FOR INFORMATION

FO/DIS/20/115

May 21, 2020

To: Members of the Executive Board

From: The Secretary

Subject: **Revised Global Financial Stability Report—Chapters 2, 3 and 4—April 2020**

Board Action:	Executive Directors' **information**
Publication:	It would be appreciated if Directors could ensure that the attached final press version of Chapters 2, 3, and 4 of the *Global Financial Stability Report* remains internal until the document is released at **9:00 a.m. on Friday, May 22, 2020.**
Questions:	Mr. Natalucci, MCM (ext. 37108) Ms. Ilyina, MCM (ext. 35351) Mr. Kerry, MCM (ext. 37204) Mr. Papageorgiou, MCM (ext. 34261) Mr. Raddatz Kiefer, MCM (ext. 36636)

CHAPTER 2

RISKY CREDIT MARKETS

INTERCONNECTING THE DOTS

Chapter 2 at a Glance

- High-yield bond, leveraged loan, and private debt markets have grown significantly over the past decade and have become more complex.
- Key vulnerabilities include weaker credit quality of borrowers, looser underwriting standards, liquidity risks at investment funds, and increased interconnectedness.
- On the positive side, use of financial leverage by investors and direct exposures of banks have declined.
- In a severe adverse scenario, total losses at nonbank financial institutions could be substantial, while risk to the banking sector appears to be lower.

Risky corporate credit markets have expanded rapidly since the global financial crisis. The role of nonbank financial institutions has increased, and the system has become more complex and opaque. This chapter maps out the financial ecosystem of these markets and identifies potential vulnerabilities, which include weaker credit quality of borrowers, looser underwriting standards, liquidity risks at investment funds, and increased interconnectedness. On the positive side, the use of financial leverage by investors and direct exposures of banks—which were crucial amplifiers during the global financial crisis—have declined. Run risks have lessened in some segments because of a prevalence of long-term locked-in capital in the private debt and collateralized loan obligation (CLO) markets. In an illustrative severe adverse scenario, losses on risky credit exposures at banks are estimated to be manageable, in aggregate, although losses at a few large banks could be substantial. However, losses at nonbank financial institutions could be high. Given the now-limited role played by banks, this could impair credit provision in these markets and make a recession more severe. The coronavirus (COVID-19) crisis, which has resulted in price declines in risky credit markets of about two-thirds of the severity of the global financial crisis through late March (before reversing a portion of these declines), could further expose the vulnerabilities highlighted in this chapter. Policymakers should now act decisively to contain the economic fallout of COVID-19 and support the flow of credit to firms. Once the crisis is over, they should assess the sources of market dislocations and tackle the vulnerabilities that have been unmasked by this episode.

Rapid Growth of Risky Credit Has Raised Red Flags

Corporate debt has been rising steadily over the past decade, leading to a weakening of corporate credit quality (see the October 2019 *Global Financial Stability Report* [GFSR]). This chapter, which focuses on the risky segments of credit markets (high-yield bonds, leveraged loans,[1] and private debt) aims to map out the financial ecosystem (the investor base and linkages between banks and nonbank financial institutions) and identify key vulnerabilities. It also explores key risk transmission channels and the extent of potential credit and mark-to-market losses that financial institutions could be exposed to under a severe adverse scenario.

As discussed in Chapter 1, market conditions in the risky credit markets have deteriorated sharply since the COVID-19 outbreak. By late March, US and Euro-

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[1]Leveraged loans refer to speculative-grade loans based on their credit rating or credit quality ratios, such as net-debt-to-earnings, debt-to-assets, or debt-to-equity ratio. Leveraged loans are predominately syndicated—that is, several (a syndicate of) lenders participate in the issuance of a loan.

pean markets for high-yield bonds and leveraged loans had experienced market declines of nearly two-thirds of the falls seen during the global financial crisis, as investors grew concerned about the deterioration of the economic outlook. Liquidity deteriorated significantly, with exceptionally high bid-ask spreads—a development that likely amplified asset price moves. Meanwhile, reflecting expectations of a worsening of firms' fundamentals, ratings agencies increased their forecasts of speculative-grade defaults to recessionary levels. Since late March, however, credit spreads have retraced a portion of their earlier widening and bid-ask spreads have largely normalized, owing to rapid and bold policy responses by major central banks and governments (see "Policy Priorities" section in Chapter 1). Nonetheless, earnings forecasts have continued to decline, and credit rating downgrades have gained momentum in risky credit markets.

Risky credit markets have grown rapidly over the past decade, supported by investor search for yield and favorable borrowing terms for firms. This rapid expansion has attracted the attention of regulators and market observers. Furthermore, nonbank financial institutions have become increasingly important players in credit markets in advanced economies, though their behavior over the full credit cycle has not been tested yet. Recent studies by international organizations and national supervisors have focused on the size, riskiness, and investor base in some of these markets.[2]

One area of risky credit markets—leveraged loans—has grown particularly rapidly since the global financial crisis. Issuance of floating-rate institutional leveraged loans moderated in 2019 due to reduced investor demand for floating-rate instruments in an environment of declining interest rates. After a brief surge early this year, issuance of leveraged loans slowed sharply following the COVID-19 outbreak (Figure 2.1, panel 1). High-yield bond issuance has also fallen from the high levels early this year during the COVID-19 outbreak, but it appears to have recovered somewhat in April.

On net, global leveraged loans outstanding grew through the end of 2019 (especially in the United States), reaching $5 trillion globally, of which $4 trillion was in advanced economies (Figure 2.1, panel 2). In addition, the formation of new CLOs remained robust before the most recent COVID-19–related slowdown, partly ameliorating the decline in demand from interest-rate-sensitive investors (Figure 2.1, panel 3).[3] CLOs outstanding more than doubled since 2010 (Figure 2.1, panel 4), driven by activity in the United States. Reportedly, investors have been attracted by the benefits of risk diversification, more resilient structures since the global financial crisis, funding stability, and transparency to investors.

The high-yield bond market had also grown significantly by the end of 2019, climbing to $2.5 trillion globally, of which $2 trillion was in advanced economies. Growth was faster in Europe than in North America in recent years (Figure 2.1, panel 5).

Finally, the private debt market also boomed, reaching nearly $1 trillion (Figure 2.1, panel 6).[4] This growth in private debt is part of a secular trend away from public markets, which first started in equity markets. In addition, the search for yield in the low-interest-rate environment by investors that have long investment horizons and are not subject to mark-to-market requirements—and may therefore be willing to give up liquidity to reach a higher yield target—has reinforced this trend.

The Credit Ecosystem Has Become More Complex

Banks' direct exposures to credit risk have declined as banks have shifted from an originate-to-retain to an originate-to-distribute business model. A broadening of the investor base beyond banks over the past few decades has contributed to the distribution of exposures to a wider set of creditors with varying risk profiles. This has likely reduced some risks to the banking system, but it has also increased the complexity and opacity of credit markets, possibly introducing new risks and shock transmission channels.

Mutual funds and exchange-traded funds (ETFs) play a key role in the US high-yield bond market, while CLOs and banks account for a large share of leveraged loan holdings globally (Figure 2.2, panels 1 and 2). In the US market, banks are exposed to CLOs primarily through AAA tranches. Asset managers and

[2]See the April 2018, April 2019, and October 2019 GFSR; Bank of England 2019; ECB 2019; FSB 2019; IOSCO 2018; and IOSCO 2020.

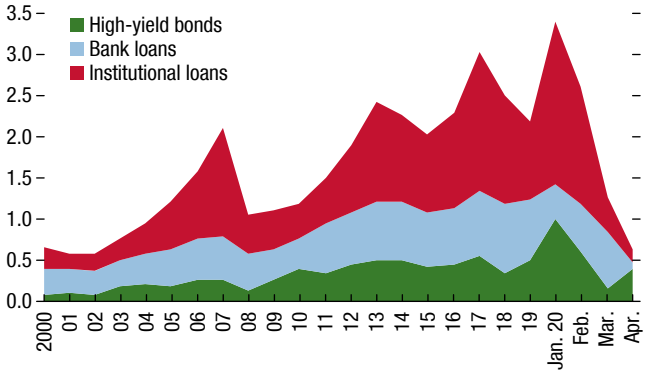
[3]A collateralized loan obligation is a structured finance product collateralized predominantly by broadly syndicated leveraged loans.

[4]Private debt refers to financing that is directly negotiated, typically between a nonbank lender and a borrower without the involvement of a syndicate bank.

Figure 2.1. Market Developments: Issuance and Size

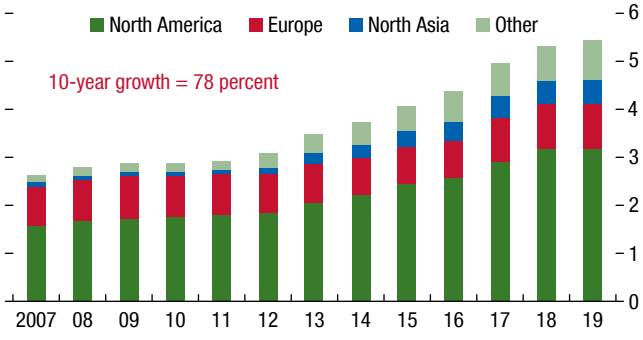
Issuance of risky credit was strong before the COVID-19 outbreak, but has slowed sharply since late February.

1. Global Gross Issuance of High-Yield Bonds and Leveraged Loans (Trillions of US dollars)



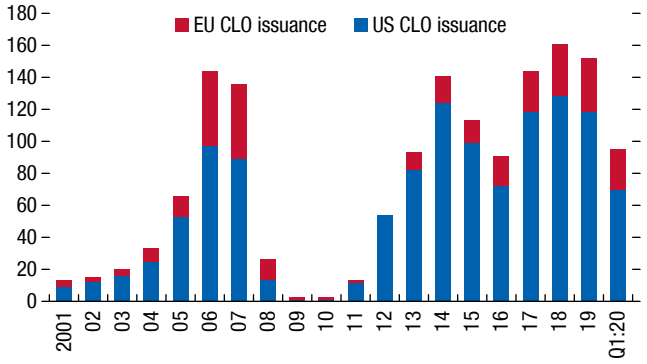
On net, the leveraged loan market grew through the end of 2019 to $5 trillion globally, $4 trillion of which was in advanced economies.

2. Global Leveraged Loans Outstanding (Trillions of US dollars)



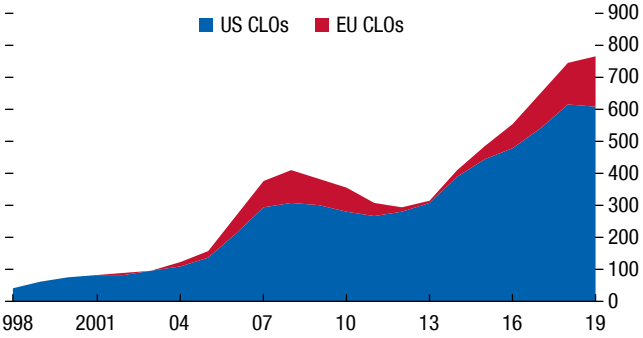
Issuance of CLOs remained robust before the COVID-19 outbreak, but declined sharply thereafter.

3. US and EU New Issue CLO Volume (Billions of US dollars)



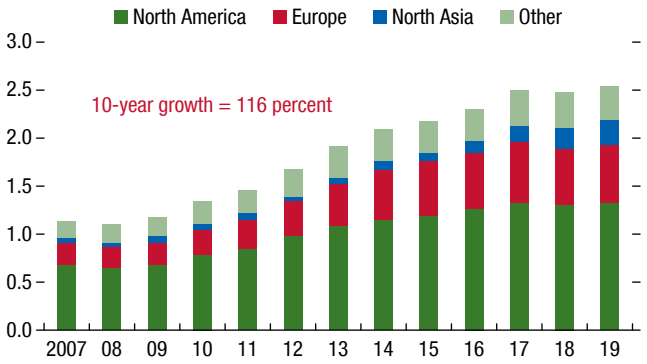
CLO volume surged through 2019, providing risk diversification and credit protection for investors in the leveraged loan market.

4. US and EU CLOs Outstanding (Billions of US dollars)



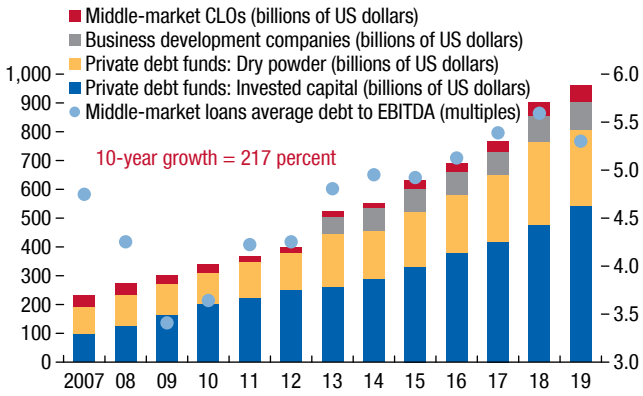
The high-yield bond market had climbed to $2.5 trillion globally by the end of 2019, benefiting from falling interest rates.

5. Global High-Yield Bonds Outstanding (Trillions of US dollars)



The private debt market also boomed on the back of demand from institutional investors seeking long-term investments.

6. Private Credit Assets under Management and Leverage (Billions of US dollars, left scale; multiples, right scale)

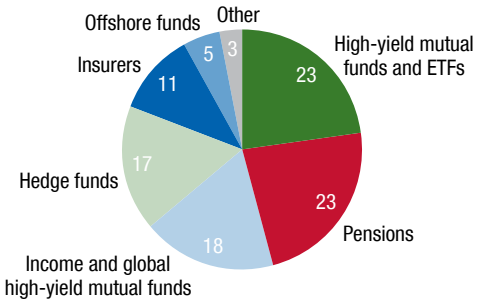


Sources: Bank of America Merrill Lynch; Dealogic; S&P Leveraged Commentary and Data; Securities Industry and Financial Markets Association; Preqin; Association for Financial Markets in Europe; and IMF staff calculations.
Note: In panel 1, monthly data are annualized. In panel 3, the estimate for 2020 is annualized Q1 data. In panels 2 and 5, Europe refers to the European Union and the United Kingdom; North America refers to Canada and the United States; and North Asia refers to China, Japan, and South Korea. In panel 6, dry powder refers to capital that has been committed but not yet invested. Middle market refers to firms with earnings below $50 million. CLOs = collateralized loan obligations; EBITDA = earnings before interest, taxes, depreciation, and amortization; EU = European Union.

Figure 2.2. Investors in Risky Credit Markets

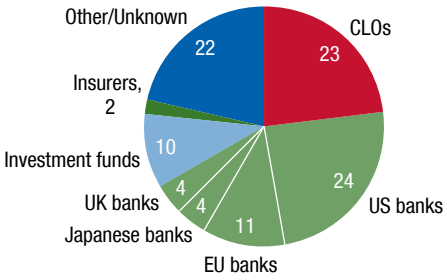
High-yield dedicated and multisector investment funds hold almost half of the high-yield bond market ...

1. US High-Yield Bond Investor Base (Percent, as of 2019)



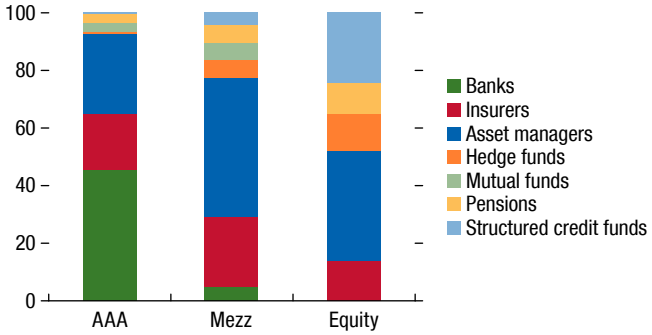
... while, globally, banks are the largest holders of leveraged loans.

2. Global Holders of Leveraged Loans (Percent, as of 2018)



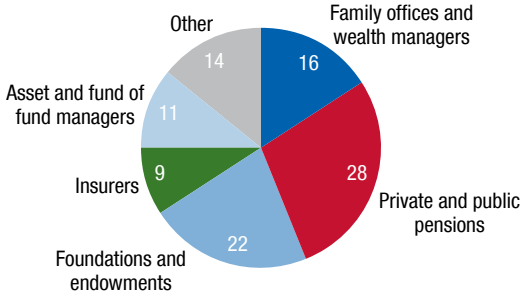
Asset managers and hedge funds are most exposed to riskier tranches of CLOs.

3. US CLO Investor Base (Percent, as of 2019)



Pension funds are the largest investors in private debt vehicles.

4. Institutional Investors in US Private Debt Funds, by Type (Percent, as of 2019)



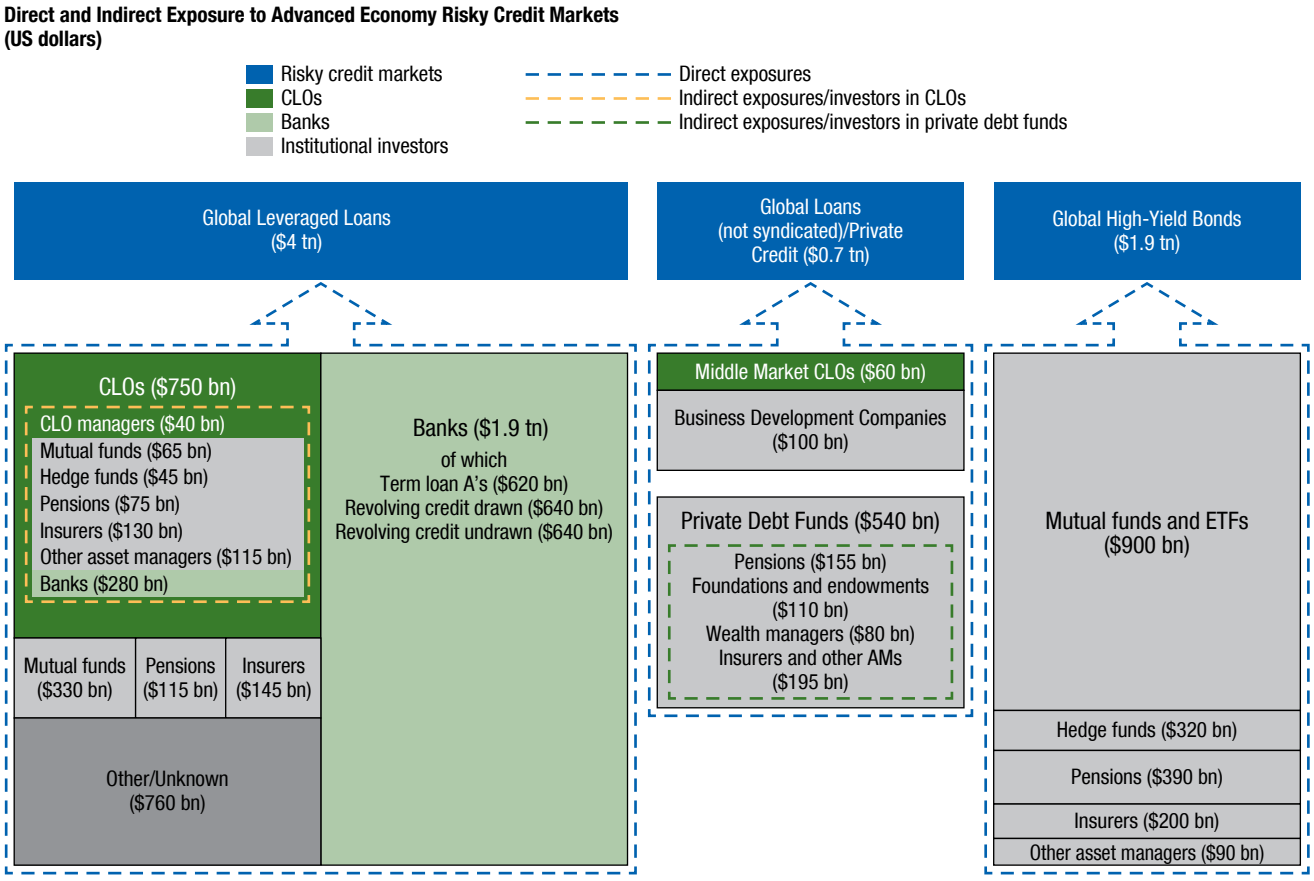
Sources: Barclays Capital; Citigroup; Financial Stability Board; Moody's; Preqin; S&P Leveraged Commentary and Data; and IMF staff calculations.
Note: For panel 2, the Other/Unknown category is based on estimates from the Financial Stability Board and includes other financial and nonfinancial US organizations based on Treasury International Capital data. CLO = collateralized loan obligation; ETFs = exchange-traded funds; EU = European Union; Mezz = mezzanine.

insurance companies, by contrast, invest across the capital structure. Investors in the CLO equity and mezzanine debt tranches are a more diverse group, also comprising hedge funds and other structured credit funds (Figure 2.2, panel 3). In the US private debt market, growth has been partly driven by institutional investors with long-term locked-in capital who are not required to mark their positions to current market prices (Figure 2.2, panel 4). This has reduced liquidity risks, albeit at the expense of increasing the opacity of the market.

Figure 2.3 provides a visualization of the global ecosystem of risky credit markets:

- *Banks remain vital to the functioning of risky credit markets*, where they provide senior secured loans and credit lines. Before the market stress surrounding the COVID-19 outbreak, half of bank credit lines were estimated to be undrawn, but companies have more recently been looking to shore up cash positions by calling on the capacity of credit lines (see Chapter 1). The undrawn credit lines may help absorb some of the refinancing pressures in a market downturn (if covenants are not breached) but can also increase credit and liquidity risk at banks. Banks also have indirect exposures through CLOs and various forms of financing and leverage.
- *CLOs hold about one-quarter of global leveraged loans and are the largest investor in the institutional leveraged loan market*, accounting for more than 60 percent of institutional loans outstanding. CLOs benefit from stable funding sources in the form of long-term locked-in capital, so run risk related to

Figure 2.3. Ecosystem of Global Risky Credit Markets



Sources: Bloomberg Finance L.P.; Financial Stability Board; S&P Leveraged Commentary and Data; and IMF staff calculations.
Note: The estimates for the global high-yield bond investors is based on the percentage allocated for the US high-yield bond investor base in Figure 2.2, panel 1, and applied to global high-yield bonds outstanding. The estimate for private debt funds excludes uninvested capital, also known as dry powder. Numbers are rounded to $5 billion. AMs = asset managers; bn = billion; CLOs = collateralized loan obligations; ETFs = exchange-traded funds; tn = trillion.

maturity mismatches is limited. They also provide steady demand for loans, particularly during the reinvestment period, when CLO managers can actively manage their portfolios. CLOs generally face pressure when the share of assets rated CCC or below increases, or when they are failing key overcollateralization tests put in place to protect senior noteholders.[5]

- *Mutual funds and ETFs are important players in global risky credit markets.* Investment funds and ETFs account for about half of the demand for high-yield bonds; these funds have also supported strong growth in the leveraged loan market. Open-ended investment funds may face liquidity mismatches, often offering investors daily redemption, despite the relatively illiquid nature of the underlying instruments.
- *Main nonbank lenders in private debt markets are private credit funds, business development companies, and middle-market CLOs.* Unlike banks, these vehicles typically do not carry maturity or asset-liability mismatches and appear to employ limited financial leverage. Such leverage is provided by banks in the form of credit lines and capital call lines.[6] Private

[5]An overcollateralization test measures the ratio of the aggregate principal value of pooled assets to the outstanding debt tranches that comprise the CLO capital structure. A typical overcollateralization test ranges by tranche, and thresholds are usually between 5 percent and 20 percent.

[6]A capital call line is a line of credit typically provided by a bank to a private equity firm. It can be used to enhance debt fund returns or provide bridge financing for limited partnership capital.

credit funds also have large amounts of capital that have been committed but not yet invested—so-called dry powder—that can be sourced and put to work in a downturn.
- Estimates of indirect exposures suggest that international banks, including large banks in advanced Asia, hold about one-third of global CLOs. Insurance companies have become the second-largest CLO buyer. For private debt funds, the primary source of capital appears to come from institutional investors, such as global private and public pension funds, foundations, and endowments.

Vulnerabilities in Risky Credit Markets Have Grown

The main vulnerabilities in global risky credit markets are highlighted in Table 2.1, which is based on the GFSR indicator-based framework (see Online Annex 1.1 of the April 2019 GFSR)[7] and discussions with market participants. These vulnerabilities include weaker credit quality of borrowers, looser underwriting standards, eroded investor protections, liquidity risk in investment funds, and higher concentration of lenders within a lender type, as well as a high degree of interconnectedness in the ecosystem. The complexity and opacity of credit markets have also increased, particularly in the private debt market. On the positive side, financial leverage and direct exposures of banks—which were crucial amplifiers during the global financial crisis—have declined, and run risk has diminished because of a prevalence of long-term locked-in capital in the CLO and private debt markets. These vulnerabilities are explored by type in the discussion that follows.

Increased Borrower Leverage

The combination of increased borrower leverage and weaker earnings has uniquely exposed risky credit markets to the COVID-19 shock (Figure 2.4, panel 1). The share of highly leveraged deals in the United States has risen more rapidly for deals financed by nonbank financial institutions than for those with loans held by banks. Leverage is also higher for smaller companies than for larger firms. Finally, deals sponsored by private equity firms—typically to fund leveraged buyouts or mergers and acquisitions—have increased considerably faster in terms of leverage multiples.

In addition, leverage in the US loan market appears to be underestimated because of significant earnings adjustments (Figure 2.4, panel 2) and inflated goodwill (see the October 2019 GFSR). This issue is widely recognized by market participants, who are said to perceive potential repricing associated with unrealized earnings addbacks as a key risk. Moreover, despite very low interest rates, interest coverage ratios have continued to decline steadily (Figure 2.4, panel 3), particularly for smaller, middle-market firms (firms with earnings below $50 million). Finally, underwriting standards and investor protections have deteriorated in recent years in both the high-yield and leveraged loan market, as summarized by weaker covenants and thinner loss-absorbing buffers of loans (Figure 2.4, panels 4 and 5). As a result, recovery values for leveraged loans in the event of default may be lower in this economic downturn. More recently, since the COVID-19 outbreak, the primary market for risky credit has reportedly become more disciplined, with higher spreads, more protections, and less leverage, as lenders have apparently applied more conservative underwriting standards.

Decreased Financial Leverage

The deterioration in ratings quality in leveraged loan markets, including the expansion of B-rated credit, has been more pronounced during the current long credit cycle (Figure 2.5, panel 1). As a result, risk ratings for CLOs have also deteriorated (Figure 2.5, panel 2). However, compared with the CLO structures that prevailed before the global financial crisis, current CLOs have less "embedded" leverage—that is, they have a higher share of equity and mezzanine debt (rated A and below) as a cushion intended to protect AAA tranche holders (Figure 2.5, panel 3). This implies that investors in AAA tranches are less likely to suffer credit losses, even in a severe market downturn, as was the case during the global financial crisis. By contrast, equity and mezzanine debt investors may experience credit losses, as shown in a simulation based on a typical CLO (Figure 2.5, panel 4).

During the global financial crisis, one of the key amplifiers was financial leverage—that is, the leveraging-up of risk positions through the use of derivatives, repurchase agreements, and bank lines of

[7]All annexes are available at www.imf.org/en/Publications/GFSR.

Table 2.1. Key Vulnerabilities in Risky Credit Markets

	Vulnerability Type							
	Size	**Valuations**	**Borrower's Leverage**	**Embedded and Financial Leverage**	**Liquidity, Maturity, FX Mismatches**	**Concentration**	**Interconnectedness**	**Complexity and Opacity**
High-Yield Bond Market	$1.9 trillion	High valuations before the COVID-19 outbreak	• High firm leverage • EBITDA add-backs • Large share of B credit • LBO activity	Active CDX market	Fund outflows can be sizable	Top borrowers represent a sizable share of the market	• Borrowers in both HY and LL markets • Correlations of HY and LL credit • Crossover funds' investments in both HY and LL	Low transparency of the riskiness of investors' exposures
Leveraged Loan Market	$4.0 trillion			• Repo, TRS, CLO warehouse lines have declined • Bank credit lines can be quickly repriced		Top lenders account for a large share of the market		
Private Debt Market	$0.7 trillion	• Limited data on prices • High return targets		Capital call lines of credit	Large locked-in capital and HTM positions		Lenders in both LL and PD markets	Low visibility of borrowers, investors, and transactions

Sources: Bloomberg Finance L.P.; Dealogic; and IMF staff calculations.
Note: "Complexity and Opacity" refers to a lack of data on prices, transactions, and investor positions in some areas of risky credit markets. CDS = credit default swap; CDX = credit default swap index; CLOs = collateralized loan obligations; EBITDA = earnings before interest, taxes, depreciation, and amortization; FX = foreign exchange; HTM = held to maturity; HY = high-yield; LBO = leveraged buyout; LL = leveraged loan; PD = private debt; repo = repurchase; TRS = total return swap.

credit. Since then, the use of financial leverage appears to have declined significantly in the United States. For example, the use of repurchase transactions to fund CLO AAA tranches is reportedly limited. Similarly, investors do not appear to widely employ total-return swaps to gain leveraged exposure to the loan market. Banks also appear to be more conservative when it comes to the amount of underwritten risk in new loans they will hold—so-called pipeline risk. Finally, CLO warehouse lines (lines of credit to finance new CLO formation) now often assign the portfolio manager or third parties to take first-loss risks, not the banks (Figure 2.5, panel 5).

Overall, banks appear to have cut some of their indirect exposure through financial leverage, likely reducing the potential for an amplification of price moves during periods of stress. However, interconnectedness between banks and other financial institutions may be increasing. For example, bank lending to nonbank financial institutions has nearly doubled since 2013, reaching $1.4 trillion in the United States (Figure 2.5, panel 6).

Refinancing and Liquidity Risks

While refinancing risks for high-yield bonds and leveraged loans seem manageable in the short term, their maturity profile appears more challenging over the medium term, with a record amount of loans maturing in five years (Figure 2.6, panel 1). In addition, maturing debt is concentrated in lower-rated loans (Figure 2.6, panel 2), raising the specter of possible downgrades and defaults in this economic downturn.

As fixed-income funds with relatively illiquid holdings have grown significantly over the past decade, large withdrawals may contribute to asset price moves and deteriorating liquidity conditions, especially for funds not managing liquidity risk properly. In addition, fund outflows appear to have become more volatile (Figure 2.6, panel 3). For example, US open-ended high-yield bond and leveraged loan funds experienced $42 billion in outflows in the fourth quarter of 2018, when financial conditions tightened markedly. While these funds were able to meet redemptions without severe dislocations to market functioning, reflecting varying strategies of liquidity management across funds and sufficient liquidity buffers in aggregate, the fourth quarter of 2018 stress episode was short-lived and took place against a backdrop of continued growth (Figure 2.6, panel 4).[8]

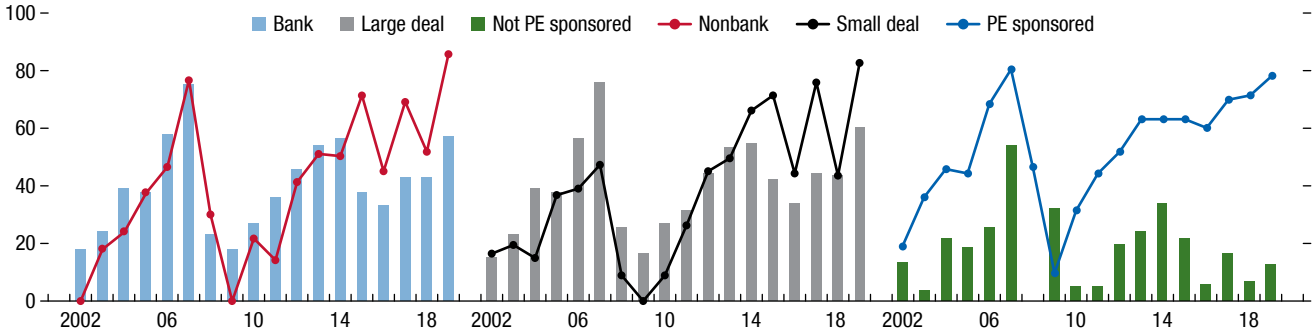
So far, between late February and the end of March 2020, US open-ended high-yield bond and leveraged loan funds have experienced $34 billion in outflows. While more recently high-yield bond funds have seen

[8]According to Emerging Portfolio Fund Research data, cumulative fourth-quarter 2018 outflows from US high-yield bond funds accounted for 7 percent of assets under management, while outflows from US loan funds totaled 12 percent of assets under management.

Figure 2.4. Balance Sheet Leverage and Credit Risk

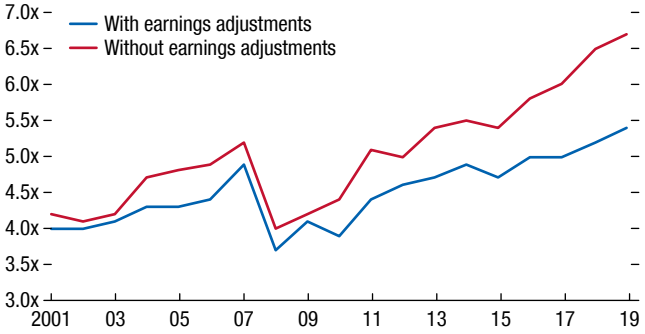
Leverage has risen in the loan market, primarily for deals financed by nonbank financial institutions, smaller deals, and private equity-sponsored transactions.

1. Leveraged Loan Deals with Leverage >5 (Percent)



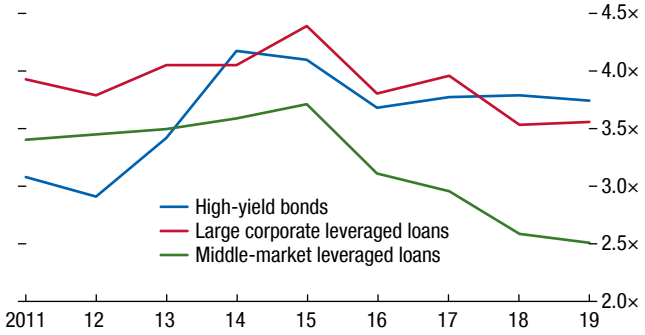
Leverage in the loan market may be understated because of significant earnings adjustments ...

2. Total Debt-to-EBITDA Ratio for Newly Issued US Leveraged Loans (Ratio)



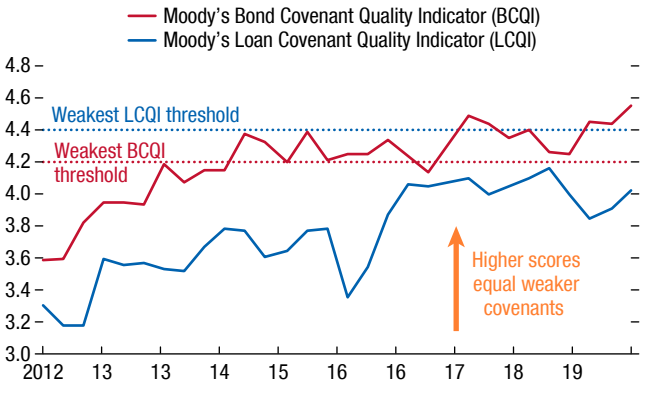
... while debt-service ability has steadily weakened since 2015, particularly in middle-market firms.

3. Interest Coverage Ratios for Newly Issued US Leveraged Loans (EBITDA-to-interest-expense ratio)

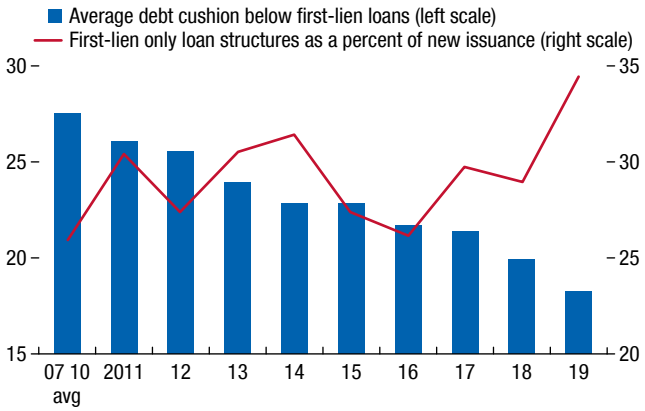


In this economic downturn, recovery values may be lower because of weaker covenants and reduced loss absorption capacity in the leveraged loan market.

4. North American Bond and Loan Covenant Quality Indices (Index level)



5. New Issue Leveraged Loan Debt Cushions and First Lien Only Structures (Percent of new issuance)

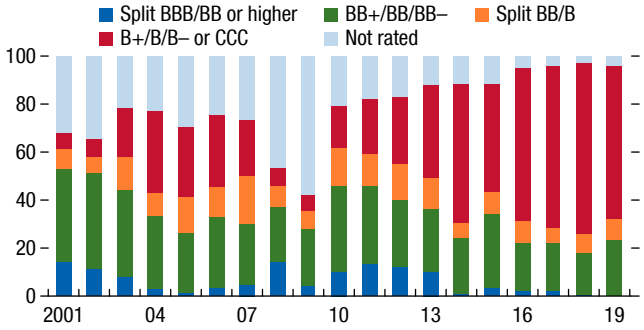


Sources: Bank of America Merrill Lynch; Moody's; S&P Leveraged Commentary and Data; and IMF staff calculations.
Note: In panel 2, the EBITDA for US leveraged loans is adjusted by adding back projected cost savings from restructuring, synergies, transaction costs, management fees, and nonrecurring operating expenses to compute the average total debt-to-EBITDA for loan deals without EBITDA addbacks. In panel 4, North America refers to Canada and the United States. The weakest threshold for the BCQI and LCQI refers to the level at which a CQI score would enter the fifth (CQ5) or weakest range of the index score that ranges between 0 and 5. The covenant quality score reflects the overall level of covenant protection based on a five-level scale of covenant quality ranging from CQ1 (strong) to CQ5 (weakest). Avg = average; EBITDA = earnings before interest, taxes, depreciation, and amortization; PE = private equity.

Figure 2.5. Embedded and Financial Leverage

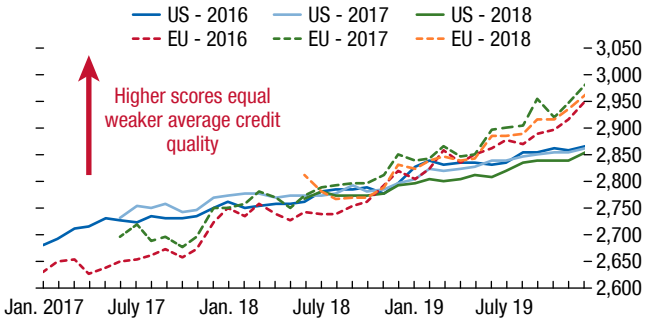
A growing concentration of lower-rated credit has raised the potential impact of rating downgrades ...

1. US Leveraged Loan Issuance, by Rating (Percent)



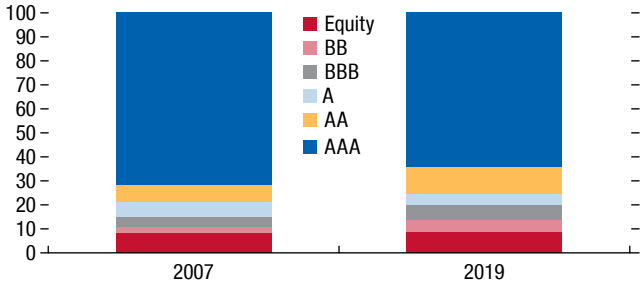
... and has already translated into a deterioration in risk ratings for CLOs.

2. Median Weighted Average Risk Factor for Outstanding CLO Deals, by Vintage (Index value)



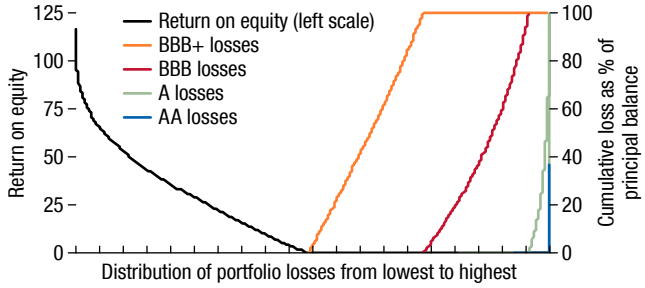
New CLOs have a larger equity cushion than precrisis CLOs ...

3. Average US CLO Liabilities, by Type and Credit Rating (Percent)



... but it can erode quickly, bringing in losses to equity holders and even investors holding lower-rated debt.

4. Returns on CLO Equity and Debt Tranches (Percent)



Financial leverage appears to have declined significantly since the global financial crisis ...

5. Estimated Lines of Credit and Derivatives in US Leveraged Loan Markets

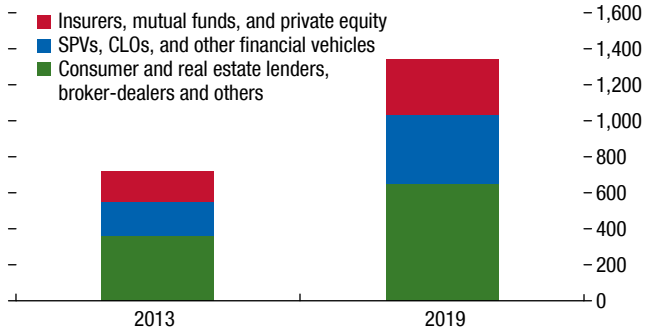
Loan Pipeline or Bridge Risk Is Lower		Risk Management Has Improved for CLO Warehouses	
Total Loans and Bonds		**CLO Warehouses**	
2007	$330 billion	2007	$40–50 billion
Today	~$50 billion	Today	$15 billion

Less Investor Leverage in the Loan Market

Total Return Swap Lines	Total	Leverage
2007	$250 billion	8–10×
Today	~<$75 billion	~3–4×

... but banks have increased their exposures to nonbank lenders.

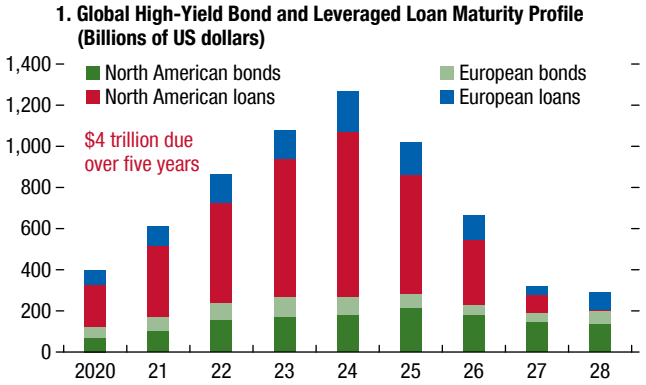
6. US Large Bank Lending to Nonbank Financial Firms, Committed Amounts (Billions of US dollars)



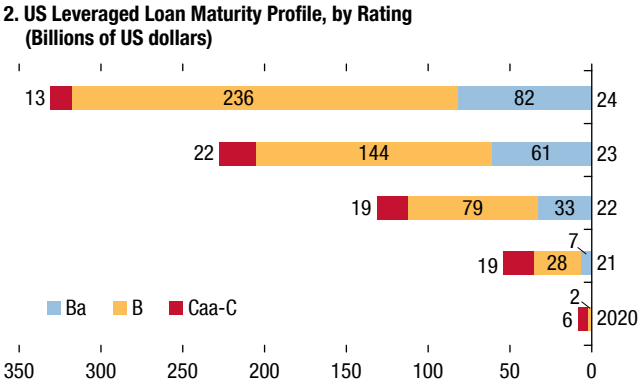
Sources: Barclays Capital; Citigroup; Federal Reserve; JPMorgan Chase & Co; Moody's; S&P Leveraged Commentary and Data; and IMF staff calculations.
Note: For panel 2, the weighted average risk factor (WARF) is the weighted average of the ratings for each loan in the portfolio, where a higher WARF score reflects a weaker weighted average credit strength. For panel 4, the estimation is based on a Monte Carlo simulation of a representative CLO. For individual loans in the portfolio, their expected default rate is dispersed around the expected default rate associated with each credit rating. The Monte Carlo simulation is run 10,000 times assuming varying levels of such dispersion. The portfolio consists of 100 senior secured first lien loans, with an adjusted weighted average life of 4.894 years, a weighted average rating of B, and an expected portfolio default rate of 15.9 percent. On the liability side, the CLO has an equity tranche equivalent to 11.8 percent of liabilities. The liability structure further consists of: A–1 notes (rated AAA and par amount equal to 60.5 percent of liabilities); A–2 notes (rated AA and par amount equal to 11.5 percent of liabilities); a B tranche (rated A and par amount equal to 6.4 percent of liabilities); a C tranche (rated BBB and par amount equal to 6.4 percent of liabilities); and a D tranche (rated BB and par amount equal to 3.4 percent of liabilities). Yields on loans and CLO tranches are derived from JPMorgan market rates. Probabilities of default and assumed recovery values are from S&P historical values. The Monte Carlo simulation is run using S&P's Global CDO Evaluator v 8.1 and employing default settings. In panel 5, bridge risk refers to short-term financing provided by banks to leveraged loan issuers that could be at risk for repayment if investor appetite, liquidity, or market demand significantly declines during the period of temporary financing. For panel 5, numbers are based on estimates provided by JPMorgan Chase & Co. CLOs = collateralized loan obligations; EU = European Union; SPVs = special purpose vehicles.

Figure 2.6. Maturity and Liquidity Mismatches

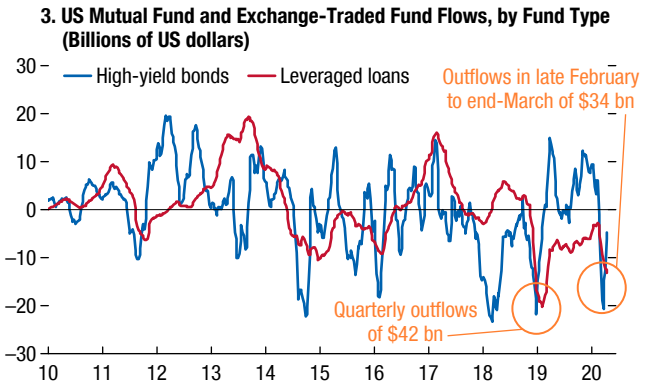
A substantial amount of high-yield bonds and leveraged loans will mature over the next five years ...



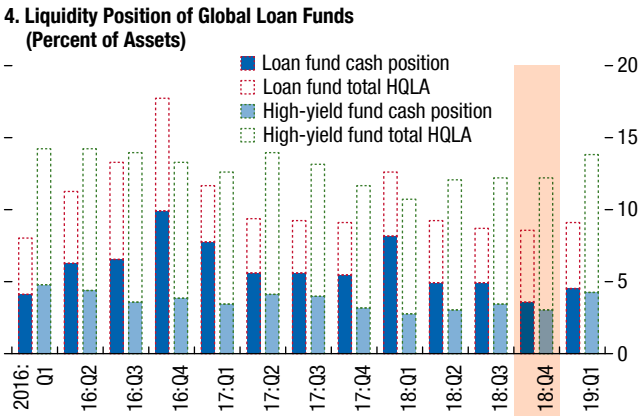
... and a significant portion of maturing loans is accounted for by companies rated single-B and lower.



Recent episodes of market stress showed that outflows can be sizable ...



... though liquidity buffers proved to be sufficient, on aggregate, in the 2018:Q4 episode.



Sources: EPFR Global; Moody's; Morningstar; S&P Leveraged Commentary and Data; and IMF staff calculations.
Note: In panel 1, Europe refers to the European Union and the United Kingdom; North America refers to Canada and the United States. Bn = billion; ETFs = exchange-traded funds; HQLA = high-quality liquid assets.

inflows, and outflows from leveraged loans have slowed markedly—reflecting both institutional investors' quarter-end portfolio rebalancing and renewed demand for exposure to risky credit markets—longer-lasting episodes of market distress, especially if accompanied by a recession, may lead to more severe liquidity strains in the future.

Concentration Risk and Interconnectedness

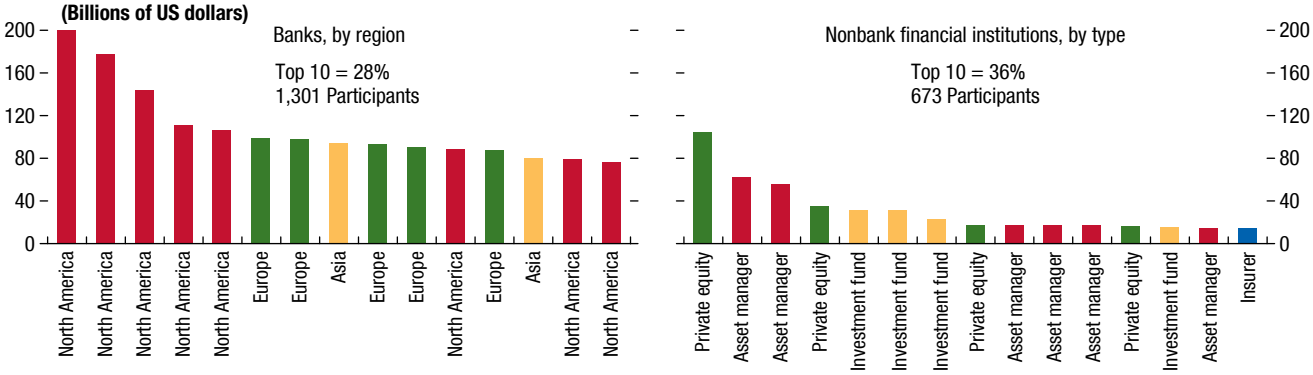
Concentration risk in risky credit markets is significant and may accelerate adverse asset price market moves should key participants decide to exit the markets. In the primary market for leveraged loans, exposures are concentrated among a few large global banks and nonbank financial institutions (Figure 2.7, panel 1). Similarly, in the secondary markets for speculative-grade credit (which includes leveraged loans and high-yield bonds) and for CLOs, several large banks account for significant portions of these markets (Figure 2.7, panel 2).[9] Large non-US banks are heavily involved, have higher sensitivity to rating downgrades because of steeper capital charges under the new Basel securitization framework, and are more exposed to changes in hedging costs. In the US high-yield bond market, large investment funds can have sizable

[9]Speculative-grade credit exposures in Figure 2.7, panel 2, are estimated by using individual institutions' Pillar 3 disclosures and, thus, include leveraged loans and high-yield bonds, as well as some small- and medium-sized-enterprise loans and some emerging market loans.

Figure 2.7. Concentration and Interconnectedness

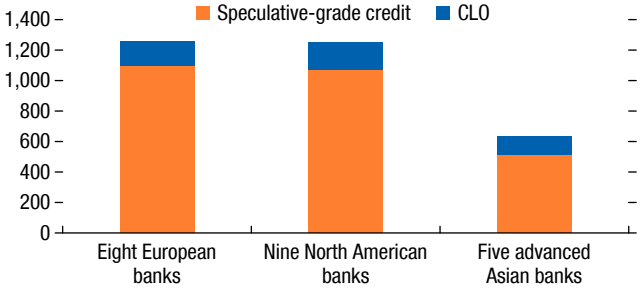
Top banks and nonbank financial institutions account for a large share of the primary loan market.

1. Amounts Outstanding of Credit Provided by Bank and Nonbank Lenders in the Primary Market for Global Leveraged Loans (Billions of US dollars)



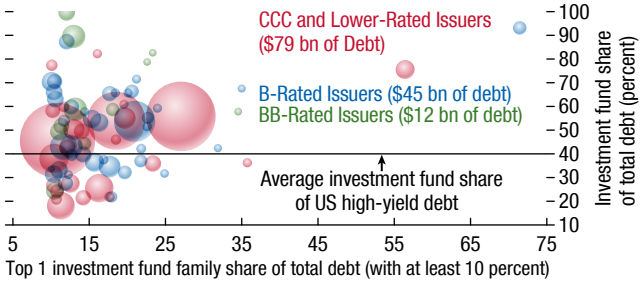
Several large banks account for significant portions of the speculative-grade credit and CLO markets.

2. Holdings of Global Risky Credit and CLOs by Top Banks (Billions of US dollars)



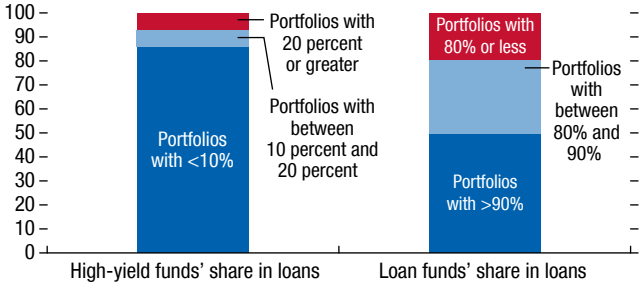
Large fund families hold concentrated positions in the lower-rated segment of the bond market.

3. Concentration of Investment Fund Families in Individual US High-Yield Bond Issuers (Percent)



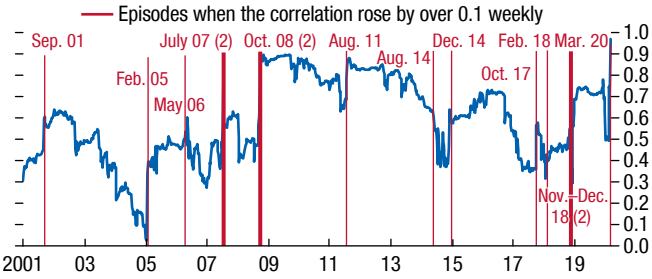
Cross-asset holdings by high-yield and loan funds could trigger price spillovers during market stress ...

4. Global High-Yield and Loan Fund Sector Investments in Loans (Percent)



... punctuated by spikes in correlations between returns of bonds and loans during recent market stress episodes.

5. US Leveraged Loan—High-Yield Bond Index Correlation (One-year rolling)



Sources: Banks' own Basel Pillar III disclosures; Bloomberg Finance L.P.; Dealogic; Morningstar; and IMF staff calculations.
Note: Panel 1 shows the initial exposures by lender's region in the primary market from loan tranche-level data from Dealogic. Loan tranches are sorted by type. Term loan A's and revolving lines of credit are assigned to banks, and term loan B's are assigned to nonbanks. Then, depending on the tranche type, the amount of each tranche is split equally among either banks or nonbanks participating in the syndicate. Finally, for each lender active in the global leveraged loans market, its exposure is calculated as the sum of outstanding amounts across all loan tranches. Panel 2 shows speculative-grade and collateralized loan obligation (CLO) exposures for selected global systemically important banks and other large banks that are active in the leveraged loan and CLO markets. Speculative-grade credit exposures are estimated by using individual institutions' Pillar 3 disclosures, as a summation of exposures at default (EAD) to corporates under both the standardized approach (SA) and internal ratings-based approach. The template CR5 is used to estimate credit risk exposures under SA, based on EAD with riskweights equal to or larger than 75 percent. The template CR6 is used to estimate credit risk exposures under the internal ratings-based approach, based on EAD with probability of default equal to or higher than 0.5 percent. Speculative-grade exposures include high-yield bonds, leveraged loans, some small- and medium-sized enterprise loans, and some emerging market loans. CLO exposures are estimated by using SEC1 as a summation of holdings as originator, sponsor, and investor in the banking book. Panel 3 is based on the issuers of all bonds included in the Bloomberg Barclays US Corporate High-Yield Total Return Index. The *x*-axis shows the share of individual borrowers/debt that a single fund family holds, indicating that CCC borrowers have greater concentration risk than higher-rated high-yield credits. The *y*-axis represents the share of the debt of the same individual borrowers that is owned by all investment fund investors. It shows that those borrowers with greater concentration risk by a single fund family are also more exposed to redemption risks than the average US high-yield borrower. This is because their total investment fund ownership often exceeds the 40 percent share that investment funds own of all US high-yield debt. CR = credit risk; SEC1 = securitization exposures in the banking book.

positions in individual credits, especially in those rated CCC (Figure 2.7, panel 3). More than $130 billion in high-yield debt is subject to concentration risk—defined specifically as debt issued by firms where an investment fund family owns more than 10 percent of debt. In addition, these firms are exposed to concentration risk because investment funds, in aggregate, own a larger-than-average portion of their debt.

The risky segment of credit markets has become more interconnected. On the borrower side, companies issue debt opportunistically both in the high-yield bond and the loan market, and some companies are switching from syndicated loans to private debt based on pricing and opportunities. On the investor side, high-yield and loan funds have material holdings across debt markets (Figure 2.7, panel 4), which could increase price correlations during a stress episode. Indeed, correlation between leveraged loan and high-yield bond returns tends to rise during market downturns, including during the COVID-19 episode (Figure 2.7, panel 5).

Layers of Leverage Could Interact with Bank-Nonbank Linkages

As discussed above, leverage played an important role in amplifying shocks during the global financial crisis. Leverage in the market can come in three forms: debt issued by firms; leverage embedded in structured finance vehicles, such as CLOs; and financial leverage in the credit system (Aramonte and Avalos 2019). What matters is not simply the levels of various forms of leverage, but also the feedback loops between them—that is, the layering of leverage on top of leverage, which could amplify downward price moves (Figure 2.8). For example, capital call lending is a growing asset class for banks, driven largely by private debt funds looking to enhance returns. This form of financial leverage can worsen losses at private debt funds in a downturn and increase credit and liquidity risks for banks.

Financial leverage is difficult to monitor: availability of data has been an ongoing issue since the global financial crisis and, because it can take novel forms, an assessment of the use of financial leverage is primarily qualitative. At this point, it appears that the use of financial leverage in credit markets (in the form of various credit lines, repurchase agreements, or derivatives) is limited compared with the period preceding the global financial crisis. However, given the complexity of the ecosystem and the opacity of some of the structures, links in the intermediation chain and interconnectedness of bank and nonbank lenders may entail risks to the banking system, whereby adverse shocks may be transmitted broadly across financial institutions and possibly amplified by the layering of visible and invisible leverage.

An Economic Downturn Could Trigger Large Losses

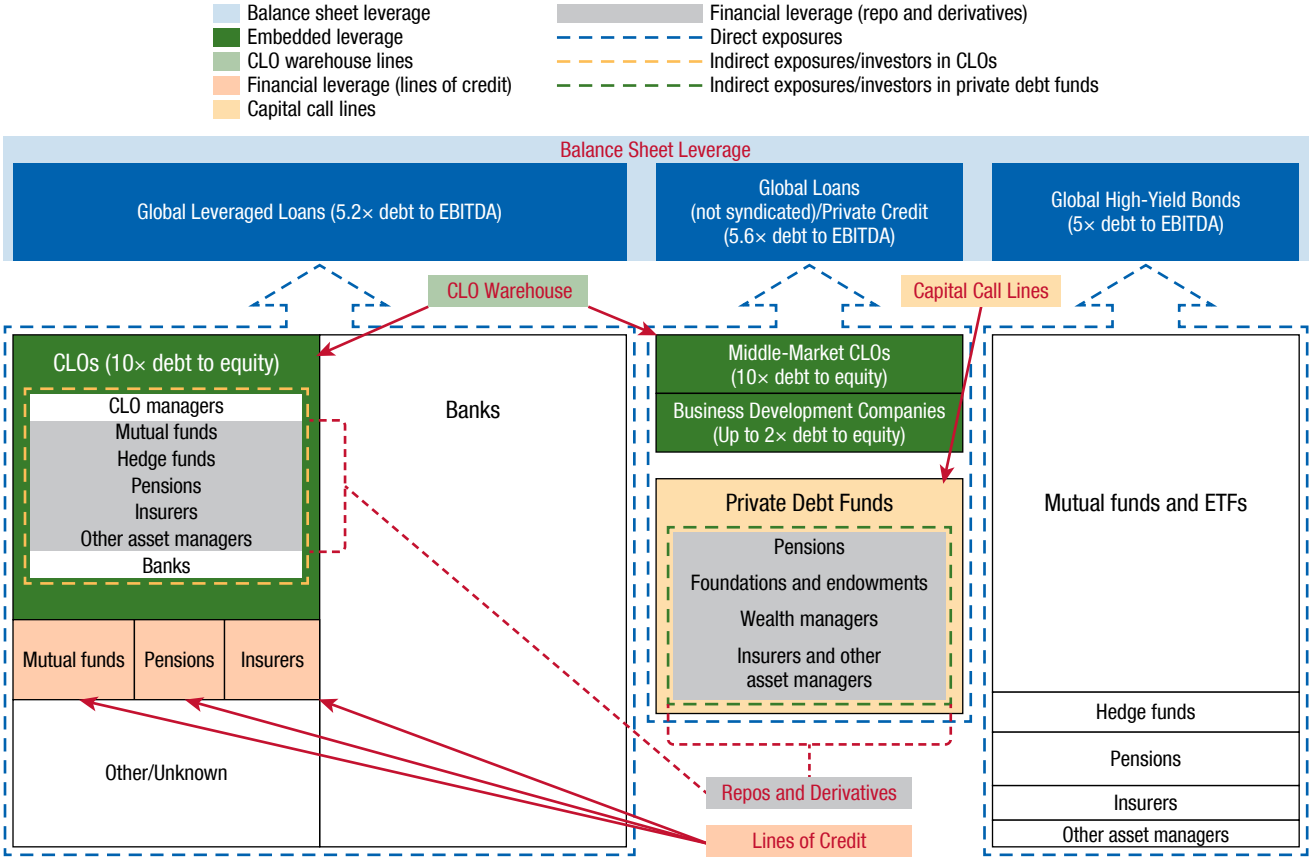
The ecosystem shown in Figures 2.3 and 2.8 is a useful starting point to assess the impact of adverse shocks. An illustrative severe adverse scenario is considered below (Table 2.2, panel 1).[10] The scenario applies the credit rating transition matrix estimated for speculative grade credit after the global financial crisis to the current credit rating compositions of the high-yield bond and leveraged loan markets to obtain downgrades and defaults in these markets. The scenario has the same recovery rate on high-yield bonds as that experienced during the global financial crisis. The recovery rate on leveraged loans is assumed to be 20 percentage points lower than during the global financial crisis to account for reduced credit protections (such as lighter covenants and less debt subordination) and a repricing of earnings addbacks. Market prices experience the same declines as during the global financial crisis. While banks are admittedly more resilient than before the financial crisis and use of financial leverage is more limited, additional amplification mechanisms are assumed to be at play, including sales by investment funds and a reduction in CLO demand for leveraged loans—trends that were already evident during the COVID-19 outbreak.

This scenario analysis considers only the losses resulting from the *direct exposures* of banks, nonbank financial institutions, and CLOs to risky credit markets. Second-round effects, however, could be significant and include, for example, the impact on banks from their lending to nonbank lenders that have suffered losses in these markets. In addition, the losses

[10]The analysis relies on global data for the investor base for leveraged loans, speculative-grade downgrade and default rates, the price shock to high-yield bonds, and individual banks' exposures to speculative-grade credit, and on US data for the investor bases for high-yield bonds, private debt, and CLOs, the price shock to leveraged loans, and the structure of a median CLO.

Figure 2.8. Risky Credit Market Ecosystem

Layers of Leverage in Advanced Economy Risky Credit Markets (Average leverage, end of 2019)



Sources: Bloomberg Finance L.P.; Financial Stability Board; S&P Leveraged Commentary and Data; and IMF staff calculations.
Note: CLOs = collateralized loan obligations; EBITDA = earnings before interest, taxes, depreciation, and amortization; ETFs = exchange-traded funds; Repos = repurchase agreements.

Table 2.2. Severe Adverse Scenario—Key Assumptions

The scenario is calibrated based on defaults and market price declines experienced during the global financial crisis.

Credit, mark-to-market, and CLO-related losses are computed based on exposures by lender type.

1. Assumptions about Defaults, Recoveries, and Market Price Declines, by Asset Class (Percent)

	High-Yield Bonds	Institutional Leveraged Loans	Private Debt
Defaults, recoveries on HY, and market price declines are the same as in the GFC. Recoveries on LL are 20 ppts lower.			
Three-year default rate	24	27	27
Recovery rate	25	45	45
Credit loss rate	6	12	12
Market price decline	–34	–40	. . .

2. Assumptions about Types of Losses, by Asset Class and Lender Type

	High-Yield Bonds	Institutional Leveraged Loans	Bank Leveraged Loans	Private Debt	CLO Equity and Mezzanine Debt
Banks	. . .	. . .	Credit	. . .	. . .
Insurers	Credit	Credit	. . .	. . .	. . .
Pension Funds	Credit	Credit	. . .	. . .	. . .
Mutual Funds and ETFs	Market	Market	. . .	. . .	Model
Hedge Funds	Market	Market	. . .	. . .	Model
Others (AM, SMA, BDC)	Market	Credit	. . .	Credit	Model
Private Debt Funds	. . .	. . .	. . .	Credit	. . .

Sources: Bloomberg Finance L.P.; Financial Stability Board; Moody's; S&P Leveraged Commentary and Data; S&P Ratings; and IMF staff calculations.
Note: Credit losses on CLO highly rated debt for banks, insurers, and pension funds are assumed to be zero. AM = asset managers; BDC = business development companies; CLO = collateralized loan obligations; ETFs = exchange-traded funds; GFC = global financial crisis; HY = high-yield bonds; LL = leveraged loans; ppts = percentage points; SMA = separately managed accounts.
"Credit" refers to held-to-maturity exposures that incur credit losses.
"Market" is for mark-to-market exposures that incur market losses.
"Model" is for exposures to CLO mezzanine debt and equity that are mark-to-market based on a standard overcollateralization test.

from this scenario are *partial*—that is, they encompass only the losses incurred in risky credit markets. However, the deterioration in these markets is assumed to be triggered by a recession—which would bring about wider losses in global equity and investment-grade bond markets. Thus, overall losses at financial institutions are likely to be greater than in the scenario considered, given the large size of other markets.

In this illustrative scenario, credit, mark-to-market, and CLO-related losses are computed based on exposures of various lender types to each of the risky credit markets (Table 2.2, panel 2). Each dollar of exposure is assumed to face only one type of loss. Banks, insurers, pension funds, and private debt funds have mostly held-to-maturity positions and are assumed to incur only credit losses. Mutual funds and ETFs, hedge funds, asset managers, and others are expected to mark their positions to market and are subject to market losses. Market losses can be reversible (as they were after the global financial crisis) after the end of the scenario, but that eventuality is not captured here.

Investors in CLOs experience "mark-to-model" losses based on a standard overcollateralization test in which "excess" CCC and D credits are marked to market based on the weakest credits. CLO mark-to-model losses are not necessarily recorded as mark-to-market losses by investors because CLOs are typically not forced sellers. CLO losses represent lost cash income to equity and mezzanine debt tranche investors, given that the income is diverted to deleverage the CLO or to improve its asset quality composition. This exercise does not incorporate mark-to-market losses on CLO tranches if investors sell them in the secondary market.

Because of a larger proportion of B credit than in the past, a median CLO's credit quality deteriorates quickly in the scenario considered (Figure 2.9, panel 1). Mark-to-model losses affect 27 percent of the capital stack, reaching mezzanine debt (A and below) in the scenario (Figure 2.9, panel 2), while leaving AAA–AA investors unaffected. For comparison, during the recent COVID-19 outbreak, weaker CLOs—with a high share of CCC credits—have already started to incur mark-to-model losses amid mounting credit rating downgrades.

Overall losses are substantial, totaling more than $1¼ trillion (or almost 20 percent of total exposures) in the scenario (Figure 2.9, panel 3). Among institution types, investors in CLO equity and mezzanine debt tranches and those with mark-to-market positions, such as mutual funds and ETFs, have higher nominal losses (Figure 2.9, panel 4). Bank losses appear to be manageable, in aggregate. In addition, banks have the lowest loss rates (defined as a share of exposures) across investors because they hold mostly senior loans with the highest recovery rates and highly rated CLO debt with negligible losses (Figure 2.9, panel 5). By contrast, hedge funds and mutual funds and ETFs with CLO equity tranche holdings and mark-to-market exposures have the highest loss rates.[11]

Many large banks incur losses in excess of 10 percent of their total buffers—that is, the sum of capital and loan loss reserves, in the severe adverse scenario (Figure 2.9, panel 6). Profits would be the first line of defense against shocks, but they are likely to decline during a recession, and Chapter 1 shows that forecast earnings have already been revised down considerably during the COVID-19 outbreak. In addition, given that these estimated losses represent only the direct and partial impact from risky corporate credit markets, bank capital and loan loss reserves may need to be used to cover wider losses from other exposures—equities, investment-grade corporate bonds and loans, lending to households, and credit to nonbank financial institutions, including those that are exposed to risky credit markets.

Policy Implications

Policymakers should act decisively to contain the economic fallout of the COVID-19 outbreak and support the flow of credit to firms.[12] Once the crisis is over, they should assess the sources of market dislocations and tackle the vulnerabilities in risky credit markets that have been unmasked by this episode.

Crisis Management Tools Are the First Priority

- As discussed in Chapter 1, authorities in major economies are providing considerable support through monetary, fiscal, and financial policies

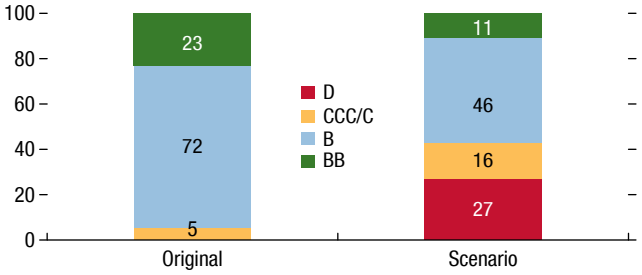
[11]Although mutual funds/ETFs and hedge funds have similar loss rates, mutual funds/ETFs have substantially larger nominal losses than hedge funds because they have considerably larger exposures to risky credit than hedge funds. One notable source of uncertainty in the estimation of losses for hedge funds is their exposure to leveraged loans due to the lack of direct estimates.

[12]For a list of policy actions taken to date see the IMF's Policy Tracker: https://www.imf.org/en/Topics/imf-and-covid19/Policy-Responses-to-COVID-19.

Figure 2.9. Severe Adverse Scenario: Impact on Collateralized Loan Obligations and Overall Losses

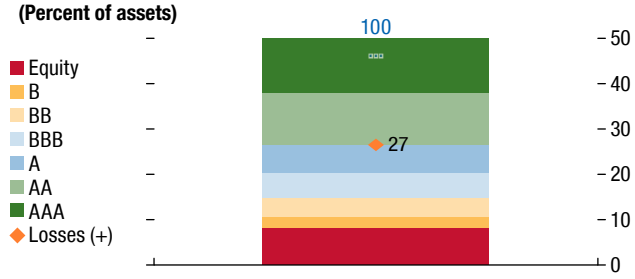
CLOs have a high share of lower-rated credits, which deteriorate quickly in the severe adverse scenario ...

1. Median US CLO 2.0: Assets, by Credit Rating (Percent of assets)



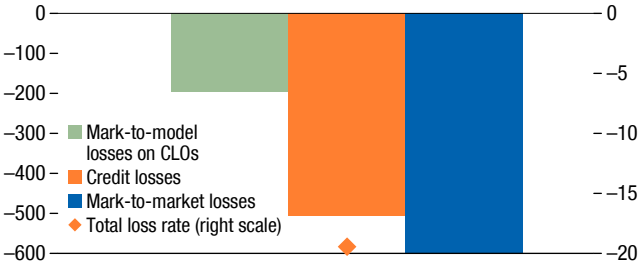
... which leads to substantial mark-to-model losses on the equity and mezzanine debt tranches.

2. Median US CLO 2.0: Debt, Equity, and Losses (Percent of assets)



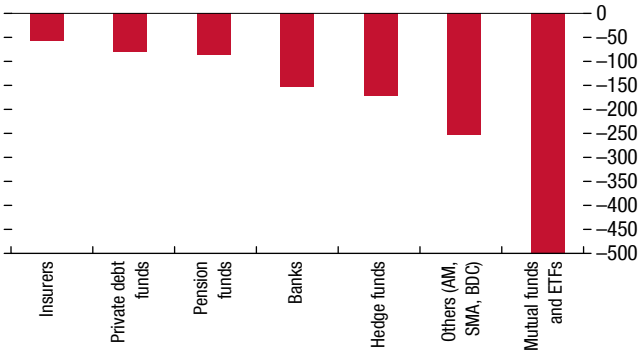
Overall losses are substantial in the scenario.

3. Losses, by Loss Type (Billions of US dollars, left scale; percent of amounts outstanding, right scale)



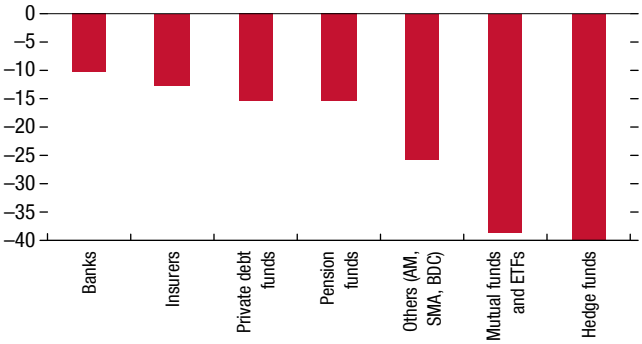
Investors with mark-to-market exposures have higher nominal losses, while investors in CLO equity and mezzanine debt tranches incur lost cash income.

4. Losses, by Investor Type (Billions of US dollars)



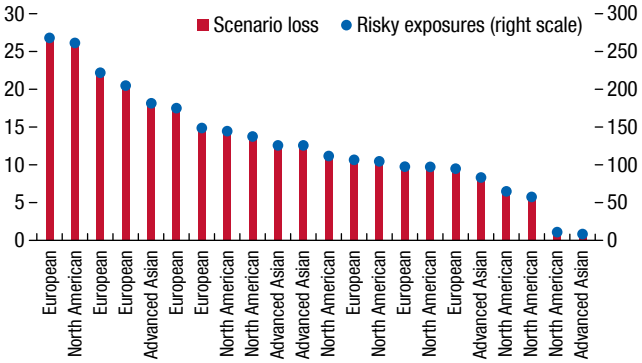
Banks have the lowest loss rates, which are still above the worst charge-offs on mortgages during the global financial crisis.

5. Loss Rates, by Investor Type (Percent of own exposures)



Many large banks incur losses in excess of 10 percent of their total buffers in the scenario.

6. Speculative-Grade Exposures and Losses by Banks (Percent of CET1 capital and loan loss reserve)



Sources: Banks' own Basel Pillar III disclosures; Bloomberg Finance L.P.; Financial Stability Board; Moody's; Morningstar; Preqin; S&P Leveraged Commentary and Data; and IMF staff calculations.

Note: In panel 2, the *y*-axis is cut off at 50 percent, though AAA debt amounts to 68 percent of assets. In panel 6, the sample of banks includes selected global systemically important banks and other large banks that are active in the leveraged loan and CLO markets. Speculative-grade credit exposures are estimated by using individual institutions' Pillar 3 disclosures, as a summation of exposures at default (EAD) to corporates under both the standardized approach (SA) and internal ratings-based approach. The template CR5 is used to estimate credit risk exposures under SA, based on EAD with risk weights equal to or larger than 75 percent. The template CR6 is used to estimate credit risk exposures under the internal ratings-based approach, based on EAD with probability of default equal to or higher than 0.5 percent. Speculative-grade exposures include high-yield bonds, leveraged loans, some small- and medium-sized enterprise loans, and some emerging market loans. Individual large banks' regions are shown instead of bank names. CET1 capital refers to Common Equity Tier 1 capital. Advanced Asia refers to Japan. Europe refers to the European Union and the United Kingdom. North America refers to Canada and the United States. AM = asset managers; BDC = business development companies; CLO = collateralized loan obligations; ETFs = exchange-traded funds; GFC = global financial crisis; SMA = separately managed accounts.

to cushion the impact of the crisis on the *broad corporate sector*. Major advanced economy central banks have initiated or increased purchases of investment-grade corporate debt.[13] Furthermore, in early April, the US Federal Reserve extended support to some investment-grade bonds downgraded to speculative grade after March 22, some ETFs invested in high-yield bonds, newly issued highly rated CLO tranches, and some small- and medium-sized enterprises whose leverage remains below specific thresholds.[14] In late April, the European Central Bank also expanded its eligible collateral for loans to banks to include investment-grade bonds downgraded to speculative grade after April 7. These measures appear to have improved market functioning and eased near-term stress in these markets, as evidenced by the narrowing in corporate credit spreads and the gradual reopening of the primary market for high-yield bonds and leveraged loans.

- Should financial conditions deteriorate further, and credit downgrades and defaults rise meaningfully, authorities may consider *further extending their support to risky credit markets*. Measures directed at maintaining the flow of credit in these segments would help prevent severe and prolonged disruptions that would affect firms and the broader economy. Because *no direct support has been provided to the bulk of risky credit markets thus far* (bonds that are deeply downgraded from investment grade, CLOs that were issued before late March and those that are actively managed, and small- and medium-sized enterprises with high leverage are not currently eligible for these facilities), credit markets have shown signs of divergence, with a still considerable gap between investment- and speculative-grade spreads.
- During the crisis, firms have relied on bank credit lines as an important source of liquidity. Supervisors should continue to monitor the banking sector to *ensure banks are in a good position to provide funding to speculative-grade firms*, while banks' existing capital and liquidity buffers should be used to absorb financial costs of any customer loan restructuring and to relieve pressures on banks' funding and liquidity using full flexibility within the existing regulatory frameworks.

The Crisis has Uncovered Many of the Vulnerabilities Discussed in this Chapter

- While market price declines in the high-yield-bond and leveraged-loan markets reached two-thirds of the descent during the global financial crisis in March, the speed of deterioration has been unprecedented, driven by sharp increases in credit and liquidity risks.
- Preexisting concerns about elevated borrower leverage, earnings addbacks, sectoral structural weaknesses, weak covenants, reduced investor protections, and large shares of weak credit have likely magnified investors' perception of *credit risk*, as reflected in sharply wider credit spreads and significantly higher forecasts of rating downgrades and defaults.
- Selling pressure triggered by broad-based demand for cash has raised *liquidity risk*, as evidenced by the sharp declines in the new issuance of risky credit during the COVID-19 outbreak, alongside record-high bid-ask spreads on corporate bonds and deep ETF price discounts in March. Interconnectedness across risky credit markets and the global nature of their investor base have likely contributed to market dislocations. Mutual funds, which were seen as one of the main pressure points in terms of liquidity risks, have experienced large outflows, even though outflows have moderated more recently. Capital committed but not yet invested (dry powder) does not appear to have been deployed yet, likely reflect-

[13]The US Federal Reserve established two facilities for investment-grade corporate debt—the Primary Market Corporate Credit Facility for new bond and syndicated loan issuance and the Secondary Market Corporate Credit Facility to provide liquidity for outstanding corporate bonds and ETFs. The European Central Bank expanded its Corporate Sector Purchase Program to include nonfinancial commercial paper, the Bank of England increased the size of its Corporate Bond Purchase Scheme, and the Bank of Japan increased the auction amounts of outright purchases of commercial paper and corporate bonds.

[14]As part of the Federal Reserve's Primary and Secondary Market Corporate Credit Facilities, the definition of eligible issuers for purchase was expanded to include those that were rated at least BBB–/Baa3 as of March 22, 2020, but are subsequently downgraded and rated at least BB–/Ba3 at the time the facility makes a purchase. The eligibility criteria for ETF purchases includes a preponderance of ETF holdings of those funds whose primary objective is exposure to US investment-grade corporate bonds, and the remainder will be in ETFs whose primary objective is exposure to US high-yield corporate bonds. The Federal Reserve's Term-Asset Loan Facility expanded the eligible collateral to include AAA tranches of static CLO deals issued after March 23, 2020. The Main Street New Loan Facility limits eligibility to borrowers that do not have debt higher than four times 2019 adjusted earnings before interest, taxes, depreciation, and amortization (EBITDA), while the Main Street Expanded Loan Facility has a debt limit of six times 2019 adjusted EBITDA.

ing uncertainties about the impact of the virus on the economy.

After the Crisis, Medium-Term Vulnerabilities Should Be Tackled

- Once the COVID-19 crisis is contained, authorities should conduct a comprehensive analysis to identify the sources of market dislocations and assess vulnerabilities that have been unmasked.
- Given the large role of nonbank financial institutions in risky credit markets, and based on the behavior of these institutions during the recent episode, authorities may consider whether *a widening of the regulatory and supervisory perimeter to include nonbank financial institutions active in risky credit markets* may be warranted. A framework for macroprudential regulation of nonbank financial institutions should be developed, taking into consideration the global nature of these markets. Such a framework is largely absent. The macroprudential toolkit should be expanded to account for the growing importance of nonbank financial institutions (see the October 2019 GFSR).
- *Policymakers should promote greater transparency in credit markets.* To enable proper assessment of risks in these markets, authorities should ensure that they have sufficient data to analyze risks stemming from current origination practices and chains of intermediation in the corporate debt market. Cross-border and global exposures to risky credit markets should be better measured.
- Bank supervisors in key economic areas should collaborate on data sharing to take account of macro-financial interconnections domestically and internationally. Given the commonality of corporate exposures at large banks and links across banks and nonbank financial institutions, as well as cross-border features of global credit markets, greater international collaboration on data sharing may be desirable to gauge risks in the banking system.

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MANAGING VOLATILE PORTFOLIO FLOWS

Chapter 3 at a Glance

- The COVID-19 pandemic led to an unprecedented sharp reversal of portfolio flows, highlighting the challenges of managing such volatility in emerging and frontier markets.
- This chapter shows that:
  - Changes in global financial conditions tend to influence portfolio flows more during surges and reversals than in normal times.
  - Stronger domestic fundamentals do not always lead to surges in portfolio flows but do help mitigate outflows.
  - Greater foreign investor participation in local currency bond markets can help reduce borrowing costs, but it may also increase price volatility where domestic markets lack depth, especially in frontier markets.

The dramatic reversal of emerging market portfolio flows following the global spread of coronavirus (COVID-19) highlights the challenges of managing volatile portfolio flows and risks they may pose to financial stability. A prolonged period of low interest rates had encouraged both borrowers and lenders to take on more risk. Surges of portfolio inflows into riskier asset markets contributed to the buildup of debt and, in some cases, resulted in stretched valuations. This chapter quantifies the sensitivities of different types of portfolio flows and the associated cost of funding to global and domestic factors during "normal" times as well as during periods of weak or strong flows. Analysis suggests that both bond and equity flows are much more sensitive to global financial conditions during periods of extreme flows than in normal times, while domestic fundamentals may matter incrementally more for equities and local currency bond flows. Furthermore, greater foreign investor participation in local currency bond markets that lack adequate depth can greatly increase the volatility of bond yields. Dealing with immediate capital outflow pressures calls for using reserves to reduce excessive volatility, deploying capital flow management measures, and preparing for long-term external funding disruptions.

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Foreign Funding in Times of Uncertainty

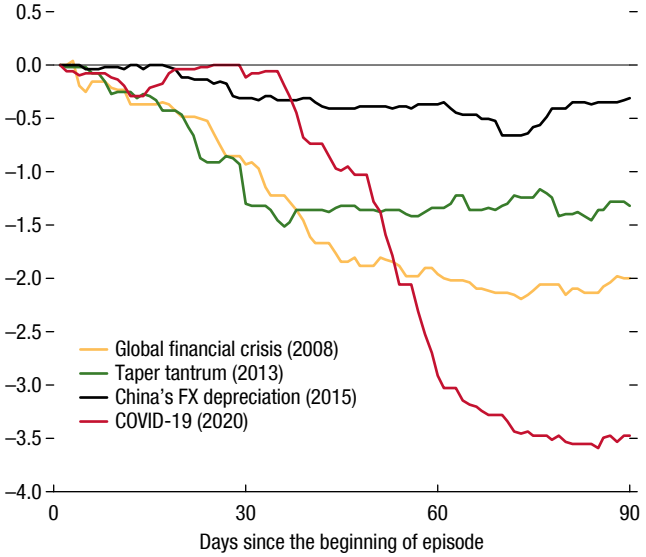
The COVID-19 pandemic has led to historic portfolio outflows from emerging and frontier markets (see also Chapter 1). After a strong resumption of portfolio flows to emerging markets through early 2020, driven by increased optimism about economic recovery amid easing trade tensions, total portfolio flows reversed dramatically in March, with more than $100 billion in outflows (or 3½ percent of asset holdings) since January 21, led initially by equity outflows (Figure 3.1, panel 1). The volatility of nonresident flows to equity and local currency bond markets during the trough of the sell-off reached unprecedented levels, despite policy rate cuts and measures to support economic activity (Figure 3.1, panel 2).

Foreign portfolio flows are an important source of funding for emerging market sovereigns and corporations. Nonresident portfolio investment can help expand and diversify the investor base for emerging market assets, lower the cost of funding, and ultimately contribute to stronger economic growth and economic development (see Hannan 2018 for a literature review). However, reliance on foreign financing can also entail risks. Heightened uncertainty in the global economy resulting from trade tensions, geopolitical events, and pandemics (as is currently the case with COVID-19) can lead to a significant tightening of global financial conditions and increased portfolio flow volatility.

Figure 3.1. Recent Trends in Portfolio Flows to Emerging Markets

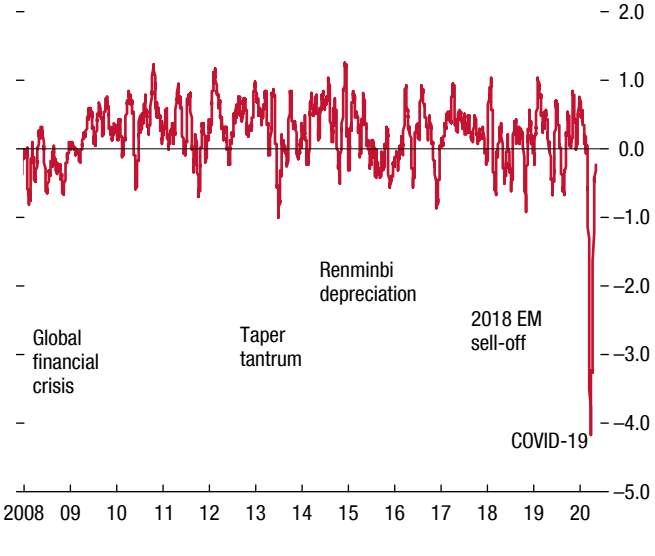
Concerns about the economic fallout of the COVID-19 pandemic on emerging markets led to strong portfolio outflows ...

1. Comparison of Portfolio Outflow Episodes
(Percent of IIP; cumulative flows based on daily observations)



... as well as historically high volatility at the trough of the sell-off.

2. Nonresident Portfolio Flows to Emerging Markets
(Daily, 28-day moving average; billions of US dollars)



Sources: IMF, World Economic Outlook database; national authorities; and IMF staff calculations.
Note: Economies included in panel 2 are Brazil, China, Hungary, India, Indonesia, Korea, Mexico, Pakistan, Philippines, Qatar, Sri Lanka, South Africa, Taiwan Province of China, Thailand, and Ukraine. EM = emerging market; FX = foreign exchange; IIP = international investment position.

Moreover, the strong and persistent portfolio inflows seen in earlier periods can create vulnerabilities by encouraging excessive domestic credit creation and an overvaluation of local currency and other financial assets. These risks need to be managed.

Emerging and frontier markets have become more reliant on foreign portfolio flows over the years. Foreign participation in emerging and frontier markets[1] has grown significantly in the 10 years since the global financial crisis, aided by accommodative policies in advanced economies (Figure 3.2, panel 1). Foreign debt portfolio investment in frontier market economies has risen rapidly and is now on par with cross-border loans. Even in equity markets, where nonresident participation has traditionally been smaller than in debt markets, foreign investors currently own a significant share of outstanding assets in some countries (Figure 3.2, panel 2).

Risks related to portfolio flows may be more acute in the context of high levels of overall debt in emerging market economies. Total debt for the median emerging market economy rose to 100 percent of GDP in 2018 from 75 percent before the global financial crisis, and to more than 250 percent of GDP in China from 140 percent in 2007. These increases are the result of greater public sector borrowing in many emerging markets and a strong rise in corporate sector leverage in China.

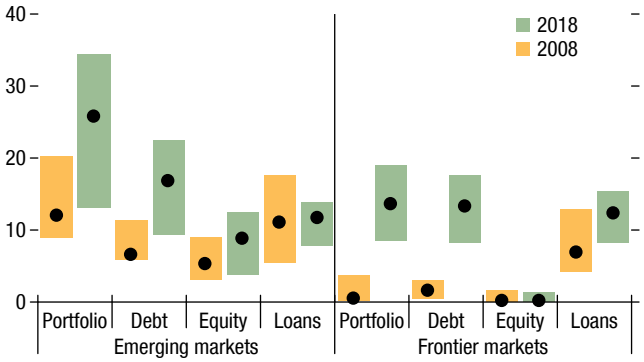
Many emerging market sovereigns have stepped up issuance of local currency debt in recent years (Figure 3.2, panels 3 and 4). At face value, this reduction in the so-called "original sin" affords countries greater insurance from episodes of domestic currency volatility or tightening of external financial conditions. But increased foreign participation in debt markets, particularly in many frontier market economies, exposes them to changes in global financial conditions through the behavior and preferences of foreign investors, such as the current volatility around the COVID-19 pandemic. During periods of risk aversion, when local currencies weaken and domestic assets sell off, foreign investors are likely to reduce their exposure and might not roll over maturing positions, thereby triggering outflows, which could disrupt bond markets. Even in the absence of outflows, increased foreign

[1]See Online Annex 3.1 for definitions of frontier market economies. All annexes are available at www.imf.org/en/Publications/GFSR.

Figure 3.2. Emerging and Frontier Market Economy Debt

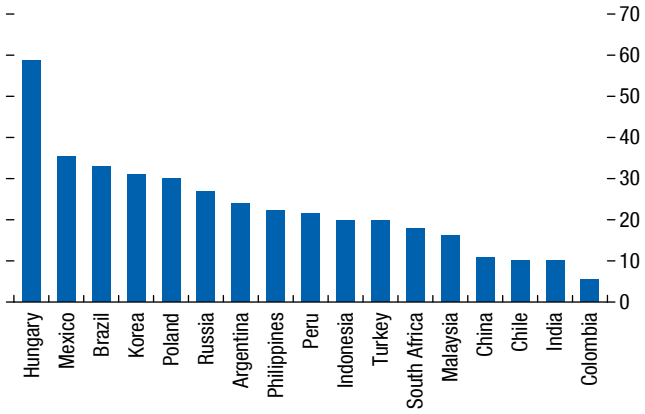
Portfolio investment has grown quickly for most emerging and frontier market economies, led by debt.

1. Portfolio and Cross-Border Loan Liabilities IIP (Percent of GDP, interquartile range, median)



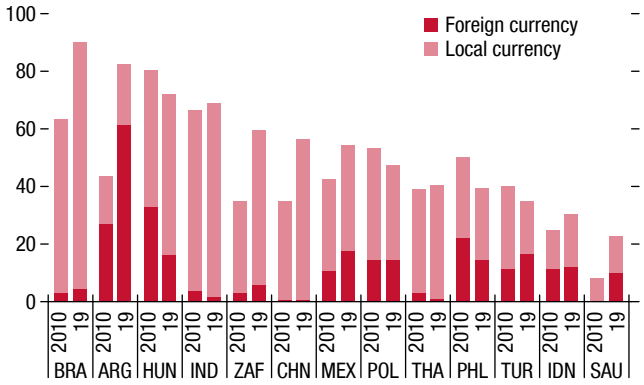
Foreign participation in equity markets is also significant in some emerging market economies.

2. Equity International Investment Position (Liabilities, percent of market capitalization, 2019:Q2)



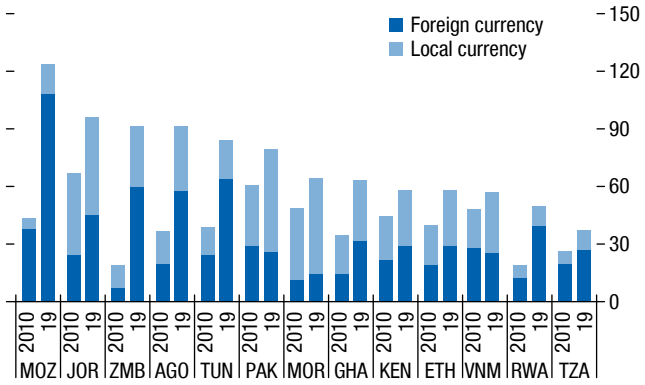
The steady rise in government debt in the past decade was mostly a result of greater local currency issuance in emerging markets ...

3. Emerging Market Government Debt, 2010 and 2019 (Percent of GDP)



... as well as in some frontier market economies, where government debt increased dramatically in many cases.

4. Frontier Market Government Debt, 2010 and 2019 (Percent of GDP)



Sources: Bloomberg Finance L.P.; IMF, World Economic Outlook database; JPMorgan Chase & Co; and IMF staff calculations.
Note: For more information on the sample of countries, see Online Annex 3.1. "Portfolio" is the sum of debt and equity, excluding loans; the interquartile range is calculated separately. In panels 3 and 4, data labels use International Organization for Standardization (ISO) country codes. EMs = emerging markets; IIP = international investment position.

currency hedging could exert substantial pressure on the exchange rate and the cost of funding.

This chapter aims to provide an empirical assessment of the trade-offs between raising additional foreign funding or reducing funding costs, on one hand, and increasing rollover risks or volatility in asset prices, on the other. The analysis involves two elements:

- *Dynamics of portfolio flows:* The drivers of nonresident bond and equity portfolio flows to emerging markets during surges and reversals and in normal times, and
- *Funding costs:* The sensitivity of the level and volatility of funding costs to portfolio flows and other domestic and common global factors, including the capacity of domestic institutional factors to mitigate the volatility of funding costs.

The empirical analysis presented in this chapter shows that the outlook for debt flows tends to be influenced more by global (common) factors than by country-specific (idiosyncratic) factors, while the outlook for equity flows is more heavily influenced

by domestic factors, such as growth. For both bond and equity flows, changes in global financial conditions tend to affect the "tails" of their predicted portfolio flow distributions (the likelihood of future surges or reversals) more than the likelihood of median flows. The outlook for local currency bond flows has greater sensitivity to domestic vulnerabilities than the outlook for hard currency (primarily dollar and euro) bond flows. For instance, strong growth prospects can limit the likelihood of future outflows from local currency bond markets but can also amplify future surges. Domestic bond yields are highly sensitive to external factors, especially for low-rated economies. The current circumstances of large outflows due to the COVID-19 global health emergency illustrate the effects of tighter global financial conditions and lower domestic growth prospects on different types of portfolio flows.

The findings from the empirical analysis can be used to assess the circumstances under which reliance on foreign investors (such as by frontier market economies) may be considered excessive, given the state of these countries' fundamentals. The analysis in this chapter suggests that a rise in foreign investor participation in the local currency bond market beyond a certain critical threshold—controlling for the domestic investor base—can significantly increase yield volatility. However, greater depth of domestic financial markets and the local investor base can help reduce the volatility of local currency bond prices. Some frontier markets already exceed that threshold. The high secondary market bond price volatility during the first quarter of 2020 under the COVID-19 shock underscores the need to find a better balance between attracting foreign investors and further developing their financial markets, particularly for frontier market economies. This includes improving the liquidity of foreign currency markets and the availability of hedging instruments.

Some Stylized Facts

Nonresident bond portfolio flows dominate equity flows in aggregate, given the larger investible universe of assets and the postcrisis boost from lower global rates (Figure 3.3, panel 1). Foreign portfolio investment in emerging market debt is still predominantly in foreign currencies, but consistent with the reduction in "original sin," there has been a long-term shift to debt denominated in local currencies since the Asian financial crisis (Figure 3.3, panel 2).

Portfolio flows to emerging markets have been more volatile since the global financial crisis compared with the previous decade. Since 2013 the periods of inflows have become shorter, while outflow episodes have lasted longer (Figure 3.3, panel 4). Equity portfolio flows to emerging markets (excluding China) have been especially volatile in recent years. And despite a generally benign global economic backdrop, steady year-to-date inflows came to a sudden halt in August 2019 on fears about an escalation of US–China trade tensions and the outcome of the primary election in Argentina.

Developments in local currency government bond markets have played an important role in shaping debt portfolio flow trends (Figure 3.3, panel 5), given the increasing share of local-currency-denominated external debt (Figure 3.3, panel 2). Watershed events for large emerging market economies—such as inclusions in global bond indices (China, Mexico, South Africa) or crises elsewhere (Brazil, Russia)—along with large systemic events—such as the taper tantrum, synchronized central bank easing, and the emerging market sell-off in 2018—have had large effects on aggregate portfolio inflows to emerging market economies.

Key Drivers of Portfolio Flows to Emerging Markets

Factors driving surges of portfolio inflows to emerging markets may differ from factors driving large outflows.[2] The extensive literature on capital flows has stressed the role of both domestic "pull" and global "push" factors in explaining the dynamics of flows to emerging markets.[3] However, almost all of the past work has looked separately, on one hand, at the drivers of average capital flows and, on the other, at the drivers of capital flow surges and sudden stops. In contrast, the analytical framework of the capital-flows-at-risk methodology (see Online Annex 3.1) considers the joint impact of multiple drivers on the entire predicted distribution of portfolio flows.[4] Looking at the

[2]Calvo and Reinhart (1999); Guidotti, Sturzenegger, and Villar (2004); and Cecchetti and others (2020) discuss the risks of portfolio flows in periods of "sudden stops" and "surges."

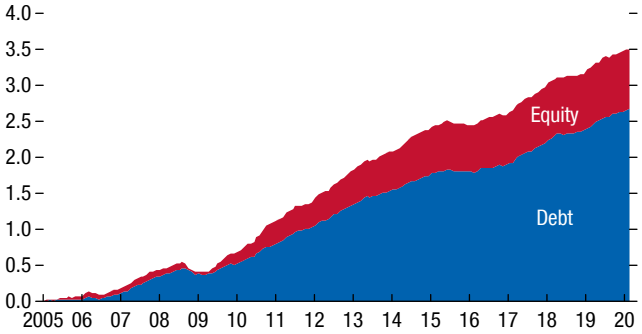
[3]See Koepke (2019) for an overview of the literature.

[4]For details of the capital-flows-at-risk methodology, see the October 2018 *Global Financial Stability Report* (GFSR), and Gelos and others (2019). For more information on the model specifications used in this chapter, see Online Annex 3.1.

Figure 3.3. Trends in Portfolio Flows to Emerging Markets

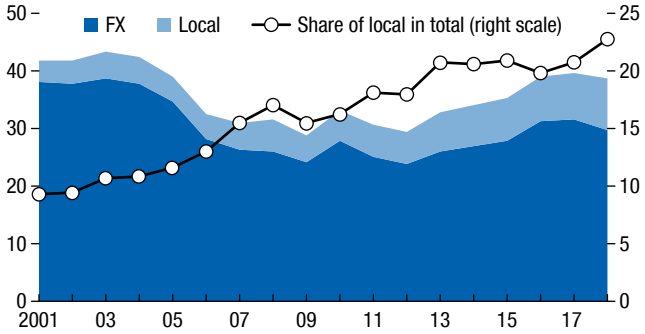
Nonresident emerging market portfolio flows have traditionally been significantly bigger for debt than for equities.

1. Cumulative Portfolio Flows to Emerging Market Assets
(Trillions of US dollars, since 2005)



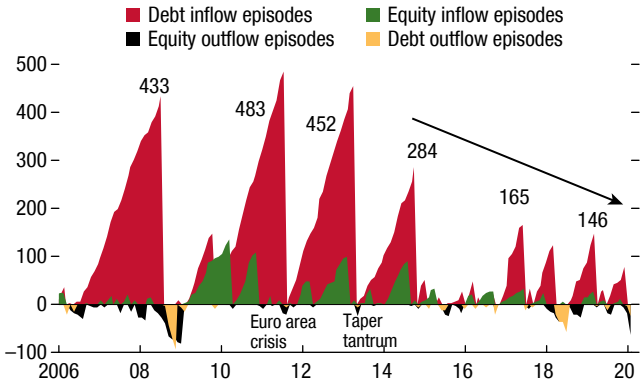
The share of foreign participation in local currency debt markets grew from 10 percent of the total in 2000 to almost 25 percent recently.

2. External Debt of Emerging Market Economies by Currency
(Left scale: total debt as percent of GDP; right scale: percent)



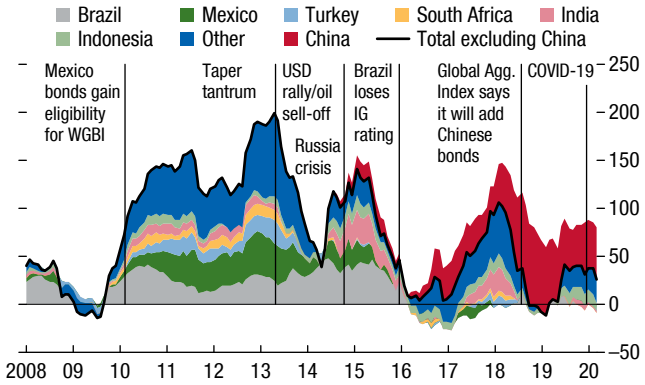
Since 2013, portfolio inflow episodes have been shorter, particularly for debt ...

3. Cumulative Emerging Market Portfolio Inflows and Outflows from the Start of an Episode
(Billions of US dollars; China not included)



... and this shortening is partly explained by significant idiosyncratic and global market developments.

4. Nonresident Flows to Emerging Market Local Currency Government Debt
(Billions of US dollars)



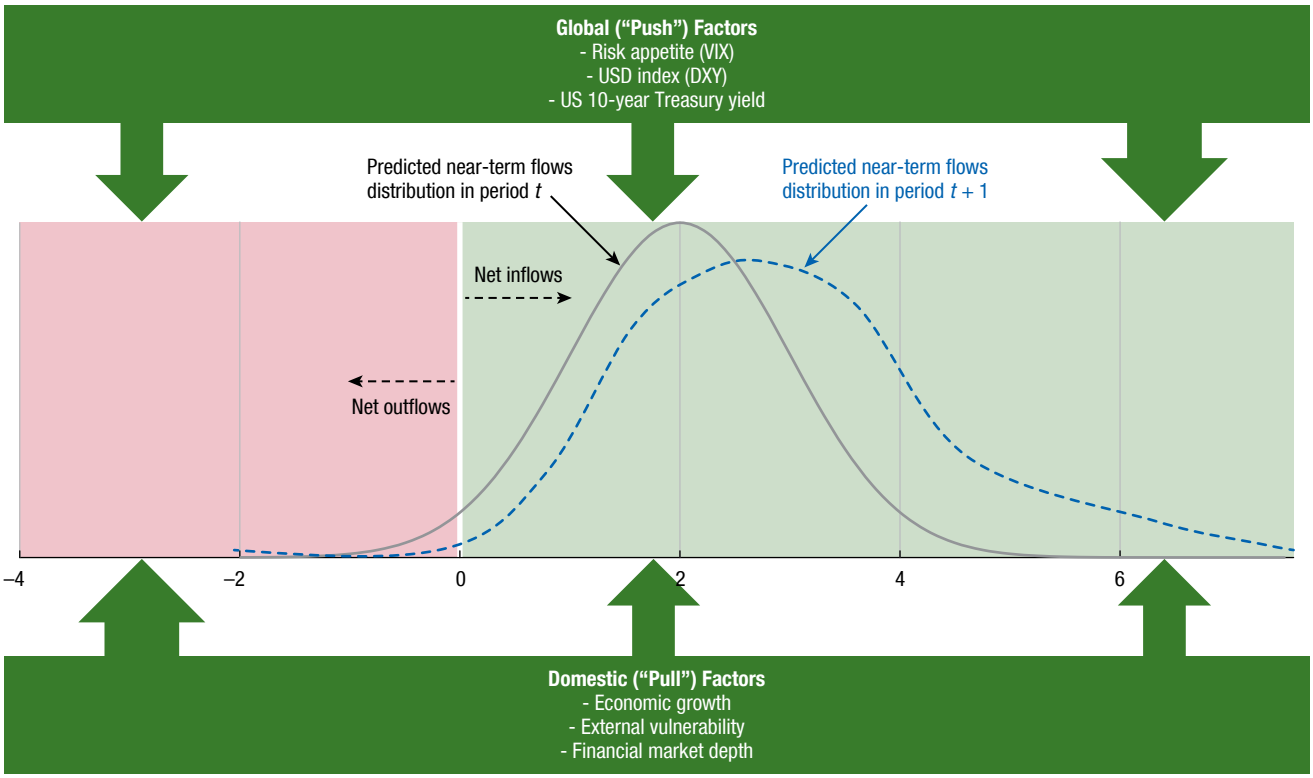
Sources: Bloomberg Finance L.P.; EPFR Global; Institute for International Finance; IMF, World Economic Outlook database; and IMF staff calculations.
Note: Panel 2: China is not included. Panel 3: inflow (outflow) episodes are reset at the first monthly occurrence of outflows (inflows). Panel 4: calculated as rolling sum, data ends February 2020. EM = emerging market; EMEA = Europe, Middle East, and Africa; FX = foreign currency; IG = investment-grade; USD = US dollar; WGBI = World Government Bond Index.

distribution of future flows is a way of quantifying a likelihood of extreme outcomes that could potentially lead to financial instability. From a policy perspective, this could help policymakers prepare for future reversals or surges of portfolio flows.

In this chapter, the capital-flows-at-risk methodology is used to study the impact of global and domestic factors on total debt and equity portfolio flows to emerging markets and on hard currency versus local currency debt flows. The analysis focuses on the predicted distributions of portfolio flows over the near term (the current quarter and the next two quarters) based on global factors in the current period and on domestic factors prevailing in the previous period. Figure 3.4 shows two stylized distributions of portfolio flows—the gray line is the predicted distribution conditional on factors observed at time t, and the dashed blue line is the predicted distribution conditional on factors at time $t + 1$. The figure shows that a change in either global or domestic conditions between t and $t + 1$ contributed to an improved outlook for portfolio flows, including a significantly lower likelihood of outflows and a higher likelihood of strong inflows, conditional on other factors being fixed.

The capital-flows-at-risk approach used in this chapter highlights the differential effects of global

Figure 3.4. Effects of Global and Domestic Factors on the Distribution of Predicted Portfolio Flows



Source: IMF staff.
Note: The gray density function is an example of a predicted density of near-term portfolio flows distribution. The predicted distribution is state-contingent; that is, it depends on the global and domestic factors in a given period. Changes in the domestic or global factors over time induce shifts in the predicted distribution. The blue density function shows a rightward shift of the predicted density of near-term flows, which could be caused, for example, by easing in global funding conditions. This change—all else equal—is associated with a reduced likelihood of net outflows and with a higher likelihood of very large inflows. In addition, the likelihood of very large inflows increases by more than the likelihood of net outflow declines. See Online Annex 3.1 for details. DXY = US Dollar Index; VIX = Chicago Board Options Exchange Volatility Index.

and domestic factors on the likelihood of negative or weak flows in contrast to the likelihood of moderate or strong flows. For example, changes in certain factors can have a larger effect on the likelihood of outflows than on the rest of the expected distribution of portfolio flows. The analysis in this chapter focuses on nonresident flows, referred to as "gross inflows" in the literature. In the baseline specification, the portfolio flows (in percent of GDP) are regressed on the Chicago Board Options Exchange Volatility Index (VIX), US Dollar Index, US 10-year Treasury yield, and lagged domestic drivers (domestic GDP growth, the ratio of short-term foreign exchange debt to international reserves, the depth of domestic financial markets, GDP per capita, and capital account openness). All regressions include country fixed effects and period dummies prior to, during, and following the global financial crisis. When discussing the results of quantile regressions, the interpretation focuses on the directional impact of different factors on the likelihood of observing weak or strong flows, conditional on other factors being fixed.

Based on the literature, tightening in global funding conditions would be expected to worsen the outlook for near-term portfolio flows. Similarly, weaker growth and more shallow domestic financial markets should worsen the outlook for portfolio flows across the board. At the same time, higher levels of external debt could have differential effects on portfolio flows at different percentiles. For example, a higher level of debt today could increase short-term financing needs—and thus future inflows—or it could lead to a decline in flows because of concerns about debt sustainability.

Debt versus Equity Portfolio Flows

For debt portfolio flows, changes in global conditions disproportionately affect the outlook for large inflows. In contrast, changes in domestic fundamentals seem to contribute more to the likelihood of negative or weak inflows than to the likelihood of large inflows. Intuitively, positive global risk sentiment can quickly boost portfolio inflows as investors search for yield, but when risk appetite deteriorates, investors tend to pay more attention to domestic factors, leading to larger pullbacks from countries with weaker fundamentals.[5] The sensitivities to specific factors vary:

- As expected, easier global financial conditions today boost the near-term outlook for debt portfolio flows across the board (that is, the entire distribution of predicted flows in Figure 3.4 moves to the right). This is also the case when considering individual factors that make external borrowing cheaper or change the risk-adjusted returns in favor of emerging markets—lower volatility (VIX), lower US Treasury yields, and a weaker US dollar. But a closer look at the individual global factors reveals important differences (Figure 3.5, panels 1–4). Lower US Treasury bond yields and a weaker US dollar (or equivalently, stronger domestic currencies) increase the likelihood of strong debt portfolio inflows by considerably more than they decrease the likelihood of negative or weak flows. This could be because debt managers often try to take advantage of favorable funding conditions to arrange funding in advance (prefinance). In contrast, risk aversion among global investors—measured by the VIX—affects the outlook for strong and weak flows in roughly equal magnitudes.
- While stronger domestic fundamentals do not necessarily lead to surges in portfolio inflows, they often help reduce the likelihood of outflows. Stronger domestic growth is associated with a smaller likelihood of negative or weak inflows but does not seem by itself to increase the likelihood of very large inflows. Greater external vulnerabilities (measured by a higher level of short-term foreign currency debt relative to international reserves) are linked to a larger likelihood of negative or weak debt inflows in the near term (Figure 3.5, panel 5). When the level of short-term debt is higher today, the likelihood of very strong inflows increases too, but to a lesser extent. This positive impact potentially reflects greater refinancing needs in countries with higher levels of short-term debt, as well as investors' confidence in successful debt redemption. Moreover, deeper domestic financial markets improve the outlook for debt flows across the board (Figure 3.5, panel 6).

The results discussed above also suggest that the COVID-19 shock has considerably weakened the outlook for debt inflows. The downgraded GDP forecasts imply a greater likelihood of weak or negative flows, while tightened global financial conditions reduce the likelihood of large inflows, at least in the near term. The magnitude of the deterioration in the near-term outlook is comparable to the one observed during the global financial crisis, with the strengthening of the US dollar and higher market volatility alone weakening the median predicted quarterly flows by 1 percent of GDP for an average emerging market economy.[6]

Equity portfolio flows are also influenced by global and domestic factors, but in a different way. A similar specification of the quantile regression for equity flows (Figure 3.5, panels 4–6) shows some notable differences[7]:

- Equity flows seem to be less sensitive to global factors than debt flows. Among global factors, the disproportionately larger impact on the likelihood of strong inflows (compared with weak inflows) is present only for debt portfolio flows. In particular, a stronger US dollar weakens the near-term outlook for equity flows across the board, but its impact is an order of magnitude smaller than for debt flows.[8]
- Domestic fundamentals have a similar qualitative impact on both debt and equity flows, but—in line with intuition—stronger domestic growth

[5]For example, as shown by Milesi-Ferretti and Tille (2010), countries with larger external or domestic vulnerabilities also experienced a larger retrenchment in capital flows during the global financial crisis.

[6]During the last quarter of 2008, the US Dollar Index and the VIX increased by about 10.5 points and 33.5 points, respectively. As of mid-March 2020, the US Dollar Index and the VIX were 10.5 points and 43 points higher, respectively, than at the end of 2019.

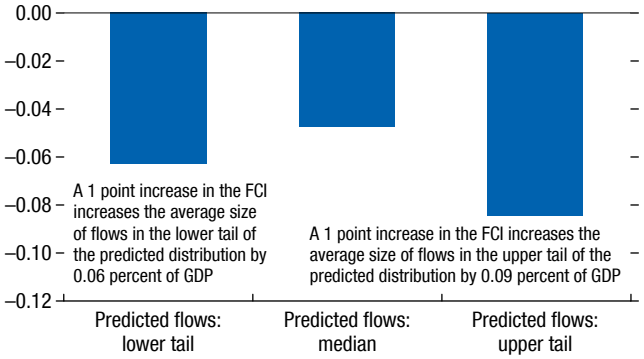
[7]Figures 3.5 and 3.6 show nonstandardized coefficients for different variables. The findings presented in this chapter also hold when comparing standardized coefficients (reported in Online Annex 3.1).

[8]This is in line with Li, de Haan, and Scholtens (2018), which finds that weaker domestic currency provides earnings support to exporters in an economy, thus boosting growth and equity flows.

Figure 3.5. What Drives Debt and Equity Portfolio Flows to Emerging Markets?

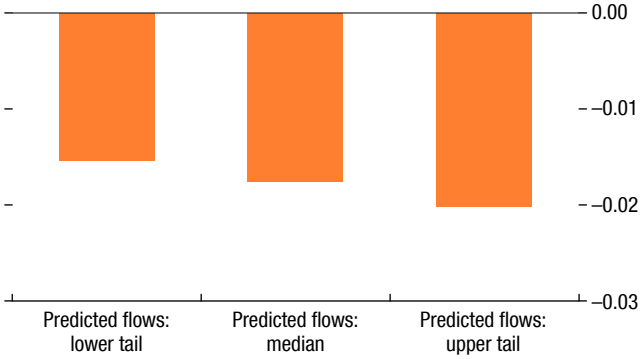
Tighter global financial conditions today decrease near-term debt flows in general.

1. Coefficients on the Global Financial Conditions Index (FCI) from Quantile Regressions of Near-Term Debt Portfolio Flows



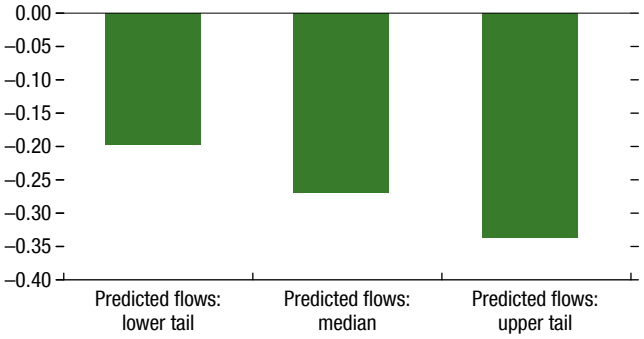
The risk aversion of global investors affects the outlook for debt flows across the board ...

2. Coefficients on the VIX from Quantile Regressions of Near-Term Debt Portfolio Flows



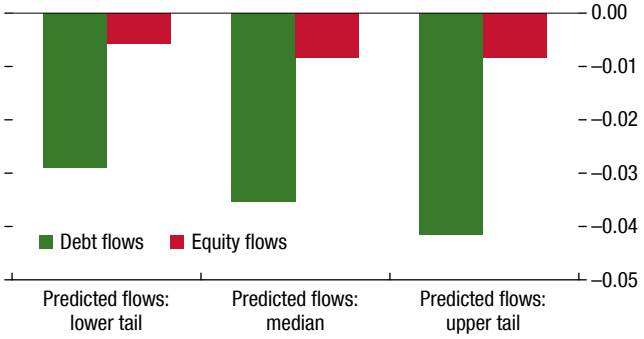
... while higher global interest rates disproportionately limit the likelihood of very large inflows.

3. Coefficients on the US Sovereign 10-Year Yields from Quantile Regressions of Near-Term Debt Portfolio Flows



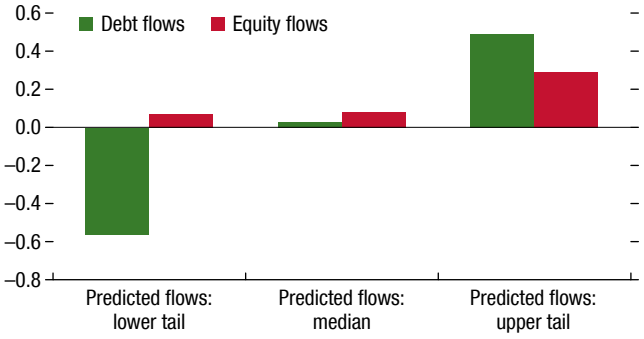
A stronger US dollar reduces the likelihood of strong flows more than it increases the likelihood of weak or negative flows, more so for debt flows than for equity flows.

4. Coefficients on the US Dollar Index from Quantile Regressions of Near-Term Debt and Equity Portfolio Flows



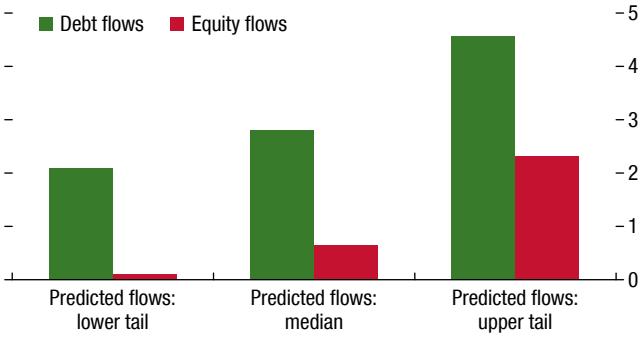
Higher debt vulnerability is negative for debt flows in general, but it increases the likelihood of negative or weak inflows much more than it increases the likelihood of large inflows.

5. Coefficients on the Ratio of Short-Term Foreign Currency Debt to Reserves from Quantile Regressions of Near-Term Debt and Equity Portfolio Flows



Deeper financial markets reduce the likelihood of negative or weak debt inflows and increase the likelihood of large inflows of both types of flows.

6. Coefficients on the Depth of Domestic Financial Markets Index from Quantile Regressions of Near-Term Debt and Equity Portfolio Flows



Sources: IMF, International Financial Statistics, Financial Flows Analytics, and Assessing Reserve Adequacy databases; World Bank; and IMF staff calculations.
Note: The reported coefficients come from quantile regressions of average quarterly debt or equity portfolio inflows in the current and next two quarters (as a percent of GDP) on a range of global and (lagged) domestic factors for a panel of emerging and frontier markets. The lower tail corresponds to average coefficients on explanatory variables from regressions for low percentiles (5th, 10th, 20th, 30th), median flows correspond to average coefficients from regressions for middle percentiles (40th, 50th, 60th), and upper tail corresponds to average coefficients for upper percentiles (70th, 80th, 90th, 95th). See Online Annex 3.1 for details.
FCI = Financial Conditions Index; VIX = Chicago Board Options Exchange Volatility Index.

contributes to an increased likelihood of strong equity inflows more than it improves the likelihood of strong debt inflows, while overall debt sustainability (as proxied by the ratio of short-term foreign currency debt to international reserves) seems to be more relevant for debt flows. In the context of the COVID-19 crisis, weakened growth prospects for emerging markets will worsen the outlook for equity portfolio flows more than for debt portfolio flows. Deeper domestic financial markets do not seem to matter when it comes to reducing the likelihood of negative or weak equity inflows in the same way as they do for debt flows.[9]

Hard Currency versus Local Currency Debt Portfolio Flows

While better domestic fundamentals and economic prospects improve the outlook for both local and hard currency debt portfolio flows, local currency flows are more sensitive to domestic factors than hard currency flows:

- Local currency debt flows appear to be more sensitive to the level of external vulnerabilities than hard currency debt flows. A higher level of short-term debt and weaker reserve adequacy significantly increase the likelihood of negative or weak inflows, especially for local currency flows (Figure 3.6, panel 1).[10] For example, a 1 percentage point rise in the ratio of short-term debt to international reserves could lower the local currency debt flows at risk[11] by 0.4 percent of GDP and hard currency debt flows at risk by 0.2 percent of GDP.[12]
- Local currency debt flows are more sensitive to domestic growth prospects than hard currency debt flows, especially the likelihood of extreme flows. Higher growth boosts expected flows but affects the tails of the portfolio flow distribution twice as much (Figure 3.6, panel 2). This also means that better growth prospects limit the likelihood of weak or negative inflows but also amplify the likelihood of very large inflows. The outlook for local currency flows is almost three times more sensitive to domestic growth than the outlook for hard currency flows.[13]
- Deeper domestic financial markets improve the outlook for both hard currency and local currency flows (Figure 3.6, panel 3) and significantly limit the likelihood of negative or weak flows. The result is in line with previous studies (October 2007 GFSR) and reflects the increased market liquidity (October 2018 GFSR) and decreased volatility (discussed later in this chapter) associated with greater market depth. The probability of significant bond outflows (equivalent to the 5th percentile of historical events) declines from about 35 percent to less than 10 percent when market depth increases by one standard deviation.

Tighter global financial conditions decrease expected portfolio flows and have a disproportionately larger impact on the likelihood of extreme flows.[14] Moreover, hard currency flows are almost twice as sensitive as local currency flows to changes in global financial conditions (Figure 3.6, panel 4). This may in part reflect differences in the investor base—hard currency bonds are typically held by global investors—whereas the local currency bond markets are typically dominated by domestic investors.[15] For example, benchmark-driven investors have a larger presence in hard currency than in local currency sovereign debt markets (April 2019 GFSR). The analysis implies that a much weaker growth outlook for emerging markets due to the COVID-19 outbreak will significantly worsen the outlook for local currency flows, while the outlook for hard currency flows will be relatively more affected by the sharp tightening in global financial conditions.

[9]The literature suggests that financial market depth can mitigate the impact of global shocks on portfolio flows by softening the asset price response to these shocks. For the role of institutional factors in capital flows, see Alfaro, Kalemli-Ozcan, and Volosovych (2008).

[10]An exception is local currency flows during surges, which potentially reflect investor confidence in successful refinancing.

[11]A measure of downside risks to capital flows, equal to the value of flows that will materialize with 5 percent probability.

[12]This is consistent with Anderson, Silva, and Velandia-Rubiano (2010), which finds that prudent public debt management with a focus on containing risks in the debt portfolio was an additional fundamental factor that strengthened emerging markets' resilience during the global financial crisis.

[13]Greater sensitivity of local currency bonds to domestic factors provides diversification for global investors (Miyajima, Mohanty, and Chan 2012).

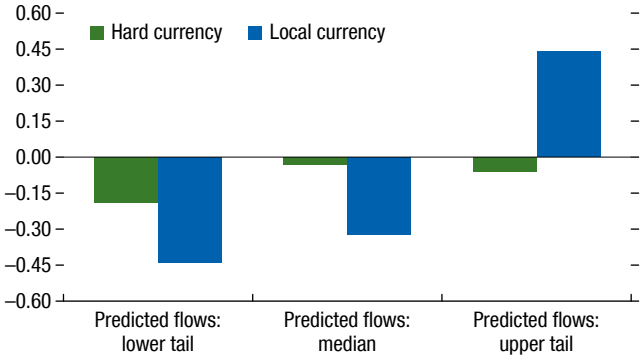
[14]Nier, Sedik, and Mondino (2014) also finds that risk appetite becomes the dominant driver of flows during crises.

[15]Median foreign ownership of emerging market local currency bonds is just about 20 percent, though this level has risen over the past decade.

Figure 3.6. What Drives Local Currency versus Hard Currency Debt Portfolio Flows?

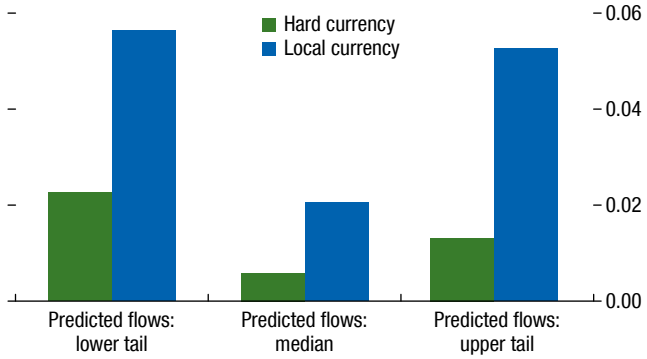
Higher short-term debt relative to reserves reduces the likelihood of negative or weak flows materially—especially for local currency flows.

1. Coefficients of Short-Term Debt/Reserves for Hard Currency and Currency and Local Currency Flows



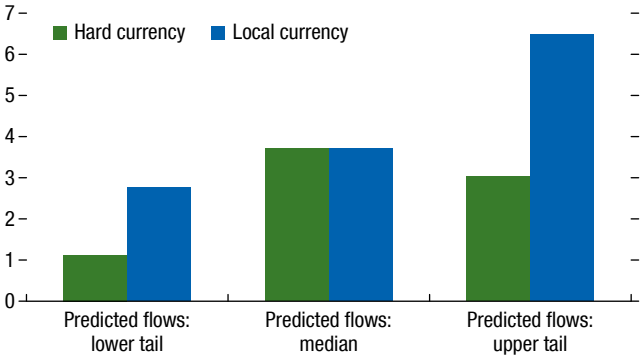
Local currency flows are more sensitive to domestic growth prospects, particularly the likelihood of extreme flows.

2. Coefficients of Domestic Growth for Hard Currency and Local Currency Flows



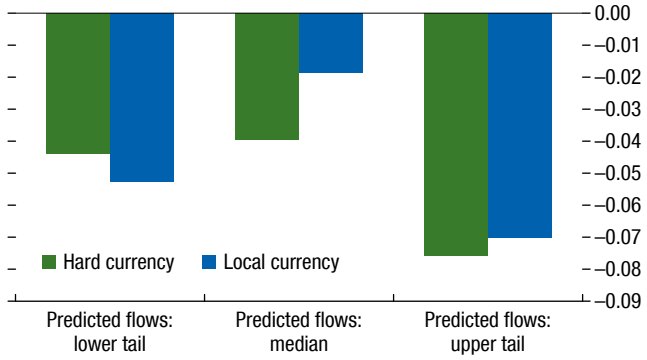
Greater market depth significantly improves the outlook for both hard currency and local currency portfolio flows.

3. Coefficients for Market Depth for Hard Currency and Local Currency Flows



Tighter global financial conditions have negative effects on both local currency and hard currency flows, with a somewhat larger impact on hard currency flows.

4. Coefficients for Global Financial Conditions Index for Hard Currency and Local Currency Flows



Sources: Bloomberg Finance L.P.; Haver Analytics; JPMorgan Chase & Co; Institute of International Finance; IMF, International Financial Statistics, Financial Flows Analytics, and Assessing Reserve Adequacy databases; World Bank; and IMF staff calculations.
Note: The reported coefficients come from quantile regressions of average quarterly debt portfolio inflows in the current and next two quarters (as a percent of GDP) on a range of global and (lagged) domestic factors for a panel of emerging and frontier markets. The lower tail corresponds to average coefficients on explanatory variables from regressions for low percentiles (5th, 10th, 20th, 30th), median flows correspond to average coefficients from regressions for middle percentiles (40th, 50th, 60th), and the upper tail corresponds to average coefficients for upper percentiles (70th, 80th, 90th, 95th). See Online Annex 3.1 for details. In panel 4, the larger sensitivity of hard currency flows to global factors may reflect the attendant exchange rate volatility and its impact on the issuer's repayment capacity in the presence of foreign exchange mismatches.

Impact of Portfolio Flows on the Level and Volatility of Funding Costs

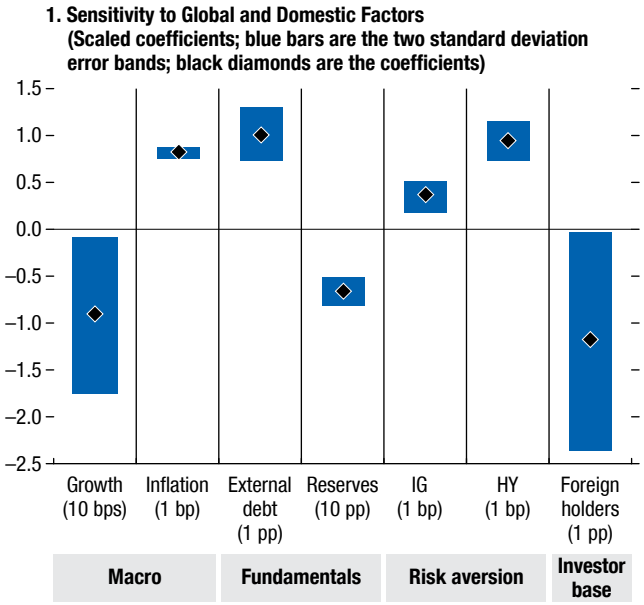
The pricing of sovereign debt securities is linked to country-specific fundamentals (Edwards 1985) but is also influenced by global investors' risk appetite (Eichengreen and Mody 2000). Strong domestic fundamentals help lower funding costs (Baldacci and Kumar 2010), while tight global financial conditions can widen spreads (Ebner 2009; Peiris 2010). Global risk appetite becomes especially relevant during periods of stress (González-Rozada and Levy-Yeyati 2008) because it can interact with domestic vulnerabilities to amplify the impact on borrowers, especially those with weaker fundamentals (Nickel, Rother, and Rülke 2009).

Foreign participation in local currency bond markets can be a mixed blessing:

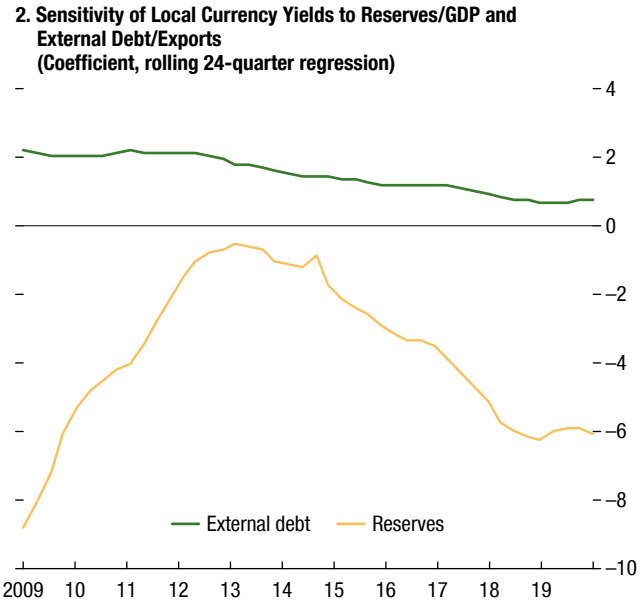
- Nonresident holdings of bonds can reduce borrowing costs, currency mismatches, and rollover risks associated with external borrowing. In addition, by

Figure 3.7. Emerging Market Local Currency Bond Yields

Funding cost is lowered by stronger domestic fundamentals and higher foreign participation.



Local currency bond yields have become more sensitive to reserve adequacy and less sensitive to the level of external debt.



Sources: Bloomberg Finance L.P.; Haver Analytics; Institute of International Finance; JPMorgan Chase & Co; and IMF staff calculations.
Note: Panels 1 and 2 report the unconditional effect of domestic and global factors on the local currency bond yields. In panel 1, variable coefficients are scaled by a given metric; for example, for every 10 basis point increase in growth, yields change by –0.9 basis points as per the panel. For every 1 percentage point increase in external debt (to exports), yields change by 1 percentage point. bp = basis point; HY = high yield; IG = investment grade; pp = percentage point.

diversifying the investor base, issuers can increase their flexibility and boost the potential size of the market beyond the absorption capacity of their domestic investor base.

- At the same time, investment decisions by foreign investors can strengthen the link between exchange rate fluctuations and domestic financial conditions. Foreign investors can create or reinforce exchange rate pressures, and a reduction in their positions can create domestic debt rollover risks. Local currency bond outflows can also increase term premiums and increase long-term interest rates, which in turn can affect domestic activity (Carstens 2019). Ebeke and Kyobe (2015) suggests that foreign holdings transmit global financial shocks to local currency sovereign bond markets by increasing yield volatility and, beyond a certain threshold, amplifying spillovers from global shocks.

Depth of domestic financial markets can help countries mobilize savings, promote information sharing, and diversify risk. Deep financial systems can also support financial stability by helping buffer the economy against external shocks and by dampening the volatility of asset prices (Sahay and others 2015).[16]

Level of Funding Costs

Stronger domestic fundamentals are associated with lower funding costs (Figure 3.7, panel 1).[17] High inflation increases local currency bond yields, while better growth prospects contribute to lower yields. Elevated vulnerabilities and lower buffers tend to increase the cost of funding: higher levels of external debt and lower levels of foreign exchange reserves are associated with higher local currency yields. IMF staff analysis suggests that the sensitivity of local currency bond yields to the level of foreign exchange reserves has increased in recent years, while sensitivity to external debt appears to have declined somewhat

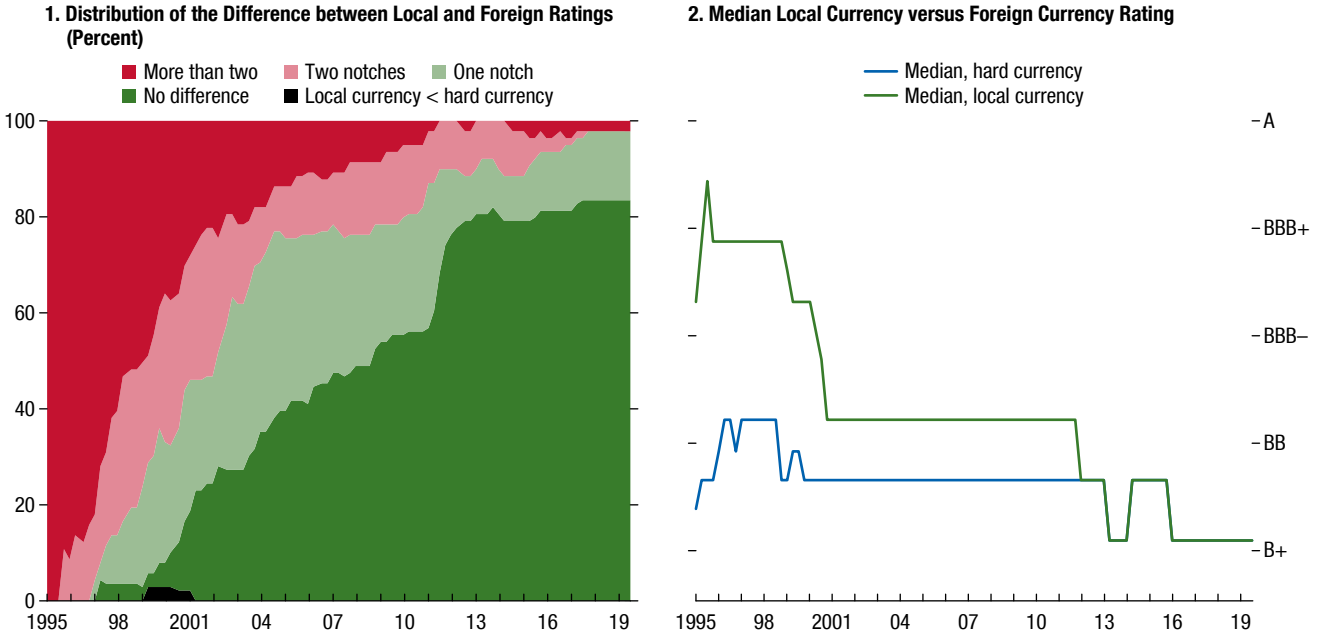
[16]Sahay and others (2015) also points out a potentially dark side of financial deepening in terms of financial stability; that is, a "too much finance effect."

[17]See Baldacci and Kumar (2010), Jaramillo and Weber (2013), and Piljak (2013).

Figure 3.8. Local Currency versus Hard Currency Sovereign Ratings

The local currency ratings advantage has narrowed significantly over time ...

... driven by an overall worsening of ratings.



Sources: Bloomberg Finance L.P.; and S&P Capital IQ.
Note: Panels reflect S&P sovereign credit ratings.

as the search for yield has intensified (Figure 3.7, panel 2).[18]

Lower-rated bond issuers are found to be more vulnerable to swings in global investor risk sentiment than higher-rated issuers,[19] as suggested by analysis of yield sensitivity to global risk-aversion shocks (Figure 3.7, panel 1). For example, a 100 basis point increase in US BBB-rated corporate spreads could widen yields of high-yield emerging market bonds by almost 100 basis points, compared with only 40 basis points for investment-grade issuers.

Greater foreign participation also helps reduce local currency yields (as in Ebeke and Lu 2015), which reflects the investor confidence channel as well as the role of foreign investors in the development of local bond markets (Peiris 2010).

Credit ratings also play an important role in determining funding costs (Jaramillo and Tejada 2011), even after accounting for fundamentals, as they alter investor behavior and eligibility. Local currency debt has been deemed safer by sovereign debt managers (Amstad, Packer, and Shek 2018), and this has aided the push toward greater local currency borrowing.[20] However, the ratings gap between local and foreign currency debt has narrowed significantly over time as the local currency rating advantage has withered away. For 80 percent of the countries in the sample, there is currently no difference between the local and foreign currency rating, compared with 50 percent at the time of the global financial crisis and 20 percent during the Asian financial crisis (Figure 3.8, panels 1 and 2). This convergence has been driven by a worsening of local currency ratings.[21]

[18]This might also reflect the lengthening of maturities by investors.

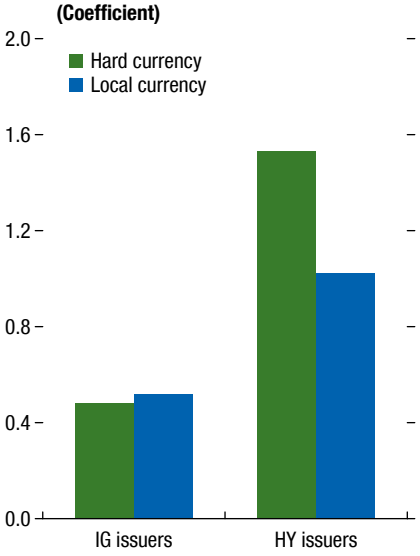
[19]The results are consistent with the hard currency spread analysis conducted in the October 2019 GFSR.

[20]Led by China's domestic bond market boom (Dehn 2019), local currency bonds now account for almost 90 percent of the marketable emerging market fixed-income universe compared with 75 percent in 2008.

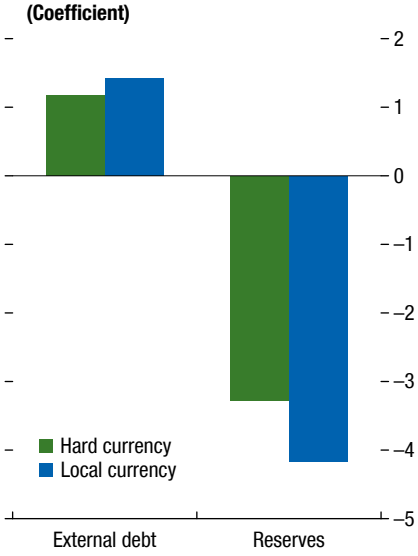
[21]This reflects country-level downgrades (Brazil, South Africa, Turkey) and increased recognition that sovereigns do default in local currency (Reinhart and Rogoff 2009), as well as more local currency ratings, possibly for the lower-rated countries (Amstad, Packer, and Shek 2018).

Figure 3.9. Drivers of Hard Currency versus Local Currency Spreads

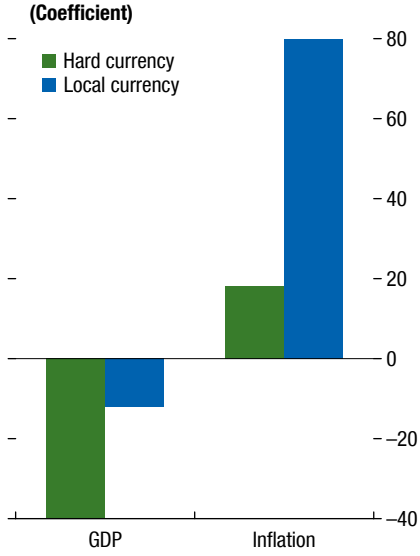
External spreads are more affected by shocks in global risk aversion.



Local currency spreads are more affected by domestic vulnerabilities and buffers.



GDP growth has a greater impact on hard currency bond spreads.



Sources: Bloomberg Finance L.P.; Haver Analytics; Institute of International Finance; JPMorgan Chase & Co; and IMF staff calculations.
Note: Spreads on local currency bonds are proxied by subtracting the five-year US Treasury yield from the local currency yields. The specification for local currency spreads is the same as discussed for local currency yields in the previous section and described in Online Annex 3.1. The model for the hard currency spreads is the same as introduced in the October 2019 *Global Financial Stability Report*. HY = high yield; IG = investment grade.

There are also notable differences between hard and local currency debt in terms of drivers of their valuations.[22] Hard currency bond spreads, especially for high-yield issuers, are affected about 60 percent more by global risk aversion shocks (Figure 3.9, panel 1). Local currency spreads are more sensitive to domestic vulnerabilities, including external debt and reserve adequacy (Figure 3.9, panel 2).[23] Economic fundamentals have a mixed effect, with domestic inflation disproportionately increasing local currency spreads (Figure 3.9, panel 3). Every percentage point rise in inflation increases local currency bond spreads by more than 70 basis points, but by only 20 basis points for hard currency bond spreads, and GDP growth has a greater impact on hard currency bond spreads.

Volatility of Funding Costs

IMF staff analysis finds evidence that greater foreign participation in local currency bond markets increases the volatility of yields after it reaches a certain threshold, while further domestic financial deepening helps reduce the volatility of yields. In particular, conditional on domestic factors, when the size of foreign investor bond holdings exceeds about 40 percent of the country's international reserves, the volatility of yields is found to increase by about 15 percent (see Table 3.1 and Online Annex 3.1). Controlling for the same factors and the threshold effect for foreign participation, the analysis finds that domestic financial market deepening decreases volatility significantly.[24] On average, domestic financial market deepening helped emerging market economies dampen volatility by 39 percent during 2004–17.

[22]These spreads capture only part of the funding costs. The level of local currency yields can also be affected by monetary policy.

[23]Du and Schreger (2013) also finds that local currency bond spreads are less sensitive to global factors than hard currency bond spreads.

[24]The variable used for financial market deepening does not capture all aspects of market depth—for example, the amount of foreign exchange liquidity, which could also act as a mitigating factor (as in Mexico and South Africa), is not accounted for.

Table 3.1. Contribution of Financial Market Depth and Foreign Participation to the Volatility of Yields

Estimates show that financial market depth increases volatility when foreign participation rises beyond a 40 percent threshold.

Variable Threshold (Percent)	Financial Market Depth	Dummy: Foreign Participation
37	–1.051***	0.009
38	–1.029***	0.060
39	–1.015***	0.090
40	–0.980***	0.147**
41	–0.969***	0.163**
42	–0.967***	0.205***
43	–0.980***	0.188**

Source: IMF staff calculations.

Note: The sample is based on quarterly data from 18 emerging market economies during 2004–17. The number of observations is 741. Country and quarter fixed effects are included. The dependent variable is volatility of yield. The dummy is defined using the ratio of different thresholds of foreign participation in local currency bond markets to reserves. Control variables include the current account balance, external debt, government debt, reserves as shares of GDP, growth rate of GDP, inflation, exchange rate against the US dollar, and turnover in the foreign exchange market. Results are robust to dropping these control variables and are not driven by any of the countries in the sample. Results are very similar for the depth of financial institutions (see Online Annex 3.1).

***$p < 0.01$; **$p < 0.05$; *$p < 0.1$.

Foreign Investor Participation in Frontier Markets and Debt Rollover Risks

Strong investor interest in frontier market economies in 2017–19 led to a notable increase in nonresident exposures in the foreign exchange and local currency bond markets. Local currency bond markets in Egypt and Nigeria have consistently had some of the largest overweight exposures in investor surveys, with most of the foreign holdings concentrated in their high-yielding short-term debt market segments. As a result, the share of foreign holdings of local currency debt in several frontier markets reached levels similar to those prevalent in emerging markets, despite the relatively weaker fundamentals and policy frameworks in frontier market economies (Figure 3.10, panel 1). Evidence so far from the COVID-19–induced market turbulence suggests that economies with greater nonresident investor participation in domestic bond markets experienced larger yield increases (Hofmann, Shim, and Shin 2020) and higher exchange rate volatility. Frontier markets underperformed, experiencing large outflows[25] and acute exchange rate pressure, with 12-month nondeliverable forwards depreciating by more than 20 percent in some cases (Figure 3.10, panel 2).

Frontier market economies often lack financial depth and have a relatively shallow domestic investor base.[26] Many of them rank well below the emerging market median in terms of overall financial development and the depth of local financial markets (Figure 3.10, panel 3). The lack of financial depth is also reflected in more challenging local market liquidity conditions, with bid-offer spreads and the price impact of trades typically being much larger than in other emerging markets (Figure 3.10, panel 4). Limited market liquidity tends to compound market pressures in times of stress, due to reduced capacity of market makers to intermediate flows, and may also impair monetary policy transmission, especially in countries where foreigners are concentrated in short-term instruments.

Emerging signs of financing strains, combined with a greater need for debt issuance to support COVID-19–related fiscal spending and a difficult external demand outlook (most notably, for oil and tourism revenues), pose significant risks for frontier market economies. Short-term relief from debt payments to official creditors announced by the IMF, the World Bank, and the Group of Twenty (G20) in April 2020 provides vulnerable economies with some breathing room to handle the health emergency. But over the near term, many frontier market economies may need to rethink the currency composition of their debt issuance, the extent of reliance on official versus private creditors, and the extent of foreign investor participation in their local markets.

Over the long term, beyond the COVID-19 pandemic, frontier market economies should seek to develop their local financial markets where feasible. The empirical estimates based on the analysis in this chapter suggest that a further deepening of domestic financial markets and institutions to the emerging market average level could help an average frontier market economy lower the volatility of

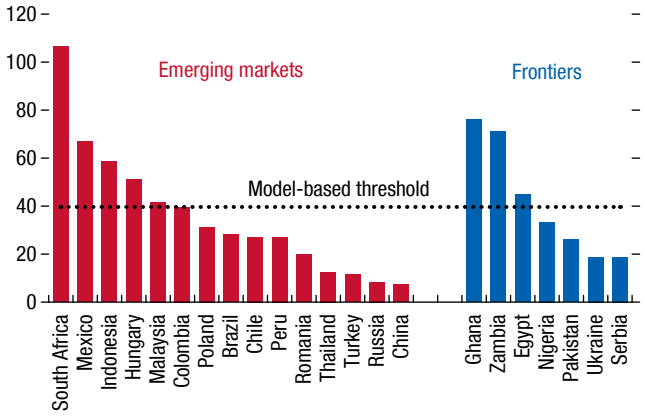
[25]For example, there were reports of large outflows in local currency debt and/or reserves declines in Egypt and Nigeria.

[26]In addition, none of the countries in the frontier market sample are yet included in any of the major global index or emerging market bond indices. In comparison, several emerging market local currency bond markets are part of both global and emerging market types of indices (for example, Malaysia, Mexico, Poland, South Africa), which can help them attract more buy-and-hold foreign investors.

Figure 3.10. Local Currency Debt Markets

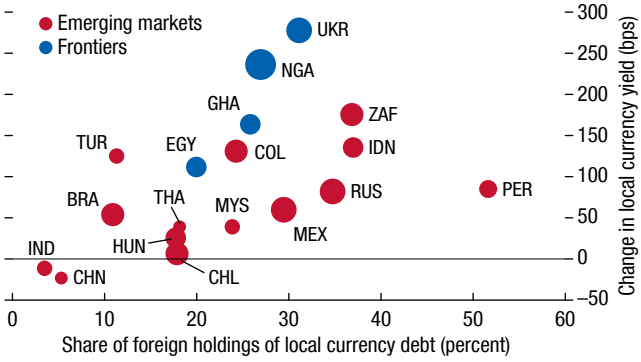
Foreign participation in local currency bond markets is comparable between emerging and frontier market economies.

1. Foreign Holdings of Local Debt (Percent of reserves)



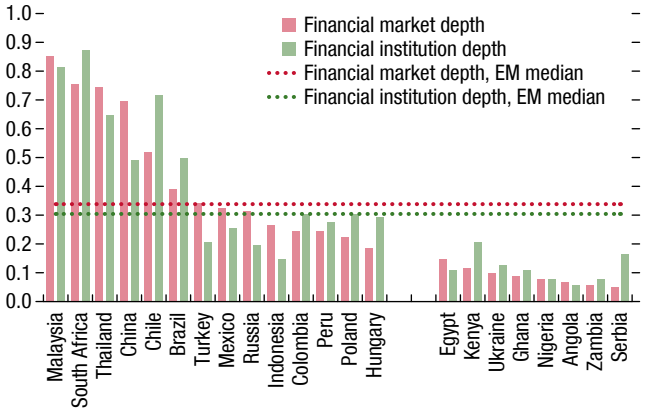
Generally, countries with a larger share of nonresident investors in their local markets saw a larger increase in their bond yields.

2. Local Currency Yields, Exchange Rate Volatility, and Foreign Holdings of Local Currency Debt (Bubble size is three-month realized exchange rate volatility)



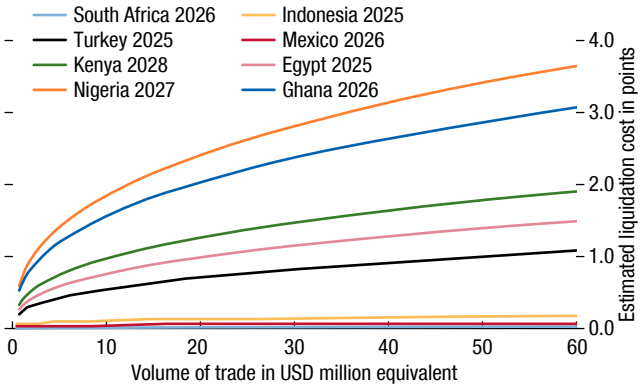
A shallower domestic investor base and lower financial depth have the potential to create higher volatility ...

3. Financial Market and Institutions Depth Score (Index)



... and limited liquidity can augment market volatility.

4. Estimates of Price Impact of Trade for Selected Bonds (Percentage points; millions of US dollars)



Sources: JP Morgan Chase & Co.; and IMF staff calculations.
Note: Panel 1 and 2 holdings data are latest available as of the end of February 2020. Reserve data are end-2019 estimates as of the end of 2019. For Nigeria and Egypt, only Treasury bill holdings are considered. Panel 2 exchange rate volatility for frontiers is calculated using nondeliverable forwards. The panel 3 index is calculated based on latest available data as of 2017. Panel 4 estimates use the liquidity assessment function in Bloomberg as of January 2019. In panel 2, data labels use International Organization for Standardization (ISO) country codes. bps = basis points; EM = emerging market; USD = US dollar.

its local currency bond yield by almost 30 percent. The capital-flows-at-risk analysis also suggests that if frontier market economies were to increase their financial depth to the emerging market average level, their portfolio debt flow outlook could improve by 1.2 percent of GDP, on average, and the probability of net nonresident outflows could decline by 15 percentage points.

Policy Priorities

The analysis presented in this chapter focuses on the cost-risk considerations related to different types of portfolio flows that have a bearing on sovereign debt management, capital flow management, exchange rate, and macroprudential policies. These policies can play an important role in containing external pressures and help cushion

the corresponding macroeconomic and financial impacts that emerging markets are facing during the COVID-19 crisis.

What Should Policymakers Do Now?

The specific policy responses to external pressures will depend on the nature of the shock (for example, liquidity versus solvency crisis), fiscal and monetary policy space, depth of financial markets, and balance sheet vulnerabilities, among others (see Chapter 1 for a broader discussion of policy priorities). However, there are some common principles that can help guide policy choices:

Foreign Currency Interventions

- For countries with flexible exchange rates, credible monetary frameworks, low inflation, deep financial markets, and the absence of large currency mismatches, the exchange rate should be a key shock absorber.
- For countries with adequate reserves, exchange rate intervention can lean against market illiquidity and thus play a role in muting excessive volatility. However, interventions should not prevent necessary adjustments of the exchange rate. Interventions should be based on the expectation that the pressures arising from the current crisis could last several months or longer.
- Countries with fixed or tightly managed currency regimes, including some major oil exporters and frontier markets, have more difficult trade-offs to consider. If reserves are adequate, maintaining the currency regime may be the best course of action in the short term. Exchange rate intervention, however, may need to be supported by monetary policy tightening and possibly capital flow management measures. These policies should also be based on the expectation that outflow pressures could last several months or longer, which may put current currency regimes under severe strain.

Capital Flow Management Measures

- In the face of an imminent crisis, introducing capital outflow management measures could be part of a broad policy package, but these measures cannot substitute for, or avoid, warranted macroeconomic adjustment. If nonresident outflows are a significant driver of overall outflows, minimum holding periods, caps, and other limits on nonresidents' transfers abroad could be considered with due consideration for the country's international obligations. Such measures should be implemented in a transparent manner, temporary, and lifted once crisis conditions abate.

Sovereign Debt Management Strategy

- Sovereign debt managers should prepare for long-term external funding disruptions. Countries that still enjoy market access at reasonable rates should actively decrease rollover risks as part of their debt management strategy. From the perspective of the trade-off between cost and risk, lowering rollover risks should take priority over concerns about containing costs when there are large downside risks stemming from potential loss of market access. Given the considerable sensitivity of the private sector and some state-owned enterprises to commodity prices, sovereign debt managers should consider the interactions between the government's financing strategy and other domestic issuers in times of stress to ensure that debt management activities of the government do not exacerbate risks (IMF 2014).

Macroprudential Policy

- If there are macroprudential buffers available, a relaxation of these tools can reduce the impact of the current shock on market conditions as well as on the economy in general. For example, foreign currency reserve requirements can be relaxed to mitigate foreign exchange funding pressures. Furthermore, countries that have introduced additional liquidity coverage ratio requirements in foreign currency can allow banks to use the buffer or relax the requirement.

Looking Beyond the Current Crisis

For frontier market economies with less-developed financial systems, *local capital market development* and the promotion of a stable and diversified local investor base should be a priority. This would require coordination among public stakeholders and proper sequencing of reforms (IMF 2020). Specific measures include (1) developing efficient money markets, (2) strengthening primary market practices to enhance transparency and predictability of issuance, (3) bolstering market liquidity, (4) developing a robust market infrastructure,

and (5) establishing a sound legal and regulatory framework for securities.

During periods of strong investor appetite, *macroprudential tools* may be put in place or tightened preemptively—before an inflow surge occurs—and maintained over the long term or permanently to build resilience and/or contain the buildup of systemic financial risk. Policymakers should weigh all evidence about encouraging the participation of foreign investors beyond a level considered prudent after taking into account the capacity of their local markets to absorb external shocks without excessive volatility. In particular, when local markets are at an early stage of development and there is limited room to adjust macroeconomic policies, authorities should proceed with caution when it comes to liberalizing portfolio inflows. Countries with portfolio flow restrictions that intend to liberalize might consider a gradual approach by moving toward either quantitative limits or price-based restrictions (for example, taxes, reserve requirements) that could mitigate the risk of excessive inflows.

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CHAPTER 4

BANKING SECTOR

LOW RATES, LOW PROFITS?

Chapter 4 at a Glance

- Over the past decade, very low interest rates have been associated with compressed bank net interest margins in several advanced economies, and this should continue over the medium term.
- The support to earnings provided by falling rates in recent years—stemming from gains on securities holdings and lower provisions—will fade in the medium term, putting sustained pressure on banks' profits.
- Cost cutting and higher fee income should help, but these mitigating factors are unlikely to fully lessen pressures on banks' profitability.
- Looking ahead, there is a danger that profitability challenges could induce banks to take on excessive risks once the economy fully recovers.
- Once the COVID-19 emergency is resolved, a combination of structural and financial policies could help mitigate future vulnerabilities and ensure an adequate supply of credit to the economy.

Profitability has been a persistent challenge for banks in several advanced economies since the global financial crisis. While monetary policy accommodation has helped sustain economic growth during this period and has provided some support for bank profits, very low interest rates have compressed banks' net interest margins (the difference between interest earned on assets and interest paid on liabilities). Looking beyond the immediate challenges faced by banks as a result of the coronavirus (COVID-19) outbreak, a persistent period of low interest rates is likely to put further pressure on bank profitability over the medium term. A simulation exercise conducted for a group of nine advanced economies indicates that a large fraction of their banking sectors, by assets, may fail to generate profits above their cost of equity in 2025. Once immediate challenges recede, banks could take steps to mitigate pressures on profits, including by increasing fee income or cutting costs, but it may be challenging to fully mitigate profitability pressures. Over the medium term, banks may seek to recoup lost profits by taking excessive risks. If so, vulnerabilities could build in the banking system, sowing the seeds of future problems. Authorities can implement a number of policies to help mitigate vulnerabilities arising from excessive risk taking and ensure an adequate flow of credit to the economy, including the removal of structural impediments to bank consolidation, the incorporation of a low-interest-rate-environment scenario on banks' risk assessments and supervision, and the use of macroprudential policies to tame banks' incentives for excessive risk taking.

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Banks Have Faced Persistent Profitability Challenges

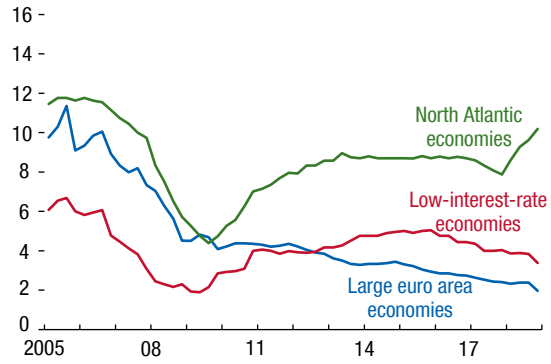
Banks globally have more and better-quality capital, hold more liquid assets, and borrow less from short-term markets than they did before the global financial crisis. This means that, on aggregate, the banking sector is better prepared to confront losses and liquidity stresses. The resilience of banks, however, may be tested in some countries in the face of the sharp slowdown in economic activity resulting from the COVID-19 pandemic and the associated, necessary containment measures, especially if the downturn turns out to be more severe and lengthier than currently anticipated.

Rather than looking at the immediate challenges facing banks, which are discussed in Chapter 1, this chapter focuses on bank profitability over the next few years in an environment of persistent low interest rates and flat yield curves. The analysis is based on a large sample of banks in nine advanced economies—the Group of Seven economies plus two other advanced economies that currently have, or have experienced, negative policy rates. These countries are divided into

Figure 4.1. Large Advanced Economy Bank Profitability and Cost of Equity

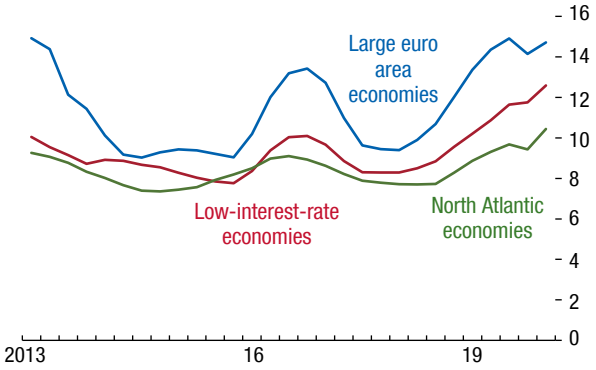
Profitability continues to be a challenge for some banks ...

1. Median Bank Return on Equity (Percent)



... particularly when return on equity is below the cost of equity required by investors.

2. Median Market Implied Bank Cost of Equity (Percent, four-quarter moving average)



Sources: Bloomberg Finance L.P.; S&P Market Intelligence; SNL Financial; and IMF staff calculations.
Note: The figure is based on a sample of more than 5,000 banks in nine advanced economies. Large euro area economies = France, Germany, Italy; low-interest-rate economies = Japan, Sweden, Switzerland; North Atlantic economies = Canada, United Kingdom, United States.

the North Atlantic economies (Canada, United Kingdom, United States), the large euro area economies (France, Germany, Italy), and the low-interest-rate economies (Japan, Sweden, Switzerland). The chapter presents an econometric analysis of the drivers of bank profitability and a novel forward-looking simulation of profitability to illustrate the challenges banks could face in a scenario consistent with the latest medium-term projections of economic activity in the April 2020 *World Economic Outlook* and market expectations of interest rates.[1]

Bank profitability challenges came to the fore during the global financial crisis, which delivered a devastating blow to bank profits in these advanced economies (Figure 4.1, panel 1). Over time, profitability has recovered in North Atlantic banks (particularly in Canada and the United States), where interest rates have been higher. However, there has been less improvement among banks in large euro area countries beset with the sovereign debt crisis; low economic growth; and a number of structural challenges, such as high operational costs and debt overhang (as discussed in the April 2017 *Global Financial Stability Report* [GFSR]). Profits in the low-interest-rate economies—especially Japan—have been weak for years, and this trend has been deepening as policy rates have been cut further.

Profitability is a concern because it affects bank resilience. While a very high level of profitability could indicate excessive risk taking, low profits mean that it takes longer for banks to build capital against unexpected losses. Slower capital accumulation also constrains banks' provision of credit to support the economy and their ability to absorb shocks, such as mark-to-market losses on their investments or credit losses on loans extended to households and firms. Consistently weak profitability—where the ex post return on equity is below the ex ante cost of equity capital (the return that shareholders require)—also makes it more difficult for banks to raise new capital from the market.

This last factor provides a useful benchmark for profitability. Banks with a return on equity below the cost of equity can be said to have an insufficient level of profitability. In this chapter, the cost of equity is measured as the ratio of a bank's return on equity to the price-to-book ratio (this formulation is based on the Gordon growth model; see Online Annex 4.1).[2]

[1]The number of banks included varies across the exercise because of their different data requirements. While the econometric exercise relies on a sample of about 12,000 banks, the estimation of the effective maturity profiles that are fed into the forward-looking simulation and the actual simulation rely on 1,000 banks. The details of the sample composition are reported in Online Annex 4.1 (all annexes are available at www.imf.org/en/Publications/GFSR). Consolidated data for individual banks are used for these analyses.

[2]According to the Gordon growth model, the share price of a firm can be written as the ratio of its dividend per share to the difference between its cost of equity and long-term growth of earnings. Under the usual assumption that earnings remain stable in the long

While this market-implied cost of equity varies over time, the median for each region has ranged from 8 percent to 14 percent since 2013 (Figure 4.1, panel 2).

A decline in interest rates can affect bank profitability through four main channels.[3]

- *Changes in net interest margins:* The replacement of maturing loans by new ones issued at lower interest rates, along with a repricing of bank deposits and other funding instruments, affects banks' net interest margins.[4] Between 2013—the year immediately after the euro area debt crisis—and 2015, interest rates on deposits fell at a faster rate, on average, than rates on loans, helping cushion the impact on net interest margins (phase 1 in Figure 4.2, panel 1). After 2015, however, deposit rates flattened out while interest rates on loans continued to fall (phase 2 in Figure 4.2, panel 1). This dynamic led to a fall in net interest margins in many countries (Figure 4.2, panel 2).
- *Declines in loan loss provisions:* Low interest rates can stimulate economic activity (Box 4.1 discusses this in more detail). Continued accommodative monetary policy—including asset purchase programs, forward guidance, and negative policy rates—has been crucial in supporting the global economic recovery over the past decade and is playing a key role in responding to the COVID-19–related challenges currently faced by the global economy. A more dynamic economy benefits households and firms by increasing their incomes and profits while, at the same time, lower rates reduce their interest burdens. These two factors tend to reduce borrowers' probability of default, enabling banks to lower their provisions against expected loan losses.
- *Higher credit growth:* Low interest rates and higher economic activity stimulate credit growth, resulting in higher revenues for a given level of net interest margins. However, this would not mechanically result in higher return on assets, unless the expansion takes place through a shift to customer loans from lower yielding securities and interbank assets. Higher credit growth, nevertheless, could lead to an increase in return on equity if the expansion in assets is accompanied by an increase in leverage.
- *Higher noninterest income:* A more dynamic economy could also result in higher noninterest income (for example, through fees) if some activities, such as mergers and acquisitions, become more prevalent. Another source of banks' noninterest income—gains on their securities portfolios—could also increase when rates decline, as the latter would lead to a rise in asset prices (Figure 4.2, panel 3).

The change in the median bank's profitability as a result of these various channels is shown in Figure 4.2, panel 4, for 2013–18. While the compression in net interest margins has contributed importantly to lower median net interest income in most countries, this has been partly offset by lower provisioning and, in a few cases, higher noninterest income. Banks have also sought to offset lower revenues by cutting operating expenses. The overall result has been mixed so far, with median return on assets actually rising in three of the economies, falling in four others, and remaining stable in the other two. This result is consistent with a strand of the literature that estimates that low rates have had little impact on bank profitability so far but expresses concern that further cuts or prolonged low rates will depress future profitability (see, for example, IMF 2017).

An econometric exercise for the nine banking systems considered in this chapter reveals how much of the fall in net interest margins between 2013 and 2018 has been due to lower rates and flatter yield curves. This analysis relates bank net interest margins to bank characteristics, the economic environment, short-term interest rates, and the term spread between long- and short-term interest rates (see Online Annex 4.1 for

term, the formula described above can be easily derived (see Online Annex 4.1). Alternative methods can be used to estimate the cost of equity. For example, Kovner and van Tassel (2019), using the capital asset pricing model, estimates US banks' cost of equity at 10.5 percent. Surveys of banks, conducted by the European Banking Authority (2018), find that two out of three banks estimate that their cost of equity was between 8 percent and 10 percent.

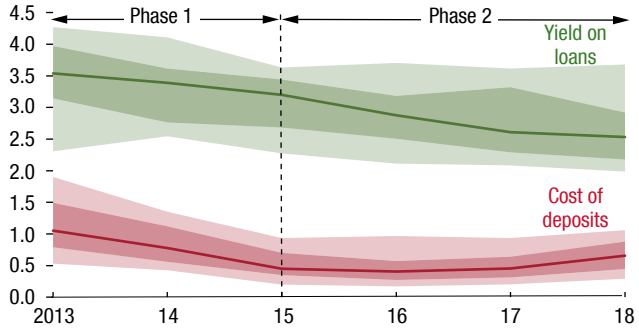
[3]These four channels are always present, but the overall direction of variables, such as provisions or credit, will depend on whether the decline in interest rates takes place in response to other shocks. For instance, adverse macroeconomic shocks, such as the recent COVID-19 shock, can induce policymakers to cut short-term policy rates and, at the same time, trigger adverse movements in all four of the channels that affect bank profitability described above, and this could lead to a situation where low rates coincide with higher credit losses and lower credit growth.

[4]This repricing effect depends on the whole term structure of interest rates—the rates prevailing at different maturities, their past trajectory, the prevalence of fixed and floating rate loans, and the use of interest rate derivatives, for example for hedging purposes.

Figure 4.2. Interest Rates and Bank Profits

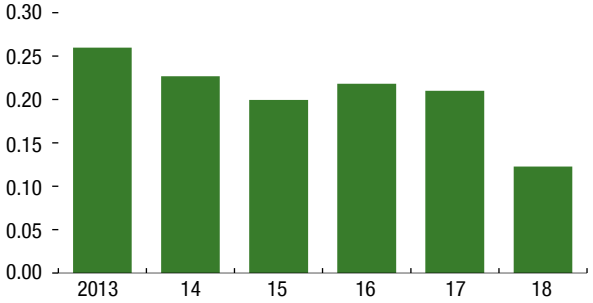
Bank deposit rates fell quickly but have stabilized near zero, while bank lending rates have continued to fall ...

1. Bank Interest Rates across Economies
(Percent)



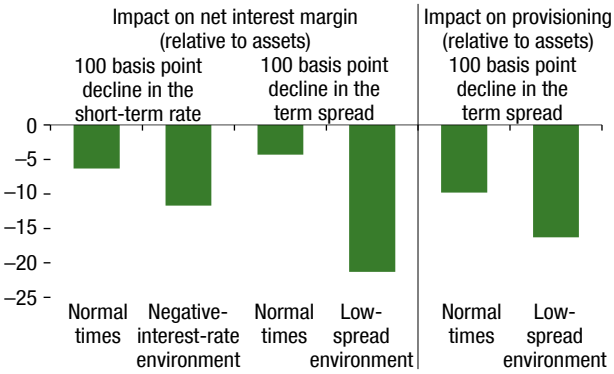
Gains from securities have been shrinking, and this trajectory may continue.

3. Banks' Net Gain on Securities
(Percent of assets)



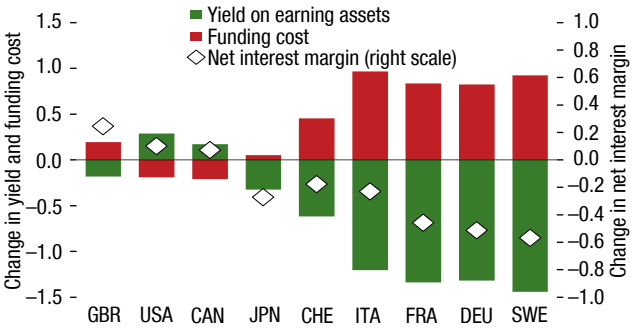
These results are supported by an econometric analysis ...

5. Impact of a Decline in Rates and Term Spreads on Bank Net Interest Margins and Provisions
(Basis points)



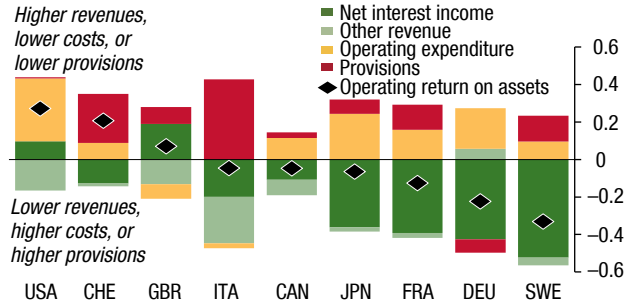
... which has squeezed bank net interest margins.

2. Changes in Bank Yields and Funding Costs, 2013–18
(Percentage points)



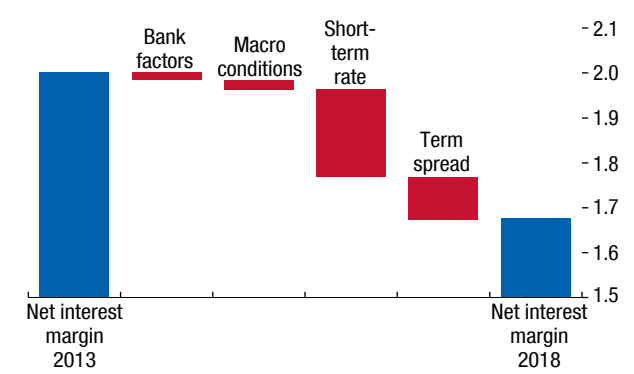
Lower net interest income has been partly offset by a cutback in provisioning and lower operating expenses.

4. Change in Median Bank's Return on Assets, 2013–18
(Percentage points)



... which can be used to illustrate the main drivers of the fall in net interest margins.

6. Contributions to the Change in Net Interest Margins: Large Euro Area and Low-Interest-Rate Economies
(Percentage points)



Sources: Bloomberg Finance L.P; European Central Bank; Fitch Connect; Haver Analytics; S&P Market Intelligence; SNL Financial; and IMF staff calculations.
Note: The figure is based on a sample of banks from nine large advanced economies. In panel 1, the shaded areas show the 10th–90th percentiles of the interest rates across the nine economies, while the dark shading shows the 25th–75th percentiles, and the line shows the median. Panels 5 and 6 are based on the econometric exercise described in Online Annex 4.1. In panels 2 and 4, data labels use International Organization for Standardization (ISO) country codes.

an explanation of the methodology).[5] The analysis—summarized in Figure 4.2, panel 5—indicates that a 100 basis point decline in short-term interest rates reduces net interest margins (relative to assets) for the average bank in the sample by about 6 basis points in normal times (when short-term interest rates are positive); this effect, however, is larger—12 basis points—when short-term interest rates are negative, indicating a nonlinear relationship. Similarly, a 100 basis point fall in the term spread leads to a decline in net interest margins (relative to assets), on average, and this effect is much larger—at nearly 21 basis points—in a period of low spreads (when the spread between the 10-year and 3-month rates is below 1 percent).[6]

The same exercise also confirms the offsetting impact that lower interest rates can have on bank profitability through lower provisioning (Figure 4.2, panel 5). A 100 basis point decline in the term spread is estimated to lead to a 15 basis point fall in provisions (relative to assets) in a low-spread environment. In addition, a 1 percent increase in economic growth is associated with a 1.2 basis point reduction in the ratio of loan loss provisions to assets.

The results from this econometric exercise can also be used to decompose the relative importance of the interest rate environment and other factors in driving changes in net interest margins (Figure 4.2, panel 6). Such a decomposition reveals that, for the average bank in the large euro area and low-interest-rate economies included in the sample, lower short-term rates and a tightening in term spreads can account for a sizable part of the fall in net interest margins over 2013–18.[7] The role of the interest rate environment is relatively lower in North Atlantic economies over this period.

Bank Profits are Likely to Come under Further Pressure

The bank profitability outlook for the near-term (2020–21) is likely to be adversely affected by sharply rising credit costs due to the economic downturn resulting from the COVID-19 outbreak (see Chapter 1). As discussed, banks in most of the countries considered in this chapter had already displayed significant margin pressure before this shock materialized. That margin compression is likely to persist and intensify as longer-term rates have declined sharply as a result of more accommodative monetary policy (while deposit rates have already stabilized to levels close to zero). Furthermore, two key earnings tailwinds—falling loan-loss provisions and investment and trading gains linked to falling interest rates—had been largely exhausted by the end of 2018, and are increasingly unlikely to remediate margin pressure going forward. Thus, underlying profitability pressures are likely to persist over the medium- and longer-term even once the global economy begins to recover from the current shock.

This chapter quantifies these pressures by simulating bank profitability over the next five years for the nine economies covered in this chapter.[8] The simulation uses market expectations of benchmark interest rates and the baseline IMF economic growth and inflation forecasts.[9] Investors expect short-term interest rates to remain at very low levels for a while and term spreads

[5]Bank characteristics include lagged values of the deposit-to-liabilities ratio, capital ratio, and the ratio of securities to assets; the economic environment includes the contemporaneous growth rate of real GDP and inflation, and the current forecasts of these variables for the upcoming year; the short-term rate corresponds to the 3-month benchmark rate for each country; and the term spread corresponds to that between the 10-year and 3-month benchmark rates. The short-term rate is also interacted with a dummy that takes the value 1 when the rate is negative, and the term spread is interacted with a dummy that takes the value 1 when the spread is below 1 percent (the 10th empirical percentile). Each of these dummies is also included in the specification. Furthermore, dummies for the years of the global financial crisis and the European sovereign crisis are included (see Online Annex 4.1 for a detailed discussion and presentation of the econometric results). This specification closely follows those previously used in the literature, such as Borio, Gambacorta, and Hofmann (2017) and Claessens, Coleman, and Donnelly (2018).

[6]Other studies (Borio, Gambacorta, and Hofmann 2017; Claessens, Coleman, and Donnelly 2018; Eggertsson and others 2019) are consistent with these observations: net interest margins decline with falling rates and declining term spreads (flattening yield curves); these effects are nonlinear as short-term rates approach zero and they are particularly nonlinear when policy rates fall below zero.

[7]An alternative specification of this econometric analysis, where there is a full set of time fixed effects, assigns the biggest role to macro factors—which include these fixed effects—than presented here, followed by the short-term rate and the term spread.

[8]For data availability reasons, the simulation uses December 2018 as the starting point. The simulated values for 2019 use the realized growth rates and interest rate data. For the rest of the simulation period, growth forecasts correspond to those of the April 2020 *World Economic Outlook*. Interest rates correspond to effective rates until the first quarter of 2020 and to forward market rates for the 1-month, 3-month, and 10-year benchmark bonds of each of the sample countries prevailing at April 6, 2020.

[9]The simulation was also conducted using consensus forecasts for growth, inflation, and interest rates released April 9–14, 2020, obtaining similar results to those described below.

to recover gradually over the next few years, albeit to levels below historical norms and with different trajectories across countries (Figure 4.3, panel 1).

In the baseline IMF scenario, growth is expected to experience a sharp contraction in 2020 and start recovering in 2021. However, because of the unprecedented nature of the shock affecting the global economy, there is considerable uncertainty about the intensity and duration of the economic contraction, and risks to the outlook are on the downside, as discussed in the April 2020 *World Economic Outlook*. Moreover, although the forecasts should account, at least to some extent, for the support provided by the recent monetary, fiscal, and financial policy actions, the simulation does not consider the direct implications of measures directly targeting the banking sector or providing relief to borrowers, among others.

The simulation incorporates the four channels through which the future interest rate and growth trajectories affect bank profitability, as previously discussed: (1) changes in net interest margins resulting from the repricing of maturing loans and deposits, (2) changes in loan-loss provisions resulting from the interest rate and economic environment, (3) changes in credit growth associated with economic growth, and (4) noninterest income.

The repricing of loans and deposits depends on the "effective repricing maturity" of the stock of loans and deposits, which is sensitive to the prevalence of floating rates and the use of interest rate derivatives. These effective maturities are estimated using a model of bank interest income dynamics over 2005–18 (see Online Annex 4.1), which suggests that loans are repriced every three to six years and deposits every two to three years, on average, across the nine economies.[10] These estimated maturities, along with forecasts of interest rates, are used to simulate the evolution of yields on loans and the cost of funding—the main two components of net interest margins—for the average bank in each economy. In doing so, it is assumed that deposit rates have a floor at zero because negative rates have so far been applied only to part of banks' deposit bases.[11] While the model of interest income dynamics cannot be separately estimated for global systemically important banks because of data availability issues, the simulation incorporates a lower sensitivity of net income to interest rate movements for these banks. This observation is in line with other econometric evidence indicating that net interest margins of global systemically important banks are less sensitive to declines in interest rates than other banks.[12]

The evolution of loan-loss provisions and the fee income component of noninterest income are modeled as a function of economic growth, short-term interest rates, and the term spread, based on econometric results. These models capture the historical relationships between these variables and, as such, they may not fully incorporate the impact of the unprecedented COVID-19 shock and the implications of recent bold and sizable policy measures, adding uncertainty to the estimates.[13] For example, as noted in Chapter 1, bank resilience may not be as severely impacted in the current episode as in the past, given that the historical relationship between economic growth and credit losses may be weaker in light of the large amounts of fiscal and other support measures being provided.

[10]Effective maturities are estimated by looking at the historical relationship between average yields (on bank assets and liabilities), short-term rates, and the slope of the yield curve. Effective maturities are estimated at the country level and are assumed to be constant for all banks domiciled in that country (see Online Annex 4.1 for more details). These effective maturities implicitly account for the amount of fixed and floating rate assets and liabilities, as well as the degree of hedging against interest rate risk. Effective maturities of deposits are longer than contractual maturities as they incorporate the stickiness of deposits (particularly those in checking or sight accounts with overnight contractual maturities) with respect to changes in interest rates.

[11]Relaxing this assumption and allowing the deposit rate to fall to a minimum of –50 basis points does not significantly change the results.

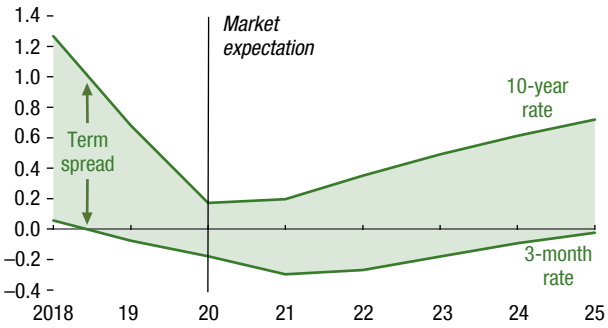
[12]See Online Annex 4.1. This is likely because these more sophisticated banks, with deeper treasury and balance sheet management capacities, may use interest rate swaps to hedge against changes in interest rates.

[13]In principle, the near-term consequences for provision expenses may be ambiguous as the magnitude of the shock may lead to greater provisioning while the flexibility provided by the regulatory and accounting response may allow banks to smooth them through the cycle. In addition, fiscal measures aimed at supporting households and firms that would otherwise default may alter historical patterns. Furthermore, government loan guarantees may reduce the need for provisioning for years to come as some of these guarantees covers a relatively long horizon. Fresh estimates of provision expenses released by major US banks for 2020 suggest that, on balance, provision expenses may be larger in the near term than those modeled from historical patterns. An important part of these increases in provisions is related to credit cards, which may in turn reflect uncertainty and record high unemployment in recent weeks. However, some banks have also reported increases in non-fee income associated with the expanded trading activity in light of the sharp rise in volatility seen in recent months.

Figure 4.3. Bank Profitability Simulation Results

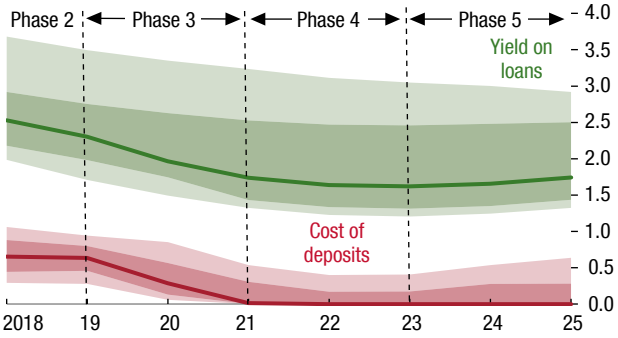
In the simulation, interest rates and term spreads are assumed to remain at low levels ...

1. Median Interest Rate Assumptions across Economies (Percent)



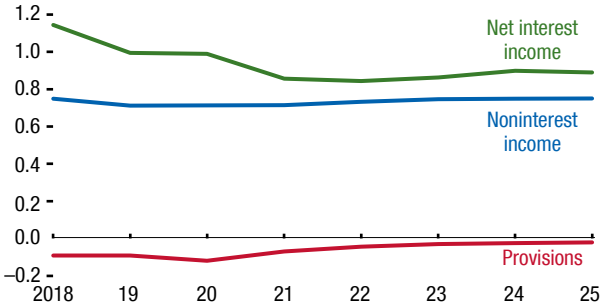
... and this passes through to interest rates on bank loans and deposits.

2. Simulated Path of Bank Interest Rates (Percent)



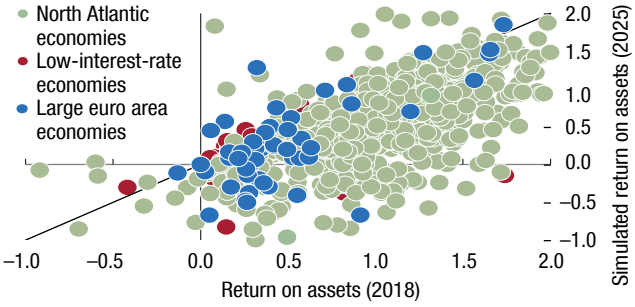
Lower net interest income is partly offset by lower provisions ...

3. Simulated Median Profitability across Economies (Percent of assets)



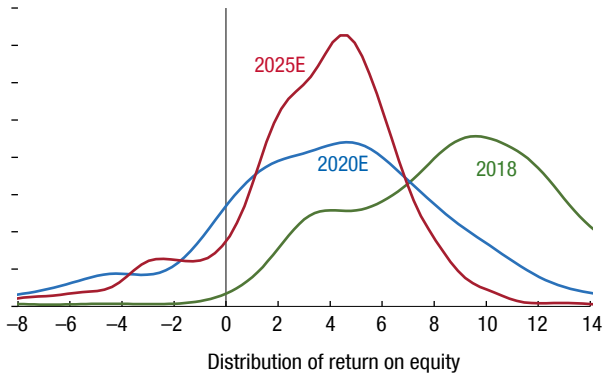
... but overall profitability falls in most of the banks in the sample.

4. Return on Assets, 2018 and Scenario Estimates for 2015 (Percent)



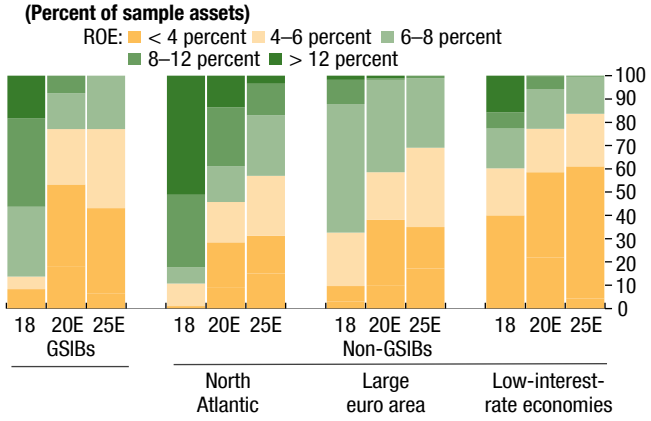
Return on equity falls materially across the banks in the sample ...

5. Return on Equity Distibutions (Percent)



... though profits are weakest in the large euro area and low-interest-rate economies.

6. Simulated Return on Equity, by Region (Percent of sample assets)



Sources: Bloomberg Finance L.P.; Fitch Connect; S&P Market Intelligence; SNL Financial; and IMF staff calculations.
Note: Results are based on the nine advanced economies covered in this chapter. In panel 2, the shaded areas show the 10th–90th percentiles of the interest rates across the nine economies, while the dark shading shows the 25th–75th percentiles, and the line shows the median. E = estimated; GSIBs = global systematically important banks; large euro area economies = France, Germany, Italy; low-interest-rate economies = Japan, Sweden, Switzerland; North Atlantic economies = Canada, United Kingdom, United States; ROE = return on equity.

Credit growth is derived from a Bayesian vector autoregression model used to estimate effective repricing maturities, ensuring consistency between the estimates. This model captures the downside pressure on credit growth resulting from the deterioration in the near-term economic outlook and the compensating effect of declining interest rates, but does not explicitly (other than what is incorporated in market interest rates) account for the consequences of other recent policy actions aimed at supporting flow of credit to the economy.

Potential gains on securities investments (the other main component of noninterest income) are kept constant relative to assets because of lack of data on banks' securities portfolios. The near-term impact of this omission is difficult to assess but, in the medium term, is likely to overstate simulated profits because, as rates remain at low levels in the simulation and eventually move up, there are likely to be few gains on securities. As is usual in simulation exercises, the composition of bank balance sheets is assumed to remain unchanged. This rules out endogenous changes in asset and liability composition, which would require a fully-fledged model of bank behavior.

The simulated path of interest rates is shown in Figure 4.3, panel 2. At the start of the simulation, new loans are issued at lower rates than those of maturing loans, while funding costs remain relatively unchanged, resulting in a continued reduction in net interest margins (this is a continuation of phase 2 previously discussed). Then, in phase 3, deposit rates fall further until they hit the zero lower bound, reflecting easing of monetary policy.[14] In phase 4, there is another round of net interest margin compression as interest rates on loans continue to fall, while deposit rates remain around zero. Finally, in the last phase, interest rates on loans start to increase gradually, as do deposit rates in some countries.

Based on historical relationships, the sharp economic contraction in 2020 will lead to higher provision expenses (Figure 4.3, panel 3). As discussed above, the actual change in provisions in the current conjuncture may differ importantly from historical patterns, adding uncertainty to this trajectory.[15] Over the rest of the simulation, provisioning declines as economic growth recovers. Nonetheless, the important message from the simulation is that the medium-term dynamics of profitability are dominated by further compression in net interest income.

Overall, these simulations suggest that bank profitability will likely remain under pressure over the next five years. Across country groups, even after the contraction in profitability in 2020–21 fades, most banks in the simulation see a reduction in return on assets by 2025 relative to their recent, already-low levels (Figure 4.3, panel 4). While the low-interest-rate environment puts pressure on net interest margins across all regions, banks in low-interest-rate economies tend to benefit less from the future economic recovery than others because provisioning and net interest margins are already very low by historical standards and rates are not expected to rise by much. In the large euro area economies, the simulation foresees a cutback in provisions and a small increase in noninterest income in the medium term that enables a fraction of banks (by assets) to increase profits relative to 2018 levels. Nonetheless, return on assets in 2025 remains below current levels for most banks in the region. Banks in the North Atlantic economies are also not immune from profitability pressures, largely driven by net interest margin compression.

Declining profits compromise the ability of banks to generate a return on equity commensurate with estimates of the cost of equity. The simulated distribution of return on equity in 2025 is markedly to the left of the one observed in 2018 and not very different from the distribution simulated for 2020, indicating that profitability pressures persist well beyond the immediate impact of the deterioration in the economic outlook (Figure 4.3, panel 5). In addition, a large fraction of banks in the sample generate a return on equity below 8 percent—the lower end of the current estimates for the cost of equity previously discussed. Profitability challenges at global systemically important banks are set to continue beyond the near term, with simulated return on equity in 2025 somewhat better than in 2020, but still deteriorating relative to 2018

[14]As discussed above, this simulation does not explicitly incorporate the consequences of the direct measures aimed at the banking sector that may result in lower cost of funding in the near term, but the quick decline in the cost of deposits obtained from the model is consistent with this mechanism.

[15]For instance, loan loss guarantees would have a dampening effect on provisions in the near term and flatten the decline in provision expenses in the medium term. The use of regulatory flexibility could have a similar effect. At the same time, earnings management by banks may have the opposite effect on the trajectory of provisions.

(Figure 4.3, panel 6). A similar pattern is observed outside of the group of global systemically important banks, where most of the banks still have weak return on equity in 2025, especially in large euro area and low-interest-rate economies.

Substantial Action Will Be Needed to Fill the Earnings Shortfall

The sharp economic downturn resulting from COVID-19 will likely hurt bank earnings through mark-to-market and credit losses (see Chapter 1). However, banks' earnings challenges emerged prior to the recent COVID-19 episode and will extend to at least 2025, well beyond the immediate effects of the current situation. Banks' capacity to mitigate these continuing, structural profitability pressures from low interest rates will therefore depend on their ability to further increase noninterest income or cut operating costs in an environment of increasing competition from fintech and nonbank financial intermediaries.

Noninterest income includes two broad components: fees and gains on securities. As discussed, gains on securities holdings will likely decline further when interest rates stabilize, so an improvement of noninterest income must derive largely from generating more fee income. However, fees appear to offer little additional potential upside to profitability. From 2013 to 2018, fee income (relative to assets) was fairly flat across advanced economy banks, on aggregate (Figure 4.4, panel 1). There were, however, some differences across economies. While fee income fell in Canada, Germany, Sweden, the United Kingdom, and the United States over 2016–18, it rose (albeit to different degrees) in France, Italy, and Japan (blue bars in Figure 4.4, panel 2). In addition, significant fee income pools appear structurally mature (capital markets sales and trading revenue have shrunk steadily over the past decade) or subject to technology-based market erosion (payments and transaction banking). Analysts are therefore forecasting falling fee income relative to assets (red bars in Figure 4.4, panel 2).

Banks can, in principle, support profits by cutting operating expenses, for example through more efficient technology. From 2013 to 2018, cost savings have delivered about a 15 basis point improvement to median return on assets (Figure 4.4, panel 3). Analysts expect cost-to-assets ratios to continue to decline in some countries, generally in the order of another 5–25 basis points of assets by 2021 (Figure 4.4, panel 4).[16]

Given that fee income and cost improvement are the two major levers banks can use to mitigate downward pressure on bank return on equity, the crucial question is: are they likely to be sufficient? Assuming profits evolve as projected in the simulation presented earlier, what combinations of cost reduction and additional fee income improvement would be required for banks in each country to generate a return on equity in line with the cost of equity? To address this question, Figure 4.5, panel 1, compares noninterest income and operating costs (both relative to assets) for a sample of banks across the three country groups against the combinations of cost and fee income that would be required for an "average" bank in that group to deliver return on equity of 8 percent (Figure 4.5). In the North Atlantic economies, a fair proportion of banks is expected to generate adequate returns by 2025 and, for the rest, there is a range of feasible cost and revenue improvements that would generate them. However, the improvements that would be required for banks in large euro area countries and low-interest-rate economies are particularly challenging. In the former, virtually all banks would need to improve both cost and noninterest income, sometimes significantly. For instance, for some banks, cutting costs to zero would not suffice in absence of an increase in noninterest income. In low-interest-rate economies, many banks show little scope for further cost improvement—costs are already quite low—and would require noninterest income rising from very low current levels.

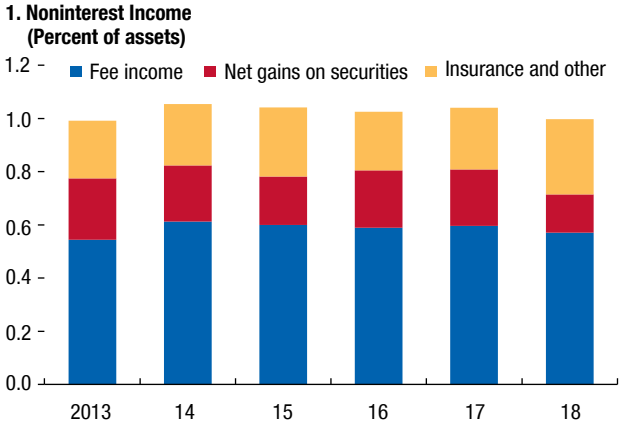
Banks may also mitigate margin pressures by hedging against declining rates, typically using interest rate swaps. The much larger overall swap books of the largest banks (relative to total assets) suggests that they are more heavily engaged in hedging (Figure 4.6, panel 1).[17] Moreover, available data for the United States suggests that smaller banks are more sensitive to a decline in rates than larger banks (Figure 4.6, panel 2). The econometric analysis discussed above corroborates this finding, and this is consistent with other studies

[16]This resembles a discussion of European banks' profitability outlook in the April 2017 GFSR, though this section deploys a more nuanced, dynamic model of the responses of net interest margin responses to changes in the policy rate environment.

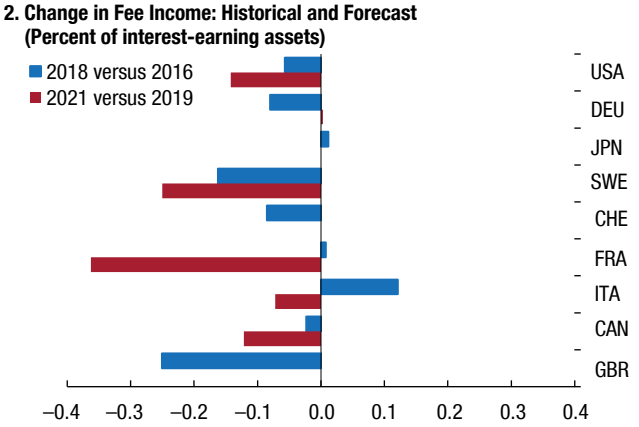
[17]Available data only reveal aggregate interest rate swap contracts in notional terms. Disclosures do not provide sufficient data to reveal the specific interest rate positioning or the degree of hedging against specific interest rate risk scenarios.

Figure 4.4. Key Mitigants of Declining Profitability: Noninterest Earnings Levers

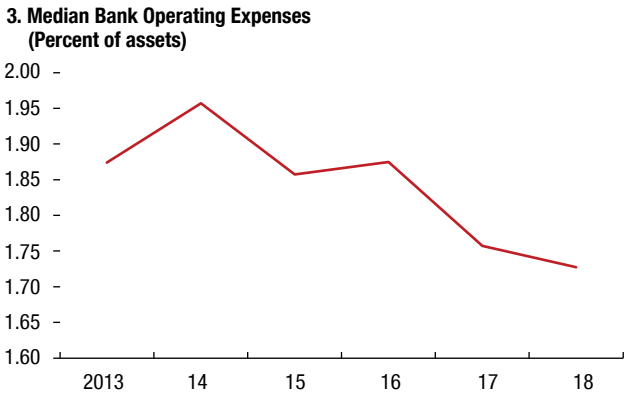
Fee income has remained roughly stable, relative to assets, but gains on securities have fallen.



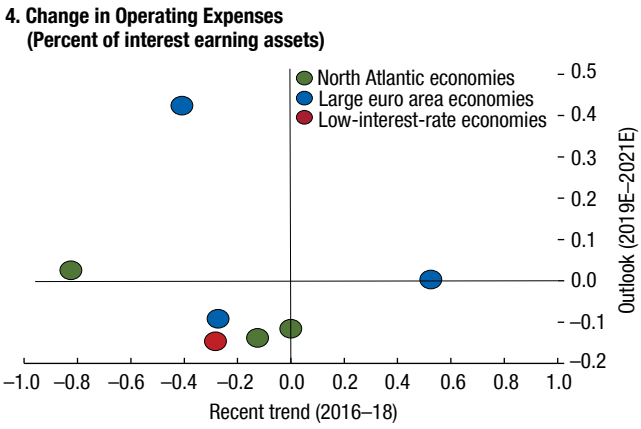
Analysts see limited potential for a significant improvement in fee income.



Banks have been cutting back costs ...



... and analysts expect this to continue.



Sources: S&P Market Intelligence; SNL Financial; and IMF staff calculations.
Note: The figure is based on the nine advanced economies covered in this chapter. In panel 4, data for 2019E to 2021E are estimated. 2021 estimates for Swiss and Japanese banks, and 2021 fee income estimates for UK banks, are unavailable. In panel 2, data labels use International Organization for Standardization (ISO) country codes.

that find small banks to be less resistant than larger domestic peers to margin and earnings compression in a negative interest rate environment (Nucera and others 2017; Molyneux, Reghezza, and Xie 2019). Finally, US banks' net interest income has become more sensitive to changes in policy rates in recent years, with risk increasingly skewed to the downside, perhaps reflecting the increasing difficulty of mitigating net interest margin pressures as deposit rates approach zero (Figure 4.6, panel 3).

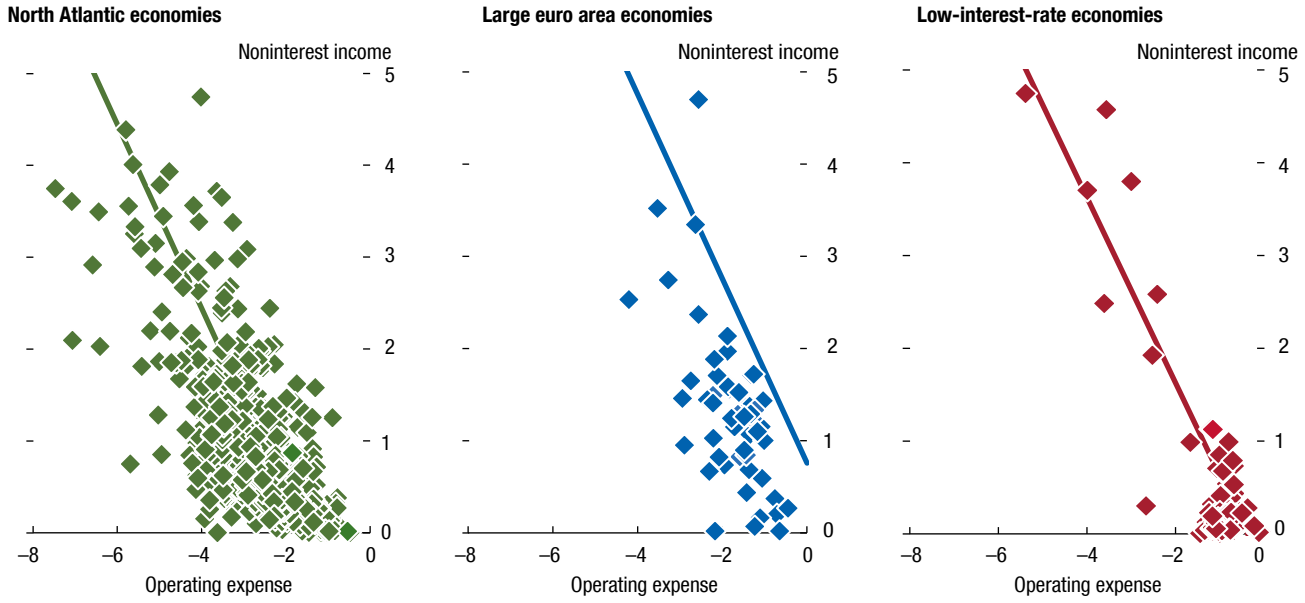
Banks May Take Excessive Risk in the Medium-Term once the Economy Begins to Recover

Recent policy measures taken by monetary and financial authorities aim to help banks use their risk-bearing capacity to mitigate the economic consequences of the COVID-19 outbreak, maintaining the flow of credit to borrowers and supporting economic growth. However, once the current crisis recedes, medium-term profitability pressures may induce banks to increase credit, maturity, liquidity, or trading risks aggressively enough to sow the seeds of future problems.

Figure 4.5. Changes to Costs and Noninterest Income to Restore Profitability

Large increases in noninterest income and substantial cuts to costs may be needed.

Cost and Noninterest Income: Bank Actual Positions and Combinations Needed to Generate 8 Percent Return on Equity (Percent of assets, 2025)



Sources: S&P Global Market Intelligence; SNL Financial; and IMF staff estimates.
Note: The lines represent combinations of operating expenses and noninterest income relative to assets required to generate 8 percent return on equity, assuming that all other earnings drivers (interest income, loan-loss provisions, tax rate, and so on), relative to assets and capital structure (equity relative to assets) are at industry-average levels. Other combinations are possible, but any significant deviation from this assumption requires even more challenging performance improvement on one or the other earnings driver.

There is some evidence that, before the onset of the COVID-19 pandemic, banks had taken more risk in response to a prolonged period of very low interest rates. First, banks in some countries had modestly shifted their exposures from short-term instruments and marketable securities toward less liquid loans, driving up loans as a percentage of total assets and taking additional liquidity risk (Demiralp, Eisenschmidt, and Vlassopoulos 2019). Second, banks had looked to increase the maturity risk of their loans to increase yields. From 2013 to 2018, estimated average loan maturity across reporting banks lengthened, particularly in countries where low interest rates exacerbated pressures on net interest margins (Figure 4.6, panel 4).[18]

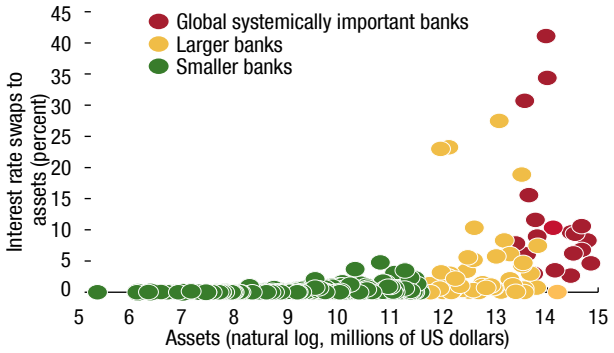
[18]Some banks report loans by maturity interval (less than 3 months, 3–12 months, and so forth). Average maturity is estimated based on the midpoint of each interval and an estimate of average maturity of the final bucket (typically, greater than 5 years).

The econometric analysis discussed earlier confirms that banks operating in a negative rate environment have tended to increase the maturity of their loans, in contrast to their behavior in normal times (Figure 4.6, panel 5). This is consistent with findings in the literature documenting banks expanding their mortgage loan portfolio (Basten and Mariathasan 2018). Finally, though difficult to discern from bank disclosure, studies of credit registers and syndicated loan data suggest that banks may respond to low interest rates by shifting the composition of their loan portfolios toward riskier borrowers (Bottero and others 2019b; Heider, Saidi, and Schepens 2019). However, others have found that the increased origination of riskier syndicated loans by banks is rapidly ceded to nonbank financial intermediaries, thus passing on credit risk to other parts of the financial system (as discussed in Chapter 2 and by Aramonte, Lee, and Stebunovs 2019).

Figure 4.6. Bank Hedging and Risk Taking

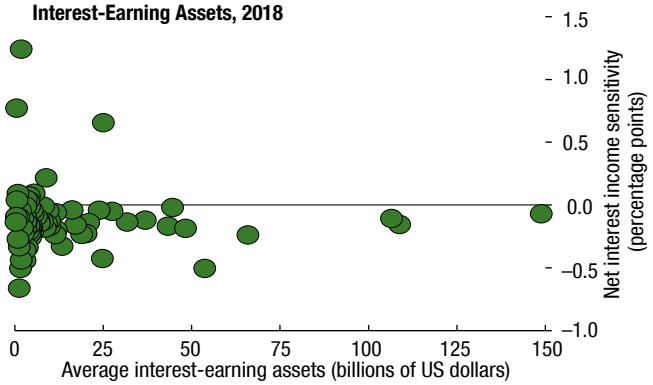
Large banks tend to take larger interest rate swap positions ...

1. Interest Rate Swaps Notional Value Outstanding and Total Assets (End-2018)



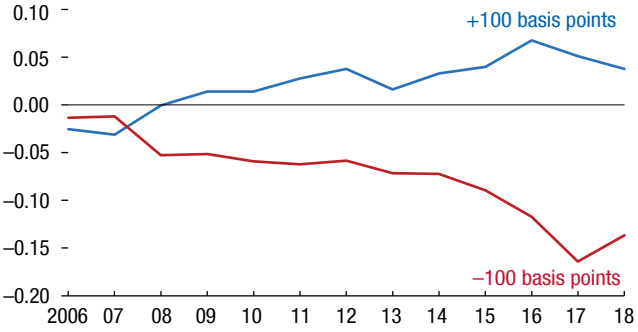
... which probably underlies their lower interest rate risk.

2. United States: Net Interest Income Sensitivity and Average Interest-Earning Assets, 2018



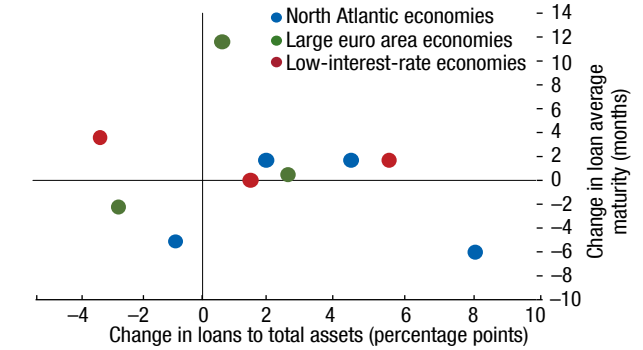
Banks' net interest margins have become more sensitive to changes in policy rates, with risks skewed downward.

3. United States: Median Net Interest Margin Sensitivity to a Change in the Base Rate (Percent)



Banks in most systems have responded by shifting toward loans and, in some cases, increasing loan maturities ...

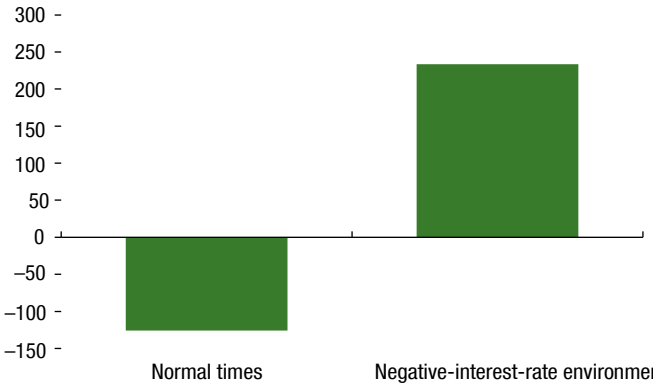
4. Changes in Loans to Assets and in Estimated Average Loan Maturity (2013–18 average)



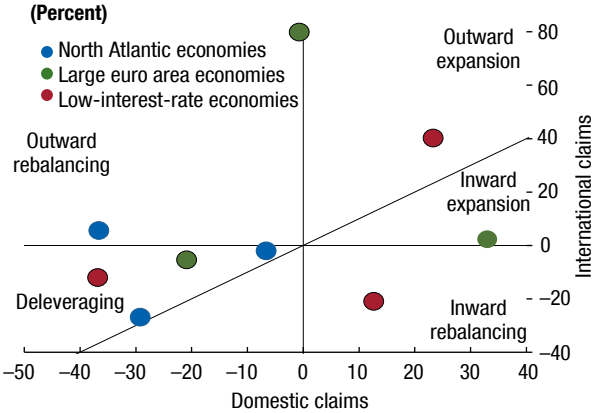
... in contrast to their behavior in more normal positive-rate environments.

Banks have also adjusted their domestic and international loans.

5. Impact of a 100 Basis Point Decline in the Short-Term Rate on the Maturity of Bank Loans (Basis points)



6. Change in Banking Systems' Domestic and International Claims, 2013:Q4–2019:Q4 (Percent)



Sources: Bank for International Settlements; Bloomberg Finance L.P; Fitch Connect; Haver Analytics; S&P Market Intelligence; SNL Financial; and IMF staff calculations.

Note: In panel 1, smaller banks are those with less than $100 billion of total assets. In panels 2 and 3, reported interest rate shocks vary in size. The analysis linearly interpolates net interest income effects to a 100 basis point shock. In panel 4, portfolio maturity is estimated from bank financial reports. This is distinct from the "effective maturity" measure employed in this chapter to gauge banks' net interest margin response to changes in "front-book" rates. Panel 5 shows the impact on the ratio of long-term bank loans to short-term loans for the nine advanced economy banking systems covered in this chapter. In panel 6, domestic claims have been adjusted for movements in local exchange rates against the dollar.

Third, some banks have increased their overseas exposures, potentially raising their currency and liquidity risks.[19] This is most evident in Canada and Japan, though some other banking systems have rebalanced their claims toward foreign lending (Figure 4.6, panel 6). Data from Japan, where individual banks publicly report their overseas exposures, suggest that this tactic is available only to large banks with extensive international subsidiary and branch footprints.

Policy Discussion

The sharp downturn in economic activity resulting from the COVID-19 outbreak will put significant pressure on bank profitability in the near term, as already reflected in banks' equity prices and discussed in Chapter 1. The high levels of capital and liquidity buffers built since the global financial crisis, together with the decisive policy actions taken by policymakers to maintain the flow of credit to households and firms and to sustain the economy, will certainly help banks navigate these challenging times. However, this episode will test banks' resilience. It is thus crucial that policymakers rapidly employ a combination of policies that maintain the balance between preserving financial stability, maintaining the soundness of financial institutions, and supporting economic activity. These include an adequate provision of liquidity by central banks and clear supervisory guidance on the prudent renegotiation of loan terms, the use of the flexibility embedded in existing regulatory frameworks to account for expected credit losses, and the use of existing buffers to absorb costs (see Chapter 1 for a detailed discussion).

Beyond the near term, the findings of this chapter highlight the medium-term profitability challenges that banks will likely face in an environment of persistently low interest rates for years to come. While such difficulties are anticipated to be compounded by increasing competition from fintech and other nonbank financial intermediaries, there are steps that authorities can take to address medium-term bank profitability concerns and ensure an adequate flow of credit to the economy.

Financial sector authorities should incorporate in their decisions and risk assessments the potential impact of the low-interest-rate environment on banks. Supervisory capital planning and stress testing should include lower-for-longer scenarios, and the strength of business models in such an environment should be evaluated. Supervisors should also remain vigilant to prevent an excessive buildup of risks through the arbitrage of existing regulations that could reduce the resilience of the banking sector.

If banks do start taking excessive risks once the current COVID-19 emergency is resolved, macroprudential policy tools should be deployed to address emerging vulnerabilities. For instance, the countercyclical capital buffer could be used in time to enhance the resilience of the banking system as systemic risk builds up during a period of loose financial conditions. Borrower-based measures could also be used to limit rapid growth of mortgage portfolios should banks aggressively shift to these types of loans to sustain margins. For banking systems that expand their foreign operations to enhance profitability, macroprudential authorities could ensure that foreign exposures remain adequately diversified and monitor liquidity mismatches in banks' foreign currency balance sheets (see Chapter 3 of the October 2019 GFSR).

Monetary policy, which has supported economic growth since the onset of the global financial crisis and has been the first line of defense during the COVID-19 pandemic, should remain data dependent and be set to meet central banks' macroeconomic targets. Policy tools helping to offset some of adverse effects of negative interest rates, such as tiering schemes aimed at limiting the application of negative rates to a portion of the banks' reserves held with the central bank, should stay in place while policy rates are negative (see Box 4.2).

In an environment of difficult policy trade-offs and constraints, authorities should also explore actions aimed at removing structural impediments still present in banking systems to support resilient institutions that can provide an adequate flow of credit to the economy. For example, authorities should assess the benefits of domestic and cross-border bank consolidation while also taking steps to ensure adequate competition and addressing potential too-big-to-fail issues. Policymakers at all levels should encourage banks to take a broad range of measures to improve operating efficiencies, including branch reduction where warranted, upgrades of information technology systems, and process outsourcing.

These cost reduction efforts need to be balanced against other important policy concerns, especially in the current environment of heightened uncertainty about the economic outlook. For instance, authorities should ensure broad access to financial services and financial inclusion for households and small- and medium-sized enterprises, technology upgrades should guarantee adequate data protection and privacy, efforts to expand non-fee income should ensure financial consumers are adequately informed and protected, and the potential consequences for local communities and employment should be properly assessed.

[19]For a comprehensive discussion of the link between foreign lending and liquidity risks in foreign currency, see Chapter 5 of the October 2019 GFSR.

Box 4.1. The Experience with Negative Interest Rate Policies

Since 2014 several central banks, mostly in Europe, have set their policy rates below zero for extended periods. Policymakers turned to negative interest rate policies when the room to deliver monetary stimulus by conventional means had been exhausted. In the euro area, Japan, Sweden, and Switzerland, short-term interest rates were already at, or close to, zero. Cyclical headwinds, and, in Switzerland, an overvalued currency, meant that monetary stimulus was needed to support demand and inflation.[1] With persistently low neutral interest rates, central banks had less room to maneuver in positive interest rate territory than in previous cycles.

As with conventional monetary policy, negative rates can be expected to be transmitted to the broader economy through various channels. Lower rates reduce the cost of capital for businesses, raise the attractiveness of current consumption over saving, and strengthen demand for domestically produced goods by weakening the exchange rate. They may also support credit growth by relaxing balance sheet constraints for both borrowers and lenders. These channels remain active when rates fall into mildly negative territory, although their strength may change.

The impact of negative interest rate policies has been most visible in money market rates. Across jurisdictions, they have tracked policy rates closely as the latter moved below zero (Eisenschmidt and Smets 2019). Longer-term yields have fallen too, especially following the initial rounds of cuts that took rates below zero, likely reflecting coincident changes in asset purchase programs and forward guidance (public communication by the central bank about the likely future path of monetary policy and its objectives and intentions).

Deposit rates and lending rates have also fallen. In jurisdictions where central banks have cut interest rates multiple times into negative territory—the euro area and Sweden—these rates have slowly fallen following each round of easing (Figure 4.1.1).[2] The fall in deposit rates has been more pronounced for corporate deposits, which is in line with the notion that, compared to retail depositors, it is costlier for corporate depositors to switch into cash (Committee on the Global Financial System 2019). There is also evidence that these cuts have helped to lower lending rates in the euro area and Switzerland, even if it is difficult to measure their effect because of many confounding factors (for example, the simultaneous announcement of Targeted Longer-Term Refinancing Operations).[3]

The evidence to date on the macroeconomic effects of negative interest rate policies remains sparse. This is partly because it is challenging to separate the effects of negative interest rate policies from those of other concurrent unconventional monetary policy measures. Still, for the euro area, negative interest rate policies seem to have had small but positive effects in inflation and growth (Rostagno and others 2019). In addition, negative interest rate policies may have supported the Japanese economy through the exchange rate channel (Honda and Inoue 2019).

Taken as a whole, the available evidence indicates that negative rates have lowered market rates, supported asset values and credit provision, reduced deposit and lending rates, and therefore likely provided support for growth and inflation. However, there is a limit to how negative rates can go—the effective lower bound. Were rates to become deeply negative, investors could make a wholesale move into cash, bank profits could decline, and the positive impacts observed on bank lending could be reversed (Brunnermeier and Koby 2018).

The author of this box is Roland Meeks.

[1]Denmark operates a currency peg with the euro and introduced negative rates to mitigate upward pressure on the krone.

[2]Deposit rates also adjust sluggishly to changes in policy rates when rates were positive (Andries and Billon 2016).

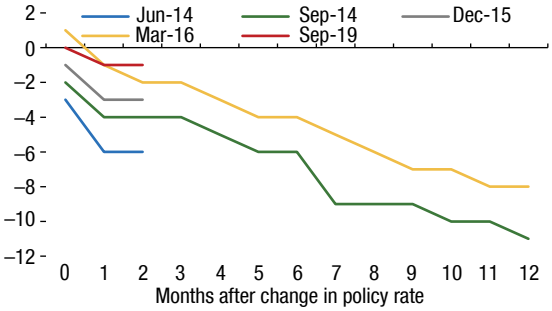
[3]For example, negative interest rate policies have lowered loan rates and gave a boost to lending by Italian and Swiss banks (Bottero and others 2019a, and Basten and Mariathasan 2018, respectively).

Box 4.1 *(continued)*

Figure 4.1.1. Euro Area and Sweden: Change in Bank Interest Rates

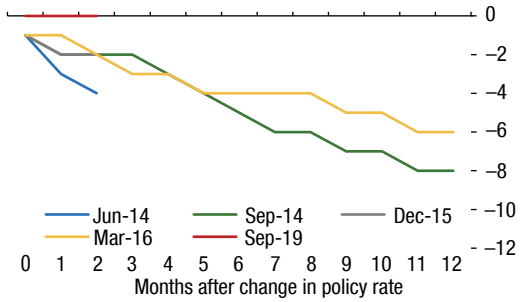
After policy rate cuts, euro area corporate deposit rates have fallen, but pass-through has diminished over time.

1. Euro Area: Change in New Deposit Rates for NFCs (Basis points, following a 10 basis point cut in deposit facility rate)



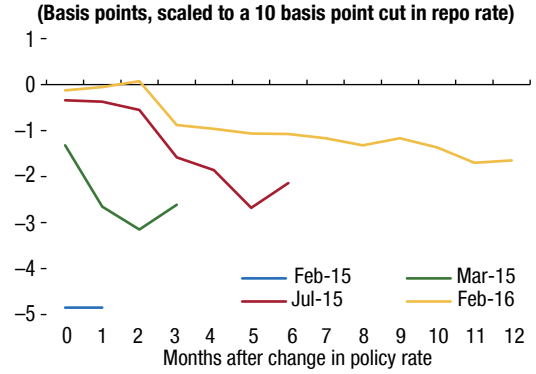
Euro area retail deposit rates have also fallen, but less so.

2. Euro Area: Change in New Deposit Rates for Households (Basis points, following a 10 basis point cut in deposit facility rate)



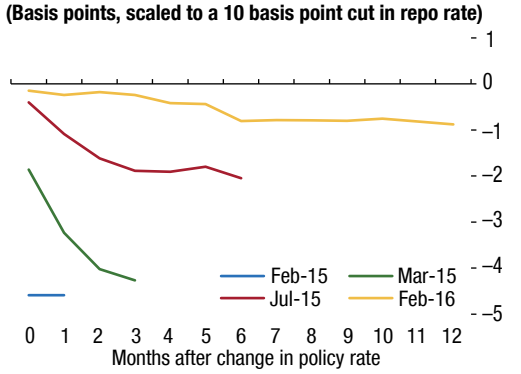
In Sweden, corporate deposit rates have also fallen, with diminishing pass-through ...

3. Sweden: Change in New Deposit Rates for NFCs (Basis points, scaled to a 10 basis point cut in repo rate)



... and Swedish retail deposit rates show the same behavior.

4. Sweden: Change in New Deposit Rates for Households (Basis points, scaled to a 10 basis point cut in repo rate)



Sources: European Central Bank; and IMF staff calculations.
Note: The figure shows the change in new short-term deposit rates for households and corporations up to 12 months following each of the 10 basis point cuts that the European Central Bank has made in its main deposit rate since June 2014 (panels 1 and 2) and the three rate cuts made by the Swedish Riksbank since February 2015 (panels 3 and 4). Shorter lines reflect shorter periods between rate cuts. NFC = nonfinancial corporation; repo = repurchase agreement.

Box 4.2. Experiences with Tiering of Reserve Remuneration

Several central banks have introduced tiered reserve systems to help counter the negative effects of low rates on banks' profitability.[1] Jurisdictions with some form of tiering system include Denmark, the euro area, Japan, Norway, Sweden, and Switzerland (Table 4.2.1).

Tiering delivers two benefits to banks. First, banks are exempted from paying interest (or receiving a less negative rate) on a portion of the reserves they maintain at the central bank. Second, banks have scope to arbitrage the difference between the negative rate and the exempted rate by trading liquidity (possibly across countries).[2]

The introduction of the two-tier system by the European Central Bank at the end of 2019 is estimated to generate total savings for euro area banks of about €4.7 billion per year relative to a counterfactual scenario where tiering is not introduced (Table 4.2.2). In Switzerland, savings from the recent change in tiering introduced in November 2019 are estimated at about $0.7 billion per year. While this helps banks, these savings, equivalent to a few basis points of return on assets, are unlikely to fully offset the impact of low interest rates on profitability.

The author of this box is Juan Solé.

[1]Although deposit tiering is present is various jurisdictions, not all central banks introduced the tiering policy to alleviate the impact of negative rates on bank profitability. For instance, deposit tiering was part of central banks' monetary policy frameworks in Denmark and Norway before the introduction of negative policy rates (Jobst and Lin 2016).

[2]For example, a German bank with excess reserves that is charged the deposit facility rate of –0.50 percent could find an Italian bank with few reserves and offer to pay, say, –0.30 percent to the Italian lender for holding such liquidity. Both lenders would gain: the German by lowering the cost of its deposits, and the Italian by accruing a positive return. The benefits from such activities are estimated to be smaller than those from the introduction of tiering schemes.

Table 4.2.1. Selected Central Bank Deposit Tiering Schemes

Economy	Description	Exemption Threshold	Interest Rate Applied to Nonexempt Reserves (percent)	Date Tiering Implemented	Date Negative Rates Implemented
Euro Area	Bank deposits below the exemption threshold pay no interest. Reserves above the threshold pay the deposit rate.	Six times the minimum reserve requirement.	–0.50	Nov. 2019	Jun. 2014
Japan	Three-tier system at 0.1 percent rate for the basic balance, 0.0 percent rate for the macro add-on balance, and -0.1 percent rate for the policy rate balance.	Amount of reserves charged at the policy rate varies in line with the Bank of Japan's monetary base target.	–0.10	Feb. 2016	Jan. 2016
Switzerland	Negative interest is charged on the portion of banks' sight deposits at the central bank exceeding the exemption threshold.	Twenty-five times the minimum reserve requirement (revised up from 20 times exemption in Nov. 2019).	–0.75	Jan. 2015	Dec. 2014

Sources: National central banks; and IMF staff estimates.

Table 4.2.2. European Central Bank Tiering Scheme: End of 2019

Economy	Minimum Reserve Requirement (MRR)	Bank Deposits with Eurosystem	Exempted Reserves (MRR * Multiple)	Cost Savings for Banks	Impact on Banks' Return on Assets (percentage points)
	(Billions of euro)				
Euro Area	135	1,818	807	**4.0**	0.01
Germany	37	562	224	**1.1**	0.01
France	27	526	160	**0.8**	0.01
Italy	18	102	110	**0.4**	0.01

Sources: European Central Bank; national central banks; and IMF staff estimates.

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