CHAPTER 1

THE FINANCIAL STABILITY IMPLICATIONS OF THE WAR IN UKRAINE

Chapter 1 at a Glance

- Global financial conditions have tightened notably and downside risks to the economic outlook have increased as a result of the Russian invasion of Ukraine. This has occurred in the context of the pandemic, which was slowly being brought under control, and the consequent recovery of the global economy from COVID-19.
- Financial stability risks have risen along many dimensions, although no global systemic event affecting financial institutions or markets has materialized so far.
- The sharp rise in commodity prices, which has exacerbated preexisting inflation pressure, poses challenging trade-offs for central banks.
- Repercussions of the war continue to reverberate globally and will test the resiliency of the financial system through various channels, including direct and indirect exposures of banks, nonbank financial intermediaries, and firms; market disruptions (including in commodity markets) and increased counterparty risk; acceleration of cryptoization in emerging markets; and possible cyber-related events.
- Emerging and frontier markets are facing tighter financial conditions and a higher probability of portfolio outflows (forecast at 30 percent now, up from 20 percent in the October 2021 *Global Financial Stability Report* [GFSR]).
- In China, financial vulnerabilities remain elevated amid ongoing stress in the property development sector and new COVID-19 outbreaks.
- In coming years, policymakers will need to confront a number of structural issues brought to the fore by the war in Ukraine and the associated sanctions against Russia, including the trade-off between energy security and climate transition, market fragmentation risks, and the role of the US dollar in asset allocation.
- Energy and food security concerns are acute and may put climate transition efforts at risk.
- Policymakers need to take decisive actions to rein in rising inflation and address financial vulnerabilities while avoiding a disorderly tightening of financial conditions that would jeopardize the post-pandemic economic recovery. Some businesses and households may need short-term fiscal support to navigate the consequences of the war.
- The surge in volatility and dislocations in commodity markets underscores the importance of ensuring the adequacy of disclosures and standards of transparency to counterparties, especially major financial institutions. This is essential to support comprehensive risk management and supervisory oversight.

The War in Ukraine Raises Immediate Financial Stability Risks and Questions about the Longer-Term Impact on Markets

Early in the year, financial markets were squarely focused on rising risks to the inflation outlook and implications for the global economy, especially given concerns about a possible slowdown in China. Investors were worried that central banks in advanced economies would have to normalize policy more aggressively than anticipated only a few months earlier, causing a sharp tightening in financial conditions, especially in emerging markets. The war in Ukraine, while at this point not a global systemic event from a financial standpoint, is nonetheless anticipated to have a material impact on the economy amid heightened uncertainty about the outlook. In addition, the sharp rise in commodity prices further complicates the challenge faced by central banks in credibly bringing down inflation to target while safeguarding the post-pandemic recovery.

The repercussions of the Russian invasion of Ukraine in terms of economic damage will be greater for the war region and Europe. In particular, official sanctions[1] and further escalations thereof, multiple companies voluntarily severing ties with Russia, together with steps taken by several countries to wean off Russian energy imports, will cause substantial damage to the Russian economy. But the war is also expected to have significant implications for the global economy (see the April 2022 *World Economic Outlook* [WEO]) and for global financial markets beyond immediate financial stability risks. The severity of the disruptions in commodity markets and to global supply chains will weigh heavily on the outlook for inflation, the global economy, and possibly macro-financial stability. In addition, record high food prices could have implications for social unrest in some emerging and frontier markets.[2]

War is a risk that is difficult to insure against or hedge, so it is only natural that investors precipitously pull back from risk taking, causing volatility and correlations across asset classes to rise. Eventually, however, asset prices tentatively stabilized around a new normal as market participants assess the evolution of the war, geopolitical implications, and prospects for different asset classes and the economy.

The information content and signal that can be extracted from price moves of Russian and Ukrainian assets are severely limited by the sanctions and lack of liquidity in these markets. That said, such assets have experienced the largest price declines, with dollar-denominated sovereign bonds pricing a very high probability of default and a low rate of recovery (Figure 1.1, panel 1). The Russian ruble has fallen to all-time low levels against the US dollar, before recovering a substantial portion of the earlier declines. The Ukrainian hryvnia exchange rate has been fixed as of February 24 (Figure 1.1, panel 2). Stock trading on the Moscow Exchange was halted on February 25 and reopened only on March 24 with substantial restrictions on trading (Figure 1.1, panel 3).

Among huge uncertainties and shifting prospects on the ground, investors have focused on severe disruptions in commodity markets as a crucial transmission channel and amplifier of the crisis. Disruptions could intensify in the event of a further escalation of the sanctions that could include an explicit ban of energy imports from Russia by Europe. Energy and food prices have risen sharply, and volatility has jumped (Figure 1.2, panels 1 and 2).

The rise in agricultural prices has important spillover effects for developing economies and emerging markets—especially in eastern Europe, the Caucasus, the Middle East, and North Africa—that are close trading partners of Russia and Ukraine. Metals, another Russian commodity export, is also affected, which has strong implications for global supply chains, including the renewable energy industry (Figure 1.2, panel 3; see also Box 1.1 for recent developments on nickel trading and the WEO Special Feature on commodities). Supply shortages are expected to persist, as seen in the very high relative price of short-term contracts over longer-term ones (Figure 1.2, panel 4).

After an initial deterioration of risk appetite following the Russian invasion of Ukraine, investors have become more optimistic about the outlook for risk assets since mid-March, with global equities recouping most of the earlier losses. Sectors already adversely affected by the pandemic—the airline and hospitality sectors—have seen large declines in stock prices (Figure 1.3, panel 1, upper segment). Other energy-intensive and energy-dependent sectors, such as automobiles, consumer durables, and industrials, have been hit by surging energy and metal prices, exacerbating COVID-19–related supply chain challenges. The food industry has come under pressure from the sharp rise in energy and agricultural commodity prices. Finally, Russia and Ukraine produce some critical inputs—gases and precious metals—for the information technology sector, particularly semiconductors, adding to supply chain challenges.[3] As a result, there are growing concerns about further chip shortages and the associated impact on supply chains, delaying the resolution of pandemic-related issues and further inflating prices.

[1]Several advanced economies, including the United States, members of the European Union, Japan, and the United Kingdom, have imposed an unprecedented range of sanctions on Russia. These have prohibited financial institutions from engaging in any transaction involving the Central Bank of Russia, thus hindering its ability to access a substantial portion of its foreign reserves. Other sanctions have effectively banned all major Russian banks not related to the energy sector from doing business in the United States, the European Union, the United Kingdom, and Japan and have frozen their assets, while some large banks have also been banned from the SWIFT system. In addition, some entities and individuals have faced sanctions, and trade restrictions have been put in place on a variety of goods. Finally, some jurisdictions have announced bans on energy imports from Russia or plans to reduce their dependence on Russian energy.

[2]The United Nations food price index has already surpassed the levels seen in 2011, when social unrest was triggered in the Middle East and North Africa region.

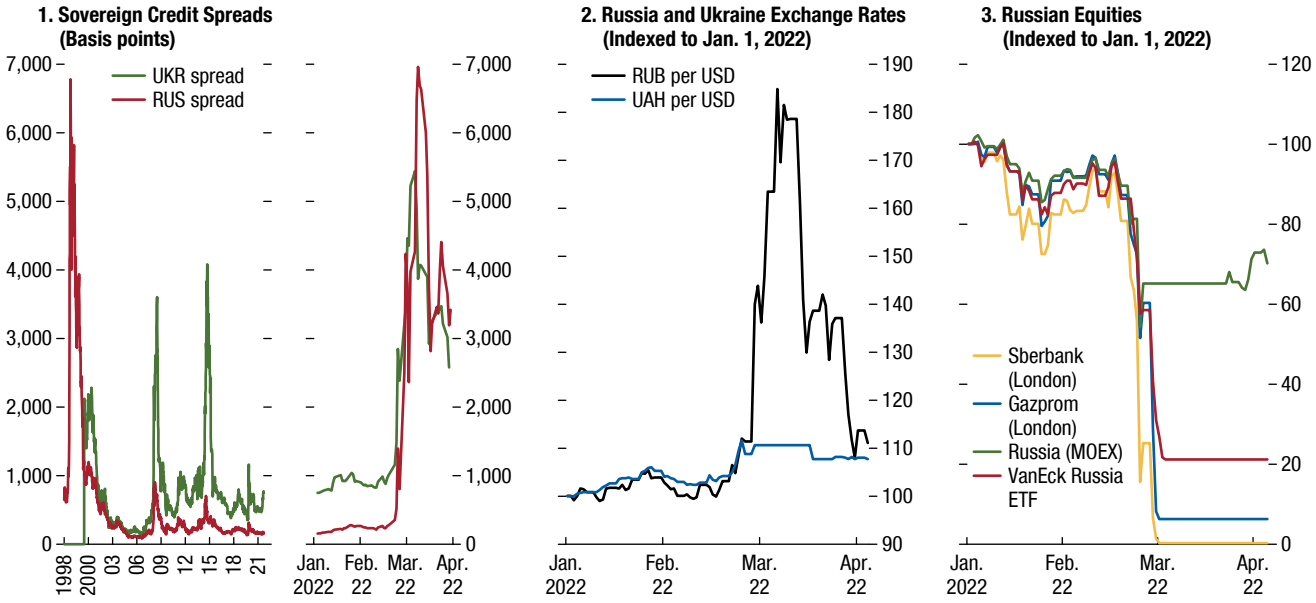
[3]See Chris Nuttall, "Ukraine War Is Chip Industry's Kryptonite," *Financial Times* (March 4, 2022).

Figure 1.1. Russian and Ukrainian Assets Have Come under Heavy Pressure Following the War in Ukraine

Russian and Ukrainian bonds are pricing a high probability of default amid poor liquidity for credit instruments.

The ruble hit record lows before retracing most of its losses.

Russian equities listed abroad collapsed, and the domestic market was closed for a month before reopening in late March.



Sources: Bloomberg Finance L.P.; and IMF staff calculations.
Note: The Ukrainian hryvnia exchange rate has been effectively fixed since February 24, 2022, with only limited trading in parallel markets. The Moscow Stock Exchange (MOEX) was closed from February 28–March 24. In panel 1, UKR refers to the United Kingdom–Russia spread; RUS spread refers to the Russia–United States spread. ETF = exchange-traded fund; RUB = Russian ruble; UAH = Ukrainian hryvnia.

Across regions, equity prices have been less affected in the United States and advanced Asia, as these economies are seen as relatively more shielded from the direct impact of the war and supported by the strong incoming economic data. In Europe, by contrast, investors appear to be more concerned about possible risks to the economic and inflation outlook given their geographical proximity to the war, relatively larger exposures, and energy dependency on Russia. Equity prices have fallen in emerging markets, in sync with rising external financing costs. The impact has been particularly pronounced for economies in central and eastern Europe. Chinese equities' notable underperformance in this period reflected rising geopolitical risks but also domestic factors like growth concerns amid COVID-related lockdowns and regulatory uncertainty in the tech industry.

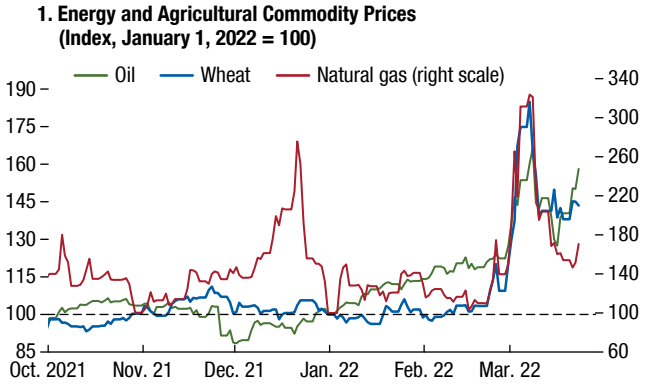
Global corporate bond spreads have widened some, surpassing pre-pandemic levels across major sectors and most high-yield segments (Figure 1.3, panel 2). The increase has been more evident for the lowest-rated firms, pointing to concerns about potential future defaults. In emerging markets, investors appear to be differentiating across countries, with those with closer economic ties to Russia through trade and remittances (Caucasus and Central Asia) and more risk-sensitive frontier market economies hit the hardest (Figure 1.3, panel 3). Currencies of Latin American countries and commodity exporters have outperformed relative to eastern European countries and oil importers in Asia (Figure 1.3, panel 4).

Volatility has risen sharply in both equity and interest rate markets following the Russian invasion of Ukraine, reflecting heightened uncertainty on the economic and policy outlook (Figure 1.4, panels 1 and 2). In equities, market-implied volatility has declined sharply recently, in some cases to levels below those that prevailed before the war, and is anticipated to remain around these levels through the end of 2022. In interest rates, market-implied volatility has remained elevated, reflecting uncertainties about the policy normalization process in advanced economies.

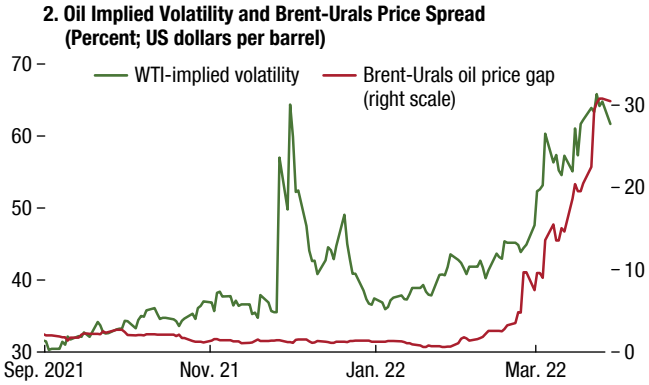
On balance, financial conditions in advanced economies have tightened notably this year, reflecting the

Figure 1.2. Impact of the War in Ukraine on Commodities

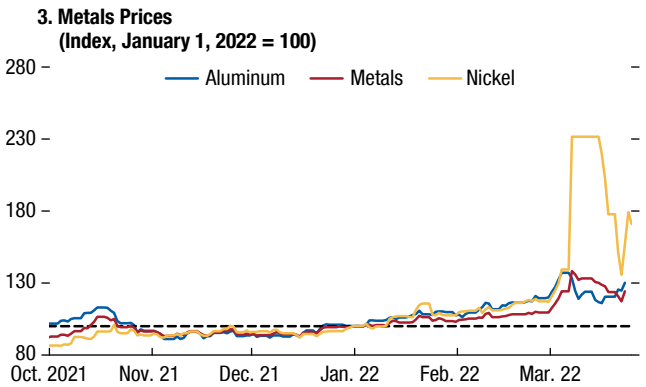
Several commodity prices have risen dramatically on fears of supply disruptions ...



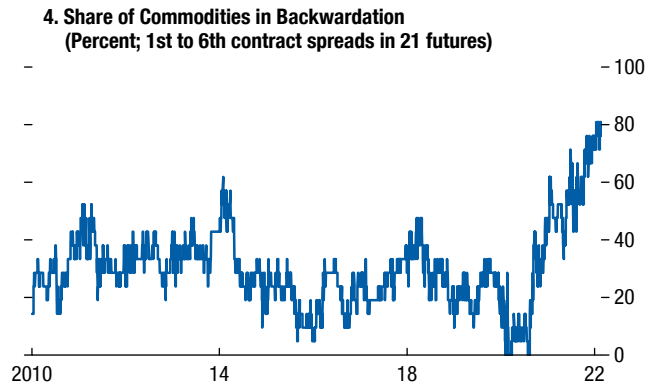
... and volatility in financial markets has spiked.



Industrial metals prices have surged amid risks to supply chains and trading disruptions on exchanges.



Supply shortages are expected to persist in the short term for multiple commodities.



Sources: Bloomberg Finance L.P.; and IMF staff calculations. Panel 3 uses three-month futures from the London Metals Exchange and Bloomberg Metals Index.
Note: In panel 2, the volatility is three months annualized. In panel 4, backwardation occurs when the first contract price is higher than the prices of later contracts.
WTI = West Texas Intermediate crude oil futures.

decline in corporate valuations, higher government bond yields, and continued expectations of monetary policy normalization. However, relative to historical levels, financial conditions remain easy or roughly neutral (Figure 1.5, panel 1). The sudden and significant increase in external borrowing costs and rising local currency rates have weighed heavily on financial conditions in eastern Europe and the Middle East with close ties to Russia (Figure 1.5, panel 2). Conditions have also tightened for many other emerging market economies, reflecting higher interest rates to combat inflation, lower equity valuations, and higher external borrowing costs. By contrast, conditions have eased in China, as policymakers have provided additional policy support to offset an economic slowdown, partly stemming from continued strains among property developers.

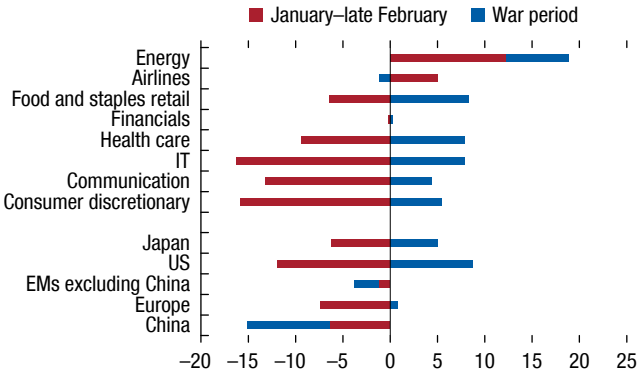
The Russian invasion of Ukraine is anticipated to have a material impact on the post-pandemic global economic recovery. Global economic growth for 2022 has been marked down to 3.6 percent, 0.8 percentage point lower than projected in the January 2022 WEO *Update* (see the April 2022 WEO). Amid heightened uncertainty, the balance of risks to growth this year remains skewed to the downside, as demonstrated via the growth-at-risk framework (Figure 1.6, panel 1).[4] Moreover, the probability of growth falling below zero in 2022 is estimated at about 8 percent, with downside risks now at elevated levels compared with historical norms (Figure 1.6, panel 2).

[4]See Chapter 3 of the October 2017 GFSR for details of the Growth-at-Risk model.

Figure 1.3. Impact of the War in Ukraine on Financial Assets

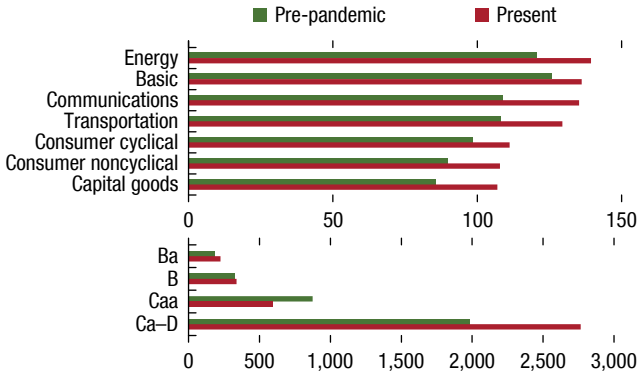
Equities have sold off, on net, in emerging markets and sectors affected by commodity prices and supply chain disruptions concerns ...

1. Global Equity Price Changes in 2022 (Percent)



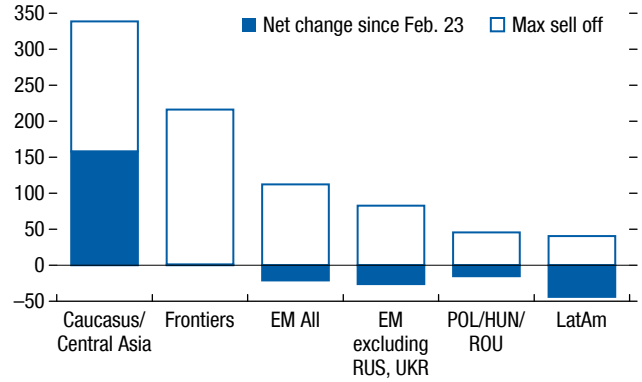
... and credit spreads have widened the most in low-rated firms.

2. Credit Spread Levels by Sector and Credit Rating (Basis points)



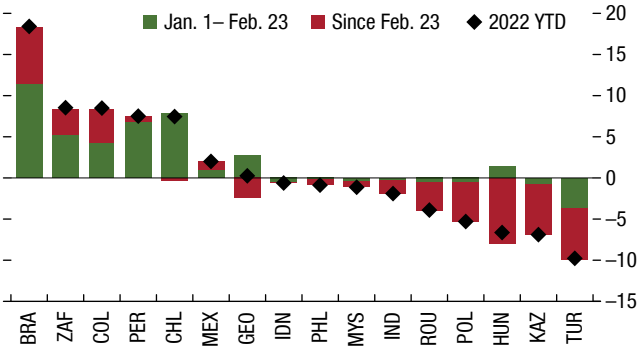
Weaker borrowers and Russia's economic partners have been hit the hardest, but spreads have recovered after the initial shock.

3. Change in Emerging Market Sovereign Bond Spreads (Basis points)



Currencies of Russia's main trading partners have sold off, but commodity exporters have held up.

4. Emerging Market Currencies (Percent appreciation/depreciation, vs. US dollar)



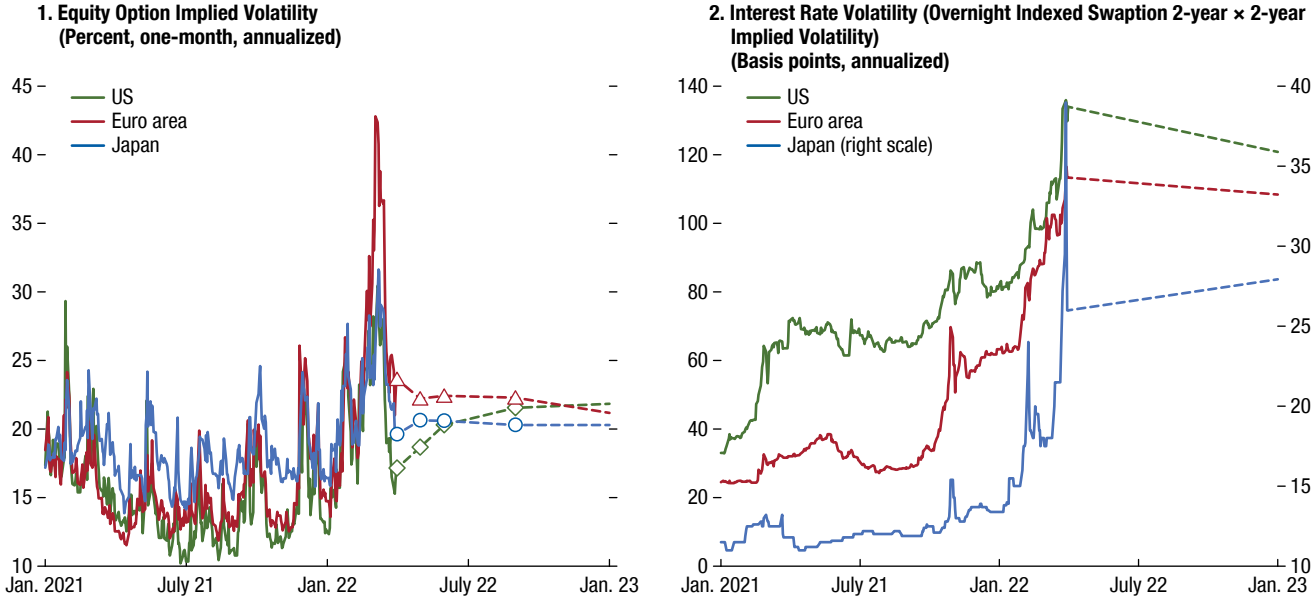
Sources: Bloomberg Finance L.P.; JPMorgan Chase & Co.; and IMF staff calculations.
Note: In panel 3, the Caucasus/Central Asia includes the average of Armenia, Azerbaijan, Georgia, Kazakhstan, and Tajikistan. In panels 3 and 4, data labels use International Organization for Standardization (ISO) country codes. EM = emerging markets; IT = information technology; LatAm = Latin America; YTD = year to date.

Despite the anticipated economic impact, especially in the war region and Europe, no global systemic event affecting financial institutions or markets has materialized so far. This reflects, at least in part, the increased resilience of the global financial system resulting from the implementation of the financial regulatory agenda following the global financial crisis. However, financial stability risks have risen on several fronts since the Russian invasion of Ukraine, and they may test the resilience of global financial markets amid huge uncertainties, especially should stress interact with preexisting vulnerabilities (see Online Box 1.1[5] on financial vulnerabilities). Inflation pressure related to surging commodity prices has worsened the policy trade-off faced by central banks, raising concerns among investors about the readiness of central banks to backstop financial markets in the event of sharp declines in asset prices. Moreover, a sudden repricing of risk resulting from an intensification of the war, including a widening of the war beyond Ukraine and Russia, and an associated escalation of sanctions, may expose, and interact with, some of the vulnerabilities that have built up during the pandemic and lead to a sharp decline in asset prices. For example, the recent equity sell-off in China, particularly in the tech sector, combined with ongoing stress in the real estate sector and the increase

[5]Online Box 1.1. is at: www.imf.org/en/Publications/GFSR.

Figure 1.4. Financial Market Volatility Has Picked Up Dramatically

Market volatility has spiked following the war in Ukraine, especially in Europe, but it has fallen notably recently.

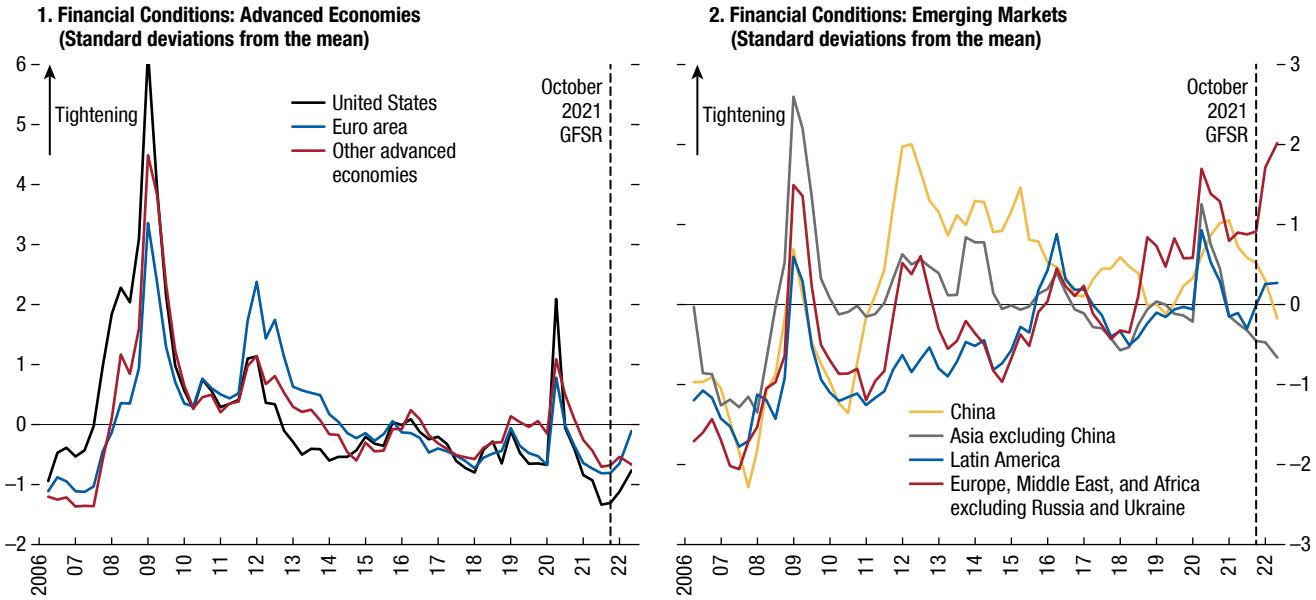


Sources: Bloomberg Finance L.P.; and IMF staff calculations.
Note: In panel 1 and 2, dotted lines indicate forwards. In panel 2, OIS swaption (swap option) refers to an option to enter into an overnight index swap (OIS).
EUR = euro; JPY = Japanese yen; USD = US dollar.

Figure 1.5. Global Financial Conditions

Financial conditions have tightened notably on average in Q1 in advanced economies, especially in the euro area ...

... and have reached extremely tight levels in eastern Europe.

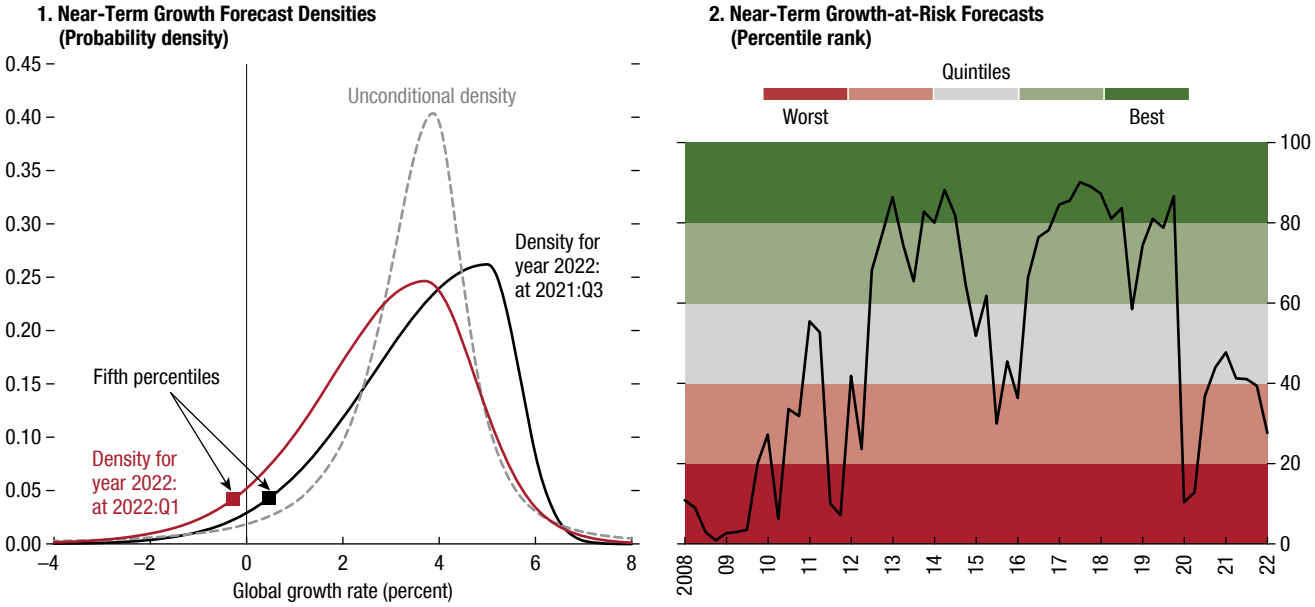


Sources: Bloomberg Finance L.P.; Haver Analytics; national data sources; and IMF staff calculations.
Note: GFSR = *Global Financial Stability Report*.

Figure 1.6. Global Growth-at-Risk

The downward revision to global growth forecast for 2022 coincides with the balance of risks remaining skewed to the downside.

Downside risks are now at elevated levels compared with historical norms.



Sources: Bank for International Settlements; Bloomberg Finance L.P.; Haver Analytics; IMF, International Financial Statistics database; and IMF staff calculations.
Note: Forecast density estimates are centered around the World Economic Outlook forecasts for 2022 as at 2021:Q3 and 2022:Q1, respectively. To gauge downside risks over time, in panel 2, the black line traces the evolution of the 5th percentile threshold (the growth-at-risk metric) of near-term growth forecast densities. The color of the shading depicts the percentile rank for the growth-at-risk metric, from 1991 onward. See the April 2018 *Global Financial Stability Report* for details.

in COVID-19 cases, has raised concerns about a growth slowdown, with possible spillovers to emerging markets. In addition, the war has crystallized specific amplification channels of the shock that operate through financial markets—for example through disruptions in commodity markets and widespread counterparty risk concerns that have propagated and weighed on risk-taking appetite across market segments.

Potential transmission channels of the war in Ukraine through global financial markets include inflation pressure related to rising commodity prices; exposures of banks and nonbank financial intermediaries to Russian and Ukrainian assets; disruptions in commodity markets transmitted through commodity trade finance and derivatives; growing concerns about counterparty risks leading to a broad pullback in risk-taking amid poor market liquidity and funding strains; a Russian default on its debt obligations and potential capital outflows from emerging markets; and cyberattacks affecting the resilience of the financial system.

In coming years, policymakers will face a number of structural challenges brought to the fore by the war in Ukraine. These include a change in the perception of the trade-offs between energy security and climate transition at a time when higher commodity prices and supply disruptions will likely make the transition toward energy renewables more costly and complex; de-globalization and fragmentation of capital markets as a result of recurring geopolitical events, with possible long-term implications for the composition of exchange rate reserves; the risk of fragmentation in payment systems and the creation of central bank digital currency blocs; and more widespread use of crypto assets in emerging markets to bypass capital restrictions and sanctions. These issues are extremely complex in a world where geopolitics is likely to play a major role with respect to asset allocations and uncertainty reigns.

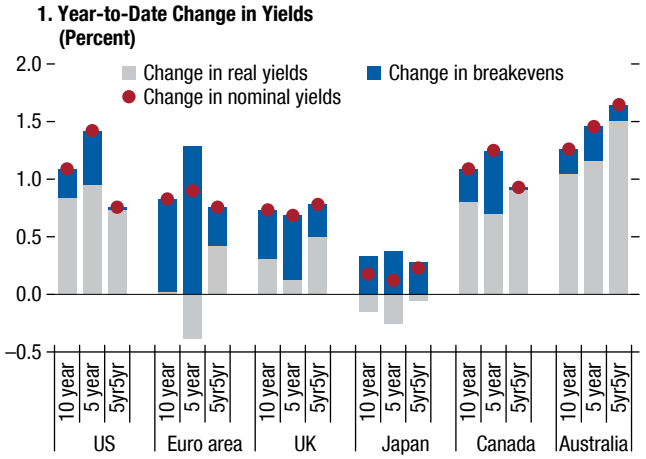
Implications of Higher Commodity Prices for Monetary Policy

Central Bank Normalization in Advanced Economies: Walking a Tightrope amid Stubbornly High Inflation

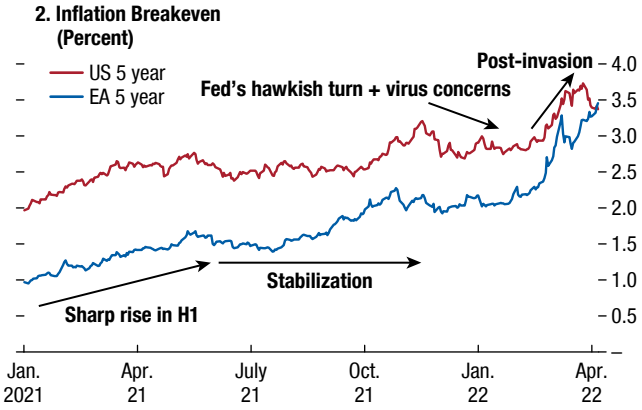
With higher commodity prices expected to add to inflation pressure that has been accelerating since the October GFSR, central banks are faced with a

Figure 1.7. Drivers of Advanced Economy Bond Yields

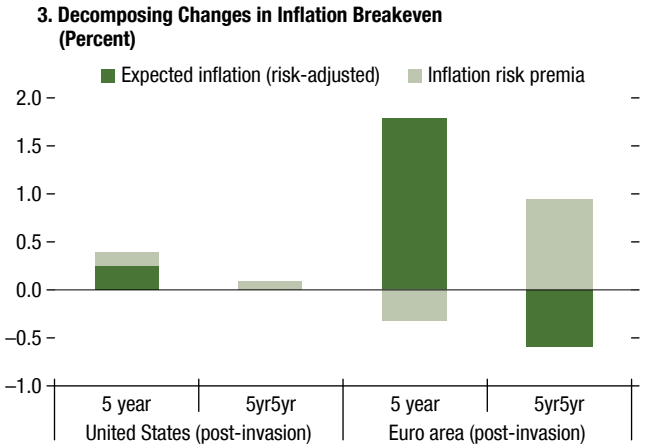
Nominal yields have increased significantly, reflecting rising inflation breakevens and real rates.



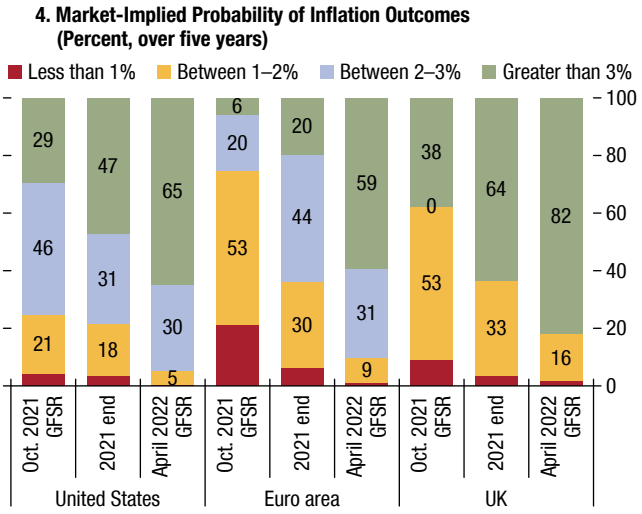
Five-year inflation breakevens have increased sharply since the invasion ...



... driven by higher expected inflation in the euro area, and with somewhat higher inflation risk premia playing a role in the United States.



The probability of high inflation outcomes has increased notably since the previous GFSR.



Sources: Bloomberg Finance L.P.; Goel and Malik (2021); and IMF staff calculations.
Note: In panel 4, probabilities are derived from inflation caps and floors. EA = euro area; 5yr5yr = 5-year, 5-year forward; H1 = first half of the year; GFSR = *Global Financial Stability Report*.

challenging trade-off between fighting multiyear-high inflation and safeguarding the recovery at a time of heightened uncertainty about prospects for the global economy. Bringing inflation down to target and preventing an unmooring of inflation expectations require careful communication and actions to prevent a disorderly tightening of financial conditions. Such a tightening, especially if interacting with financial vulnerabilities, could pose risks to financial stability and weigh on growth.

After rising early in the year on concerns about the inflation outlook, advanced economy nominal bond yields increased sharply in March amid heightened interest rate volatility, reflecting an increase of both breakevens and real rates (Figure 1.7, panel 1). The yield increase accelerated in early April as investors reassessed their outlook for monetary policy following the formal commencement of the normalization process by the Federal Reserve at its March Federal Open Market Committee (FOMC) meeting.

Inflation breakevens (a market-implied proxy for future inflation) have risen significantly since the beginning of the year on the back of sharply higher commodity prices (Figure 1.7, panel 2). Real rates have also increased in a number of advanced economies, on expectations of tighter monetary policy.

The increase in inflation breakevens across countries has been very pronounced at the five-year horizon. In the euro area, such an increase appears to reflect significantly higher expected inflation, while in the United States higher inflation risk premia—an estimated proxy for inflation uncertainty—seem to have also played a role (Figure 1.7, panel 3). Meanwhile, the rise in inflation breakevens at the five-year, five-year forward horizon has been more contained so far, driven primarily by higher inflation risk premia, suggesting that longer-term inflation expectations continued to be largely anchored despite the jump in commodity prices. However, pricing in inflation options markets points to a notable increase in the probability of high inflation—specifically, inflation outcomes greater than 3 percent—since the time of the previous GFSR (Figure 1.7, panel 4).

The market-implied expected path of policy has risen significantly in advanced economies since the beginning of the year and moved further upward since the Russian invasion of Ukraine, as central banks have taken steps to normalize monetary policy amid record-high headline inflation (Figure 1.8, panel 1). In the euro area, the European Central Bank (ECB) has accelerated the pace of tapering its asset purchase program, noting that interest rate increases could follow some time after the end of asset purchases. The Bank of Japan, by contrast, has maintained its ultra-loose policy as inflation has remained subdued.

The Federal Reserve delivered its first policy rate hike at its March FOMC meeting. In addition, the median FOMC participant now anticipates the federal funds rate to approach 2 percent by the end of the year (Figure 1.8, panel 2). In real terms, however, the FOMC-implied stance of policy is expected to remain accommodative at least through 2023 (Figure 1.8, panel 3). Even though the market-implied policy path in 2022 is now above the FOMC participants' assessment of appropriate monetary policy, there is still a risk of a possible repricing of the magnitude of the policy cycle. Historically, once tightening is under way, long-term interest rates eventually tend to move higher (Figure 1.8, panel 4). Such an increase, especially if driven by real rates, may lead to a sudden repricing of risk that may weigh on economic prospects. Reportedly reflecting concerns about the economic outlook, the US Treasury yield curve has flattened significantly since the beginning of the year, and certain segments of the curve have inverted (Figure 1.8, panel 5).

The normalization of balance sheet policies may present additional challenges to central banks. While policy rates remain the main monetary policy tool, clear communication on plans to unwind the unprecedented expansion of central bank balance sheets—in terms of timing, speed of reduction, and composition of both the asset and liability sides—will be crucial to avoid unnecessary market volatility. To gauge the impact of balance sheet normalization on long-term interest rates, investors have focused on the 2017–19 quantitative tightening (QT) experience, highlighting the risk of a sudden increase in term premia given the larger size of the Federal Reserve's balance sheet and its footprint in some market segments (Figure 1.9, panel 1). The unwinding of the Federal Reserve's balance sheet is expected to be fast, with more than $1 trillion of assets (approximately 20 percent of the Treasury securities held in the Federal Reserve System Open Market Account portfolio) maturing in 2022 (Figure 1.9, panel 2).

While still low by historical standards, southern European countries' spreads have widened since the ECB's announcements of its intention to scale back asset purchases, underscoring the risk of market fragmentation in the euro area. Between 2020 and 2021, accommodative and supportive market conditions brought about by the ECB's asset purchase programs have helped push spreads lower (Figure 1.9, panel 3). With fiscal deficits and debt levels remaining relatively high in some countries, additional fiscal stimulus in Europe is being considered to cushion the impact of the war in Ukraine (including future defense and climate spending) (Figure 1.9, panel 4). The wind-down of asset purchases may contribute to a tightening of financial conditions.

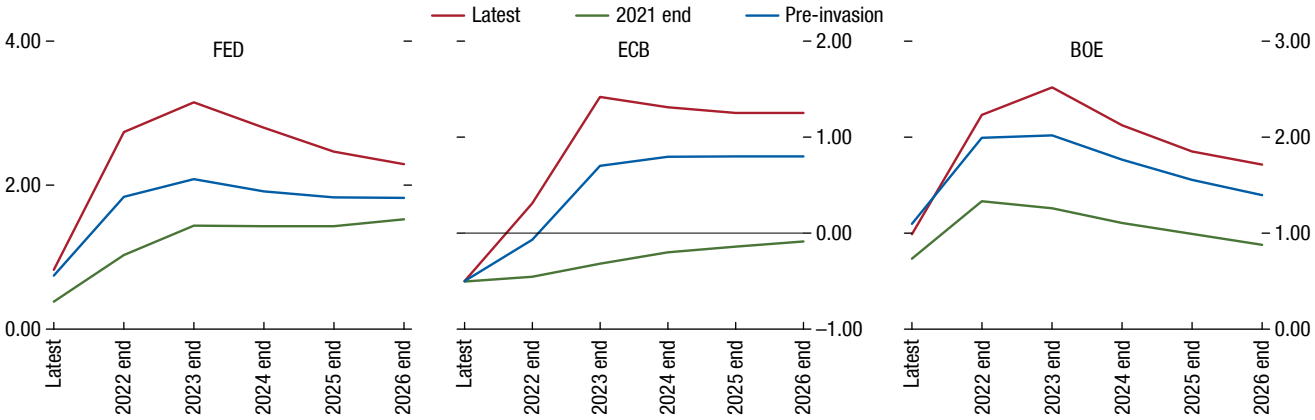
Emerging Market Central Banks Face Further Inflation Pressure

Even before the Russian invasion of Ukraine and the associated surge in commodity prices, emerging market central banks in Latin America and Europe were facing rising inflation pressure. Inflation prints came in well above central bank targets last year, outpacing inflation forecasts (Figure 1.10, panel 1). To maintain market confidence in their ability to meet their mandates,

Figure 1.8. Increase in Advanced Economy Policy Rates

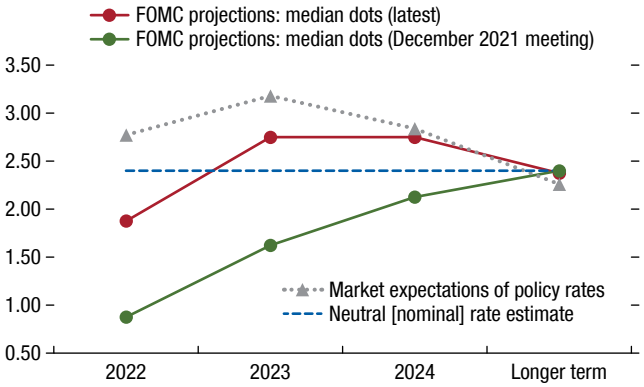
Market-implied expectations of policy rates have risen across advanced economies.

1. Policy Rate Expectations: Advanced Economies
(Percent)



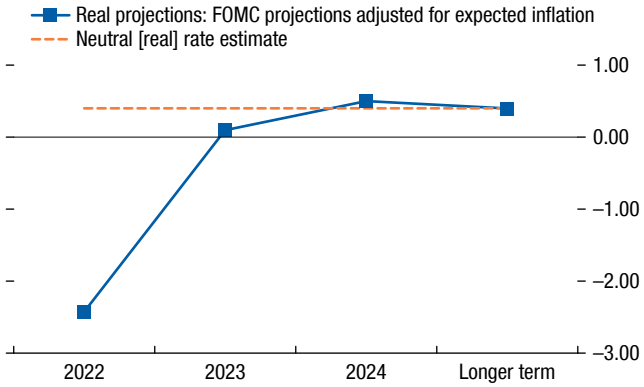
The FOMC assessment of appropriate monetary policy has also moved significantly higher.

2. Shift in US Policy Rate Projections: Nominal Rates
(Percent)



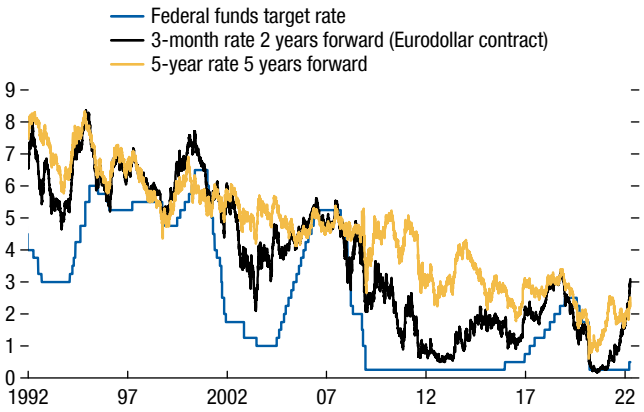
Accounting for expected inflation, however, policy appears to still be relatively accommodative for the current and following year.

3. US Policy Rate Projections: Real Rates
(Percent)



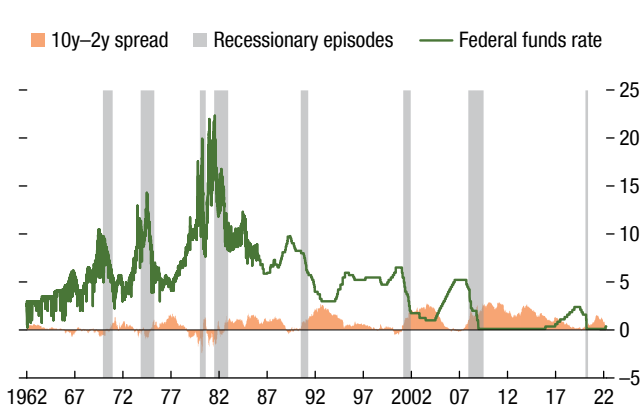
Longer-term interest rates tend to move higher once policy tightening is under way.

4. Long-Term Interest Rates and Policy Tightening
(Percent)



The yield curve has flattened significantly since the beginning of the year, reflecting concerns about the economic outlook.

5. US Yield Curve Slope and the Federal Funds Rate
(Percent; percentage points)

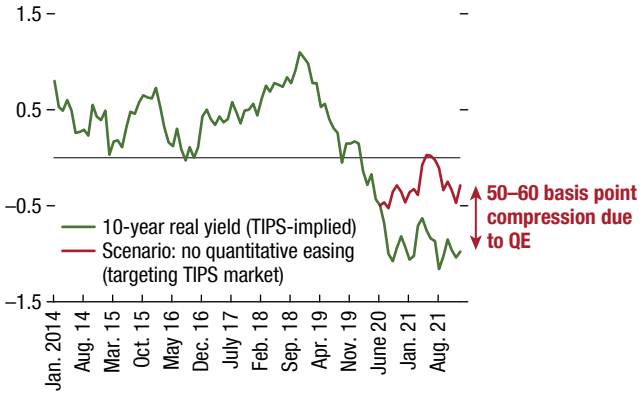


Sources: Bloomberg Finance L.P.; national authorities; US Federal Reserve; and IMF staff calculations.
Note: BOE = Bank of England; ECB = European Central Bank; FED = US Federal Reserve; FOMC = Federal Open Market Committee.

Figure 1.9. A Challenging Normalization Process

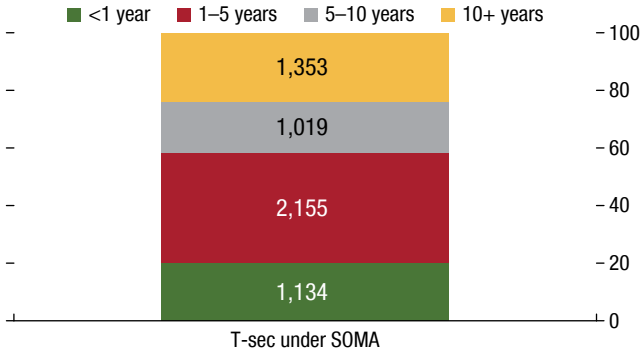
A repricing of risk is possible, as the effects of quantitative tightening on the path of interest rates remain uncertain.

1. Impact of Quantitative Tightening on Real Rates: Decompression of Liquidity Premia
(Percent)



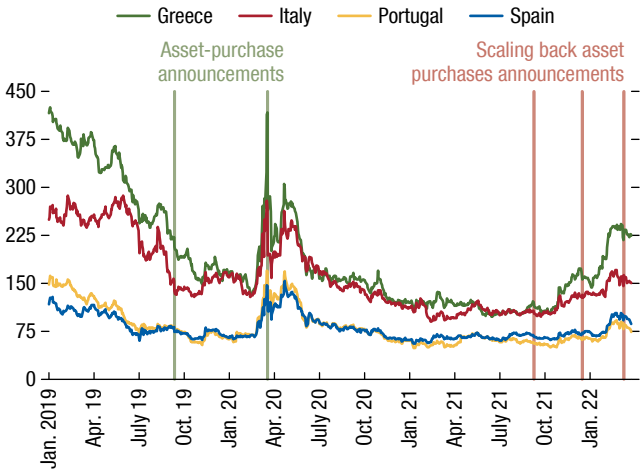
The Federal Reserve's run-off potential in 2022 is approximately 20 percent of the Treasury securities held in the System Open Market Account (SOMA) holdings.

2. Distribution of Residual Maturities of the Treasury Securities Held by the Federal Reserve
(Percent; billions of US dollars)



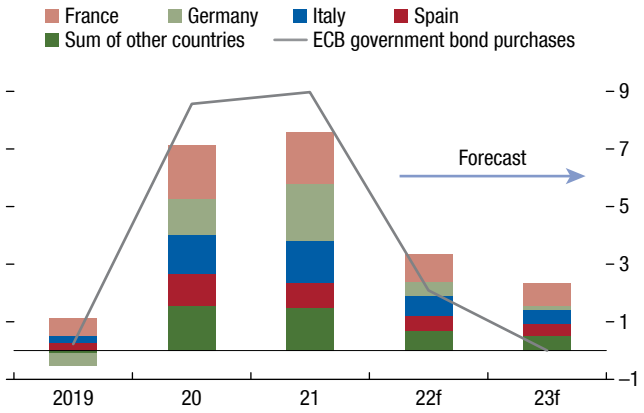
Southern European sovereign yields have exceeded pre-pandemic levels and spreads have widened.

3. Euro Area 10-Year Peripheral Spreads
(Basis points, against German bunds)



Borrowing needs remain larger compared to pre-pandemic levels and vary across countries.

4. European Central Bank Net Sovereign Purchases and Deficits
(Percent of GDP)



Sources: Bloomberg Finance L.P.; Federal Reserve; national authorities; and IMF staff calculations.
Note: ECB = European Central Bank; QE = quantitative easing; TIPS = Treasury Inflation Indexed Securities; T-sec = Treasury securities.

many central banks responded decisively and front-loaded policy tightening—a crucial step, as evidenced by the relative stability of longer-term inflation expectations.[6] Market participants were already pricing that central banks in Latin America and eastern Europe would be able to halt or even reverse earlier hikes within a one-year horizon on the back of an improvement in the inflation outlook (Figure 1.10, panel 2). Meanwhile, investor flows in local currency markets were experiencing a nascent recovery.

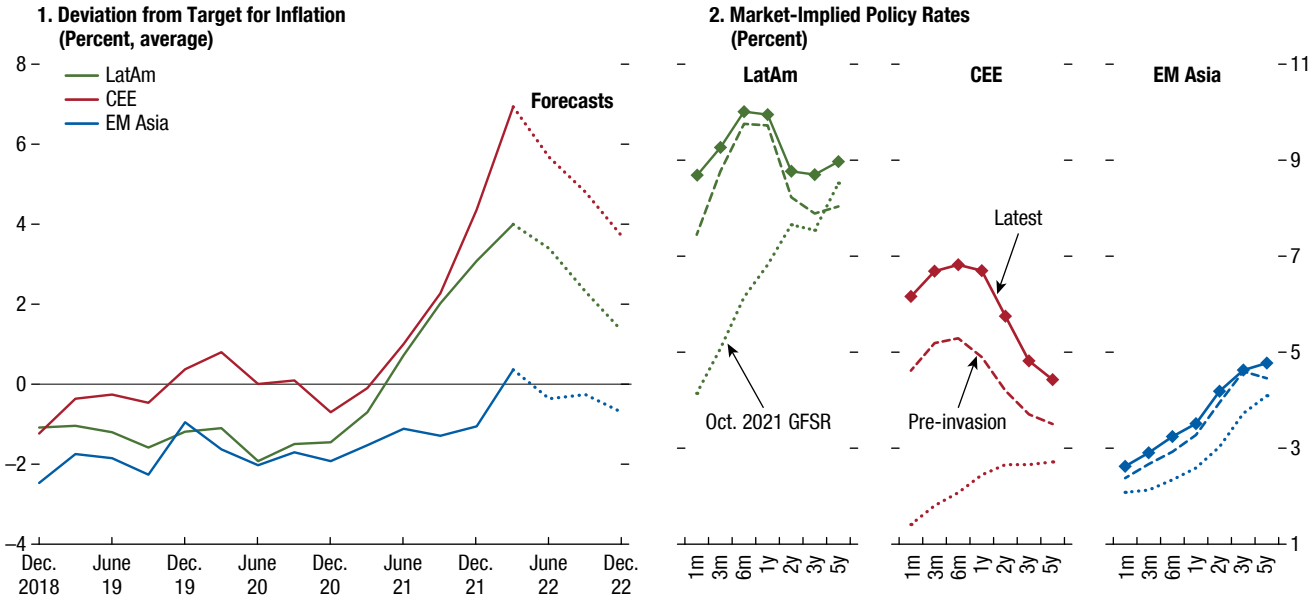
However, the Russian invasion of Ukraine has adversely affected the outlook for many emerging markets. As indicated in the April 2022 WEO, relative to the January 2022 WEO *Update*, the inflation forecast

[6]Two notable exceptions are Argentina and Turkey, where inflation expectations remain well above the inflation targets in the relevant policy horizon.

Figure 1.10. Inflation and Interest Rates in Emerging Markets

Consensus expects that the inflection point for inflation prints is near.

Policy-implied paths differ substantially among regions.



Sources: Bloomberg Finance L.P.; Consensus Forecasts; and IMF staff calculations.
Note: Both charts are based on a sample of countries from CEE = Central and Eastern Europe; EM Asia = emerging market Asia; LatAm = Latin America. Panel 1 uses the upper limit of the inflation targeting framework where available. GFSR = *Global Financial Stability Report*.

for emerging market and developing economies for 2022 has been revised up 2.7 percentage points to 8.6 percent, while the GDP forecast for 2022 has been revised down 0.9 percentage point to 3.9 percent. The war in Ukraine has had a larger impact on economies in central and eastern Europe, where a notable tightening of financial conditions has been accompanied by currency interventions (and restrictions such as by Russia and Ukraine), and a shift to an even more hawkish monetary policy stance in some cases. The rise in commodity prices has been swiftly felt in most countries with direct trade links to Russia and Ukraine, creating further upside risks to inflation. In addition to a shift to a more hawkish stance of monetary policy, some countries (such as Egypt) have also taken the opportunity to use the exchange rate as a shock absorber.[7] By contrast, commodity exporters across emerging markets, such as Brazil, Chile, and South Africa have seen an improvement in their terms of trade and a relatively milder impact on financial conditions. This has provided central banks with more space to calibrate monetary policy to domestic developments. Emerging market economies in Asia that have limited direct links to Russia and Ukraine and a more benign inflation outlook have continued with their more delayed and gradual policy normalization.

Transmission Channels of the War through Financial Intermediaries and Markets

The Russian invasion of Ukraine and ensuing sanctions have already had an impact on financial intermediaries, firms, and markets directly or indirectly exposed to the war. Europe bears a higher risk than other regions due to its proximity, reliance on Russia for energy needs, and non-negligible exposure of some banks and other financial institutions to Russian financial assets and markets. But the war is also generating broader concerns well beyond Europe. Rising risk aversion has led to flight-to-quality flows and signs of strains in dollar-funding markets. Extreme volatility in commodity markets has resulted in ripple effects

[7]Other countries also had to resort to measures to stem outflows of foreign exchange given the spike in demand for foreign exchange and logistical difficulties in sourcing foreign exchange. For example, Kazakhstan banned people leaving the country with more than $10,000 and imposed restrictions on gold and silver departures.

across global markets and financial intermediaries, often magnified by poor liquidity, leading to lower risk appetite, rising counterparty risk concerns (for example, in relation to commodity financing and derivatives), and supply chain disruptions. The prospect of a Russian default on government debt and the removal of Russian assets from global indices would have implications for emerging market capital flows. Cyberattacks have become a first-order concern for financial institutions and policymakers alike. These factors can operate as shock amplifiers and, in some cases, lead to severe market disruptions.

Foreign Banks' Direct Exposures to Russia and Ukraine: Relatively Modest, in Aggregate

Direct exposures of foreign banks to Russia and Ukraine appear to be relatively modest, in aggregate (Figure 1.11, panel 1).[8] As of the third quarter of 2021, claims of foreign banks on Russian residents totaled about $120 billion, with 60 percent in foreign currencies. For Ukraine, exposures were relatively small at $11 billion. The vast majority of these exposures were held by euro area banks. For some countries, these exposures were economically significant, as individual banks play an active role in the Russian banking system (Figure 1.11, panel 2). Because they operate as subsidiaries, however, they typically fund themselves locally; as a result, intra-group loans are generally small.

The market capitalization of European banks declined sharply after the Russian invasion (Figure 1.11, panel 3). While banks with large exposures to Russia and Ukraine experienced the largest declines, an index of European bank equity prices fell over 20 percent after February 24, reflecting in part concerns about a deterioration of the economic and profitability prospects.[9] By contrast, equity prices of US banks dropped only about 8 percent at the worst point.

Meanwhile, the increase in European bank credit default swap (CDS) spreads has been more modest, suggesting that investors expect the impact of the war and sanctions on banks' balance sheet and capital to be manageable. Banks with Russian subsidiaries can choose to either exit the market entirely or maintain their presence but prepare for a sharply worsening revenue and asset quality outlook. The exit strategy is estimated to reduce the common equity Tier 1 (CET1) ratio at the group level by an average of 20 basis points, with an impact about four times larger for the most exposed bank (Figure 1.11, panel 4).[10] However, cross-border exposures are likely to be either pulled back or experience some losses, in which case the total impact could reach an average of 80 basis points (about 2½ times the impact for the most exposed bank).

Indirect Exposures: More Difficult to Assess

Banks' indirect exposures are more difficult to identify and assess because they are less well known (especially the extent of interconnectedness) and hard to quantify in the absence of detailed and consistent disclosures by country or specific activity types. The risk is that indirect exposures could be meaningful and surprise investors once revealed, leading to a sharp rise in counterparty risk and risk premia. These exposures could result from activities such as investment banking and wealth management, derivatives (including commodity derivatives),[11] and off-balance-sheet exposures related to supply chain or commodity financing, as well as contingent liabilities and guarantees.[12] In some cases, these exposures to Russian counterparties could be large. For example, foreign exchange swap and forward contracts, unlike other derivative instruments, involve the exchange of notional amounts and are akin to collateralized lending. As such, gross positions matter, as they expose institutions to significant counterparty and settlement risks, notably in situations where foreign currency settlement is restricted.

[8]The actual exposures are likely higher, as some countries are not included in the aggregate data. However, according to bank disclosures or statements in 2022:Q1, exposures have likely decreased since 2021:Q3.

[9]The cost of equity (CoE) for European banks increased from 11 percent to 16.5 percent after the invasion, before recovering to modestly above the pre-invasion level. A capital asset pricing model shows that the increase in CoE has been driven by a rise in the European equity risk premium and amplified by higher sensitivity (beta). This is consistent with higher expected losses associated with Russian exposures, alongside a more challenging macroeconomic outlook.

[10]The exercise assumes loss of equity, intra-group funding, and subordinated debt at the Russian subsidiary level, and de-consolidates the associated risk-weighted assets. Loss from cross-border exposures was considered as an additional shock, assuming a 100 percent haircut in the worst scenario.

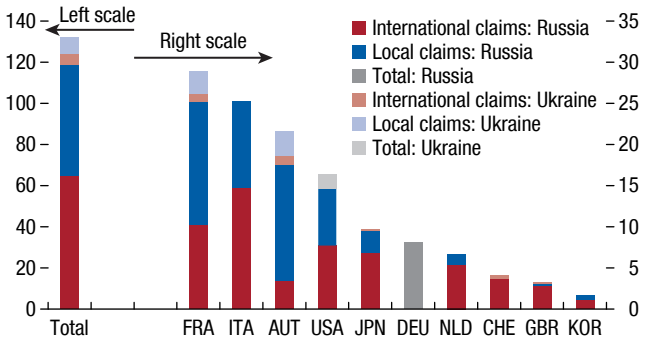
[11]Commodity derivative exposure from euro area banks that are designated as significant institutions stood at 52 million euros, according to an ECB assessment as of March 15, 2022.

[12]Typically, trade finance has public or private insurance as risk mitigation.

Figure 1.11. Foreign Bank Exposures to Russia and Ukraine

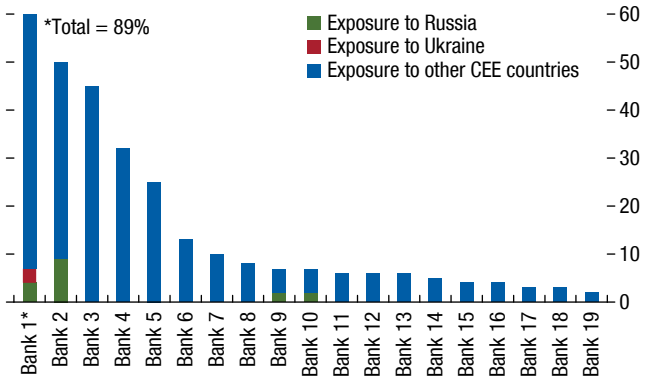
Direct exposures to Russia and Ukraine are modest in aggregate ...

1. Foreign Banks' Gross Claims on Russia and Ukraine (Billions of US dollars)



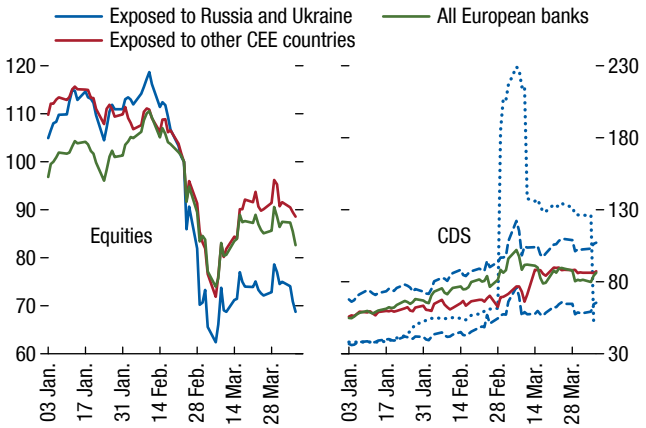
... but are sizable at some banks.

2. Banks with Largest Exposures to Russia, Ukraine, and Central and Eastern Europe Countries (Percent of total assets)



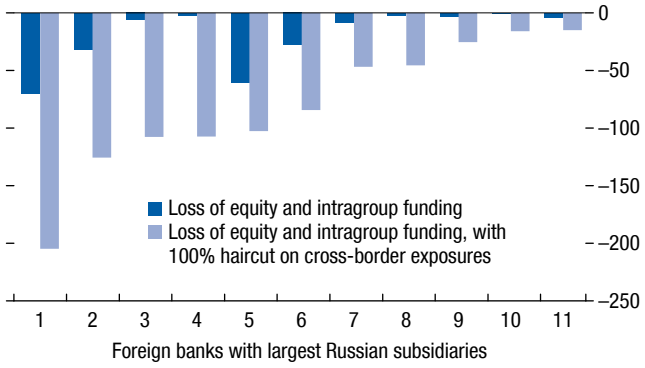
There have been sharp declines in bank stocks and a relatively modest increase in credit default swaps ...

3. Stock Price and Credit Default Swap Spreads (Index, February 23, 2022 = 100; basis points)



... as the capital impact appears manageable for most.

4. Foreign Bank Exit: Potential Impact on Group CET1 Ratios (Basis points)



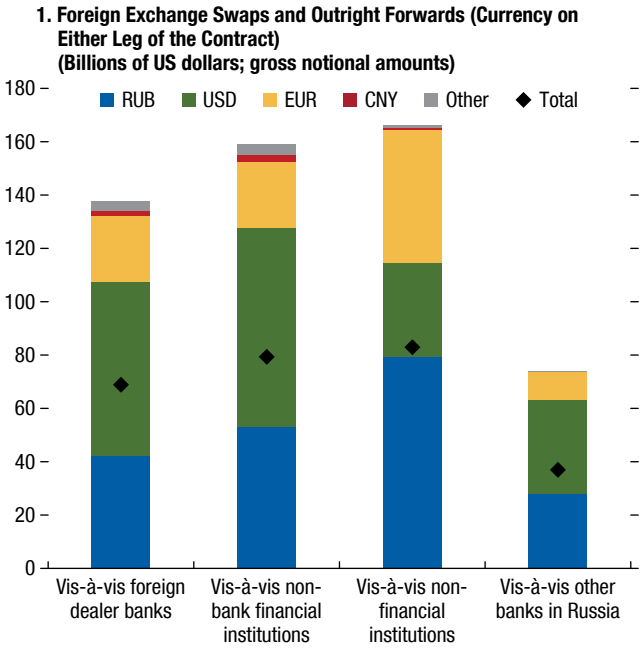
Sources: Bank for International Settlements, Consolidated Banking Statistics; European Banking Authority; Bloomberg L.P.; individual bank disclosures; and IMF staff calculations.
Note: In panel 3, the blue-colored lines on the right chart refer to three different banks with material exposures to Russia and Ukraine. In panel 4, see footnote 15 for details. Data labels use International Organization for Standardization (ISO) country codes. CDS = credit default swaps; CEE = central and eastern Europe; CET1 = Common Equity Tier 1.

Before the war, Russian banks had entered into foreign exchange swaps and forwards contracts with foreign dealer banks. Typically, Russian banks would lend US dollars against a pre-agreed amount of Russian rubles (the gross notional amount), as they received large amounts of dollar deposits (and, to a lesser extent, euros) from their clients.[13] The total gross notional amount of over-the-counter foreign exchange swaps and forwards between Russian banks and foreign dealer banks amounted to about $69 billion at the end of 2021 (Figure 1.12, panel 1, first bar, black diamond). To the extent that foreign dealer banks have received dollars, a default by Russian banks would have limited spillovers in the foreign exchange derivatives market, as foreign banks would be left holding US dollars. Even if that is the case, however, the termination of the foreign exchange derivatives exposures may leave both foreign and Russian banks with unhedged exposures. The Russian banks would be left with a currency mismatch against their domestic depositors, while foreign banks would have to find new

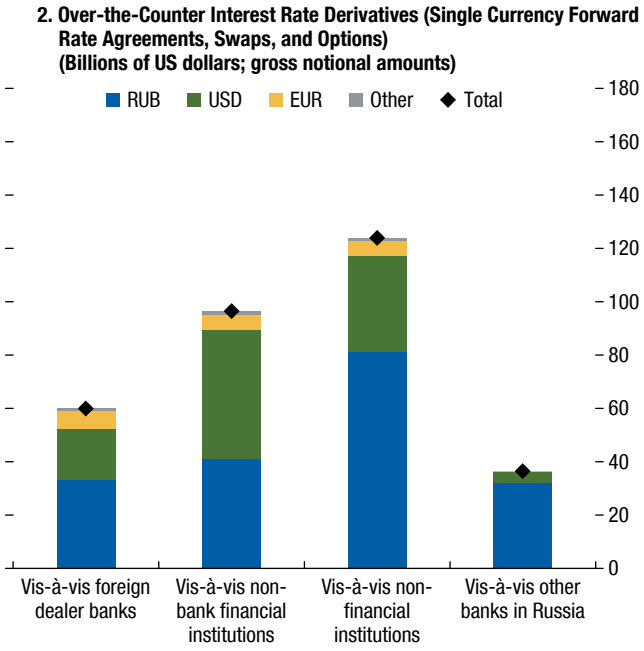
[13]Banks in Russia had around $220 billion US dollar deposits as of the end of September 2021, according to Bank for International Settlements locational banking statistics.

Figure 1.12. Over-the-Counter Derivative Exposures of International and Domestic Banks in Russia, End-2021

Foreign exchange derivative exposures of foreign dealer banks to banks in Russia is significant ...



... while over-the-counter interest rate derivative exposures are smaller (and less risky).



Sources: Central Bank of Russia; and IMF staff calculations.
Note: As foreign exchange swap and forward contracts involve the exchange of two currencies, the sum of outstanding notional amounts across individual currencies (for either leg of the contract) in panel 1 is exactly double the total outstanding amount. Foreign dealer banks include the subsidiaries and branches of these banks located in Russia. Over-the-counter interest rate derivatives are generally subject to clearing requirements, although for contracts in Russian rubles clearing has only been mandatory for interest rate swaps since the last quarter of 2021. Such swaps typically constitute the bulk of outstanding amounts (>75% of the global total). CNY = Chinese yuan; EUR = euro; RUB = Russian ruble; USD = United States dollar.

instruments to hedge any outstanding ruble exposures. Outstanding amounts of over-the-counter interest rate derivatives, which require only an exchange of interest payments, are generally lower than foreign exchange gross notional amounts, and clearing requirements help to contain counterparty risk exposures (Figure 1.12, panel 2).

Nonbank Financial Intermediaries: Coping with a Potential Russian Default

Foreign nonbank financial intermediaries (NBFIs) had sizable investments in Russian assets, holding about one-fifth of its total sovereign debt, half of its corporate debt, and more than 40 percent of Russian equities as of the fourth quarter of 2021 (Figure 1.13, panel.1).[14] Within the NBFI sector, open-end investment funds (OEFs), which offer mostly daily liquidity and are therefore at greater risk of redemption pressures, have exposures to Russian equities of about $100 billion, the vast majority of which is held by US funds (Figure 1.13, panel 2). OEFs also have a combined $34 billion in fixed-income assets, about two-thirds of which is held by European funds. As a share of total assets, however, their exposure to Russia is small. Even for European funds, which display the largest portfolio shares in Russian debt and equities, aggregate exposures are less than 2 percent of funds' assets.

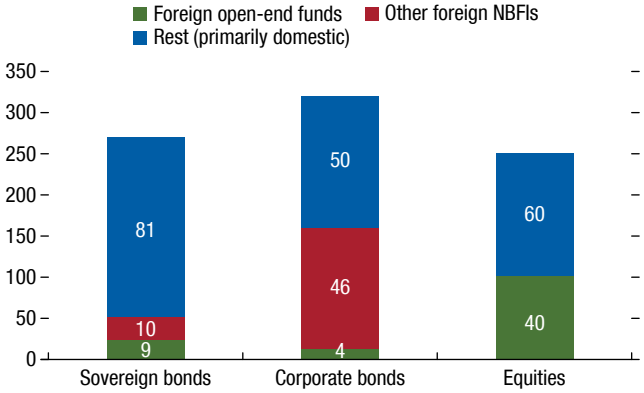
Within the OEFs, emerging-market-dedicated funds hold the vast majority of Russian debt and equity. However, even these funds have maintained a cautious stance on their exposures to Russian debt since the Crimea occupation in 2014, particularly for the hard-currency bond funds subcategory (Figure 1.13, panel 3). Emerging market dedicated funds reduced their share of Russian debt from over 10 percent prior to 2014 to just over 4 percent in 2022. In fact, heading into the 2022 Russian invasion, these funds had (on average) an underweight position compared to their

[14]The estimate for equities is likely to be higher, as there is only data available for the holdings of foreign open-end funds, with the latter holding an estimated 40 percent of the market cap of Russian equities.

Figure 1.13. Exposure to Russian Assets by Foreign Nonbank Financial Intermediaries

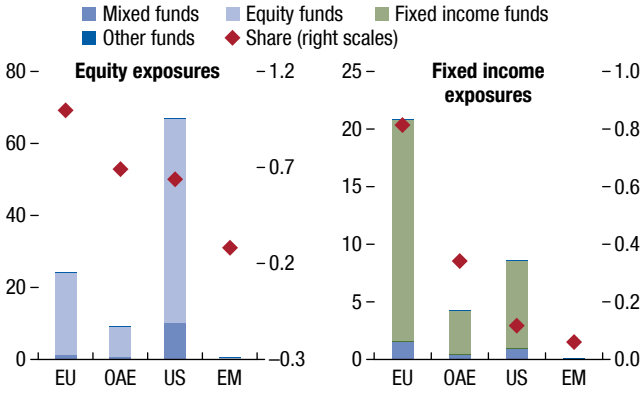
Foreign nonbank financial intermediaries hold a sizable amount of Russian securities ...

1. Russian Sovereign Debt, Corporate Debt, and Equities (Billions of US dollars; percent)



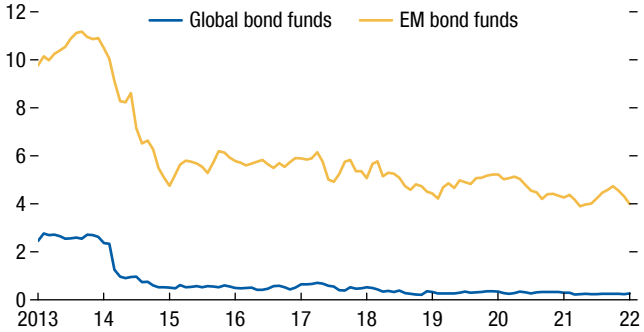
... with US and European investment funds accounting for most of the exposures.

2. Open-End Investment Fund Exposure to Russian Sovereign Debt, Corporate Debt, and Equities (Billions of US dollars, left scales; average portfolio share, percent, right scales)



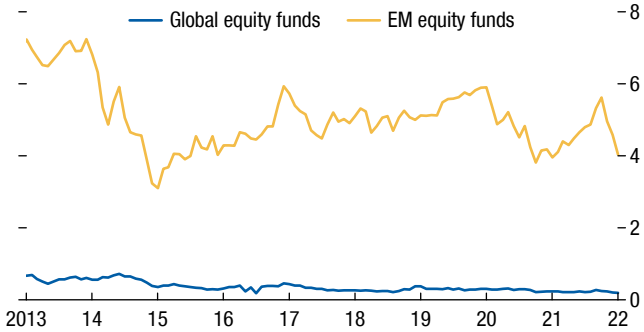
The share of Russian bonds in the portfolios of emerging-market-dedicated bond funds has declined since 2015 and is negligible for global funds ...

3. Open-End Bond Fund Portfolio Allocation to Russia (Percent of assets)



... and a similar pattern prevails for equity funds.

4. Open-End Equity Fund Portfolio Allocation to Russia (Percent of assets)



Sources: Arslanalp and Tsuda (2014, updated); Bloomberg Finance LP; Haver Analytics; JPMorgan Chase & Co.; Morningstar; and IMF staff calculations.
Note: In panel 1, the "other foreign NBFIs" category for corporate bonds includes all intermediaries that are not open-end funds, including sovereign wealth funds, close-end funds, pension funds, hedge funds, and others. The "rest" category in panel 1 for equities also includes foreign NBFIs outside of open-end funds due to the lack of available data. The market cap of the MOEX index is used as a proxy for the total value of Russian equities. The total value of both Russian sovereign and corporate bonds outstanding includes both foreign and domestic currency bonds. EM = emerging markets; EU = European Union; NBFIs = nonbank financial intermediaries; OAE = other advanced economies; US = United States.

emerging market benchmark (more on this follows). In contrast to emerging-market-dedicated funds, funds benchmarked to global indices had a much smaller exposure to Russia (in both absolute and relative terms), with an average 0.2 percent of their assets invested in Russian debt in 2022.[15] On equities, the share of Russian exposure in emerging-market-dedicated funds stood at 4 percent of total assets before the invasion, while for global equity funds it was less than 0.2 percent. Since the Russian invasion of Ukraine, the very sharp drop in valuations of Russian assets has dramatically reduced the market value of investment funds' exposures to Russia. Some regulators have started to consider options to isolate Russian assets from broader portfolios by, for example, allowing the separation of the Russian exposures into so-called side pockets, which are portfolio tranches exclusively owned by

[15]Separately, unconstrained global multi-sector bond funds (MSBFs) hold over 1 percent of Russia's total sovereign debt stock, but this exposure is also small when measured as a percentage of assets. However, these funds may have exposure to derivative contracts, which could be subject to greater losses.

existing investors and are temporarily not available for redemption.[16]

Some NBFIs, such as specialized insurers and leasing companies, may also be facing greater risks in the areas of cyber underwriting, trade credit, and aircraft leasing. The war in Ukraine has intensified the risk of offensive cyber operations, with a potentially adverse impact on financial stability in the region and beyond. Despite the relatively small size of cyber insurance (estimated at $8 billion globally), it has experienced rapid growth amid concerns about the uncertainty of expected losses against which insurers have to reserve and hold capital.[17] Aircraft leasing companies, many of which are domiciled in Ireland, are also exposed to potential large losses if Russia refuses to return leased aircraft. Finally, foreign providers of trade credit are also exposed to Russia, with an estimated $16 billion of trade credit as of the last quarter of 2021.

Foreign sanctions as well as capital controls and other retaliatory measures imposed by Russia have increased risks for foreign investors in Russian securities. Payments to foreigners are not explicitly forbidden by the current set of sanctions, but actions taken by Russian and other international securities depositories (ICSDs), along with the freezing of some of Russia's international reserves, have made payments more difficult.[18] At the time of writing, Russian authorities have continued servicing Russia's foreign law debt in hard currency but have suspended the transfer of payments to foreigners on local law ruble-denominated bonds. The latter action has not created major complications to foreign law debt given that foreign law bonds and CDS do not contain cross-default terms with local law bonds (Figure 1.14, panel 1). However, further sanctions could prevent bonds from trading in the secondary market, which would hamper the CDS settlement process.

In addition to disappearing liquidity and rising credit risk, investors face significant challenges in terms of the valuation of their financial instruments. For example, some foreign investors have positions in non-deliverable forwards (NDFs) that settle in dollars but use the onshore foreign exchange rate as the reference rate. The NDF positions can help them hedge their currency exposures without having to sell their highly illiquid positions in local-currency-denominated assets. Since the start of the war, the Russian central bank has kept tight control on the onshore foreign exchange market,[19] and the Ukrainian central bank has not updated the daily foreign exchange rates. The Russian and Ukrainian exchange rates in offshore markets have diverged from the onshore rates, rendering the NDFs as ineffective hedges (Figure 1.14, panel 2). The sanctions and valuation differences between onshore and offshore markets can also be a problem for foreign banks that have foreign exchange derivatives exposures vis-à-vis Russian banks.

The reduced investability of Russian assets has led to their exclusion from multiple benchmark indices largely used by emerging-market-dedicated funds.[20] The sharp drop in the liquidity of Russian securities and the reduced convertibility of the ruble were some of the key reasons behind the decisions of benchmark providers. Global bond benchmarks (as opposed to emerging-market-specific benchmarks) are reliant on Russia maintaining an investment-grade rating, which is no longer the case. Environmental, social, and governance (ESG) related indices have also excluded Russian assets. While these ESG indices are relatively smaller in size, they are growing fast and reflect investors' increasing focus on the ESG dynamics for emerging markets. Finally, Ukraine's inclusion in the JPMorgan Government Bond Index-Emerging Markets (GBI-EM) index family, which was scheduled for March 31, 2022, is now subject to a further review given the current circumstances. This inclusion was expected to bring additional flows to the local market and help with market deepening.

[16]The United Kingdom's Financial Conduct Authority is currently discussing the option of side pockets with asset managers (FCA 2022). In general, side pockets and gates—temporary redemption stops—are permitted in several European jurisdictions as liquidity management tools used by open-end investment funds (ESMA 2020).

[17]The limited loss history of cyber events, the unreliability of past data when predicting future events, and the possibility of a large-scale attack where losses are highly correlated across firms and sectors make it difficult to write comprehensive policies (Granato and Polacek 2019).

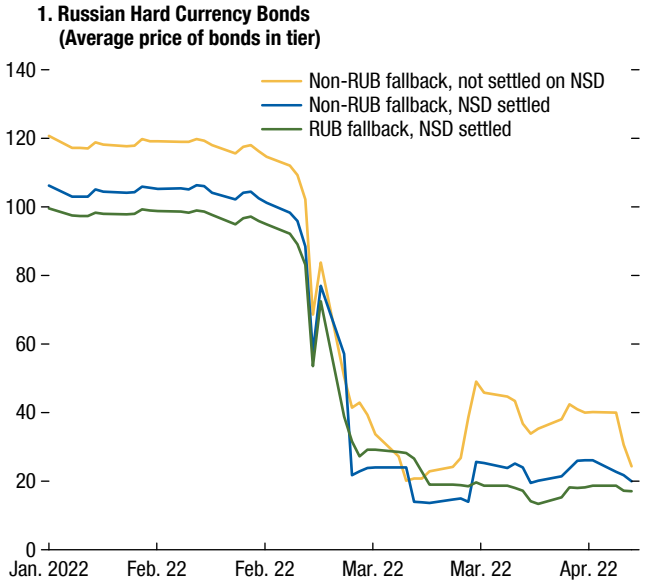
[18]The US Treasury has stated that US persons are authorized to receive interest, dividend, or maturity payments on debt or equity of the Central Bank of the Russian Federation, the National Wealth Fund of the Russian Federation, and the Ministry of Finance of the Russian Federation through May 25, 2022.

[19]Normally, the Russian central bank provides daily fixings (official rate) of the exchange using transactions in the local market. However, trading in local markets has been severely impaired by various restrictions such as the shutdown of the stock exchange for several weeks.

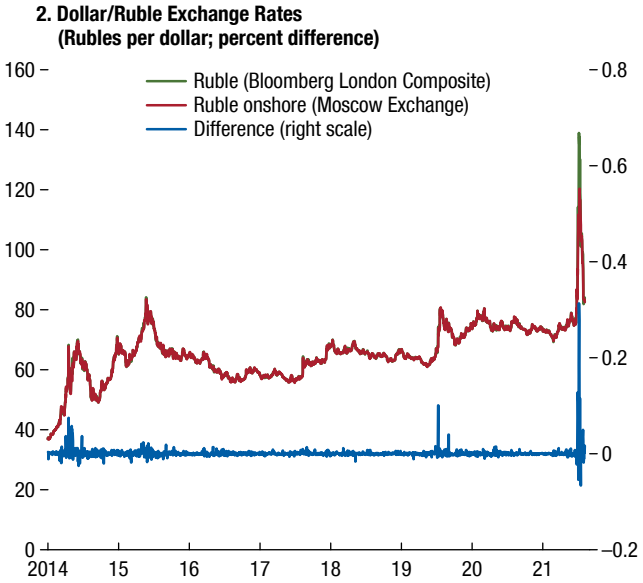
[20]Similar issues apply to Belarusian assets.

Figure 1.14. Investor Challenges in Russian Security Markets

Russian hard currency bonds trade in three tiers depending on recovery assumptions.



Sanctions and other restrictions have created a notable disconnect in the ruble market.



Sources: Bloomberg Finance L.P.; and IMF staff calculations.
Note: In panel 1 "RUB fallback" refers to a provision that allows these bonds to be repaid in rubles under certain conditions. NSD = Russian National Settlement Depository; RUB = rubles.

The index exclusion of Russia is a notable event because benchmark-driven investors have become a key source of intermediating cross-border flows to emerging markets.[21] While the index exclusion adds to price pressures and illiquidity, Russia's weight in the indices has declined sharply in the past few years. Its median weight across major indices dropped from 10 percent during the global financial crisis to just 3 percent before the Russian invasion of Ukraine, and less than 1 percent immediately thereafter, largely due to valuation declines (Figure 1.15, panel 1).

Russia's exclusion from benchmarks could lead to some positive portfolio reallocation flows to other emerging markets, as their benchmark weight will mechanically increase. Investors could also choose to reallocate funds to other emerging markets that shared similarities with Russia before the war. For instance, the 2014–15 Russian annexation of Crimea led to a foreign investor exit from Russian local assets, while foreign ownership in other high-yielding emerging markets rose at the same time (Figure 1.15, panel 2). Investors could also gain exposure to countries that benefit from the current macro backdrop, such as commodity exporters.

Commodity Price Volatility Amplified by Commodity Trade Finance and Derivatives Exposures

The ongoing war in Ukraine, associated sanctions, market participants' actions in response to the global outcry, and rising counterparty risk have caused severe disruptions in commodity markets and supply chains across the globe (Blas 2022).[22] Amid sharply rising volatility, prices have skyrocketed across the commodity complex, causing severe pressures in commodity financing and derivatives markets. Shipping costs of commodities have increased, and higher commodity prices have raised the financing needs of commodity traders and those involved along the supply chain. In addition, users of commodity derivatives (including commodity producers using futures or options for hedging purposes, commodity trading firms, dealer banks, levered investors

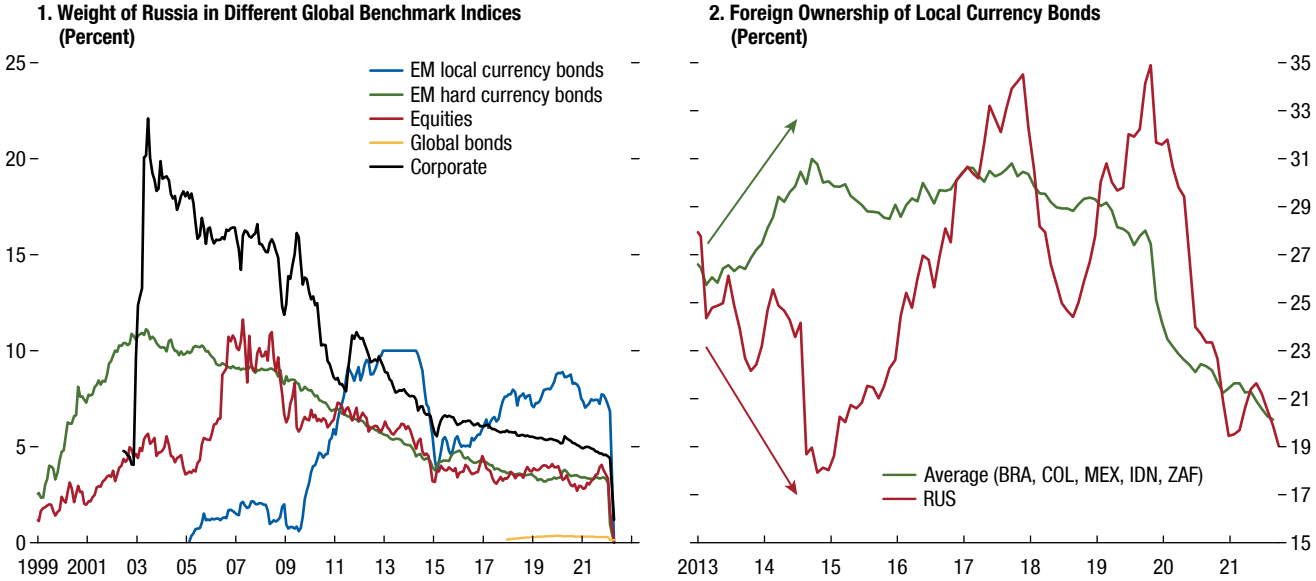
[21]JP Morgan's March 2022 client survey showed that nearly half of participants plan to divest as much of their Russian debt holdings as possible and hold the rest off-index, while nearly a quarter plan to continue investing.

[22]The European Union banned imports of certain metals from Russia and the United States banned oil, gas, and coal imports.

Figure 1.15. Impact from Russia's Exclusion from Global Benchmark Indices

Russia's weight in global benchmark indices has declined sharply over the years.

Foreign ownership trends can diverge meaningfully between Russia and other emerging markets.



Sources: Bloomberg Finance L.P.; JPMorgan Chase & Co.; and IMF staff calculations.
Note: In panel 1, EM local currency bonds refers to JPMorgan Government Bond Index, EM hard currency bonds refers to JPMorgan Emerging Market Bond Index, global bonds refers to Bloomberg Barclays Global Aggregate Index, and corporate refers to JPMorgan Corporate Emerging Market Bond Index. Data labels use International Organization for Standardization (ISO) country codes. EM = emerging markets.

like hedge funds, and investment funds) have faced massive margin calls on short positions in response to huge swings in commodity prices, testing the resilience of corners of global financial markets that were little known by the broader public only a few weeks ago (see Box 1.1 on the nickel market disruption).[23]

Dealer banks play a crucial role and have significant exposures in commodity markets, so there is a risk they may become a propagation channel of commodity market disruptions. They provide collateralized funding to finance the shipment of commodities. In addition, they provide leverage to some investors and act as intermediaries in commodity derivatives markets. For example, when commodity producers enter into a (short) future position to hedge against a drop in (future) commodity prices, dealer banks take the opposite side (long) of this trade. In turn, they then hedge their book by entering into an opposite trade (for example, on an exchange).[24] Furthermore, they often offer lines of credit to their clients, which can be used at times of acute liquidity needs.

A concern raised by some market participants is that, in response to large swings in commodity prices, differences in initial margin modeling and the prevalence and frequency of posting variation margins appear to be incentivizing some derivative users to trade bilaterally with broker dealers instead of centrally cleared trades, because doing so may offer lower likelihood of large increases in initial margins and of demand for posting more variation margins in times of stress.[25] As a result, dealer banks may be exposed to higher margin calls by

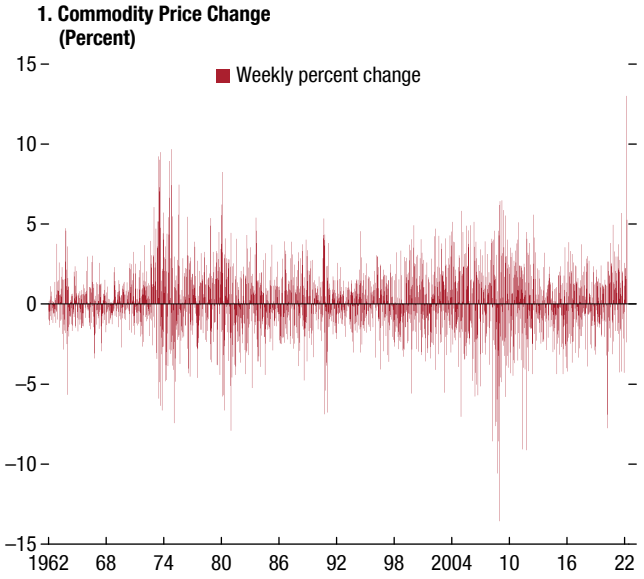
[23]Commodity producers are important users of commodity derivatives, often hedging against a drop in future commodity prices. Other participants in the commodity derivatives market include large commodity trading houses (see ECB 2017) and leveraged investors. Large investment banks operate as intermediaries in commodity financing and commodity derivatives, as well as providers of leverage to some of these investors.

[24]In the event of a sharp increase in prices, banks are owed money from commodity producers that face margin calls on short futures positions, but also owe money to the exchange on their own short positions used as a hedge—so they themselves face margin calls. If the producers are unable to meet margin calls, the dealers are caught with unhedged exposures.

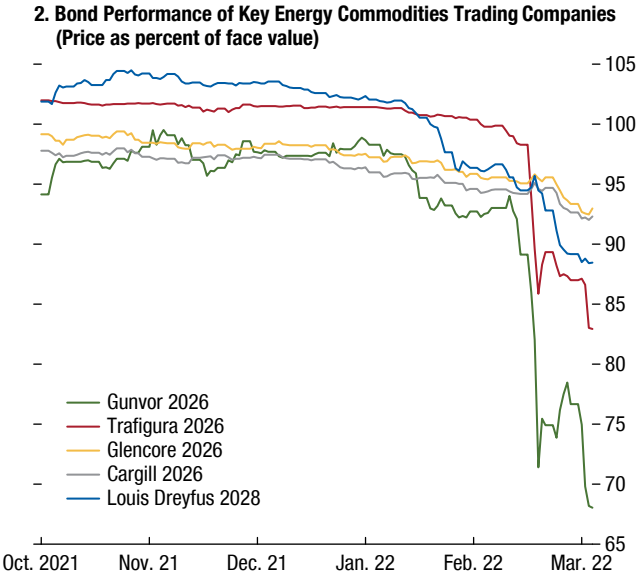
[25]Initial margins are collateral required to protect a transacting party in the event of default by the other counterparty that could result from a future change in the mark-to-market value. Variation margins are collateral required to protect the party for the current exposure and depend on the mark-to-market value of the derivatives, which can change over time.

Figure 1.16. Commodity Trading Companies Have Been Exposed to a Spike in Volatility

The spike in commodity price volatility ...



... causes stress for commodity trading companies



Sources: Bloomberg Finance L.P.; and IMF staff calculations.
Note: In panel 2, the bond prices of Gunvor, Glencore, and Cargill are quoted in US dollars; the bond prices of Trafigura and Louis Dreyfus are quoted in euros.

the exchanges and central counterparty clearing houses compared to what they collect from clients, adding to banks' liquidity needs.[26] More broadly, the danger is that liquidity risk may morph into counterparty credit risk, thus lowering dealers' balance sheet capacity and raising the cost of intermediation across a number of markets.

Another possible pressure point is related to concentration and interconnectedness. The number of dealer banks globally active in commodity markets has declined in recent years. These banks provide credit and liquidity to, among others, a small group of large energy trading firms that operate globally across a number of commodity markets. These firms are largely unregulated, mostly privately owned, and highly reliant on financing by dealer banks to operate. Market participants have also expressed concerns about dealer banks' concentrated positions with respect to assessment of aggregate exposures and risk management practices.[27] In addition, available data suggest that investors may be growing concerned about credit availability and liquidity positions of commodity trading firms amid large commodity price moves (Figure 1.16, panels 1 and 2).

Strains in commodity markets may also have adverse effects for end users like commodity producers and consumers, including manufacturers reliant on raw material inputs as well as ultimate consumers. Amid supply chain disruptions and large price swings, banks may become less willing to finance commodity shipments, and the cost of hedging through futures and options may become prohibitively expensive for some producers. In addition, in the event of default on a derivatives contract by a counterparty, smaller clearing members of exchanges may themselves face risk of default, adding strains to the system.

Rising Liquidity and Funding Risks

There are some signs that the sharp rise in market volatility, severe disruptions in commodity markets, and the perception of rising counterparty risk may be starting to weigh on dealer banks' balance sheet capacity and appetite for intermediation, with implications for liquidity and funding conditions as well as broader market functioning.

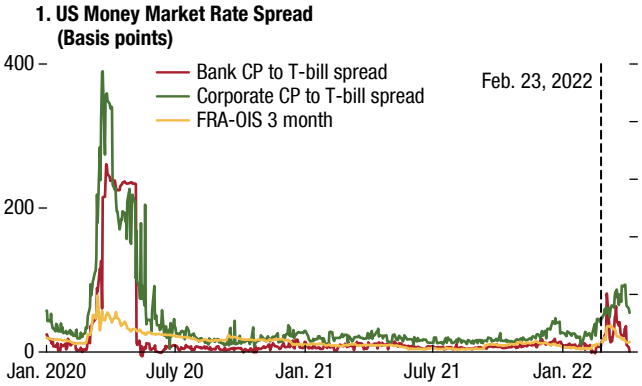
Tensions in short-term dollar funding markets have been limited so far, but strains are beginning

[26]At this point, it remains unclear whether these trades are executed over the counter but still centrally cleared, or both executed and cleared over the counter.

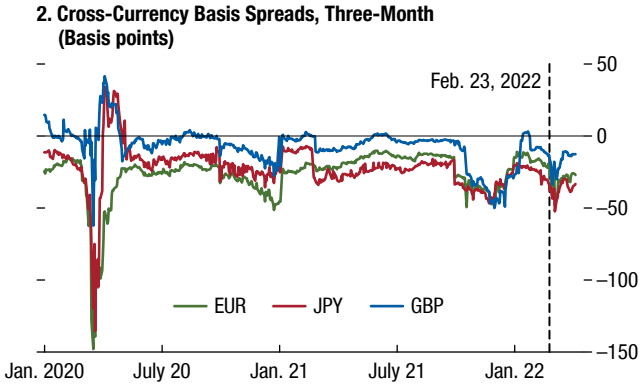
[27]The Division of Trading and Markets of the US Securities and Exchange Commission issued a statement on March 14, 2022, urging broker-dealers and other market participants to remain vigilant regarding market and counterparty risks that may surface during periods of heightened volatility and global uncertainties.

Figure 1.17. Short-Term Dollar Funding Tensions and Market Liquidity

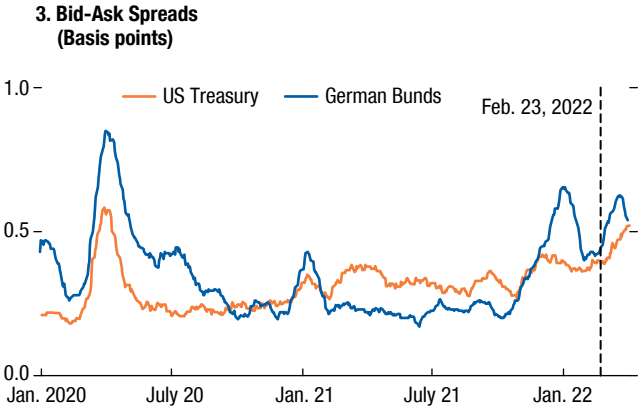
US money market conditions have tightened somewhat ...



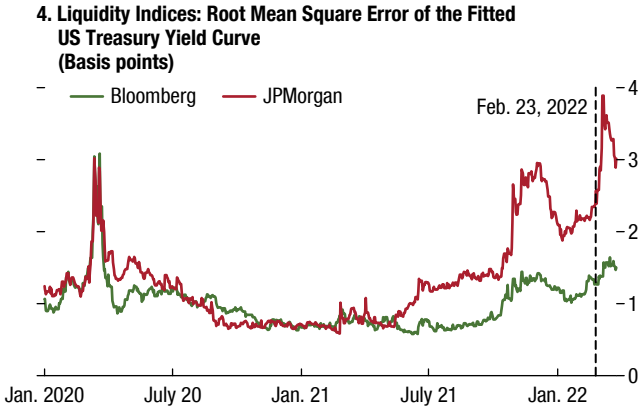
... and international dollar funding conditions have also shown some strains.



Bid-ask spreads of high-quality government bonds are the widest since the peak of the COVID-19 crisis.



Divergence from fair value models reflects traders' unwillingness to provide liquidity.



Sources: Bloomberg Finance L.P.; JPMorgan Chase & Co.; and IMF staff calculations.
Note: In panel 1, commercial papers (CPs) are AA bank 90-day CPs and A2P2 nonfinancial corporate 90-day CPs. The FRA-OIS spread measures the gap between the US 3-month forward rate agreement and the overnight index swap rate. In panel 2, LIBOR-indexed cross-currency basis spreads are used for JPY and GBP prior to February 2021. In panel 4, root mean square error is the measure between fair-value model yields and actual Treasury yields observed. GBP = British pound; EUR = euros; JPY = Japanese yen; T-bill = US Treasury bill.

to emerge. Reportedly reflecting both precautionary motives to bolster liquidity positions as well as growing concerns about credit risk, spreads in short-term dollar funding markets have widened. In US unsecured money markets, LIBOR-OIS and FRA-OIS spreads have widened since the announcement of sanctions,[28] but they are still well below levels seen in early 2020. Issuance of financial and nonfinancial commercial paper has risen, leading to increased borrowing costs (Figure 1.17, panel 1). By contrast, secured US money markets (repo) have not displayed signs of stress thus far.

Similarly, international dollar funding conditions, as measured by the cross-currency swap basis, have tightened since late February, but spreads remain well below pandemic levels (Figure 1.17, panel 2). The actions taken to freeze the Central Bank of Russia's reserves and disconnect a number of Russian banks from SWIFT have also been mentioned as factors contributing to spread widening.[29] Amid rising risk aversion and

[28]LIBOR is the London interbank offered rate, OIS stands for overnight index swap, and FRA stands for forward rate agreement.

[29]Russian banks and the central bank have traditionally been net suppliers to dollar funding markets. However, the impact of the disconnection of Russian banks from SWIFT and freezing of central bank assets on dollar funding markets has been relatively modest thus far. This is mainly due to the large US dollar oversupply in funding markets; other lenders have taken up the slack that the departure of Russian funding created.

strong precautionary demand for high-quality collateral, 10-year euro area swap spreads have widened to levels not seen since 2011.

Despite higher volatility and some strains in funding markets, there are no signs of the "dash-for-cash" dynamics that emerged in March 2020, and the financial system appears more resilient to withstand liquidity and funding shocks. Global liquidity remains at record high levels in advanced economies, and banks are better capitalized and more liquid with a large surplus of reserves. In addition, central banks have tools to alleviate stresses in funding markets. Activation of standing swap lines between central banks and government paper repo lines—the US Federal Reserve's standing repo facility (SRP) and the Foreign and International Monetary Authorities (FIMA) repo facility, as well as the ECB's Eurosystem repo facility for central banks—can act as a backstop for dollar (and euro) funding pressures.[30] However, the vulnerabilities identified during the COVID-19 pandemic remain largely unaddressed at this point.

Given higher uncertainty and faster Federal Reserve policy tightening, market liquidity conditions of high-quality government bond markets have deteriorated based on multiple metrics. Price-based liquidity metrics, such as bid-ask spreads and fitting errors of yield curve models, have worsened, reflecting market-makers' unwillingness to hold inventories under a higher volatility environment (Figure 1.17, panels 3 and 4). Further deterioration of market liquidity and functioning could amplify a repricing of duration risk. There also might be a risk of tighter funding conditions due to a close link between market liquidity and funding liquidity (Brunnermeier and Pedersen 2009).[31]

Cyber Risks: A Critical Threat

The war in Ukraine has raised acute concerns about cyber operations. Cyberattacks targeting Ukraine go back several years. In 2017, the NotPetya malware attack originally aimed at critical infrastructure in Ukraine spilled over and caused supply chain disruptions and worldwide losses estimated at about $10 billion.[32]

[30]The usage of the US Federal Reserve reverse repo facility as of March 25 stood at a level similar to February 23 ($1.7 trillion).

[31]A decline in market liquidity leads to higher price impact and higher volatility, and a volatility shock may lead to higher haircuts and funding rates. As funding becomes scarce, market makers find it difficult to obtain leverage to finance their inventories. There is a feedback mechanism linking market liquidity and funding liquidity.

[32]According to multiple sources, including Wolff (2021).

Cyberattacks intensified in the weeks preceding the current war. The coordination of attacks disrupting banks' online services with text message (SMS) disinformation campaigns, as observed in Ukraine, increases this risk. Cyberattacks led by private actors have also been reported against Russian institutions, which may further escalate tensions on both sides.

Attacks could target systemically important financial institutions. If successful, such attacks could trigger loss of confidence in the broader financial system, with a potentially adverse impact on global financial stability. Cyber threats against SWIFT and other shared financial and non-financial market infrastructure could also increase. Intense hacktivism and false-flag operations that disguise the actual source of the attack and place responsibility on another party further complicate the situation. As cyber risks rise globally, operational costs have increased across industries, with the potential for significant economic loss in various countries.

The War and a Repricing of Risk in Markets May Put Corporate Sector Recovery at Risk

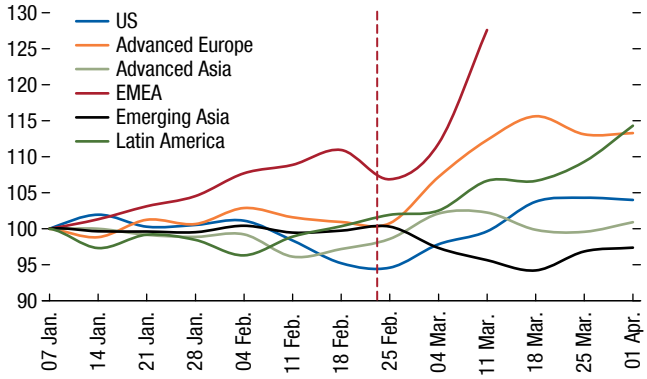
The war in Ukraine has clouded the corporate outlook. Firms most at risk are those in Russia, which will suffer trade barriers, lack of intermediate inputs, and depressed domestic demand. Additionally, more than 60 percent of Russia's external debt of close to $500 billion is owed by nonfinancial firms. Elsewhere, the impact of heightened uncertainty, sanctions, and the anticipated slowdown of the economy is evident especially in Europe due to its greater exposure to Russia through trade and investments in energy firms and projects (Figure 1.18, panel 1). European firms have the largest direct exposures to Russia and Ukraine, as measured by revenues from the region (Figure 1.18, panel 2). Sanctions imposed on Russia, the self-imposed exodus of large firms from Russia, and a slump in demand in Russia and Ukraine are expected to result in a sharp decline in global firms' revenues derived from the region.[33] On a sectoral basis, many large European firms have some exposures to Russia and Ukraine (above 2 percent of revenues from the region). However, the share of debt at firms with

[33]"Over 600 Companies Have Withdrawn from Russia - But Some Remain," Yale School of Management (April 12, 2022). https://som.yale.edu/story/2022/over-600-companies-have-withdrawn-russia-some-remain.

Figure 1.18. Corporate Sector amid the War in Ukraine

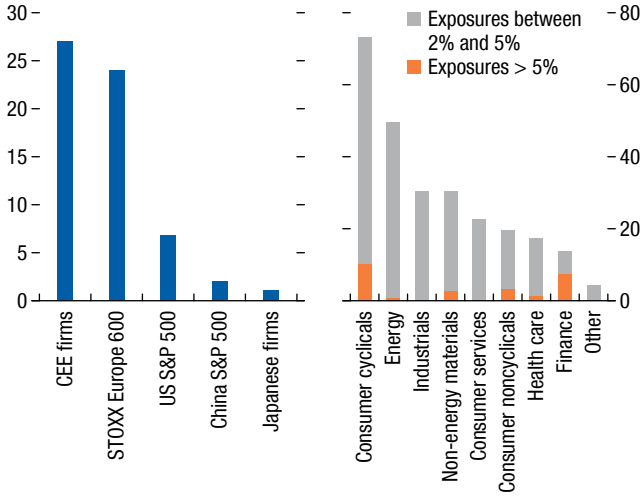
Uncertainty about the corporate sector outlook has increased, especially in Europe.

1. Dispersion in Earnings Forecasts (Index, January 1, 2022 = 100)



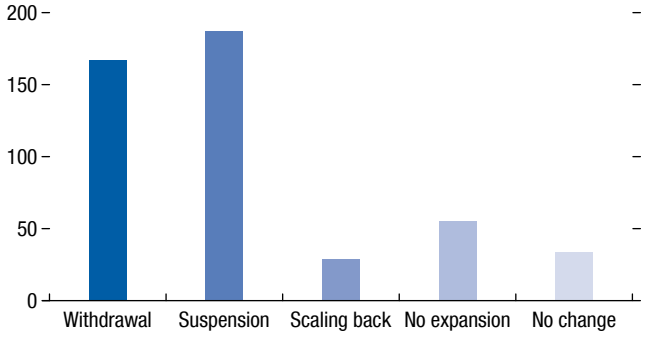
Among international peers, European firms have the largest exposures to Russia and Ukraine.

2. Percent of Firms with Exposures to Russia and Ukraine (Percent of firms with >2 percent exposures in left chart; share of debt at firms with exposures in total debt of all firms by sector in right chart)



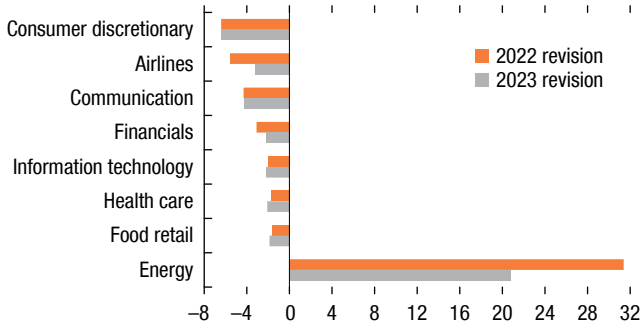
Most large international companies have announced exits of various types from Russia.

3. Number of Large Firms that Have Exited Russia Since Its Invasion of Ukraine (Number)



Analysts have slashed earnings forecasts across nearly all major sectors.

4. Revisions in Advanced Economy Corporate Earnings Forecasts (Percent of 2019 earnings, from pre-war period to present)



Sources: Bloomberg Finance L.P.; FactSet; MSCI; Refinitiv Datastream IBES; Yale School of Management; and IMF staff calculations.
Note: Panel 1 presents standard deviations in analyst forecasts of earnings per share over the next 18 months. In panel 2, foreign exposures are defined as revenues derived from abroad in percent of total revenues. In panel 2, the sample includes 529 CEE firms and 2,079 Japanese firms. CEE = central and eastern Europe and includes Bulgaria, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia, Slovenia, and Turkey; EMEA = emerging Europe, Middle East, and Africa.

substantial exposures (above 5 percent of revenues from the region) is less than 10 percent of the total debt of all firms in these sectors. Since the Russian invasion of Ukraine, most large international companies have announced exits of various types from Russia because of the reputational risk and the difficulty of doing business in Russia related to sanctions (Figure 1.18, panel 3).

Global firms have been hit by the rise in energy and raw material prices. In addition, supply chain challenges that have emerged during the pandemic have been exacerbated by the uncertainties and reductions in export quantities of agricultural commodities, energy, metals, and technology inputs affecting a variety of industries. While large firms are generally in a better position to secure shipments of rationed components

and to pass on the increase in input costs to customers because of greater pricing power, even before the war analysts had noted that the pass-through to customers had become more limited and that profit margins were expected to shrink. For example, small European businesses in the transportation and agricultural sectors have already sounded the alarm about energy prices, and over half of US small businesses have voiced concerns about energy prices.

So far, analysts have maintained a positive outlook for most sectors (except airlines), with 2022 earnings projected to be well above pre-pandemic levels. However, analysts have started to substantially downgrade earnings forecasts across sectors, except for energy (Figure 1.18, panel 4). A prolonged war, an escalation of sanctions, higher commodity prices, and increased investor risk aversion could further worsen the corporate outlook. Energy and agricultural product importers in emerging markets and countries with strong trade links with Russia and Ukraine have already seen a more adverse market reaction compared to their peers, based on equity indices and credit spreads. More broadly, increased and lingering uncertainty associated with the war and elevated geopolitical risks are detrimental to corporate investment at a time when it is most needed for the transition to a post-pandemic and greener economy.[34] The economic impact of underinvestment could be especially detrimental for vulnerable firms that have already built up debt in the last two years.[35] In addition, higher inflation because of rising commodity prices, wage pressures in some regions, tighter financial conditions, and a more cautious lending posture by banks may substantially affect firms' revenues and exacerbate funding challenges for vulnerable businesses, including small and medium-sized firms.

A repricing of risk by investors—due for example to an escalation of the sanctions, a sharper than previously expected tightening of monetary policy, or a deterioration of the economic outlook—could result in a sharp tightening of financial conditions, a development that could interact with unresolved pandemic-related vulnerabilities in the corporate sector. A deterioration in liquidity and funding conditions could be particularly challenging for risky credit markets, an important barometer of risk taking. Spreads on high-yield bonds and leveraged loans have widened in advanced economies on the heels of rising market volatility and implications of higher energy and labor costs especially for smaller firms—and are now slightly above pre-pandemic levels. Outflows have accelerated from high-yield bond funds, and new issuance has slowed. Issuance has similarly decelerated in the collateralized loan obligation (CLO) market, as spreads have increased in both secondary market leveraged loans and CLO tranches. Should geopolitical tensions prove longer lasting than currently anticipated and if economic growth were to slow, risky borrowers could face tougher financing conditions and higher rollover risks, potentially resulting in a deeper default cycle that could severely impact the real economy. The tightening in market conditions could be amplified by the deterioration in underwriting standards and first-lien investor protections seen in recent years in both the high-yield bond and leveraged loan market—as reflected by weaker covenants and thinner loss-absorbing buffers for loans. In addition, tighter monetary policy comes in the form of higher interest costs for leveraged loan issuers and could eventually pressure debt servicing capacity.

Emerging Markets Have Come under Pressure, with Notable Differences across Countries

Since the Russian invasion of Ukraine, emerging market hard currency spreads have widened at a rapid pace, akin to earlier episodes of emerging market stress, before retracing part of the move in mid-March (Figure 1.19, panel 1). Credit spreads moved as much as 113 basis points higher—or 84 basis points excluding Russia and Ukraine—after the war in Ukraine started, with a more pronounced widening among high-yield issuers. Weaker issuers were already underperforming before the war as the prospect of monetary policy normalization in the United States was starting to weigh heavily on countries with elevated post-pandemic vulnerabilities. The number of issuers trading at distressed levels has surged higher to nearly 25 percent of issuers (Figure 1.19, panel 2), surpassing pandemic-peak levels. The deterioration in spreads, combined with the increase in US yields, has pushed financing costs well above their pre-pandemic levels for many borrowers (Figure 1.19, panel 3). Emerging market sovereign issuance has been sluggish in recent months, with market access for frontier economies

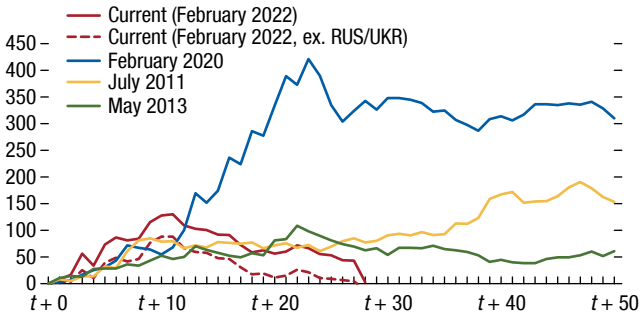
[34]For an overview of the literature on investment under uncertainty, see Dixit and Pindyck (1994).

[35]See Chapter 2 in the April 2022 *World Economic Outlook*.

Figure 1.19. Emerging Market Financial Spillovers

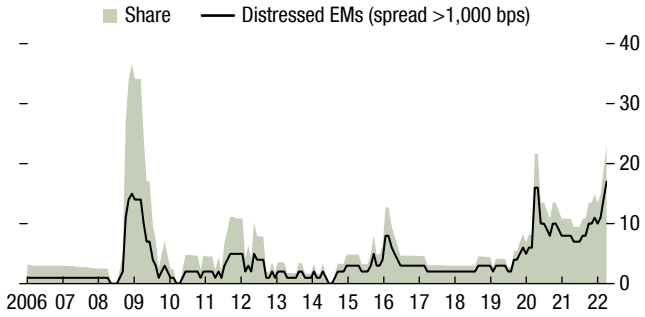
Credit spreads widened sharply as tensions escalated and the war began before pulling back as risk sentiment stabilized.

1. Emerging Market Sovereign Credit Spreads
(Basis points; change from beginning of each episode)



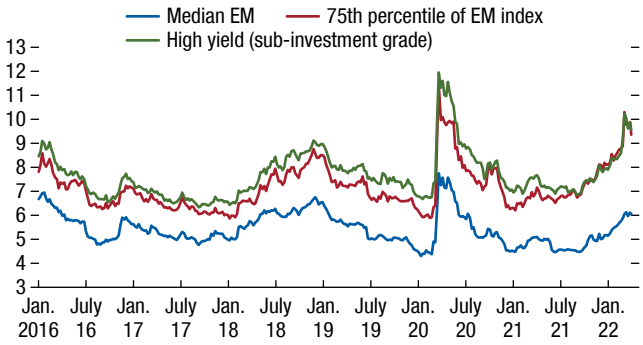
More than 20 percent of issuers have spreads in distressed territory (above 1,000 basis points).

2. Distressed Sovereign Issuers in Hard Currency
(Number of economies, percent share)



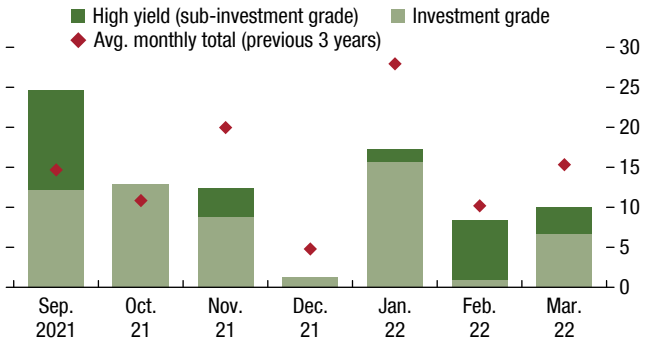
External funding costs for the weakest borrowers have moved above pre-pandemic levels.

3. Emerging Markets Sovereign Hard Currency Bond Yields
(Percent)



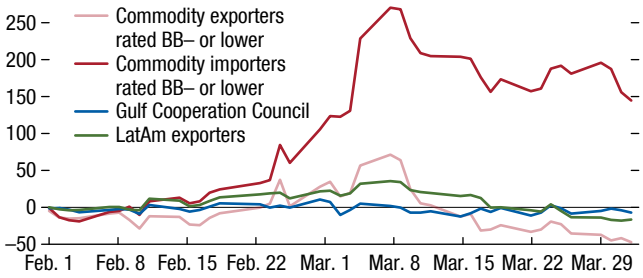
Hard currency issuance has dried up in recent months and practically disappeared since the start of the war.

4. Emerging Markets Sovereign Hard Currency Issuance
(Billions of US dollars)



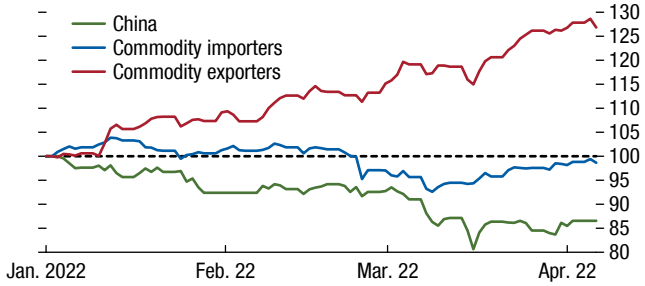
Commodity importers have seen credit spreads widen sharply over a short period.

5. Emerging Market Sovereign Hard Currency Spreads
(Basis points, cumulative change from Feb. 1, 2022)



Equity markets in commodity exporters have outperformed in 2022.

6. EM Equity Performance and Commodity Exposure
(Indexed to Jan. 1 = 100, percent change)



Sources: Bloomberg Finance L.P.; JPMorgan Chase & Co.; UN Comtrade; and IMF staff calculations.
Note: In panel 1, the current episode is the cumulative change since Feb. 18. In panel 4, yields are calculated from JPMorgan Emerging Market Bond Index. In panel 6, net trade balance is based on oil, wheat, and base metals as share of GDP. In panel 5, BB exporters include Angola, Bahrain, Ecuador, Iraq, Nigeria, and Oman. Importers include the Dominican Republic, Egypt, Georgia, Jordan, Kenya, Pakistan, Senegal, and Tunisia. EM = emerging market; LatAm = Latin America; RUS = Russia; UKR = Ukraine.

in particular deteriorating. The share of high-yield issuance had dropped notably since the third quarter of 2021, including a nearly four-week freeze following the escalation of hostilities. Nigeria and Turkey reopened the market on March 17, 2022, after risk sentiment had improved, albeit with a substantial premium over their existing benchmarks and coupons over 8 percent (Figure 1.19, panel 4).[36]

Commodity exposures and trade linkages to Russia and Ukraine have been a key source of differentiation in terms of market performance. The role of Russia and Ukraine in energy, metals, agriculture, and tourism has exposed several emerging markets to a large deterioration in their terms of trade, upside risks to inflation, and increased pressures on fiscal accounts given food and energy subsidy policies. Flight-to-quality dynamics, as well as investor preference toward countries that are set to benefit from the rise in commodities, have led to a general outperformance of higher-rated commodity exporters, both in credit and equity markets (Figure 1.19, panels 5 and 6). The differentiation is also notable among lower-rated issuers, where spreads have widened significantly for some commodity importers.

Portfolio Flows Have Come under Pressure, with High Differentiation across Economies and Risks Tilted to the Downside

After a challenging end to 2021 for portfolio flows, flows into emerging market local currency debt and equity markets strengthened in early 2022, defying expectations of policy normalization in the United States. Fund inflows were stronger for countries in Asia, eastern Europe, and the Middle East and North Africa, reflecting subsiding concerns about the pandemic, and in some cases rising commodity prices (Figure 1.20, panel 1). Moreover, hiking cycles were already much farther along in many emerging markets, creating attractive risk compensation (carry) for investors in both real and nominal terms when compared to advanced economies. Finally, the potential for large outflows was seen as low, as the nonresident investor base had been considerably reduced in preceding years (Figure 1.20, panel 2).

However, following the Russian invasion of Ukraine, flows become highly volatile and reversed quickly for some economies. Flows in local currency bonds and equities have come under pressure, experiencing the largest weekly redemptions since March 2020. The first signs of differentiation across countries have emerged (Figure 1.20, panel 3). Economies benefiting from higher commodity prices, such as Brazil and Indonesia, withstood the pressure and have seen large equity inflows on net so far this year, while some energy importers have seen sharp equity outflows. Some of the outflows in more liquid markets like Chinese sovereign bonds (which saw the largest monthly outflow on record in February) in part reflect technical factors, as fund managers have reportedly raised cash holdings in expectation of possible redemption pressure. The need for short-term liquidity was further amplified by the highly illiquid market conditions in Russian markets due to sanctions and trading restrictions.

Looking ahead, the interplay of tighter external financial conditions on the back of monetary policy normalization in the United States and heightened geopolitical uncertainty is likely to increase the downside risks for portfolio flows. IMF staff analysis shows that capital flows at risk (the 5th percentile of the range of capital flow forecasts to quantify the downside risks; see IMF 2019 for more details) have increased to 2.3 percent of GDP from 1.7 percent of GDP in the October 2021 GFSR, and the probability of outflows is about 30 percent from 20 percent from the October 2021 GFSR. A sharp rise of US term premia, combined with a further rise in risk aversion, would entail more significant financing risks for emerging market economies. In such a scenario, these economies would be subject to much stronger headwinds, especially countries with lingering inflation risks and/or elevated debt vulnerabilities. For example, a risk aversion shock similar to the one seen in March 2020 would take capital flows at risk to 2.5 percent and increase the probability of outflows to almost 50 percent (Figure 1.20, panel 4).

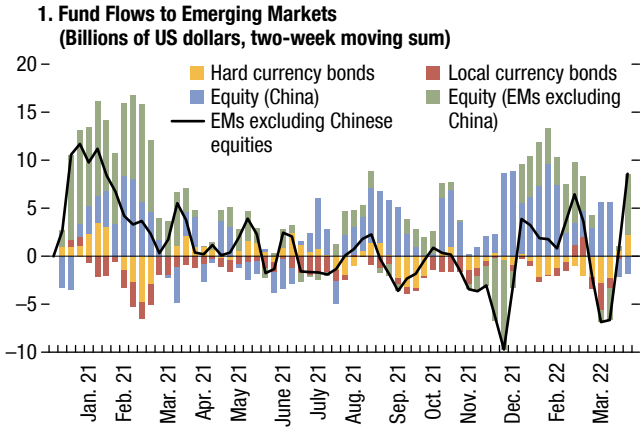
Risks of Cryptoization and Sanction Evasion through the Crypto Ecosystem

Crypto asset trading volumes against some emerging market currencies have increased notably since the start of the pandemic. Although a large part of this increase is due to speculative investment activities by emerging

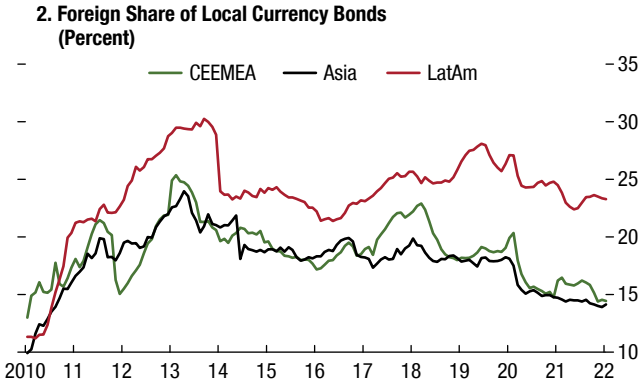
[36]Frontier markets include 42 countries, incorporating 31 countries from the JP Morgan Next Generation Markets Index.

Figure 1.20. Emerging Market Portfolio Flow Pressures Have Intensified

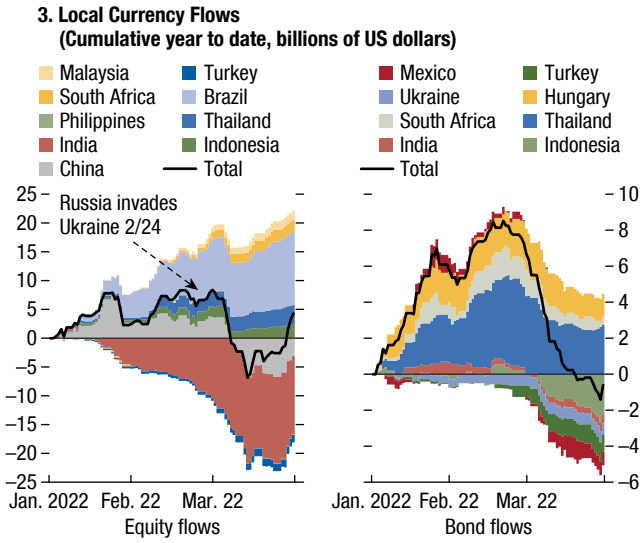
Portfolio flows recovered in early 2022 but have come under renewed pressure recently.



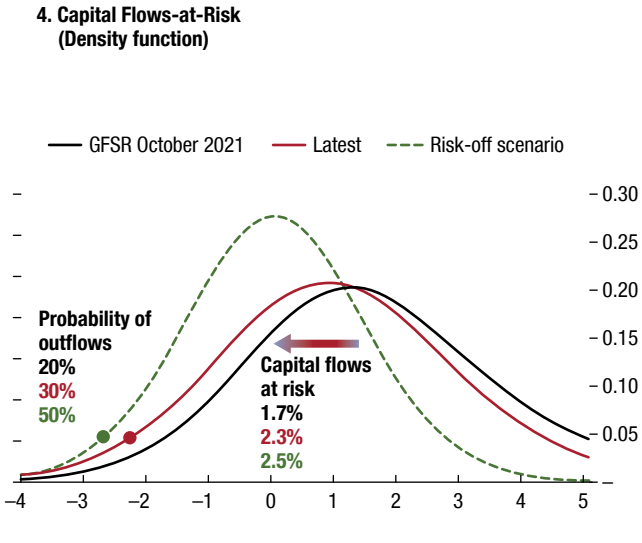
Foreign holdings of local currency debt have been close to multiyear lows for several issuers.



Local currency outflows declined sharply, with significant differentiation, before a partial recovery in late March.



Capital flows-at-risk worsened significantly as a result of the decline in investor risk sentiment.



Sources: Bloomberg Finance L.P.; JPMorgan Chase & Co.; national data sources; and IMF staff calculations.
Note: In panel 3, total equity flows include Vietnam, Sri Lanka, and United Arab Emirates, which are not shown. In panel 4, the risk-off scenario assumes a global risk aversion shock with Chicago Board Options Exchange Volatility Index reaching the March 2020 peak levels. CEEMEA = Central and Eastern Europe, Middle East, and Africa; EMs = emerging markets; GFSR = *Global Financial Stability Report*; LatAm = Latin America.

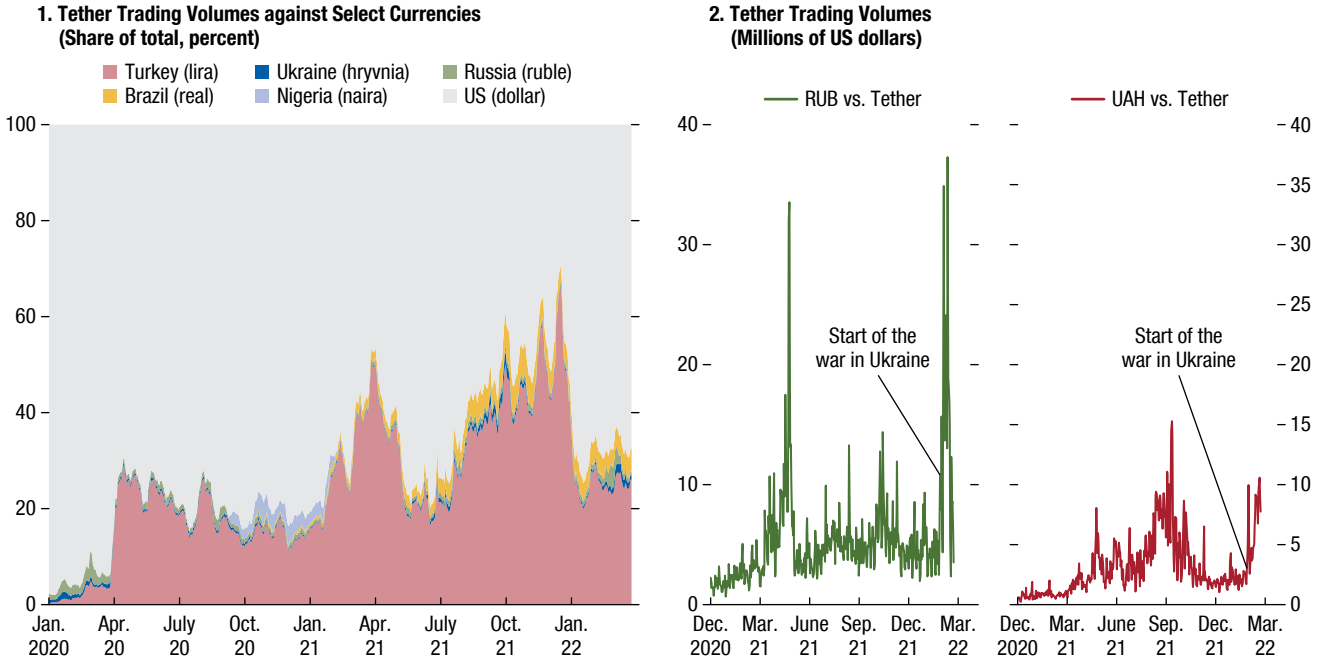
market residents, a more structural shift toward crypto assets as a means of payment and/or store of value could pose significant challenges to policymakers (see the October 2021 GFSR for a discussion on cryptoization). For example, Tether—the largest stablecoin used to settle spot and derivative trades—has seen a notable rise in trading volumes against emerging market currencies (Figure 1.21, panel 1). The most pronounced increase is in Turkey, where exchange rate volatility has been particularly high, and the overall use of crypto assets appears to have gained traction over the last few years. More recently, trading volumes spiked following the introduction of sanctions against Russia and the use of capital restrictions in Russia and Ukraine (Figure 1.21, panel 2).[37] However, liquidity

[37]The spike in trading preceded Ukraine's enactment of the Law on Virtual Assets (March 17, 2022), which legalized crypto assets.

Figure 1.21. Crypto Asset Markets

The share of Tether volumes against EM currencies has been rising since the pandemic began.

The ruble and hryvnia have seen a spike in crypto trading volumes in centralized exchanges.



Sources: Bloomberg Finance L.P., CryptoCompare; and IMF staff calculations.
Note: AE = advanced economies; EM = emerging markets; RUB = Russian ruble; UAH = Ukrainian hryvnia.

in the ruble and hryvnia trading pairs in centralized exchanges remains limited and has even declined more recently in the case of ruble,[38] making large-scale transfers of value through crypto asset exchanges impractical.

The war in Ukraine has brought to the forefront some of the challenges that regulators face in terms of applying sanctions and capital flow management measures. Crucially, the implementation of such measures requires that intermediaries verify the identities of the transacting parties. The crypto ecosystem, however, could allow users to circumvent such requirements through several means, including (1) the use of exchanges and other crypto asset providers that are noncompliant with sanctions and/or capital flow management measures; (2) poor implementation of adequate due diligence procedures by crypto asset providers; and (3) the use of technologies and platforms that increase the anonymity of transactions (such as mixers, decentralized exchanges, and privacy coins).[39] Regulators in the United States and United Kingdom, among others, have urged firms in their jurisdictions, including the crypto asset sector, to increase vigilance with regard to potential Russian sanction evasion attempts.[40]

Over time, sanctioned countries could also allocate more resources toward evading sanctions through mining. Mining for energy-intensive blockchains like Bitcoin can allow countries to monetize energy resources, some of which cannot be exported due to sanctions. The monetization happens directly on blockchains and outside the financial system where the sanctions are implemented. Miners can also generate

[38]Major exchanges have frozen the accounts of sanctioned entities, while new ruble deposits in exchanges may have been blocked (see Binance 2022). As a result, part of the transaction volumes could have shifted to less transparent peer-to-peer platforms.

[39]Chainalysis (2022) has reviewed several potential sanction evasion mechanisms since the start of the war. None of the indicators showed a sustained spike in volumes at the time of writing.

[40]For the United States, see "FinCEN Advises Increased Vigilance for Potential Russian Sanctions Evasion Attempts," U.S. Financial Crimes Enforcement Network Fin-2022-Alert001 (March 7, 2022); for the United Kingdom, see the "Joint Statement from UK Financial Regulatory Authorities on Sanctions and the Cryptoasset Sector," Financial Conduct Authority (November 2, 2021).

revenues directly from users that pay transaction fees to miners (which in this case might be sanctioned governments). At this point, the share of mining in countries under sanctions and the overall size of mining revenues suggests that the magnitude of such flows is relatively contained, although risks to financial integrity remain. For example, the monthly average of all Bitcoin mining revenues last year was about $1.4 billion, of which Russian miners could have captured close to 11 percent, and Iranian miners, 3 percent.[41]

Financial Vulnerabilities Remain Elevated in China amid Ongoing Stress in the Property Development Sector and COVID-19 Risks

Concerns about a sharper-than-anticipated growth deceleration in China amid elevated financial vulnerabilities have weighed on the global economic outlook. Chinese equity prices have slumped, particularly in the tech sector, amid new outbreaks of COVID-19 and worsening investor sentiment, in part reflecting the impact of continued regulatory uncertainty and rising geopolitical risks. Financial stability risks have risen amid ongoing stress in the battered real estate sector, a major source of China's economic growth and household wealth in the past decade. Severe financing strains have spread through much of the property development sector, generating spillovers to housing sales, real estate investment, and land sales. Widening mobility restrictions aimed at containing COVID-19 outbreaks could delay recovery in the property market and pose further disruptions to spending and income. Exceptional financial support measures may be necessary to ease balance sheet pressures but would add further to medium-term debt vulnerabilities.

Credit availability has deteriorated for some corporate borrowers, notably home builders, whose offshore US dollar bonds have slumped by more than 50 percent since the second half of 2021.[42] Amid property market pressures and signs of slowing growth, Chinese authorities have taken steps to ease property sector financing controls, lower policy interest rates, and increase fiscal spending. Authorities have also pledged to stabilize financial markets and reduce regulatory uncertainty for tech firms, supporting investor sentiment.

Financial stress in the developer sector has nevertheless worsened amid evidence of self-reinforcing pressures on liquidity, creating risks of broader spillovers to the housing market, financial sector, and the real economy. Property developers have relied heavily on presales of unfinished properties as a key source of funding. Amid concerns that developer balance sheet problems may affect their capacity to finish presold homes, home purchases have slowed sharply, and local governments have tightened escrow requirements to ensure sufficient funds to complete local projects. These factors have exacerbated the large liquidity gap created by contractual spending commitments, which had typically been covered by additional borrowing and new presales (Figure 1.22, panel 1). These liquidity pressures, along with news that many developers carried substantial hidden debts or guarantee obligations on top of their already thinning equity buffers, have reinforced a sharp tightening in credit availability for the sector.

Disruptions to the completion of presold housing could reinforce market pressures on real estate firms and the broader housing market. Property developers' large stock of presold but unfinished housing has grown rapidly and is nearly equivalent to the size of all private housing completed since 2015 (Figure 1.22, panel 2, left side). Financial statements show that nearly half of presale liabilities are owed by "developers-at-risk," defined as those with liquidity shortfalls (Figure 1.22, panel 2, right side, sum of orange and gray bars).[43] Unfinished housing projects could affect property prices for adjacent developments and weigh on valuations of property developers' inventories, raising solvency concerns.

Financial strains in the property development sector could create several mutually reinforcing channels of macro-financial stress.[44] First, prolonged dislocations in new home sales could trigger a correction in property prices due to high valuations and oversupply in some cities. Prices appear stretched across the country.[45] Inventory overhangs are also significant in some of China's smaller Tier 2 cities outside the eastern

[41]These figures are as of August 2021 and are based on the Cambridge Bitcoin Electricity Consumption index.

[42]Property developers have nearly $215 billion in debt outstanding in offshore US dollar bond markets.

[43]Liquidity shortfalls are defined as cash being less than combined net current liabilities, net interest payment, and contractual capital commitments.

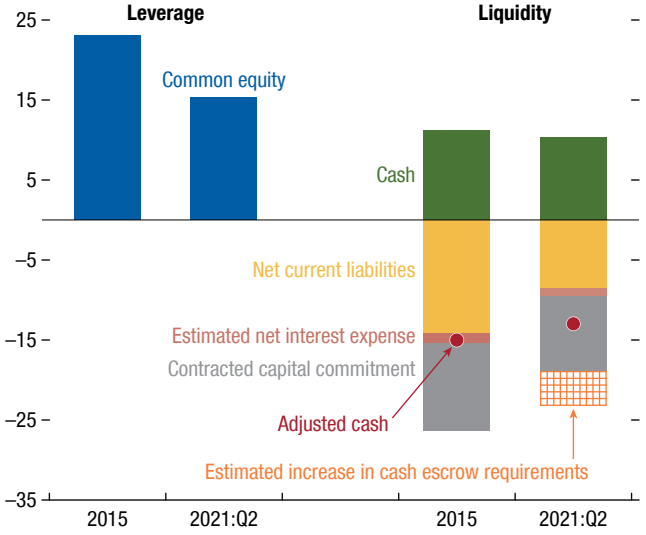
[44]Worsening property sector stress could create international spillovers, see IMF (2022, Box 4).

[45]Price-to-income ratios in China's smaller and less developed Tier 2 and Tier 3 cities are about twice those of the five largest advanced economy cities, and those in China's larger and wealthier Tier 1 cities are closer to four times higher.

Figure 1.22. Stress in the Chinese Property Development Sector

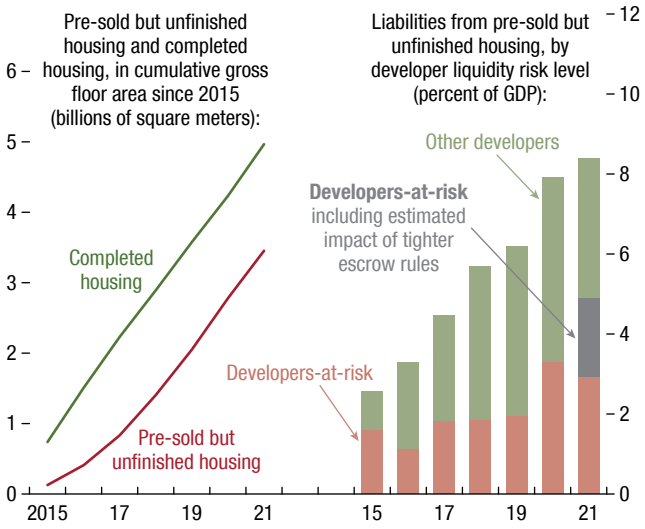
Credit contagion reflects leverage concerns and liquidity shocks from tighter escrow requirements.

1. Real Estate Firm Leverage and Liquidity (Percent of total assets)



Liquidity stress may affect completion of a large stock of pre-sold but unfinished housing.

2. China: Cumulative Housing Completions and Developer Balance Sheet Inventories (Billions of square meters; percent of GDP)



Sources: Bloomberg Finance L.P.; CEIC; S&P Capital IQ; and IMF staff calculations.
Note: In panel 1, the estimated increase in cash escrow requirements is calculated as the lesser of 20 percent of unearned revenues or 40 percent of unearned revenues less restricted cash. In panel 2, developers considered at risk have insufficient cash to cover net current liabilities (including net interest payments and contracted capital commitments) or net current liabilities and an estimated increase in cash escrow requirements as calculated in panel 1. Data for 2021 are from end-June.

provinces and in less developed Tier 3 cities. Large declines in house prices could also reinforce tightening financial conditions through balance sheet channels, as a large share of loans are collateralized by real estate assets.

Second, property developers' financial strains are likely to add to the fiscal pressures of local governments, constraining financing conditions for some vulnerable firms dependent on local authorities' support. Provincial or city authorities may have to pick up the cost of completing unfinished housing projects to avoid further destabilizing homebuyer confidence in housing markets. Land sales, which account for a sizable share of local governments' gross funding, are also falling sharply as liquidity-strapped property developers pull back on purchases. In provinces with weak public finances, deepening investor concerns about the credibility of local governments' backstops for local firms could exacerbate an existing pullback in corporate credit availability (Figure 1.23, panel 1) or precipitate the default of a local government financing vehicle (see the October 2021 GFSR).

Finally, rising defaults by property developers could impair balance sheets across the broader private sector, weighing on credit intermediation and aggregate demand. Aggregated total liabilities of property developers with publicly available data are nearly 25 percent of GDP, with roughly half of that attributable to those with liquidity shortfalls (defined as "liabilities-at-risk"). Roughly half of these liabilities-at-risk, or about 6 percent of GDP, are owed to business partners and homebuyers, with the other half owed to financial institutions (Figure 1.23, panel 2). Rising balance sheet stress across banks and private borrowers alike could limit banks' capacity and willingness to extend new credit, weakening growth momentum. As property developers' liquidity worsens, mortgage credit availability could also suffer as banks rely on property developers' guarantees to provide mortgages against presold homes.

Selected Medium-Term Structural Challenges Policymakers Will Need to Confront

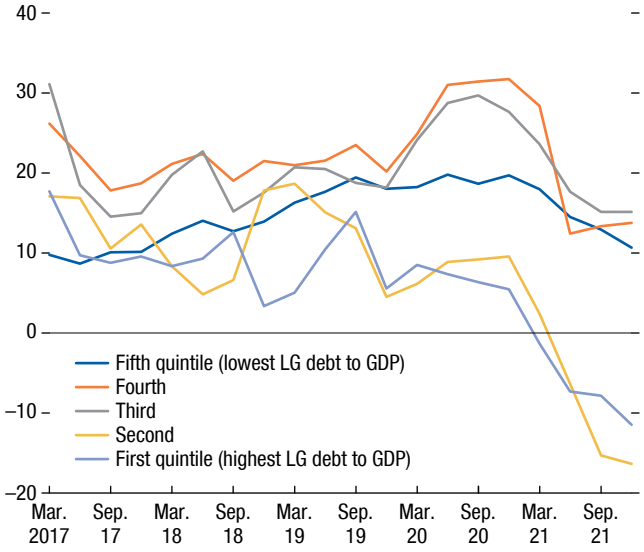
Could the Geopolitics of Energy Security Put the Energy Transition and thus Financial Stability at Risk?

The Russian invasion of Ukraine, the ensuing sanctions, and the actions of market participants in response to a global outcry have wreaked havoc in

Figure 1.23. Chinese Property Development Spillovers

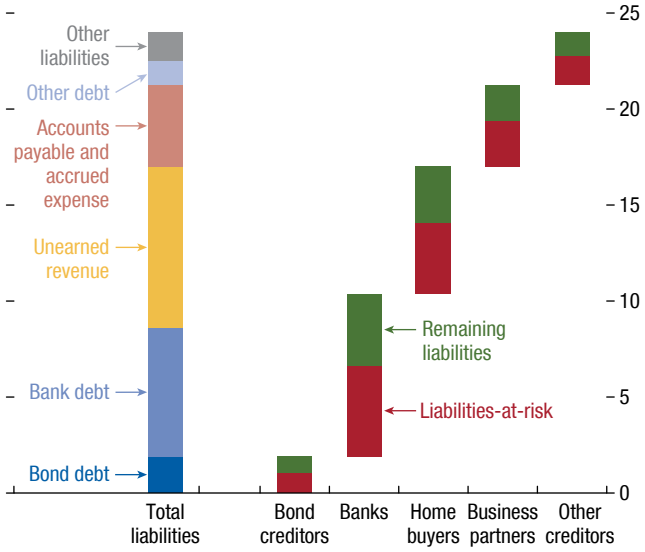
Rising macro-fiscal pressures may exacerbate challenging credit conditions for firms in provinces with heavier debt loads.

1. Growth in Outstanding Corporate Bonds
(Percent; by quintile of home province government debt)



Rising defaults could spill over to bank loan books and other private sector balance sheets.

2. Liabilities and Financing of Real Estate Firms
(Percent of GDP)



Sources: Bloomberg Finance L.P.; CEIC; S&P Capital IQ; WIND Information Co.; and IMF staff calculations.
Note: In panel 2, data are from mid-2021 or latest available. Banks' exposures to real estate firms include their direct lending to real estate firms and their mortgage lending to homebuyers; the latter, which is guaranteed by real estate firms, is for financing unfinished, presold housing. LG = local government.

commodity markets. Disruptions in supply chains, rising concerns about counterparty risk, and growing worries about energy availability have pushed commodity prices higher across the entire complex (Figure 1.2). Given Russia's large footprint in global commodity production, not only oil and gas prices, but also widely used metals (including those used for renewables), have increased sharply (Figure 1.24, panel 1).

Against this backdrop, the war in Ukraine has crystalized concerns about energy security across the globe. With the perception of the trade-off between energy security and transition changing rapidly, there is a risk that the transition toward renewables may become more costly, complex, and disorderly. Given that climate change poses a threat to financial stability, a delayed and disorderly climate transition may magnify risks to the financial system. There may be some setbacks in the immediate future, but the impetus to reduce energy dependency on Russia could be a catalyst for change. It is therefore crucial that policymakers intensify their efforts to achieve net-zero targets and lever up private finance to accelerate the transition toward a greener economy.

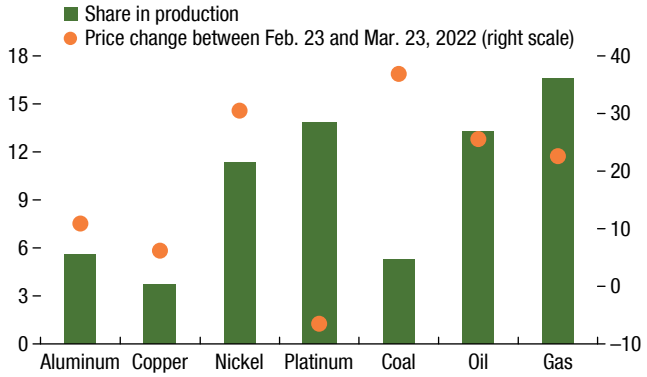
The war has indeed made evident the energy dependency of Europe on Russia. In particular, Europe relies on Russia for roughly 40 percent of its consumption of natural gas and for more than 50 percent of thermal coal, (Figure 1.24, panel 2). Renewable energy currently accounts for only 22 percent of energy consumption in Europe. In response to the war, Europe is rethinking its energy landscape (for example, through the REPower EU agenda).[46] However, uncertainties remain in the short term. Physical bottlenecks are significant, for example in the context of switching to coal-fired power generation. In addition, Europe's diversification strategy (with increased

[46]REPower EU is a multifaceted plan announced in early March 2022 by the European Commission that aims to reduce gas imports from Russia by almost 70 percent by the end of this year, refilling gas storage, increasing investment in regasification terminals, and speeding up the transition with supply- and demand-driven measures. The statement by the European Commission and the United States on energy security, published on March 25, 2022, which builds on the REPower EU agenda, aims at terminating EU dependency on Russian gas by 2027. Germany's Federal Ministry for Economic Affairs and Climate Action on March 25, 2022 also announced plans to fully move away from Russian gas imports by the end of 2024.

Figure 1.24. The War in Ukraine Tests the Climate Challenge

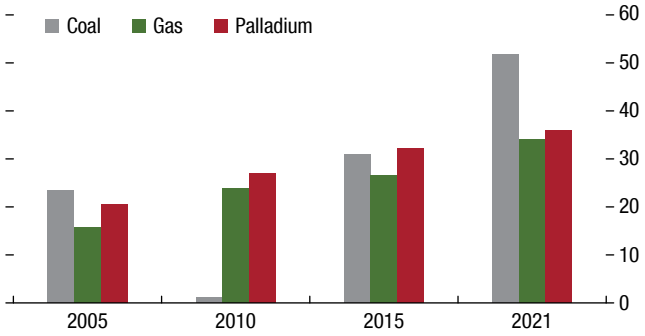
Commodity prices have jumped across the entire complex given Russia's substantial share of the world's energy supply ...

1. Russia's Share in Global Production and Price Change since the Start of the War
(Percent)



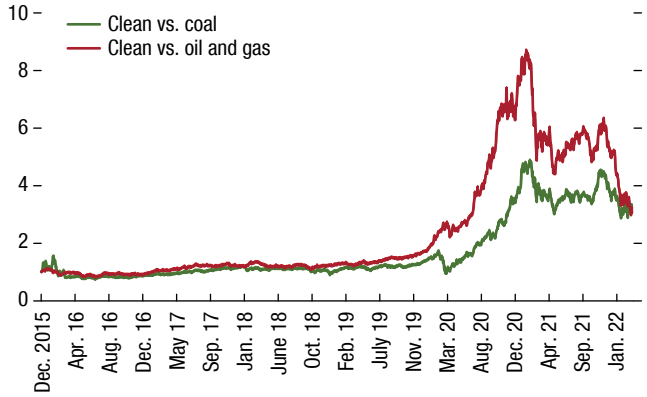
... leading to decisive trade-offs in the short to medium term due to Europe's reliance on Russia for key commodities.

2. Share of Russia in Respective Import Volumes in the European Union
(Percent)



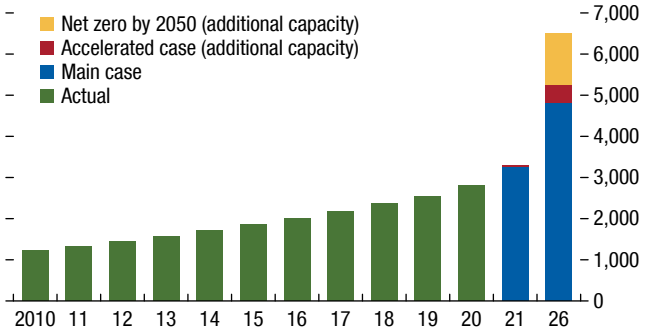
Recent outperformance by renewable energy indices has deteriorated amid energy security concerns ...

3. Relative Performance of Clean Energy Exchange-Traded Funds vs. (Thermal) Coal and Oil and Gas Index
(Ratio)



... as Europe's reliance on Russia for key commodities is leading to decisive trade-offs in energy policy in the short to medium term.

4. Evolution in Renewable Energy Capacity and Forecasts in a Net-Zero Scenario
(Total capacity in gigawatt)



Sources: Bloomberg Finance L.P.; BP Statistical Review of World Energy; International Energy Agency; UN Comtrade; US Geological Survey, National Minerals Information Center; and IMF staff calculations.
Note: In panel 4, IEA's forecasts are shown for 2026, where main case is the base case scenario, accelerated case is a more optimistic scenario, and Net-zero by 2050 case estimates capacity needed to transition to a net-zero energy system by 2050.

imports from the Asia, Australia, and the United States) is likely to take time to be fully implemented amid rising global energy demand (especially in Asia) and supply constraints.

The war has also made evident the urgency to cut dependency on carbon-intensive energy and accelerate the transition to renewables. However, the energy transition strategy may face setbacks for some time. Some countries have already indicated their intention to switch to domestic coal-fired power generation and fossil fuel production to secure their energy needs in the short term. Moreover, the current energy crisis is likely to weigh on the speed of phasing out fossil fuel subsidies in emerging market and developing economies and could also delay the decommissioning plans for coal-fired power plants—especially in major coal-exporting countries (Australia, Indonesia, South Africa, United States). Rising inflation pressure may also lead authorities to resort to subsidies or other forms of fiscal support to households or firms, with the risk of delaying climate transition plans.

In addition, the buildup of renewable energy infrastructure will require time and is likely to face headwinds amid rising prices and supply disruptions of critical commodities (such as cobalt, palladium, and nickel). As an indication of possible headwinds, the increased focus on energy security appears to have adversely affected the performance of clean energy indices relative to fossil fuels. This weaker performance has occurred despite strong investor demand for low-carbon assets and a substantial decline in renewable energy costs in recent years (Figure 1.24, panel 3). Meanwhile, renewable energy supply remains limited amid a shortfall in renewable energy investment, (Figure 1.24, panel 4).

The most recent Intergovernmental Panel on Climate Change report has highlighted that fossil-fuel burning is "choking humanity," enhancing the urgency of the energy transition to avoid carbon lock-in in infrastructure and policy, and therefore irreparable damage to our planet. Meanwhile, the war in Ukraine has brought to fore the need to ensure energy security and the mitigation of supply vulnerabilities in a world where the geopolitical landscape is rapidly changing. Policymakers need to strike the appropriate balance to achieve fundamental objectives that may at times seem difficult to reconcile.

As the Line between Geopolitics and Financial Markets Gets Blurred, New Challenges Arise

The swift imposition of sanctions and the immobilization of the assets of the Central Bank of Russia have raised a number of issues that policymakers must confront. One key issue is whether the composition of exchange rate reserves will change. Some market commentators have argued that reserve managers may opt to diversify away from currencies of advanced economies and the US dollar in particular. Potential beneficiaries of such a shift may be assets that the Group of Seven (G7) will find more difficult to immobilize if there are new geopolitical events, including the Chinese renminbi, commodities, and potentially even crypto assets.

For now, such a scenario appears distant. The composition of currencies held by central banks has remained largely steady over decades. Reserve compositional changes can be described as glacial in pace even considering the small decline of the US dollar share over the years (Iancu and others 2020). In the medium to long term, however, geopolitical shifts and technological changes can indeed cause central banks to rethink what constitutes, and how to hold, reserves. Emerging market and developing economies could also issue more debt in the currencies of emerging creditors, such as China, to help meet increased financing needs. Countries may become more interested in ensuring critical supplies that could alter trade links and invoicing practices. In addition, a shift toward localized production would reduce the demand for international currencies. Finally, demand for alternative reserve currencies may increase in some regions. Issuers of alternative reserve currencies could increase the attractiveness of their currencies through leveraging digital technology, which could help them overcome some of the advantages of incumbent currencies.

There are strong welfare effects of sharing common payment infrastructures or critical service providers, although risks of single points of failure must also be managed in order to uphold operational resilience. Costs can be shared, and economies of scale applied. Likewise, such sharing increases compatibility between domestic payment systems, which facilitates international trade and finance. There is a risk that measures to increase a country's resilience to sanctions could promote the development of parallel national or regional infrastructures or critical service providers. For instance, there are currently only a few international payment message providers other than SWIFT, but these are generally small and cover a limited geographical area. Users of the Chinese payment system CIPS, for instance, currently still rely partly on SWIFT. An increased ambition to allow for payment messaging outside of SWIFT could, however, lead to establishing larger and fully independent and parallel systems. Consequent loss of efficiency and cross-border payment compatibility could also undermine efforts to improve access globally to cheap, safe, and efficient cross-border payments. In particular, there is ongoing international collaboration to increase compatibility and improve cross-border payments undertaken under the aegis of the Group of Twenty (G20) (FSB 2020).

This fragmentation could also arise in emerging payment infrastructures. Many countries are currently exploring central bank digital currencies (CBDCs) and are also looking into their use for cross-border payments. Within the G20 initiative to enhance cross-border payments there is a workstream on how CBDCs could improve cross-border

payments and increase global economic integration. Efforts to increase resilience to sanctions could undermine this project, and instead lead to fragmentation as national central banks seek to establish CBDCs independent of international infrastructures. There is a risk of competing "CBDC blocs" with fragmentation across technology and design. Cross-border compatibility could work well within the bloc but have little or no compatibility with CBDCs outside of each bloc.

Finally, the imposition of unprecedented financial sanctions could also lead to more complex, bespoke, and less passive asset allocation on behalf of investors. For example, going forward investors could place greater importance in their portfolio decisions on some of the risk factors exposed by the war in Ukraine (such as currency convertibility, sanctions, and reputation risk) and less importance on the decisions of benchmark providers. Analysts have also noted the possibility of creating bespoke indices that could cater to the unique mandates of different investors. In such a scenario, markets that have a higher share of benchmark-driven investors, including some frontier economies (IMF 2019), could be especially at risk of losing portfolio inflows.

Policy Recommendations

Central banks face a challenging trade-off between fighting persistent inflation and safeguarding the recovery at a time of heightened uncertainty about the global economic outlook while avoiding a disorderly tightening of global financial conditions. Higher policy interest rates and the unwinding of pandemic-related balance sheet policies will eventually lead to tighter financial conditions. Such a tightening is, in fact, an intended objective of policy, necessary to slow aggregate demand. With inflation expected to remain stubbornly high and significantly above target in many advanced economies, central banks should act decisively to prevent inflation pressure from becoming entrenched and avoid an unmooring of inflation expectations. As the war in Ukraine continues to unfold, the surge in commodity prices and disruptions to global supply chains pose further upside risks to the inflation outlook. Amid tight labor markets and still robust demand, there is a risk that wage and price increases may become entrenched. Against this backdrop, central banks in advanced economies will need to normalize the monetary policy stance at a faster pace than was anticipated only a few months ago to bring inflation credibly back to target.

Policymakers should provide clear guidance about the policy normalization process while remaining data dependent. Amid persistent inflation pressure, central banks face challenges to meet their mandates and should be resolute in preventing any perceived damage to their credibility. To avoid unnecessary volatility in financial markets, it is crucial that central banks in advanced economies provide clear guidance about the normalization process. Such guidance should include both the expected path of policy rates and the anticipated unwinding of pandemic-related asset purchases. With significant accommodation still in place (as evidenced by still meaningfully negative real rates in many advanced economies), policymakers may consider a faster pace of balance sheet normalization to achieve the desired tightening of financial conditions. Finally, it is also important that the normalization process remain data-dependent and be recalibrated along the way as dictated by the evolution of the economic and inflation outlook as well as by market conditions that are already affected by the war in Ukraine.

Emerging market economies remain vulnerable to a tightening of global financial conditions. While there is still heterogeneity across emerging markets in terms of the inflation outlook and policy responses, many central banks have already significantly tightened policy, most notably in Latin America and eastern Europe. Further rate increases, or policy normalization with respect to other measures such as asset purchases, should continue as warranted based on country-specific inflation and economic outlooks and the persistence of commodity price increases to anchor inflation expectations and preserve policy credibility. In countries where inflation has surprised on the upside and there are tangible risks of more persistent price pressures that put central bank credibility at risk, a more frontloaded and decisive monetary policy response is needed. An abrupt and rapid increase in US rates could lead to significant spillovers to some emerging and frontier markets, adversely affecting the recovery and further widening the gap with advanced economies. A disorderly tightening of global financial conditions would be particularly challenging for countries with high financial vulnerabilities, unresolved pandemic-related challenges, and significant external financing needs.

Policymakers should take targeted actions to contain the buildup of financial vulnerabilities during the policy

normalization process. This includes tightening selected macroprudential tools to tackle pockets of elevated vulnerabilities while avoiding a disorderly tightening of financial conditions. If such tools are not available—for example, in the nonbank financial intermediation sector—policymakers should urgently develop them. Striking a balance between containing the buildup of vulnerabilities and avoiding procyclicality appears important in light of persisting uncertainties about the economic outlook owing to the war in Ukraine, the ongoing monetary policy normalization process, and limits on fiscal space in the aftermath of the COVID-19 pandemic.

On the fiscal front, amid heightened uncertainty and marked divergence across countries, tailored and agile fiscal policy response to an evolving situation is warranted (see the April 2022 *Fiscal Monitor*). In those economies hardest hit by the war, fiscal policy will need to address the humanitarian crisis and economic disruption. Given rising inflation and interest rates, fiscal support should be targeted to those most affected and to priority areas. In many emerging markets and low-income economies, higher inflation and tightening global financial conditions call for prudence, while fiscal support is needed for those that will be the hardest hit by the higher commodity prices and where the recovery was already weaker. To help alleviate the burden of higher food and energy prices, governments should provide targeted, temporary, and direct support to vulnerable households, while allowing domestic prices to adjust.

While taking steps to address energy security concerns raised by the war in Ukraine, policymakers should intensify efforts to implement the 2021 United Nations Climate Change Conference (COP26) roadmap to achieve net-zero targets. Amid widespread upward pressures on commodity prices, policymakers should take steps to increase the availability and lower the cost of fossil fuel alternatives and renewables while improving energy efficiency. Authorities should also focus on policies aimed at scaling up private finance in the transition to a greener economy to steer the mobilization of investment and the alignment of capital flows on a low-carbon trajectory. Toward this end, strengthening the climate finance information architecture remains paramount to enhance the development of climate transition financial instruments and shareholder engagement practices. This includes improving the availability of high-quality, consistent, and comparable climate-related data; developing science-based classifications for climate finance to align capital flows with net-zero goals; and implementing global climate-related disclosure standards that involve transition plans.

Policy Recommendations to Address Specific Financial Stability Risks

The deterioration in the economic outlook and the withdrawal of monetary accommodation and other policy support measures may pressure bank asset quality, so supervisory authorities should ensure that asset classifications and loan-loss provisions accurately reflect credit risk and losses. Any significant decline in capital ratios should be accompanied by a credible capital restoration plan. Authorities should also determine whether financial institutions have a comprehensive risk management process, with a special focus on credit, market, and counterparty risks. Authorities should ensure that broker dealers have appropriate visibility and buffers for aggregate derivatives exposures, including adequate capital and margin requirements for derivatives that are not centrally cleared.

The surge in volatility and (associated) dislocations in commodity markets underscore the importance of ensuring the adequacy of disclosures and standards of transparency to counterparties, especially major financial institutions such as dealer banks. These institutions are exposed to commodity markets through provision of funding and risk-hedging services. Adequate disclosures and transparency standards are essential to supporting comprehensive and strong risk management within the financial sector and its oversight by supervisory authorities. Robust risk management at these financial institutions is paramount, particularly the adequacy of margining and stress testing vis-à-vis concentration, market, and credit risks.

While margin calls appear to have been generally orderly and not disruptive to market functioning so far, recent measures taken in markets and exchanges in response to elevated volatility in commodity prices highlight the need to examine the broader implications of such efforts. For example, commodity markets function differently than securities markets, and trading disruptions could exert significant adverse impacts on the real sector. Exchanges and central counterparty clearing houses should also ensure the robustness and resilience of their information technology systems to withstand current trading conditions. Governance mechanisms for the LME

need to be strengthened to address conflict of interest. Measures must be in place to ensure that the concentration of trading does not adversely impact free and fair markets. Supervisors and regulators should consider enhancing transparency, in both exchange-traded and over-the-counter markets, to preempt the buildup of concentrated positions and thereby limit financial stability implications.

Recent developments related in particular to the nickel market on the London Metal Exchange (LME) suggest that there are a number of potential lessons for policymakers to consider.[47] While the stated objective of the cancellation of trades by the LME was to stabilize the nickel market, counterparties with long positions were put at a disadvantage. Reportedly, large commodity traders have voiced concerns over the longer-term impact of the cancellation and price change limits on market confidence and participation. This risks a migration of exchange-traded contracts into uncleared over-the-counter derivatives, which are more opaque and do not have the same mechanisms for mitigating counterparty risks. Disruptions in commodity derivative markets are particularly problematic at the current juncture of volatile prices and supply bottlenecks. Broadly speaking, a disruption in trading needs to balance financial stability and free and fair market objectives; the adequacy of governance mechanisms of market infrastructure institutions requires careful review from the perspective of mitigating conflict of interest; and further assessment may be required concerning the need to enhance transparency in exchange-traded and over-the-counter markets to improve the technical soundness of exchange platforms and avoid concentration of trading (with its implications on fair trade).

The recent escalation of geopolitical tensions and their ramifications in the cyber domain have highlighted the importance of incorporating cyber risk into financial stability analysis. It is paramount to ensure that cyber regulation and supervision are fit for purpose and that response and recovery capacity is improved to ensure operations can quickly resume if an attack occurs. Enhancing information-sharing and incident reporting frameworks and helping emerging market economies build cybersecurity capacity are key to ensuring that all nodes of the network are resilient. Stepping up international efforts to prevent and deter attackers would reduce the threat at its source. Addressing all these gaps requires a comprehensive international collaborative effort.

Policymakers need a multifaceted policy strategy to preserve the effectiveness of capital flow management measures in an environment of increasing use of crypto assets (see He and others, forthcoming). Essential steps include developing a comprehensive, consistent, and coordinated regulatory approach to crypto assets,[48] and applying it effectively to capital flow management measures; establishing international collaborative arrangements for implementation; addressing data gaps; and leveraging technology ("regtech" and "suptech"). Implementation of the existing Financial Action Task Force standards is key to mitigating financial integrity risks that might give rise to illicit capital flows. Finally, laws and regulations for foreign exchange and capital flow management measures should be reviewed and amended if necessary to cover crypto assets even if they are not classified as financial assets or foreign currency.

Policymakers need to urgently develop appropriate macroprudential tools to address risks from nonbank financial intermediation (NBFIs). Nonbanks play an increasingly important role in the financial system, including intermediating cross-border capital flows. It is essential that risks from NBFIs are effectively managed and that authorities have the right tools to supervise and regulate NBFIs. The IMF continues to work closely with the Financial Stability Board and standard setting bodies to develop these tools.

To fend off cryptoization risks, strengthening macroeconomic policies is necessary but may not be sufficient given the unique challenges posed by the crypto ecosystem. A broader discussion of policy recommendations can be found in the October 2021 GFSR and He and others (forthcoming). Central bank digital currencies may also help reduce cryptoization pressures driven by a need for better payment technologies.

The international community should work to prevent further fragmentation of the global payment system. Fragmentation would lead to reduced efficiency of international payments, with subsequent efficiency loss and fragmentation for trade and finance. Continued and deepened international cooperation is necessary to achieve this. The IMF can be an important facilitator of this cooperation.

[47]On April 4, 2022, UK regulators announced a review of the LME's approach to managing the suspension and resumption of the market in nickel.

[48]The elements of such an approach are further discussed in Bains and Sugimoto (forthcoming).

Authorities in emerging and frontier markets need to safeguard against risks related to tighter external financial conditions. Countries with stronger fiscal positions and clearer policy frameworks will be better positioned to manage tighter conditions. There is a need to rebuild fiscal policy space and retire extraordinary crisis measures where possible, especially in some commodity-exporting economies that have seen an improvement in terms of trade and experienced positive growth surprises. Given the significant volatility in financial markets since the start of the war in Ukraine, appropriate use of foreign exchange intervention measures may be needed, as long as they do not prevent credible macroeconomic policies and necessary adjustments. In addition to the warranted macroeconomic adjustment, in cases of crises or imminent crises, capital flow management measures may be an option for some countries to limit outflow pressures. For weaker sovereign borrowers, enhanced efforts to contain the risks from high debt and weak recovery should continue, including via multilateral cooperation and decisive support from the international community.

Some firms and sectors may need short-term fiscal support to navigate the consequences of the war in Ukraine. The corporate sector outlook has deteriorated since the Russian invasion of Ukraine, including as a result of the surge of energy and raw material prices, adding to the preexisting vulnerabilities from the pandemic. While corporate balance sheets have continued to strengthen, benefiting from unprecedented policy support and the ongoing economic recovery, smaller firms may be less resilient and more exposed to a tightening in financial conditions and a more stringent lending posture by banks. Solvency risk has remained elevated for small firms in some countries. Direct government support to firms may be needed to prevent the risk of a wave of bankruptcies. Such support should depend on firms' viability[49] and available fiscal space and be limited to circumstances in which there was clear market failure.[50] It is crucial that policymakers continue to undertake structural measures, including strengthening insolvency frameworks via a fast-track process.

Amid heightened uncertainty, financial stability risks stemming from risky credit markets should be mitigated. Supervisors should take a comprehensive view of risks, intensify monitoring, and enforce sound underwriting standards and risk management practices at banks and non-bank financial intermediaries active in these segments. Supervisors should ensure that more comprehensive stress tests—incorporating macro-financial feedback effects from high corporate sector indebtedness, as well as correlated risks in related sectors (such as commercial real estate)—are conducted for banks and non-bank financial intermediaries with significant corporate exposures.

[49]See the corporate framework, including the operationalization of viability, in Chapter 1 of the April 2021 GFSR.

[50]See Chapter 1 of the April 2022 *Fiscal Monitor*.

Box 1.1. Extreme Volatility in Commodities: The Nickel Trading Suspension

The London Metal Exchange (LME) suspended trading in the nickel market for six trading days after the three-month nickel forward price skyrocketed on March 8, 2022 (Figure 1.1.1, panel 1). Given that Russia is the world's third largest producer of nickel, nickel prices had been on the rise since the start of the Russian invasion of Ukraine. Reportedly, one of the world's largest nickel producers, Tsingshan Holding Group, had large short futures positions (approximately 150,000 tons, of which about 30,000 tons were on the LME and the rest were bilateral over-the-counter [OTC] exposures with various banks). Commodity producers typically hedge against price declines (yellow line in Figure 1.1.1, panel 1). As prices increased rapidly (black line), the Tsingshan Holding Group was apparently unable to post the necessary margins with its brokers at the LMEC as well as for the OTC derivative positions with banks. The firm also reportedly faced margin calls on its OTC trades with various banks, which it was similarly unable to meet. The LME suspended trading, canceled all contracts executed on the morning of March 8, and deferred physical delivery of maturing contracts. The LME cited orderly market grounds as a reason for its decision. On the long side of these trades were likely banks, commodity trading companies, hedge funds, and other investors standing to benefit from the price increases. Suspension of these trades, while giving some relief to counterparties holding short positions, wiped out profits of those on the other side, leading to a widespread criticism from market participants. Trading resumed on March 16 under daily price change limits, which were hit and widened various times. To contain market volatility, the LME also imposed daily price limits on other base metals and on March 24 prohibited the submission of orders outside the daily limit.

The author of this box is Torsten Ehlers.

If margins are not posted or contracts are canceled on derivatives markets, large banks acting as dealers are left with open risk positions. While dealer banks typically hold small net positions, their gross positions are very large (about 1 million metric tons in long and short positions), as they act as intermediaries in the nickel and many other derivatives markets (Figure 1.1.1, panel 2). Banks take both positions on exchanges as well as positions over the counter directly with clients. While dealers tend to run a matched book between long and short positions, if counterparties default or contracts are canceled, this leaves banks with large open positions. Indeed, several large dealer banks were reportedly left with open short positions after March 8 due to unpaid margins.

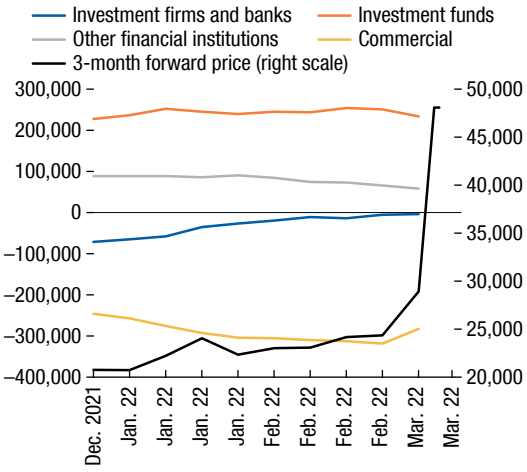
The current volatility in the commodities markets can create serious market functioning problems. Typically, prices on major commodity markets move only a few percentage points on any given day. This enables commodity producers to enter a substantial amount of both short- and long-term hedging contracts of shorter and longer maturity, as was the case on March 4 before the rapid price increase (Figure 1.1.1, panel 3). As the strike prices of outstanding options contracts indicate, the price increase on March 7 was already significantly beyond what traders were taking into consideration and hedging against (Figure 1.1.1, panel 4). During such extreme events, counterparties may not have readily available resources to fulfill their derivatives obligations. As derivatives markets are important to distribute risks among producers and consumers of commodities, an impairment of derivatives markets may ultimately spill over into the already strained availability of commodities. More broadly, strains in derivatives markets may create liquidity stress and concerns about counterparty risk that may spill over to other corners of the financial system.

Box 1.1 *(continued)*

Figure 1.1.1. The Nickel Market Short Squeeze in March 2022

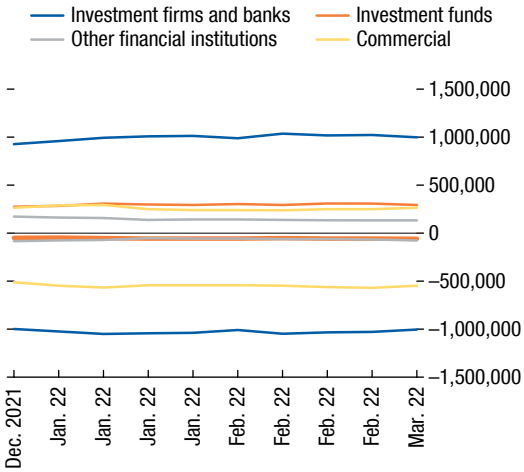
Nickel producers (commercial traders) consistently run short positions for hedging ...

1. Net Trader Positions in the Nickel Derivatives Market (Negative = net short position) (Metric tons, left scale; US dollars, right scale)



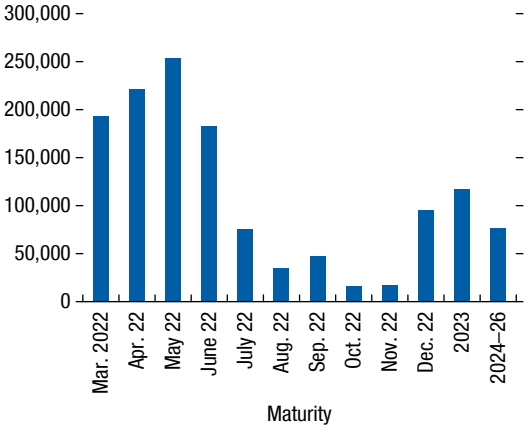
... while investment firms and banks hold the largest gross positions.

2. Gross Trader Positions (Metric tons)



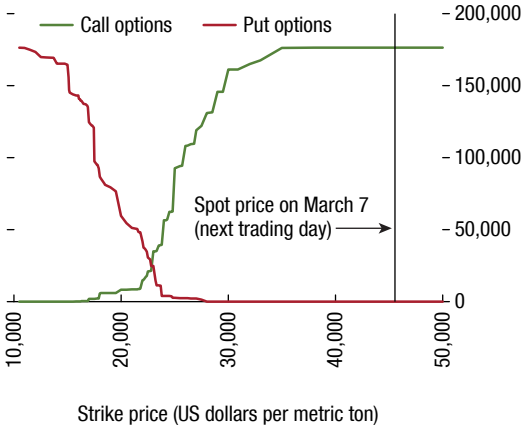
A large amount of nickel forward contracts stuck before the price increase is still outstanding.

3. Open Interest in Nickel Forward Contracts by Maturity as of March 4, 2022 (Metric tons)



All call options outstanding on March 4, 2022, were "in-the-money" at prices prevailing on March 7/8, 2022.

4. Open Interest of "In-the-Money" Nickel Options at Given Strike Price as of March 4, 2022 (Metric tons)



Sources: Bloomberg Finance L.P.; London Metal Exchange; and IMF staff calculations.
Note: Panel 4 depicts open interest (that is, active long positions) for all call options at or above the strike price and put options at or below the strike price ("in-the-money" options). Options have a maturity of maximum two years but mature mostly in 2022.

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