

I. Old challenges, new shocks

Key takeaways

- Two powerful forces – the Covid-19 pandemic and the Russian invasion of Ukraine – shaped economic outcomes over the past year.
- Growth was resilient, at least until the outbreak of the Russia-Ukraine conflict. Inflation rose to multi-decade highs against a backdrop of persistently goods-intensive demand and constrained supply.
- Stagflation risks loom large, owing to high inflation, the war in Ukraine and slower growth in China. Pre-existing macro-financial vulnerabilities magnify the risks, which could disrupt financial systems and strain emerging market economies.
- The most pressing monetary policy task is to restore low and stable inflation, while limiting as far as possible the cost to economic activity and preserving financial stability. Over the medium run, there is a need to sustainably rebuild monetary and fiscal buffers. Governments should reignite supply side growth drivers.

Powerful non-economic forces once again shaped economic developments over the past year. The emergence of the Omicron variant of Covid-19 dashed hopes of a quick and smooth global “pandexit”. Meanwhile, the invasion of Ukraine triggered the largest European armed conflict in decades. First and foremost a humanitarian disaster, the war also had major repercussions for commodity and financial markets, and global supply chains.

For much of the year, growth was resilient. The global economy expanded strongly in 2021, although in the United States and China it fell short of expectations. As the review year progressed, the expansion lost some momentum, with supply constraints, Omicron and the war in Ukraine blowing headwinds.

Against this backdrop, global inflation rose to multi-decade highs. At first, higher inflation was seen as transitory, reflecting increased relative prices for a small number of pandemic-affected items. But it proved persistent, broadening over time. In response, central banks generally brought forward the timing and pace of policy tightening. Higher inflation and shifting expectations of the policy response led to bouts of financial market volatility, with financial conditions tightening substantially as the year progressed, albeit from an exceptionally easy state.

This combination of forces makes for a challenging outlook. The mix of high inflation, high and volatile commodity prices and significant geopolitical tensions bears an uncomfortable resemblance to past episodes of global stagflation. An uncertain growth outlook in China reinforces the downside risks. Unlike in the past, stagflation today would occur alongside heightened financial vulnerabilities, including stretched asset prices and high debt levels, which could magnify any growth slowdown.

In this environment, policymakers face several challenges. In the short term, the priority is to bring inflation down while limiting as far as possible the cost to economic activity and preserving financial stability.¹ At the same time, there is an

imperative to rebuild monetary and fiscal buffers through a durable normalisation of policy settings. Recent economic developments further complicate this task. Fiscal policy in particular faces pressure to address higher living costs and, in some countries, increase military expenditures, while having to honour longer-term commitments to “green” the economy. These challenges put a premium on supply side reforms to promote sustainable growth.

This chapter first describes the key economic and financial developments over the past year. It then examines the looming stagflation risks. Finally, it elaborates on the policy challenges.

The year in retrospect

Global growth loses momentum as inflation returns

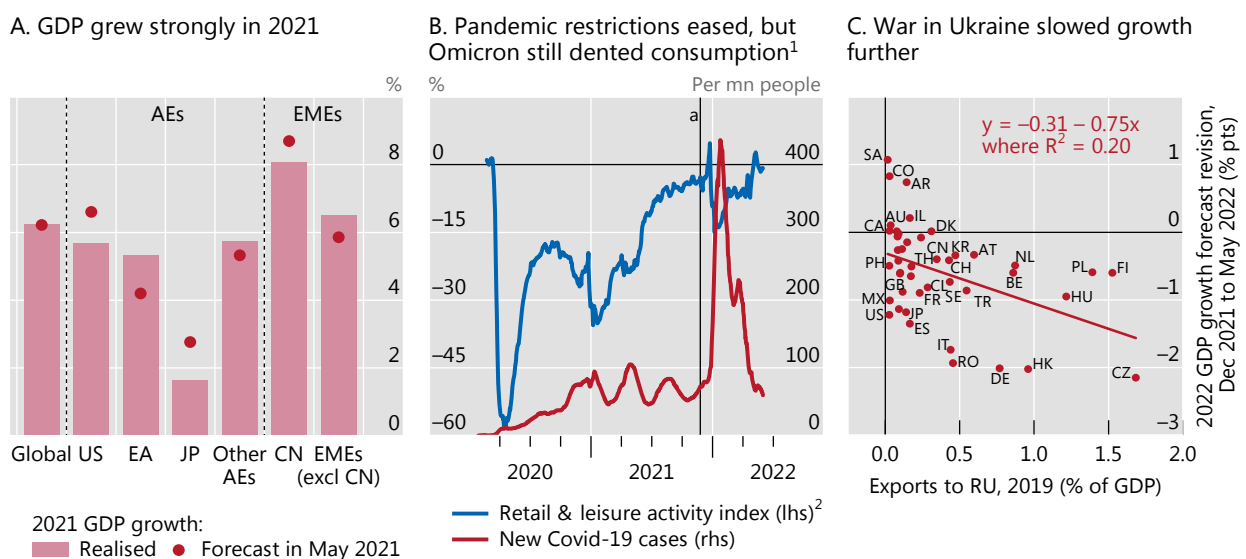
The year under review started well. Global GDP is estimated to have grown by 6.3% in 2021, its fastest rate in almost 50 years, and in line with expectations at the time of last year’s Annual Economic Report (Graph 1.A).

The expansion in 2021 was broad-based. Japan aside, most advanced economies (AEs) grew strongly, bolstered by the easing of most remaining pandemic-related restrictions and very accommodative fiscal and monetary policy. Growth in emerging market economies (EMEs) (excluding China) varied, but as a group they expanded by 6.5%, supported by buoyant global goods trade, easy global financial conditions and, for commodity exporters, higher terms of trade.

Developments in China were less positive. Admittedly, GDP still grew by a solid 8.1% in 2021. However, this fell short of expectations. Regulatory interventions in the real estate and IT sectors weighed on activity. In addition, more frequent and broader lockdowns, in line with the authorities’ “dynamic zero-Covid” policy, disrupted supply networks and undercut consumption.

Pandemic and war disrupted the expansion

Graph 1



^a Covid-19 Omicron variant reported to World Health Organization.

¹ Global; seven-day moving averages. ² Mobility trends relative to pre-Covid-19 period.

Sources: IMF; OECD; Consensus Economics; Google COVID-19 Community Mobility Reports; Our World in Data; national data; BIS.

The global expansion lost momentum as the review period progressed. Soaring infections once Omicron emerged in late 2021 cut consumer spending and, in some countries, labour supply (Graph 1.B). And, just as the expansion resumed, the war in Ukraine dealt a further blow. GDP growth forecasts for 2022 were marked down, particularly for countries more affected by the conflict (Graph 1.C).

In a striking break with the recent past, global inflation climbed to multi-decade highs. By early 2022, it exceeded central bank targets in almost all AEs, and had risen above 5% in more than three quarters of them (Graph 2.A). The share of EMEs with inflation above 5% was almost as high. Higher inflation was less prevalent in Asia. But even there, it generally rose above target as the year progressed, with the notable exception of China.

The flare-up in inflation came as a surprise to most observers. At the end of 2020, forecasts were generally projecting inflation at or below central bank targets (Graph 2.B). Even in mid-2021, by which time inflation had already started to rise, most forecasters underestimated the extent or persistence of the increase.² Contributing to the miss, the increase was initially concentrated in a narrow set of items, such as durable goods, food and energy. These price increases were widely interpreted as one-off or transitory relative price adjustments to pandemic-induced shifts in supply and demand. But inflation progressively broadened (Graph 2.C). By early 2022, growth in service prices, which tends to be more persistent, exceeded its pre-pandemic level in much of the world (Graph 3).

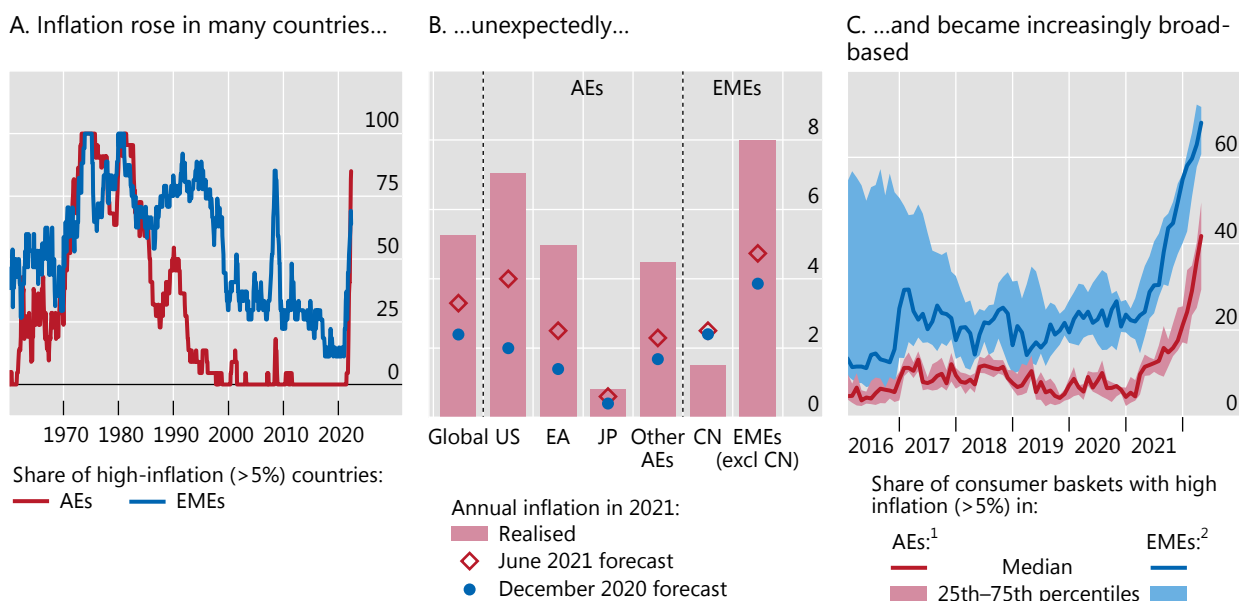
Higher inflation reflected a confluence of factors.

First, the recovery from the Covid recession has been unusually rapid, particularly in AEs (Graph 4.A). Massive fiscal and monetary policy support early in the pandemic bolstered household incomes despite large falls in GDP. This income boost – much of which was initially saved – paved the way for spending to bounce back as activity restrictions eased in 2021. However, some of this additional spending translated into

An unanticipated rise in global inflation

In per cent

Graph 2



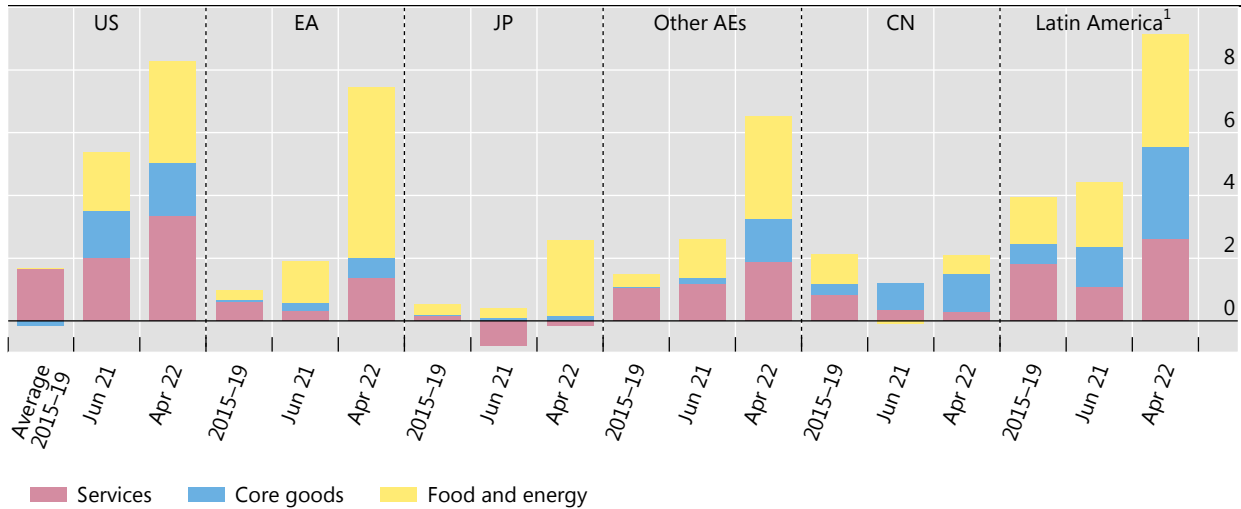
¹ AT, BE, CH, DE, DK, ES, FR, GB, IT, JP, NL, PT, SE and US. ² BR, CL, CO, CZ, HU, KR, MX, PH, PL, RO and TR.

Sources: IMF; OECD; CEIC; Consensus Economics; national data; BIS.

Goods prices rose most, but price growth also increased for services

Contribution to year-on-year inflation; in per cent

Graph 3



¹ CL, CO and MX.

Sources: OECD; Bloomberg; Datastream; national data; BIS.

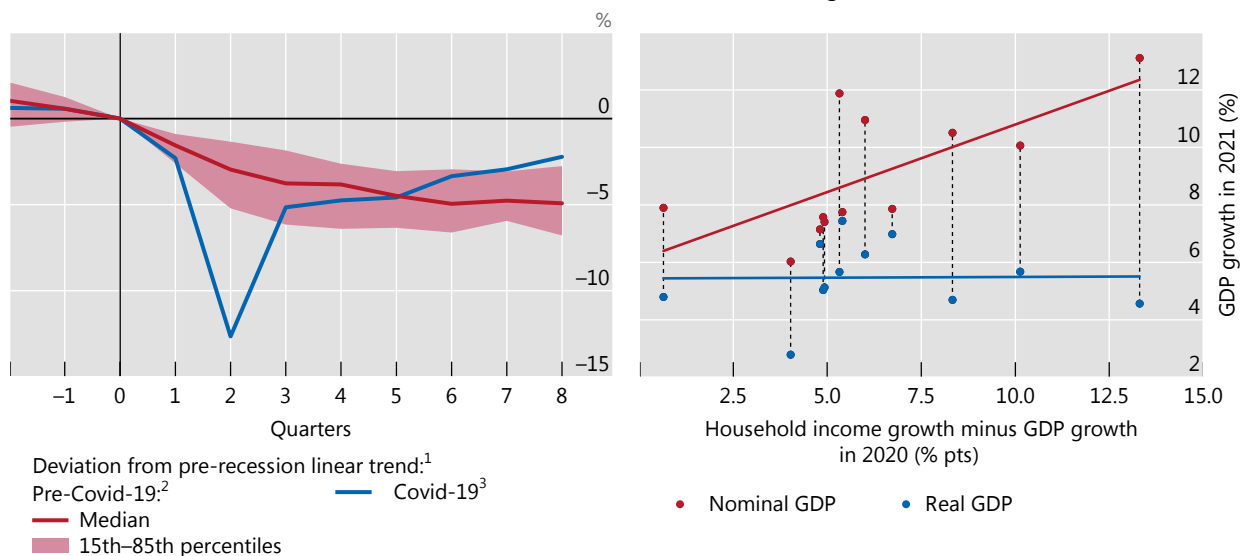
higher inflation, so that the relationship between income support early in the pandemic and economic activity in 2021 was much more evident for nominal GDP than real output (Graph 4.B).³ Meanwhile, policy measures such as furlough schemes and debt moratoriums helped prevent the feared wave of corporate bankruptcies.⁴

Causes of higher inflation: aggregate demand and income

Graph 4

A. An unusually fast recovery from the Covid recession

B. Policy measures supporting household income in 2020 associated with higher inflation in 2021



¹ GDP trend calculated on the five years preceding the recession. Sample of seven AEs. ² Cross-country median of 1985–2019 recessions. ³ GDP-weighted average of each country-specific Covid-19 recession.

Sources: IMF; OECD; BIS.

Second, the pandemic-induced rotation of aggregate demand to goods from services, especially contact-intensive ones, proved surprisingly persistent. Little demand rotated back, even after most containment measures were lifted (Graph 5.A). Strong price increases by firms operating at full capacity in industries facing high demand were not matched by slower price growth elsewhere.⁵ As a result, inflation rose even as output remained below its pre-pandemic trend and labour markets pointed to spare capacity.

Third, supply failed to keep up with surging demand. In particular, global value chains came under pressure.⁶ In some cases, the pressure reflected disruptions due to natural disasters, geopolitical conflicts and lockdowns; in others, simply the strength of demand. Thus, bottlenecks emerged in a number of areas, including container shipping and semiconductors, leading to sharp price increases (Graph 5.B).⁷ Since many bottlenecks affected goods and services located “upstream”, ie near the start of production networks, the supply constraints had large spillovers across industries and countries. This caused long delivery delays and left many retailers short of inventory.

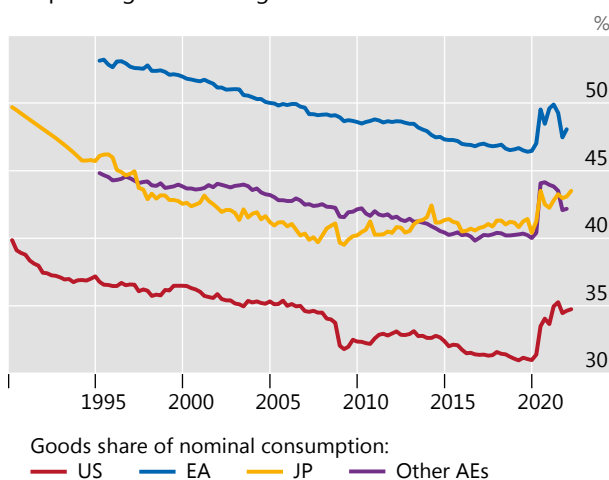
Supply was especially tight in energy and other commodity markets, triggering major price increases and higher volatility (Graph 6.A, Box A). In this case, a legacy of low investment by resource producers further restricted supply (Graph 6.B). Partly as a result, the supply response of marginal producers, such as those of shale oil, fell short of previous ones, which had helped to moderate commodity price shifts in the 2010s (Graph 6.C). The war in Ukraine further disrupted the global supply of products such as wheat, oil, gas, nickel, palladium and fertilisers.

In several EMEs, central banks responded quickly to rising inflation. In Latin America, many had already raised policy rates several times by the end of 2021 (Graph 7.A). In Asia, where inflation was generally lower, policy tightening occurred later and more gradually. Still, by early 2022 most EME central banks had started to remove accommodation. The People’s Bank of China was an important exception: it eased as the economy softened and inflation remained subdued (Graph 7.B).

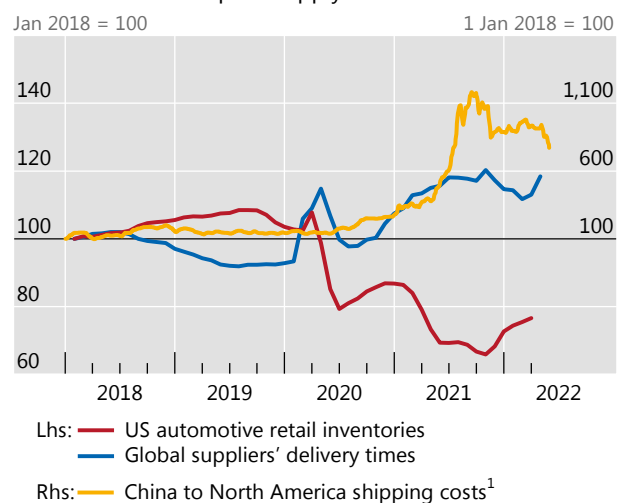
Causes of higher inflation: demand composition and supply constraints

Graph 5

A. Spending rotated to goods



B. Bottlenecks disrupted supply chains



¹ Seven-day moving average.

Sources: Federal Reserve Bank of St Louis, FRED; IMF; OECD; Datastream; IHS Markit; national data; BIS.

Rising commodity prices: are we set for a repeat of the 1970s?

The past year has seen a significant rise in global inflation alongside higher commodity prices. This combination recalls the experience of the 1970s, particularly the aftermath of oil crises in 1973 and 1979. Those crises contributed to higher inflation and to a slowdown in global growth, which declined from an average of 5.5% in the decade leading up to the 1973 oil crisis to 2.5% in the following one. There are several reasons to expect recent commodity price rises to be less disruptive than those of the 1970s: recent price rises are proportionally smaller, albeit spread across a broader range of commodities, commodity supply has so far held up better, the global economy has become vastly more efficient in its use of many commodities, and the inflationary backdrop is more benign. That said, adverse outcomes are still possible if policymakers repeat the mistakes of the 1970s.

Recent commodity market developments differ from those of the 1970s in several respects. The 1970s crises were concentrated in the oil market. In the 1973 crisis, oil prices more than doubled in the space of a month (Graph A1.A). Prices rose to a similar extent in the 1979 crisis, albeit more gradually. Recent oil price increases have been modest in comparison. Oil prices have increased by around 50% since the middle of 2021, although they briefly rose more after the start of the war in Ukraine in late February.¹ Taking a longer-term perspective, oil prices today are still within the range of long-term averages, being at roughly the same level in nominal (US dollar) terms as they were in mid-2014, and about 20% lower in real terms. In contrast, the 1970s crises took oil prices to historic highs.

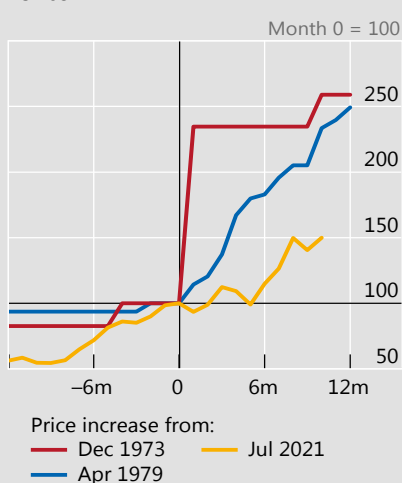
But while oil prices have so far increased by less than during the 1970s crises, a broader range of commodities has experienced price increases. The prices of non-oil energy, some agricultural goods, fertilisers and metals have all risen significantly over the past year, to be well above their pre-pandemic levels (Graph A1.B). Increases in European natural gas prices, which rose almost fourfold between the middle of 2021 and early 2022 and eight times from pre-pandemic levels, were particularly notable. In contrast, the 1970s crises were more concentrated in oil and, in the 1973 case, agricultural products.

Commodity supply disruptions have played a smaller role in recent price increases than in the 1970s. Global oil production dropped by around 5% around the 1973 oil crisis (Graph A1.C). The decline in oil consumption in AEs was even larger, at around 8%, due in part to embargos. Global oil production fell by less around the 1979 crisis, although oil consumption in AEs again decreased substantially. In contrast, the rise in commodity prices over the past year has been accompanied by a modest rise in the production of many commodities, although not oil. That said, supply disruptions could intensify over the coming year. The war in Ukraine will lower global production of agricultural commodities such as wheat and maize, as well as fertilisers.² Meanwhile, sanctions on Russian oil and gas would represent an effective reduction in the

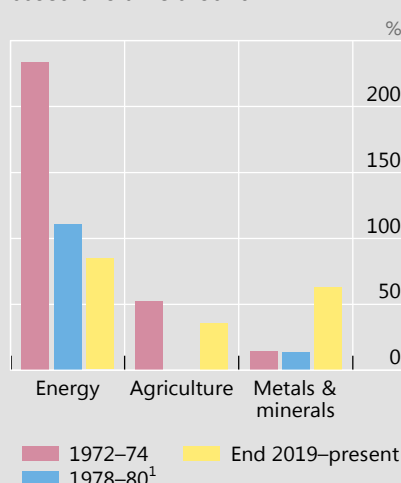
The current commodity price rise vs the 1970s: how do they compare?

Graph A1

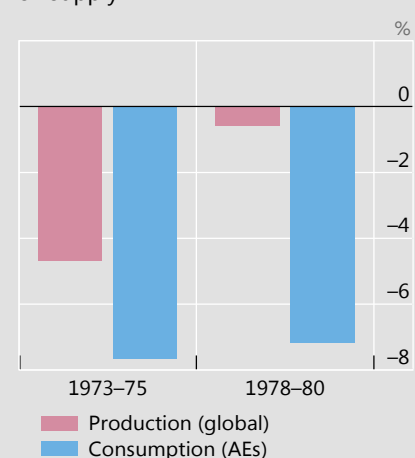
A. Oil prices rose much more in the 1970s



B. Rise in commodity prices broader-based this time around



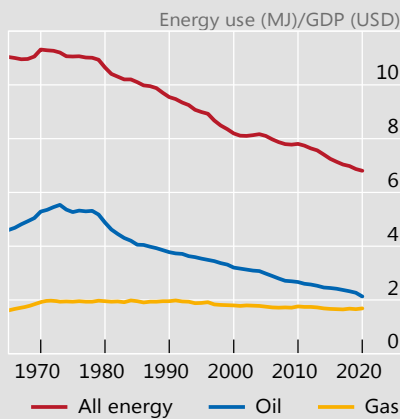
C. 1970s crises saw a big hit to global oil supply



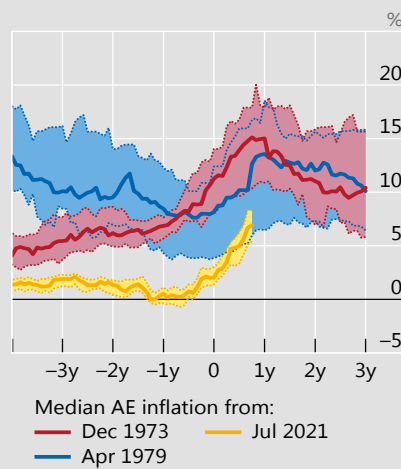
¹ Value for "agriculture" is 0.25%.

Sources: Federal Reserve Bank of St Louis, FRED; World Bank; BP; Datastream; national sources; BIS.

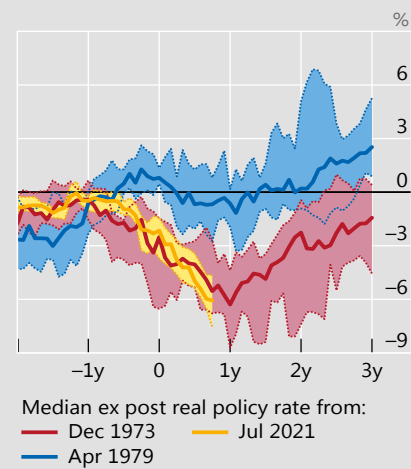
A. Energy intensity has declined



B. Inflation is lower and its rise is more recent¹



C. AE real interest rates resemble those of the early 1970s¹



MJ = megajoule.

¹ Shaded areas indicate 20th–80th percentiles.

Sources: World Bank; BP; Datastream; Global Financial Data; national data; BIS.

supply of these products, where Russia accounted for around 12% and 17%, respectively, of global production in recent years.

Aside from differences in commodity market behaviour, there are several reasons to think that the current episode could play out differently to those of the 1970s. Higher energy prices, in particular, could matter less for growth today than in the past. The energy intensity of GDP – the amount of energy required to produce a given amount of goods and services – has fallen by around 40% since the late 1970s (Graph A2.A). The reduction has been most striking for oil, for which consumption has more than halved relative to GDP. To be sure, some of this reflects a shift in energy use from oil to other fuels, such as gas, whose prices have also risen recently. But even for gas, total consumption per unit of GDP is lower now than in the late 1970s.

The inflationary environment today is also arguably more benign. Although global inflation has risen significantly since the start of 2021, this follows several years of low inflation (Graph A2.B). In contrast, the 1973 crisis took place against a backdrop of several years of steadily rising global inflation and signs that inflation expectations were de-anchoring.³ Inflation was also generally high in the lead-up to the 1979 oil crisis, albeit with substantial cross-country dispersion. The high-inflation environment of the 1970s may have contributed to the large “spillovers” of rising oil prices to the prices of other goods and services (Chapter II).

The consequences of recent commodity price increases will depend on how policymakers respond. One reason to expect more favourable outcomes is that monetary policy frameworks are very different. The 1973 crisis closely followed the collapse of the Bretton Woods managed exchange rate regime. At that time, the goals and even instruments of monetary policy were poorly defined in many countries. Central banks today have much clearer and more robust institutional frameworks. Even so, the path of real interest rates over the past year, at least in AEs, bears a striking resemblance to that in the 1970s, with large declines in real interest rates in the lead-up to the oil price shock in both episodes (Graph A2.C). In contrast, in the 1979 crisis real interest rates were more stable in the face of higher oil prices and then eventually increased substantially as central banks sought to bring inflation under control.

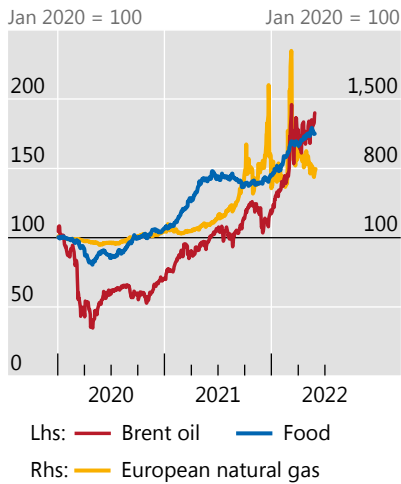
The conduct of fiscal policy will also matter. In AEs, many governments sought to cushion the blow to incomes from the 1973 oil crisis with expansionary fiscal measures.⁴ The resulting increase in aggregate demand added to inflationary pressures. In contrast, the fiscal responses to the 1979 oil crisis were generally less expansionary. The backdrop to the current crisis is quite different, with budget deficits projected to contract in most jurisdictions as governments withdraw stimulus deployed at the height of the Covid-19 pandemic. That said, a number of governments have announced tax cuts or expanded subsidies in response to recent commodity price rises, as occurred following the 1973 oil crisis.

¹ While the increase in oil prices since their trough in April 2020 has been much larger, those low levels followed an unprecedented price decline in the early stages of the pandemic. ² See Food and Agriculture Organization of the United Nations (2022). ³ See Reis (2021). ⁴ See Black (1985) and Roubini and Sachs (1989).

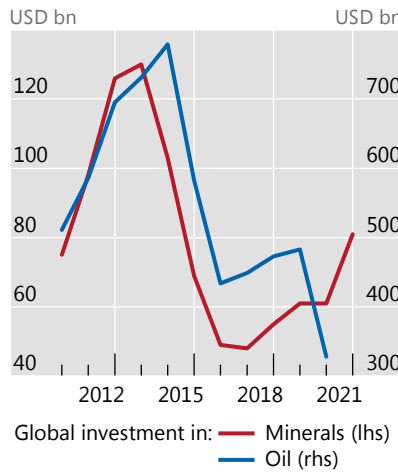
Commodity prices and supply

Graph 6

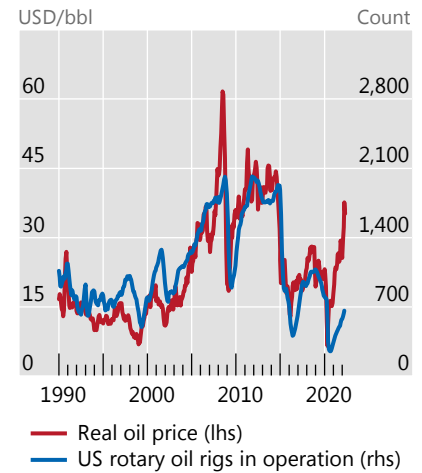
A. Commodity prices soared due to strong demand...



B. ...a legacy of low investment...



C. ...and a sluggish supply response



Sources: International Energy Agency; Bloomberg; PwC; national data; BIS.

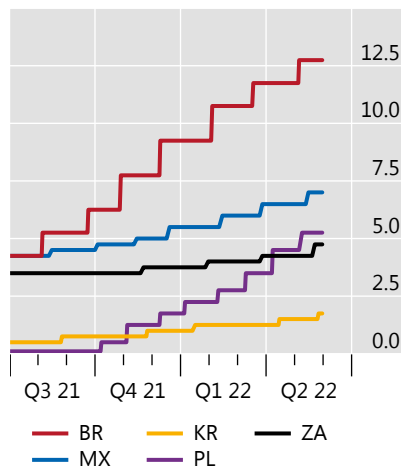
In AEs, central banks responded more slowly. Initially, many attempted to “look through” seemingly transitory higher inflation. But as the review year progressed, central banks wound back their forward guidance, signalling an earlier start of policy normalisation (Graph 7.C). In the United States, the Federal Reserve shifted in December towards a quicker tightening pace and had raised the federal funds rate by 75 basis points by the end of the review period. A number of small open economy central banks also hiked interest rates several times by early 2022. In the euro area,

Monetary policy tightened in most economies, with China an exception

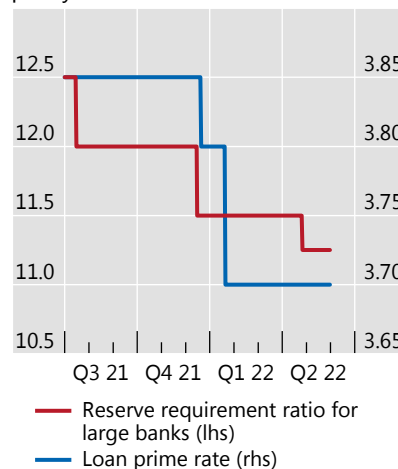
In per cent

Graph 7

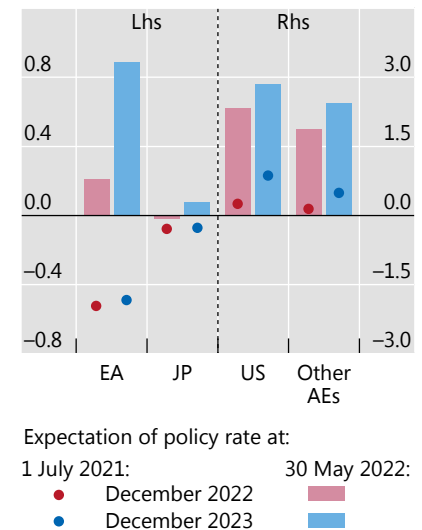
A. EME central banks were the first to raise interest rates



B. More accommodative monetary policy in China

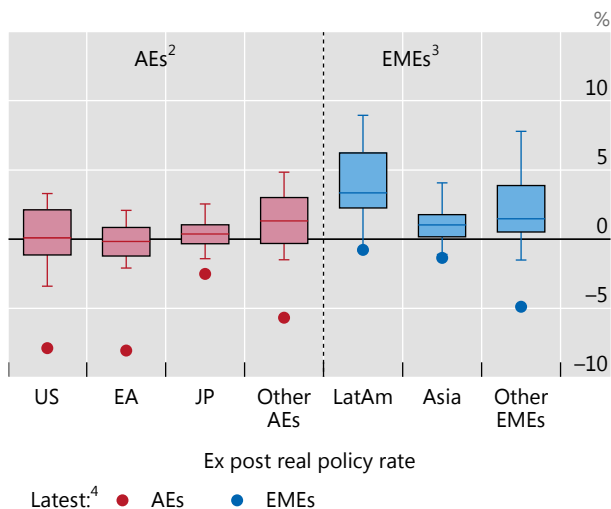


C. Expectations of future AE policy rates increased

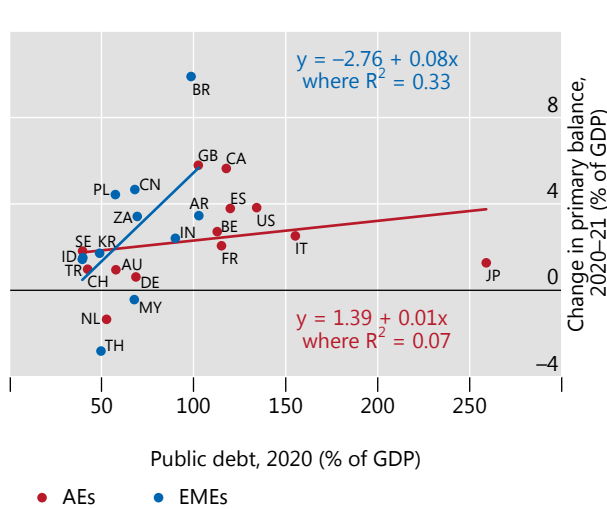


Sources: Bloomberg; Datastream; national data; BIS.

A. Real policy rates remained exceptionally low¹



B. Primary fiscal balances increased



¹ Box plots show medians, interquartile ranges and fifth–95th percentiles. ² Data starting in 1990. ³ BR, CN, HK, ID, IN, KR, MX, MY, PL, TH and ZA. Data starting in 2000 (subject to data availability). ⁴ See technical annex for details.

Sources: IMF; OECD; national data; BIS.

market participants brought forward their expectations of the timing of interest rate increases, while the ECB gradually adjusted its guidance to raise the possibility of an earlier policy tightening. The Bank of Japan remained an exception, maintaining its highly accommodative stance.

Nominal policy rates generally increased by less than near-term inflation. As a result, real ex post policy rates – ie adjusted for realised inflation – actually fell in most countries, from levels that were already exceptionally low. In most AEs, at the time of writing, real rates are 1–6 percentage points below their historical range over the past three decades (Graph 8.A). Real policy rates have generally been somewhat higher in EMEs, but remain negative in most.

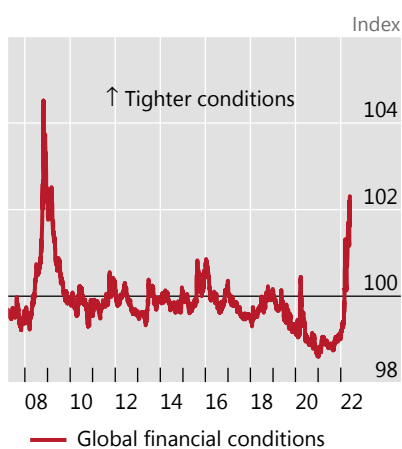
Fiscal deficits declined in most countries. Improving economic conditions allowed governments to wind back some of the fiscal stimulus deployed at the height of the pandemic. In EMEs, fiscal constraints loomed large and countries with higher debt levels generally implemented larger fiscal consolidations (Graph 8.B). While fiscal deficits generally shrank in AEs, governments in the United States and Europe laid the groundwork for large infrastructure programmes in the coming years.

Inflation and war shape financial conditions

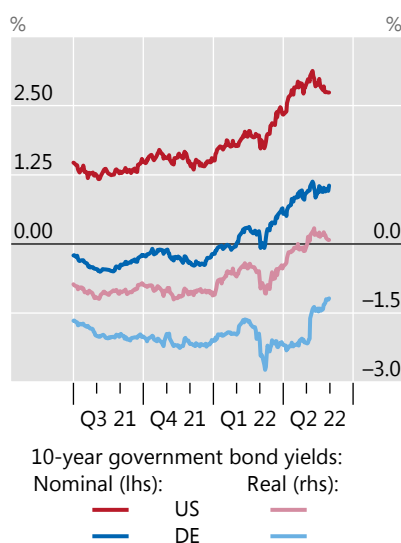
Higher inflation and the outbreak of war in Ukraine also left an imprint on financial markets. Financial conditions tightened sharply during the review period, particularly from the start of 2022, as asset prices responded to the prospect of rising inflation and the resulting anticipated monetary policy tightening (Graph 9.A). The extent of the tightening varied across countries and asset classes, reflecting their different exposures to economic and geopolitical developments.

The consequences of the shifting macroeconomic conditions were first evident in sovereign bonds. In the core bond markets, nominal yields rose sharply in October 2021, particularly at shorter maturities. Long-term yields followed from December as the Federal Reserve flagged an earlier and faster policy tightening,

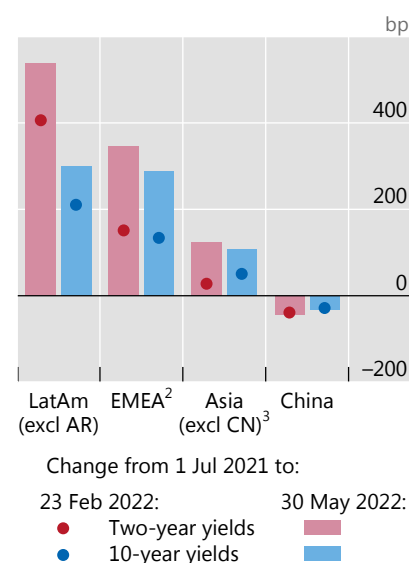
A. Global financial conditions tightened sharply in 2022¹



B. Core bond yields rose as inflation pressures mounted



C. Yields rose in most EMEs, except China



¹ A value of 100 indicates average conditions. ² CZ, HU, IL, PL and ZA. ³ ID, IN, MY, PH and TH.

Sources: Bloomberg; Goldman Sachs Global Investment Research as of 31 May 2022; BIS.

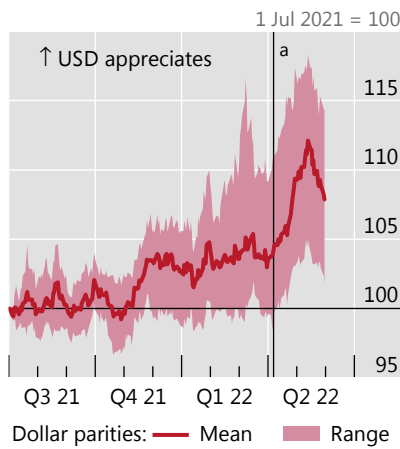
before moving sharply higher after the start of the war in Ukraine (Graph 9.B). The rise in US yields initially reflected higher inflation compensation, particularly at shorter maturities. But real long-term yields also increased materially after the start of the war. Indeed, in May the yield on 10-year Treasury Inflation-Protected Securities became positive for the first time since the start of the pandemic (light red line). In the euro area, German real yields remained deeply in negative territory (light blue line), despite a jump in May as the ECB flagged an earlier rise in policy rates. Over the entire period, however, the rise in German yields was due largely to increased inflation compensation.

Shifts in the shape of the US yield curve amid faster than anticipated monetary tightening raised concerns about the economic outlook. Starting in October, the US yield curve flattened as short-term yields rose by more than long-term ones. In March, it briefly inverted, which is often seen as a signal of an imminent recession. In the event, the inversion was short-lived and reversed sharply in early April. Such a flattening was not observed in the euro area and Japan, reflecting their slower pace of monetary tightening.

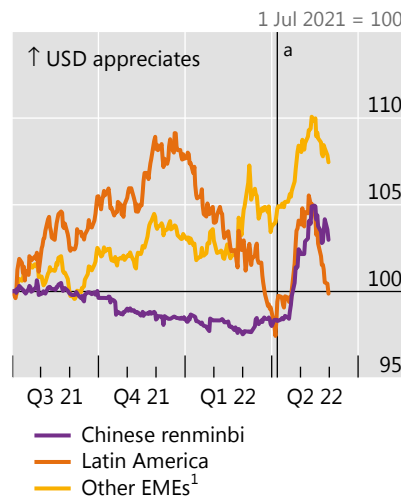
In EMEs, sovereign yields also increased alongside inflation. Initially, they rose more in Latin America, where inflationary pressures were strongest and many central banks had already started tightening policy early in 2021 (Graph 9.C). The increase of sovereign yields in eastern Europe accelerated after the outbreak of war in Ukraine, reflecting these countries' greater exposures to the conflict. Asian economies generally saw smaller sovereign yield increases, as inflation was slower to gain momentum in the region. In China, yields declined, as policymakers wrestled with the fallout of a troubled real estate sector and renewed Covid outbreaks.

Tighter US financial conditions spilled over globally through an appreciation of the US dollar. The appreciation proceeded in two steps. The first, lasting from late 2021 to March 2022, was gradual, reflecting evolving inflationary concerns and expectations that monetary tightening would proceed more quickly in the United States than in other AEs (Graph 10.A). EME exchange rate movements were more

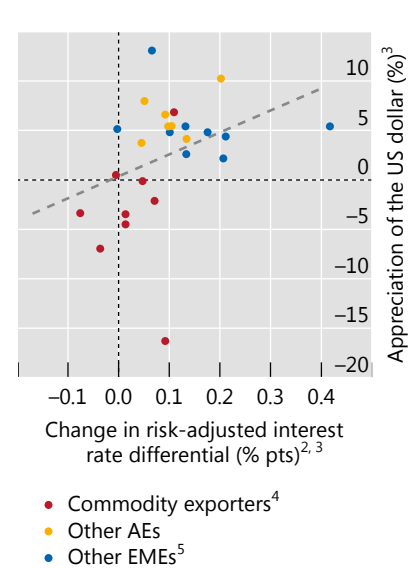
A. US dollar amassed large gains against AE currencies...



B. ...while remaining more mixed vis-à-vis EME currencies



C. US dollar gains lined up with interest rate differentials



^a Release of minutes of the March 2022 FOMC meeting.

¹ CZ, HU, ID, IL, IN, KR, MY, PH, PL, TH and ZA. ² An increase in the differential would typically make the US dollar more attractive vis-à-vis the corresponding currency. See technical annex for details. ³ Changes over 3 January–27 May 2022. ⁴ AUD, BRL, CAD, CLP, COP, MXN, NOK, PEN and ZAR. ⁵ CNY, CZK, HUF, IDR, INR, KRW, MYR, PHP and PLN.

Sources: Bloomberg; JPMorgan Chase; BIS.

varied. Commodity exporters, particularly in Latin America, even saw their exchange rates appreciate on the back of widening interest rate differentials and rising commodity prices (Graph 10.B). The renminbi also strengthened gradually, supported by a large current account surplus and portfolio inflows.

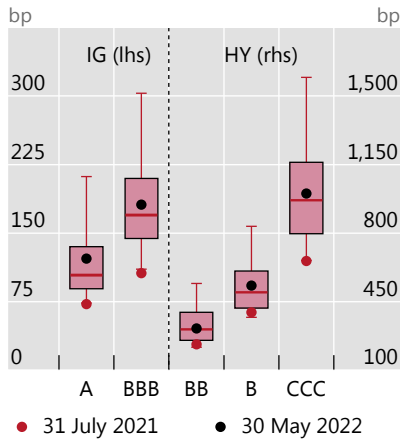
From April, the pace of US dollar appreciation increased sharply, before retracing somewhat in late May. The appreciation coincided with the large upward shift in the US yield curve, the reversal with renewed concerns about the global growth outlook. Overall, since the beginning of 2022 the US dollar appreciated most against the currencies of non-commodity exporters that were less advanced in their tightening cycles, as reflected in the expected changes in risk-adjusted interest rate differentials (Graph 10.C). Also in the second quarter, gold prices gave up the modest gains amassed earlier in the year, while cryptocurrencies, particularly ethereum and bitcoin, plummeted to their lowest levels since mid-2021. Some stablecoins, such as tether, deviated significantly from their benchmarks, while others broke down completely in a manner resembling the collapse of traditional exchange rate pegs.⁸ Capital outflows from most EMEs, however, were moderate, signalling the surprising resilience of investor sentiment towards this asset class in the face of tighter global financial conditions.

Corporate credit conditions tightened significantly as the year progressed. Relative to their distribution since the Great Financial Crisis (GFC), investment grade credit spreads saw the sharpest increases, although spreads in all rating categories rose from historical lows to levels exceeding their post-GFC medians (Graph 11.A). The relatively muted rise in high-yield credit spreads was partly due to rising investor demand for floating rate debt – more prevalent in the high-yield segment – at a time of higher expected future policy rates. It may also have reflected falling liquidity

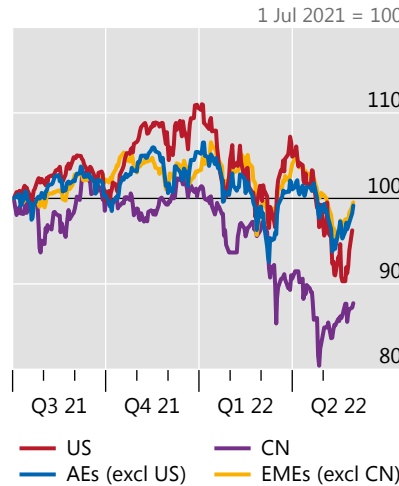
Risky assets saw a large correction in valuations, and corporate financing tightened

Graph 11

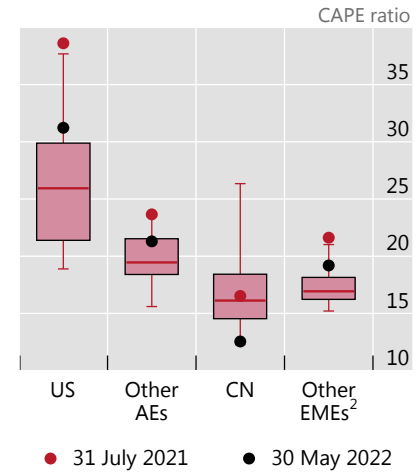
A. Corporate credit spreads widened substantially¹



B. Stock markets dived in 2022, amid bouts of heightened volatility...



C. ...resulting in large falls in equity valuations¹



CAPE = cyclically adjusted price-to-earnings; HY = high-yield; IG = investment grade.

¹ Box plots show medians, interquartile ranges and fifth–95th percentiles; data starting in 2010. ² BR, HK, IL, IN, KR, MX, PL, SG, TR and ZA.

Sources: IMF; Barclays; Bloomberg; Datastream; ICE BofAML; BIS.

in high-yield corporate debt markets, particularly in the euro area, which delayed the full repricing of riskier debt.

Equity markets saw large fluctuations amid broad sectoral divergences. Stock prices generally rose in the first half of the review period, albeit with bouts of volatility as higher inflation and Omicron rattled investor sentiment (Graph 11.B). They then fell significantly in 2022 in the wake of the Federal Reserve's tightening shift and the expectation that other central banks would follow suit, as well as the outbreak of the war. In most regions, valuations declined, although they generally remained above their post-GFC medians (Graph 11.C).

Chinese equities were an important exception. They drifted down from early 2022, as problems in the real estate sector lingered and Covid-related lockdowns intensified (Graph 11.B). The rout accelerated after the beginning of the war, with Chinese assets – both stocks and bonds – seeing large outflows, leaving valuations at post-GFC troughs (Graph 11.C).

Stagflation: how high are the risks?

Although global growth was generally resilient over the review period, downside risks loom large. To a great extent, this reflects the unique nature of the Covid recession and subsequent expansion, which has led to higher inflationary pressures alongside elevated financial vulnerabilities, notably high indebtedness against a backdrop of surging house prices. This combination is historically unprecedented. Prior to the mid-1980s, recessions were generally preceded by high inflation and the associated monetary tightening while the financial system was largely repressed. Since then, Covid aside, recessions have typically followed financial cycle peaks, with inflation remaining subdued during expansions and hence calling for relatively little monetary policy tightening.

The absence of historical parallels makes for a highly uncertain outlook. At a minimum, a spell of below-trend growth will be required to return inflation to acceptable levels. But a modest slowdown may not be enough. Lowering inflation could involve significant output costs, as after the “Great Inflation” of the 1970s. Even then, inflation may not fall quickly, given the intensity of recent price pressures. In a worst case scenario, the global economy could be set for a period of stagflation, involving both low growth, if not an outright recession, and high inflation.

How could such a stagflationary situation arise? The entrenchment of recent high inflationary outcomes, reinforced by rising commodity prices, would be a natural starting point. High commodity prices could also weigh on global growth, as would a significant slowdown in the Chinese economy. Financial stress could magnify the growth slowdown. EMEs are especially exposed.

A new inflation era?

Inflation regimes have self-reinforcing properties (Chapter II). Just as low inflation helped to moderate wage and price rises before the pandemic, so recent high inflation outcomes may lead to behavioural changes that could entrench it. Such a shift is most likely if an inflation rise is large and persistent enough – ie salient – to leave a large imprint on the lives of workers and firms, and if they have sufficient bargaining and pricing power to trigger a wage-price spiral.

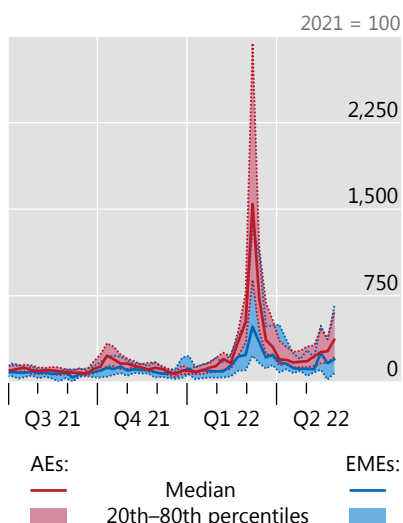
There are several indications that recent inflation increases have been salient. For instance, internet searches for the price of petrol surged in early March (Graph 12.A). And measures of inflation expectations, for both households and financial market participants, have started to increase (Graph 12.B).

At the same time, the conditions for faster wage and price growth look to be in place. Real wages grew unusually slowly over the past year, and declined in some

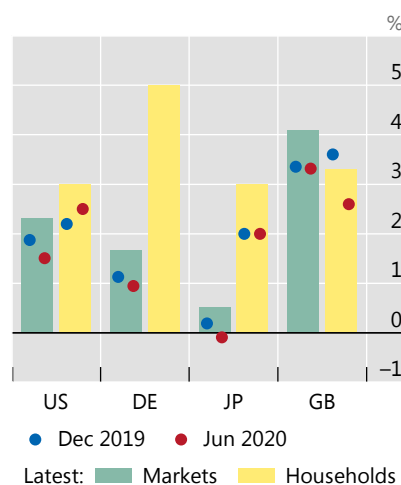
High inflation could become entrenched

Graph 12

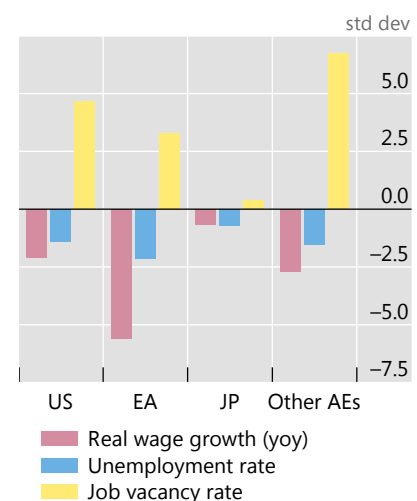
A. Internet searches for petrol prices soared as oil prices rose¹



B. Measures of long-term inflation expectations have increased²



C. Low real wage growth and unemployment, high job vacancies³



¹ Based on Google searches for country-specific expressions for “petrol prices”. ² For markets, five-year forward break-even inflation rate. For households, median response to survey question on inflation expectations at five-year horizon. Household data for DE start in October 2020. ³ Standard deviation of latest observation (Q4 2021 or Q1 2022) from 2000–19 mean.

Sources: Deutsche Bundesbank; Bank of Japan; Bank of England; OECD; Bloomberg; Datastream; Google Trends; University of Michigan Surveys of Consumers; national data; BIS.

jurisdictions, even as labour market conditions were remarkably tight, with job vacancy rates well above their historical averages and unemployment rates low (Graph 12.C). In part, this reflects the fact that wages tend to be negotiated infrequently, and so naturally take time to respond when inflation increases unexpectedly. As existing wage agreements expire, workers are likely to seek larger wage rises. In some countries they have already secured wage indexation clauses to guard against future inflation surprises.⁹ Meanwhile, the recent broadening of inflation pressures suggests that many firms have greater pricing power than they had pre-pandemic.

The war in Ukraine

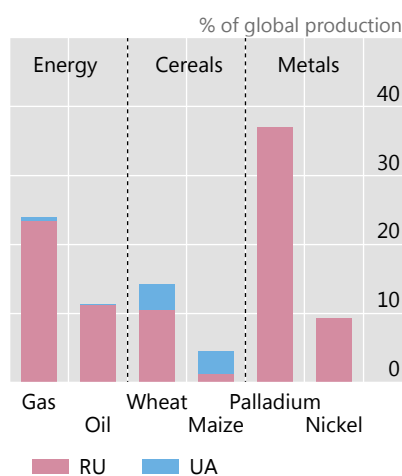
The war in Ukraine adds to the inflationary pressures. The primary channel is through higher commodity prices, particularly for oil, gas, agricultural products and fertilisers, of which Russia and Ukraine are significant producers (Graph 13.A). Some of these price rises – eg for oil and wheat – will feed directly into inflation. EMEs will be hit harder than AEs, given the typically larger share of food and energy in consumption baskets (Graph 13.B). Exchange rate appreciations may reduce imported price pressures for commodity-exporting EMEs, although this relationship appears to have weakened since the start of the pandemic (Graph 13.C). Other price rises, eg for metals, will raise firms’ production costs and could intensify price pressures through global value chains.

The net effect of these factors could be material, particularly as inflation is already high. Estimates of the effect of commodity price increases across a broad panel of countries indicate that a 30% increase in oil prices, combined with a 10% rise in agricultural prices – roughly in line with those seen since the start of the year – has historically been associated with a 1 percentage point increase in inflation in the following year (Graph 14.A).¹⁰ For European countries, where gas prices have surged even more than oil prices, the effects could be larger.

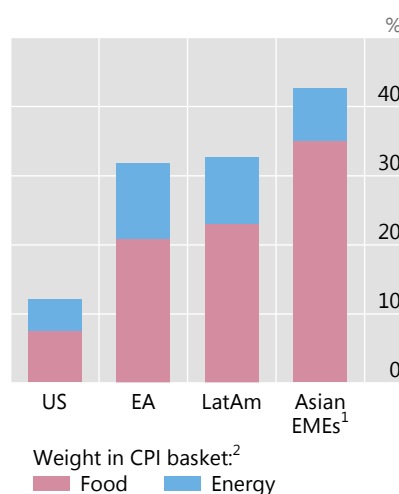
Commodity prices and inflation

Graph 13

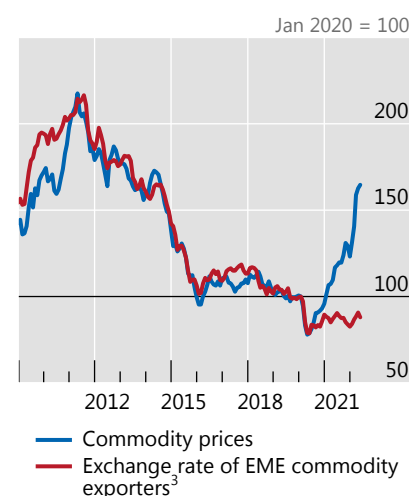
A. Ukraine and Russia are large commodity suppliers



B. Food and energy larger in EME consumption baskets

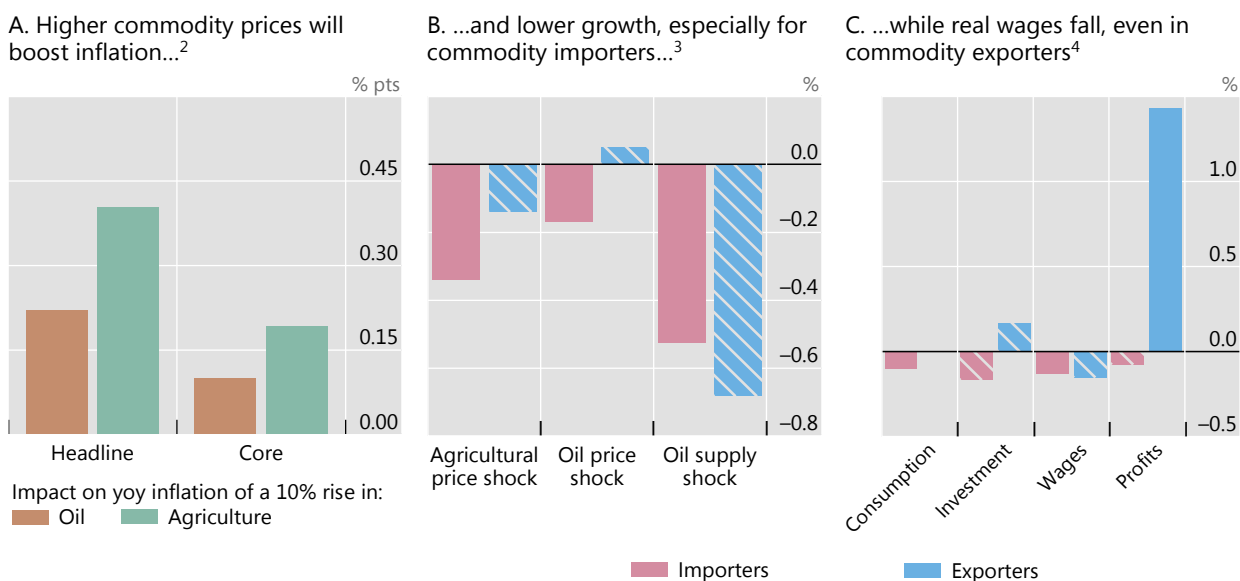


C. Exchange rates providing less help for commodity exporters



¹ KR, IN and PH. ² PCE for US. ³ BR, CL, CO, MX and ZA.

Sources: International Energy Agency; OECD; UN Food and Agriculture Organization; US Geological Survey; Bloomberg; Datastream; national data; BIS.



¹ Impulse responses from structural vector autoregression models. Diagonal patterns indicate values that are not statistically significant at the one standard deviation confidence level. See technical annex for details. ² Responses 12 months after the initial shock. ³ Responses of GDP to a shock that raises commodity prices by 10%, eight quarters after the initial shock. ⁴ Responses to an oil price shock that raises oil prices by 10%, eight quarters after the initial shock.

Sources: Igan et al (2022); OECD; Datastream; national data; BIS.

Commodity market disruptions will also weigh on growth (Graph 14.B). By raising firms’ production costs, higher commodity prices effectively lower global aggregate supply. Although commodity exporters will benefit from higher export revenues, largely in the form of higher corporate profits, the growth boost could be smaller than usual if tighter financial conditions and expectations that the rise in commodity prices will be temporary deter firms from investing to boost capacity (Graph 14.C).^{11, 12} Meanwhile, for commodity importers, the terms-of-trade loss will further compress domestic incomes and aggregate demand. The hit to growth could be even larger if higher commodity prices are accompanied by a cut to global commodity output and rationing, as occurred in the 1970s.

This speaks to possible broader consequences of the war, beyond its effect on commodity markets. Admittedly, the hit to trade flows is relatively small on a global scale. But the conflict has created an environment of higher uncertainty and political risk, which is historically associated with lower business investment.¹³ And over the longer term, the new geopolitical landscape could see real and financial fragmentation, including through a reorganisation of global supply chains.

Slower growth in China

Developments in China could be a further source of global stagflationary pressure. On the one hand, the country has accounted for a sizeable share of global growth – around one quarter – over the past two decades. In addition, it has been a major source of external demand for the rest of the world, notably for raw materials. On the other hand, China’s entry into the global trading system exerted persistent disinflationary pressures, particularly in AEs, even as its domestic demand pushed up commodity prices.¹⁴ There are signs, however, that some of these influences could now be waning.

Some of the factors contributing to China's growth slowdown are structural, and hence likely to be long-lasting. China's working age population, which peaked in the early 2010s, will decline further in the coming years. Meanwhile, the potential for further productivity gains from incorporating pre-existing technology and reallocating labour to higher-productivity activities has diminished. The slowdown in labour productivity growth as China has approached the technology frontier is broadly comparable with those of Japan and Korea in previous decades (Graph 15.A). This suggests that a return to very high productivity growth rates is unlikely.

A prolonged downturn in the financial cycle would exert a further drag on growth. Against a backdrop of high debt levels, the influence of financial factors was already evident in the year under review. In response to the further build-up of corporate debt during the pandemic, and the continued high leverage of property developers, Chinese authorities introduced several measures to reduce real estate vulnerabilities in the second half of 2021 (Graphs 15.B and 15.C). These cut developers' ability to borrow, leading some to delay debt payments and shed assets, and curtailed mortgage lending to households. Such measures enhance the sustainability of growth over the longer run but dampen growth in the near term (Box B). Indeed, the relaxation of some measures in early 2022 highlights the authorities' difficult balancing act.

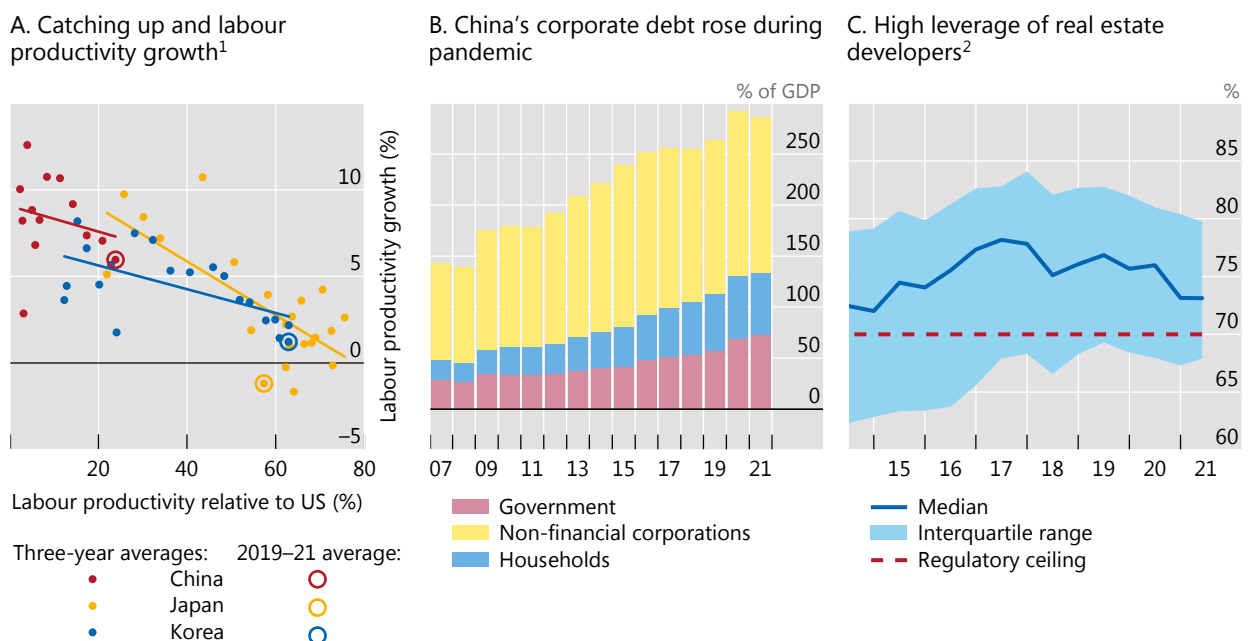
Pandemic-related developments exacerbate near-term headwinds. Local lockdowns and other measures to enforce the authorities' strict Covid policy could further disrupt production networks, both within China and with trading partners.¹⁵ The fight against the virus is far from over.

Macro-financial vulnerabilities

China is far from the only country with significant macro-financial vulnerabilities. More than a decade of exceptionally accommodative financial conditions, reinforced

China: structural slowdown and strains from the real estate sector

Graph 15



¹ For JP, data start in 1956; for KR, 1962; for CN, 1983. ² Liability-to-asset ratio (excluding advance receipts); top 50 listed developers by total assets.

Sources: The Conference Board Total Economy Database™, April 2022; Wind; national data; BIS.

by the policy response to the pandemic, has left firms and households in many countries highly indebted and has contributed to elevated asset prices, especially for property. Unusually, these vulnerabilities did not decline materially during the Covid recession. Indeed, in most countries private debt levels, particularly for the non-financial corporate sector, rose substantially (Graph 16.A).

The coexistence of elevated financial vulnerabilities and high inflation globally makes the current conjuncture unique for the post-World War II era. The tighter monetary conditions needed to bring down inflation could cast doubt on assets – including housing – priced for perfection on the assumption of persistently low real interest rates and ample central bank liquidity. Even traditionally more secure assets could be exposed. Bonds, for example, have provided a safe haven for investors in the low-inflation environment of recent decades. During this phase, bad economic times, when the prices of riskier assets like equities typically fall, were generally met with monetary easing, which boosted bond prices (Graph 16.B). But when inflation is high, economic downturns are more likely to be triggered by tighter monetary conditions, causing both bond and stock prices to fall.

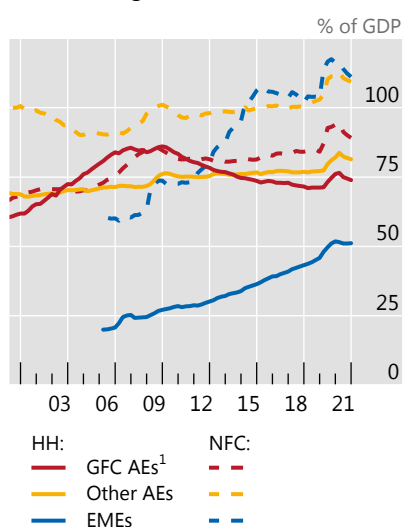
The effects of tighter monetary conditions would also be felt through higher debt repayments. The largest strains are likely in countries where floating rate loans – sensitive to higher policy rates – are more common (Graph 16.C). In this regard, several small open economies look particularly exposed, at least in their household sectors. For firms, floating rate loans are more common among riskier segments. In principle, the aggregate savings built up early in the pandemic could provide buffers for households and firms to cope with higher rates, at least initially. However, the incidence of higher savings may not match that of debt burdens.

The consequences of these vulnerabilities for economic activity will depend on how high interest rates rise and how asset prices and debt servicing burdens respond. Illustrative simulations based on historical relationships between financial and economic variables can shed light on the key risks. Particularly in countries

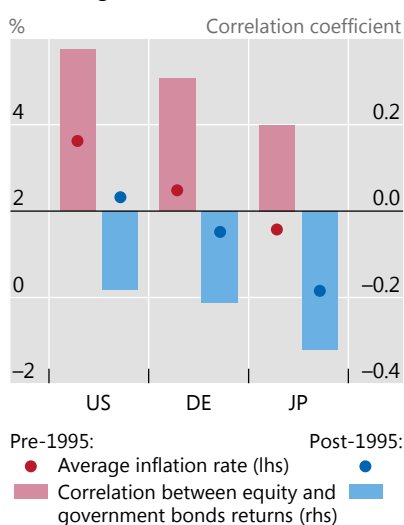
Financial vulnerabilities and high inflation: where are the risks?

Graph 16

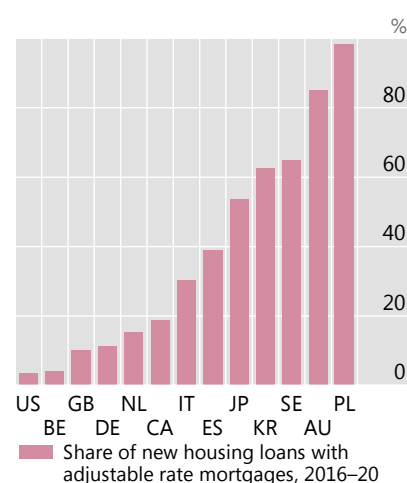
A. Private sector debt-to-GDP near historical highs in most countries



B. Asset return patterns change under high inflation²



C. Floating rate housing loans pose a risk when rates rise



HH = households; NFC = non-financial corporations.

¹ ES, FR, GB, GR, IE, IT, PT and US. ² Data starting in 1985.

Sources: IMF; Bloomberg; Datastream; European Mortgage Federation; ICE BofAML; national data; BIS.

The real estate sector's evolving contribution to China's growth

The real estate sector plays a major role in China's economy. Residential investment increased steadily in the first decade of the 2000s, and has remained elevated since, accounting for a much larger share of GDP than in other major economies (Graph B1.A).¹ The real estate sector has also contributed to China's credit expansion, leading the authorities to take actions to reduce leverage. Given the prominent role of housing credit booms and busts in past financial crises and recessions globally, and the strong correlation between housing sector downturns and recessions, understanding the contribution of real estate to Chinese growth, and its implications for the outlook, is of first-order importance.² This box highlights the sizeable contribution of the housing sector to China's slowdown over the past year.

The analysis uses province-level housing market data and relates these to country-level GDP.³ Since local economic conditions exert a large influence on housing sector activity, province-level indicators can help identify developments that national-level data obscure. Moreover, from a methodological perspective, province-level data provide more variation in the variables that are being analysed, which helps to pin down economic relationships.⁴

The relationship between the real estate sector and China's GDP growth strengthened in the 2010s. While province-level measures of housing activity, such as floor space starts, show no significant link with subsequent GDP growth pre-2010, a significant link emerges after 2010 (Graph B1.B). This is consistent with the increasing share of residential investment in China's output.

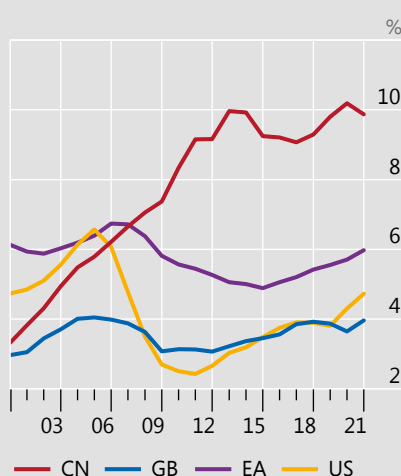
Housing sector indicators can also help forecast GDP. In particular, a measure of oversupply of housing at the provincial level – computed as floor space starts less floor space sold – signals lower GDP growth over a two-year horizon (Graph B1.C). A similar relationship, albeit with the opposite sign, holds for floor space starts and residential investment activity at a one-year horizon. These relationships capture the direct and indirect effects of residential investment on GDP, eg from spillovers to other sectors, such as real estate services, production of construction materials and home improvement-related retail sales.⁵

These results confirm that the slowdown in the housing sector is likely to have had a material effect on China's growth over the past year. To give a sense of the magnitudes, the estimates suggest that, if growth in floor space starts and residential investment had stayed at their average levels in 2018–19, and growth in housing oversupply at its 2018 level, real GDP growth (year-on-year) would have been some 1–1.5 percentage points higher in 2021. That said, such estimates are by their nature uncertain, in part because they assume that the relationships between the variables remain stable and that the causation runs exclusively from the

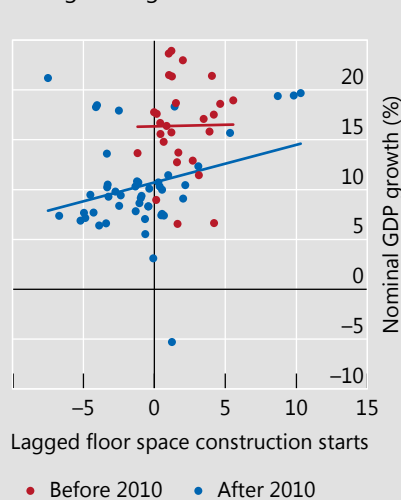
Real estate sector and economic activity in China¹

Graph B1

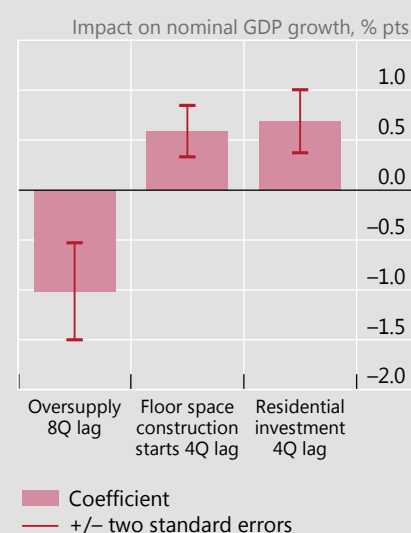
A. Residential investment to GDP



B. Real estate and GDP: a strengthening link



C. Forecasting GDP with real estate sector variables



¹ See technical annex for details.

Sources: IMF; Bloomberg; CEIC; national data; BIS.

real estate indicators to GDP. Moreover, the model does not explicitly control for financial factors or changes in housing market policies, including macroprudential measures, which are also likely to have contributed to China's housing market dynamics.⁶

¹ For analysis on China's housing boom, see Fang et al (2015) and Glaeser et al (2017). ² See Jordà et al (2016), Leamer (2015) and Kohlscheen et al (2020). ³ For detailed analysis, see Kerola and Mojon (2022). ⁴ Indeed, aggregated province-level housing market indicators explain a larger share of the variation in China's GDP growth than aggregate country-level housing data; the opposite is true for exports and imports, where country-wide measures prove more informative. This result is obtained by aggregating information from province-level data by principal component analysis and then comparing with nation-wide indicators. ⁵ Accounting for sectoral linkages and spillovers by means of input-output tables, Rogoff and Yang (2021) argue that the impact of the real estate sector on China's GDP is close to 30%. In this comparison as well, China's real estate sector appears larger than those in other major economies. ⁶ See Kuttner and Shim (2016).

where a large portion of debt is at fixed rates, it will take some time for the interest rates faced by households and firms to reflect higher policy rates (Graph 17.A and 17.B). Despite these lags, average AE private sector debt service ratios (DSRs) could rise by more than 1 percentage point by 2025, to their highest level in over a decade, if central bank policy rates evolve as financial markets currently expect (Graph 17.C). If rates were to mirror the larger 425 basis point increase in the federal funds rate in the 2004–06 period, average DSRs could increase by more than 2 percentage points, reaching their pre-GFC peak.

In this environment, asset prices could come under pressure. According to the simulations, the path of real house prices would resemble that around the GFC, while the long post-GFC run-up in equity prices would start to retreat (Graphs 17.D and 17.E). In contrast, if policy rates were to remain at their current levels, asset prices and debt levels would continue to rise, implying a further build-up in vulnerabilities.

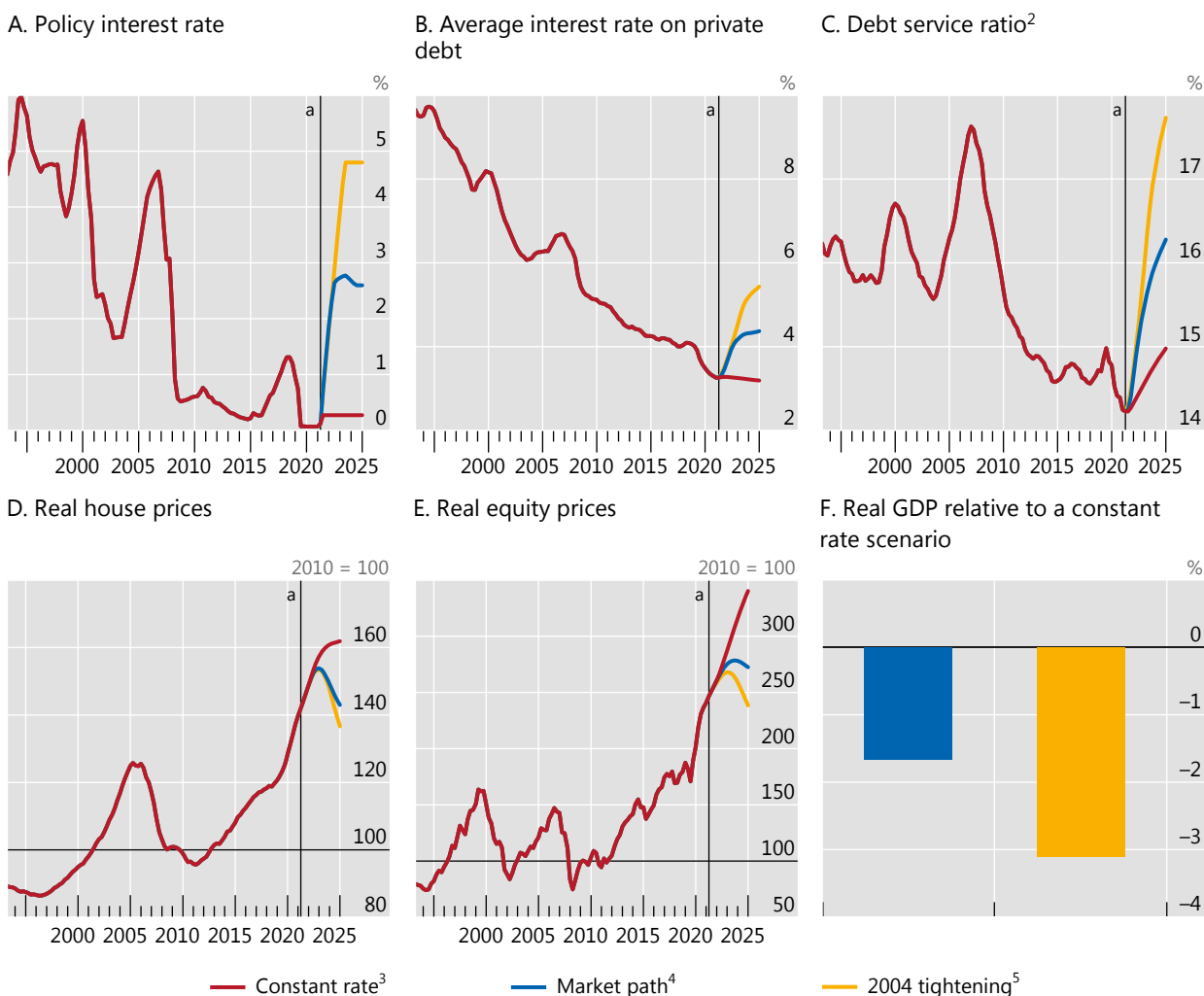
Such shifts in DSRs and asset prices could have a material effect on economic activity. The simulations suggest that the level of GDP in the average AE would be about 1.5% lower under the market interest rate path than it would be if policy rates were held constant (Graph 17.F). In the steeper “2004 tightening” scenario, the level of GDP would be around 3% lower. Even these results may understate the GDP response to tighter monetary conditions, which would occur against a backdrop of historically high debt levels, whose effects on growth may be felt more keenly when asset prices are falling, and the growth headwinds of the higher commodity prices and enhanced geopolitical uncertainty described above.¹⁶

Naturally, the results of this simulation exercise are purely illustrative. In particular, they are based on average historical relationships since the mid-1980s, which may have evolved over the past four decades. The use of cross-country averages also masks considerable variation in exposure to higher policy rates across jurisdictions. And, even for individual countries, the simulations are subject to considerable uncertainty. Nonetheless, they help to highlight key vulnerabilities and give a sense of the orders of magnitude involved.

Financial system stress

Financial system disruptions could reinforce any slowdown in household and corporate spending. Such disruptions could come from stresses in banks or non-bank financial intermediaries (NBFIs). Consider the two sectors in turn.

An economic downturn against the backdrop of high debt levels would test banks' resilience. Credit losses are most likely to accrue in the medium term, after rising policy rates have passed through into market rates and households and firms have exhausted accumulated buffers.



^a Simulations begin.

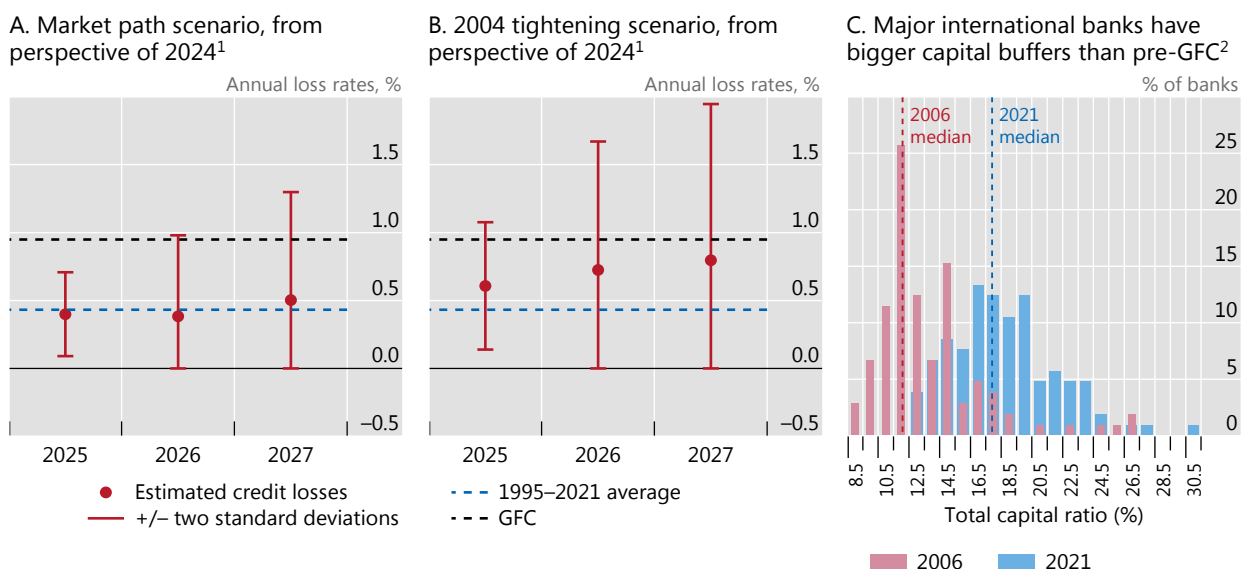
¹ Weighted average of projected outcomes in a sample of 12 AEs, based on GDP at PPP exchange rates. See technical annex for details. ² Ratio of interest payments on private sector debt to private sector income. ³ Policy rates remain at their May 2022 levels throughout the projection period. ⁴ Policy rates evolve according to financial market expectations as of May 2022. ⁵ Policy rate increases from Q2 2022 at the same rate as in the United States between 2004 and 2006.

Sources: Bloomberg; national data; BIS.

The size of credit losses will depend on the degree of required policy tightening. If macro-financial conditions follow the “market path” scenario shown in Graph 17 until the end of 2024, past relationships suggest that expected bank credit losses over 2025–27 would be close to historical norms across AEs, albeit with considerable uncertainty (Graph 18.A). They would be larger in the scenario where rates follow the “2004 tightening” scenario shown in Graph 17, somewhat closer to those experienced in the GFC (Graph 18.B). That said, stronger capital cushions mean that banks are in a much better position to take the hit than they were then (Graph 18.C).

Developments in NBFIs could pose greater challenges.

Financialised commodity markets are a key pressure point. These markets came under strain when the war in Ukraine broke out, as sharp rises in commodity price volatility triggered large margin calls in derivatives markets. The frantic search for



¹ Medians across a panel of 12 AEs. See technical annex for details. ² Based on 105 banks that reported their total capital ratio in both 2006 and 2021 (common sample). See technical annex for details.

Sources: Juselius and Tarashev (2022); Fitch Solutions; S&P Capital IQ Pro; national data; BIS.

cash to meet those calls briefly led to stress in dollar funding markets, as reflected in the spreads to OIS of forward rate agreement rates (Graph 19.A). At the same time, some futures markets saw substantial increases in initial margin requirements, leading some commodity traders to stop hedging their exposures in those markets and absorb price risk themselves (Graph 19.B). This, in turn, saw commodity end users, such as airlines, face difficulties hedging their own exposures. While the tensions ultimately eased, the underlying vulnerabilities could resurface if price volatility spikes again.

Some sovereign bond markets could also face strains as monetary conditions tighten. The unwinding of large central bank bond purchases will remove reserves from the banking system and could prove disorderly, as the ructions in US repo markets in September 2019 showed. Already, liquidity in US Treasury markets diminished in late 2021 as broadening inflationary pressures led investors to anticipate an imminent policy shift. Market conditions worsened further as the review period progressed, with implied volatilities in fixed income markets near historical peaks, particularly for short-term rates (Graph 19.C).

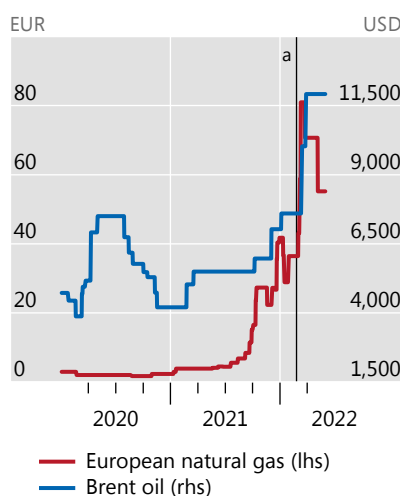
As well as market functioning, sovereign credit spreads could emerge as a concern as central banks wind down asset purchases. Some European government bond markets are a case in point, given very high debt levels and past experiences. As credit risk is repriced, these worries could also have a significant impact on financial institutions' balance sheets, probably affecting both securities dealers – key participants of the NBFIs ecosystem – and banks, which hold substantial amounts of government bonds in their portfolios.

A broader concern is that the extent of exposures among NBFIs, which could transform stresses at individual institutions into more systemic disturbances, are not well known. The collapse of Archegos Capital Management in April 2021, and the attendant stock market disruptions, is a leading example. In that instance, not only was the capital of Archegos largely wiped out, but several banks that provided it with prime brokerage services also took significant hits to their own capital buffers.

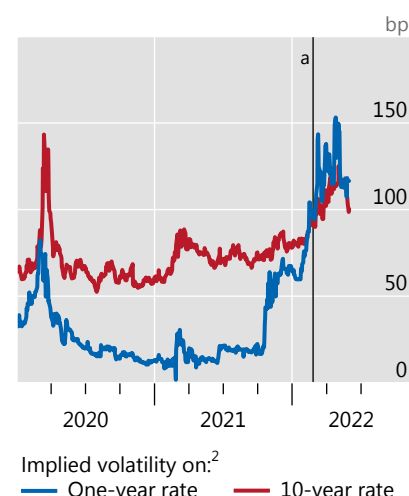
A. Dollar funding cost increased sharply with commodity stress...¹



B. ...and so did initial margins in futures markets



C. Forward-looking gauges of fixed income volatility remained high



^a Start of war in Ukraine.

ESTR = euro short-term rate; FRA = forward rate agreement; OIS = overnight indexed swap.

¹ FRA-OIS and FRA-ESTR spreads are key bank funding stress indicators. See technical annex for details. ² Based on USD swaptions with three-month maturity that give the right to enter a one-year or 10-year OIS.

Sources: Bloomberg; ICE (the data have been made available in accordance with the terms of use); BIS.

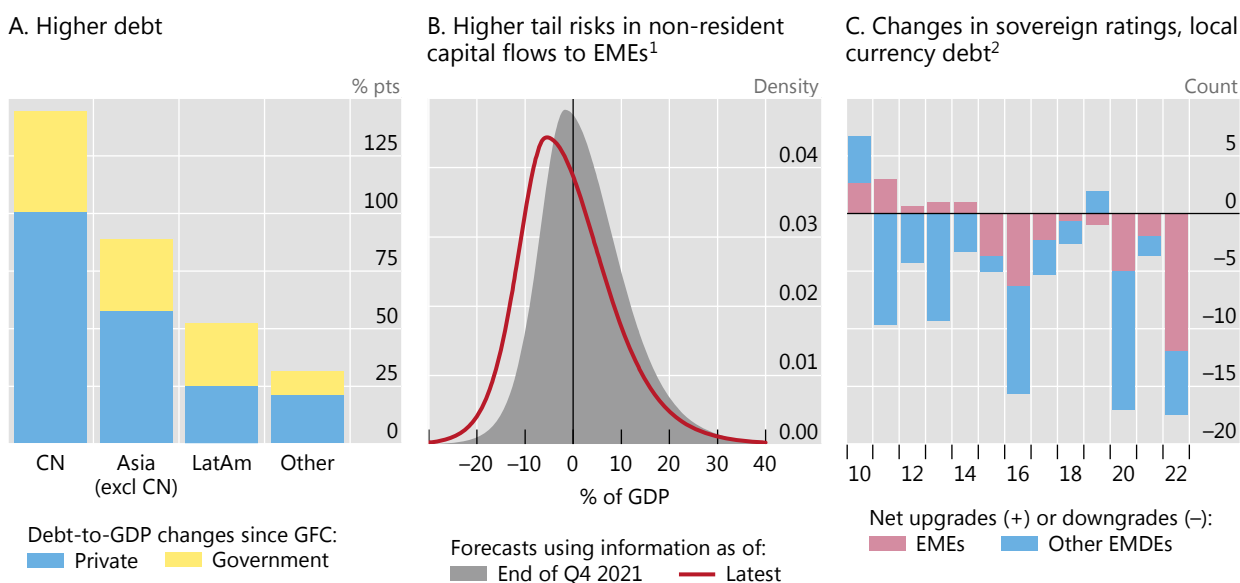
While the fallout was ultimately contained, it nonetheless highlights the risks posed by hidden leverage in loosely regulated corners of the financial system.

Emerging market economies

The risks discussed above pose tough tests for EMEs. This is despite improvements in fiscal and monetary policy frameworks that, together with greater use of prudential buffers and macroprudential tools, have made EMEs generally more resilient.

Challenges arise because, in some other respects, the starting point for EMEs is worse than in the past. Many are facing tighter financial conditions against a backdrop of high debt, which rose further during the pandemic (Graph 20.A). This raises the prospect of increased capital outflows, which have historically accompanied times of rising global interest rates.¹⁷ The rise in geopolitical tensions at the current juncture amplifies such risks (Graph 20.B). For commodity exporters, the rise in commodity prices counteracts outflow pressures. Nonetheless, a number of sovereigns have recently seen rating downgrades (Graph 20.C).

Many EMEs are highly exposed to stagflationary risks. Growth prospects had already deteriorated pre-pandemic, with potential growth rates on average 2 percentage points lower than before the GFC.¹⁸ In addition, in many EMEs pandemic scarring is more evident than in AEs. By the first quarter of 2022, the median length of full school closures due to Covid-19 had amounted to 29 weeks in Latin America and 16 weeks in emerging Asia, compared with six weeks in AEs.¹⁹ Labour force participation is also recovering more slowly. In Latin America, in particular, participation rates in 2021 were some 2 percentage points below pre-pandemic levels.²⁰ Many EMEs are highly exposed to slower Chinese growth, especially countries in emerging Asia and some commodity exporters (Graph 21.A). And, in



¹ Conditional distributions of cumulative flows over the next four quarters. See technical annex for details. ² Average number of yearly up-/downgrades across three major credit ratings agencies. Multi-notch up-/downgrades counted as separate changes.

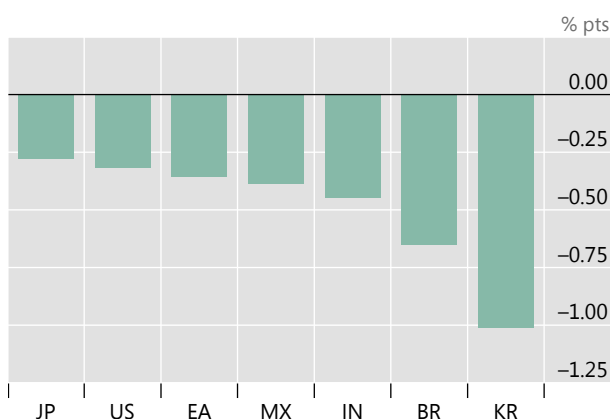
Sources: Aguilar et al (2022); IMF; Bloomberg; national data; BIS.

countries where vaccination rates lag, health and economic activity could be more vulnerable to further pandemic waves.

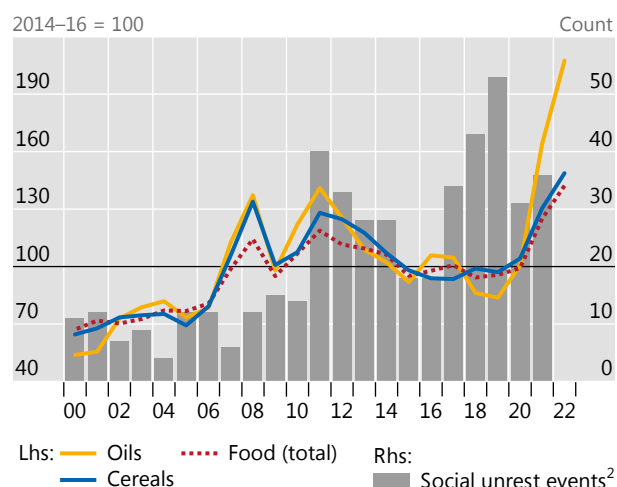
Even if growth does not decline, higher inflation tends to be more disruptive in EMEs. Since inflation expectations are less well anchored in some of these countries, not least in Latin America, larger nominal policy rate increases are required to control inflation. Surging food prices are also more disruptive. Sharp rises in food prices have been associated with social instability and the imposition of export controls in the past, with recent price levels surpassing those seen during the food price spike of 2011 (Graph 21.B).²¹ And while regulated food and energy prices, and the associated subsidies, will lower the immediate pass-through to headline inflation in some EMEs, they come with a fiscal cost and can create economic distortions.²² Combined with growing demands for social spending in the pandemic’s aftermath, larger fiscal deficits could eventually feed through into exchange rate depreciations and inflation (Chapter II).

Macroeconomic policy challenges

Recent developments raise a number of macroeconomic policy challenges. High inflation is clearly a major one, further complicated by the fragile growth outlook and financial vulnerabilities. In such an environment, it could be difficult to achieve a soft landing, ie bringing inflation sustainably back to target without sharply restraining the expansion. At the same time, the need to rebuild both monetary and fiscal buffers over the medium term, which has been clear for a long time, remains pressing. The current environment creates an opportunity for sustained monetary policy normalisation, but complicates the task for fiscal policy. Indeed, achieving policy normalisation over the medium term and improving macroeconomic performance more generally will require less reliance on macroeconomic stabilisation

A. Spillovers from lower growth in China¹

B. Real food price indices and social unrest events



¹ Real GDP growth response to a 1 percentage point decline in China's growth, after one year. Based on global VAR estimates over 1996–2019. ² In 130 countries.

Sources: Barrett (2022); Barrett et al (2020); IMF; UN Food and Agriculture Organization; BIS.

policy to sustain growth and a renewed drive to strengthen the productive capacity of the economy.

Controlling inflation

The most pressing challenge for central banks is to restore low and stable inflation without, if possible, inflicting serious damage to the economy. At least in AEs, central banks have not faced this challenge for decades. Historically, achieving such a “soft landing” has proved difficult, and the starting conditions are in many respects unfavourable (Box C). In most countries, inflation rates are much higher than usual at the start of a tightening cycle, and real and nominal policy rates much lower, which suggests that a stronger tightening may be required to bring inflation under control (Graph 22.A). At the same time, elevated asset prices and high debt levels mean that the output costs of tighter financial conditions could be larger than in the past.

The prominent role of relative price changes in driving inflation complicates the policy response. The standard textbook prescription is to “look through” this type of inflation because the tightening required to prevent it would be costly.²³ But that prescription assumes that the resulting inflation overshoot is temporary and not too large. In the light of recent experience, it is harder to argue for such a clear-cut distinction. If relative price adjustments are persistent and higher inflation triggers second-round effects, central banks have no choice but to respond.

Calibrating the response naturally involves a trade-off. Tightening too much and too quickly could inflict unnecessary damage. But doing too little would raise the prospect of a larger and more costly tightening down the road.

For much of the past two decades, central banks had exceptionally ample leeway to lean towards a more accommodative approach. In particular, inflation was generally at or below central bank targets, even where unemployment rates reached multi-decade lows. Of course, trade-offs did not disappear. A decade or more of historically low interest rates contributed to a build-up of financial vulnerabilities and meant that central banks did not rebuild monetary buffers.

How likely is a soft landing?

Most central banks are now starting to tighten policy, often in the face of high inflation. A key question is whether they will be able to engineer a “soft landing” – ie a tightening cycle that ends without a recession. This box examines what historical monetary policy tightening cycles can teach us about the likelihood of a soft landing and what factors are associated with it.

The first step is to identify policy tightening cycles and soft landings. The analysis is based on tightening cycles in a panel of 35 countries over the period 1985–2018. A tightening episode is defined as one in which the nominal monetary policy rate increases in at least three consecutive quarters.¹ The tightening cycle ends when the policy rate peaks before a subsequent decline. If an economy enters a recession, defined as two consecutive quarters of negative GDP growth, in the three years after the peak of the policy cycle, the landing is defined as a hard one. If the economy avoids a recession, the landing was soft.² Historically, about half of all monetary policy tightening cycles have ended in a soft landing, as defined above.

Tightening cycles that end in hard landings differ from those that end in soft landings in several respects. A key one is that hard landings are more likely when monetary tightening is preceded by a build-up of financial vulnerabilities. In particular, faster growth in credit relative to GDP prior to a tightening episode is associated with hard landings (Table C1, top panel). Intuitively, financial vulnerabilities are likely to reinforce the contractionary effects of tighter monetary policy on GDP growth. Moreover, heightened vulnerabilities mean that a growth slowdown is more likely to trigger a recession. The influence of credit growth on the probability of a hard landing is also consistent with the observation that financial cycle peaks have tended to coincide with recessions since the early 1980s, lining up with the sample in this exercise.³

Financial vulnerabilities are more likely to emerge when interest rates are low. Reflecting this, hard landings are also commonly associated with low real interest rates prior to the start of the tightening episode. For example, the average real policy rate at the start of tightening cycles that end in hard landings is 0.4%, compared with 1.4% at the start of those that end in soft landings. Inflation is also on average higher before hard landings than it is before soft ones, although the difference between the two is not statistically significant.⁴

The policy rate trajectory during a tightening episode can also influence the likelihood of a soft landing. In particular, hard landing episodes tend to involve increases in policy rates that play out over a longer time (middle panel of Table C1). However, neither the average speed of a policy tightening, nor the size of overall

	Variable	Soft landings	Hard landings
Conditions at the start of the tightening cycle	Inflation (%)	2.6	4.1
	GDP growth (%)	2.6	2.7
	Real policy rate (%)	1.4*	0.4*
	Change in household credit-to-GDP (% pts) ²	2.8*	6.4*
Conditions during tightening	Real policy rate increase (% pts)	0.8	1.3
	Average quarterly real rate increase (% pts)	0.2	0.2
	Tightening duration (quarters)	4.9*	5.9*
Conditions after tightening ³	Change in inflation (% pts)	-1.1	-0.2
	Change in GDP growth (% pts)	-0.7*	-3.8*
	Real policy rate (%) ⁴	1.6	-0.4
	Stock price growth (%)	3.1*	-7.7*

¹ Averages for a panel of 35 economies and 129 policy tightening cycles. Growth rates are in per cent and changes in percentage points. The asterisks indicate the statistical significance of the difference between soft and hard landing episodes at the 5% level. The number of observations for the different rows varies between 46 and 64 for soft landings, and between 50 and 65 for hard landings. ² Over the two years before the start of the tightening cycle. ³ Over the three years after the end of the tightening cycle. ⁴ Three years after the end of the tightening cycle.

Sources: Datastream; national data; BIS.

tightening, seems to be associated with differences in the likelihood of hard or soft landings. This suggests that there is little to be gained in terms of output from a shallower and more drawn-out tightening path.

What are the consequences of a hard landing, beyond lower GDP growth? Hard landings are more likely to be associated with abrupt stock price falls (bottom panel of Table C1). At the same time, they are more likely to be followed by lower real interest rates, which often become negative. These findings suggest that achieving a soft landing could be key to ensuring a sustainable normalisation of monetary policy settings to allow buffers to be rebuilt over the medium term.

While the analysis above is silent about the underlying policy frameworks, there are a number of ways in which they could increase the likelihood of a soft landing. Some relevant dimensions have seen notable improvements in recent decades. For example, the greater use of macroprudential tools and larger financial system buffers could weaken the relationship between credit growth and hard landings, by increasing the resilience of the economy against shocks. Better anchoring of inflation expectations may reduce the required policy tightening in response to inflationary pressures, through its stabilising impact on wage and price-setting (Chapter II).

¹ We do not consider the role of balance sheet, exchange rate or credit policies in policy tightening. ² There is no standard definition of a hard landing. The results are unchanged when one defines a hard landing based on the peak-to-trough GDP growth following the end of the tightening cycle. The results are also similar when a horizon of two rather than three years is considered after the end of the tightening cycle. ³ See Borio et al (2018). ⁴ Because most of the tightening cycles in the sample occurred after central banks had adopted inflation targeting, or similarly credible policy regimes, the results may understate the adverse effects of high inflation and de-anchored inflation expectations on the likelihood of experiencing a hard landing.

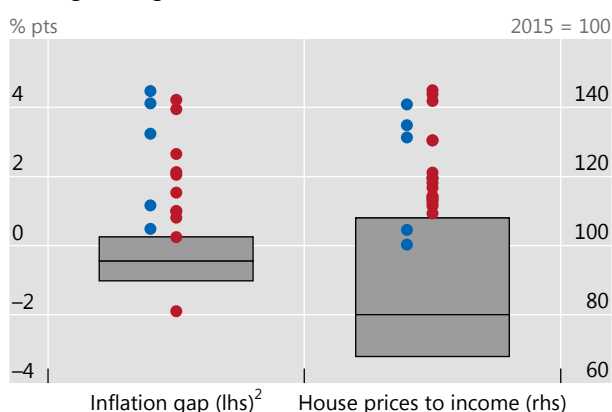
The new inflationary environment has changed the balance of risks. Gradually raising policy rates at a pace that falls short of inflation increases means falling real interest rates. This is hard to reconcile with the need to keep inflation risks in check. Given the extent of the inflationary pressure unleashed over the past year, real policy rates will need to increase significantly in order to moderate demand. Delaying the necessary adjustment heightens the likelihood that even larger and more costly future policy rate increases will be required, particularly if inflation becomes entrenched in household and firm behaviour and inflation expectations (Graph 22.B).

Policy normalisation

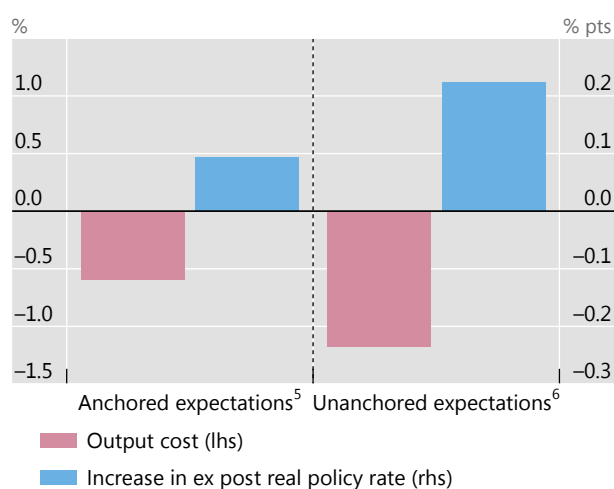
A second macroeconomic policy challenge is to deliver a durable policy normalisation. As discussed in last year's Annual Economic Report, this requires achieving macroeconomic objectives consistent with central bank mandates *and* room for policy manoeuvre. The pandemic and the war in Ukraine have highlighted the imperative to hold buffers so that macroeconomic policy can deal not only with inevitable, cyclical recessions, but also truly unanticipated events.

Such an outcome is by no means guaranteed. Even in countries where financial markets anticipate rapid monetary tightening, long-term bond yields still point to very low policy rates at the peak of the adjustment, often negative in real terms (Graph 23.A). Few fiscal authorities project a material decline in public debt in the years ahead, even though the constellation of real interest rates is substantially below real GDP growth rates, thereby greatly favouring a debt drawdown.²⁴ Indeed, higher energy and food prices have been creating substantial pressure for more government spending to ease cost of living pressures.

Some governments have already stepped up spending, and further expenditures, often untargeted, loom on the horizon. Germany, the Philippines, Sweden and the United Kingdom, for example, have announced cash transfers to vulnerable households to alleviate cost of living increases, while France and Korea have temporarily lowered sales taxes on energy products.²⁵ Brazil and Turkey have cut import tariffs on food. In Europe, proposed increases in defence expenditure could

A. Unusually high inflation and asset prices for the start of a tightening¹

Latest: ● AEs ● EMEs³

B. Disinflation will be more costly if expectations de-anchor⁴

¹ Box plots indicate median and interquartile ranges of each variable at the starting time of tightening cycles from 1985 to 2021 for AU, CA, CH, DK, EA (from 1999), GB, JP, NO, NZ, SE and US. ² Deviation from the target inflation rate. ³ KR, MX, PL, RU and ZA. ⁴ See technical annex for details. ⁵ Model simulation where all agents have model-consistent expectations. ⁶ Model simulation where agents' inflation expectations are an equally weighted average of model-consistent and adaptive expectations.

Sources: OECD; Bloomberg; national data; BIS.

also have a material impact on public finances. Commitments to address climate change add further pressure on fiscal positions globally. And less visible fiscal commitments linked to ageing populations loom large.

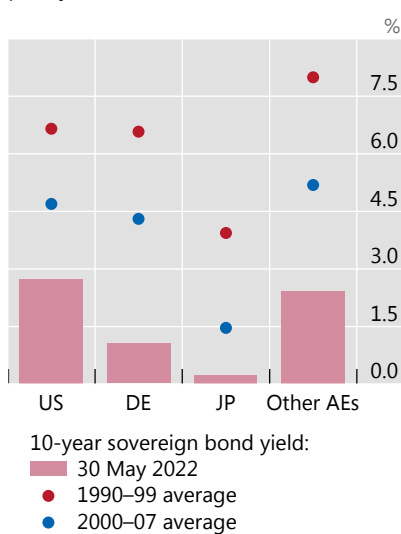
A major difference from previous years is higher inflation. In the near term, this provides a pressing reason to normalise monetary policy. Moreover, the unexpected inflation burst will erode to some extent the value of long-term fixed income debt. Because it rose much faster than interest rates in 2021, higher inflation helped limit the rise in debt-to-GDP ratios (Graph 23.B). However, surprise inflation is not a mechanism that fiscal or monetary authorities can or should rely on to control public debt over the medium term. If it occurred repeatedly, unexpected inflation could make investors demand a sizeable risk premium. And higher interest rates will make fiscal policy normalisation harder.

The large stocks of government debt held by central banks complicate matters. As explained in last year's Annual Economic Report, they increase the sensitivity of overall fiscal positions to higher rates. In effect, they transform long-term fixed income debt into debt indexed at the overnight rate (the interest rate on bank reserves). The effect can be quite large. Where central banks have used such purchases more extensively, some 30–50% of public debt in the large AE jurisdictions is in effect overnight.²⁶

The general picture brings into sharp focus the tensions between fiscal and monetary policy along the normalisation path. These could heighten the pressure on central banks to keep their stance more accommodative than appropriate and delay the already lengthy return of central bank balance sheets to more normal levels (Graph 23.C). This puts a premium on institutional arrangements that safeguard central bank independence and a clear emphasis on the primacy of low and stable inflation as the core monetary policy objective.

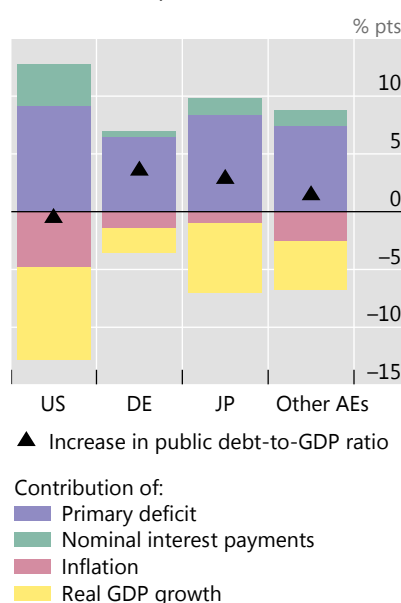
Central banks have some options to influence the likelihood of a successful policy normalisation. Choices about the pace and timing of policy tightening, as

A. Markets expect modest long-run policy rate normalisation

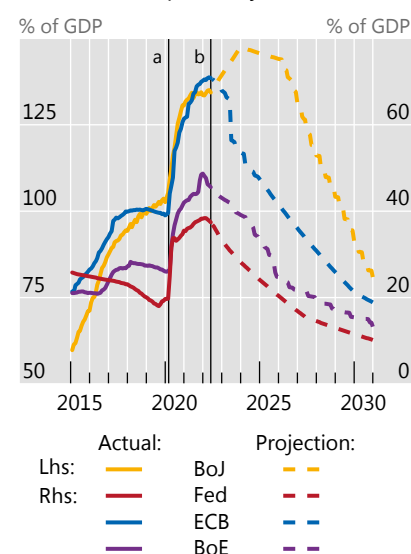


10-year sovereign bond yield:
 ■ 30 May 2022
 ● 1990-99 average
 ● 2000-07 average

B. Higher inflation and GDP growth limited rise in public debt in 2021



▲ Increase in public debt-to-GDP ratio
 Contribution of:
 ■ Primary deficit
 ■ Nominal interest payments
 ■ Inflation
 ■ Real GDP growth

C. Central bank balance sheet reduction will probably take time¹

Actual: Projection:
 Lhs: BoJ Rhs:
 Fed BoE

^a Covid-19 declared a pandemic. ^b Projections begin.

¹ See technical annex for details.

Sources: ECB; Bank of Japan; Bank of England; Federal Reserve Bank of St Louis, FRED; IMF; OECD; Bloomberg; national data; BIS.

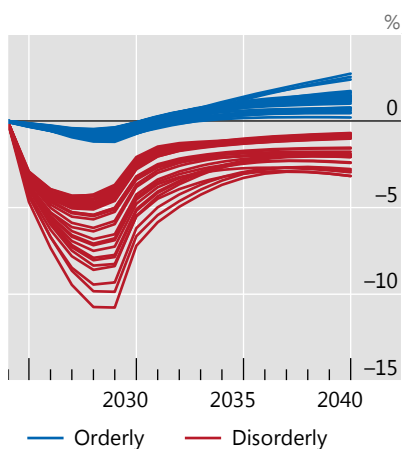
well as the sequencing of balance sheet adjustment and interest rate increases, could all influence the smoothness of the process. Effective communication is critical. Here, central banks face a trade-off between forward guidance and flexibility. Setting clear guidelines and benchmarks for policy normalisation could help steer financial markets and reduce disruptions as interest rates rise. But if forward guidance is interpreted as a degree of pre-commitment, it can curtail the central banks' flexibility to respond to evolving conditions. This flexibility is essential.

Rebooting the supply side

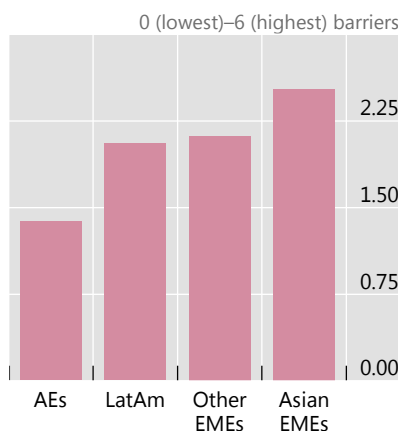
The experience of the past year, ranging from supply chain bottlenecks to conflict-induced stagflationary pressures, reinforces the importance of reigniting growth-friendly expenditure, in particular investment, and supply-side reforms. These could raise growth and make it more resilient, thus facilitating the normalisation of monetary and fiscal policies over time. To the extent that some of the measures will involve carefully targeted expenditure increases that provide benefits only further down the road, in an environment of limited fiscal space, there is also a premium on making the tax system more growth-friendly.

As one of the most urgent tasks, the green transition calls for targeted measures to put in place a more durable and sustainable energy mix. Simulations suggest that an orderly transition that features a timely increase in green energy investment could impose relatively small near-term costs and deliver persistent long-term gains, measured in terms of economic output (Graph 24.A). By contrast, a disorderly shift, where the adoption of clean energy technology lags but carbon-intensive energy sources are shut down rapidly, would involve significant costs in both the short and long run. The war in Ukraine has sharpened

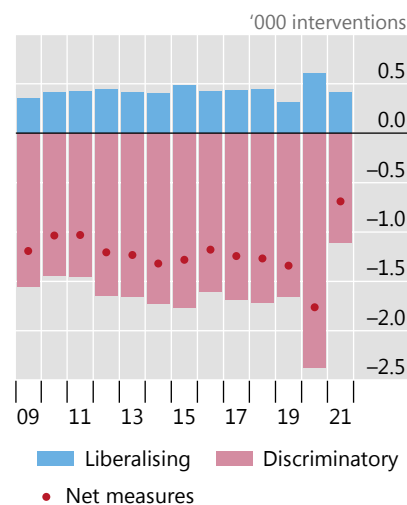
A. A disorderly green transition sees a persistent decline in GDP¹



B. Barriers to firm entry and competition²



C. Trade interventions³



¹ Projected GDP level paths for 33 countries under the two scenarios for green transition considered in Nodari et al (2022). ² AEs = CA, DE, FR, GB, IT, JP and US; Other EMEs = AE, PL, RU, SA, TR and ZA. ³ Discriminatory interventions are shown with a negative sign.

Sources: Nodari et al (2022); OECD; Global Trade Alert; BIS.

the focus on energy security, which, especially over the longer run, is consistent with the push to “green” the economy. That said, in the near term, energy security considerations are likely to delay the green transition in some countries by increasing the demand for coal and shale gas, for example. Moreover, the near-term transition costs could be higher than conventionally assumed and may create additional fiscal burdens.

To raise sustainable growth, and where fiscal space allows, many countries could benefit from increased spending on human and physical capital. Increased and better targeted education spending would help compensate for losses in schooling and skills during the pandemic, especially in countries with lower income levels. Pre-pandemic, the average length of schooling was around five years shorter in emerging Asia (eight years) than in AEs (13 years); in Latin America, the difference from AEs was around four years.²⁷ As to physical capital, investment to improve the state of public infrastructure, if carefully chosen and effectively implemented, could make economies better prepared to deal with any future shocks, be they health or natural disasters, and support the smooth functioning of global trade.²⁸

Another priority is to maintain competitive and open markets and avoid real and financial fragmentation, especially in the face of geopolitical tensions and surging food prices. Lowering barriers to firm entry and competition would help accommodate pandemic-induced shifts in consumer preferences and lift businesses closer to the productivity frontier (Graph 24.B). Recent years have seen an increase in restrictive trade measures, and high food prices raise the risk of further export restrictions (Graph 24.C). In the aftermath of the pandemic and in response to rising geopolitical risk, supply chains are likely to see some adjustments, including reshoring, aimed in part at increasing their resilience. While some of these adjustments are necessary and desirable, it will be important to fend off growing impulses in favour of nationalism and fragmentation, given the importance of trade for global growth and productivity.

More generally, the need for structural reforms underscores that higher and durable growth cannot be achieved only through macroeconomic stabilisation policies. The repeated and systematic use of such policies over the past decade in the face of economic weakness, combined with difficulties in rebuilding buffers in good times, is one reason why the room for macroeconomic policy manoeuvre has declined so much over time. A change in direction is urgently needed.

Endnotes

- ¹ See also Chapter II.
- ² See Budianto et al (2021).
- ³ Because the increase in demand was particularly strong for internationally tradeable, durable goods, expansionary fiscal measures may also have had large international inflationary spillovers; see de Soyres et al (2022).
- ⁴ See Banerjee et al (2020) and Mojon et al (2021).
- ⁵ As shown in Graph 3, price growth in the services sector – which was more affected by pandemic-related restrictions – generally picked up in the year under review, albeit not to the same extent as goods prices.
- ⁶ See Santacreu and LaBelle (2022) and Shin (2021).
- ⁷ See Rees and Rungcharoenkitkul (2021).
- ⁸ See also Chapter III.
- ⁹ According to Hernández de Cos (2022), 30% of collective bargaining agreements in Spain in the first three months of 2022 linked final wage increases to inflation, up from 17% in 2021.
- ¹⁰ See Igan et al (2022) for estimates of the effects of commodity price movements on growth and inflation.
- ¹¹ Particularly in some oil exporters, much of the revenue boost will accrue to state-owned enterprises rather than the private sector.
- ¹² Rees (2013) and Kulish and Rees (2017) discuss the different investment implications of temporary and permanent commodity price shocks.
- ¹³ See Caldara and Iacoviello (2022).
- ¹⁴ For evidence on the contribution of imports from lower-wage countries to reduced price pressures in AEs, see Auer et al (2013).
- ¹⁵ For estimates regarding the costs of lockdowns in China that take account of trade linkages across cities, see Chen et al (2022).
- ¹⁶ Similarly, the research on “GDP at risk” documents that downside risks to growth increase when financial conditions are tighter; see Adrian et al (2019).
- ¹⁷ See Box I.F in BIS (2021).
- ¹⁸ Potential GDP growth is proxied by Consensus GDP growth forecasts for six to 10 years.
- ¹⁹ Based on UNESCO map on school closures (<https://en.unesco.org/covid19/educationresponse>) and UIS, March 2022 (<http://data.uis.unesco.org>).

- ²⁰ Based on data from ILO database.
- ²¹ Commodity price increases have also, on occasion, been a source of social tension in AEs, with the “gilets jaunes” protests in France in 2018–19 being a prominent recent example.
- ²² For weights of administered and regulated prices in various EME inflation measures, see eg Table 3.1 in Patel and Villar (2016).
- ²³ See Aoki (2001).
- ²⁴ On average, government debt in AEs is projected to decline by just 3 percentage points of GDP, from around 116% of GDP to 113% of GDP, between 2022 and 2027. In EMEs, it is projected to increase by almost 10 percentage points, from 67% of GDP to 77% of GDP. See IMF (2022) and BIS (2021).
- ²⁵ See IMF (2022).
- ²⁶ See Borio and Disyatat (2021).
- ²⁷ Based on data from the World Economic Forum Global Competitiveness Index.
- ²⁸ See OECD (2021).

Technical annex

Graph 1.A: Country groups calculated as weighted averages using GDP and PPP exchange rates. "Other AEs" is based on data for AU, CA, CH, GB and SE. "EMEs excl CN" is based on data for AR, BR, CL, CO, HU, ID, IL, IN, KR, MX, MY, PE, PH, RU, SA, SG, TH, TR and ZA.

Graph 2.B: December 2021 year-on-year inflation. Country groups calculated as weighted averages using GDP and PPP exchange rates. "Other AEs" is based on data for AU, CA, CH, GB and SE. "EMEs (excl CN)" is based on data for BR, CL, CO, HK, ID, IN, KR, MX, MY, PE, PL, RU, SA, SG, TH, TR and ZA.

Graph 3: "Other AEs" is an average of AU, CA, CH, DK, GB, NO, NZ and SE, weighted by GDP and PPP exchange rates. "Latin America" is a simple average of CL, CO and MX. "Food and energy" includes alcoholic beverages.

Graph 4.A: Based on data for AU, CA, EA, GB, JP, SE and US.

Graph 4.B: Based on data for AU, BE, CA, DE, ES, FR, GB, IT, NL, PL, SE and US.

Graph 5.A: "Other AEs" is an average of AU, CA, DK, GB, NO, NZ and SE, weighted by GDP and PPP exchange rates.

Graph 5.B: Suppliers' delivery times PMIs are displayed on an inverted scale. Shipping costs correspond to the Freightos Baltic daily containerised freight rate index.

Graph 6.C: Real oil price calculated as WTI crude oil price deflated by US CPI.

Graph 7.C: Based on one-month AUD, CAD, CHF, EUR, GBP, JPY, SEK and USD overnight index swap forward rates. "Other AEs" calculated as the simple average of AUD, CAD, CHF, GBP and SEK.

Graph 8.A: Ex post real policy rate defined as the difference between the policy rate and the year-on-year inflation rate. Country groups calculated as simple averages. "Other AEs" is based on data for AU, CA, CH, GB and SE. For CH, EA, KR, ID and TH, latest data refer to May 2022; for AU, to March 2022; for the remaining countries, to April 2022.

Graph 9.A: Goldman Sachs Financial Conditions index (FCI), which is a weighted average of country-specific riskless interest rates, exchange rate, equity valuations and credit spreads, with weights that correspond to the estimated impact of each variable on GDP.

Graph 9.C: Country groups calculated as simple averages.

Graph 10.A: Based on US dollar exchange rates for AUD, CAD, CHF, EUR, GBP, JPY, NOK, NZD and SEK.

Graph 10.B: Country group indices calculated as simple averages. "Latin America" is based on data for BR, CL, CO, MX and PE.

Graph 10.C: The risk-adjusted interest rate differential corresponds to the carry-to-risk ratio. This is calculated as the 12-month US dollar interest rate spread over corresponding country rates in their respective local currencies, as implied by forward and spot exchange rates, divided by the option-implied volatility of the exchange rate. "Other AEs" based on US dollar exchange rates for CHF, DKK, EUR, GBP, JPY, NOK and SEK.

Graph 11.A: Each rating bucket is constructed from GDP and PPP exchange rate-weighted averages of euro area and US ICE BofA ML corporate spread indices.

Graph 11.B: Country groups calculated as weighted averages using GDP and PPP exchange rates. "EMEs (excl CN)" is based on data for BR, CL, CO, CZ, HK, HU, ID, IN, KR, MX, MY, PE, PH, PL, RU, SG, TH, TR and ZA.

Graph 11.C: Cyclically adjusted price-to-earnings (CAPE) ratios are calculated by dividing a company's stock price by the average of 10 years of earnings, adjusted for inflation. Country groups calculated as weighted averages using GDP and PPP exchange rates. "Other AEs" is based on data for AU, CA, CH, EA, GB, JP and SE.

Graph 12.A: "AEs" is based on data for AT, AU, BE, CA, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, JP, NL, NO, NZ, PT, SE and US. "EMEs" is based on data for AR, BR, CN, CO, CZ, HU, ID, IN, MX, MY, PE, PH, PL, RO, SG, TH, TR, VN and ZA.

Graph 12.C: "Other AEs" calculated as the simple average of AU, CA, DK, GB, NZ and SE.

Graph 13.B: Country groups calculated as simple averages. "LatAm" is based on data for BR, CL, CO and MX.

Graph 13.C: Group exchange rate calculated as the GDP (PPP)-weighted average of country-specific US dollar exchange rates. An increase in the group exchange rate denotes an appreciation against the US dollar. Commodity prices correspond to the Bloomberg Commodity Index (BCOM).

Graph 14: Mean group estimates of the effect of a 10% rise in oil and agricultural commodity prices on: year-on-year headline and core inflation after 12 months (Graph 14.A), real GDP after two years (Graph 14.B), income and expenditure components of GDP after two years (Graph 14.C). Mean group estimates calculated based on country-specific estimates for AU, AT, BE, CA, CH, DE, DK, ES, FI, FR, GB, IT, JP, NL, NO, NZ, SE, US, ZA over the sample from 1972 to 2019. See Igan et al (2022) for technical details of the model and estimation.

Graph 15.A: Labour productivity defined as output per person employed in 2021 international dollars, converted using PPP exchange rates. Observations are three-year non-overlapping averages.

Graph 16.A: Country groups calculated as weighted averages using GDP and PPP exchange rates. "Other AEs" is based on data for AT, AU, BE, CA, CH, DE, DK, FI, JP, LU, NL, NO, NZ and SE. "EMEs" is based on data for AR, BR, CL, CN, CO, CZ, HK, HU, ID, IL, IN, KR, MY, MX, PL, RU, SA, SG, TH, TR and ZA.

Graph 17: Projections are based on country-specific macroeconomic models. The models consist of a VAR linking the behaviour of private sector debt-to-income ratios, real house prices, real equity prices, real income, effective private sector interest rates and real GDP. The coefficients in some VAR equations (eg equity prices) are restricted to reflect realistic information lags. VARs are estimated over the sample Q1 1985–Q4 2019. Policy interest rates are included as an exogenous variable in the model. In each scenario, all variables other than the policy rate evolve according to their estimated relationships in the model.

Graph 18.A–B: Credit losses calculated based on the private sector debt-to-income and credit growth projections shown in Graph 17 using the approach described in Juselius and Tarashev (2022).

Graph 18.C: Total capital ratio is the total capital adequacy ratio under the Basel III framework. It measures Tier 1 plus Tier 2 capital, which includes subordinated debt, hybrid capital, loan loss reserves and the valuation reserves as a percentage of risk-weighted assets and off-balance sheet risks.

Graph 19.A: FRA-OIS and FRA-ESTR spreads increase when investors paying the fixed rate in forward rate agreements demand a higher premium on rates that have to be settled in the future.

Graph 20.A: Country groups calculated as simple averages. Private debt is measured as total credit to the non-financial private sector. “Other” is based on data for CZ, HU, PL, RU, TR, SA and ZA. Change from Q1 2008 to Q1 2022 (if not available, Q4 2021).

Graph 20.B: Based on a “capital flows at risk” model, estimated using panel quantile regressions for EMEs. The model relates gross debt and equity inflows to two-year US government bond yields, commodity prices, and geopolitical and financial risks. The model also includes US and local GDP growth to control for global and local business cycles. Geopolitical risks are measured using the index from Caldara and Iacoviello (2022). Panel based on data for AR, BR, CL, CN, CO, CZ, ID, IN, KR, MX, MY, PE, PH, PL, RO, TH, TR and ZA.

Graph 20.C: “Other EMDEs” includes emerging market and developing economies as defined by the IMF, excluding those already included in “EMEs”.

Graph 21.B: Data for social unrest events are shown until end-2021.

Graph 22.A: A tightening cycle is defined as a period of consecutive policy rate hikes with a cumulative increase greater than or equal to 2 percentage points. The definition may differ across the sample. Series for some countries are shorter or missing. The latest data are as of April 2022.

Graph 22.B: Cumulative output loss/average real policy rate increase required to achieve a permanent 1 percentage point decline in inflation. Estimates based on a workhorse three-equation DSGE model (see eg Galí (2015)). In the “anchored expectations” simulations, agents have model-consistent expectations. In the “unanchored expectations” simulations, agents’ inflation expectations are an equally weighted average of model-consistent expectations and the previous quarter’s inflation rate. The permanent decline in inflation is implemented using the structural change methodology described in Kulish and Pagan (2017).

Graph 23.A: "Other AEs" calculated as the simple average of AU, CA, DK, GB, NZ and SE.

Graph 23.B: 2021 primary deficit measured as general government primary net lending/borrowing; "Other AEs" is weighted average using GDP and PPP exchange rates. Nominal interest payments stemming from gross general interest payments over general government gross debt. Inflation measured as GDP deflator. Nominal interest payments, inflation and real GDP growth components adjusted by the lagged value of debt-to-GDP.

Graph 23.C: Federal Reserve assumed to follow its announced balance sheet reduction path. ECB assumed to end reinvestment in 2025. Bank of Japan assumed to continue net purchases through 2023 and end reinvestment in 2026. Bank of England assumed to follow passive roll-off path.

Graph 24.B: Country groups calculated as simple averages.

Graph A1.B: Commodity prices expressed in real terms. "Present" corresponds to April 2022.

Graph A2.A: Primary energy consumption.

Graph A2.C: Ex post real policy rate defined as the difference between the policy rate and the year-on-year inflation rate.

Graph B1.A: Series employed rely on nominal values. EA calculated as GDP-weighted average of AT, BE, DE, ES, FI, FR, GR, IE, IT, LU, NL and PT.

Graph B1.B: The analysis uses province-level housing market data and relates these to country-level GDP. Based on quarterly data expressed in year-on-year growth rates. Data for floor space construction starts are shown as principal components of province-level data and are lagged by four quarters, as described in Kerola and Mojon (2022). Floor space construction starts refer to the entire floor space of newly started houses by the real estate development enterprises during the reference time.

Graph B1.C: The analysis uses province-level housing market data and relates these to country-level GDP. All variables in the forecasting model are expressed as two-year average growth rates as described in Kerola and Mojon (2022). The explanatory variables are principal components of province-level data. The model also includes dummy variables to account for the early phase of the Covid-19 crisis. Floor space construction starts refer to the entire floor space of newly started houses by the real estate development enterprises during the reference time.

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