing investor concerns about downside risks to the economic outlook. Financial conditions have eased further since the previous Global Financial Stability Report (GFSR) but appear to be premised on expectations of additional monetary policy accommodation across the globe. Large declines in interest rates have created further incentives for investors to search for yield, leading to stretched valuations in some asset markets. Although accommodative conditions have helped contain near-term downside risks to global growth, they have also fueled a further buildup of financial vulnerabilities. Against this backdrop, medium-term risks to global growth and financial stability continue to be firmly skewed to the downside. Policymakers urgently need to take action to tackle financial vulnerabilities that could exacerbate the next economic downturn.*

### The Combination of Trade Tensions and Dovish Monetary Policy Has Led to Significant Swings in Financial Markets

The global economy remains at a difficult juncture, as discussed in the October 2019 *World Economic Outlook* (WEO). Growth has slowed, and inflation has continued to be muted across a number of economies. Trade tensions have persisted, despite the occasional temporary respite, with further rounds of tariffs announced since the previous GFSR.

Global financial markets have ebbed and flowed between periods of trade tension, where risk asset prices have fallen, and temporary truces, where asset prices have rallied. Equity prices of firms most exposed to trade tensions (including the automobile, metals, technology and telecommunications, and transportation

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sectors) have fared worse than their peers (Figure 1.1, panel 1). Other risk asset markets have moved in lock-step with equities. Credit spreads for lower-rated issuers have been relatively more sensitive to shifts in investor risk appetite (Figure 1.1, panel 2). Option-implied market volatility—which reflects investors' expectations of future variability in markets—has swung between short-lived spikes and longer periods of relative calm (Figure 1.1, panel 3). Some of the price moves in August may have been amplified by relatively strained market liquidity conditions.<sup>1</sup>

Against the backdrop of weakening economic activity and business sentiment, increased downside risks to growth, and continued subdued inflation, central banks across the globe have adopted a more dovish stance. The US Federal Reserve cut its policy rate twice (in July and September) by a total of 50 basis points, the first rate cuts since the financial crisis, and ended the reduction of its securities holdings earlier than previously planned. The European Central Bank lowered the interest rate on its deposit facility by 10 basis points in September and will restart net purchases of assets in November.<sup>2</sup> Many other central banks have adopted a more accommodative stance since the previous GFSR, and there has been a policy easing in economies representing about 70 percent of world GDP. Current and anticipated monetary policy accommodation has substantially boosted risk assets (Figure 1.1, panel 1).

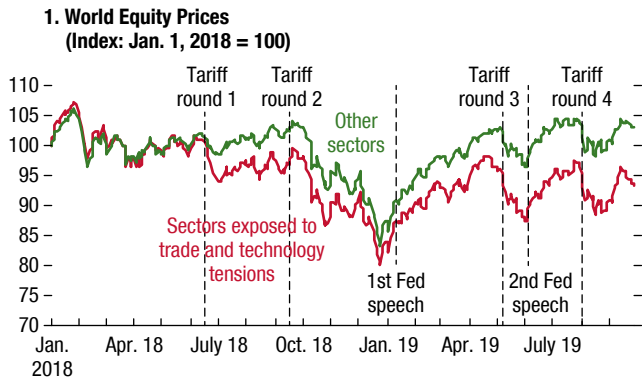
This change in policy stance appears to have been interpreted by financial markets as a turning point in the monetary policy cycle, following a period of rate normalization in some economies. The shift suggests that a sustained normalization of rates and central bank balance sheets may be more difficult than previously envisioned, especially in the context of weaker global growth and when other central banks continue to pursue quantitative easing.

<sup>1</sup>Based on the IMF staff assessment using the jump analysis (see the April 2019 GFSR) and conversations with market participants.

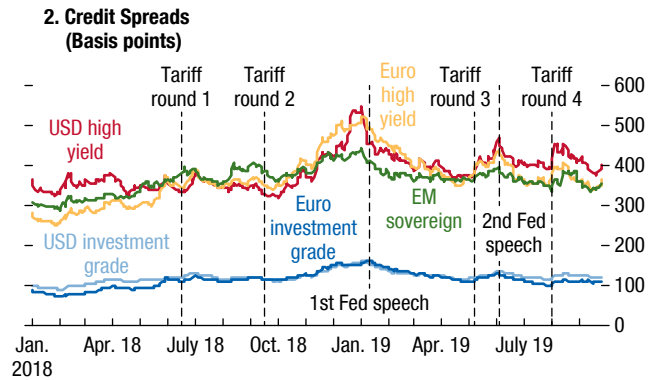
<sup>2</sup>The European Central Bank also announced the introduction of a two-tier system for reserve remuneration, in which part of banks' holdings of excess liquidity will be exempt from the negative deposit facility rate; an extension to three years on the maturity of its longer-term refinancing operations; and a lower interest rate for these operations.

**Figure 1.1. Financial Market Developments**

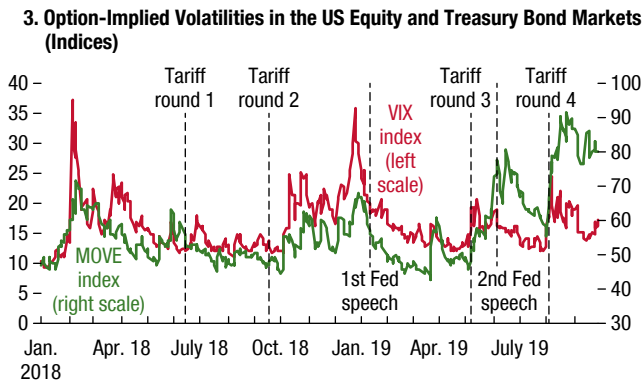
Global equity prices of sectors most exposed to tariffs have fallen in periods with trade tensions ...



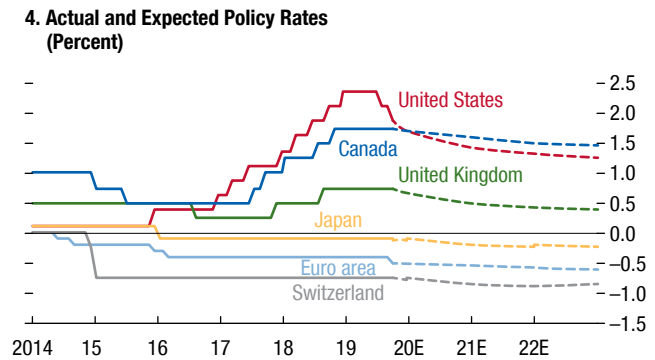
... credit spreads of lower rated issuers have been more sensitive to shifts in risk appetite ...



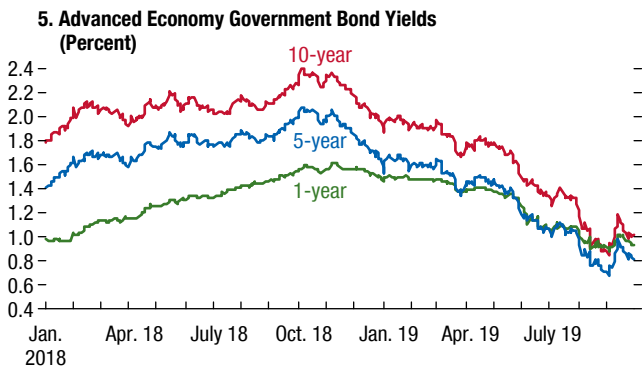
... and market volatility has oscillated in synchrony.



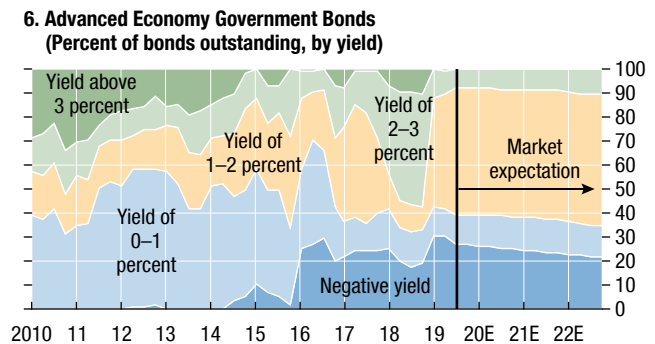
Market pricing suggests that monetary policy will be eased further.



Bond yields have fallen significantly in advanced economies ...



... leading to a growing share of bonds with negative yields.



Sources: Bloomberg Finance L.P.; and IMF staff calculations.

Note: In panels 1–3, the four rounds of tariffs were in June and September 2018 and in May and August 2019. The first Federal Reserve (Fed) speech was by Chairman Jerome Powell on January 4, 2019 at the American Economic Association and the second was on June 4, 2019 at the Federal Reserve Bank of Chicago. In panel 1, “Sectors exposed to trade and technology tensions” comprises automobiles and components, metals and mining, technology and telecommunications (communications equipment, semiconductors, and telecommunications services), and transportation (air freight, containers and packaging, marine transport, and trading companies and distributors). “Other sectors” comprises all other sectors in the MSCI World Equity Index. Panel 5 shows government bond yields (from advanced economies deemed to have systemically important financial sectors, with available data) weighted by the current amount of government debt outstanding. Bond yields from the same countries are used to draw panel 6. E = estimated; EM = emerging market; MOVE = Merrill Option Volatility Estimate; USD = US dollar; VIX = Chicago Board Options Exchange Volatility Index.

In response to recent central bank actions and communications, investors have reassessed the expected monetary policy path. Market pricing points to an additional 45 basis points of policy easing in the United States by the end of 2020 and suggests that policy rates could remain negative in the euro area, Japan, and Switzerland for many years (Figure 1.1, panel 4).

This reassessment of the outlook for monetary policy, along with concerns about the economic outlook and subdued inflation prospects, has led to a sharp decline in market interest rates across the globe. Average 10-year government bond yields in large advanced economies (weighted by sovereign debt outstanding) have fallen by about 75 basis points since the previous GFSR, despite the bounce back from August lows (Figure 1.1, panel 5). Yield curves have also flattened substantially, and in some cases have inverted, with the difference between 10-year, five-year, and one-year yields narrowing dramatically. The amount of bonds with negative yields has increased to about \$15 trillion, including more than \$7 trillion in government bonds from large advanced economies, or 30 percent of the outstanding stock (Figure 1.1, panel 6). Ten-year yields are now negative in a range of countries, including Austria, Belgium, Denmark, Finland, France, Germany, Japan, the Netherlands, Sweden, and Switzerland. Market pricing indicates that about 20 percent of sovereign bonds will have a negative yield until at least 2022.

### Asset Valuations Remain Stretched

Declines in interest rates have further motivated investors to search for yield by increasing duration and credit exposures, a development that has boosted asset valuations.<sup>3</sup> Ten-year term premiums in major markets are now highly compressed, and in some cases below levels justified by fundamentals (Figure 1.2, panel 1). In several countries this misalignment in term premiums has increased since the previous GFSR.

Despite occasional spikes, implied volatility has been relatively contained on average this year. An IMF staff fair-value model points to corporate earnings and payouts as a key factor compressing US equity volatility (Figure 1.2, panel 2). However, the model also suggests that the current level of volatility may not fully account for external factors, such as trade tensions and uncertainty about the global economic outlook.

<sup>3</sup>See Section 1 of Online Annex 1.1 for details of the methodology underlying the asset valuation models used in this chapter.

This divergence could in part result from investors' belief that central banks will respond quickly to a sharp tightening in financial conditions, hence implicitly providing insurance against significant declines in stock prices. This highlights the communication challenges that central banks face when easing monetary policy to support an economic expansion in an environment of increased downside risks.

Other risk assets are also showing signs of stretched valuations.<sup>4</sup> Equity markets appear to be overvalued in Japan and the United States (Figure 1.2, panel 3, shows misalignments scaled by monthly price volatility). Since April, US equity prices have increased whereas fundamentals-based valuations have declined as higher uncertainty about future earnings outweighed the boost from an expected rebound in earnings and lower interest rates. Equity valuations in major emerging markets, however, are closer to fair value, as investors' risk appetite may have been tempered by concerns about trade tensions and the economic growth outlook (see Chapter 4).

IMF staff valuation models also suggest that spreads of high-yield bonds are too compressed relative to fundamentals, along with investment-grade bonds in the euro area and United States (Figure 1.2, panel 4). Furthermore, emerging market bonds appear to be overvalued for more than one-third of issuers included in the JPMorgan Emerging Markets Bond Index Global as of the third quarter of 2019 (see Chapter 4).

### Global Financial Conditions Have Eased Further

Sharp declines in market interest rates have resulted in a further easing of financial conditions in advanced economies since the April 2019 GFSR (Figure 1.3, panel 1). In the United States, financial conditions continue to be accommodative relative to historical norms, although the easing has slowed in the third quarter (Figure 1.3, panel 2). In China, financial conditions are marginally tighter as a result of a decline in corporate valuations.<sup>5</sup>

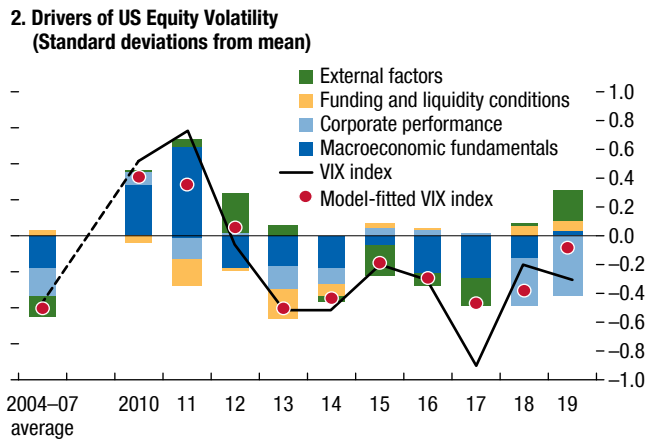
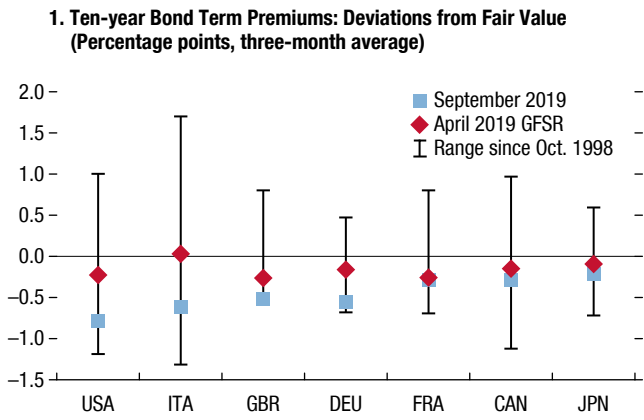
<sup>4</sup>The valuation model for equities includes government bond interest rates as a fundamental factor, and so does not take into account the misalignments in term premiums. Misalignments in the equity and bond models are scaled by standard deviations to aid comparison across economies where the underlying volatility in asset prices may differ. This measure also allows gauging of the potential losses that investors could incur due to correction of misalignments relative to regular price variation in a given market.

<sup>5</sup>In this report, financial conditions are based on price measures, as explained in the October 2018 GFSR Online Annex 1.1. The discussion of Chinese financial conditions in IMF (2019), however, also considers volume measures.

**Figure 1.2. Asset Valuations**

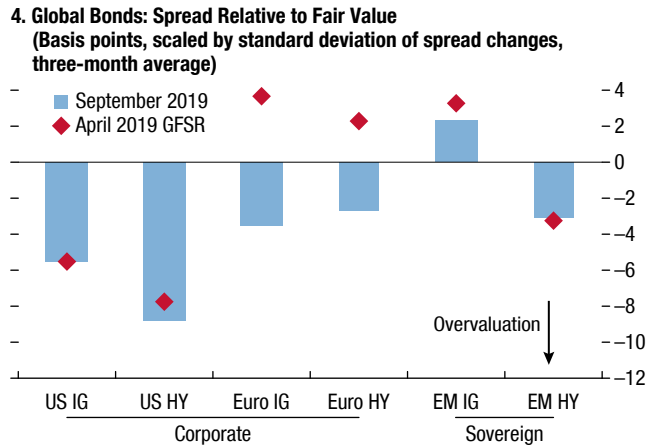
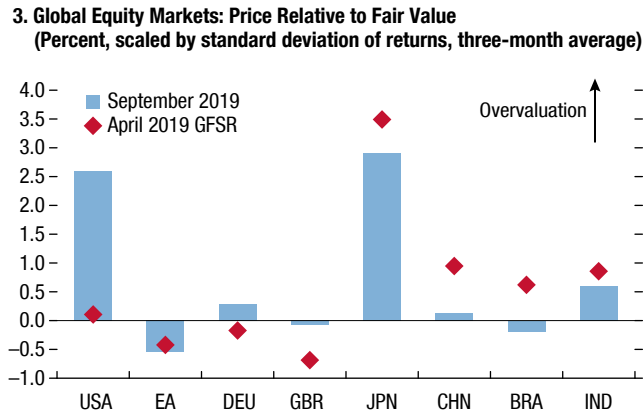
Term premiums have fallen below levels justified by fundamentals.

Option implied US equity volatility may not fully reflect external factors, including trade tensions.



Equity valuations appear stretched in some countries ...

... and bond spreads are too compressed relative to fundamentals.



Sources: Bank for International Settlements; Bloomberg Finance L.P.; Consensus Economics; Federal Reserve Board; Fitch; Haver Analytics; IMF, World Economic Outlook database; Institute of International Finance; Philadelphia Federal Reserve Survey of Professional Forecasters; Standard & Poor's; S&P Capital IQ; Thomson Reuters I/B/E/S; and IMF staff calculations.

Note: Panel 1 shows 10-year government bond term premium estimates, based on the Adrian, Crump, and Moench (2013) model, relative to the value implied by fundamentals in a number of models. See Box 1.2 in Chapter 1 of the April 2018 GFSR for more information. Panel 2 shows the drivers of equity volatility taken from a model of the VIX index that uses quarterly data from 2004:Q1 to 2019:Q2. Panel 3 shows the percent deviation of equity prices relative to a fair-value model, scaled by the standard deviation of monthly price changes. Panel 4 shows global bond spreads relative to a fair value model, in basis points, scaled by the standard deviation of monthly changes in spreads over three years. Panels 3 and 4 are scaled by standard deviation to aid comparison across economies where the underlying volatility in asset prices may differ. See Section 1 of Online Annex 1.1 for details of the asset valuation models. Data labels in panels 1 and 3 use International Organization for Standardization (ISO) country codes. EA = euro area; EM = emerging market; GFSR = *Global Financial Stability Report*; HY = high-yield; IG = investment-grade; VIX = Chicago Board Options Exchange Volatility Index.

In major emerging markets (excluding China) conditions have eased slightly in aggregate over the past six months.<sup>6</sup> In a broader group of emerging markets, financial conditions varied across regions (Figure 1.3, panel 3). In Asia, financial conditions have

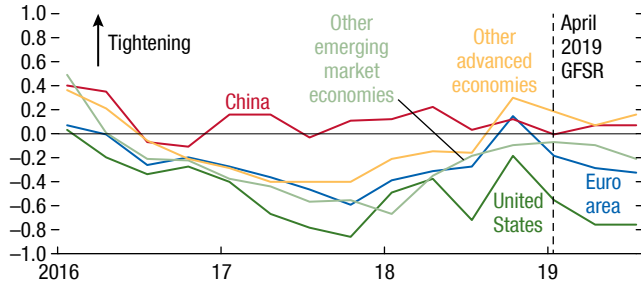
slightly eased, mainly because of reductions in external borrowing costs (Figure 1.3, panel 4). Conditions have modestly tightened in Latin America overall—as the recent strains in Argentine markets have been partly offset by some easing in Brazil. In the Europe, Middle East, and Africa region as a whole, conditions are similar to those six months ago, despite some tightening in the second quarter.

<sup>6</sup>In addition to China, the systemically important emerging market economies are Brazil, India, Mexico, Poland, Russia, and Turkey.

Figure 1.3. Global Financial Conditions

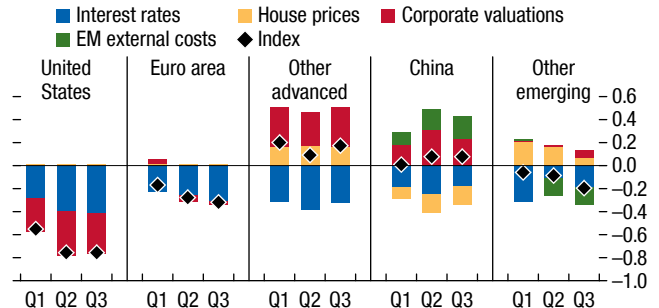
Financial conditions have eased in advanced economies ...

1. Global Financial Conditions (Standard deviations from mean)



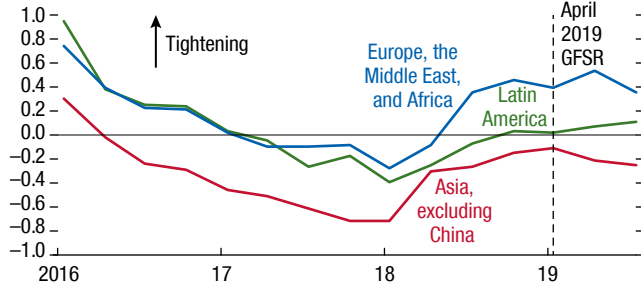
... as interest rates have fallen across the globe.

2. Key Drivers of Financial Conditions, 2019 (Standard deviations from mean)



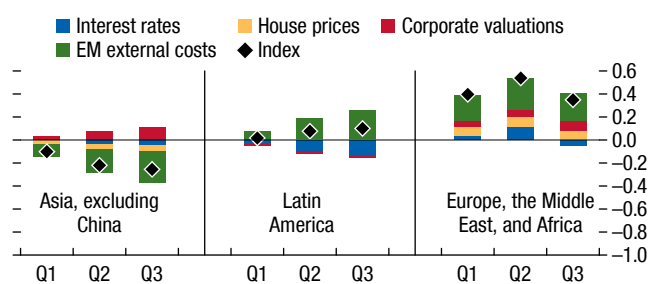
Financial conditions have eased slightly in emerging markets ...

3. Emerging Market Regional Financial Conditions (Standard deviations from mean)



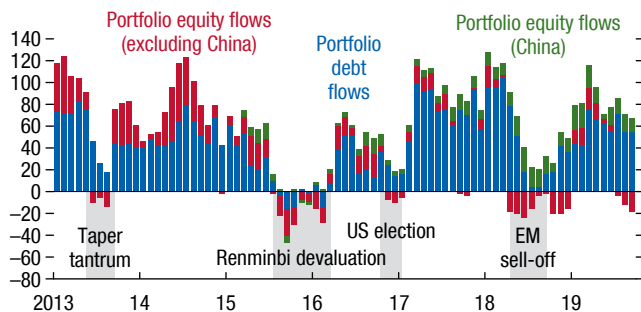
... but have varied across regions.

4. Key Drivers of Emerging Market Regional Financial Conditions, 2019 (Standard deviations from mean)



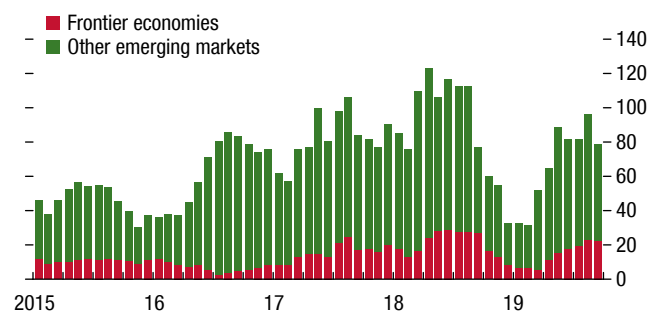
Portfolio flows rebounded in 2019 ...

5. Portfolio Flows (Billions of US dollars)



... and this has helped support strong issuance.

6. Sovereign Bond Issuance (Billions of US dollars, six-month rolling sum)



Sources: Bank for International Settlements; Bloomberg Finance L.P.; Bond Radar; Haver Analytics; IMF, International Financial Statistics database; Institute of International Finance; and IMF staff calculations.

Note: The standard deviations and means used for the financial conditions indices are calculated over the period 1996–2019. See Online Annex 1.1 of the October 2018 GFSR for more information on the financial conditions indices. “Other advanced economies” comprises Australia, Canada, Denmark, Hong Kong SAR, Japan, Korea, Norway, Singapore, Sweden, Switzerland, and the United Kingdom. “Other emerging market economies” comprises Brazil, India, Mexico, Poland, Russia, and Turkey. In panels 3 and 4, a group of 20 emerging market economies is used. EM = emerging market; GFSR = *Global Financial Stability Report*.

The easing in financial conditions in advanced economies supported a rebound in portfolio flows to emerging markets (Figure 1.3, panel 5). Debt flows have risen as higher-yielding dollar-denominated bonds have become increasingly more attractive than bonds issued by advanced economies. Chinese local currency

bond flows have also benefited from the inclusion of the country in benchmark indices (as discussed in the April 2019 GFSR). Increased appetite for emerging market dollar debt has supported a pickup in issuance by emerging and frontier market sovereigns over the past few months (Figure 1.3, panel 6).

## Financial Vulnerabilities Continue to Build

The prolonged period of accommodative financial conditions has pushed investors to search for yield, creating an environment conducive to a buildup of vulnerabilities. Lower yields have prompted institutional investors—for example, those with nominal return targets—to invest in riskier and more illiquid assets, providing a growing source of funding for nonfinancial firms and facilitating borrowing by weaker firms. Although this has supported economic activity, it has also increased risks for some lenders and borrowers. Balance sheet vulnerabilities in *nonfinancial companies* and in *nonbank financial entities* are elevated by historical standards in several large economies with systemically important financial sectors (Figure 1.4, panel 1).

Among *other nonbank financial entities*, vulnerabilities are high in 80 percent of economies with systemically important financial sectors, by GDP.<sup>7</sup> This share is comparable to the fraction at the height of the global financial crisis. Vulnerabilities in this sector have increased in the United States and euro area since the April 2019 GFSR (Figure 1.4, panel 2). This largely reflects an increase in leverage and credit exposures as institutional investors have taken on riskier positions to try to meet targeted returns, as discussed in Chapter 3 (Figure 1.5, panel 1).<sup>8</sup> In China, vulnerabilities continue to be high, largely due to leveraged positions in investment vehicles.

In the *insurance sector*, vulnerabilities remain elevated in advanced economies, reflecting the search for yield that has been taking place in the low-interest-rate environment (Figure 1.4, panel 2; Chapter 3).<sup>9</sup>

In the *banking sector*, vulnerabilities continue to be relatively moderate overall. But banks are exposed to vulnerabilities in other sectors through their lending. Figure 1.5, panel 2, illustrates these exposures using data on banking sector credit to domestic and foreign

sectors, weighted by the level of vulnerabilities in each sector (using the scores underlying Figure 1.4).<sup>10</sup> This measure is a useful gauge of bank exposures, though it does not take into account the level of capital in the banking system. Chinese banks have the largest weighted exposures by this measure, given their sizable lending to domestic firms, households, and other financial companies. The banking systems in Brazil, India, Korea, and Turkey also have relatively high vulnerability-weighted exposures.

Lower interest rates and flatter yield curves—along with a subdued economic outlook—have driven bank equity market valuations down as investors expect compressed interest margins to reduce the profitability of these institutions. Market-adjusted capitalization—which uses the market value of equity in place of the book value in capital ratios—has fallen. This metric—which has been found to be a relatively good predictor of banking sector stress—can be used, along with regulatory capital ratios, to reveal pockets of weaker banks (Figure 1.5, panel 3).<sup>11</sup> For example, using these indicators of leverage, euro area institutions accounting for more than 30 percent of sample bank assets have relatively weak capitalization, and in China the proportion is about 25 percent. Although this assessment does not cover all aspects of balance sheet vulnerabilities, it chimes with the finding in the April 2019 GFSR that many small and medium-sized Chinese banks have lower capital ratios and profits than the five largest institutions (Figure 1.5, panel 4). These strains have recently surfaced in funding markets and prompted the authorities' interventions in three regional Chinese banks (as discussed in Box 1.1).

Last, some banks may be more exposed to mismatches in their currency exposures and funding profiles. The April 2018 GFSR highlighted potential liquidity risks in the dollar funding of non-US banks. Chapter 5 of this report builds on this work, with a particular focus on synthetic dollar funding

<sup>7</sup>Additional economies have been included in the assessment of vulnerabilities in the other financial sector, which now includes the *Other Emerging Markets* region. This has resulted in an increase in the proportion and number of countries with high and medium-high vulnerabilities relative to the results published in the April 2019 GFSR.

<sup>8</sup>The European Central Bank (2019) notes that the continued search for yield, liquidity risks, and leverage in the euro area non-bank financial sector could amplify the wider financial cycle.

<sup>9</sup>The methodology for assessing vulnerabilities in the insurance sector has been revised with the addition of four new indicators. These include two indicators in the leverage and credit buckets, as well as two indicators measuring vulnerabilities from foreign and equity investments. Data for insurers now start from 2004.

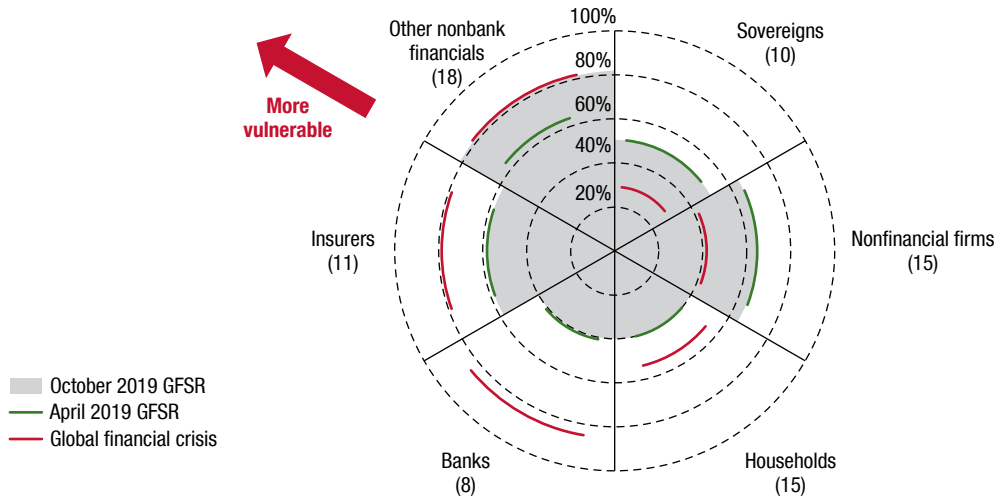
<sup>10</sup>The weights in this calculation are based on vulnerability scores allocated to sectors. These scores show the percentile of the vulnerability rating, relative to historical ratings for the peer group. (Countries are divided into an advanced economy and an emerging market peer group.)

<sup>11</sup>Market-adjusted capitalization is defined as the product of tangible common equity and  $\min(\text{price-to-book ratio}, 1)$  presented as a percentage of tangible assets. The thresholds for market-adjusted capitalization used in Figure 1.5, panel 3, are based on the findings in Kerry (2019). The common equity Tier 1 thresholds are  $\pm 1$  standard deviation around the mean for the sample of banks in the figure.

**Figure 1.4. Global Financial Vulnerabilities**

Vulnerabilities have increased among nonbank financial institutions and remain high in the corporate sector.

**1. Proportion of Systemically Important Economies with Elevated Vulnerabilities, by Sector**  
(Percent of countries with high and medium-high vulnerabilities, by GDP [assets for banks]; number of countries in parentheses)



Vulnerabilities are elevated in several economies and have increased among other nonbank financial entities in advanced economies.

**2. Financial Vulnerabilities by Sector and Region**

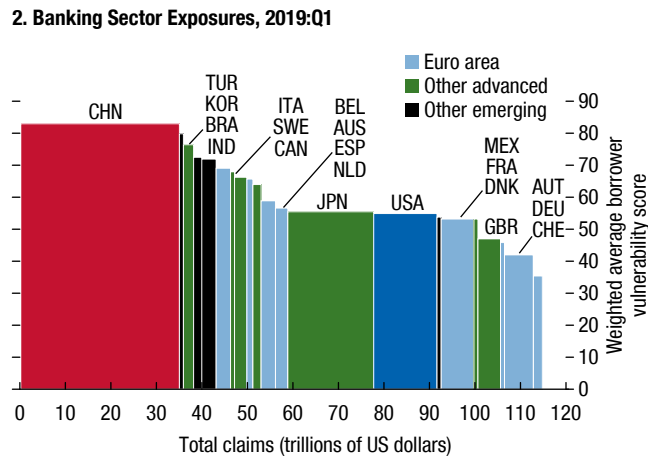
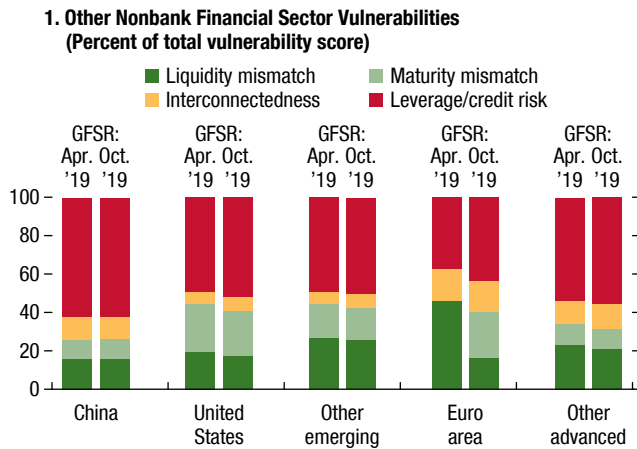
	Quintiles											
	Sovereigns		Nonfinancial Firms		Households		Banks		Insurers		Other Nonbank Financials	
	Apr. 2019	Oct. 2019	Apr. 2019	Oct. 2019	Apr. 2019	Oct. 2019	Apr. 2019	Oct. 2019	Apr. 2019	Oct. 2019	Apr. 2019	Oct. 2019
<b>Advanced Economies</b>												
United States	Light Red	Light Red	Light Red	Light Red	Dark Green	Dark Green	Dark Green	Dark Green	Light Red	Light Red	Light Red	Dark Red
Euro area	Dark Red	Light Red	Light Red	Light Red	Dark Green	Dark Green	Light Red	Light Red	Light Red	Light Red	Light Red	Light Red
Other advanced	Light Red	Light Red	Dark Green	Dark Green	Dark Red	Dark Red	Dark Green	Dark Green	Dark Red	Dark Red	Light Red	Light Red
<b>Emerging Market Economies</b>												
China	Light Red	Light Red	Dark Red	Dark Red	Dark Red	Dark Red	Dark Red	Dark Red	Light Red	Light Red	Dark Red	Dark Red
Other emerging	Dark Red	Dark Red	Light Red	Light Red	Light Red	Light Red	Light Red	Light Red	Dark Green	Light Red	Light Red	Light Red

Sources: Banco de Mexico; Bank for International Settlements; Bank of Japan; Bloomberg Finance L.P.; China Insurance Regulatory Commission; European Central Bank; Haver Analytics; IMF, Financial Soundness Indicators database; Reserve Bank of India; S&P Global Market Intelligence; S&P Leveraged Commentary and Data; Securities and Exchange Commission of Brazil; WIND Information Co.; and IMF staff calculations.  
Note: In panel 1, global financial crisis reflects the maximum vulnerability value during 2007–08. In panel 2, dark red shading indicates a value in the top 20 percent of pooled samples (advanced and emerging market economies pooled separately) for each sector during 2000–18 (or longest sample available), and dark green shading indicates values in the bottom 20 percent. In panels 1 and 2 for households, the debt service ratio for emerging market economies is based on all private nonfinancial firms. See the April 2019 GFSR online annex for details of the methodology behind this figure. “Other advanced” economies comprises Australia, Canada, Denmark, Hong Kong SAR, Japan, Korea, Norway, Singapore, Sweden, Switzerland, and the United Kingdom. “Other emerging” economies comprises Brazil, India, Mexico, Poland, Russia, and Turkey. GFSR = Global Financial Stability Report.

**Figure 1.5. Financial Sector Vulnerabilities**

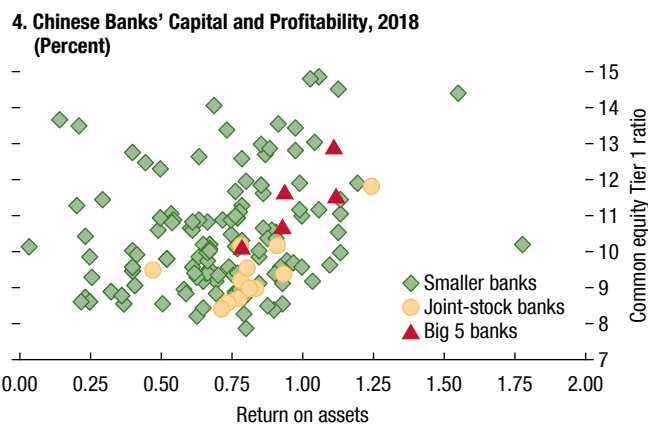
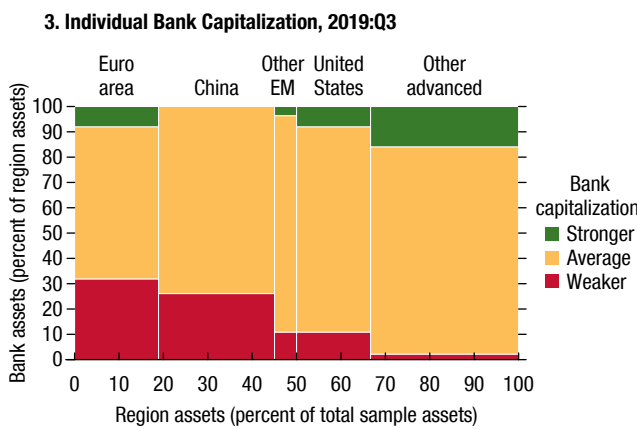
Leverage and credit exposures are a source of vulnerability among other nonbank financial entities.

Although banks are stronger overall, some banking systems have large exposures to sectors with high vulnerabilities ...



... and vulnerability indicators vary significantly across individual banks ...

... including among small and medium-sized banks in China.



Sources: Banco de Mexico; Bank for International Settlements; Bloomberg Finance L.P.; European Central Bank; Haver Analytics; Institute of International Finance; IMF, International Financial Statistics database; IMF, World Economic Outlook database; national authorities; Orbis; Reserve Bank of India; S&P Market Intelligence; Securities and Exchange Commission of Brazil; WIND Information Co.; and IMF staff calculations.  
 Note: Panel 1 shows the contribution of leverage and other mismatches to the overall vulnerability score. See Online Annex 1.1 for the April 2019 GFSR for more details. Panel 2 is drawn using banking sector exposures to different sectors in the 29 economies deemed to have a systemically important financial sector, weighted by the vulnerability scores used to produce Figure 1.4. Data labels in panel 2 use International Organization for Standardization (ISO) country codes. Panel 3 is based on a sample of banks that are traded on the stock market and shows data for 2019:Q3 or, if these are not available, the latest available data. The label "stronger banks" shows the lowest proportion of banks that have either a common equity Tier 1 ratio of 15 percent or more, or a market-adjusted capitalization ratio of 3 percent or more. The label "weaker banks" shows the highest proportion of banks that have a common equity Tier 1 ratio of 10 percent or less, or a market-adjusted capitalization ratio of 1.5 percent or less. All other banks are considered to have an average capitalization. Market-adjusted capitalization is the product of  $\min\{\text{price-to-book ratio}, 1\}$  and tangible common equity, presented as a percentage of tangible assets (see Kerry 2019). US bank assets have been adjusted for derivatives netting. EM = emerging market economy; GFSR = *Global Financial Stability Report*.

and cross-currency basis swaps. It finds that banks with US dollar funding fragilities can amplify the impact of funding shocks, ultimately raising financial stability concerns.

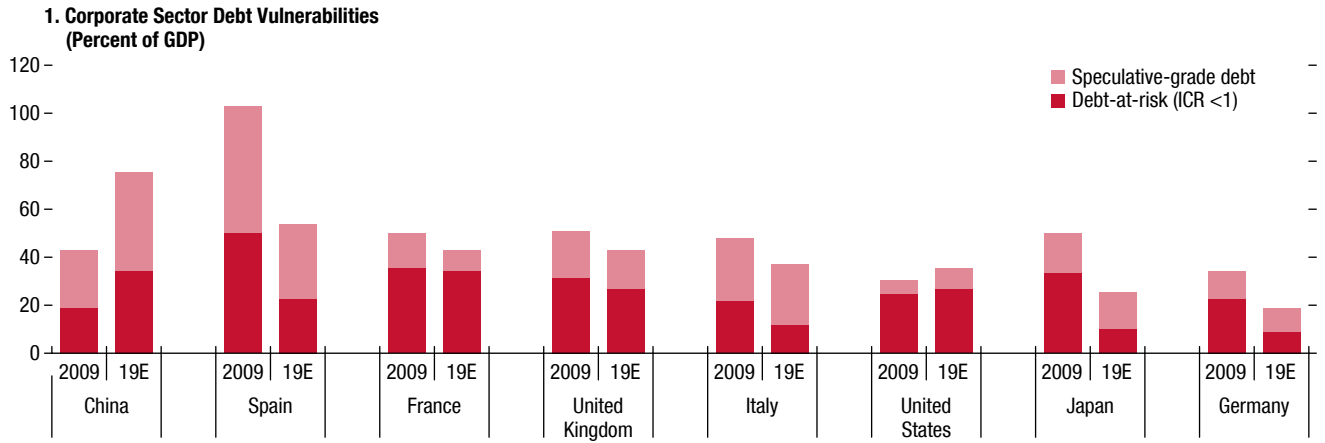
Easy financial conditions have supported financial risk-taking in the *nonfinancial corporate sector*. Vulnerabilities in the corporate sector continue to be elevated, particularly in China, other emerging market economies

in aggregate, and the United States (Figure 1.4, panels 1 and 2). Chapter 2 presents a comprehensive assessment of the corporate sector credit quality in eight major economies: China, France, Germany, Italy, Japan, Spain, the United Kingdom, and the United States. It finds that debt issued by companies whose earnings are insufficient to cover interest payments is elevated relative to GDP in several economies and could

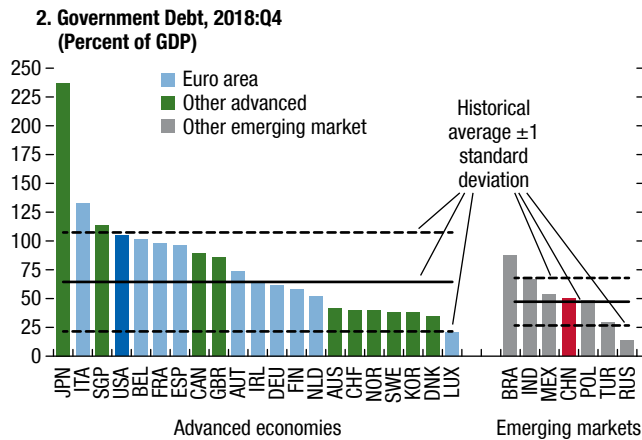


Figure 1.6. Nonfinancial Sector Vulnerabilities

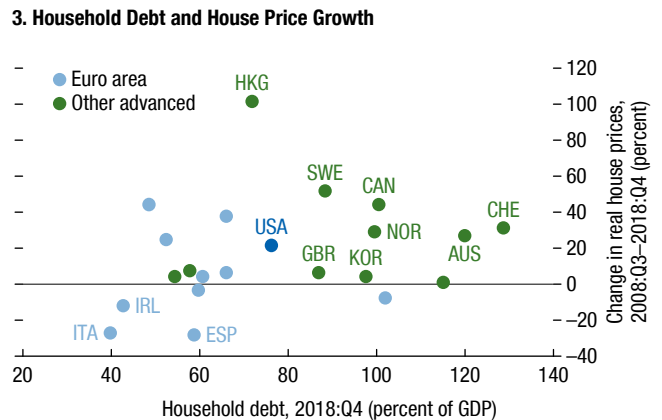
Debt at nonfinancial firms with weak fundamentals is sizable in some economies.



Government debt remains elevated in a few economies ...



... and household debt is high where house prices have boomed.



Sources: Haver Analytics; Institute of International Finance; IMF, International Financial Statistics database; IMF, World Economic Outlook database; national authorities; Orbis; S&P Market Intelligence; WIND Information Co.; and IMF staff calculations.

Note: In panel 1, the interest coverage ratio is defined as EBIT (earnings before interest and taxes) relative to interest expense. Speculative grade debt is defined as debt owed by firms with an ICR of less than 4.1 and net debt/assets greater than 0.25, where net debt is gross debt minus cash (see section 2 of Online Annex 1.1). Data for 2019 are estimated. For panel 2, Ireland's public debt is 106 percent if it is scaled by modified gross national income, which removes a large proportion of the multinational activities. In Singapore, government debt is not issued to finance a deficit but rather to deepen the domestic market, to meet the investment needs of the Central Provident Fund, and to provide individuals a long-term savings option. Data labels in panels 2 and 3 use International Organization for Standardization (ISO) country codes. E = estimated; ICR = interest coverage ratio.

approach or exceed the crisis levels in an adverse scenario, which is half as severe as the global financial crisis (Figure 1.6, panel 1). The corporate sector weaknesses are primarily concentrated in small and medium-sized firms and in large Chinese firms, including state-owned enterprises (see Chapter 2).

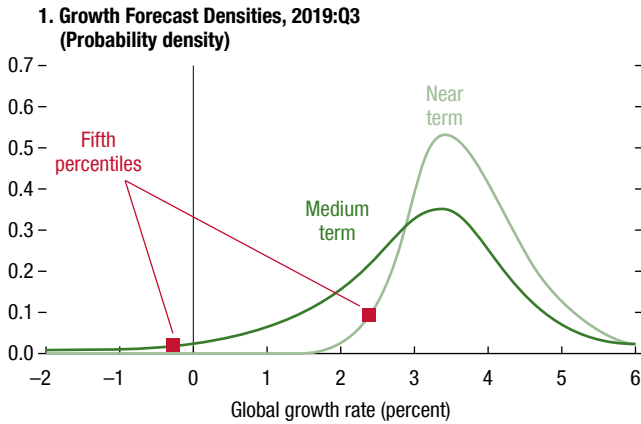
Low interest rates have reduced debt service costs and may have contributed to an increase in *sovereign debt*. This has made some governments more susceptible to a sudden and sharp tightening in financial conditions, as discussed in the April 2019 *Fiscal Monitor*. Although

sovereign sector vulnerabilities are broadly unchanged at the global level, they have fallen slightly in the euro area as a whole as debt levels have declined in some economies. There are, however, several governments with elevated debt relative to their GDP (Figure 1.6, panel 2). Chapter 4 discusses government debt for a broad range of emerging market and frontier economies.

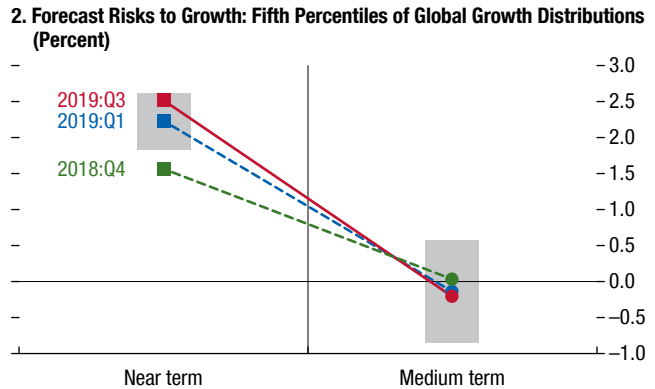
In the *household sector*, vulnerabilities continue to be elevated in China and a number of other advanced economies (Figure 1.4, panels 1 and 2). Many of the economies that managed to escape the worst impact of

**Figure 1.7. Global Growth-at-Risk Estimates**

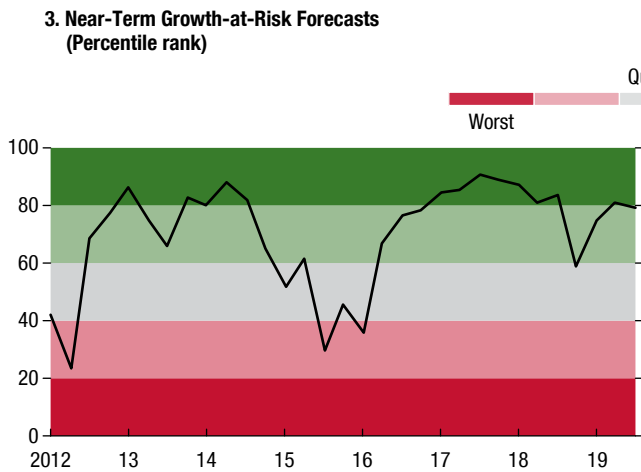
Medium-term risks are skewed to the downside ...



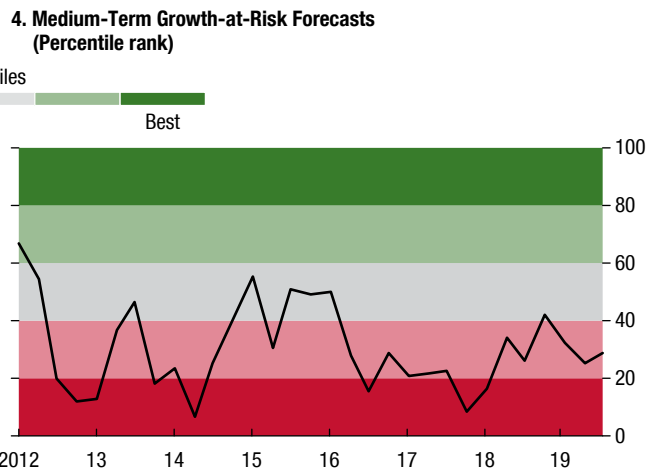
... and remain elevated.



Near-term risks are broadly unchanged ...



... but medium-term risks continue to be high by historical standards.



Source: IMF staff calculations.

Note: In panel 1, forecast density estimates are centered around the respective *World Economic Outlook* forecasts. In panel 2, the lines indicate pairs of near- and medium-term forecasts, but do not assert a linear relationship between the two periods. The shaded areas correspond to  $\pm 1$  standard error bands around the fifth percentile threshold (Growth-at-Risk) of near- and medium-term growth forecast densities from 1991 onward. The financial conditions index used in the analysis presented in this figure incorporates information on the price of risk, as well as the credit-to-GDP ratio (as a proxy for financial vulnerabilities). See the April 2018 *Global Financial Stability Report* for details of the Growth-at-Risk methodology.

the global financial crisis have subsequently had house price booms. These now tend to be the economies with the highest household-debt-to-GDP ratios (Figure 1.6, panel 3). Conversely, in some countries that were hit the hardest by the global and euro area financial crises, such as Ireland and Spain, household debt has now moderated, and house prices have fallen in real terms. In the United Kingdom and the United States, however, house prices are at least back to the levels during the crisis in real terms.

### Financial Stability Risks Remain Elevated in the Medium Term

The easing in financial conditions since the previous GFSR has helped contain near-term downside risks to global growth and financial stability, despite the decline in the baseline growth forecast (see the October 2019 WEO) and continued rise in financial vulnerabilities. On net, near-term growth-at-risk (defined as the fifth percentile of the one-year-ahead forecast distribution) is little changed compared to six months ago (Figure 1.7,

panels 2 and 3).<sup>12</sup> However, the easy financial conditions and stretched asset valuations at this late stage of the cycle suggest that investors may be overly complacent about downside risks.

A number of events could trigger a sharp tightening in financial conditions at the current conjuncture, including an intensification or broadening of trade tensions, a faster-than-expected slowdown in global growth, a sudden market reassessment of the outlook for monetary policy (especially if there is a gap between market expectations and central banks' communications), or the crystallization of political and policy risks (for example, a geopolitical event that leads to contagion and capital flow reversals from emerging markets, renewed concerns about fiscal challenges in highly indebted countries, or a no-deal Brexit). Despite continued uncertainty about Brexit, trading conditions in UK markets have been orderly in recent months. There is a risk, however, that market volatility may rise as key Brexit deadlines approach, and the associated tightening in financial conditions may be substantial in the event of a no-deal Brexit.

Over the medium term, downside risks to global growth and financial stability remain high (Figure 1.7, panels 1 and 4), as easy financial conditions are conducive to a further buildup of vulnerabilities. Box 1.2, using the example of the United States, shows that a higher level of private nonfinancial sector vulnerabilities increases downside risks to growth and financial stability, particularly in the medium term. Furthermore, in the event of a tightening of financial conditions, the level of vulnerabilities matters: if vulnerabilities are already high, downside risks to growth and financial stability would be much more pronounced, in both the near and medium term. This suggests that the best time to take action to reduce financial stability risks is when vulnerabilities are still relatively low and financial conditions are accommodative.

<sup>12</sup>The growth-at-risk framework assesses the downside risks to financial stability by gauging how the range of severely adverse growth outcomes (5th percentile of the growth distribution) shifts in response to changes in financial conditions and vulnerabilities (see Chapter 3 of the October 2017 GFSR for details). Assumptions pertaining to policy responses or macroeconomic shocks (like the oil price shocks), which are explicitly incorporated in the WEO model (see the October 2019 WEO), are captured in the growth-at-risk framework only to the extent that they affect the current economic and financial conditions, or the baseline growth forecast.

## Policymakers Should be Mindful of Financial Stability Risks

Concerns about weakening economic activity and rising downside risks to the outlook have prompted policymakers to refocus their efforts on supporting economic growth. Many central banks have already shifted to a more accommodative monetary policy stance, which was appropriate from a macroeconomic perspective (see the October 2019 WEO). With investors anticipating very low interest rates for a long time, financial conditions may ease further at a time when they are already accommodative (Figure 1.8, panel 1).<sup>13</sup> In this context, monetary policy should remain data dependent and any changes in stance should be clearly communicated to avoid mispricing of risk by market participants.

To reduce the risk that additional easing may have the unintended consequence of leading to a further buildup of financial system vulnerabilities, macroprudential policies should be tightened, as warranted. Because the necessary macroprudential tools are lacking in several major economies, such tools should be urgently developed (see Table 1.1).<sup>14</sup>

The *appropriate mix of macroeconomic and financial policies* should be tailored to the particular set of cyclical conditions and vulnerabilities each economy faces:

- *In countries where economic activity remains robust, financial conditions are still easy, and vulnerabilities are high or rising, policymakers should urgently tighten macroprudential policies, including activating or tightening broad-based tools, to increase the resilience of the financial system and reduce risk-taking.*<sup>15</sup> For example, countercyclical capital buffers have been deployed only infrequently (Figure 1.8, panel 2), and more economies with

<sup>13</sup>In the United States, financial conditions have actually loosened during the recent monetary policy tightening cycle, in contrast to the previous six tightening cycles (the exception is the 2007 easing cycle, during which financial conditions tightened with the onset of the global financial crisis).

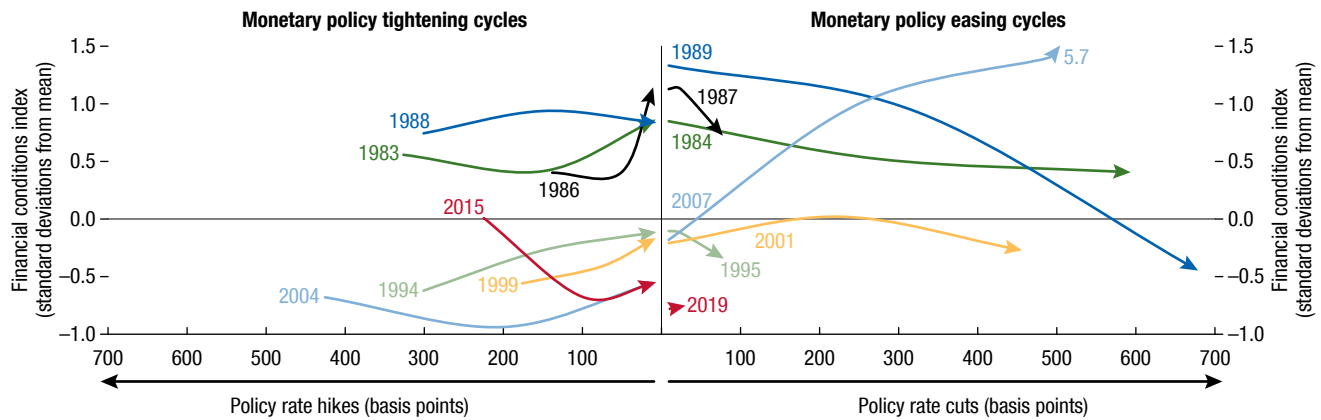
<sup>14</sup>Table 1.1 reflects the number of tools reported in the IMF Macroprudential Policy Survey. Some countries have institutional arrangements that implement macroprudential policies other than through specific tools. For example, in the United States, the Financial Stability Oversight Council has used its power to designate nonbank financial companies that it considers to be of systemic importance, and this entails heightened oversight, including on the part of the Federal Reserve Board.

<sup>15</sup>The authorities should recognize that this may also encourage a shift in lending activity from banks to the nonbank financial sector.

**Figure 1.8. Monetary and Macroprudential Policies**

Financial conditions are already easy and could ease even further.

**1. Financial Conditions in Past Monetary Policy Tightening and Easing Cycles in the United States**



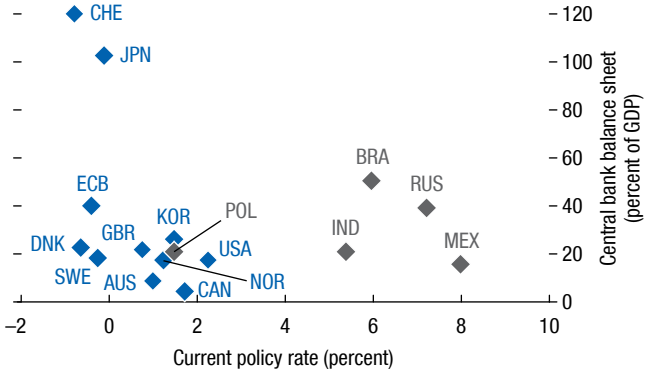
Despite elevated vulnerabilities, many countries have not deployed countercyclical capital buffers.

Monetary policy space may be limited in some countries.

**2. Countercyclical Capital Buffers, 2019**



**3. Central Bank Monetary Policy Space, 2019**



Sources: Bank for International Settlements; Bloomberg Finance L.P.; Haver Analytics; IMF, Macroprudential Policy Survey; and IMF staff calculations. Note: Panel 2 shows the average level of the countercyclical capital buffer in jurisdictions with low (1) to high (5) vulnerabilities in the nonfinancial private sector (average of the household and nonfinancial corporate sectors weighted by the level of debt in each sector), based on the information used to draw Figure 1.4. Green diamonds are used for the lower two quintiles, yellow for the middle quintile, and red for the upper two quintiles. Data labels in panel 3 use International Organization for Standardization (ISO) country codes. ECB = European Central Bank.

high vulnerabilities and still easy financial conditions might benefit from activating this tool (Table 1.1, first column).<sup>16</sup>

- In countries where macroeconomic policies are being eased but where vulnerabilities are still a concern in particular sectors, policymakers should consider a more targeted approach, such as stress tests on banks' exposures to certain types of borrowers, higher risk weights on these exposures, or other targeted measures, such as sectoral capital buffers and borrower-based tools, where appropriate.

- For economies facing a significant slowdown, the focus should be on more accommodative policies, considering available policy space. While authorities may look at ways to ease monetary policy, there may be limited policy space in many systemically important advanced economies (Figure 1.8, panel 3). Monetary policy could, therefore, be complemented by fiscal easing in countries that have fiscal space and where financial conditions allow. Countercyclical capital buffers could also be released in economies that have built up buffers.

<sup>16</sup>Figure 1.8, panel 2, and Table 1.2 show the level of the countercyclical capital buffer as of summer 2019. Some countries, including Belgium, France, Germany, and Luxembourg, have announced that the buffer will be tightened at a future date.

Regulation put in place in the wake of the global financial crisis has improved the overall resilience of the banking sector (see Table 1.2), but pockets

**Table 1.1. Macroprudential Policy Tools**

Economy	Counter-Cyclical Capital Buffer	Nonbank Financial Sector Tools	Household Sector Tools	Corporate Sector Tools
Australia				
Austria				
Belgium				
Brazil				
Canada				
China				
Denmark				
Finland				
France				
Germany				
Hong Kong SAR				
India				
Ireland				
Italy				
Japan				
Korea				
Luxembourg				
Mexico				
Netherlands				
Norway				
Poland				
Russia				
Singapore				
Spain				
Sweden				
Switzerland				
Turkey				
United Kingdom				
United States				

Sources: IMF, Macroprudential Policy Survey; and IMF staff calculations. Note: The table shows the level of the countercyclical capital buffer as of summer 2019, and the macroprudential measures in place as reported by each country in the Macroprudential Policy Survey, available at <https://www.elibrary-arear.imf.org/Macroprudential/Pages/Home.aspx>. Some countries have announced that the countercyclical capital buffer will be tightened at a future date (see footnote 16). The figures on macroprudential tools are compiled exclusively from information provided by IMF member countries. Hence, a policy tool's inclusion in, or absence from, the table does not represent a judgment or decision by the IMF on whether a particular tool is macroprudential. Some examples of the tools in the database are (1) for the corporate sector—sector-specific capital requirements, or a cap on loan-to-value ratio for commercial real estate credit; and (2) for the nonbank financial sector—countercyclical capital requirements for insurers, resecuritization prohibitions, or default fund requirements for central counterparties.

of weaker institutions remain. More broadly, robust regulatory and supervisory frameworks and intensive supervision should be the first line of defense when it comes to addressing banks' risk exposures or dollar funding risks in large internationally active banks (see Chapter 5).

## Urgent Policy Action Is Needed Where Vulnerabilities Are High and Few Tools Are Available

Policy response is urgent in areas where vulnerabilities are high or rising, whereas the necessary policy tools may be lacking (see Table 1.1):

- *Rising corporate debt burdens:* Stringent supervision of banks' credit risk assessment and lending practices should be maintained. Efforts should be made to increase disclosure and transparency in nonbank finance markets to enable a more comprehensive assessment of risks. In economies where overall corporate sector debt is deemed to be systemically high, policymakers may consider developing prudential tools for highly leveraged firms (see Chapter 2). A widening of the regulatory and supervisory perimeter could be considered to include nonbank financial entities that provide financial intermediation services to firms, as warranted. Reducing the bias in tax systems that favors debt over equity financing would also help reduce incentives for excessive borrowing by firms.
- *Increased holdings of riskier and more illiquid securities by institutional investors:* Policymakers can help address the buildup of vulnerabilities among institutional investors through appropriate incentives (for example, to reduce the offering of guaranteed return products), minimum solvency and liquidity standards, and enhanced disclosures. Efforts should be stepped up to implement policy initiatives to mitigate leverage and other balance sheet mismatches in insurance firms and mutual funds (see Table 1.2 and Chapter 3 for more details). For example, institutional investors should be required to hold liquid assets commensurate with rising risks, informed by stress tests built on severe and plausible assumptions.
- *Increased reliance on external borrowing by emerging and frontier market economies:* Indebted emerging market and frontier economies need to mitigate debt sustainability risks through prudent debt management practices and strong debt management frameworks, taking a holistic view on overall debt-related risks (as discussed in Chapter 4).

## Global Policy Coordination Remains Critical

Policymakers also need to complete and implement the regulatory reform agenda (as discussed in previous GFSRs). International resolution frameworks, especially for internationally active firms, need to be developed further, and any rollback of regulatory standards should be avoided.

**Table 1.2. Policy Initiatives to Mitigate Leverage and Balance Sheet Mismatches**

<b>Banks</b>	<p><b>Capital and leverage</b>                      BCBS (2019) reported that there has generally been good progress in implementing the capital framework. For the large exposure framework, however, only eight jurisdictions had final rules in force as of end-March 2019.                      The leverage ratio was revised (to refine the exposure measure, introduce a GSIB buffer, and address concerns about potential “window dressing” of balance sheets) with an implementation date of January 2022.                      Output floors, providing minimum risk-weights for banks using the advanced approach for Tier 1 capital ratios, will be phased in over the period 2022–27.                      In December 2017, a discussion paper on the regulatory treatment of sovereign exposures was published. The BCBS has not reached a consensus on this topic and no revisions to the framework have been proposed.</p> <p><b>Liquidity, maturity, and foreign currency mismatches</b>                      BCBS (2019) noted that all member countries have implemented the liquidity coverage ratio (LCR), whereas only 11 of its 27 members had final net stable funding ratio (NSFR) rules in force as of end-March 2019 (a further 15 countries are in the process of adopting the NSFR).                      Although Basel III does not include minimum liquidity requirements per currency, the framework requires the monitoring of the LCR and NSFR by material currency.                      The Basel framework contains capital requirements for market risks stemming from open currency positions. The market risk framework was revised, with an implementation deadline of January 2022.</p>
<b>Insurance Companies</b>	<p><b>Capital and leverage</b>                      Risk-based capital standards are expected to be adopted for internationally active insurance groups by end-2019, with a five-year monitoring period prior to final review and subsequent international agreement and adoption. This is a substantial delay from the original plan.                      Implementation of capital requirements for insurance groups may help to prevent regulatory arbitrage.                      Although more jurisdictions are introducing economic-based solvency regimes (such as Solvency II), there is no common global standard, and this could encourage regulatory arbitrage transactions on a cross-border basis.</p> <p><b>Liquidity and maturity mismatches</b>                      The IAIS has released guidance on liquidity management and planning and is developing a holistic framework for systemic risks in the insurance sector (including on liquidity risk management). Some jurisdictions (for example, France and Belgium) are enhancing monitoring and policy tools to address potential liquidity risk in the insurance sector.                      Implementation of economic and risk-based capital frameworks would encourage insurers to minimize duration mismatches. These mismatches may not be fully captured in the current low and negative yield environment, for example under the standard formula in the European Union’s Solvency II rules.</p>
<b>Investment Funds</b>	<p><b>Leverage</b>                      Work is ongoing on leverage measures for investment funds. IOSCO is expected to finalize its leverage report by end-2019. Materially increasing convergence among supervisors on how to measure leverage remains a challenge.</p> <p><b>Liquidity mismatches</b>                      The February 2018 IOSCO report on liquidity risk management includes new recommendations on the availability and use of additional liquidity management tools, but the language leaves room for wide divergencies in implementation at the national level.                      An assessment on the implementation of the liquidity risk management recommendations is expected to take place in 2020.</p>

Source: IMF staff.

Note: BCBS = Basel Committee on Banking Supervision; GSIB = globally systemically important bank; IAIS = International Association of Insurance Supervisors; IOSCO = International Organization of Securities Commissions.

Action is needed in two other specific areas discussed in this report. First, market participants need to ensure that they are prepared for the transition from LIBOR to alternative risk-free interest rate benchmarks (see Box 1.3). Authorities are actively consulting the market on a number of issues related to this transition, but despite encouraging signs in many areas, issuance of new products based on LIBOR continues. The continued reliance on LIBOR and the current pace of progress raise concerns about potential financial stability risks if the orderly transition is not completed by end-2021. Supervisors should therefore encourage market participants to net down legacy derivative positions and to accelerate the pace of adoption of the new benchmark rates.

Second, environmental, social, and governance (ESG) principles are becoming increasingly important for both borrowers and investors (see Chapter 6). Closing data gaps will be crucial for individuals, firms, and markets to efficiently price externalities, mitigate risks, and reward long-term benefits from sustainability. To encourage further growth in sustainable finance, progress is needed in developing standards and promoting consistent ESG reporting. Regulators and central banks should take intellectual leadership in assessing ESG risks. The IMF will continue to incorporate ESG considerations critical to the economy into its surveillance. Financial sector policies for mitigating climate change are also discussed in the *Fiscal Monitor*.

### Box 1.1. Implications of the Recent Bank Interventions in China

In late May, the Chinese authorities took over Baoshang Bank, imposing marginal haircuts on corporate and interbank depositors. The takeover raised, for the first time in two decades, the possibility of creditor losses. In late July, several large state-owned financial institutions purchased minor stakes in the Bank of Jinzhou, which had been facing liquidity problems for some time. In early August, another regional bank, Hengfeng, received a capital injection from a unit of China's sovereign wealth fund. Unlike Baoshang, there were no haircuts for depositors in the Jinzhou and Hengfeng cases.

Although the challenges facing Baoshang—and many others like it—were well known, the possibility of creditors suffering losses surprised financial market participants. Interbank funding markets became strained as investors questioned the creditworthiness of weaker, smaller banks and nonbank financial institutions. The spread between the funding costs of highly rated and weaker borrowers widened from an average of 16 basis points before the Baoshang takeover to nearly 90 basis points in early July (Figure 1.1.1, panel 1). The negotiable certificates of deposit market, an important source of funding for smaller rural banks, saw sharp declines in issuance for weaker borrowers (Figure 1.1.1, panel 2).

These events underscore several vulnerabilities in the Chinese financial system:

- *Liquidity, funding, and solvency risks:* These three banks were hardly unique; they were among the dozen or so banks that had delayed the release of annual reports. Like many other joint-stock, city, and rural commercial banks, they relied on wholesale funding and held a large share of risky nonloan assets (Figure 1.1.1, panels 3 and 4). In addition, these banks faced challenges—such as low capital and weak profitability—that are similar to those faced by other small and medium-sized banks (see the April 2019 *Global Financial Stability Report*).
- *Interlinkages between banks, nonbank financial institutions, and investment vehicles:* Banks that rely on funding through negotiable certificates of deposit

tend to be large investors or guarantors of investment vehicles, which are themselves major investors in such certificates and other bank debt and capital instruments—thereby introducing circularity and interconnectedness that tend to amplify the transmission of shocks.<sup>1</sup>

- *Maturity mismatches and other risks within investment vehicles* that banks issue (such as wealth management products) and invest in (such as asset management products and trust beneficiary rights): These vehicles often rely on short-term wholesale funding and other support from banks to help fund credit to long-term investment projects, including loans to local governments.

The recent liquidity and funding squeeze, and associated solvency concerns, is likely to increase pressure on banks to raise deposit funding while paying more for other sources of funds. This will in turn bring into sharper focus the trade-off these banks face between improving resilience and maintaining credit growth. IMF staff analysis suggests that the loan books of smaller banks would have to contract significantly if banks were required to increase core Tier 1 equity ratios to the system average (10.5 percent) and hold adequate capital against roughly half of their on- and off-balance-sheet shadow credit (see the April 2019 *Global Financial Stability Report*).

The Chinese authorities have taken different approaches to Baoshang, Jinzhou, and Hengfeng banks based on the authorities' assessment of the institution's specific circumstances. Striking a balance between maintaining market liquidity and introducing counterparty solvency risks—a crucial development in the reform of China's financial system—is a delicate task, made more difficult by implicit guarantees. Policymakers urgently need to introduce a bank resolution regime, alongside measures to reform the asset management industry and its linkages to banks (see the December 2017 Financial System Stability Assessment and IMF 2019).

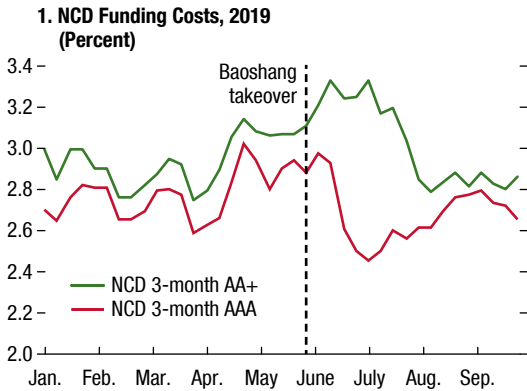
<sup>1</sup>For more information on banks' shadow banking exposure, funding, and risk transmission, see IMF (2016).

This box was prepared by Sally Chen.

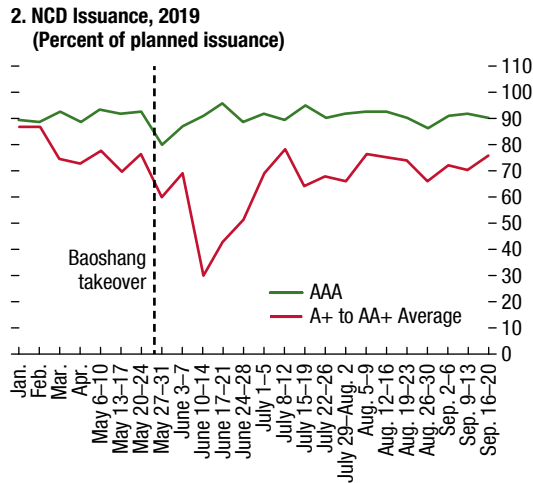
**Box 1.1 (continued)**

**Figure 1.1.1. Market Impact of the Recent Bank Interventions**

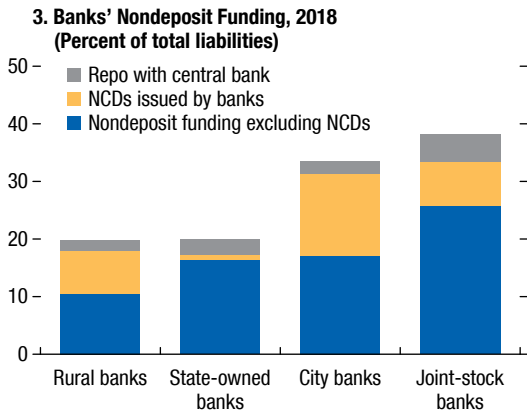
Interest rates on negotiable certificates of deposit (NCDs) diverged for weaker borrowers ...



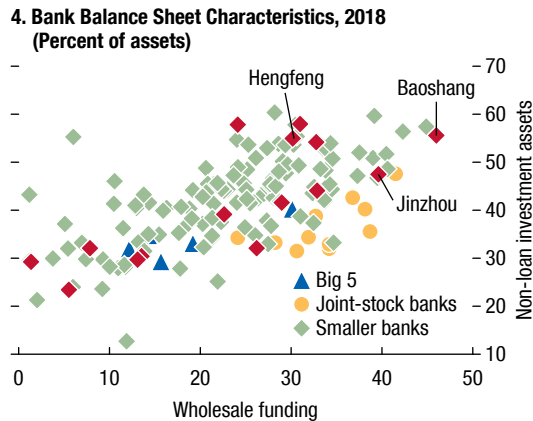
... whereas NCD issuance, particularly from weaker borrowers, fell significantly.



Small banks tend to rely on nondeposit funding ...



... and have large holdings of debt instruments.



Sources: Bloomberg Finance L.P.; SNL Financial; WIND Information Co.; and IMF staff calculations.  
 Note: Panel 4 shows 2018, or the latest available data for each bank given the multiple delays in annual report publication for some banks; red dots are for banks with a delay in the publication of their annual report. Repo = repurchase agreement.



### Box 1.2. Assessing the Impact of Changes in Financial Conditions and Vulnerabilities in the Growth-at-Risk Model for the United States

Financial conditions—measured via financial conditions indices—reflect the pricing of risk and so the cost of funding in the financial system. Easy financial conditions may be supportive of growth in the near term, but they may also encourage excessive risk-taking, thus putting growth at risk over the medium term. Using the growth-at-risk (GaR) framework, this box analyzes how the trade-off between near- and medium-term risks is influenced by the prevailing *level of vulnerabilities*.

In a GaR model, the distribution of future growth outcomes is a function of current economic and financial conditions. The GaR specification for the United States presented in this box differs from the global GaR specification used in the *Global Financial Stability Report* (see Figure 1.7) in two ways:

1. The *financial conditions* index used in this box includes only price of risk variables, whereas the standard *Global Financial Stability Report* specification also includes credit variables as a proxy for private nonfinancial sector vulnerabilities.
2. Information on *vulnerabilities* is included separately (in a linear manner) via a financial vulnerability index for the private nonfinancial sector (households and nonfinancial companies), constructed using the data underlying Figure 1.4.<sup>1</sup>

This box was prepared by Sheheryar Malik.

<sup>1</sup>The private nonfinancial financial vulnerability index used in the GaR specification is constructed as a credit-weighted aggregate of corporate and household financial vulnerability indices. The financial vulnerability index input into the GaR is first orthogonalized with respect to the financial conditions index.

This approach makes it possible to disentangle the effects of changes in both financial conditions and financial vulnerabilities and consider them separately in a comparative static analysis.

In what follows, two counterfactual scenarios are considered, focusing on the United States:

1. *Implications of the level of (private nonfinancial sector) vulnerabilities:* A baseline GaR specification incorporating financial conditions, as well as the financial vulnerability index for the private nonfinancial sector, suggests that medium-term risks are elevated compared to near-term risks (the baseline in Figure 1.2.1, panel 1). Assuming financial conditions remain unchanged, a one-standard-deviation increase in the level of vulnerabilities meaningfully increases medium-term downside risks to growth (blue line in Figure 1.2.1, panel 2).
2. *Impact of a tightening in financial conditions:* Estimates suggest that a one-standard-deviation tightening in financial conditions when vulnerabilities are high (yellow line in Figure 1.2.1, panel 3) increases risks at both time horizons relative to the baseline, with a relatively larger impact over the near term. However, when vulnerabilities are low (green line) and financial conditions are tightened, near-term risks to growth rise relative to the baseline, but medium-term risks are significantly reduced.

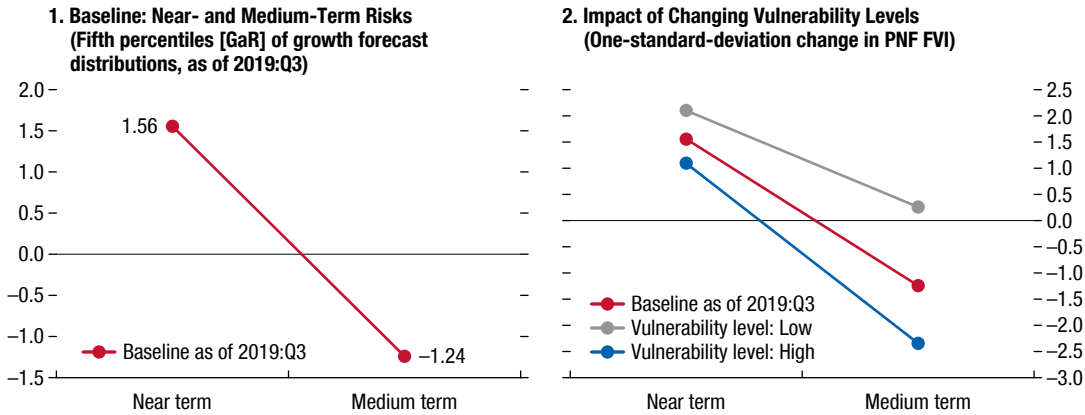
This analysis suggests that policymakers should adopt policies aimed at reducing vulnerabilities while these vulnerabilities are still low and financial conditions are relatively easy.

**Box 1.2 (continued)**

**Figure 1.2.1. Financial Conditions and Financial Vulnerabilities in the Growth-at-Risk Model for the United States: A Counterfactual Scenario Analysis**

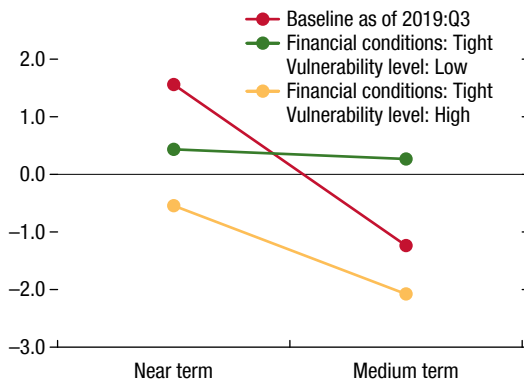
In the baseline specification, medium-term risks are higher than near-term risks.

Assuming financial conditions are unchanged, a higher level of vulnerabilities would raise medium-term risks more than near-term risks.



A tightening in financial conditions when private nonfinancial vulnerabilities are low results in increased risk in the near term, but helps mitigate medium-term risks. In contrast, when vulnerabilities are high, a tightening in financial conditions increases risks at both time horizons relative to the baseline.

**3. Impact of Tightening Financial Conditions (One-standard deviation increase in FCI; one-standard-deviation change in PNF FVI)**



Sources: Bank for International Settlements; Bloomberg Finance L.P.; Haver Analytics; and IMF staff calculations.

Note: In panels 1–3, the lines indicate pairs of near- and medium-term forecasts and do not denote a linear relationship between the two horizons. Private nonfinancial (PNF) financial vulnerability indices (FVIs) using the growth-at-risk (GaR) specification are constructed as a credit-weighted aggregate of corporate and household FVIs. FCI = financial conditions index.

### Box 1.3. The End of LIBOR: Managing a Challenging Transition

By 2014, many benchmark reference rates demonstrated critical deficiencies, such as scarcity of transactions and lack of transparency in setting rates, thus making their reform or replacement imperative.<sup>1</sup> Authorities have warned that market participants should end their reliance on LIBOR before official sector support for the benchmark is withdrawn at the end of 2021. A major international work program, coordinated by the Financial Stability Board (FSB) at the request of the G20, is underway to help guide this challenging transition process.<sup>2</sup>

Despite the impending discontinuation of LIBOR, it remains a central feature of the global financial system (see Table 1.3.1).<sup>3</sup> In the United States, US dollar LIBOR (USD LIBOR) is linked to about \$200 trillion in derivatives and other securities. In addition, there is another \$67 trillion of non-USD

LIBOR products, mostly linked to sterling and yen LIBOR. The continued reliance on LIBOR poses risks to financial stability, which can be fully addressed only through a timely transition to alternative risk-free reference rates.

Alternative rates have been selected and established in all major jurisdictions and there has been steady progress toward their adoption. There are encouraging signs in many areas. The open interest on the Chicago Mercantile Exchange (CME) for secured overnight financing rate (SOFR) futures has climbed to over \$1 trillion and the number of contracts has been rising fast (Figure 1.3.1, panel 1). The volume of new swaps referencing SONIA is now broadly equivalent to those in GBP LIBOR, while the market standard for new issuance of floating rate notes and securitizations in GBP has shifted to SONIA.

Despite the progress, much remains to be done. For example, in the United States and the United Kingdom, open interest in legacy rate futures contracts still dwarfs that in futures contracts based on alternative risk-free reference rates (Figure 1.3.1, panel 2). Meanwhile, issuance of new USD LIBOR-based products continues; 20 percent of US dollar LIBOR derivatives contracts and an even higher share of USD LIBOR cash products are scheduled to mature after 2021.

The continued reliance on LIBOR and the current pace of progress in adopting new benchmarks raise concerns about potential financial stability risks if the orderly transition is not completed by end-2021. While progress has been made to address the

This box was prepared by David Jones, Yingyuan Chen, Sanjay Hazarika, and John Caparusso.

<sup>1</sup>In the case of LIBOR, for example, data from its administrator shows that only a small minority of inputs to the rates produced are based directly on underlying market transactions. See ICE (2019), [https://www.theice.com/publicdocs/ICE\\_LIBOR\\_Weekly\\_Report\\_-\\_23\\_Sep\\_2019\\_-\\_27\\_Sep\\_2019.pdf](https://www.theice.com/publicdocs/ICE_LIBOR_Weekly_Report_-_23_Sep_2019_-_27_Sep_2019.pdf).

<sup>2</sup>FSB (2014), Reforming Major Interest Rate Benchmarks.

<sup>3</sup>LIBOR panel banks will no longer be bound by their voluntary agreement with the UK Financial Conduct Authority to issue daily submissions required to compute the rate after 2021. Other IBOR rates, such as those in Japan and Australia, are being reformed in accordance with International Organization of Securities Commissions principles and will continue to be generated.

**Table 1.3.1. Risk-Free Reference Rates Replacing LIBOR**

	LIBOR Market Size (trillions of US dollars)	Replacement Rate	Administrator	Replacement Rate Launched	Outstanding New RFR-linked Products (trillions of US dollars) <sup>1</sup>
<b>United States</b>	200	SOFR	US Federal Reserve	April 2018	2.2
<b>United Kingdom</b>	30	Reformed SONIA	Bank of England	April 2018	12.5
<b>Euro Area</b>	2	€STR	European Central Bank	October 2019	None
<b>Japan</b>	30	TONA	Bank of Japan	1997	0.65
<b>Switzerland</b>	5	SARON	SIX Swiss Exchange	2009	0.16

Sources: Bloomberg; International Swaps and Derivatives Association; Oliver Wyman; Securities Industry and Financial Markets Association.

Note: €STR = euro short-term rate; LIBOR = London Interbank Offered Rate; OIS = overnight indexed swap; RFR = risk-free rates; SARON = Swiss average rate overnight; SOFR = secured overnight financing rate; SONIA = sterling overnight index average; TONA = Tokyo overnight average rate.

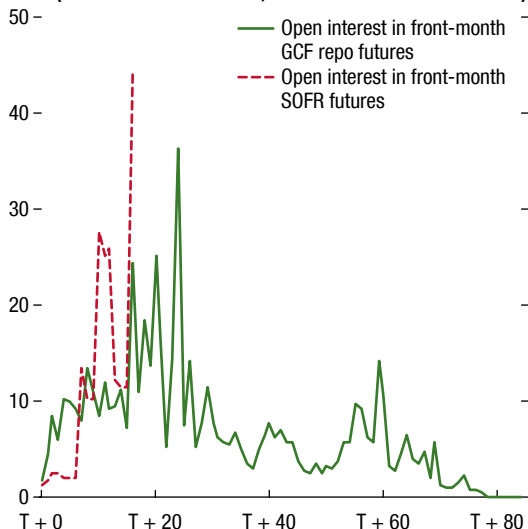
<sup>1</sup>Outstanding for US includes futures, swaps, and floating rate debt; UK includes futures, swaps, and floating rate debt; Japan and Switzerland include only OIS swaps.

**Box 1.3 (continued)**

**Figure 1.3.1. Market Products Linked to LIBOR and to New Risk-Free Reference Rates**

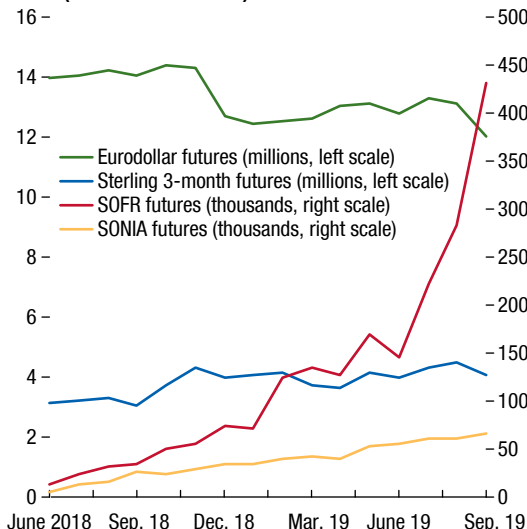
SOFR futures are gaining traction ...

**1. Open Interest of SOFR Futures and General Collateral Financing Repo Futures (Thousands of contracts; T + 0 = month of introduction)**



... but volumes of alternative risk-free rate futures are still small relative to LIBOR-based rates.

**2. Open Interest of LIBOR-based Futures and Alternative Reference Risk-Free Rates (Number of contracts)**



Sources: Bloomberg Finance L.P.; Federal Reserve Bank of New York; and IMF staff.

Note: GCF = general collateral financing; LIBOR = London Interbank Offered Rate; repo = repurchase agreement; SOFR = secured overnight financing rate; SONIA = sterling overnight index average.

remaining hurdles, work needs to accelerate in some areas to meet the envisaged timeline. Outstanding issues include:

1. *Legal uncertainty:* Derivatives contracts will need to be either renegotiated to refer to alternative risk-free reference rates or amended to include fallback provisions (where these do not already exist in an appropriate form) for a different rate to replace LIBOR should the latter become unavailable.<sup>4</sup> The FSB has been working with the International Swaps and Derivatives Association (ISDA) on amending its standard documentation to include robust fallback clauses for derivatives. This process is nearing

<sup>4</sup>In the United States, the Alternative Reference Rate Committee has provided guidance for fallback reference rate language for all new-issue LIBOR-linked cash products. Investors in these products purchase them knowing that the reference rate will change with the cessation of LIBOR and need to value the securities accordingly. Separately, some recommendations on fallbacks for cash products have been prepared as well.

its conclusion and has received broad support from market participants.<sup>5</sup> These fallbacks are expected to be available for adoption in Q1 2020, and, for example, the LCH Group has given advance notice of its intention to adopt the changes for all new and existing contracts.<sup>6</sup> However, the adoption of the amended protocol may not be universal before end-2021, especially for derivatives that are not centrally cleared.<sup>7</sup>

2. *Liquidity of markets in new reference rates:* LIBOR rates are typically produced daily at a variety of maturities, from overnight to one year. However, many risk-free reference rates are produced

<sup>5</sup>ISDA (2019a).

<sup>6</sup>LCH (2018), <https://www.lch.com/membership/ltd-membership/ltd-member-updates/lchs-position-respect-isdas-recommended-benchmark>.

<sup>7</sup>Centrally cleared derivatives will automatically adopt the amended ISDA protocol. For derivatives that are not centrally cleared, adoption is voluntary.

**Box 1.3 (continued)**

only for the overnight tenor.<sup>8</sup> This difference in the characteristics of the new reference rates will require markets to adapt to new ways of referencing interest rate benchmarks. This can be addressed in part by calculating term rates from derivatives on overnight risk-free reference rates, but the robustness of such rates will depend on sufficient liquidity in the underlying markets (Heitfeld and Park 2019). This underscores a chicken and egg problem in the transition: the limited depth and liquidity of derivative markets in some risk-free reference rates may be hampering the growth of linked cash products. This in turn may be slowing the development of risk-free reference rate derivatives. Authorities should actively encourage the development of trading products in longer maturities to eventually build out a longer yield curve.

3. *Replacing unsecured LIBOR rates with nearly risk-free reference rates:* Unlike LIBOR, alternative risk-free rates do not contain appreciable credit risk. In normal times, both types of rates would move together on average and typically be expected to closely track central bank interest rates.<sup>9</sup> However, during periods of sustained stress in funding markets, differences in the underlying dynamics of these markets may lead to a notable divergence in rates—as witnessed, for example, during the global financial crisis or, more recently, during episodes of strains in USD funding markets. For example, under stressed conditions, such divergence may pose challenges for instruments such as cross-currency swaps that reference multiple risk-free reference rates. Market participants will need to develop risk management tools to ensure that any new basis risks can be appropriately managed.
4. *Value transfer:* The replacement of LIBOR with new risk-free reference rates will likely affect the financial position of existing trades that mature after 2021. The scale of this impact depends on a variety of factors, including the rate adjustments

<sup>8</sup>In June 2019, the FSB's Official Sector Steering Group (OSSG) published a users' guide to overnight risk-free rates setting out how these can be used in cash market products. FSB (2019), <https://www.fsb.org/wp-content/uploads/P040619-1.pdf>.

<sup>9</sup>Through use of risk-free rates in the majority of financial products, many end-users will no longer be exposed to the risk of moves in credit premiums that do not relate to their own credit standing.

needed to account for the changes in credit risk and in terms, as well as the degree to which market participants take action to mitigate these risks. The International Swaps and Derivatives Association (ISDA) has recently selected the “compound in arrears” approach for term adjustment and the historical mean/median approach for credit risk adjustment in derivatives contracts that reference LIBOR in USD or other currencies. Relative to alternative adjustment methods that had been considered, this approach is expected to have only a modest valuation impact on derivative positions.<sup>10</sup> ISDA is currently consulting on final parameterization of this approach and these fallbacks are expected to be available for adoption in 2020:Q1.

A successful transition to alternative benchmarks requires the following:

*Transition planning, coordination, and raising awareness:* Continued international coordination and collaboration between authorities and market participants is needed to accelerate the pace of adoption of the new benchmark rates. Regulators and supervisors should determine the extent of reliance on LIBOR within their financial systems and engage with market participants to ensure risks are mitigated effectively; LIBOR remains deeply embedded throughout the global financial system, including in many emerging markets. International standard setting bodies should examine the implications of the discontinuation of LIBOR for their existing frameworks.<sup>11</sup>

*Reducing legal uncertainties:* Supervisors should encourage market participants to net down legacy derivative and swap positions and to transition legacy derivatives to new reference rates. Authorities should also encourage adoption of contractual fallback provisions (such as the amendments that will be offered in the ISDA protocols) to mitigate problems

<sup>10</sup>ISDA (2019b), Consultation on Final Parameters for the Spread and Term Adjustments in Derivatives Fallbacks for Key IBORs.

<sup>11</sup>For example, the International Accounting Standards Board (IASB) is proposing changes to its rules on hedge accounting to provide relief to firms affected by the benchmark reform. The European Insurance and Occupational Pensions Authority (EIOPA) has also added the monitoring of LIBOR transition to their 2019 priorities.

**Box 1.3 (continued)**

emerging from the discontinuation of LIBOR-based reference rates. Such fallbacks are not intended as a substitute for the conversion of existing contracts before LIBOR becomes unavailable but are an important backstop to mitigate financial stability risks.

*Improving liquidity of new risk-free reference rates:*  
As market participants transition to instruments based on risk-free reference rates, authorities should

encourage liquidity in these new instruments, for instance, by issuing obligations linked to these rates and also by encouraging the development of trading products in longer maturities by market participants.<sup>12</sup>

<sup>12</sup>Institutions like Freddie Mac, Fannie Mae, and the World Bank have to date issued over \$47 billion in floating rate notes linked to SOFR.

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