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Edited by Bill English, Kristin Forbes
and Angel Ubide

Monetary Policy Responses to the Post-Pandemic Inflation

**CENTRE FOR
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RESEARCH**

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**CIMB CENTRE INTERNATIONAL
D'ETUDES MONETAIRES
ET BANCAIRES**

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Foreword

Central banks worldwide responded to the unprecedented challenges posed by the COVID-19 pandemic through massive and swift policy packages, aimed at preventing prolonged economic weakness and limiting deflationary risks. However, the unexpected rapid rebound in demand, coupled with supply-side shocks and geopolitical events, led to soaring inflation levels not seen in decades. This resulted in central banks, particularly in advanced economies, swiftly adjusting policies by raising interest rates earlier and more aggressively than anticipated, whilst also winding down pandemic-related emergency programmes. As of early 2024, there is optimism, though not certainty, that monetary policy can facilitate a soft landing following post-pandemic inflation spikes. However, potential nonlinearities and uncertainties persist.

This eBook analyses and seeks to learn from the range of strategies adopted by central banks across advanced and emerging economies during this period of high inflation, with thematic chapters providing insights into causes, labour market effects, energy shocks, and future implications for financial stability and monetary policy frameworks. A pivotal question arises relating to whether central banks could have mitigated the need for aggressive policy measures by providing less stimulus during the pandemic, which prompts a re-evaluation of the balance between inflationary pressure and economic recovery. The chapters highlight how the experience of the past few years serves as an indication to central banks that they cannot ignore inflation risks, especially in a global environment where inflationary pressures can rapidly fluctuate due to unforeseeable global shocks.

This comprehensive resource, which follows on from the CEPR eBook *Monetary Policy and Central Banking in the Covid Era* (2021), serves as a valuable reference for understanding the complexities and trade-offs encountered by central banks during these tumultuous times. The research presented will provide guidance for policymakers when confronting future shocks.

CEPR is grateful to Bill English, Kristin Forbes and Angel Ubide for their expert editorship of the eBook. Our thanks also go to Anil Shamdasani for his skilled handling of its production.

CEPR, which takes no institutional positions on economic policy matters, is delighted to provide a platform for an exchange of views on this important topic.

Tessa Ogden
Chief Executive Officer, CEPR
February 2024

Introduction

Bill English, Kristin Forbes and Angel Ubide¹

Yale School of Management; MIT-Sloan School of Management and CEPR; Citadel

1

Central banks around the world responded to the COVID-19 pandemic and the corresponding lockdown of the global economy with policy packages that were unprecedented in terms of their size, speed, and scope.² With global economic activity collapsing faster than any historic precedent, and a backdrop of a decade of subpar inflation and stuttering recovery from the last recession, policymakers undertook massive and multipronged actions supporting activity. The priority was to avoid a prolonged post-pandemic period of economic weakness and to limit the risks of a deflationary equilibrium. By comparison, upside risks to price stability from the large monetary and fiscal stimuli were believed to be minimal as inflation expectations were well anchored after a decade of below-target inflation (at least in most advanced economies). Central banks were also confident that any upside inflation surprises could be tackled by raising rates. No one realised the extent of the test that this monetary policy regime was about to face.

The unexpectedly rapid rebound in demand, supported by the effectiveness of vaccines and an expansionary policy mix, interacted with a series of unprecedented supply-side shocks from the shutdown and then reopening of the global economy and broad-based increases in commodity prices after the invasion of Ukraine (see the chapter in this book by Ben Bernanke and Olivier Blanchard). This combination of factors drove inflation to levels not seen for decades. Many central banks, particularly in advanced economies, waited to adjust policy until they were confident that the downside risks had declined, and the subsequent response required not only hiking interest rates much earlier than initially expected, but raising them quickly and in large increments. The rapid recovery also led central banks to wind down pandemic-related emergency programmes and remove stimulus through a range of other tools – including by shrinking balance sheets. This sudden and aggressive tightening, however, generated new risks around financial stability and the sustainability of fiscal positions.

The responses of most central banks to this period of high inflation shared many similarities – which is not surprising as they were largely responding to common global shocks. For example, most relied heavily on raising their policy interest rates as the primary form of tightening. At the same time, prior policy choices and heterogeneous economic structures and histories created important differences in their tightening

1 We thank Ugo Panizza for his support for this project, Anil Shamasani for his outstanding work in editing and assembling the volume, and Chris Collins for assistance preparing this introductory chapter. Most importantly, we thank the chapter authors for their willingness to share their time and expertise in contributing to this book.

2 See English et al. (2021a) for an overview and details on the response of sixteen central banks in advanced economies and emerging markets.

strategies. The goal of this book is to bring together and learn from these experiences. What strategies were adopted in different countries, and how were they chosen? What did we learn about the costs, benefits, and risks from different approaches? What lessons should be drawn for the effective management of monetary policy in the future?

After this introduction, this book includes chapters describing the central bank responses to the post-pandemic inflation in seven advanced economies (Australia, Canada, the Euro area, Japan, Sweden, Switzerland, and the United States) and eight emerging markets (Brazil, Chile, India, Indonesia, Mexico, South Africa, South Korea, and Türkiye). Most chapters are written by a senior official at the central bank during this tightening cycle. Each of these chapters not only summarises how each central bank responded to this period of high inflation, but also explores why the central bank made those policy choices. This book ends with thematic chapters drawing on key aspects of the cross-country experiences: the causes of high inflation, the interaction with labour markets, lessons from Latin America (the region at the forefront of tightening), the role of energy shocks and energy policy, and the financial market responses. The last three thematic chapters are more forward looking and discuss the implications of this period for financial stability, international financial regulation, and future monetary policy frameworks.

This book is meant to complement a CEPR eBook released in 2021, *Monetary Policy and Central Banking in the Covid Era*, which provides a similar country-level and thematic overview of how central banks responded to the pandemic (English et al. 2021a). The combination of these two books should provide a reference for scholars, teachers, policymakers, and investors seeking to understand what happened during these tumultuous years, as well as to better understand the trade-offs when responding to the next series of shocks.

The remainder of this introduction is divided into four sections. The first section describes the factors contributing to the sharp acceleration in inflation after the pandemic began. The second section summarises the central bank responses, highlighting ways in which the responses were similar as well as how they differed and why. The third section discusses the lessons learned from central banks' responses to the post-pandemic inflation, drawing insights for monetary policy in the future. The final section concludes.

1 INFLATION DYNAMICS: FROM TOO LOW TO TOO HIGH IN A MATTER OF MONTHS

We begin with a thorough description of the drivers of inflation, and especially the nature, extent and breadth of supply and demand dynamics. Understanding these dynamics is critical to understanding why inflation caught central banks by surprise, as well as their subsequent policy responses.

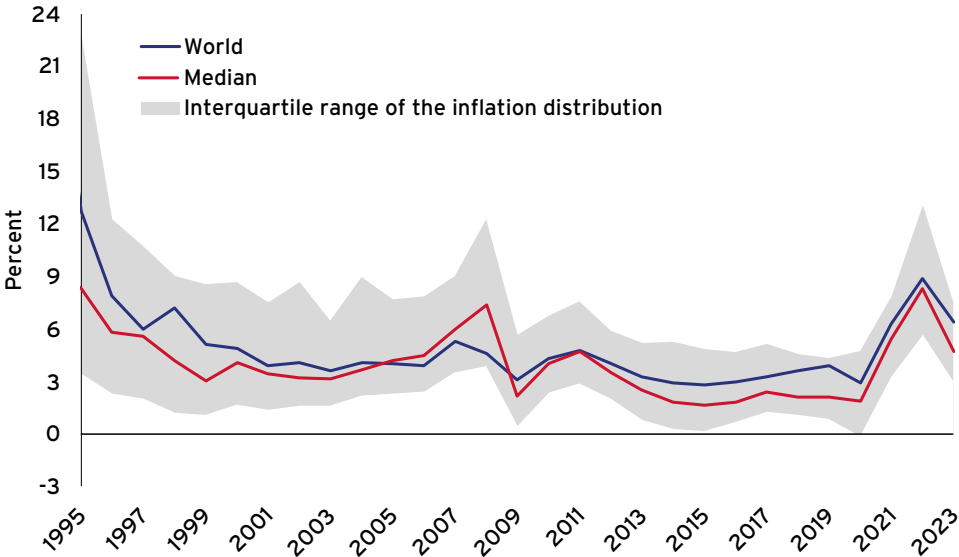
When the COVID-19 pandemic began, there was little concern about inflation accelerating quickly. Global economic activity collapsed faster than any recorded recession or depression. This was expected to outweigh the collapse in supply as global trade ground to a halt, generating a large amount of slack in most economies and causing global inflation (GDP weighted, PPP basis) to initially dip. Even when the initial lockdown restrictions were eased in many countries in mid- and late 2020, and vaccines began to be rolled out with tentative but promising results in early 2021, few concerns about inflation surfaced. Elevated unemployment and a collapse in labour force participation in most countries was believed to correspond to a large amount of excess capacity, dampening pressure for wage and price increases. The lesson from the last recovery was that labour markets were slow to recover and the Phillips curve was fairly flat, suggesting that economies had substantial space to absorb workers before wages and inflation would pick up meaningfully. These factors had contributed to keeping inflation below 2% for most of the previous decade in advanced economies, and this period of below-target inflation had anchored inflation expectations close to or even below 2% in these countries. This combination of factors suggested that the risks to price stability during the initial phase of the recovery were clearly to the downside.

The earliest concerns about inflation accelerating to well above targets originated in two different areas – the United States and emerging markets – albeit for different reasons. In the United States, concerns arose that fiscal stimulus was excessive and would boost output well above potential, which could lead to a surge in inflation. For example, Edelberg and Sheiner (2021) estimated that the \$1.9 trillion coronavirus relief package passed in 2021 would open a positive output gap of about 2.6% of GDP by 2022Q1. Blanchard (2021) wondered whether the US unemployment rate could fall to as low as 1.5%.³ While the effect of an output gap of this size on inflation was expected to be modest (less than 1 percentage point) given standard linear Phillips curve estimates, worries arose about possible non-linearities in the Phillips curve and a de-anchoring of inflation expectations, either of which could lead to a wage-price spiral. Emerging markets were less worried about the inflationary effects of large stimulus packages, especially as the fiscal response in emerging markets was much smaller than in advanced economies (and much less than the United States). Instead, their concerns centred on the inflationary impact of rapidly rising food prices, currency depreciations passing through into import prices, the faster recovery in demand (especially as many emerging markets experienced smaller recessions during the pandemic), and the weaker anchoring of inflation expectations (partly due to less well-established independence of central banks). These concerns were aggravated in commodity exporters as commodity prices recovered quickly and added to the risk of stronger demand growth (see the chapters by Fernanda Guardado on Brazil, by Elias Albagli and Pablo García on Chile, and by Jonathan Heath and Jaime Acosta on Mexico).

3 See also Summers (2021).

By the middle of 2021, however, it became clear that the pickup in inflation was global and widespread across countries (Figure 1). Supply disruptions caused by the pandemic were exacerbated by the rapid rebound in demand as countries reopened (Figure 2). This wreaked havoc on some economic sectors, with the disruption quickly spilling over to other industries and countries that people had not previously understood were closely linked. For example, disruptions to semiconductor factories in Asia and other supply chains affected the production of new cars in the United States. The lack of new cars and increased demand for vehicles (partly due to health concerns) drove up the price of new and used cars at an annual rate of roughly 40% during some months in 2021 and accounted for more than a third of core inflation that year.⁴ Constraints on supply chains were aggravated by changes in the composition of demand. Consumers spent more time at home to avoid the pandemic, reducing demand for services but driving a large increase in the global demand for goods. This further increased pressure on the global trade system and caused supply bottlenecks as companies could not respond quickly to the changing patterns in demand. This combination of factors caused goods inflation, which had been near zero prior to the pandemic, to jump materially in 2021 and 2022. As the chapter by Bernanke and Blanchard shows, the combination of higher commodity prices and supply disruptions accounts for a large share of the rise in overall inflation in this episode.

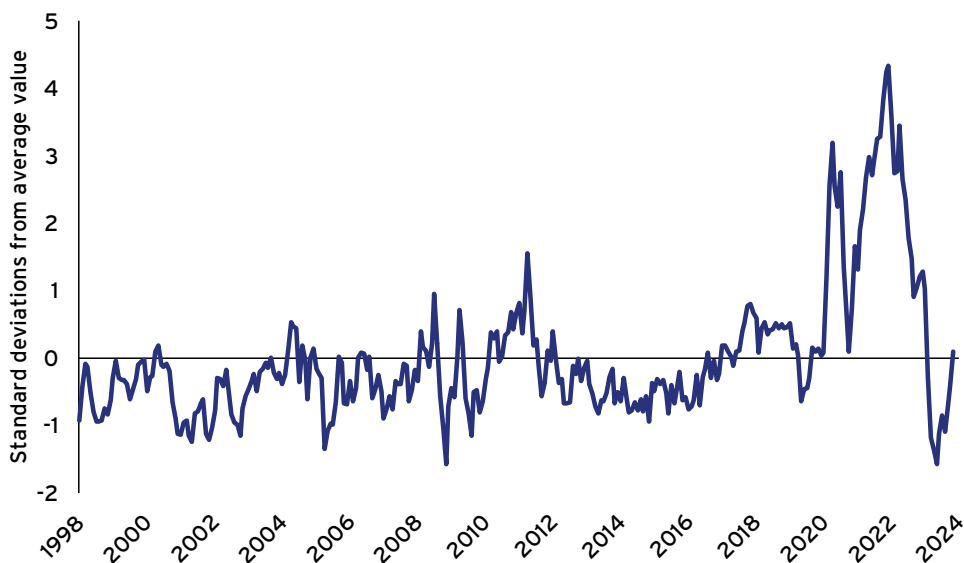
FIGURE 1 WORLD CONSUMER PRICE INFLATION, 1995-2023



Source: Data from IMF *World Economic Outlook*, October 2023.
 Note: End of period annual consumer price inflation. World inflation is purchasing-power-parity-GDP-weighted. Median and interquartile range are calculated over 196 countries in the WEO database.

4 Ubide (2022) documents this and other drivers of the inflation surge as seen from mid-2022.

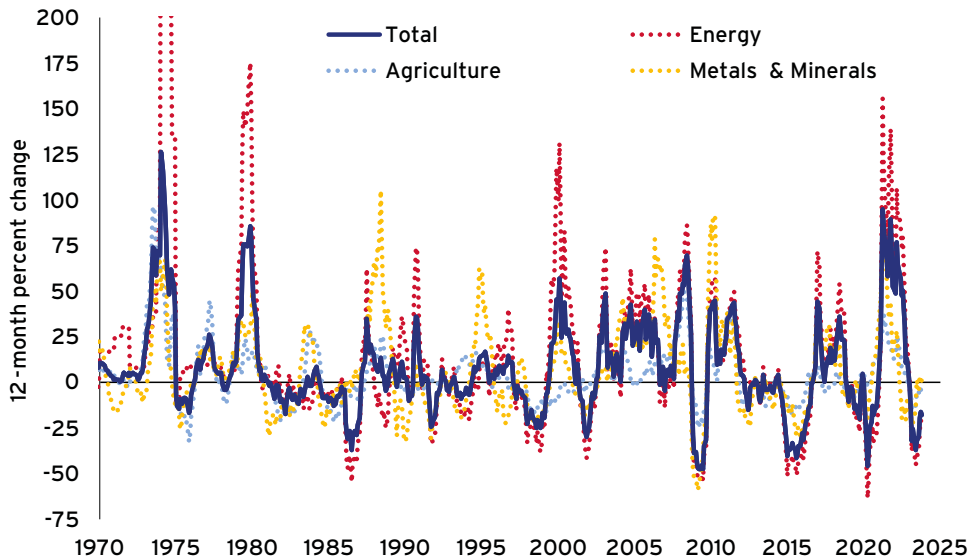
FIGURE 2 FEDERAL RESERVE BANK OF NEW YORK GLOBAL SUPPLY CHAIN PRESSURE INDEX, JANUARY 1998 TO PRESENT



Source: Data from Federal Reserve Bank of New York.

Then, in late 2021, commodity prices started to accelerate rapidly (Figure 3). Even before the Russian invasion of Ukraine in early 2022, European natural gas prices had jumped sharply in the second half of 2021 as Russian supplies suddenly became scarce (which, in hindsight, has been interpreted as Russian action prior to the invasion). Once the war in Ukraine began, commodity prices spiked more broadly than historic precedents – as discussed in the chapter by Mai Dao, Allan Dizioli, Chris Jackson, Pierre-Olivier Gourinchas and Daniel Leigh – with sharp increases in the prices of oil, natural gas, electricity, and most foodstuffs. While this period is often compared to the 1973-74 spike in commodity prices (which included a larger increase in oil prices), this episode affected a much broader range of commodity prices. For example, the spike in electricity and natural gas prices fed directly into prices of many goods and services, leading to a bigger and faster pass-through into core inflation. This generated a larger impact on inflation than has historically occurred, even after the offset from the lower dependence of most economies on energy as a share of GDP (Gil Tertre 2023).

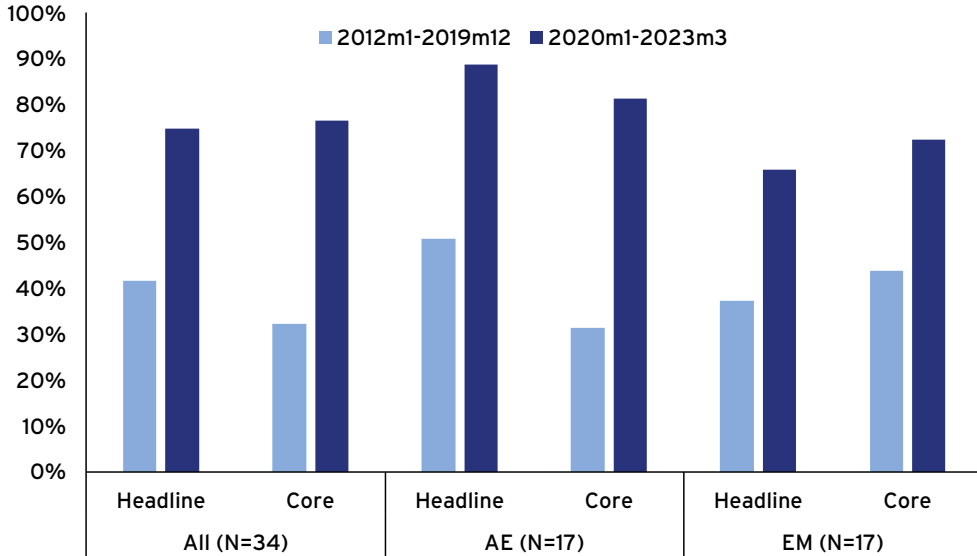
FIGURE 3 COMMODITY PRICE INFLATION, 1970 TO PRESENT



Source: Data from World Bank.

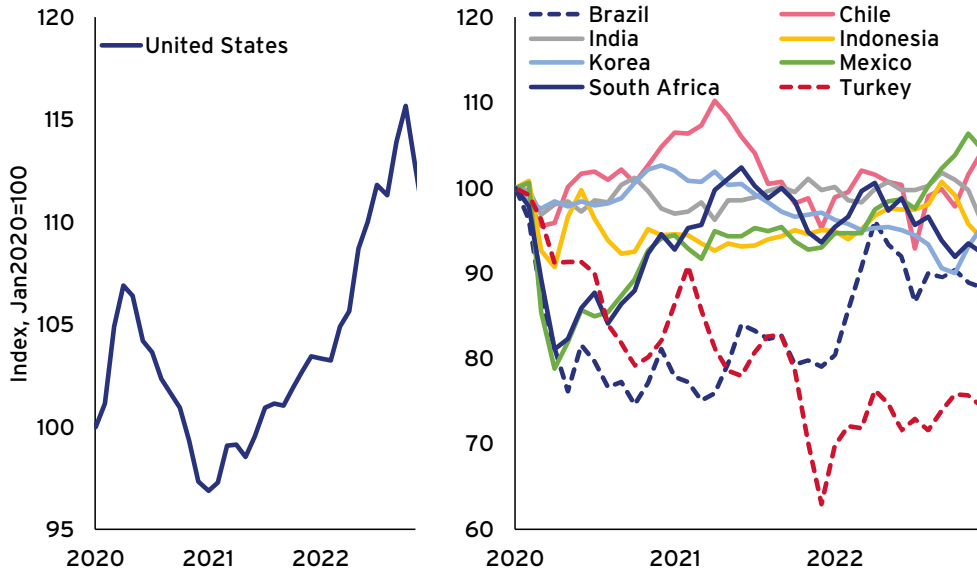
This sequence of supply shocks led to spikes in inflation in most countries around the world – even those without a large fiscal stimulus, with stable exchange rates, and for commodity importers as well as exporters – and the trough and peak of inflation across countries generally happened at around the same time. Indeed, the first principal component of inflation explains a much higher fraction of the variation in both headline and core inflation than before COVID in a large sample of countries, as well as in subgroups of just advanced economies or emerging markets (Figure 4). See the chapter by Ilan Goldfajn for similar results for just Latin America. This increase is particularly noteworthy as this shared global component in inflation had already increased sharply in the 2010s compared to earlier decades (Forbes 2019). While inflation moved up somewhat earlier, on average, in advanced economies, it rose faster and to higher levels in emerging markets. Also important for inflation in many emerging markets was how their currencies adjusted as the US dollar appreciated rapidly (Figure 5, see also Koch and Nouredin 2023); sharp depreciations (as discussed in the chapter on Korea by Chang Yong Rhee and Young Hwan Park and the chapter on Türkiye by Hakan Kara and Çağrı Sarıkaya) quickly passed through into higher import prices and aggravated the effects of these supply shocks on inflation.

FIGURE 4 PERCENT VARIANCE OF 12-MONTH INFLATION EXPLAINED BY FIRST PRINCIPAL COMPONENT



Source: Calculations based on inflation data from the OECD, IMF, World Bank Global Inflation Database, national sources.
 Note: Sample includes 34 economies; 17 advanced economies (CAN, CHE, CZE, DEU, DNK, ESP, FRA, GBR, HKG, HUN, ISR, ITA, JPN, KOR, NOR, SGP, SWE, USA) and 17 emerging markets (BRA, CHL, CHN, COL, IDN, IND, MEX, MYS, PER, PHL, POL, RUS, THA, TUR, TWN, ZAF).

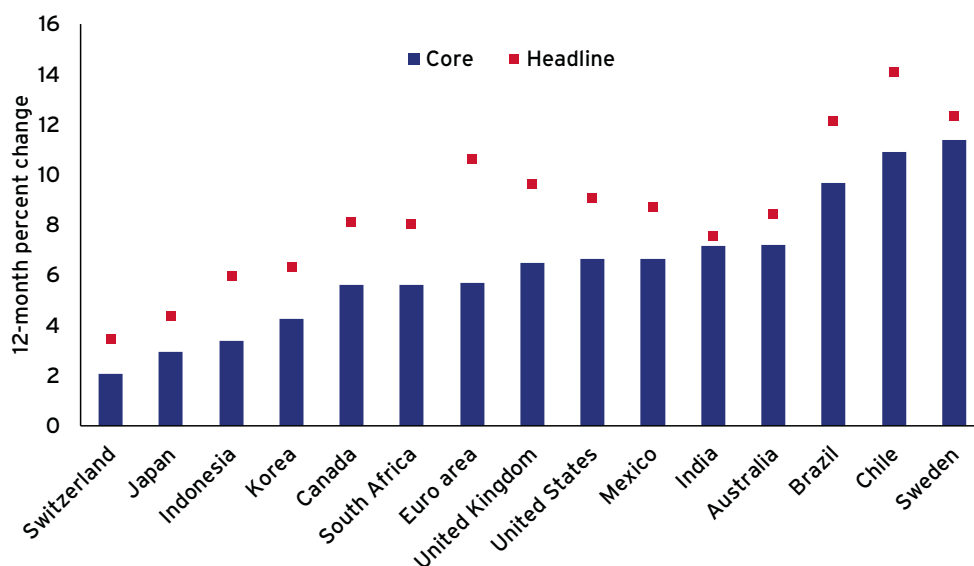
FIGURE 5 REAL EFFECTIVE EXCHANGE RATES, JANUARY 2020 TO DECEMBER 2022



Source: Data from BIS.
 Note: Real (CPI-based), broad exchange rate indices.

While inflation accelerated in most countries during late 2021 and 2022, and in some countries even into 2023, there were substantial differences in the amplitude of the price increases (Figure 6) and the timing of the inflation peaks for reasons other than the pass-through from exchange rates. Initially, these differences in inflation dynamics primarily reflected the weight of energy and other commodity prices in the CPI basket and the different fiscal policy responses (such as subsidies or price caps) adopted to cushion the shock (as described in the chapter by Dao and co-authors). For example, disparities inside the euro area, a group of countries sharing the same monetary policy stance, were stark: while headline CPI in Estonia reached 24.8%, in France it peaked at just above 6%. In the United Kingdom, the timing of government adjustments to the energy price cap delayed the inflationary impact relative to other countries experiencing a similar energy price shock. These fiscal measures aimed at reducing inflation helped to keep inflation expectations in check – a rare case of expansionary fiscal policy contributing to lower inflation. In other countries, idiosyncratic factors were also important to understand inflation dynamics. For example, Japan is less dependent on global energy prices, and its government sets the wholesale price of imported wheat, which helped contain food inflation. India adjusted a number of regulations, restrictions and duties on imports and exports (see the chapter by Michael Patra and Binod Bhoi), as well as buying energy from Russia at lower prices, to help contain inflation. In China, inflation peaked around 3%, limited by an idiosyncratic drop in pork prices – a large share of the CPI basket – which helped offset the impact of higher energy prices.

FIGURE 6 PEAK INFLATION RATES, JANUARY 2020 TO PRESENT



Source: Based on data from the World Bank Global Inflation Database, OECDStat, National Sources.

Note: Economies ordered by peak core inflation rate. Türkiye excluded. Inflation rates are for the 12-month period ending in the month of the latest data release available at the time of liftoff. Core inflation for most economies is all items excluding food and energy. For Indonesia, core is all items excluding food. For Australia, data is the Monthly CPI Indicator, rather than the quarterly CPI, and core excludes volatile items and holiday travel.

Initially obscured by the sharp swings in inflation driven by commodity prices and supply chain constraints, the degree of labour market slack also began to gradually affect inflation in many countries. Moreover, inflation in countries with less slack in labour markets seemed to be more sensitive to supply shocks, experiencing more pronounced second-round effects on wages and domestic prices.⁵ Worries about these second-round effects became a major concern for central banks as the shocks to inflation proved much larger and longer-lasting than expected. It was time to re-evaluate the standard central bank strategy of treating supply shocks as only having a temporary impact on inflation.

2 CENTRAL BANK RESPONSES TO HIGH INFLATION

With economies still recovering from the COVID shutdown, central banks faced a difficult dilemma. Ordinarily, policymakers would 'look through' the series of supply shocks discussed above. But demand growth was also strong, thanks to the very powerful policy mix deployed to counter the COVID shocks, and the size and intensity of the series of supply shocks boosted inflation substantially above target for a long enough period that the anchoring of inflation expectations could be undermined. This complex combination of both demand and supply shocks, in many cases unprecedented in nature and size, contributed to extremely large and persistent forecasting errors (Figure 7).⁶ The models typically used to forecast inflation during the pre-pandemic period were mostly linear and based on parameters estimated over periods dominated by relatively low and well-behaved inflation.⁷ These models generally suggested that as long as inflation expectations remained well anchored (which was generally assumed), inflation would move back to target relatively quickly as shocks subsided. Instead, inflation not only surprised repeatedly to the upside, but by very large margins. For example, the Oct 2021 IMF World Economic Outlook forecast inflation for 2021 and 2022 at 2.8% and 2.3% for advanced economies, and 5.5% and 4.9% for emerging markets. The actual outturns were materially higher: 3.1% and 7.3% for advanced economies, and 5.9% and 9.8% for emerging markets.

As central banks began to realise that inflation was going to rise further than expected, and likely remain elevated longer than would be anticipated after a single supply shock, many began to adjust their monetary policy stances. The resulting adjustments in monetary policy differed based largely on two factors: the perceived risks of inflation expectations becoming unanchored, and the perceived flexibility to pivot quickly from easing to tightening monetary policy. Emerging markets generally responded more

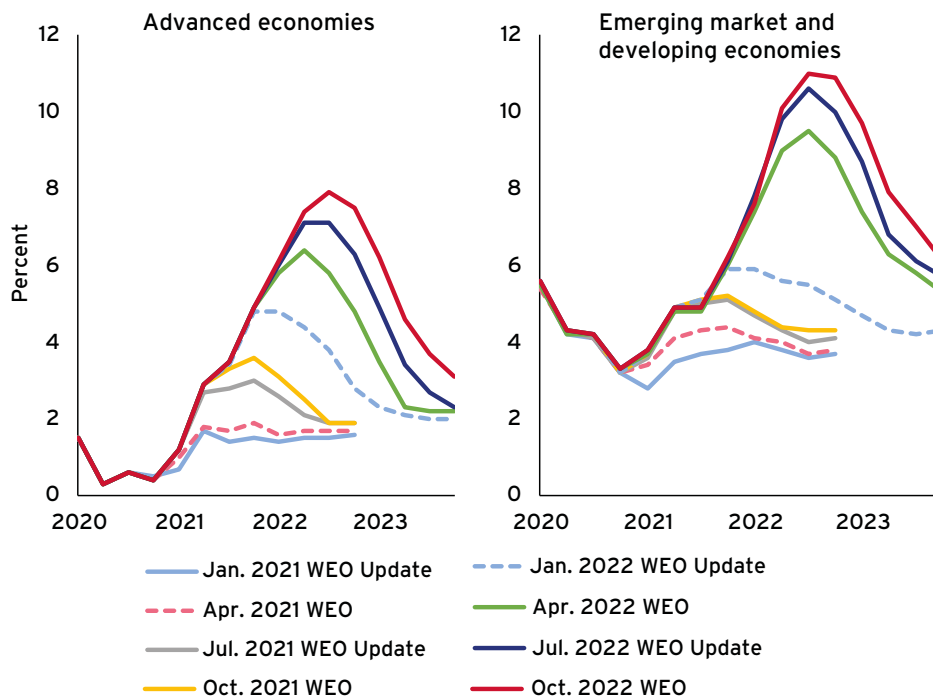
5 See Dao et al. (2023) for an analysis of how the degree of slack in labour markets interacted with supply shocks to impact inflation.

6 See Koch and Noureldin (2023) for a more detailed analysis of the reasons for forecast errors during this period.

7 For example, see Laforte (2018) on the effects of shocks on inflation in the Fed's FRB/US model.

quickly, reflecting both factors.⁸ They had less confidence in the stability of inflation expectations, due to a combination of higher inflation over the last decade and a shorter and less well-established history of central bank independence, and in many cases inflation picked up faster due to food inflation and exchange rate depreciation. Emerging markets were also less constrained by asset purchase programmes and forward guidance, and they could quickly start raising interest rates without having to extricate themselves from other commitments. Brazil was the first country to start its post-pandemic hiking cycle – in March 2021, a year before the Fed – followed quickly by Mexico and Chile.⁹ By the end of 2021, most emerging markets had started raising rates, and some had already tightened policy considerably (see the chapters in this volume on emerging market central banks and the chapter by Goldfajn). For example, Brazil had already raised interest rates by 725 basis points at the end of 2021, when many advanced economies were still purchasing assets and most had not lifted off. India and Indonesia, with softer inflationary pressures, followed a different strategy, waiting until mid-2022 to raise rates (see the chapters by Patra and Bhoi on India and Perry Warjiyo on Indonesia).

FIGURE 7 INFLATION FORECAST VINTAGES, JANUARY 2021 TO OCTOBER 2022



Source: Data based on IMF World Economic Outlook, October 2022.

Note: The lines plot the four-quarter purchasing-power-parity-GDP-weighted inflation forecasts at different dates.

8 As noted in English et al. (2021b), emerging market central banks were able to ease policy and take other aggressive steps, including asset purchases in some cases, because of the independence and credibility their policymakers had built prior to the crisis. That independence and credibility was again on display as inflation rose, and most emerging market central banks moved fairly quickly to take the difficult steps that were necessary to respond.

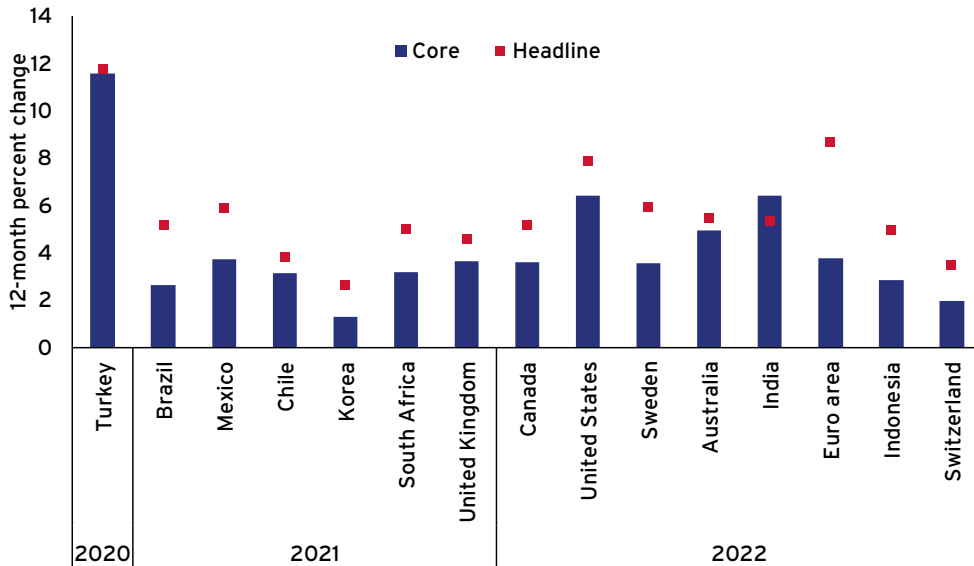
9 Türkiye raised interest rates in September 2020 and then further between November 2020 and March 2021, before shifting to easing later in 2021 through 2023, despite high levels of inflation; see the chapter by Hakan Kara and Çağrı Sarıkaya for more information on why this was a unique case.

By contrast, central banks in advanced economies were slower to pivot towards tightening monetary policy. There was less sense of urgency, as advanced economies had more confidence in the stability of inflation expectations, and some regions (such as the euro area) even welcomed an uptick in inflation expectations after a decade of below-target inflation. In addition, the institutional commitment of central banks to bring inflation back to their targets was more firmly established, raising fewer risks if inflation exceeded forecasts for a time. In some countries, such as Switzerland, the rise in inflation was also more muted due to factors such as the smaller share of energy in the CPI and smaller fiscal stimulus (see the chapter by Thomas Jordan). Also importantly, central banks may have been slow to pivot because of the guidance they had provided regarding the likely timing of rate increases and duration of asset purchases. When the pandemic hit, central banks had anticipated a long period of economic weakness, and so had provided guidance that was more ‘commitment like’. Such guidance was designed to provide a larger boost to the recovery, but it also made it more difficult to adjust policy if economic conditions developed in an unexpected manner.¹⁰ Although central banks could raise interest rates while still completing any pre-set commitments to asset purchases, this policy mix was seen as difficult to explain, while ending asset purchase programmes earlier than indicated raised fears of financial instability and of undermining the power of guidance and asset purchase programs in the future.

Some advanced economies also had idiosyncratic concerns that delayed their decision to raise interest rates. For example, the Federal Reserve worried about a repeat of the 2013 ‘taper tantrum’ and consequent global spillovers if it ended quantitative easing abruptly, and the ECB worried about the impact on spreads for countries judged by markets to have less sustainable fiscal policies (see the chapters by Charles Evans and by Philip Lane on the United States and euro area, respectively). The Riksbank worried about the high level of household debt (see the chapter by Stefan Ingves). Subsequent waves of COVID, such as the Delta wave in the middle of 2021, coming against a backdrop of elevated unemployment rates, also raised uncertainty about the durability of the global economic recovery. This combination of factors meant that when economic activity and inflation accelerated in the second half of 2021, many central banks were caught by surprise (see the chapter by Tiff Macklem on Canada and the chapters on the euro area and the United States). The Norges Bank was the earliest of the advanced economies to lift off (in September 2021), followed by the Reserve Bank of New Zealand in October and the Bank of England in December. Others were much slower – such as the Bank of Canada and Federal Reserve in March 2022, the Reserve Bank of Australia and Riksbank in May, the Swiss National Bank in June, and the ECB not until the end of July 2022. By the time of lift-off, not only was headline inflation much higher than 2% targets, but core inflation was well above 2% in most advanced economies (Figure 8).

10 See, for example, the discussion of the Fed’s guidance in Eggertsson and Kohn (2023).

FIGURE 8 INFLATION RATES AT TIME OF LIFT-OFF



Source: World Bank Global Inflation Database, OECDStat, national sources.

Note: Economies ordered by date of lift-off. Japan excluded. Inflation rates are for the 12-month period ending in the month of the latest data release available at the time of lift-off. Core inflation for most economies is all items excluding food and energy. For Indonesia, core is all items excluding food. For Australia, data are the Monthly CPI Indicator, rather than the quarterly CPI, which was not produced until after lift-off in August 2022, and core excludes volatile items and holiday travel.

While the shift to tightening policy was delayed in many advanced economies, most (but not all) central banks subsequently moved very quickly after they started adjusting rates. After ‘lift-off’, most central banks raised rates at every subsequent meeting – a stark shift from the post-2008 crisis where a rate hike was often followed by several meetings with no change, and even a full year between the Federal Reserve’s first two rate hikes in December 2015 and December 2016. Many central banks also quickly shifted to raising not only at every meeting but using ‘supersized’ increments. For example, the Reserve Bank of Australia, Bank of Canada and Federal Reserve all jumped to hiking by 50 basis points after their initial 25 basis point lift-off; and the ECB raised by 50 basis points for its first hike, followed by 75 basis points at the next meeting. The Bank of Canada even raised by 100 basis points in one meeting, and Chile hiked rates by an average of 100 basis points per meeting, with a few meetings of 125 and 150 basis point rate hikes. Some emerging market central banks (e.g. Korea and Mexico) hiked rates by sizes never previously experienced. With this speed and magnitude of hikes, policy interest rates quickly rose to well above pre-COVID levels, and in some cases to levels not experienced for decades. In Canada, New Zealand, the United Kingdom and the United States, the policy rate was raised by about 5 percentage points in a little over a year – the fastest tightening cycle since the early 1980s. Some countries that had started raising rates earlier, such as the United Kingdom, Norway, and New Zealand, were initially less aggressive in tightening policy, but fears that inflation was becoming more embedded

in wage and price setting led them to ‘backload’ rate hikes and move more aggressively later in their tightening cycles.¹¹ Others, like South Africa, were able to manage an early yet gradual tightening approach to nurture a fragile recovery, benefiting from the South African Reserve Bank’s anti-inflation credibility gained prior to the pandemic (see the chapter by Christopher Loewald).

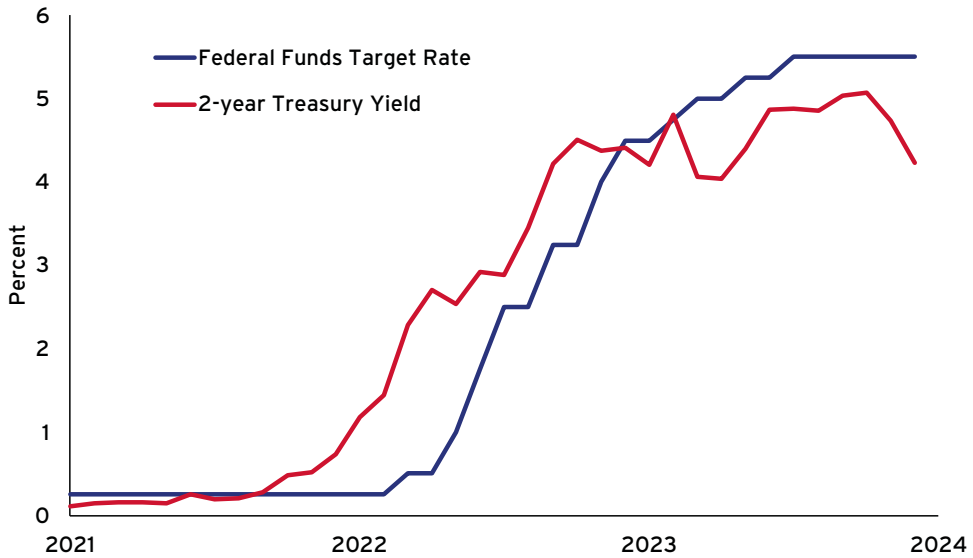
Although advanced economies were slower than emerging markets to start raising interest rates, there are several reasons why the delay may not have had a significant cost in terms of inflation outcomes. First, the portions of inflation most directly affected by monetary policy – those due to tight labour and goods markets and increased inflation expectations – accounted for only a small part of the overall increase in inflation (see the chapter by Bernanke and Blanchard). Second, in some economies, such as the United States, the euro area, Sweden, and Switzerland, some increase in inflation expectations was welcome to restore them to levels consistent with inflation targets. Third, as policymakers began to communicate the shift to tightening policy, markets anticipated the coming rate increases, causing a significant tightening of financial conditions well before lift-off (see the chapter by Roberto Perli and Eric LeSueur). Figure 9 shows this effect for the United States: two-year rates, which incorporate the expectations of tightening over the cycle, increased sharply from mid-2021 as markets began to price in the Fed rate hikes, and they had already increased by 150 basis points by the time the Fed started to raise the Federal Funds rate in March 2022. This type of tightening in financial conditions well before adjustments in policy interest rates was also seen in other advanced economies and (somewhat) reduced the urgency to start raising rates.

After lift-off, central banks faced a second challenge: calibrating the policy response. This challenge reflected uncertainty about the continued effects of COVID on demand and supply, the strength of activity and inflation more broadly, as well as risks to the outlook. Economic models were inadequate to capture the results of the sudden shutdown and then the unexpectedly rapid reopening of economies – a very different business cycle than historic averages or after the financial crisis. The post-financial crisis experience of persistent weakness in real activity and subdued inflation not only led to delays in raising rates but, even for central banks that raised rates earlier, also to initial expectations that rates would not have to rise by very much. For example, at the time of lift-off in March 2022, the Federal Open Market Committee (FOMC) anticipated that the Federal Funds rate would peak at just 2.8%. Markets were equally complacent: as of 1 April 2022, market-implied estimates of the terminal interest rates were a little over 1% in Switzerland and the euro area, just over 2% in Sweden and the UK, about 3% in the US and Canada, and 3½% to 3¾% in Australia and New Zealand, respectively.¹²

11 See the panel discussion by Kristin Forbes on “Probing for Maximum Employment” at the Federal Reserve Bank of Boston’s 66th Economic Research Conference on 17th November 2023.

12 Source: Morgan Stanley estimates of the terminal rate as reported by Bloomberg.

FIGURE 9 US INTEREST RATES, JANUARY 2021 TO DECEMBER 2023



Source: Data from Federal Reserve Board.

Note: Monthly, end of period. Federal Funds Rate Target is the upper limit of the target range.

Policymakers were forced to continually revise upwards their plans for tightening policy for several reasons. First, it became clear that inflation would remain well above target for an extended period, risking the anchoring of longer-term inflation expectations and raising concerns that high inflation would become embedded in wage and price setting. Second, economies generally proved to be more resilient than expected; the short-term neutral rate was arguably higher – supported by expansionary fiscal policy and sound private balance sheets that benefited, inter alia, from the high level of savings accumulated when economies were locked down. Third, robust demand for workers was accompanied by limited labour supply due to early retirements around COVID, sectoral reallocation that led to skills mismatches, long COVID, and reduced immigration. As a result, firms faced acute labour shortages, causing many to hire workers at substantial wage premiums. The volatility in both labour supply and demand led to a focus on indicators other than the unemployment rate to assess the degree of slack in the labour market. These measures included vacancy rates, quit rates, and the ratio of vacancies to unemployment, all of which rose to extraordinary levels.¹³

¹³ There was considerable debate on how quickly pandemic disruptions to labor markets would pass and so how the ratio of vacancies to unemployment (V/U) would return to more normal levels. Blanchard et al. (2022) argued that a large increase in unemployment would likely be needed to restore V/U to more normal levels, while Figura and Waller (2022) argued that ‘excess’ vacancies could decline without a run-up in unemployment as the labour market normalised. To date, there has been a large decline in vacancies and a significant normalisation of the labour market with only a modest rise in unemployment (supporting the latter arguments). In addition, there is ongoing debate about the use of V/U to measure labour market slack, as there seems to be a time trend in the vacancy rate reflecting a decline in the cost of posting vacancies (Mongey and Horwich 2023).

Finally, risk management considerations shifted from justifying more cautionary increases in interest rates to the need for more aggressive tightening. After a decade where risks were weighted towards slower growth and below-target inflation, the sudden and sustained spike in inflation shifted risks toward high inflation becoming embedded in wage and price setting behaviour, making it more difficult to bring inflation back down. If so, monetary policy might need to be tightened even more to generate a significant recession and return inflation and inflation expectations back to target. The potential costs of such an outcome began to outweigh those of a nearer-term period of economic weakness, leading central banks to raise rates further and faster than they might have otherwise. As Chair Powell said at his press conference in May 2022, “We can’t allow a wage–price spiral to happen. And we can’t allow inflation expectations to become unanchored. It’s just something that we can’t allow to happen.”¹⁴ As rates moved sharply higher, however, central banks also worried that tighter policy could create financial stress – not only in the financial system, but for households, companies, and governments that had accumulated debt at floating rates under the expectations borrowing costs would remain low.

A country that arguably benefited from the global inflation overshoot was Japan. The price shocks and the depreciation of the yen, in an environment of robust demand and very tight labour markets, created the virtuous circle the Bank of Japan had long been hoping for, lifting Japanese inflation, wage dynamics, and inflation expectations to levels closer to the 2% inflation objective. This created the conditions for a gradual – though necessarily volatile, given the nature of the framework – softening of yield curve control and set the stage for a likely lift off of interest rates towards neutral levels during 2024 (see the chapter by Shinichi Uchida).

In the end, central banks that adjusted their policy interest rates (i.e. other than Japan) followed three stages: first, move quickly to raise rates to a restrictive level to help bring inflation down and contain inflation expectations; second, fine tune the stance to a sufficiently restrictive level, i.e. a level that would put inflation on a path back to target over a reasonable period; finally, keep rates at that sufficiently restrictive level until policymakers were confident that inflation was returning to target (this could potentially take some time). Although these stages sound straightforward, calibration was not. Economies appeared to be more resilient to higher interest rates than expected, partly because of greater strength in underlying aggregate demand, but also because of uncertainty and lags in the effects of monetary policy on the economy. As a consequence, central banks generally adopted what the Bank of England’s Huw Pill labelled the ‘Table Mountain’ approach: hold rates in restrictive territory for some time, rather than raise rates higher and potentially have to reverse course quickly if the stance proved to be too tight. After rapid increases in rates at the start of their tightening cycle, central banks closed the final gap to their desired resting point for interest rates in different ways. Some

14 Source: <https://www.federalreserve.gov/mediacenter/files/FOMCpresconf20220504.pdf>.

central banks slowed down the pace gradually and skipped meetings near the end of their tightening cycle (e.g. the Federal Reserve), while others paused hiking for a few meetings and then resumed hikes to fine tune (e.g. the Bank of Canada and Reserve Bank of Australia). Other central banks converged to their resting point without any pauses (e.g. the ECB and the central banks of Brazil, Chile, Mexico, Korea, and South Africa), while others (such as the Bank of England) accelerated hikes at the end of the tightening cycle.

After central banks began raising interest rates, those that had implemented asset-purchase programmes in response to the pandemic also moved to begin shrinking their balance sheets (so-called quantitative tightening, or QT).¹⁵ This also occurred much sooner and faster than expected. In the previous tightening cycle, the United States was the only country to make meaningful progress unwinding its asset purchases, and it waited nearly two years after starting to raise rates before beginning a very gradual run-off of securities. The long lag reflected a desire to first raise the policy rate to a level where it could be lowered meaningfully to provide stimulus without returning to the lower bound, combined with uncertainty about the impact of quantitative tightening. By contrast, as inflation spiked in 2021-22 and central banks realised they would need to tighten monetary policy significantly, they did not need to worry about QT limiting their ability to raise rates. Some central banks used the start of QT programmes to support their messaging of ‘firming the stance of monetary policy’.¹⁶ QT might also tighten financial conditions at the medium and longer end of the curve, spreading the adjustment to higher interest rates across sectors of the economy. Moreover, the sharp increase in interest rates would generate large losses on central bank’s asset holdings, generating political criticism about central banks large asset holdings.¹⁷

With only one historical episode of QT, however, there was substantial uncertainty about how it would affect financial conditions and liquidity in the markets for the assets being unwound. Given this uncertainty, most central banks chose ‘passive’ QT, allowing assets held by the central bank to run off, sometimes subject to caps or limits (for the ECB, the Federal Reserve, and Riksbank). For central banks with a shorter maturity of asset holdings, this passive runoff would shrink balance sheets quickly, such as in Canada where QT is expected to be finished around the end of 2024 or early 2025. The Bank of England, Riksbank, and Reserve Bank of New Zealand sought to shrink their balance sheets more quickly than could be achieved by passive run-offs (partly due to the longer maturity of their assets), so they supplemented passive QT with active sales of their security holdings.

15 See Du et al. (2024) for details on QT programmes and their impact in countries around the world.

16 For example, see the transcript of Chair Powell’s 16 March 2022 press conference [here](#).

17 Some central banks, such as the ECB, changed some of their operational arrangements, such as the remuneration of reserves, to minimise their potential losses.

After starting QT, central banks indicated that they would likely continue to reduce the size of their balance sheets for an extended period and according to pre-set parameters that will only be adjusted after a periodic review or in periods of market stress. Each central bank undertaking QT has communicated that adjustments in policy rates are the primary tool for adjusting monetary policy, and QT is meant to occur ‘in the background’. Some officials have suggested that QT could continue even if they start cutting rates. This seems counterintuitive, as it could imply easing and tightening at the same time using different monetary policy tools. However, such a situation could reflect normalisation of both the size of the balance sheet and of the level of rates in a soft-landing scenario.¹⁸ Others have indicated that asset runoff would not necessarily be adjusted “in response to the economic outlook” (Logan 2023). In both cases, officials are attempting to signal that future decisions on QT could be independent from changes in the monetary policy stance. In addition, some central banks appear to have concluded that balance sheet policies have an asymmetric impact: smaller during tightening but larger during easing (as they reinforce forward guidance and improve market functioning). By the end of 2023, central banks had made meaningful progress in reducing the size of their balance sheets – in some cases accomplishing a larger reduction (judged by the reduction in asset holdings relative to GDP) than the Federal Reserve accomplished during its entire QT programme over 2017-2019 (Du et al. 2024). The impact on financial markets and measures of market functioning has been minimal to date – although, as seen in 2019, effects in markets could emerge quickly and unexpectedly.¹⁹

Despite the initial forecast errors in predicting the sharp pickup in inflation, and the resulting accelerated pace of monetary tightening that proved necessary, economies have so far adjusted remarkably well. As 2023 comes to an end, inflation has not only peaked, but is declining rapidly and nearing 2% in some countries, while the unemployment rate has remained near record lows. The gloomy prognostications about the need to cause sharp recessions and large increases in the unemployment rate to restore price stability have not materialised, at least yet. Raising rates enough to keep demand growth a bit below trend, combined with strong messaging about the commitment to return inflation to targets, may have been enough to anchor inflation expectations while the effects of the sequence of negative supply and commodity price shocks faded. In short, the aggressive monetary policy response that central banks ultimately put in place may have been enough to ensure that the inflationary effects of the COVID-related disruptions were actually transitory in the end.

18 For example, Chair Powell indicated that the Federal Reserve could cut rates even as QT continued, if the rate cuts reflected a movement of policy back to neutral, rather than a response to a sharply weaker economy (see the press conference transcript from December 2023, p. 24.). The Bank of England’s Andrew Hauser raised the possibility of continuing QT while cutting rates at the Bank’s Watchers Conference in London on 3 November 2023.

19 See Perli (2023) for a discussion of the indicators that the Fed will monitor to judge when it may be appropriate to bring QT to a close.

3 LESSONS FOR MONETARY POLICY

The size and persistence of the inflation shocks led to significant popular discontent and criticism of central banks. While much of the spike in inflation was outside the control of these institutions – given the sheer size and breadth of the global shocks (as explained above) – price stability is a key mandate of central banks. Their credibility was further damaged by their inaccurate inflation forecasts and debate over the delays in adjusting policy as they shifted from fighting economic weakness to fighting inflation. Even more damaging, in some countries the central bank was seen as having misled the public by providing guidance that rates would stay low for an extended period, before backtracking on what had been wrongly seen as an unconditional commitment (such as the abrupt end to yield curve control in Australia). The substantial financial losses on central bank asset holdings have also generated negative headlines in some cases. Even in countries where this financial risk was understood and indemnified, the negative headlines may grow worse as fiscal pressures grow (partly from the higher interest rates set by central banks).

These wide-ranging concerns have already led to formal reviews of central bank mandates and processes in several countries. For example, in the United Kingdom the House of Lords recently issued a critical report (House of Lords 2023) and the Court of Directors of the Bank of England has commissioned a review “into the Bank’s forecasting and related monetary processes during times of significant uncertainty.”²⁰ The Australian government commissioned an independent review of the Reserve Bank of Australia (Australian Government 2022) – and many of its recommendations have already been adopted (as discussed in the chapter by Renée Fry-McKibbin and Carolyn Wilkins, two of the authors of this review).

What are some of the broader lessons we can learn from the central bank responses to the post-pandemic inflation? And how should these inform discussions on central bank mandates in the future?

Seven lessons learned

First, a great deal more work is needed on inflation forecasting. As discussed above (see Figure 7) and analysed in Koch and Noureldin (2023), economic models failed in forecasting the 2021-2023 spike in inflation. Stock and Watson (1999) showed that, even in more tranquil times, it is very difficult to beat a simple autoregressive model when forecasting inflation. It becomes materially more difficult when a series of supply shocks or other global shocks hit the economy. Even before the pandemic, Forbes (2019) showed that the shared global component of CPI inflation more than doubled from the early 1990s through the mid-2010s in advanced economies, as movements in CPI inflation were increasingly driven by global shocks to commodity prices, supply chains, and global slack; these global forces are difficult to forecast, so that existing models are not well

20 <https://www.bankofengland.co.uk/-/media/boe/files/news/2023/bernanke-review-tor.pdf>

suited for the task of predicting domestic inflation. Detailed modelling of the individual components of inflation is becoming more important, as well as a better understanding of the effects of supply disruptions. Research also supports the role of nonlinearities in how labour markets affect wages and inflation – nonlinearities which can be difficult to estimate when there is limited historical experience to identify the break points (Benigno and Eggertsson 2023, Forbes et al. 2022, Hooper et al. 2019). Potentially even more challenging, the impact of different shocks may vary based on the state of the economy (e.g. the impact of a supply-chain shock may depend on the degree of slack in the labour market), making it difficult to estimate the various interactions, particularly if there are no historical parallels (see the chapter by Macklem). In order to convey the resulting uncertainties to the public, central bankers should consider providing more scenarios and discuss the possible alternative outcomes (as suggested in the review of the Reserve Bank of Australia's performance and the chapter by Fry-McKibben and Wilkins).

Moreover, capturing the dynamics of inflation may now require new approaches and new data. For example, after inflation spiked, many companies shifted from a time-dependent to a state-dependent pricing strategy and the frequency at which companies adjusted prices increased. These changes in firm pricing strategy appear to be correlated with the acceleration in inflation, but there is little evidence on whether this relationship is symmetric and pricing strategy will return to being time-dependent as inflation falls (Cavallo et al. 2023). Monitoring the frequency of price changes – and enhancing the scope and analysis of surveys of firms' near term inflation expectations, which in many countries were the early warning signals of the inflation acceleration – may therefore be a useful indicator for inflation analysis and forecasting. In addition, as the pandemic upended labour markets and how people work, it has been challenging to assess the amount of slack using traditional measures, such as unemployment or job creation. Indeed, it is surprising how well-behaved real wages have been given the degree of tightness of labour markets (as concluded in the chapter by Cassandra Castle and Clare Lombardelli). Data on job transitions (including quits, separations and vacancies) and differential wage dynamics between job switchers and job stayers can provide important information on changes in wage dynamics. For example, the Federal Reserve Bank of Atlanta Wage Tracker shows that the initial acceleration of wage growth after the pandemic was driven by job-switchers (as companies were willing to pay more for any available employee) and the peak and subsequent softening of the wage growth of job-switchers was an early indication that the dynamics of the labour market had shifted back. Unfortunately, the new data sources required to evaluate changes in firm pricing and wage dynamics do not have track records of performance, especially at turning points, but there is no better time to start developing this track record.

Second, the simple textbook response of simply 'looking through' supply shocks (which assumes that inflation expectations are well anchored) may not be the appropriate response; instead, it is necessary to incorporate a careful analysis of the current stance of policy, the nature and duration of the shocks, and the appropriate management of

risks in each direction. The textbook response requires making several assumptions: that the policy setting is appropriate absent the shock, that the supply shock will not affect inflation expectations, and that the inflation risks are symmetric. Each of these assumptions was on shaky ground during the post-pandemic inflation. Monetary policy in most countries was highly accommodative before the supply shocks (as discussed above). As a result, interest rates would have needed to be increased to at least neutral levels over time, even if the shocks were 100% transitory and looking through them was appropriate. Moreover, the series of large shocks pushing up inflation increased the risk that inflation expectations would not remain anchored; in some countries (such as the United Kingdom and Chile), medium-run and long-run inflation expectations began to move up, raising the risk that ‘transitory’ shocks were becoming embedded in wage and price setting. The interaction of the supply shocks with limited spare capacity also risked generating a larger and longer-lasting impact on inflation (as discussed in the chapters by Macklem, Dao and co-authors, and Castle and Lombardelli). As a result, risk management considerations required a policy setting restrictive enough to prevent inflation expectations from de-anchoring to the upside. In some cases, this called for a shift from a balanced rule to a robust control strategy and a faster pace of rate hikes (see the chapters by Evans and by Macklem). In practice, this implied setting policy for the weighted or mean scenario, rather than the mode. Such a change in strategy, however, then raises the question of when to shift back to a balanced rule, and how and when to adjust policy if the risk scenario does not materialise.

Third, despite the development of an array of new tools used by central banks since the 2008 crisis, interest rates remain the primary instrument for tightening policy and bringing down inflation. When the pandemic hit, central banks relied on a wide range of tools to support their economies (such as balance sheet policies, forward guidance, bank support programmes, a range of liquidity and credit support programmes, and in some cases exchange rate intervention) – even in many countries with interest rates above their effective lower bounds. As inflation picked up, however, central banks quickly reaffirmed that interest rates were the main instrument for tightening monetary policy and bringing down inflation. While some countries used additional tools to support the tighter stance of policy – such as the exchange rate (Switzerland), liquidity withdrawal (Korea), or different forms of QT – the asymmetry in the array of tools used to ease policy combined with the primacy of interest rates for tightening was established. Countries that attempted to use other policies to substitute for higher interest rates – such as Türkiye – were unsuccessful in controlling inflation (see the chapter by Kara and Sarıkaya). This asymmetry in the use of a variety of tools for easing, while relying predominantly on interest rates for tightening, partly reflects the constraint of the effective lower bound (ELB); once the policy rate reaches the effective lower bound, other tools are needed. It also reflects caution by central banks in using the balance sheet as an active tool for tightening policy. There is very limited experience with shrinking balance sheets, so that such policies are hard to calibrate and communicate, and the risks around financial stability are not well understood. Moreover, since some of the channels by which QE

stimulates the economy (such as through signalling and liquidity) are likely to be less effective when reversed, QT may not be as useful in removing accommodation as in providing it.

Fourth, central banks should maintain flexibility to adjust policy in either direction, especially in environments of substantial uncertainty. As discussed above and shown in Figure 7, forecasting inflation is extremely challenging, especially when inflation dynamics are increasingly driven by global shocks and supply shocks. As a result, policy may need to be adjusted quickly. Some easing tools – such as QE, forward guidance, and yield curve control – rely on expectations of future action (or lack of action) for their effectiveness, and so often involve at least an implicit commitment to maintain the given policy for a certain length of time or until a set of conditions is met. While this expected persistence has contributed to the effectiveness of these tools, it can also make it difficult to communicate when a sudden pivot is needed. As inflation picked up after the pandemic, some central banks felt constrained in their ability to raise interest rates – a tool which can be adjusted quickly – as it was expected they would sequence tightening by adjusting other tools before their first rate hikes (such as adjusting forward guidance and ending asset purchases or yield curve control). This sequencing added noise to the tightening process – such as the surprise end of yield curve control by the Reserve Bank of Australia, or the “talking about talking about tapering” discussion by the Federal Reserve as it sought to limit the risks of another taper tantrum. Clearer communication is needed to explain to the public that policies may need to be adjusted sooner than anticipated if the economic outlook changes. A sudden end to the use of tools such as guidance, asset purchases and yield curve control should not be seen as a failure of the approach, but rather as a feature of the instruments in an uncertain world. In the future, these tools should be carefully designed to balance the need to provide robust support for the economy against the risk of a potential need to pivot swiftly, possibly by providing well-defined, state-contingent triggers or thresholds (see the chapter by Jane Ihrig and Chris Waller).

Fifth, although fiscal policy is outside of central bank mandates, central banks should not always shy away from discussing how fiscal policy could affect the economic outlook and risks. Governments deployed a massive and unprecedented fiscal stimulus in response to COVID – much of which had the traditional impact of supporting both growth and inflation. After the Ukraine invasion led to a spike in commodity prices, many governments also implemented an array of energy price caps and subsidies to support incomes and contain the rise in energy prices – a form of fiscal policy that worked in the other direction and dampened inflation pressures. These energy policies limited the effect of price increases on inflation expectations and, by supporting incomes, restrained wage demands and thus lowered the risk of a wage-price spiral. The chapter by Dao and co-authors argues that these fiscal policy measures helped lower headline inflation

in the eurozone by about 2 percentage points.²¹ While central banks may assume the continuation of ‘current policies’ in their baseline forecasts, they could make greater use of alternative scenarios that reflect how some of these measures that directly affect price levels would change the inflation forecasts. For example, if central banks had modelled the impact of alternate energy support policies after the 2021 commodity price spikes (shown in Figure 3), they could have reduced some of their large inflation forecast errors (shown in figure 7).

Sixth, monetary policy will have a much larger fiscal effect than many hoped in the pre-COVID era of low interest rates, an effect which could lead to more political pressure on central banks. The rapid rise in interest rates over the past two years has had a direct and meaningful fiscal effect, through both the losses to central banks on their asset holdings and asset sales, and through the increased cost of financing government debt.²² Although the losses on central banks’ balance sheets are immaterial for the conduct of monetary policy, they could be used to support political attacks on the independence of central banks, and the overall fiscal effects of higher rates are raising questions about the sustainability of public debt in some countries. The extent to which the recent increases in interest rates affect public finances over the medium term is unclear and will depend on a number of hard-to-predict variables.²³ For example, it will depend on the relationship between growth rates and the interest rate paid on public debt over time, which will in turn depend on the much-debated level of the neutral interest rate.²⁴ This is likely lower than today’s rates, albeit higher than pre-COVID due to larger government debts and deficits. Moreover, any change could reflect, in part, stronger growth prospects due to technological advances such as AI, progress which would have offsetting effects on revenues. In any event, with the debt-to-GDP ratio much higher in many economies because of the fiscal actions taken in response to the pandemic, the impact of higher interest rates and corresponding room for fiscal policy mistakes may have narrowed materially.

Finally, even though macroprudential and regulatory reforms since the 2008 financial crisis have meaningfully strengthened banking systems, vulnerabilities still exist, and central banks need to be able to achieve their monetary policy goals while supporting financial stability. As central banks raised interest rates much faster and to higher levels than expected, several financial institutions and sectors came under stress – such the liability-driven investment (LDI) sector in the United Kingdom, regional banks in the United States, and Credit Suisse in Europe. While broader financial systems generally remained resilient during these episodes (see the chapters by Klaas Knot and by Claudio

21 See also Dao et al. (2023).

22 That said, the fiscal implications of asset purchases are complex. Even if central banks have losses on their holdings, purchases should reduce government funding costs and also contribute to a stronger economy, thereby boosting tax receipts and cutting safety net spending. Higher inflation will also reduce the real burden of outstanding longer-term debt; see English and Kohn (2022) for a discussion.

23 Also, the effects of recent rate increases will have a delayed effect as the average maturities of public debt are in the seven- to ten-year range.

24 See Obstfeld (2023) for a recent discussion.

Borio), the limited and contained effects were at least partly due to the rapid intervention by central banks. Indeed, central banks aimed for a 'separation principle' under which different tools were used to simultaneously achieve financial stability and price stability goals – even when the tools appeared to work in opposite directions. For example, as the UK LDI sector came under stress, the Bank of England resumed buying gilts for a short period to provide liquidity to LDI funds that were being forced to sell assets at large losses – even though it was planning to start its QT programme. In the United States, as regional banks experienced stress, the Federal Reserve created a new liquidity facility to ease banks' adjustment to the lower market values of their bond portfolios due to rapidly rising interest rates – even as the FOMC was raising interest rates.²⁵

Nonetheless, in some cases financial stability goals affected the timing of monetary policy. For example, Korea raised rates earlier than it would have based purely on price stability considerations because of concerns that a housing boom triggered by easy monetary policy was generating financial stability risks (see the chapter by Rhee and Park). In contrast, the Federal Reserve likely would have raised rates further during 2023 if the fallout from the regional banking stress had not already tightened financial conditions. Central banks should plan in advance for situations when financial stability concerns could require actions that seem to work against monetary goals. For example, they should design programmes to provide emergency liquidity or support market functioning in periods of systemic stress in ways that minimise their impact on monetary policy (as the Bank of England did in its support of the LDI sector). This is not straightforward – and there are many difficult issues to consider (such as appropriate communication and how to limit moral hazard) – but careful thought about contingencies in advance would be helpful so that tools are available if needed in an emergency.

These seven lessons for central banks from their responses to the post-pandemic inflation have important implications for the mandates of central banks. Most important, central bank commitments to inflation targets should not be undermined. When inflation spiked, a key part of central banks' efforts to anchor inflation expectations relied on emphasising their commitment to their current inflation targets. Discussion of raising the inflation target, which had been floated prior to the inflation surprise as a way to overcome constraints around the lower bound, was suddenly muted. The recent experience has also led some to question the 'mandate creep' occurring at a number of central banks before the pandemic, as it made it harder to message the focus on inflation (and full employment in the United States). Governments had not previously worried about giving central banks additional responsibilities when inflation was low and there was little risk of these additional responsibilities affecting actual or expected inflation.

²⁵ Also, the FDIC, the Federal Reserve, and the Treasury invoked the systemic risk exception to least-cost resolution to limit the contagion effects from the failures of Silicon Valley Bank and Signature Bank.

As high inflation became the top priority, however, the importance of a simple message – price stability (possibly combined with full employment) – was central to avoiding high inflation becoming embedded in wage and price setting.

Another key lesson for central bank mandates is the importance of symmetry in their response to high and low inflation. While the effective lower bound should affect risk management and the choice of policy tools when inflation is low, central banks must also remain resolute in their willingness to address upside risks to inflation. The upcoming round of reviews of policy frameworks by the main central banks will need to assess whether the focus had shifted excessively to containing deflation (particularly in the United States) and should aim to strengthen the ability of central banks to respond to all kinds of shocks (see the chapter by Evans).

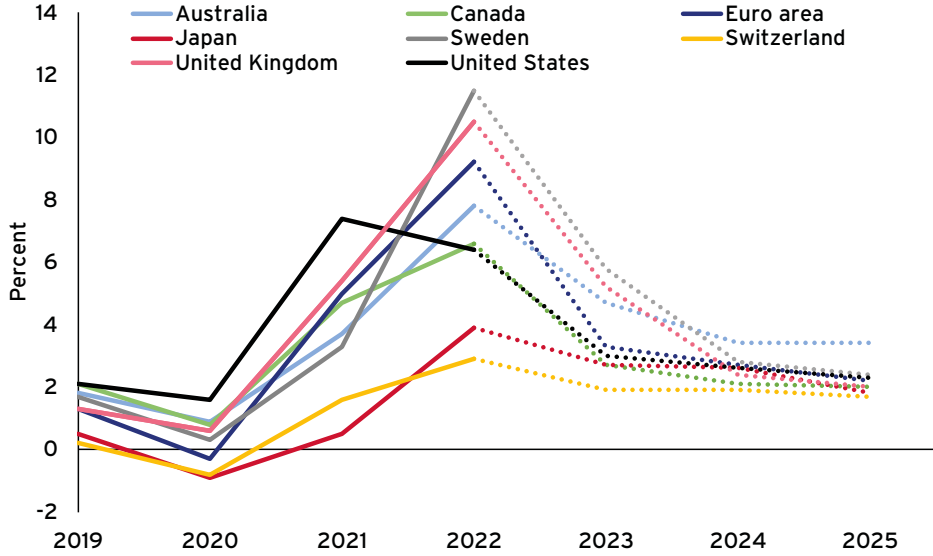
4 CONCLUSION

As we write these lines at the start of 2024, it seems possible, although not assured, that monetary policy will achieve a soft landing after the post-pandemic inflation. After spiking in 2021 and 2022, inflation appears to be on track to return close to target in most countries (Figure 10) without a significant slowdown in activity. Some emerging market central banks – those that led the tightening cycle – have already started cutting rates (such as Brazil and Chile) and most central banks are signalling they are likely to follow in coming months, including in advanced economies where headline inflation peaked near double digits. The robust policy response to the pandemic described in English et al. (2021) appears to have successfully avoided the negative hysteresis that followed the Great Recession and left employment and output weak and inflation below target for years. In fact, Figure 11 shows that unemployment rates are not only close to pre-pandemic levels in most countries, but in many cases lower (and in some cases meaningfully lower) than 2019 levels (and these levels were believed to be around full employment in many economies).

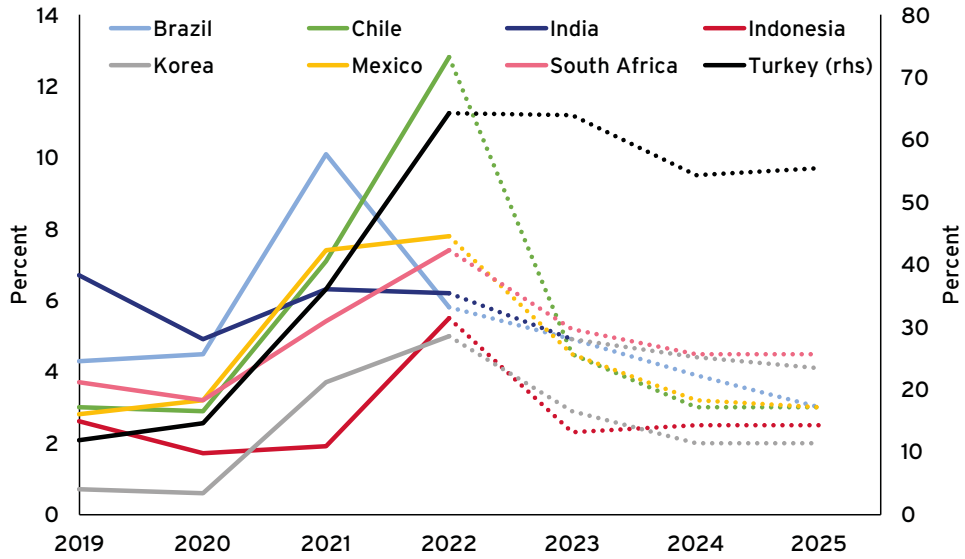
Of course, the end of this story is yet to come. While inflation has been falling quickly and is forecast to return to targets, it still has some way to go in many economies. Forecasts missed much of the upward spike in inflation, and some of the nonlinearities and interactions that caused these forecast errors could play a role (in either direction) as inflation falls. Some of the impact of the sharp tightening in monetary policy on the real economy is still to come and may play out differently than historic precedents. The result is a high level of uncertainty about the outlook – even in the absence of any further global shocks or supply shocks – which could easily arise and suddenly shift inflation in either direction.

FIGURE 10 CONSUMER PRICE INFLATION, 2019-2025 (EXP.)

a) Advanced economies



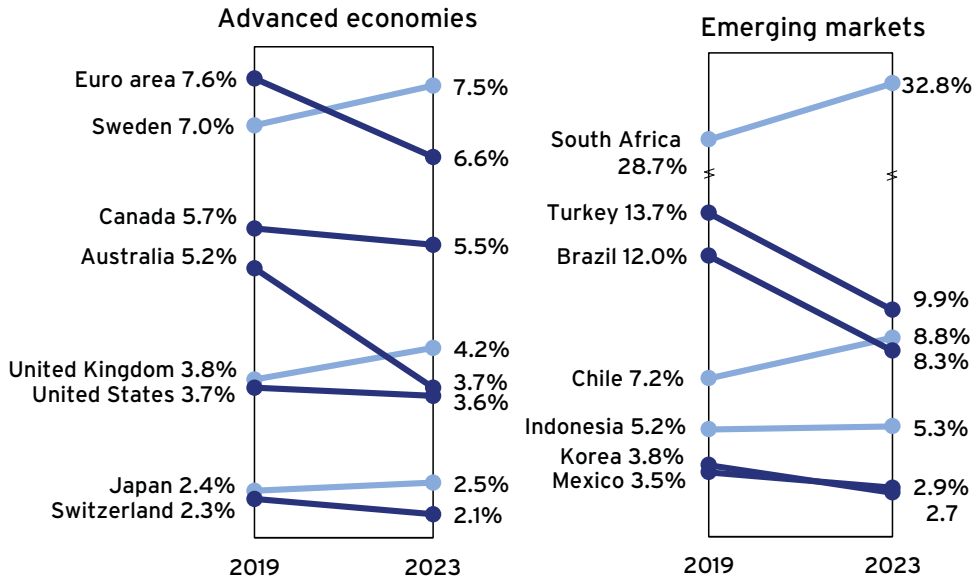
b) Emerging markets



Source: Data based on IMF *World Economic Outlook*, October 2023.

Note: End of period annual consumer price inflation.

FIGURE 11 UNEMPLOYMENT RATES, 2019 AND 2023



Source: Based on data from the IMF World Economic Outlook, October 2023.

While the central bank response to the post-pandemic period of high inflation seems to have been successful thus far, the aggressive pivot and then tightening of monetary policy over 2021-2023 generated new risks. The unexpected and aggressive hikes in interest rates have caused financial stress for households, businesses, and financial institutions; bankruptcies are picking up quickly and housing transactions have largely frozen in many countries. The fiscal positions of many countries have worsened and could require substantial reductions in spending and increases in taxes – neither of which will be politically popular. Could central banks have provided less stimulus in response to the pandemic, or removed the stimulus sooner, resulting in less inflationary pressure and thereby reducing the need to hike interest rates as aggressively while still fostering a full recovery from the pandemic?

Even if a more restrained monetary policy response to the pandemic could have dampened the subsequent need to hike interest rates, this potential benefit would need to be balanced against the benefits of the aggressive monetary support. Most economies have recovered to pre-COVID levels of GDP more rapidly than expected, and robust recoveries in many economies helped bring workers back into the labour force and avoid a longer-lasting hit to labour supply. Importantly, any judgement of whether central banks eased too much in response to COVID must be assessed based on the information that central banks had at the time of their decisions – not with the benefit of hindsight. When central banks were responding to the pandemic, and then when they were deciding when to reduce stimulus as economies began to recover, it made sense to focus on the downside risks to both activity and inflation. Most countries had been slow to recover

from the financial crisis, and inflation had been too low for most of the previous decade. The uncertainties around the global pandemic were also largely on the downside as the COVID virus continued to evolve.

Nonetheless, the experience of the past couple of years has been a poignant reminder to central banks that they cannot ignore the risks to inflation, especially in a world where inflationary pressures can quickly shift (in either direction) from impossible-to-predict global shocks. Whenever they confront the next shock, they will have to incorporate in their judgements the possibility that inflation could surprise aggressively to the upside or downside. Moreover, central banks may have gotten away with a slow response to the sharp turnaround in inflation this time around due to context-specific factors; the very tight labour market may have taken longer to feed through into wages and prices because of inflation having been too low for an extend period. In countries which had not had inflation below target for the 2010s, the 'hot' economy has created a more challenging wage and inflation dynamic that may make it harder to return inflation to target. Thus, even if an aggressive response to economic weakness was the appropriate strategy in 2020, it might not be the optimal approach to a similar shock today, with a starting point of inflation expectations anchored near target, a recent period of above-target inflation, and with little spare capacity in labour markets.

Similar difficult issues will arise if inflation converges towards – but remains above – 2% targets. It will be tempting to debate whether it is worth the costs of maintaining restrictive monetary policy to continue reducing inflation all the way to 2%, especially if a potentially long period of slack in labour and goods markets is required to return inflation to target. Should central banks instead stabilise inflation a bit above 2%, to offset future declines below target and achieve 2% inflation on average, as suggested in the chapter by Evans? Should central banks revise their inflation objectives higher? Or should the recent episode be a reminder of the risk of underestimating the costs of high inflation and weakening the focus on inflation targets? Will countries that were slower and less aggressive in responding to the spike in inflation face a more difficult trade-off in returning to price stability?

We hope that the chapters in this book will provide guidance on how to balance these considerations during the next period of high inflation.

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PART 1

MONETARY POLICY RESPONSES IN ADVANCED ECONOMIES

CHAPTER 1

Central bank responses to the post-COVID period of high inflation: The case of Australia

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INTRODUCTION

The onset of the COVID-19 pandemic put whole countries on high alert, from front-line workers to businesses to governments and their agencies. The pandemic was, first and foremost, a public health threat that has led to around 11.6 million confirmed infections and 23,500 deaths in Australia since early 2020.¹ At the same time, the public health measures taken to contain the health threats in Australia and worldwide were certain to result in an economic downturn and unemployment. What was impossible to know at the outset was how much economic hardship and for how long.

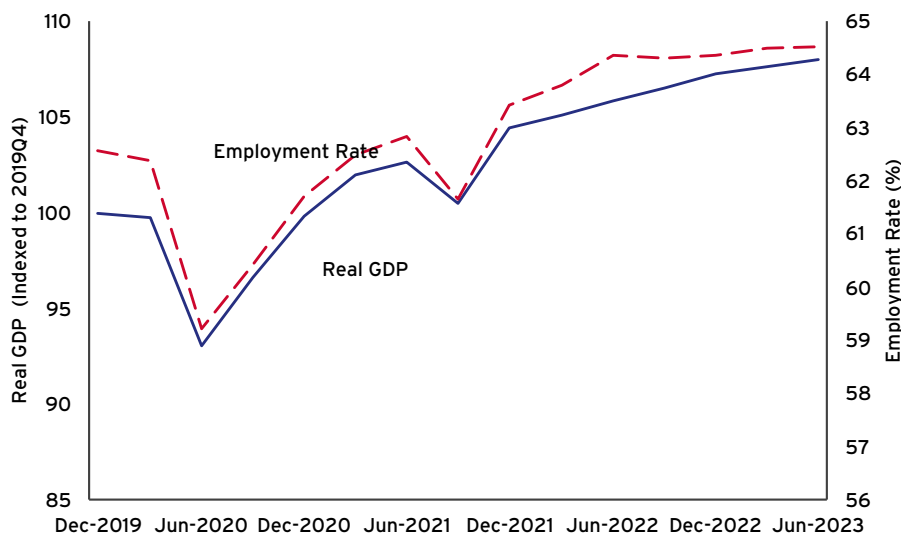
Like many central banks, the Reserve Bank of Australia (RBA) responded forcefully in March 2020 as the pandemic took hold to help support the economy and return inflation to its 2–3% target. The RBA acted to restore market functioning and stimulate aggregate demand through a combination of targeted asset market purchases, interest rate decreases, yield curve control, state-based forward guidance and a facility to ease bank funding conditions.² In November 2020, the RBA provided further monetary easing via a bond purchase programme. These actions were on top of considerable fiscal stimulus and some targeted micro-macro prudential actions to help support the flow of credit (Debelle 2023).

Authorities were justified in taking these initial actions, as the economic downturn was sharp and deep in the second quarter of 2020 (annual real GDP growth was -5.7%). The combination of decisive fiscal and monetary policy actions created a bridge to ‘the other side’ such that the level of economic activity and employment as a share of the working-age population recovered sharply, returning to its pre-COVID level in the 1st quarter of 2021 (Figure 1).

1 As of 8 November 2023 (see <https://covid19.who.int/region/wpro/country/au>).

2 A full discussion of the rationale for these actions can be found in Debelle (2021) and Lowe (2020).

FIGURE 1 REAL GDP AND EMPLOYMENT RATE



Notes: a) All values are quarterly from December 2019 to June 2023; b) Real GDP values are indexed to Dec-2019; c) Employment rate is calculated as the total number of employed persons as a share of working age population.

Source: Authors calculations based on RBA Statistical Table H1 and H5.

That said, with the benefit of hindsight, subsequent injections of monetary stimulus were at odds with achieving the inflation target. This appears to be due to the effects of persistent supply chain issues on inflation. Moreover, the availability of vaccines meant that subsequent waves of COVID were less detrimental to demand than many had expected and, along with continued fiscal stimulus, warranted tighter monetary policy settings. The illegal invasion by Russia of Ukraine only made inflation pressures worse.

This turn of events led to an abrupt exit from yield curve control in October 2021, forward guidance in May 2022, and a rapid increase in the policy rate from 10 basis points to 4.35% by December 2023. The good news is that inflation is now retreating slowly, although it is expected to take until the end of 2025 to reach a little below 3% (RBA 2023b).

The Australian Government commissioned an independent review of the RBA in July 2022, which the two co-authors of this paper and Dr. Gordon De Brouwer completed in March 2023 (Australian Government 2023). The Review had a broad mandate, covering monetary policy performance and choice of policy instruments, the RBA’s objectives, the interaction of monetary policy with fiscal and macroprudential policy, its governance (including Board structure), and its culture.³ Here, we will highlight the five main lessons that underpin the RBA Review’s recommendations most relevant to the recent period:

3 The final report had 51 recommendations, all of which were accepted by the government.

1. **Regular use of cost-benefit and stress-scenario analyses** would support decision-making under uncertainty by testing the efficacy and robustness of different monetary policy strategies. This is particularly important when considering extraordinary policy tools (e.g. yield curve control, quantitative easing (QE), time-based forward guidance and related exit strategies).
2. **More effective monetary and fiscal policy coordination** to provide better collective responses to both downside *and* upside shocks to inflation.
3. **A better-enabled RBA Board** would support more effective challenge in decision-making. This includes criteria for selection of board members encompassing a wide range of relevant skills and experience, more time to consider and shape analysis, support from RBA staff, and inclusion in all monetary policy-related decisions.
4. **Enhanced clarity around the monetary policy framework and regular reviews of the framework** to support understanding of the RBA's commitment to the welfare of Australians and help ensure that the commitment remains in their best interests.
5. **Improved transparency around monetary policy decisions** to support accountability and inform public debate. This includes more fulsome minutes of Board meetings (e.g. unattributed voting records), regular press conferences at each decision point, making forecasts available in convenient formats, including for the NAIU and potential output. The Review also recommends making Board papers available with a lag.

The remainder of this chapter describes the RBA policy actions from March 2020 to November 2023, and then turns to an assessment based on the main economic and financial outcomes. We then expand on the lessons learned from these policy actions and outline how the Australian Government and the RBA are taking steps – through policy and proposed legislative changes – to address the Review's recommendations (Bullock 2023, Australian Government and the Reserve Bank of Australia 2023, Parliament of Australia 2023). We conclude with some suggested future research.

RBA POLICY RESPONSE TO THE PANDEMIC

The Review of the Reserve Bank of Australia assessed the use of monetary policy tools through notable periods, including the initial phase of the pandemic (March to September 2020), the second phase of the pandemic (October 2020 to August 2021) and the overshooting of the inflation target afterwards (until March 2023). Annex 1 summarises the key policy actions from 2020 onwards. For all of these periods, it is important to consider the context in which decisions were made, including the considerable uncertainty and the complexity of the tools the RBA deployed for the first time. Overall, the Review found that the RBA is a highly respected institution with an

excellent reputation both domestically and internationally. Nonetheless, some limitations in the setting of monetary policy were evident in each of the phases that then informed the recommendations of the Review to strengthen the RBA into the future.

The initial phase of the pandemic: March to September 2020

Unlike many other developed economies, Australia had not used unconventional monetary policy tools until the onset of the pandemic in 2020. In March 2020, the RBA reduced the cash rate target to what was then considered to be the effective lower bound of 0.25% and introduced three additional monetary policy tools to support the economy. These included a term funding facility, forward guidance, and Australian Government Bond yield curve control (YCC). The combined intent of the additional policies was to ease financial conditions by lowering borrowing costs, ensuring access to credit and contributing to lowering the exchange rate (Debelle 2021).

The term funding facility, introduced in March 2020 and extended in September of that year, was intended to provide a reliable and low-cost source of longer-term funding to banks, which would support market functioning and a continued flow of credit to households and businesses over a challenging period.⁴ Generally viewed as successful in achieving its objectives, it was closed to new drawdowns in June 2021, at which time A\$188 billion of funding was outstanding. One notable design limitation to consider for the future is the facility's fixed interest rate structure, which built in rigidity as economic conditions evolved.

Aside from the reductions in the policy rate, YCC and forward guidance were the tools most directly aimed at supporting the macroeconomy and returning inflation to target.⁵ YCC was the most novel and was implemented despite not being included in the preferred options to pursue in preparatory work presented to the Reserve Bank Board in mid-2019 outlining options if the cash rate ever reached its effective lower bound, and further support was required. The target for the yield on three-year Australian Government Bonds was set at 0.25%.⁶ This programme was supported by state-based forward guidance that the cash rate would remain unchanged until progress was made towards full employment and inflation was sustainably within the 2–3% target band.

The Review found that the policies implemented over this initial phase successfully buffered the economic fallout of the pandemic and the accompanying health measures by reducing finance costs for large purchases of government debt (Orphanides 2023).

There were limitations evident in this period, however, mainly around the range of information considered by the Board and governance, that show up again in the subsequent phases. In particular, there was a dearth of analysis provided to or requested

4 The facility provided three-year funding to authorised deposit-taking institutions (ADIs) at a rate that was fixed and below market funding costs. Access to new funding was linked to an ADI's growth of business credit.

5 Australia and Japan are the only countries to implement a yield curve control programme.

6 The target focussed on the bond closest in maturity to three years: the April 2023 bond until October 2020 and the April 2024 bond after that.

by the Reserve Bank Board on the design of the new monetary policy programmes, their expected costs and benefits, and the associated strategies to manage risks, including exit strategies under different scenarios. Moreover, the structure around the Reserve Bank Board's deliberations gave the Board insufficient time to challenge materials, request additional information or discuss alternative strategies to those presented to them; for instance, because the Board meets 11 times a year, the Board members receive board papers only a few days before the decision meetings, which last only half a day, before decisions are announced at 2:30pm the same day.

Second phase of the response to the pandemic: October 2020 to August 2021

Towards the end of 2020, many central banks grappled with ambiguous evidence on whether additional monetary policy support was needed. RBA forecasts at that time were for a long and slow recovery. While COVID-19 vaccines had been approved in some countries by the end of the year, there was still considerable uncertainty about availability and effectiveness. Nonetheless, some argue that there were already early indications that activity and employment outcomes would not be as bad as expected, particularly given the significant stimulus already provided by monetary and fiscal policy, such that additional support was unnecessary (Orphanides 2023). At a minimum, the situation merited serious consideration of the upside risks to inflation in addition to those on the downside; given those circumstances, the Review concluded that there were insufficient materials to support a robust debate about how much further monetary support was needed, if at all.

The Reserve Bank Board initiated a second phase of unconventional policy tools in October and November 2020, with existing programmes being extended or modified and the Board deciding to introduce a Government Bond Purchase Programme (GBPP).

For the existing programmes, a calendar-based component of three years was added to forward guidance in a speech by the Governor in October and in the Reserve Bank Board statements from November, indicating they did not expect to increase the cash rate for at least three years. In November, the Reserve Bank Board lowered the yield curve target and the policy rate to 0.1%.

The GBPP was introduced in November 2020 to help lower borrowing costs across the whole term structure and to lower the exchange rate. The Reserve Bank Board committed to purchasing \$100 billion of bonds at \$5 billion weekly over six months, at maturities of around five to ten years. The split of bond purchases was 80% on nominal bonds issued by the Australian Government, with the remaining 20% on bonds issued by the state and territories.⁷

⁷ Given that Australia's corporate bond market is small, it was not a part of the programme.

By February 2021, the calendar-based language around forward guidance further evolved to become more specific by modifying forward guidance that the Board does not expect these conditions (i.e. inflation sustainably within the 2–3% target range) to be met until 2024 at the earliest. As the year progressed, inflationary pressure emerged in Canada, New Zealand, the United Kingdom and the United States. Despite signs of an inflation pickup abroad, in July 2021, the RBA announced an extension of the GBPP until at least mid-November, with a reduced intervention amount of \$4 billion a week.

The Review found that the limitations identified in the first phase carried over to how the decisions were taken in the second, particularly with regard to the expected net benefits of the programme. It is unclear how powerful targeting the five to ten-year segment of the yield curve would be, particularly given that housing finance and bank funding in Australia typically occurs at a shorter end of the term structure. The RBA's own modelling – conducted after the programme was introduced – estimated that the programme boosted real GDP by \$13.5 billion and added 37,000 jobs (Australian Government 2023). This is set against the expected direct financial losses of the programme, which range between \$35 billion and \$58 billion (RBA 2022a). Moreover, the financial costs will likely be higher than this, given that interest rates have had to rise faster than expected at the time the estimates were made.

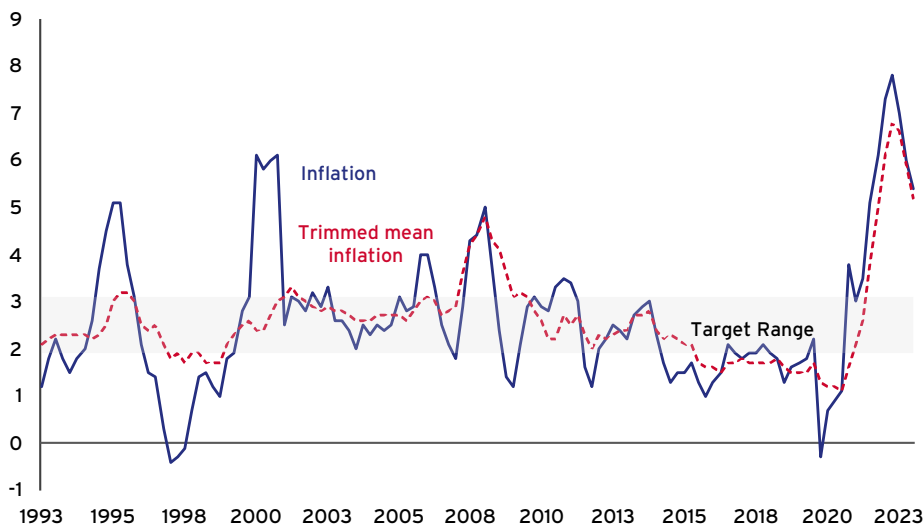
Moreover, there were also continued governance issues. For example, the introduction of the calendar-based element of forward guidance was not presented in advance to the Reserve Bank Board for decision as a policy instrument, and the Reserve Bank Board was not consulted on the extension of the yield target in September 2020.

The inflation shock: September 2021 to present

Inflation took the RBA – along with many other forecasters – by surprise in September 2021 as trimmed mean inflation jumped to 2.1%, above their forecast of 1.7%. By December 2022, trimmed mean inflation reached 6.9%, while headline inflation peaked at 7.8%. This was the highest rate in more than three decades after many years of inflation running somewhat below target (Figure 2). As in many other countries, supply disruptions (e.g. food, some durable goods and energy) along with growing demand pressures were pushing inflation higher than expected. The Russian invasion of Ukraine in February 2022 only made matters worse.

Monetary policy remained very accommodative during the initial phase of the inflation shock in 2021, with the RBA and many central banks expecting the pickup to be temporary. It was becoming clear that market participants and some senior RBA staff were seeing more persistent inflation and expecting the RBA would ultimately need to tighten policy earlier than indicated by their forward guidance.⁸

8 For example, the Reserve Bank Board were not made aware of options discussed by senior staff members to discontinue yield curve control in mid-2021.

FIGURE 2 CONSUMER PRICE INFLATION AND TRIMMED MEAN INFLATION (%)

Notes: a) All values are quarterly from March 1993 to September 2023; b) Inflation values are year-over-year percentage change; d) Trimmed mean inflation is a measure of consumer price inflation that excludes the prices of goods and services with the largest movements (positive or negative).

Source: RBA Statistical Table G1.

Following the stronger-than-expected inflation data in October 2021, the yield on the target bond moved sharply away from the target. The RBA made no purchases to defend the target when it would have been expected to, and made no announcement to explain why. This sudden and unexplained change in policy generated uncertainty in financial markets as to whether YCC had indeed been dropped, causing market disruption. It also undermined the RBA's credibility, especially among market participants.⁹

By May 2022, the higher-than-expected inflation motivated the Reserve Bank Board to begin raising the cash rate, slightly behind the US Federal Reserve and the Bank of Canada and lagging the Bank of England and Reserve Bank of New Zealand by five and eight months, respectively. From May 2022, the Reserve Bank Board increased the cash rate by 25 or 50 basis points each month until June 2023, except for April.¹⁰ The rate rises were paused between July and October 2023 as they waited to see how inflation and employment evolved. The cash rate was increased again in November to 4.35% (bringing the cumulative increase to 425 basis points), and was paused in December as the Board assessed the risk of inflation remaining higher for longer.

⁹ This is evidenced from many market reports as well as the results of consultations done for the RBA Review.

¹⁰ The Reserve Bank Board meets eleven times a year (monthly except for January).

In hindsight, the Board, like other central banks, was slow to tighten monetary policy given rising inflation, highlighting several limitations:

- **Forecasting tools and focus on downside risk.** The slow reaction of the RBA to rising inflation partly reflected persistent and larger-than-normal forecasting errors for inflation and employment, combined with a desire to insure against downside risks. The slow response was also reflected in the continued use of calendar-based forward guidance until November 2021 and state-based forward guidance until May 2022 despite increasing evidence of inflation and other countries raising their policy rates. The public interpreted the decision to increase interest rates in May 2022 as a broken promise, significantly undermining the RBA's public credibility.¹¹
- **Exit strategies.** The exit from YCC and forward guidance was disorderly, reflecting limitations with respect to consideration of exit strategies if upside risks were to crystallise. While scenarios where inflation pressure was stronger than the base case were presented to the Reserve Bank Board in late 2020, they did not address implications for the policy rate. Hence, inadequate consideration was given to various exit strategies from YCC and forward guidance. Moreover, Orphanides (2023) found that the bond purchase program carried a risk of creating pressure on the yield target and was counterproductive in that it complicated the assessment of the stance of policy.¹² By the end of the year, the RBA signalled that the end of the GBPP was in sight, although the last purchases were in February 2022.
- **Governance.** The RBA effectively decided to discontinue YCC (by ceasing to implement it) a week before the Board meeting in which the decision was formally made.¹³ As noted earlier, this followed other related decisions that were taken without Board consultation (i.e. introducing the calendar-based element of forward guidance, extending the yield target in September 2020) as well as lack of visibility of the Board of key analysis on alternative exit strategies from YCC. Overall, this highlights unclear lines of responsibility between the RBA executive and the Board in terms of policy decisions and implementation.

LESSONS LEARNED AND FUTURE RESEARCH

Given the extreme uncertainty concerning how the pandemic and the related health measures would affect the lives and livelihoods of Australians, we commend the RBA for its decisive actions to stabilise the economy. Moreover, the RBA and the Australian Government are making meaningful steps to implement the changes recommended by the Review to set themselves up for success in the future.

11 This was evidenced in the extensive consultations conducted in the context of the RBA Review.

12 Orphanides (2023) found that it was unclear the additional stimulus from the GBPP was necessary given economic conditions at the time, or how the size of the programme was calibrated accounting for the stimulus already in place through alternative policies.

13 The Board was not informed ahead of the Governor's decision to not defend the yield target.

Top of our list is the need to make better use of cost-benefit and stress-scenario analyses.

We have noted several instances over the past few years when these policy evaluation methodologies would have supported more robust discussion among RBA Board members by testing the efficacy and robustness of different monetary policy strategies. For example, scenario analysis that contemplated a serious inflation overshoot would have been valuable for Reserve Bank Board deliberations on exit strategies from YCC and forward guidance and setting the policy rate. A structured, empirical approach is critical when making strategic decisions about extraordinary policy tools under extreme uncertainty.

That is why the Review also recommended that if the RBA plans to consider using these extraordinary monetary policy tools, it should develop a framework for using these tools to embed lessons from its recent experience. The Review recommended this requirement be captured in the agreements between the Treasurer and the Reserve Bank Board set out in the Statement on the Conduct of Monetary Policy (“The Statement”);¹⁴ the framework should cover transparency, assessing costs and benefits, managing risks, exit strategies at the outset for different scenarios and discussions on the appropriateness of fiscal policy as an alternative policy lever. The new Statement published in December 2024 adopted these measures with the language around fiscal policy as an alternative policy lever (Australian Government and the Reserve Bank of Australia 2023).¹⁵

Related to this is the need for more effective monetary and fiscal policy coordination to provide better collective responses to both downside and upside shocks to inflation.

The RBA’s own work (RBA 2022b), as well as the work of others (Lucca and Wright 2022), suggests that the net benefits of government bond purchase programmes in the form of QE may not be that high for small open economies such as Australia. QE can imply substantial fiscal costs, and fiscal policy is likely more effective than QE at the effective lower bound.

Clearly, the RBA and Government must determine their policy settings independently, considering their individual objectives and constraints. That said, increased information sharing between the RBA and Government on risks, scenarios and policy constraints would improve coordination without threatening the independence of either authority. As part of this, the Review recommended that the RBA and Treasury undertake joint scenario analysis exercises to prepare for best responses to challenging circumstances that may occur more frequently such as supply shocks and shifting geopolitics. Other challenges where policy responses may be less straightforward than in the past include climate events, the transmission to a lower-carbon economy and demographic shifts.

¹⁴ The Statement “records the common understanding of the Reserve Bank Board and the Government on key aspects of Australia’s monetary and central banking policy framework” (Australian Government and Reserve Bank of Australia 2023).

¹⁵ The Statement says that “[t]he Government recognises the role that sound fiscal management plays in achieving the Reserve Bank Board’s objectives. In recognition of this, the Reserve Bank and the Government (through the Treasury) commit to working together to enhance their understanding of prevailing macroeconomic conditions and the impact that monetary and fiscal policy settings have in influencing these conditions.”

The RBA and Treasury should also work more with outside researchers to advance understanding of policy interactions by developing an Australian Macroeconomic Policy Research Program to promote applied monetary, fiscal and financial policy research.¹⁶ The Review identified a need for more modelling capacity on the supply side of the economy and the interactions between monetary and fiscal policy.

A better-enabled RBA board would support more effective challenge in decision making

The Review found that the Reserve Bank Board could provide more challenge to the RBA executive's view if its skillset were better matched to the complex economic environment in which monetary policy increasingly operates. The external members of the Reserve Bank Board have been outstanding leaders in their fields, yet collectively have less economic and financial market expertise than decision-making bodies at comparable central banks.¹⁷

The Australian Government has introduced proposed changes to the RBA Act that would create a dedicated Monetary Policy Board and a separate Board that would deal with the broader corporate governance of the RBA (currently, the RBA Board does both, although it spends little time on governance), consistent with the Review's recommendations.¹⁸ This prospective change in governance is also recognised in the renewal of The Statement. To reduce the chance of governance lapses of the nature experienced during the COVID period, the Review recommended that all RBA boards establish charters setting out their responsibilities and those of the executive.

To better enable a Monetary Policy Board, the RBA has adopted the Review's recommendations to deepen the Board's deliberation on monetary policy and ensure it is open to a wide range of inputs, including:

- moving from 11 to 8 policy meetings a year, but increasing the time spent on monetary policy and strategy;
- providing opportunities for Board members to hear the views of a wider range of RBA staff and giving external Monetary Policy Board members staff support;
- increasing the forecasting and macro-econometric modelling capability of RBA staff and ensuring that decisions are informed by the best possible data;
- producing a richer set of briefing materials on strategy, policy options, costs, benefits and risk;
- convening an expert advisory group to hear external views on the economy and outlook, policy issues and strategy, and research.

¹⁶ See Leeper (2023) for advice given the Review on monetary-fiscal policy interactions for central bankers.

¹⁷ See Gai (2023) and Levin (2023) for advice given to the Review on governance of monetary-policy decisions.

¹⁸ As of early December, the proposed changes had received only the first reading in Parliament. For more information, see https://parlinfo.aph.gov.au/parlInfo/search/display/display.w3p;db=LEGISLATION;id=legislation%2Fbills%2Fr7126_first-reps%2F0001;query=id%3A%22legislation%2Fbills%2Fr7126_first-reps%2F0000%22;rec=0

An expert group of decision makers, engaging in a deeper consideration of the issues and interacting more with staff, should increase the demand for analysis and research and result in a stronger culture of research, challenge and debate within both the RBA and the Australian public.

Enhanced clarity around the monetary policy framework, including regular reviews.

Our view is that flexible inflation targeting with regard for full employment operated by an independent RBA has generally worked well over three decades, contributing to lower, more stable inflation and unemployment. Although there are a number of different frameworks for monetary policy (see Appendix 2 of the Review), there is no compelling evidence that any would perform significantly better. For this reason, the Review suggests only modest improvements to the framework to increase clarity and accountability.

The recommendations included modernising the Reserve Bank of Australia Act to include objectives more aligned with what is done in practice while remaining flexible enough to adjust the framework if warranted in the future. This means including both price stability and full employment as objectives for monetary policy, within the context of promoting the economic prosperity and welfare of Australians as the overall purpose of the institution.¹⁹

In practice, the RBA should retain a flexible inflation target of 2–3% and systematically set out its assessment of its full employment objective, as reflected in a range of relevant indicators of labour market conditions. The RBA should also clearly explain how it is balancing its two monetary policy objectives, including how long inflation is expected to be materially away from the midpoint of the target and why, and how long labour market conditions are expected to deviate from full employment and why.

While the RBA's monetary policy framework has performed well, the Review recommended that Government and RBA Monetary Policy Board should instigate a formal review of the framework and tools every five years. These should be jointly led by the RBA and Treasury and include formal and transparent input from independent domestic and international experts with a wide range of viewpoints. This should ensure that the monetary policy framework and tools remain appropriate.

Given the important interactions between monetary and financial sector policies, the Review also recommended to develop more formalised cooperation arrangements for financial stability policy, including with the RBA providing formal advice to the Australian Prudential Regulatory Authority (APRA) for its use of macroprudential tools.²⁰

¹⁹ The amendments to the RBA Act that have been tabled include these changes. Currently the Reserve Bank Act has three objectives for monetary policy. These are that the Reserve Bank Board will conduct monetary policy to best contribute to (1) the stability of the currency of Australia; (2) the maintenance of full employment in Australia; and (3) the economic prosperity and welfare of the people of Australia. The Act was written when Australia operated a fixed exchange rate regime (see www.legislation.gov.au/Details/C2020C00322).

²⁰ See Kashap (2023) for advice given to the Review on monetary-macroprudential policy coordination.

These recommendations have also been reflected in the renewal of The Statement (Australian Government and the Reserve Bank of Australia 2023).

Finally, increased transparency around monetary policy decisions would support accountability and inform public debate.

Many central banks worldwide, including the RBA, have been working to improve the transparency and accessibility of their communications. Despite advances in recent years, the RBA's regular communications are less transparent than those of some other peer central banks (for instance, press conferences are more infrequent). Explanations of policy strategy lack important detail, and there is limited information available about the range of views within the Board.

The Review concluded that the RBA should better explain its policy choices through regular press conferences and increased information about policy deliberations, strategy, and the RBA's forecasts. The RBA's communications should include the reasoning behind decisions, what alternative policy options were considered, and how current policy settings fit into a broader strategy.

Monetary Policy Board members should be more accountable for their role in setting monetary policy. They should be expected to discuss the Board's decisions in public from time to time, and statements released after policy meetings should be agreed by them, including unattributed votes and published in their name. These expectations are outlined in the renewal of The Statement, to come into force once the new Monetary Policy Board is created.²¹

In a recent speech, Governor Bullock was clear that her strategic priorities are to strengthen the decision-making process through deep and informed deliberation, with clearer explanations for the public (Bullock 2023). The RBA has recently hired a chief communications officer to report to the governor to help build this strategic communications capacity (RBA 2023a). She has also outlined her vision for changing the culture and has taken steps to develop internal debate, set expectations for RBA leaders, and commit to a diverse and inclusive workplace. These are welcome developments.

CONCLUDING REMARKS

Like many other central banks worldwide, the RBA acted forcefully at the onset of the COVID pandemic to a grave health and economic threat. It is clear that the initial policy actions were successful in re-establishing market functioning and, along with fiscal policy, creating a bridge to recovery. The Australian Government and the RBA have taken important steps – including through a revised statement between the Treasurer

²¹ Creation of the new Monetary Policy Board is part of the proposed amendments to the RBA Act, which has at this time received only its first reading in Parliament.

and the Board on the Conduct of Monetary Policy and proposed amendments to the RBA Act – to address the recommendations made by an independent review of the RBA that was completed in March 2023, including to:

1. make more regular use of cost-benefit and stress-scenario analyses to support decision making;
2. improve monetary and fiscal policy coordination to provide better collective responses to both downside and upside shocks to inflation;
3. better enable the RBA board to support more effective challenge in decision making;
4. enhance clarity around the monetary policy framework and conduct regular reviews of the framework and tools; and
5. improve transparency around monetary policy decisions.

There is still much to learn from the COVID pandemic for central banks and other authorities. Not enough time has passed to see the full costs and benefits of policy actions. As with research on the Great Depression, one can expect a full range of research on this topic for Australia and other countries for many years to come. This work should include an assessment of the design of the extraordinary tools that were used. We also hope that academics and central bank practitioners invest in the next generation of models to produce more reliable forecasts of macroeconomic activity and inflation, as well as a better understanding of the optimal fiscal–monetary policy mix.

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ANNEX 1 TIMELINE OF RBA POLICY ACTIONS FROM MARCH 2020 TO NOVEMBER 2023.

Date	Policy action
2020	
March 3	Cash rate target reduced by 0.25% to 0.50%.
March 19	Following a special Reserve Bank Board Meeting on March 18: Cash rate target reduced by 0.25% to 0.25%. Exchange settlement (ES) balances: interest rate adjusted to 0.10%. Yield curve control: target on 3-year Australian government bond of 0.25% introduced. Term funding facility of at least \$90 billion in three-year funding to support credit to small and medium sized businesses at a fixed rate of 0.25%. Forward guidance: "The Board will not increase the cash rate target until progress is being made towards full employment and it is confident that inflation will be sustainably within the 2-3% target band". Policy coordination announcements coordinated with announcements by APRA that banks can use capital buffers to facilitate outgoing lending and the Australian Government that the Australian Office of Financial Management will invest \$15 billion in wholesale funding markets used by small ADI and non-ADI lenders.
March 20	Yield curve control: commencement of purchase of \$5 billion of Australian government securities. Swap lines: The RBA and the US Federal Reserve establish a temporary swap line for liquidity support.
September 1	Term funding facility increased to \$200 billion and extended to June 2021.
October 15	Forward guidance: "The Board will not be increasing the cash rate until actual inflation is sustainably within the target range...we do not expect to be increasing the cash rate for at least three years". (Speech by the RBA Governor and confirmed in the Reserve Bank Board statements from November).
November 3	Cash rate target reduced by 0.25% to 0.10%.

Date	Policy action
	<p>ES balances: interest rate reduced by 0.10% to 0%.</p> <p>Yield curve control: target on 3-year Australian government bond reduced from 0.25% to 0.10%.</p> <p>Term funding facility: interest rate for new drawing reduced by 0.15% to 0.10%.</p> <p>Bond purchase programme: announced purchase of \$100 billion of government bonds in the secondary market of maturities of around 5 to 10 years at a rate of \$5 billion over 6 months.</p>
2021	
February 2	<p>Bond purchase programme extended with the purchase of an additional \$100 billion of government bonds on completion of the existing program in mid-April, 2021 at the rate of \$5 billion per week.</p> <p>Forward guidance "The Board will not increase the cash rate until actual inflation is sustainably within the 2-3 per cent target range. ... The Board does not expect these conditions to be met until 2024 at the earliest".</p>
June 31	Term funding facility closed to new drawdowns.
July 6	<p>Yield curve control: retain the April 2024 bond as the bond for the yield curve control (instead of the November 2024 bond) and retain the target of 0.1%.</p> <p>Bond purchase programme: continue purchasing government bonds after the completion of the current bond purchase program in early September 2021 at the rate of \$4 billion per week until at least mid-November 2021</p>
September 7	Bond purchase programme: continue purchasing government securities at the rate of \$4 billion a week and to continue the purchases at this rate until at least mid February 2022.
October 27	Yield curve control abandoned.*
November 2	Yield curve control: official decision to discontinue yield curve control. Forward guidance calendar based forward guidance "until 2024" discontinued, and state-based forward guidance adopted.
2022	
February 1	Bond purchase programme: cease further purchases of government securities under the bond purchase program, with the final purchases to take place on 10 February 2022
May 3	<p>Cash rate target increased by 0.25% to 0.35%.</p> <p>ES balances interest rate increased by 0.25% to 0.25%.</p> <p>Bond purchase programme: decision the Bank would not reinvest proceeds of maturing government bonds that it had purchased during the pandemic and had no current plans to sell these bonds.</p> <p>Forward guidance discontinued.</p>
June 7	<p>Cash rate target increased by 0.5% to 0.85%.</p> <p>ES balances interest rate increased by 0.5% to 0.75%.</p>
July 5	<p>Cash rate target increased by 0.5% to 1.35%.</p> <p>ES balances interest rate increased by 0.5% to 1.25%.</p>
August 2	<p>Cash rate target increased by 0.5% to 1.85%.</p> <p>ES balances interest rate increased by 0.5% to 1.75%.</p>

Date	Policy action
September 6	Cash rate target increased by 0.5% to 2.35%. ES balances interest rate increased by 0.5% to 2.25%.
October 4	Cash rate target increased by 0.25% to 2.60%. ES balances interest rate increased by 0.5% to 2.50%.
November 1	Cash rate target increased by 0.25% to 2.85%. ES balances interest rate increased by 0.25% to 2.75%.
December 6	Cash rate target increased by 0.25% to 3.1%. ES balances interest rate increased by 0.25% to 3%.
2023	
February 7	Cash rate target increased by 0.25% to 3.35%. ES balances interest rate increased by 0.25% to 3.25%.
March 7	Cash rate target increased by 0.25% to 3.6%. ES balances interest rate increased by 0.25% to 3.5%.
May 2	Cash rate target increased by 0.25% to 3.85%. ES balances interest rate increased by 0.25% to 3.75%.
June 6	Cash rate target increase by 0.25% to 4.1%. ES balances interest rate increased by 0.25% to 4.0%.
November 7	Cash rate target increase by 0.25% to 4.35%. ES balances interest rate increased by 0.25% to 4.25%.

Notes: The policy actions are summarised in the Minutes of the Monetary Policy Meetings of the Reserve Bank Board, available at <https://www.rba.gov.au/monetary-policy/> and are discussed in Chapter one of the Review. * refer to Orphanides (2023).

CHAPTER 2

The Bank of Canada's response to post-COVID inflation, and some lessons learned

Tiff Macklem

Bank of Canada

INTRODUCTION

Canada, like many countries around the world, experienced a sharp run-up in inflation following the COVID-19 pandemic. Among advanced economies, the Bank of Canada undertook one of the most forceful responses to the inflation shock, and these policy actions are bearing fruit. Inflation came down relatively quickly at first, but progress to the 2% target subsequently slowed. The Bank's latest projection has inflation in Canada, as measured by the consumer price index, returning to the 2% target in 2025.

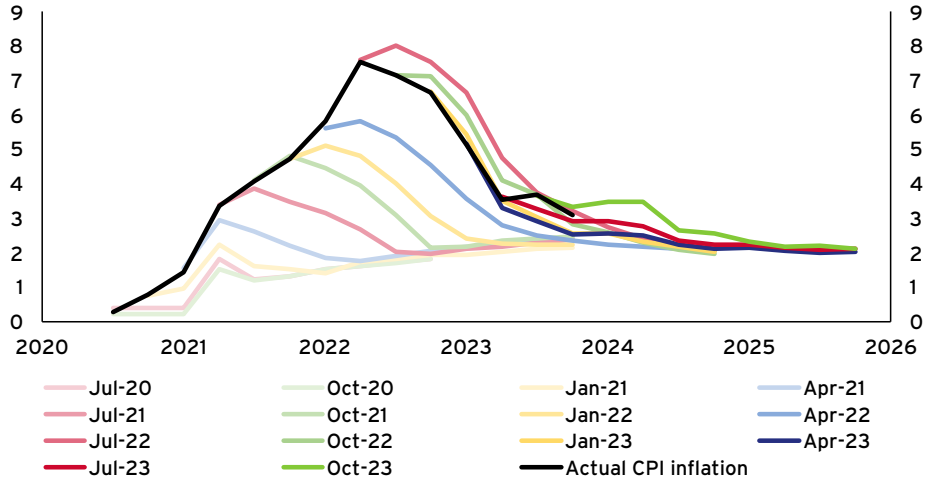
This episode of high inflation has tested the commitment of central banks to their inflation targets and the tools we all use to achieve low inflation. It has also taught us some important lessons about inflation dynamics, our policy responses, and our monetary policy frameworks. Some of these lessons are already shaping our work. Others require more analysis and reflection to be fully incorporated in the years ahead.

WHAT HAPPENED

The inflation pressures that arose following the COVID-19 pandemic were stronger and more persistent than we expected. In January 2021, the Bank of Canada projected an uptick in inflation following the re-opening of our economy from a series of pandemic lockdowns. However, we expected the rise in inflation to be transitory and we projected inflation would fall back slightly below our 2% target, as supply chain disruptions eased quickly and demand remained weak. However, from January 2021 to July 2022, we revised up the forecast for inflation in each subsequent *Monetary Policy Report* (MPR) (Figure 1). Since the middle of 2022, inflation has been easing. Early in 2023, we said that inflation would be close to 3% by the summer, and it was. Since then, there has been some volatility in inflation. Headline inflation rose to 4% in August with higher global

oil prices and subsequently declined as oil prices fell back. As of October 2023, headline inflation was 3.1 %, with underlying inflation as captured by our core measures about 3½%.¹

FIGURE 1 ACTUAL CPI INFLATION IN CANADA VS BOC FORECASTS (%)



Note: Actual CPI inflation in 2023Q4 is the quarter-to-date up to October

Why did we miss the strength and persistence of inflation in 2021 and early 2022? We faced a series of shocks, first global and then domestic, that pushed inflation higher as the world recovered from the COVID-19 pandemic. That recovery had several distinct characteristics. The global pandemic generated a sharp shift away from high-contact services toward goods (which people wanted in the absence of services) and housing (as people sought more space to live and work). Goods consumption and housing activity boomed, supported by stimulative fiscal and monetary policies across all the major economies. This, in turn, strained already stretched global supply chains. This strong global demand for goods, along with pandemic-related supply restrictions and some weather-related events, pushed goods inflation sharply higher both globally and in Canada. At the same time, rising global demand and activity lifted commodity prices, especially oil.

By early 2022, the Canadian economy looked to have fully recovered overall even if some unevenness persisted, and inflationary pressures were not proving as transitory as expected. Supply problems – both global and domestic – were more pervasive than we had anticipated. Then Russia’s unprovoked invasion of Ukraine sent prices for energy and agricultural goods sharply higher. At the same time, domestic sources of inflation were also becoming more important. Once Canada emerged from the Omicron wave early in 2022, the economy fully reopened, and consumers wanted to catch up quickly on what

¹ This is the latest inflation reading at the time of writing in November 2023.

they had missed for two years. Businesses, unable to keep up with demand, were easily able to pass through higher energy and other input costs. This put significant upward pressure on prices, and inflation would peak at just over 8% in June 2022.

THE POLICY RESPONSE

When inflation in Canada first started to rise in 2021, the Bank's Governing Council (its decision body for monetary policy) chose to scale back our quantitative easing (QE) programme in April and then July, ending it in the autumn (Table 1). We were the first major advanced economy central bank to end our QE programme and move into balance sheet reinvestment (Table 2).

TABLE 1 BANK OF CANADA ACTIONS TO FIGHT INFLATION

Announcement	Action	Date
Quantitative easing reduced (Step 1)	Reduce purchases of government debt from \$4 billion per week to \$3 billion per week.	21 April 2021
Quantitative easing reduced (Step 2)	Reduce purchases of government debt from \$3 billion per week to \$2 billion per week.	14 July 2021
End of quantitative easing	End of quantitative easing and entry to reinvestment phase (purchase of Government of Canada bonds solely to replace maturing bonds).	27 October 2021
Removal of exceptional forward guidance	Bank no longer to provide exceptional forward guidance on the policy interest rate.	26 January 2022
First policy rate increase	Increased the policy rate 25 bps to 0.50%	2 March 2022
Policy rate increases	Further increases totalling 450bps to 5% policy rate	13 April 2022 to 12 July 2023
Quantitative tightening	Maturing Government of Canada bonds on the Bank's balance sheet will no longer be replaced and, as a result, the size of the balance sheet will decline over time.	13 April 2022 to ongoing

Note: The Bank recalibrated its QE programme in October 2020 to shift purchases towards longer-term bonds, which have more direct influence on the borrowing rates that are most important for households and businesses. At the same time, total purchases were reduced from \$5 billion a week to at least \$4 billion a week. It was judged the QE programme was providing at least as much monetary stimulus as before.

TABLE 2 CENTRAL BANK MONETARY POLICY ACTIONS TO FIGHT INFLATION

Organisation	BoC	FED	ECB	BoE	Riksbank	RBA
Date of first increase in their policy rate	March 2, 2022	March 16, 2022	July 21, 2022	December 16, 2021	April 2022	May 2022
Date of reduction in QE purchases	April 21, 2021: Reduce from 4bn to 3bn July 14, 2021: Reduce from 3bn to 2bn	November 2021	PEPP reduction September 2021	December 2021 Complete stop	2021 H2	February 2022
Date of reinvestment phase	November 2021	March 2022 - June 2022	APP (Asset Purchase Program) July 2022-February 2023 PEPP (Pandemic Emergency Purchase Program) April 2022 until end 2024	December 2021-February 2022	January 2022-April 2022	N/A (no maturities between February and May 2022)
Date of QT	April 2022	June 2022	APP partial reinvestment March 2023 - June 2023. APP no reinvestment July 2023	February 2022 (active sales began in November 2022)	Balance sheet started shrinking in second half of 2022; no new purchases by the end of 2022. Bond sales started in April 2023	May 2022

However, we opted against raising interest rates in 2021 for a few reasons. First, the inflationary supply shocks coming from abroad were still considered temporary, even if they were lasting longer than expected based on the experience of past decades. Second, for most of 2021, the economy was thought to be operating well below capacity, so even if global goods prices were rising rapidly, domestic inflationary pressures were seen as modest. This was reinforced by measures of service-price inflation, which were relatively stable. Finally, successive waves of the pandemic required a series of restrictions on businesses whose activities involved close contact, and these extended through 2021 and into 2022. In this environment, we believed that premature tightening could impede the ability of people who lost their jobs during the pandemic to find work again. We made our thinking clear in our communications. In July 2020, we had provided exceptional forward guidance that we would “hold the policy rate at its effective lower bound until slack was absorbed”. Each quarter, we updated our assessment of how close this condition was to being satisfied, and when we expected slack would be absorbed.

In these decisions, we were weighing the risk that higher inflation could last longer than anticipated against the risk that tightening prematurely could stall the recovery and send inflation back below our target. Admittedly, we were not sufficiently attentive to the risk that inflation could rise sharply. This reflected our assessment through 2021 that slack in the economy remained, particularly in the service sector where many industries continued to operate well below pre-pandemic levels. It also reflected the view that the supply-driven sources of elevated goods-price inflation would likely prove temporary.

The first interest rate decision of 2022 marked a shift in the Bank’s assessment. The Bank decided not to increase the policy rate, but gave notice that the era of ultra-low interest rates was ending:

“While COVID-19 continues to affect economic activity unevenly across sectors, the Governing Council judges that overall slack in the economy is absorbed, thus satisfying the condition outlined in the Bank’s forward guidance on its policy interest rate. The Governing Council therefore decided to end its extraordinary commitment to hold its policy rate at the effective lower bound. Looking ahead, the Governing Council expects interest rates will need to increase, with the timing and pace of those increases guided by the Bank’s commitment to achieving the 2% inflation target.”²

This communication was followed by the first increase in the policy rate, in March 2022. The Bank of Canada was one of the first advanced-economy central banks to begin tightening monetary policy. This move was followed by six more consecutive interest rate increases – for a total of 400 basis points in less than a year – including a one-percentage-point rate hike in July 2022. While we considered our policy rate the primary tool to

2 “Bank of Canada maintains policy rate, removes exceptional forward guidance”, press release, January 2022 (www.bankofcanada.ca/2022/01/fad-press-release-2022-01-26/).

tighten monetary policy, the Bank also began quantitative tightening in April 2022, allowing maturing bonds to roll off its balance sheet. Since then, roughly \$150 billion of Government of Canada bonds have rolled off and overall, the Bank's balance sheet has shrunk by \$250 billion, or 45%, since its peak in early 2021.³

In January 2023, after a further rate increase, the Bank's Governing Council said it expected to hold the policy rate at its then-current level, conditional on the outlook for inflation. After raising interest rates very quickly for nine months, the "conditional pause" was designed to give Governing Council time to assess whether our forceful response was sufficient to return inflation to the 2% target. Put another way, we were looking for an accumulation of evidence that supply and demand were rebalancing, and price pressures were easing, in line with our inflation target. We were clear in our communication that we may need to raise the policy rate further:

"With today's modest increase, we expect to pause rate hikes while we assess the impacts of the substantial monetary policy tightening already undertaken. To be clear, this is a conditional pause—it is conditional on economic developments evolving broadly in line with our MPR outlook. If we need to do more to get inflation to the 2% target, we will.

We are trying to balance the risks of under- and over-tightening. If we do too little, the decline in inflation will stall before we get back to target. But if we do too much, we will make the adjustment unnecessarily painful and undershoot the inflation target."⁴

By the spring of 2023, evidence was accumulating across a range of indicators that excess demand in the economy and underlying inflationary pressures were proving more persistent than the Bank had expected. In June 2023, the Bank's Governing Council raised the policy rate to 4¾%, bringing an end to the five-month pause, and this increase was followed by another 25 basis points in July 2023. Since then, (as of time of writing in November 2023) the Bank has held the policy rate at 5%, reflecting clearer evidence that higher interest rates are slowing economic activity and the view that this should further relieve price pressures.

A number of lessons have emerged from the last two-and-a-half years with respect to why central banks underestimated the rise in inflation and the persistence of underlying inflationary pressures. Some of these lessons are clear and already inform policy decisions. Others will require more time, analysis, and research to fully understand their implications.

3 As of November 2023. When key financial markets became strained in March 2020, the Bank of Canada introduced several programs to provide liquidity and maintain market functioning. As markets gradually improved, most facilities and operations were suspended, discontinued or scaled back, and the Bank shifted the use of its tools, primarily to quantitative easing. As the economy rebounded, the Bank ended quantitative easing in 2021 and moved into a reinvestment phase. In 2022, the Bank stopped reinvestment and began quantitative tightening, where maturing bond holdings are not replaced. This has continued through the third quarter of 2023.

4 <https://www.bankofcanada.ca/2023/01/opening-statement-2023-01-25/>

SOME LESSONS FROM THE POST-PANDEMIC INFLATION

It is a lot easier to restore demand than supply.

As the pandemic hit, central banks provided extraordinary stimulus to their economies, cutting policy rates to the effective lower bound, providing exceptional forward guidance about the future path of policy interest rates, and undertaking large-scale asset purchases. At the same time, governments provided massive fiscal support: in Canada and most other advanced countries, government transfers more than compensated for the labour income lost. When the public health measures were lifted, demand soared as many households spent the significant savings accumulated over the course of the pandemic, while those who wanted to borrow could do so at exceptionally low interest rates.

The recovery in supply was more challenging. First, global supply chains came under intense pressure as the demand for goods soared, pressures that were compounded by logistical bottlenecks and disruptions due to lockdowns. In the domestic economy, re-opening proved more difficult than anticipated. With many businesses closed through successive lockdowns, re-opening at scale required hiring and training an almost-entirely new workforce, since many pre-pandemic employees had moved on to other opportunities. This hiring and training took time. Likewise, the move to remote or hybrid work arrangements involved learning new ways of working, and absences for illness also contributed to labour shortages. The result was that businesses quickly faced capacity constraints. When combined with strong demand, these supply constraints made it easier for companies to fully pass on input cost increases and raise their prices.

Supply shocks have a bigger impact on inflation when the economy is in excess demand.

For the 30 years prior to the pandemic, supply shocks – typically energy – have tended to have a temporary effect on inflation. A run-up in oil prices, for example, would boost inflation for a year or so, but oil prices would typically plateau or reverse, and inflation would come back down pretty much by itself. Since it takes more than a year for the full effect of monetary policy to work through the economy, central banks have tended to largely look through the direct impact of supply disruptions on inflation.

Post-pandemic, the inflation response was different. We were faced with a series of negative supply shocks just as the economy was reopening, and the effects of these supply shocks on prices and inflation were faster and more pronounced than usual. With businesses having trouble keeping up with demand, they were less worried about losing customers if they raised their prices. Other firms, now facing higher prices for intermediate inputs, would in turn raise their prices, creating a ripple inflationary effect through the supply chain to broadly higher final goods prices. And consumers, eager to

finally buy what they couldn't get through the pandemic, paid the higher prices. As a result, the impact on inflation of the price shocks was faster and more widespread than our models suggested.

This experience has highlighted that supply disruptions are more inflationary when the economy is overheated. While we had supply shocks in the 30 years preceding the pandemic, they did not intersect with periods of sustained excess demand. The post-pandemic inflation was a stark reminder that when they do, central banks cannot simply look through them and count on inflation coming back down by itself.

Looking forward, supply shocks may be larger and last longer than in recent decades. Globalisation is at least shifting, if not reversing, and this is unlikely to be a smooth process. Supply chains and production are at risk from shifting trade and investment restrictions arising from geopolitical tensions. More frequent weather events related to climate change are also likely to be an increased source of volatility, particularly for agricultural products.

International spillovers reflect complex interactions between demand, supply and global policy responses.

Canada is a very open economy, and so what happens elsewhere matters a lot for Canada. Modelling these international spillovers is always complicated, and COVID-19 highlighted that the interaction between the international policy response and cross-border demand and supply linkages can be particularly hard to predict.

The policy response to the pandemic was informed by previous crises, especially the Global Financial Crisis (GFC). Following the GFC, many countries experienced excess capacity and below-target inflation for extended periods, despite substantial monetary and fiscal stimulus. And post-GFC assessments of policy largely concluded that slower withdrawal of monetary and fiscal stimulus following the GFC could have made all countries better off through positive demand spillovers.

The COVID-19 crisis was clearly a very different shock, with a necessarily different response, and this resulted in very different international spillovers. With households around the world shifting away from close-contact services to goods and much larger fiscal support through the pandemic recession, the global demand for internationally traded goods soared. So even when countries were experiencing excess supply overall, goods producers were trying to keep up with demand. Supply chain disruptions across global value chains intersected with strong demand, resulting in sharply higher prices for internationally traded goods and higher imported inflation in most countries. This experience highlights how different international spillovers can be across different cycles, and how the international policy response can interact with both demand and supply channels in complicated ways. A better understanding of how policy actions can ripple around the world should enable more effective global responses to future shocks.

The aggregate can mask important sectoral differences that matter for inflation.

During the pandemic lockdowns, public health measures restricted the demand for services. At the same time, other parts of the economy were experiencing excess demand as consumers bought goods to replace the services they couldn't get. The inflationary impact of excess demand for goods was larger than the disinflationary forces in close-contact services. As a result, our inflation models that focus on the average or aggregate imbalance between demand and supply in the economy had a hard time predicting the rise in inflation. This has underlined the need for deeper sectoral analysis, including richer sector-specific data and multi-sector models to better understand the implications of demand-supply imbalances for inflation when the forces driving demand and supply diverge dramatically across sectors.

Labour market data, in particular, allow for a more granular assessment of the demand-supply balance across sectors, as well as the labour market performance of different demographic groups and different regions.⁵ And more bottom-up assessments of inflationary pressures across major categories of goods and services complement aggregate Phillips-curve assessments of overall inflation dynamics.⁶ Finally, models that incorporate different sectors combined with stages of production allow the broader inflationary impacts of cost shocks to be traced through to final goods prices (Coletti 2023).

Models are necessary but can be misleading when shocks are outside of history.

Models are fundamental to understanding where the economy is, how it may evolve, and how to best steer monetary policy. But models are necessarily based on history: they seek to explain how the economy operates based upon the empirical relationships observed in the data over the last several decades.

The limitations of models can be exacerbated in circumstances like the COVID-19 pandemic. Over the sample on which most models were calibrated – the past three decades – most of the main shocks were from the demand side. And when supply shocks did occur, they tended to be small and temporary. Consequently, the models were ill-equipped to provide insight into the implications of the massive global supply shocks associated with the pandemic. As the pandemic hit, we were aware of these limitations of our models, and we worked hard to both adapt our models and use a broader range of supplementary evidence to inform our decisions. Nonetheless, we need to learn from this experience and build more flexibility into our models to allow us to better address circumstances outside of recent history.

5 www.bankofcanada.ca/markets/market-operations-liquidity-provision/covid-19-actions-support-economy-financial-system/labour-market-recovery-from-covid%e2%80%9119/

6 For example, recent MPRs have included bottom-up assessments of the sources of inflation across major goods and services categories; see Chart 17 in the October 2023 Monetary Policy Report (Bank of Canada 2023).

For example, most central bank models of the inflationary process in advanced countries attach a weight to well-anchored inflation expectations. Hence, unless pushed by other factors, inflation tends to return to target because it is expected to do so. This is because the models are estimated off a period when inflation and inflation expectations were always close to the target. But if we find ourselves in a world in which near-term inflation expectations have been elevated for some time (unlike the reference period of the model but like the post-pandemic period), our models are not as well-equipped to understand the dynamics of inflation.

The lesson is that we need to be ready to venture beyond models that are too tightly tied to recent history and consider alternative ways to look at how the economy is evolving. This includes more systematic use of alternative scenarios that consider what happens if the future is different from recent decades. It also requires drawing on novel sources of data to get a more complete assessment of what is happening on the ground, in real time. To make better use of all these data we need to take innovative approaches, including working with big data and advanced analytics. Adding new analytical tools and information sources is allowing us to fill important gaps in our understanding of what is happening in all parts of the economy.

Communicating uncertainty is hardest when it matters most.

Striking the balance between acknowledging uncertainty and providing confidence is difficult, especially when faced with large and unprecedented shocks. In the face of extraordinary volatility in economic activity and inflation in the wake of the pandemic, uncertainty has been much higher than usual. Forecasting the future has been harder and forecast errors have been larger. Nevertheless, monetary policy still needs to be forward looking, and households and businesses still need to make plans for the future. In these circumstances, it is especially difficult for a central bank to find the balance between recognising and communicating the uncertainty about the future and providing its best judgement on the economic outlook with a sense of confidence about the effectiveness of its actions.

This is further complicated by the reality that the appropriate policy response to elevated uncertainty depends critically on the circumstances. Uncertainty may require a cautious and gradual approach when entering uncharted territory, but – as the GFC and pandemic have illustrated – there are also times when policymakers must act boldly. Any policy involves risk, but inaction can be riskier. It is important to take those risks, but equally important to understand them and be transparent in communicating their nature.

To this end, we need to find ways to more clearly communicate uncertainty to a wide range of audiences – from the most sophisticated financial market participants to business owners, to families and individuals trying to navigate uncertain economic times – without undermining credibility or casting doubt on the effectiveness of monetary policy.

Public trust cannot be taken for granted.

The prolonged period over which inflation has been above the 2% target may have undermined the trust that Canadians have in their central bank. While this poses a challenge, it also presents an opportunity. By providing more insights into our monetary policy decisions, we can help citizens understand what we are doing and why. To do that well, we need to broaden our outreach and make our messages accessible to all our varied audiences. For some, this means providing deep analysis and the data behind it. For many, this means moving to plainer and simpler language on more diverse media channels to communicate our key messages.

Finally, we need to be humble, when humility is due. This means explaining our forecast errors, and their implications, openly and clearly. Being open is always important, but it is especially crucial in uncertain times – and as we work to bring inflation back to our 2% target.

CONCLUSION

Central banks got many things right during the COVID-19 pandemic. Exceptional monetary and fiscal policy stimulus prevented the sharpest recession on record from becoming a lasting economic depression and helped engineer a rapid recovery.

Central banks also responded forcefully when confronted with the steep rise in inflation. A concerted effort by central banks around the world has brought inflation down considerably, even though most of us have not yet achieved our inflation targets. And by acting together, we reinforced the collective commitment to price stability, helping to anchor inflation expectations in all our countries and making it easier for all of us to control inflation.

At the same time, we need to acknowledge that we underestimated the inflationary risks posed by an extraordinary combination of demand and supply shocks. Quite simply, we were facing an unprecedented economic situation and we did not predict the dynamics of inflation correctly. While we will never have a crystal ball to predict the future, there are some lessons to be learned from recent experience, as well as some questions that require more reflection.

But perhaps the most important lesson from the last two years is a lesson relearned. High inflation is painful. It hurts people and erodes the fabric of society.

In Canada, despite near record low unemployment, consumer confidence is currently at a recessionary low. Unhappy Canadians are not alone – despite swift recoveries from the pandemic and stronger-than-expected labour markets in many countries, measures of consumer sentiment are unusually depressed in many countries. Of course, this likely reflects a combination of factors. But one factor is clearly the responsibility of central banks – inflation.

People are angry about high inflation. Our own survey of consumers ranks the rising cost of living as Canadians' top financial concern. The rising cost of living is making life harder for everyone, especially Canadians who have less to start with. After 25 years of low and relatively stable inflation, generations of Canadians are experiencing the pain of inflation for the first time.

We have seen the unhappiness that comes with high inflation before. In the 1970s, inflation in Canada averaged more 7% and peaked at nearly 13%. The central bank and the government tried several policies to get inflation down, but neither was willing to stay the course – to restrain government spending and tighten monetary policy enough to wring inflationary pressures out of the economy. So, Canadians lived with high inflation for more than a decade. By the time policymakers realised they needed more forceful action, inflation was entrenched in the economy. It took very high interest rates – the policy rate reached 21% in 1981 – and a deep recession to restore price stability.

Today, we have some clear advantages over the 1970s to help get inflation down; a 2% inflation target, a 25-year track record of achieving it, and a forceful monetary policy response. We are well on our way to restoring price stability, and we need to stay the course.

We also need to learn from the inflationary experience of the last two and a half years. There are clear implications for our understanding of inflation, the models and data we use to forecast inflation, and how we communicate uncertainty and foster public trust. The post-pandemic inflation has been a bitter reminder of the harm inflation causes. We will need to learn from this experience to restore and maintain price stability in a changing world.

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ABOUT THE AUTHOR

Tiff Macklem was appointed Governor of the Bank of Canada, effective June 3, 2020, for a seven-year term. As Governor, he is a member of the Board of Directors of the Bank for International Settlements. He also chairs the Group of Governors and Heads of Supervision, the oversight body of the Basel Committee on Banking Supervision, and co-chairs the Financial Stability Board's Regional Consultative Group for the Americas. During the 2008–09 global financial crisis, Mr. Macklem was Associate Deputy Minister at Canada's Department of Finance and represented Canada at the G7, G20 and Financial Stability Board. From 2014 until his appointment as Governor,

Mr. Macklem was the Dean of the Rotman School of Management at the University of Toronto. Born in Montréal, Quebec, Mr. Macklem graduated from Queen's University with a bachelor's degree in economics, and from the University of Western Ontario with a master's degree and PhD in economics.

CHAPTER 3

The 2021-2022 inflation surges and monetary policy in the euro area

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European Central Bank, Trinity College Dublin and CEPR

INTRODUCTION

In this chapter, I review the monetary policy decisions of the ECB between April 2021 and December 2023 in responding to the extraordinary inflation shocks that occurred in 2021 and 2022.² While the 2021 recovery from the 2020 pandemic trough resulted in a widespread inflation surge across advanced economies, the February 2022 Russian invasion of Ukraine constituted a distinct additional shock that accounted for most of the extraordinary surge in inflation during 2022, especially in Europe.

My overall aim is to describe and explain the actual monetary policy path that was decided by the Governing Council of the ECB. In particular, I do not review the set of alternative policy paths that could have been selected under various counterfactual scenarios.³ I also do not attempt to provide an extensive dissection of the competing explanations for the surges in inflation that occurred between the middle of 2021 and late 2022 and the subsequent disinflation during 2023.⁴

To set the scene, Figure 1 shows the dynamics of headline and core inflation, extended forward through 2026 on the basis of December 2023 Eurosystem staff projections. Relative to its pandemic low point in late 2020, inflation started to increase in early 2021, rising above the 2% medium-term target in July 2021. Inflation continued to climb through the rest of 2021 and most of 2022, peaking at 10.6% in October 2022. Since late 2022, inflation has declined and stood at 2.9% in December 2023. According to the December 2023 Eurosystem staff projections, inflation is expected to stabilise around the 2% target from about the middle of 2025 onwards.

1 I would like to thank Janina Desoi for her support in the preparation of this chapter. For their technical input in the preparation of Table 1 and Figures 1 to 14, I am also grateful to Elisa Saporito, Anna-Camilla Hofmann-Drahonsky, Maria Dimou, Franziska Huennekes, Wouter Wakker, Lorenzo Ferrante, Bruno Fagandini, Ryan Minasian, Pedro Neves, Martina Pallotti, Emanuel Skeppas, Matteo Sirani, Lucas Queiroz, Laura Fras and Giulia Martorana. Oscar Arce, Fabian Eser, Christophe Kamps, Massimo Rostagno and Frank Smets provided helpful comments.

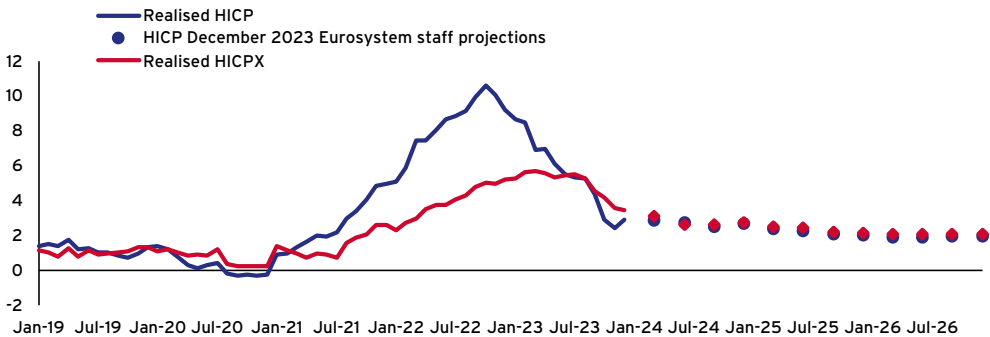
2 The views expressed in this chapter are personal and should not be interpreted as representing the collective view of the ECB's Governing Council. This chapter can be viewed as a successor contribution to Lane (2021a) that reviewed the ECB's monetary policy during the most intense phase of the pandemic, covering the monetary policy meetings from March 2020 through March 2021.

3 On alternative monetary policy paths, see, amongst others, Acharya et al. (2023) and De Fiore et al. (2023). A full-scale counterfactual analysis of this period would also have to examine a range of alternative fiscal paths.

4 See also Lane (2022a), Blanchard and Bernanke (2023), Cavallo et al. (2023), Galstyan (2023), Guerrieri et al. (2023), Arce et al. (2024, forthcoming), and the contribution by Bernanke and Blanchard in this volume.

FIGURE 1 HEADLINE INFLATION, CORE INFLATION AND ECB STAFF PROJECTIONS

(annual percentage changes)



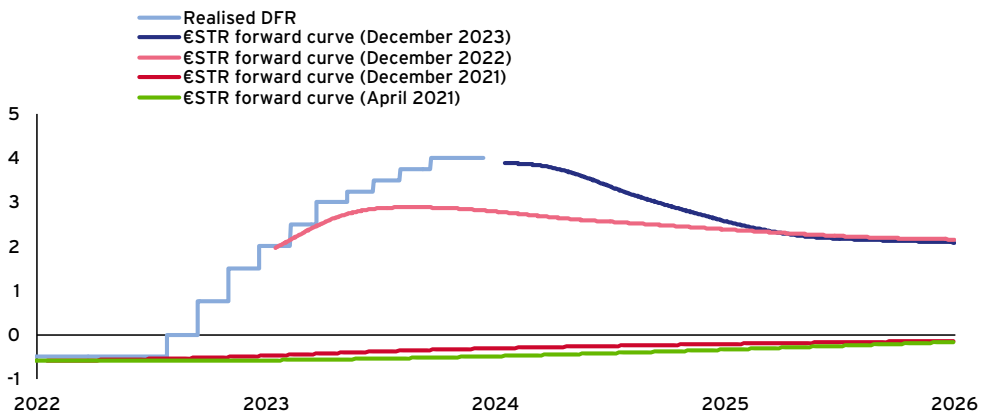
Sources: Eurosystem staff macroeconomic projections exercise.

Notes: HICP refers to headline inflation and HICPX to HICP excluding food and energy. Realised HICP and HICPX are at a monthly frequency, and HICP and HICPX projections are at a quarterly frequency. The latest observations for realised HICP and HICPX are December 2023.

Table 1 reports the monetary policy decisions of the ECB over this period, together with the decisions on the termination of various pandemic-related measures such as the easing of collateral policies. Figure 2 plots the deposit facility rate, which is the policy rate determining money market conditions under conditions of abundant liquidity, and the €STR money market forward curves at different points in time. Figures 3 and 4 show the evolution of the balance sheet policies used by the ECB: the asset purchase programme (APP); the pandemic emergency purchase programme (PEPP); and the targeted longer-term refinancing operations (TLTRO).

FIGURE 2 THE ECB POLICY RATE AND THE €STR FORWARD CURVE

(percentage per annum)



Sources: Bloomberg and ECB calculations.

Notes: Lines correspond to April and December refer to 21 April and 15 December, respectively. The curves for December 2022 and December 2023 refer to 14 December 2022 and 13 December 2023, respectively. The latest observation is 13 December 2023 for realised DFR.

TABLE 1 ECB MONETARY POLICY AND OTHER MEASURES BETWEEN APRIL 2021 AND DECEMBER 2023

	Apr. 2021	Jun. 2021	Jul. 2021	Sep. 2021	Oct. 2021	Dec. 2021
Purchase programmes	■ Key ECB interest rates	■ Supervisory measures				
Lending programmes	■ Swap/repo lines	■ Other measures				
84-day US dollar liquidity operations to be discontinued	<ul style="list-style-type: none"> as of July 2021. 	<p>Pandemic emergency purchase programme (PEPP) - recalibration of pace of net purchases</p> <ul style="list-style-type: none"> Net purchases under the PEPP over the third quarter expected to continue to be conducted at a significantly higher pace than during the first months of the year. 	<p>No extension of dividend recommendation beyond September 2021</p>	<p>PEPP - recalibration of pace of net purchases</p> <ul style="list-style-type: none"> Moderately lower pace of net asset purchases under the PEPP than in the previous two quarters. 	<p>The European Commission adopts a review of EU banking rules on 27 October 2021 (CRR II / CRD V package)</p> <ul style="list-style-type: none"> The package implements the outstanding elements of the Basel III reform in the EU. It introduces explicit rules on the management and supervision of environmental, social and governance (ESG) risks. 	<p>Asset purchase programme (APP) - reduction in net purchases</p> <ul style="list-style-type: none"> €40 billion and €30 billion net monthly purchases in the second and third quarter of 2022 respectively. €20 billion net monthly purchases from October 2022 onwards.
		<p>Extension of leverage ratio relief for banks until end-March 2022</p> <ul style="list-style-type: none"> Banks may exclude central bank exposures from leverage ratio as exceptional macroeconomic circumstances continue. Banks to recalibrate their 3% leverage ratio requirement. <p>Market participants strongly encouraged to cease using LIBOR in new contracts and substantially reduce their exposures to LIBOR-referenced rates</p> <p>ECB takes over supervision of systemic investment firms</p>				<p>PEPP net purchases to be discontinued in March 2022 and reinvestments extended to end-2024</p> <ul style="list-style-type: none"> Net asset purchases under the PEPP expected to be conducted at a lower pace than in the previous quarter. Net asset purchases under the PEPP to be discontinued at the end of March 2022. Principal payments from maturing securities intended to be reinvested until at least the end of 2024. PEPP reinvestments can be adjusted flexibly across time, asset classes and jurisdictions.
						<p>Third series of targeted longer-term refinancing operations (TLTRO-III) conditions</p> <ul style="list-style-type: none"> Special conditions applicable under TLTRO-III since June 2020 confirmed to end in June 2022 (as had been announced in December 2020).
						<p>Liquidity coverage ratio relief expires on 31 December 2021</p>

TABLE 1 CONTD.

Feb. 2022	Mar. 2022	Apr. 2022	Jun. 2022	Jul. 2022	Sep. 2022	Oct. 2022	Nov. 2022	Dec. 2022
<p>ECB Banking Supervision decides to review the capital relief beyond December 2022</p> <ul style="list-style-type: none"> • Banks are once again expected to operate above Pillar 2 Guidance from 1 January 2023. 	<p>APP - reduction in net purchases</p> <ul style="list-style-type: none"> • Monthly net purchases will be reduced by €20 billion in May and €20 billion in June. • Calibration of net purchases for the third quarter to be data-dependent and to reflect the evolving assessment of the outlook. 	<p>Repo line renewed</p> <ul style="list-style-type: none"> • The Nationala României and IIS January 2023. 	<p>APP net purchases</p> <ul style="list-style-type: none"> • To be discontinued from net asset purchases as of 1 July 2022. 	<p>Interest rate hike*</p> <ul style="list-style-type: none"> • The deposit facility rate (DFR) was increased by 50 bps to 0.00%. 	<p>Interest rate hike</p> <ul style="list-style-type: none"> • The DFR was increased by 75 bps to 0.75%. 	<p>Interest rate hike</p> <ul style="list-style-type: none"> • The DFR was increased by 75 bps to 1.50%. 	<p>ECB sets deadlines for climate risks</p> <ul style="list-style-type: none"> • Following a thematic review, banks are expected to progressively meet all the supervisory expectations regarding climate risk by end-2024. 	<p>Interest rate hike</p> <ul style="list-style-type: none"> • The DFR was increased by 50 bps to 2.00%.
	<p>Timeline of the phasing-out of the pandemic collateral easing measures</p> <ul style="list-style-type: none"> • Pillar 2 Guidance will be gradually phased out between July 2022 and March 2024: • Continue to waive minimum credit quality requirement for Greek government bonds, allowing NCBs to accept them as collateral in line with continued eligibility under the PEPP. 		<p>PEPP flexibility in monetary policy transmission mechanism, flexibility will be applied in reinvesting due in the PEPP portfolio.</p>	<p>Establishment of the Instrument (TPI)</p> <ul style="list-style-type: none"> • Can be activated to counter unwarranted, disorderly market dynamics that threaten the transmission of monetary policy. • Subject to fulfilling established criteria, the Eurosystem can make securities issued in jurisdictions experiencing a deterioration in financing conditions not warranted by country-specific fundamentals. 	<p>Suspension of the two-tier system for excess reserves</p> <ul style="list-style-type: none"> • Multiplier set to 0. 	<p>Recalibration of TLTRO-III conditions</p> <ul style="list-style-type: none"> • Adjustment on the interest rates applicable in the TLTRO-III contracts. • Banks offered additional voluntary early repayments dates. 		
	<p>Eurosystem repo (EUREP) facility</p> <ul style="list-style-type: none"> • EUREP facility extended until 15 January 2023. • Complement the regular euro liquidity providing arrangements for non-euro area central banks. 					<p>Euro-reminni swap arrangement extended</p> <ul style="list-style-type: none"> • Bilateral euro-reminni currency swap arrangement with the central bank of China extended for another three years. 		
	<p>Swap / repo lines</p> <ul style="list-style-type: none"> • New €10 billion swap line set up with Narodowy Bank Polski until 15 January 2023. • Existing temporary repo lines with non-euro area central banks extended until 15 January 2023. 					<p>Change in the remunerations of minimum reserves</p> <ul style="list-style-type: none"> • Minimum reserves to be remunerated at DFR. 		
	<p>ECB Banking Supervision specifies supervisory expectations on leveraged transactions via a letter to banks</p> <ul style="list-style-type: none"> • Identifies leveraged finance as key supervisory priority in 2022-24. • Expresses expectation that highly leveraged transactions should be reduced. 							<p>Pandemic collateral easing measures start to be phased out</p> <ul style="list-style-type: none"> • Haircut schedules for assets used as collateral in monetary policy operations to be updated with effect from 29 June 2023 (including an increase in the haircuts for marketable and non-marketable assets). • Measures aim to ensure adequate level of risk protection, improve consistency of framework and ensure high equivalence of assets, while ensuring collateral availability. • Measures based on ECB's pre-pandemic risk tolerance levels for credit operations.
								<p>Swap and repo lines with non-euro area central banks extended</p> <ul style="list-style-type: none"> • to 15 January 2024.

TABLE 1 CONTD.

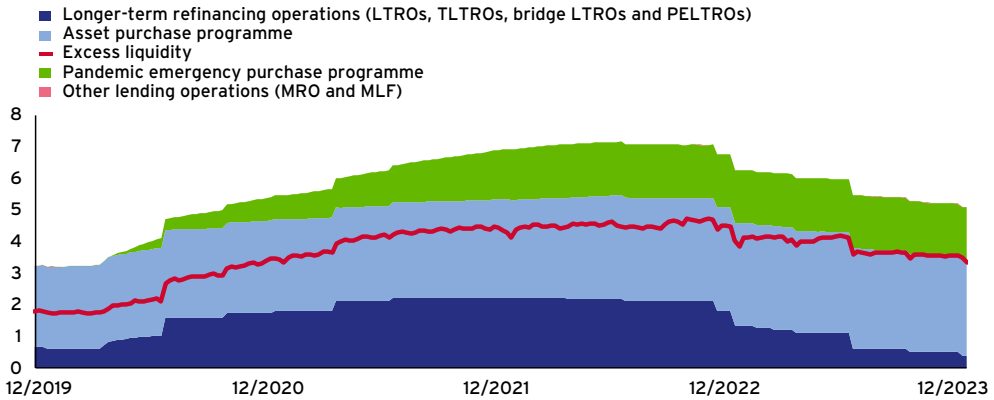
Jan. 2023	Feb. 2023	Mar. 2023	Apr. 2023	May. 2023	Jun. 2023	Jul. 2023	Sep. 2023	Dec. 2023
<p>Base I/II reforms take effect as of 1 January 2023, with a phase-in period of five years</p>	<p>Interest rate hike</p> <ul style="list-style-type: none"> The DFR was increased by 50 bps to 2.50%. 	<p>Interest rate hike</p> <ul style="list-style-type: none"> The DFR was increased by 50 bps to 3.00%. <p>7-day US dollar liquidity operations offered on a daily basis</p> <ul style="list-style-type: none"> as of 20 March 2023, at least until the end of April. 	<p>Frequency of 7-day US dollar liquidity operations reversed</p> <ul style="list-style-type: none"> from daily to once per week as of May 2023. 	<p>Interest rate hike</p> <ul style="list-style-type: none"> The DFR was increased by 25 bps to 3.25%. <p>APP reinvestments discontinued</p> <ul style="list-style-type: none"> Continued reduction of the APP portfolio at a measured and predictable pace; APP reinvestments expected to be discontinued as of July 2023. 	<p>Interest rate hike</p> <ul style="list-style-type: none"> The DFR was increased by 25 bps to 3.50%. 	<p>Interest rate hike</p> <ul style="list-style-type: none"> The DFR was increased by 25 bps to 3.75%. <p>Change in the remuneration of minimum reserves</p> <ul style="list-style-type: none"> minimum reserves to be remunerated at 0%. 	<p>Interest rate hike</p> <ul style="list-style-type: none"> The DFR was increased by 25 bps to 4.00%. <p>Announcement of the updated framework for liquidity lines</p> <ul style="list-style-type: none"> effective as of 16 January 2024. 	<p>PEPP partial reinvestments</p> <ul style="list-style-type: none"> Principal payments from maturing securities intended to be fully reinvested during the first half of 2024. Intended reduction of the PEPP portfolio by €7.5 billion per month on average over the second half of 2024. PEPP reinvestments intended to be discontinued at the end of 2024. <p>The European Banking Authority publishes implementation roadmap of the EU Banking Package with application date 1 January 2025 and phase-in period stretching over the next years</p>

Source: ECB staff.

Notes: *The interest rate applied in the main refinancing operations and marginal lending facility were always increased by the same amount.

FIGURE 3 EVOLUTION OF EXCESS LIQUIDITY AND SELECTED EUROSISTEM ASSETS SINCE DECEMBER 2019

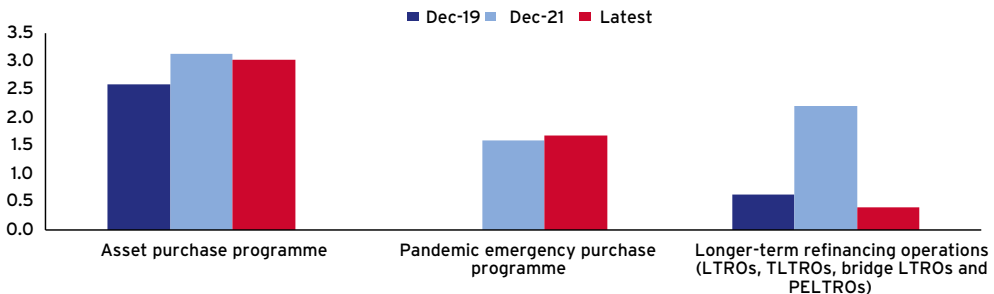
(EUR trillions)



Sources: ECB.

Notes: The latest observation is for 29 December 2023.

FIGURE 4 THE EVOLUTION OF MONETARY POLICY OUTRIGHT PORTFOLIOS AND TARGETED LENDING OPERATIONS



Sources: ECB.

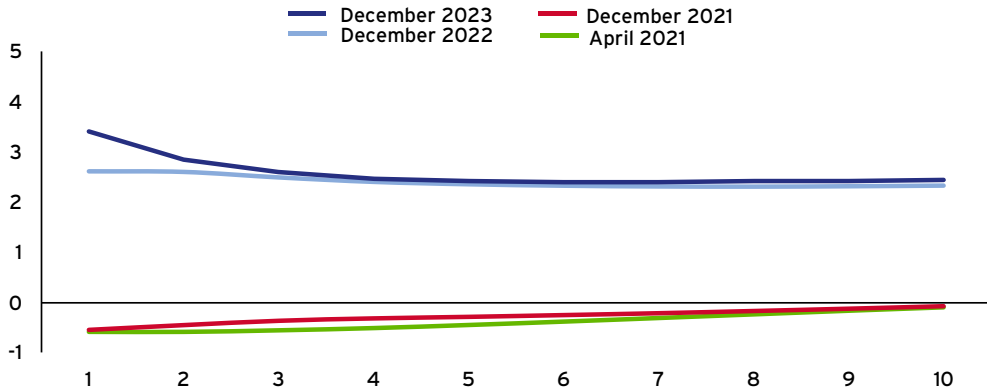
Notes: The latest observation is for 29 December 2023.

In terms of the transmission of monetary policy through the financial system, Figure 5 shows the OIS yield curve at these points in time, while Figures 6 and 7 plot the evolution of the average ten-year sovereign yield and the average bank lending rate to firms. In addition to price indicators, monetary policy also operates through its impact on the willingness of banks to supply credit: the ECB's loan supply indicator is shown in Figure 8.⁵

⁵ For analyses of the transmission of the ECB's monetary policy during this episode, see Altavilla et al. (2023), Darracq-Paries et al. (2023) and Lane (2022b, 2023a, 2023b).

FIGURE 5 EURO AREA OIS YIELD CURVE

(percentage per annum)



Sources: Refinitiv and ECB calculations.

Note: The curves in April and December 2021 refer to 21 April and 15 December, respectively. The curve for December 2022 refers to 14 December 2022 and the curve for December 2023 refers to 13 December 2023. Latest observation: 13 December 2023.

FIGURE 6 EURO AREA TEN-YEAR GDP-WEIGHTED SOVEREIGN YIELD

(percentage per annum)

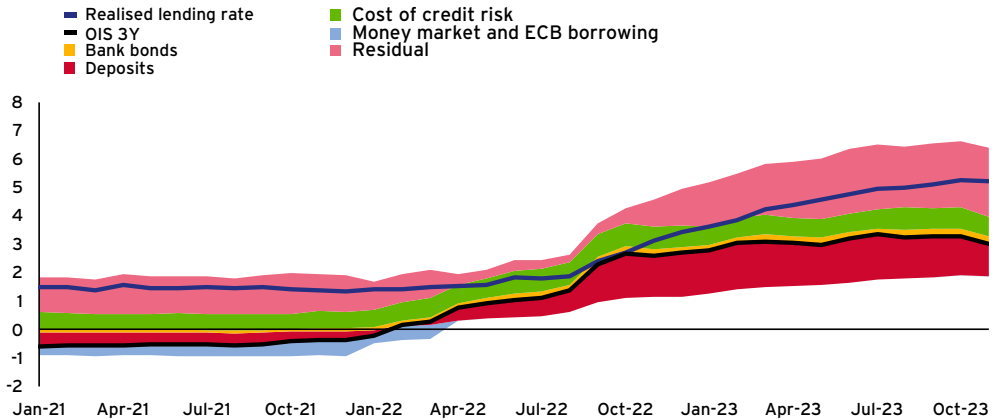


Sources: Refinitiv, Bloomberg and ECB calculations.

Note: The latest observation is for 14 December 2023.

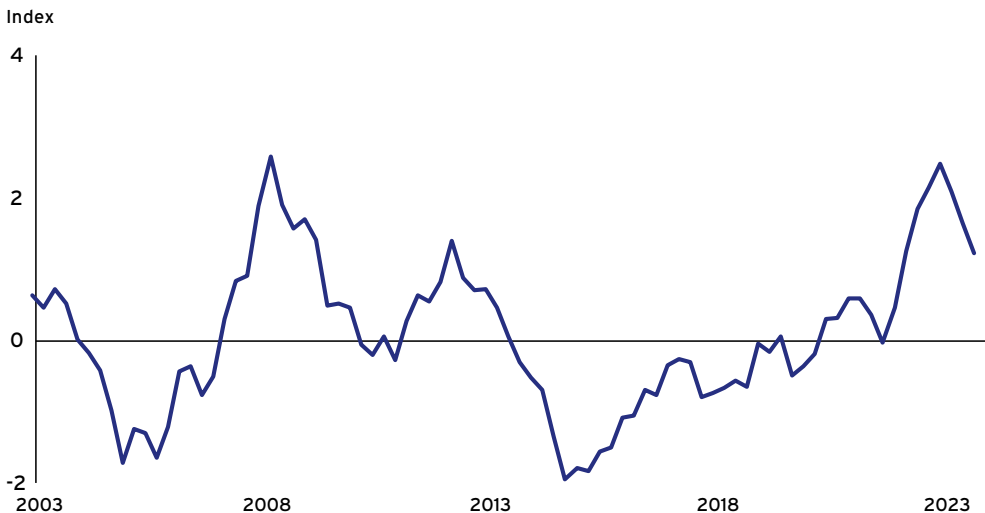
FIGURE 7 LENDING RATE TO NON-FINANCIAL CORPORATIONS AND ITS COMPONENTS

(percentages per annum)



Sources: ECB (BSI, MIR), Bloomberg, Moody's and ECB calculations.

Notes: The chart decomposes the realised lending rate to non-financial corporations (blue line) into contributions from bank cost components. The residual between the realised lending rate and the various cost components identifies a measure of intermediation margin. Deposits, bank bonds and money market and ECB borrowing are expressed as spreads vis-à-vis the base rate (i.e., the three-year overnight index swap (OIS), black line), weighted by their respective importance in banks' funding mix. The latest observations are for November 2023.

FIGURE 8 LOAN SUPPLY INDICATOR

Sources: BLS and ECB calculations.

Notes: Loan supply indicator (LSI) for bank lending to firms, as in Altavilla, C., Darracq-Paries, M. and Nicoletti, G. (2019). The series is a five quarter-centred moving average. Positive values indicate a tightening, while negative values indicate an easing. The latest observation is for Q3 2023.

A NARRATIVE CHRONOLOGY OF MONETARY POLICY DECISIONS, 2021-2023

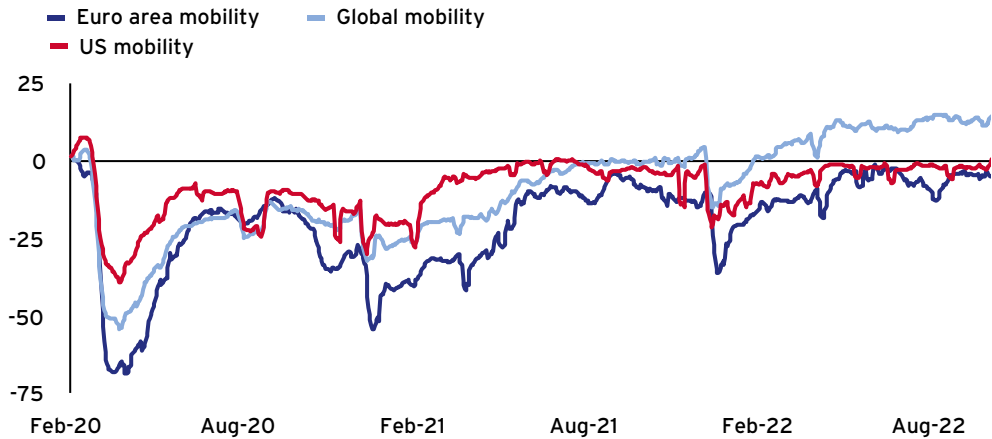
To recap the pandemic monetary policy of the ECB since March 2020, the ECB engaged in extensive asset purchases (primarily through the Pandemic Emergency Purchase Programme (PEPP) that was launched in response to the pandemic) and targeted

refinancing operations (supported by an easing of collateral rules and a cut in the lending rate in the TLTRO III programme to 50 basis points below the deposit facility rate).⁶ In contrast to some other major central banks, the pandemic did not trigger policy rate cuts, since the main policy rate (the deposit facility rate) already stood at -0.5% since September 2019. Since late 2020, the execution of asset purchases under the PEPP was guided by the criterion of maintaining favourable financing conditions. In addition to supporting the recovery and boosting inflation from the pandemic low of -0.3 per cent at the end of 2020, the highly accommodative monetary policy was also intended to avoid the risk of an adverse feedback loop between the real economy and financial markets that could have been triggered if monetary support had been assessed to be insufficient (Lane 2020, 2021a).

By late 2020, it was understood that the rollout of vaccines should result in a progressive easing of the pandemic burden over the course of 2021, although the base case of gradual improvement was surrounded by uncertainties about the pace of vaccinations and the risk that new variants might render the vaccines ineffective. Indeed, as is shown in Figure 9, many pandemic restrictions remained in place and there was considerable uncertainty about how the pandemic exit process would unfold at both European and global levels. The adverse impact of the pandemic on the financial health of the most-affected sectors added to the uncertainty, especially in view of the considerable lags in the availability of data on corporate balance sheets.

The increase in inflation during the first half of 2021 could be attributed to the weakening of the deflationary forces that took hold in the most acute phase of the pandemic in the Spring of 2020 and the inevitability of temporary supply-demand mismatches as sectors re-opened and re-closed in response to the various pandemic waves. Figure 10 shows a range of bottleneck indicators, while Figure 11 plots the large relative price movements over this period. In particular, the easing of such mis-matches over time should be associated with a decline in price pressures: that is, it was assessed that such bottlenecks would result in only a short-lived inflation spike. In addition, the asymmetric nature of restrictions on contact-intensive services sectors and the associated global shift in the composition of demand from services to goods generated atypically large sectoral relative price movements. Given pervasive downward nominal rigidities and the lags in the transmission of monetary policy, such sectoral price movements constitute shocks to the overall price level under flexible inflation targeting regimes that seek to deliver the inflation target over the medium term, especially in view of the scale of the demand depression that would have been required to stabilise inflation at the target in the near term.

6 This rate would be paid to the banks that reached the targeted lending performance threshold.

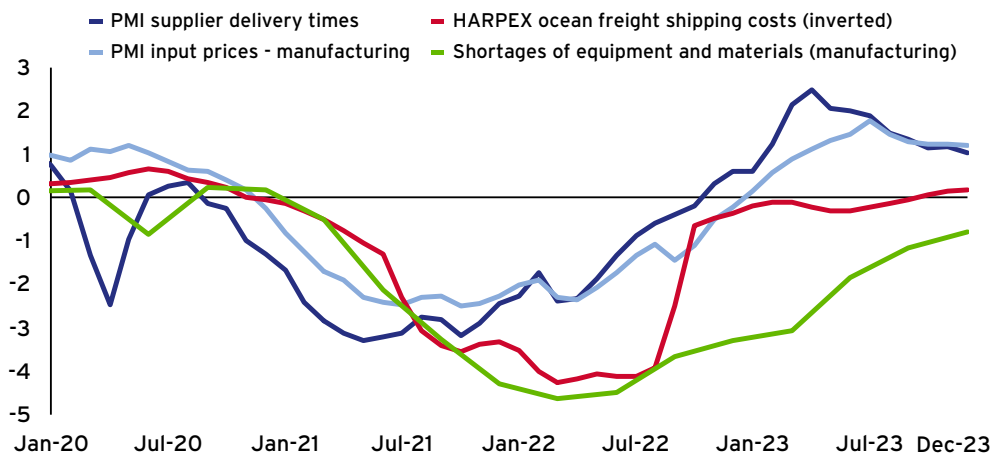
FIGURE 9 MOBILITY INDEX

Sources: Google mobility trend indicator.

Notes: The series are displayed as weekly moving averages. The index was discontinued in October 2022. The latest observation is for 15 October 2022.

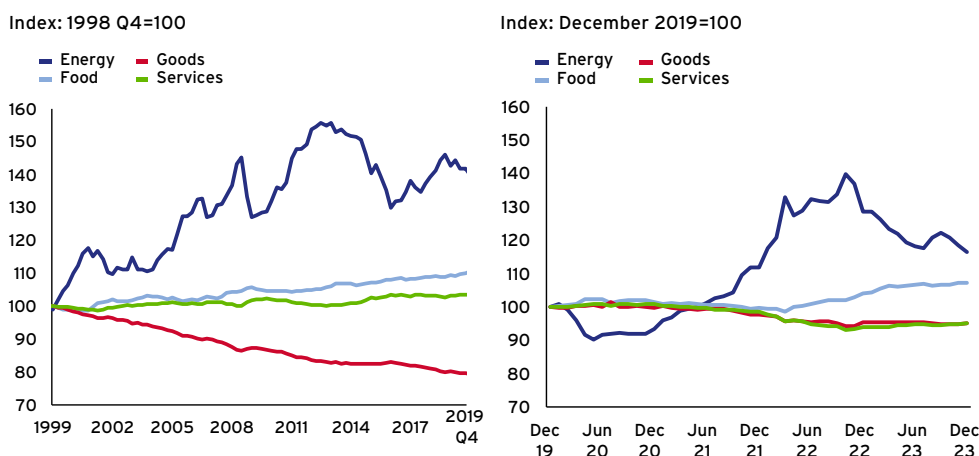
FIGURE 10 SUPPLY BOTTLENECK INDICATORS

Standardised



Sources: Eurostat, S&P global, DG-ECFIN and ECB calculations.

Note: Latest observations: Q4 2023 (survey conducted in October) for EC equipment shortages, Dec 2023 for PMI and HARPEX freight costs. Negative values mean more severe bottlenecks.

FIGURE 11 PRICE DEVELOPMENTS RELATIVE TO HICP FOR DIFFERENT SUBCOMPONENTS

Sources: Eurostat.

Note: Seasonally adjusted data for HICP, food, goods and services. Seasonally adjusted series for energy not available. Goods refers to non-energy industrial goods (NEIG). Latest observation: December 2023.

Accordingly, in view of the accumulated slack during the pandemic, the still-low level of medium-term inflation expectations and muted wage pressures, the initial rise in inflation in the first half of 2021 did not lead to significant revisions in the expected medium-term inflation path. In particular, the March 2021 staff macroeconomic projections expected inflation to average 1.5% in 2021, 1.2% in 2022 and 1.4% in 2023.⁷ Given the subdued medium-term inflation outlook and the rise in market yields in the early part of 2021 (assessed to be a spillover from US conditions), the purchasing pace under the PEPP was actually stepped up at the March 2021 monetary policy meeting in order to preserve favourable financing conditions as the underpinning for medium-term inflation dynamics (Lane (2021b)).

By the time of the June 2021 meeting, there was increasing confidence in the success of the vaccine programmes and a strong economic recovery was expected in the second half of 2021. However, output still remained far below the pre-pandemic level and, while bottlenecks were progressively worsening and oil prices were climbing, these forces were still assessed to be short-lived in nature. This was also reflected in market pricing: for instance, the oil futures curve indicated a significant reversion in energy prices in 2022. The June 2021 staff macroeconomic projections expected inflation to average 1.9% in 2021, 1.5% in 2022 and 1.4% in 2023. The scale of the projected undershoot in the outer years of the projection horizon was among the largest in the history of Eurosystem projections, which is primarily attributable to the muted energy price projections in June 2021 compared to the subsequent spectacular increase in oil and gas prices.

⁷ The projections of other forecasters were broadly similar, as has been the case throughout this episode.

The overall narrative of temporary bottlenecks and the normalisation of energy prices with no significant change in the medium-term inflation outlook still held at the July 2021 meeting, although the scale of the near-term inflation spike continued to be upwardly revised, with inflation expected to be significantly above the 2% target in the second half of 2021.

Following the 8 July 2021 conclusion of the ECB's monetary policy strategy review, the 22 July 2021 meeting also saw the re-formulation of interest rate forward guidance.⁸ In particular, the Governing Council stated that it “expects the key ECB interest rates to remain at their present or lower levels until we see inflation reaching two per cent well ahead of the end of our projection horizon and durably for the rest of the projection horizon, and we judge that realised progress in underlying inflation is sufficiently advanced to be consistent with inflation stabilising at two per cent over the medium term. This may also imply a transitory period in which inflation is moderately above target.” In terms of the overall monetary policy stance, this rate forward guidance was supplemented by the commitments to continue net asset purchasing under the APP until shortly before the interest rate would be lifted and net asset purchasing under the PEPP until the coronavirus crisis phase would be over.

This monetary policy configuration reflected the still-subdued medium-term inflation outlook and the conclusion of the monetary policy strategy review that proximity to the lower bound requires “especially forceful or persistent monetary policy measures to avoid negative deviations from the inflation target becoming entrenched.”⁹ While there had been some upward revisions in the longer-term inflation expectations reported in expert surveys and contained in market pricing by the time of the July 2021 meeting, these indicators continued to be significantly below the target level and the revisions could be interpreted as constituting some initial progress in re-anchoring expectations from below towards the newly announced symmetric 2% inflation target.

The monetary policy strategy statement also recognised that this policy approach “may also imply a transitory period in which inflation is moderately above target”, which was also reflected in the rate forward guidance quoted above. In addition, the strategy statement that the appropriate monetary policy response to a deviation of inflation from the target is context-specific and depends on the origin, magnitude and persistence of the deviation. In terms of the rate forward guidance, the rate lift-off criteria required that the target was projected to be attained on a durable basis within the projection horizon but also that underlying inflation had sufficiently picked up to reinforce confidence in the attainment of the target. Among other scenarios, these criteria were designed to exclude a monetary policy response to a temporary surge in headline inflation that was not reflected in underlying inflation or was not projected to persist throughout the projection horizon.

⁸ See Lane (2021c) for my assessment of the monetary policy strategy review.

⁹ See paragraph 6 of the ECB's monetary policy strategy statement.

By September 2021, the economic recovery had further advanced but the new Delta variant generated new uncertainty about the course of the pandemic. The bottlenecks that had affected early and intermediate stages of production were now becoming evident in the consumer prices for goods and the labour market was also strengthening, as evident in emerging vacancies in some sectors and unemployment falling to 7.7%. Inflation expectations were still increasing but could still be interpreted as welcome re-anchoring from below, possibly aided by the July announcement of the symmetric 2% target and the enhanced rate forward guidance. The new staff projections expected inflation at 2.2% in 2021, 1.7% in 2022 and 1.5% in 2023.

Still, the incremental change in the inflation outlook was reflected in two steps. First, the risk assessment in the monetary policy statement included an acknowledgement that “if supply bottlenecks last longer and feed through into higher than anticipated wage rises, price pressures could become more persistent.” Second, net asset purchases under the PEPP were scaled down to a “moderately lower pace.”

The autumn of 2021 saw a marked change in inflation dynamics. As shown in Figure 12, the intensification of inflation was not foreseen in the September projections (nor in the projections of other forecasters). This was the first in a series of sizeable one-quarter-ahead inflation forecast errors across the September 2021, December 2021, March 2022 and June 2022 projection rounds. As shown in Figure 13, the primary factor in Autumn 2021 was the unexpected surge in energy prices.

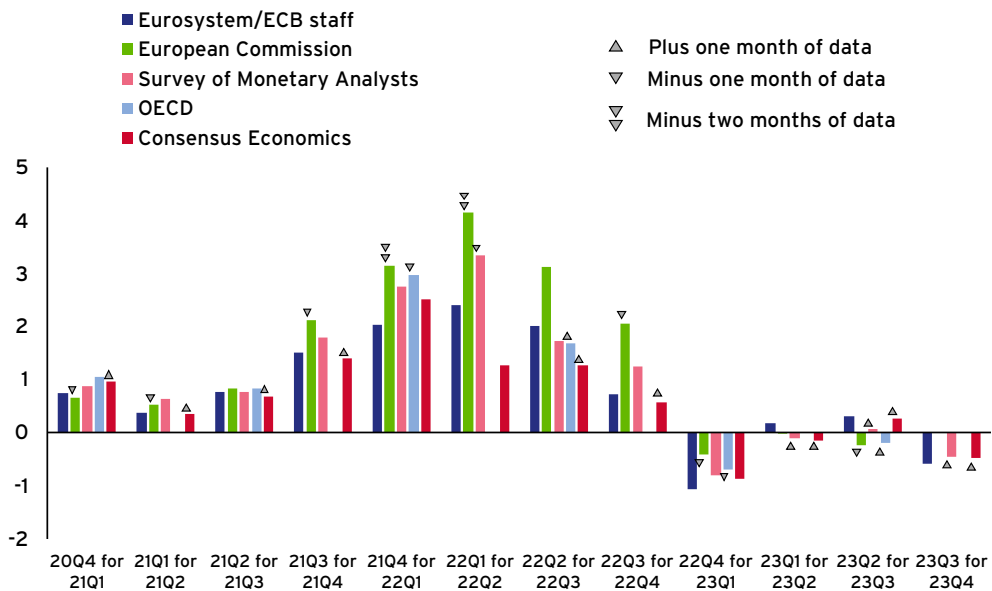
For the euro area, the energy sector is characterised by a high net import content, such that the energy price shock constituted a severe terms of trade deterioration. While energy prices pushed up inflation in the short run, the adverse income effects of a terms of trade decline are typically assessed to lower price pressures in the medium term. Still the joint impact of the energy price surge, the ongoing intensification of bottleneck pressures and the mismatch generated by a recovery in domestic demand that was outpacing constrained supply meant that there were considerable near-term inflation pressures. The October 2021 monetary policy statement recognised that inflation would rise further from the 3.4% September print in the near term but assessed that inflation would decline in the course of 2022. Furthermore, in addition to the prolongation of bottlenecks, the risk assessment identified a stronger-than-expected return to full capacity as a further possible source of additional price pressures.

In Autumn 2021, some central banks started to adjust their monetary policy settings. However, by and large, the global debate recognised that the policy risks differed across central banks. In particular, it was generally recognised that ongoing monetary accommodation was appropriate in the euro area, since the rise in inflation had not translated into the main drivers of medium-term price pressures (wage growth, longer-term inflation expectations) and the assessment that inflation shocks were temporary

in nature appeared well founded.¹⁰ On a comparative basis, the euro area was further behind in the recovery from the pandemic, did not have the same fiscal stimulus as in the United States and inflation expectations were still pinned down by the long period of below-target inflation. Moreover, especially in view of the ongoing uncertainties about the state of corporate balance sheets in the sectors most affected by the pandemic, it was recognised that the pandemic exit was not sufficiently secure to risk a premature shift away from favourable financing conditions.

FIGURE 12 ONE-QUARTER AHEAD HICP FORECAST ERRORS: COMPARISON WITH OTHER FORECASTERS

(percentage points)



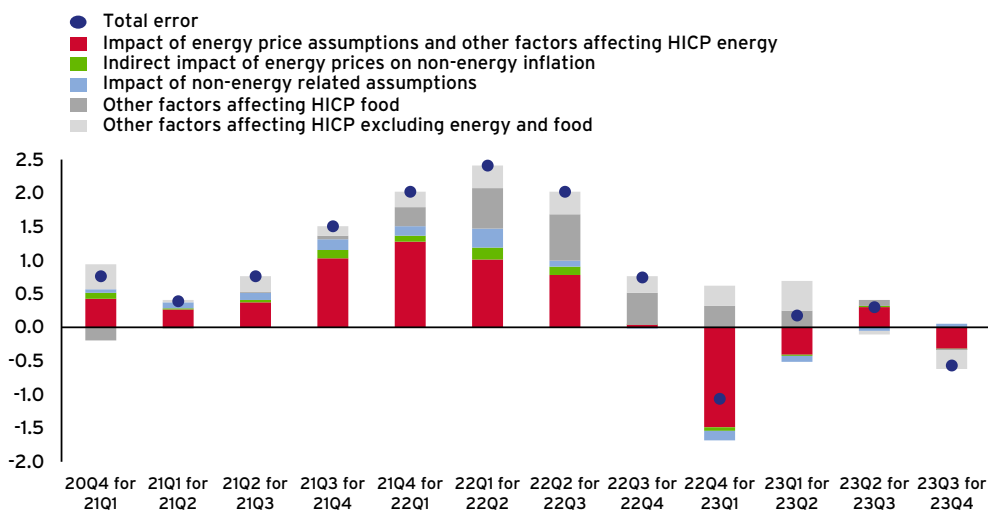
Sources: Eurosystem/ECB staff projections, Consensus Economics, Survey of Monetary Analysts (SMA), European Commission, OECD and Eurostat.

Notes: See also Chahad et al. (2023). For other forecasters, the errors are shown for publications where the corresponding cut-off date is closest to that of the Eurosystem/ECB staff projections. For the SMA, the median of survey respondents is shown. The arrows indicate differences in the months of available HICP data at the cut-off point for each publication relative to the Eurosystem/ECB staff projections. An upward arrow indicates one additional month of data, a downward arrow indicates one month less data, and two downward arrows indicate two months less data. Quarterly projections from the OECD are only available twice per year and therefore no error is shown in the first and third quarters. Notes on 2023Q3 for 2023Q4 errors: The European Commission did not publish quarterly forecasts in its Summer 2023 forecast, so there is no error depicted in the chart. The cut-off date for the Eurosystem/ECB staff projections was 30 August 2023. Although this was one day before the publication of the euro area HICP flash estimate for August 2023, flash releases for five euro area countries (covering 45% of the euro area HICP) were included implying no deviation from the Eurostat release for headline HICP.

¹⁰ For a representative example, see the discussion in the October 2021 IMF Regional Economic Outlook for Europe. However, Reis (2022) has highlighted that the right tail in the distribution of inflation expectations could be a leading indicator. In tracking these right-tail indicators, two conjectures are especially relevant. In one direction, more attentive traders, experts and individuals may identify more quickly a persistent shift in inflation dynamics, while inattentive participants adjust more slowly. Under such scenarios, right-tail measures will be leading indicators for a generalised revision in long-term inflation expectations. However, under other scenarios, the right tail might be populated by those who overreact to high spot inflation readings and misperceive as permanent what turns out to be a temporary increase in the inflation rate. In these scenarios, the right-tail will not serve as an accurate leading indicator of generalised long-term inflation expectations (Bordalo et al. 2022). Accordingly, the interpretation of right-tail measures is closely bound to the general analysis of the relative contribution of temporary and persistent forces in inflation dynamics.

FIGURE 13 DECOMPOSITION OF RECENT ONE-QUARTER-AHEAD HICP INFLATION ERRORS IN THE EUROSYSTEM/ECB STAFF PROJECTIONS

(percentage points)



Source: ECB calculations.

Notes: See also Chahad et al. (2023). "Total error" is the outturn minus the projection. "Indirect impact of energy prices on non-energy inflation" is the sum of the indirect effects of oil, gas and electricity prices. (For oil, these are based on the elasticities derived from the Eurosystem staff macroeconomic models, and for gas and electricity these are computed assuming an elasticity proportional to the oil price shock.) "Impact of non-energy related assumptions" represents the assumptions for short and long-term interest rates, stock market prices, foreign demand, competitors' export prices, food prices and the exchange rate.

The December 2021 meeting represented a significant pivot for the ECB. The new staff projections assessed that inflation would not only remain above target in the near term but would not be very far from the target even at the end of the projection horizon: inflation was foreseen to rise from 2.6% in 2021 to 3.2% in 2022 before falling back to 1.8% in 2023 and 2024. Although inflation was still projected to fall below target in the outer years of the forecast (with longer-term inflation expectations still persistently below the target), the relatively limited end-of-horizon shortfall (1.8% compared to the target of 2.0%) and the extended period above target in 2021 and 2022 were sufficient to warrant the scaling down of quantitative easing. In particular, it was decided to announce that net purchases under the PEPP would stop at the end of Q1 2022. To smooth the deceleration in quantitative easing, there was a partial step up in the announced purchases under the APP for Q2 2022 but reverting to the pre-pandemic pace of €20 billion per month from the start of Q3 2022. While this configuration still indicated that the policy rate was not expected to be increased any time soon, this was also in line with market pricing of the forward curve and the yield curve (Figures 2 and 3).¹¹

¹¹ The median expectation among the participants in the Survey of Monetary Analysts (SMA) in January 2022 was for inflation in 2023 to fall to 1.7%, in line the December staff projections. In fact, only two respondents expected inflation to be above 2% in 2023 at that time with the highest estimate at 2.7%. Given the low inflation expectations, SMA participants in the January 2022 survey expected the DFR to increase slowly, reaching only 0.75% by 2027.

Still, the announced end to net purchases under the PEPP and the significant deceleration in the overall pace of net asset purchases constituted a significant shift in the orientation of the ECB's monetary policy stance and provided greater policy optionality in the event that medium-term inflation pressures picked up during the course of 2022.¹² At the same time, it was also considered that there remained downside risks to the economic recovery, with the advent of the Omicron variant policy stance also had to guard against an excessively sharp shift in financing conditions. This included a clarification that the end of PEPP net purchases did not mean that flexibility in the conduct of monetary policy would be excluded for the future. In particular, the monetary policy statement explained that: "Within our mandate, under stressed conditions, flexibility will remain an element of monetary policy whenever threats to monetary policy transmission jeopardise the attainment of price stability".

The February 2022 monetary policy meeting took place in the context of December and January inflation prints that, at 5.0% and 5.1% respectively, were substantially above the levels foreseen in the December projections. As shown in Chart 13, the forecast errors for Q1 2022 could be attributed to further unexpected surges in energy prices, which had increased due to the rising threat of Russian aggression against Ukraine, now also accompanied by upward surprises in food inflation and the broadening of price pressures to more sectors, including due to the indirect impact of rising energy prices on input costs across the economy. While there was tentative evidence that bottlenecks had peaked at the end of 2021, the ECB corporate telephone survey suggested that the repair of supply chains would be a slow process.¹³ It was also assessed that, although there had been significant lockdown measures in the opening weeks of 2022, the Omicron variant would not delay the pandemic recovery for too long. Indicators of longer-term inflation expectations also moved closer to the 2% target, while there was some initial evidence of a pick-up in wage growth, albeit from a low level.

In view of these considerations, the monetary policy statement strengthened its inflation risk assessment by stating that: "Compared with our expectations in December, risks to the inflation outlook are tilted to the upside, particularly in the near term". In terms of the approach to monetary policy, the statement also signalled that the Governing Council was prepared to adjust its policy measures as needed: "In view of the current uncertainty, we need more than ever to maintain flexibility and optionality in the conduct of monetary policy".¹⁴ In the wake of this meeting, the forward curve shifted upwards in

12 The December 2021 monetary policy statement also modified the standard recitation that the Governing Council stood ready to adjust all of its instruments to deliver the medium-term target by specifying that instruments could be adjusted "in either direction". This signalled that the Governing Council was as attentive to the emerging risk of above-target inflation in the medium term as to the long-standing chronic risk of returning to below-target inflation in the medium term.

13 Lane (2022c) provides an assessment of bottlenecks from the perspective of February 2022.

14 As explained by President Lagarde at the February press conference, the high level of uncertainty would require the ECB to be data dependent in making its monetary policy decisions. The concept of data dependence would be further developed in subsequent monetary policy meetings.

anticipation of a faster-than-expected move towards lifting the policy rate, while there was an intensification of the discussion concerning the conditions under which it would be appropriate for the ECB to end quantitative easing and begin raising the policy rate.¹⁵

The 24 February 2022 unjustified Russian invasion of Ukraine constituted a multi-dimensional shock. In addition to the high dependence of the euro area on Russian gas and oil imports, the uncertainty triggered by this war led to repricing in European bond and equity markets. It would also turn out to be associated with a discrete and persistent shift in consumer inflation expectations: the median three-year-ahead inflation expectation in the ECB's Consumer Expectations Survey jumped from 2% to 3% in the March 2022 survey.

The March 2022 monetary policy meeting had to assess the impact of the war under a range of scenarios. At the same time, it was also increasingly clear that the euro area economy was firmly on the exit path from the pandemic, with a strong recovery in tourism and other contact-intensive services expected with the end of lockdown measures. The sequence of large upside inflation surprises – primarily driven by upside surprises to energy prices – also informed the new projections exercise. In the baseline staff projections, inflation was projected to average 5.1% in 2022, 2.1% in 2023 and 1.9% in 2024.

In addition to the baseline projections, the ECB staff also published alternative war scenarios. While inflation would be considerably higher and the economy much weaker in the near term under more severe scenarios, inflation was still projected to decrease progressively and settle around the target in 2024. At the same time, although these scenarios saw convergence to the target, the risk assessment recognised that the war could also drive inflation higher over the medium term.

These projections warranted a further deceleration in the pace of quantitative easing. The €40 billion pace for Q2 that had been announced in December was replaced by a step-down schedule of €40 billion in April, €30 billion in May and €20 billion in May. Furthermore, it was announced that QE would end in the third quarter if, as was expected, the incoming data would not indicate any weakening in the medium-term inflation outlook. With the end of QE now in sight, it was also decided at this meeting to provide some guidance as to the subsequent timing and pace of rate hikes.¹⁶ In particular, any rate adjustments would take place “some time after” the end of QE and would be gradual. The “some time after” phrase was intended to create extra optionality in the timing of the lift-off decision, since the long-standing guidance that QE would end only “shortly before” the first rate hike could have been misinterpreted to mean that the decision to end QE was irrevocably connected to a pre-determined decision to also quickly hike rates thereafter.

¹⁵ See, amongst others, Lane (2022d) and Schnabel (2022).

¹⁶ This meeting also saw the deletion of the directional bias that rates would remain at their “present or lower” levels until the rate forward guidance criteria had been fulfilled.

Although it could be argued that the March 2022 baseline projections broadly fulfilled the rate forward guidance criteria, the agreed policy sequencing by which QE would end before rate hiking would begin meant that it was not immediately policy relevant at the March 2022 to decide whether the rate forward guidance criteria were satisfied, especially in view of the high war-related uncertainty that surrounded this meeting.

As shown in Figure 12, the inflation outturn in Q2 2022 far exceeded the March staff projections (and the projections of other forecasters). The scale of the war-related shocks to energy prices and food prices accounted for most of this forecast error, although the under-prediction of core inflation was also starting to make an increasing contribution. In turn, the under-prediction of core inflation reflected some mix of the indirect impact of the large energy and food shocks on the costs facing other sectors, the demand recovery in supply-constrained contact-intensive service sectors and the extra space created for price increases by the move up in near-term inflation expectations in the wake of a sequence of increasingly high inflation prints.¹⁷

In this context, the April 2022 monetary policy statement reinforced the Governing Council's expectation that QE would end in the third quarter. It also outlined how the Governing Council would incorporate the high level of uncertainty into its decision making process: through maintaining “optionality, gradualism and flexibility” in the conduct of monetary policy.¹⁸ After an extended phase in which future decisions had been guided by the schedule of net asset purchases and the rate forward guidance criteria, the approaching end of QE and the fulfilment of the rate forward guidance conditions meant that it was timely to signal that future monetary policy decisions should be taken on a meeting-by-meeting basis to maximise optionality. At this juncture, there was little evidence about the potential impact of the relatively-rapid switch from high volumes of QE to zero net asset purchases, such that it was appropriate to underline gradualism for the reasons laid out by Brainard (1967).¹⁹ Especially in the context of the history of the uneven transmission of monetary policy in the euro area, it was also important to maintain clarity that the ECB would be flexible in the conduct of monetary policy, if warranted.

Between the April and June monetary policy meetings, it was increasingly evident that contact-intensive sectors such as tourism and hospitality were experiencing strong reopening effects after the prolonged shutdowns, with surging demand mismatched with still-constrained supply. In contrast, bottlenecks were constraining the manufacturing

17 The intrinsic persistence of inflation due to staggered price and wage setting, lags in monetary transmission and the medium-term orientation of the inflation targeting regime meant that an increase in near-term inflation expectations was fully consistent with solidly anchored medium-term inflation expectations, since large-enough inflation shocks could be expected to unwind only over a multi-year horizon.

18 See also Lagarde (2022a).

19 In addition to uncertainty about the market impact of the rapid shift in the scale and expected timeline for quantitative easing, the prospective shift away of policy rates from a long period near the effective lower bound might be expected to have a different impact to a standard policy tightening cycle to the extent that the financial system had adapted to a 'low for long' regime. In addition, rate hiking would take place under conditions of excess liquidity, which alters the impact of policy rates via banking sector transmission channels.

and food sectors, compounded by the ongoing shutdown in China and the impact of the Russian invasion of Ukraine. According to the June 2022 Eurosystem staff projections, inflation would average 6.8% in 2022, 3.5% in 2023 and 2.1% in 2024, with core inflation at 2.3% in 2024. Although near-term growth was marked down, the growth outlook was still robust at 2.8% in 2022, 2.1% in 2023 and 2.1% in 2024.

In the context of this updated set of projections and the significant inflation surprises in Q2 2022, the Governing Council decided to end QE at the beginning of the third quarter. In addition, it formally concluded that the rate forward guidance criteria were fulfilled and announced its intention to raise the key policy rates by 25 basis points at the July meeting. Furthermore, it outlined that it expected that a further increase (possibly by a larger increment) at the September meeting and, beyond September, a gradual but sustained path of further increases in interest rates would be appropriate.

This set of policy announcements was in line with the policy approach outlined in the April meeting in which “optionality, gradualism and flexibility” would guide the conduct of monetary policy. The June monetary policy statement added “data dependence” to this list since the high level of uncertainty implied that the application of the principles of optionality, gradualism and flexibility should take into account the information contained in the incoming data flow.²⁰ In particular, the conjunctural environment could be interpreted as a “high learning” setting in which an unusually wide set of future inflation and growth paths could be envisaged, such that Bayesian updating on the basis of incoming data would be an essential element in a disciplined approach to policy calibration.

The June set of policy announcements signalled that the exit from the effective lower bound would involve a sequence of policy rate hikes but that the cumulative adjustment in interest rates would be data dependent. In addition to the high uncertainty about inflation and growth dynamics, it was evident that bond market risk premia were also increasing due to elevated uncertainty about whether the Governing Council would introduce an ex ante policy instrument to reinforce its commitment to flexibility in the implementation of monetary policy. In response to the surge in market volatility after the June monetary policy meeting, the Governing Council released a statement on 15 June that committed to an acceleration of preparatory work for the design of an anti-fragmentation instrument, while also applying flexibility in the reinvestment of the PEPP portfolio. This announcement had a calming effect on markets and the Transmission Protection Instrument (TPI) was officially announced at the 21 July monetary policy meeting.²¹

²⁰ See also Lagarde (2022b).

²¹ See the 21 July 2022 ECB press release on the TPI.

It was decided at the July meeting that the first rate hike should be 50 basis points, rather than the 25 basis points that had been flagged at the June meeting. This revision took account of the further inflation surprise in June and the reduced uncertainty about the transmission of monetary policy due to the introduction of the TPI. By delivering an exit from the negative interest rate zone that had been in place since 2014, a more substantial first hike also had a symbolic value in signalling the shift in monetary policy orientation.²² Rather than try to indicate any particular increment for future hikes, the July statement also guided that future rate decisions would be taken on a meeting-by-meeting basis. It also dropped the reference to gradualism: having executed a smooth end to QE and curtailed transmission risks through the TPI announcement, uncertainty about the impact of monetary policy had diminished, while the risk of inflation staying significantly above target for a prolonged period had increased, such that it would be problematic if the speed of monetary policy normalisation were to be excessively curtailed.

Since monetary policy works through its influence on the entire yield curve, it is important to appreciate that a meeting-by-meeting approach to monetary policy essentially has two elements (Lane 2022e). First, it allows for meeting-by-meeting reassessments of the medium-term path for interest rates that is required to deliver the target.²³ In particular, during the hiking phase of the monetary policy cycle, a primary influence on the interest rate decision in any one meeting is the size of the gap between the prevailing interest rate and the estimated peak rate. Second, at a tactical level, the exact calibration of the interest rate decision should also take into account the appropriate speed to close that gap. Especially under conditions of high uncertainty, each of these factors can shift in a material way from one meeting to the next: first, there may be a revision in the projected peak rate; and second, the appropriate speed in closing the gap may accelerate or decelerate.

Turning to the appropriate speed in closing the gap between the prevailing policy rate and the appropriate peak rate, uncertainty about the transmission of policy rate changes to overall financing conditions, such that it makes sense to allow the financial system to absorb rate changes in a step-by-step manner. At the same time, in calibrating a multi-step hiking sequence, the appropriate size of the individual increments will be larger, the wider the gap to the terminal rate and the more skewed the risks to the inflation target.²⁴ In particular, since the initial policy rate setting was highly accommodative and the policy challenge was to ensure the timely elimination of above-target inflation dynamics, there was a logic taking atypically large steps in moving from accommodative towards a 'normal' level of rates. A multi-step adjustment path towards the peak rate also makes it easier to undertake mid-course corrections if circumstances change. In particular, if

22 The exit from negative interest rates also meant that the tiered remuneration system of excess liquidity (introduced in September 2019) should be revised, as was flagged in the July monetary policy statement.

23 The Governing Council does not publish a projection of future policy rates but considers a range of forward rate path scenarios as part of its deliberations. See Lane (2022e) on the pros and cons of publishing conditional paths for future policy rates.

24 See also Lagarde (2022c).

the incoming data (new shocks, updates on the relative strength of opposing adjustment forces) were to call for a downward shift in the peak rate, this would be easier to handle under a step-by-step approach. This consideration has greater force the closer the gap to the range of plausible terminal rates, which would call for smaller increments as rates moved above normal into restrictive territory.

The summer of 2022 saw a yet further surge in gas prices. The mismatches in contact-intensive sectors (especially tourism) between constrained supply and recovering demand added to inflationary pressures. More generally, the broadening of price pressures across sectors (including due to the indirect impact of energy on the cost bases of other sectors) also fuelled self-validating inflationary pressures by which rising near-term inflation expectations encouraged firms to raise prices more frequently and by larger increments. The September projections saw significant upward revisions to inflation, with inflation foreseen at 8.1% in 2022, 5.5% in 2023 and 2.3% in 2024. In the context of easing bottlenecks and the momentum from the pandemic reopening dynamic, the assessment of the adverse terms of trade shock and the impact of monetary tightening saw only a limited downward revision in output growth to 3.1% in 2022, 0.9% in 2023 and 1.9% in 2024.

In this context, the Governing Council opted at the September and October monetary policy meetings to move quickly in the normalisation of monetary policy with a pair of 75 basis point hikes. In bringing the main policy rate to 150 basis points, the Governing Council at the October meeting assessed that the cumulative rate hiking had made “substantial progress in withdrawing monetary policy accommodation”.²⁵ However, since 150 basis points still stood below the range of peak policy rates indicated by simulation exercises, the October statement also maintained an expectation to raise rates further, with the future rate path based on the evolving outlook for inflation and the economy.²⁶

The December staff projections saw a further substantial upward revision in the expected inflation path to 8.4% in 2022, 6.3% in 2023, 3.4% in 2023 and 2.3% in 2024.²⁷ In addition, the Governing Council maintained its assessment that risks to the inflation outlook remained primarily on the upside. Against this backdrop, it was decided to not only further hike rates by 50 basis points but also signal that “interest rates will still have to rise significantly at a steady pace to reach levels that are sufficiently restrictive to ensure a timely return of inflation to our 2% medium-term target”.

25 See Lane (2019) for pre-pandemic estimates of the equilibrium real interest rate for the euro area.

26 In line with the July commitment to review the remuneration of excess liquidity, the October statement also announced a revision in the interest rate on TLTRO loans and a shift in the remuneration rate for minimum required reserves (from the MRO rate to the DFR rate). Additional TLTRO voluntary repayment options were also provided.

27 The 2022 inflation rate would have been even higher in the absence of the large-scale energy subsidies and other cost-of-living measures rolled out by euro area governments. However, the scheduled unwinding of these temporary measures was calculated to push up projected inflation further out in the projection horizon, especially in 2024.

This decision struck a balance. In one direction, the downshift from a 75 basis points increment to a 50 basis points increment recognised that smaller steps would be appropriate as the level of the policy rate moved into restrictive territory and moved closer to estimates of the peak rate. A smaller increment also reflected some reduction in inflation tail risks, in view of the declines (from spectacular peaks) in oil and gas prices in autumn 2022. In the other direction, the projections indicated that inflation would remain far above the target for much of the projection horizon, including due to upward revisions in the assessed persistence of underlying inflation dynamics. In particular, although the underlying shocks were expected to fade out, the scale of the cumulative increase in the price level and input costs meant that a multi-year adjustment phase could be expected before reaching the new long-term equilibrium real wage levels and relative price levels. Especially in view of some complacency in the run-up to the meeting in market assessments of the future inflation and rate paths, it was important to signal that the Governing Council judged that there was still substantial ground to cover to reach the appropriate peak rate.

In particular, while the December 2022 staff projections expected very sizeable disinflation during the course of 2023 due to a combination of base effects, the easing of supply bottlenecks and the completion of the re-opening phase of the pandemic recovery, there was still considerable uncertainty about the strength and persistence of the dynamic propagation of 2022 inflation shock. While a multi-year adjustment phase was inevitable, in which firms that had experienced declines in profit margins due to rising input costs and workers that had suffered a reduction in living standards due to the sharp increase in consumer prices would seek to rebuild the real value of their earnings and incomes, a restrictive monetary policy would limit the extent and duration of the deviation of inflation from the target by dampening demand and stabilising medium-term inflation expectations.²⁸

The second half of 2022 had seen the smooth absorption of the end of QE in euro area bond markets. Accordingly, the Governing Council at the December meeting also announced that the APP portfolio would only be partially reinvested from March 2023 onwards. Together with sizeable TLTRO repayments, this meant that the Eurosystem balance sheet was scheduled to shrink markedly during 2023. While the additional monetary tightening through the impact of lower bond holdings on term premia and a lower stock of central bank reserves on credit dynamics would be taken into account, these measures were intended as gradual and predictable steps towards balance sheet normalisation, with the level of the policy rates the active marginal instrument determining the monetary policy stance.

28 Monetary policy is best interpreted as jointly operating on demand and inflation expectations. In the absence of dampening demand, the stabilising impact of monetary policy tightening on inflation expectations is necessarily limited. Equally, the stabilisation of inflation expectations in itself dampens demand since, all else equal, a lower expected inflation rate raises the real interest rate.

The steady pace of lifting rates into restrictive territory was continued through a further 50 basis points hikes at the February 2023 meeting, which also flagged that a further 50 basis points hike was intended for the March 2023 monetary policy meetings, that would bring the main policy rate to 300 basis points. Since the March 2023 projections still assessed that inflation would return to the target only gradually (inflation was projected at 5.3% in 2023, 2.9% in 2024 and 2.1% in 2025), despite the welcome and substantial drop in the energy price path, and that the slowdown in the euro area economy would be only temporary and quite limited in scale (growth at 1.0% in 2023, 1.6% in both 2024 and 2025), the intended 50 basis points hike at the March meeting was confirmed, even against the backdrop of banking turmoil in the United States and Switzerland.

Since the financial market tensions implied additional uncertainty around the baseline assessments of inflation and growth, the March monetary policy statement did not indicate a directional bias for future interest rate decisions. In any event, even in the absence of the global financial market turmoil, the cumulative scale of the rate hiking over a compressed time period and the narrowing of the gap to the plausible range for the appropriate peak rate meant that it was appropriate to shift towards a more incremental approach to adjusting the monetary stance.

In particular, the March statement explained that policy rate decisions would be determined by the “assessment of the inflation outlook in light of the incoming economic and financial data, the dynamics of underlying inflation, and the strength of monetary policy transmission”. The first criterion would draw on all available economic and financial data to update expectations and risk assessments of the future inflation path; the second criterion would assess whether inflation outturns (suitably filtered to capture the persistent – or underlying – component of inflation) were on track to ensure a timely return of inflation to the target; the third criterion would be essential in calibrating rate decisions, since the required scale of rate hiking would depend on the observed impact of monetary tightening on financing conditions, the real economy and pricing decisions.²⁹

At the May meeting, a 25 basis points hike was agreed. The shift towards a smaller increment reflected the narrowing of the gap to the plausible range of peak rates, the ongoing improvement in the energy situation, the progress indicated by the cumulative decline in inflation in the opening months of 2023 (which was faster than expected in the December 2022 projections) and the gathering evidence of the substantial impact of monetary tightening on credit dynamics.³⁰ However, the ongoing passthrough of earlier energy price hikes into economy-wide prices, the pickup in wage inflation (as workers gradually obtained pay increases to compensate for the loss in living standards due to the 2021-2022 inflation surge) and the assessment that inflation risks were still to the upside warranted the further hike. Moreover, the May statement also suggested that the stance

²⁹ See also Lagarde (2023a).

³⁰ The strong transmission of monetary policy was flagged from February 2023 onwards in the monetary policy statements. See also Lane (2023a, 2023b).

was not yet sufficiently restrictive, stating that future policy rate decisions “will ensure that the policy rates will be brought to levels sufficiently restrictive to achieve a timely return of inflation to our two percent medium-term target and will be kept at those levels for as long as necessary”.

The inclusion of the duration of restrictiveness as well as the level of restrictiveness as determining the monetary policy stance was a natural evolution in the communication of the rate strategy.³¹ In particular, the Governing Council was entering a phase in which it would have to decide the appropriate balance between the number of further rate hikes and the duration of holding at the peak rate for a sufficiently long period to ensure the timely return of inflation to the target. In one direction, all else equal, a higher peak rate might deliver a faster return to target but at the cost of a greater sacrifice of foregone output and employment and might imply greater financial stability tail risks. In the other direction, all else equal, a lower peak rate would have to be maintained for a longer period in order to ensure a sufficiently timely return of inflation to target but might entail lower economic costs and lower financial stability tail risks.

At the June meeting, the Governing Council decided on a further 25 basis points hike (bringing the main policy rate to 350 basis points) and maintained its orientation that rates had not yet reached sufficiently restrictive levels. Furthermore, given the smooth balance sheet normalisation process so far, the Governing Council also decided to discontinue APP reinvestments from July onwards. The further rate hike was assessed to be warranted by the range of incoming data and the new set of staff projections. Despite the further improvement in the energy situation, the ongoing declines in headline inflation and indications of strong monetary transmission, the June staff projections slightly revised upwards the projected inflation path (5.4% in 2023, 3.0% in 2024 and 2.2% in 2025) and only marginally reduced the expected output path (0.9% in 2023, 1.5% in 2024 and 1.6% in 2025). The upward revision to the inflation outlook was based on the assessment that the speed of disinflation would be slower than previously expected, since the robust labour market should reinforce the strength of real wage catchup dynamics and the underlying inflation data did not yet indicate widespread compression of profits. While the baseline path for inflation was raised, the risk assessment no longer emphasised an upside skew to the same degree as in previous meetings.

A further 25 basis points increase was decided at the July meeting, bringing the main policy rate to 375 basis points.³² While further declines in energy prices and headline inflation, together with increasing evidence of the tightening in monetary conditions, meant there was increasing confidence that the overall inflation trajectory was moving in the right direction (which was reinforced by the small one-quarter ahead projection

31 See also Lagarde (2023b).

32 The July meeting also included a decision to lower the remuneration rate on minimum required reserves from the deposit facility rate to 0%. This decision would improve the efficiency of monetary policy by reducing the overall amount of interest that needed to be paid on reserves in order to implement the appropriate stance, while preserving the effectiveness of monetary policy by maintaining the same degree of control over the monetary policy stance and ensuring the full pass through of interest rate decisions to money markets.

errors in the March and June projection exercises), it remained concerning that inflation would remain well above target for an extended period, especially given the associated risks to the stability of inflation expectations. In particular, while external sources of inflation (the origin of the inflation surge) were clearly easing, domestic price pressures from rising wages and still robust profit margins were still strong. Since the persistence of these domestic price pressures remained uncertain, it was assessed to be appropriate to further restrict the monetary stance. At the same time, the orientation signal in relation to future rate decisions was weakened, with the guidance that rates “will be set at sufficiently restrictive levels ...” replacing “will be brought to levels sufficiently restrictive ...”.

The September staff projections an upward revision in inflation projections for 2023 and 2024 (to 5.6% and 3.2%, respectively), primarily due to the higher path for energy prices that had developed over the summer months. At the same time, there was a downward revision for growth prospects for both 2023 and 2024 (to 0.7% and 0.8% respectively). The choice between holding the main policy rate at 375 basis points or moving up to 400 was finely balanced. The September meeting continued the sequence of rate hikes, with a further 25 basis points increase that lifted the main policy rate to 400 basis points. However, this decision was bracketed with the assessment that the Governing Council considered that “the key ECB interest rates have reached levels that, maintained for a sufficiently long duration, will make a substantial contribution of inflation to our target”.

At the margin, it was assessed to be safer to move up to 400 basis points rather than to pause at 375 and ‘wait and see’ whether an additional hike would be validated by the data flow between now and future meetings. In particular, the decision was motivated by the highly uncertain environment and the significant disinflation that was still required to return to the target in a timely manner. Still, it was also important to communicate that the cumulative increase in rates had reached a sufficiently restrictive level such that the duration of restrictiveness could act as the marginal stance adjustment mechanism, rather than necessarily relying on additional further rate hikes.

In particular, drawing on the baseline staff projections, a range of model-based simulations suggested that a deposit facility rate of 400 basis points, so long as it was understood to be maintained for a sufficiently long duration, should be consistent with a return of inflation to target within the projection horizon (Lane 2023c).³³ The views of external experts in the September round of the Survey of Monetary Analysts (SMA) were also clustered in the (375, 400) interval in terms of a peak policy rate. This path for policy rates was also broadly reflected in market pricing of the forward rate curve.

33 The ECB maintains a range of macroeconomic models. In identifying target-consistent rate paths, it is important to take into account the nature of the shocks driving inflation and the full set of influences determining monetary conditions (including balance sheet reduction and the global monetary policy stance). The running of single-equation Taylor-type monetary policy rules can provide some insights, but the single-equation approach is less well suited when shocks are atypical, balance sheet policies are being revised and global monetary policy is also responding to the inflation shock.

In deciding between 375 and 400 basis points as the appropriate ‘holding’ rate, it was determined that the additional rate hike should reinforce progress towards the target for two basic reasons. First, if the economy evolved according to the staff projections baseline case, the decision to hike should bolster confidence that inflation would return to target within the projection horizon. Second, a higher level of the interest rate would more strongly limit the amplification of any upside shocks to the inflation path, in view of the interaction dynamics between inflation shocks and the overall demand environment. It followed that, all else being equal, a more secure pace of disinflation and greater insurance against upside risks would also reinforce the anchoring of inflation expectations, which remained a precondition for the disinflation process to keep up its pace.

After ten consecutive rate hikes, the October monetary policy decision was to hold rates constant. This was in line with the September guidance and was supported by the incoming data along several dimensions. First, headline inflation fell markedly in September, not only on account of the predictable base impact of the high price increases in early autumn 2022 falling out of the index but also due to initial signs that food and core inflation rates were also easing. Accordingly, these inflation outturns reinforced confidence that the September baseline projections were not under-predicting inflation dynamics. Second, the global upward shift in longer-end yields provided extra monetary tightening, while the new Bank Lending Survey confirmed additional tightening through the banking transmission channel. Third, the deterioration in the geopolitical situation due to the tragic conflict triggered by the terrorist attacks in Israel added to downside risks to the growth outlook, with only limited risk of upside pressures on energy prices.

The hold was maintained at the December meeting. There were further broad-based declines in inflation in October and November, at a pace exceeding the September baseline. These were reflected in downward revisions to the 2023 and 2024 inflation projections (to 5.4% and 2.7%, respectively). Also taking into account the further marginal downgrades to the growth outlook for 2023 and 2024 (to 0.6% and 0.8%, respectively) and the evidence of strong monetary transmission, the December meeting reconfirmed the assessment that the current level of the main policy rate, if maintained for a sufficiently long period, should be sufficient to ensure the timely return of inflation to the target.³⁴ Indeed, in the run-up to the meeting, there was considerable repricing of market interest rates, in anticipation that the ECB (and other global central banks) could shift to easing the monetary stance during the course of 2024. The 5 January release of the December flash estimate provided further evidence of inflation deceleration: the Q4 average of 2.7% was well below the September projection and also below the December projection.

³⁴ In the context of stable bond market conditions and increasing distance from the pandemic crisis period, it was also decided to advance the normalisation of the Eurosystem's balance sheet. While full reinvestment of the PEPP portfolio would continue in the first half of 2024, there would be a step down to partial reinvestment in the second half (reducing the PEPP portfolio by €7.5 billion per month on average) and intended full discontinuation of reinvestments under the PEPP at the end of 2024.

In the December 2022 projections, considerable disinflation had been foreseen for 2023 due to the base impact of the very high energy price increases in 2022 falling out of the index, with a stabilisation in energy prices also contributing to food disinflation and core disinflation. Moreover, the post-pandemic easing of bottlenecks and the fading out of the intense impact of post-pandemic reopening effects on contact-intensive services were also foreseen to contribute to disinflation. This disinflation was predicated on inflation expectations remaining anchored, including through the dampening impact of monetary tightening on price and wage setting.

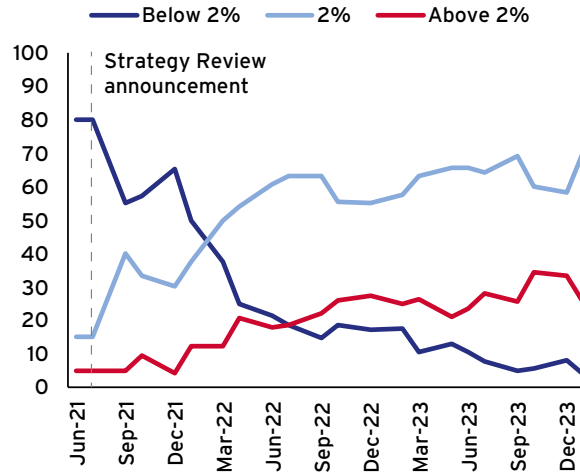
As it turned out, the scale of disinflation in 2023 exceeded these estimates. Energy prices not only stabilised but fell considerably during the course of 2023, including due to the impact of global monetary tightening on world activity levels and commodity prices. Consistent with the repeated downgrades of 2023 and 2024 growth estimates and very weak credit dynamics, the strength of monetary transmission was likely also initially underestimated. In addition, the downward revisions to 2023-2024 growth also reflected unexpectedly weak global demand for European exports (including due to global monetary tightening) and the underestimation of the adverse impact of the 2021-2022 decline in real incomes and the terms of trade on consumption and investment dynamics.

To wrap up this narrative account of 2021-2023 monetary policy decisions, it is useful to examine the evolution of long-term inflation expectations over this period (Figure 14).³⁵ Between the middle of 2021 and early 2022, there was a remarkable shift in long-term inflation expectations, with survey respondents moving away from long-held views that inflation would indefinitely remain below the 2% target. While there certainly was a marked increase in the fraction of survey respondents that expected inflation to remain above target in the long term, the majority of respondents assessed that the inflation shock opportunistically served to re-anchor long-term inflation expectations at the target by demonstrating that inflation risks were two-sided. In turn, reinforced by the target-consistent monetary policy decisions during this period, the stabilisation of inflation expectations has provided an important anchor in the disinflation process.

³⁵ Figure 14 focuses on the inflation expectations reported in the Survey of Monetary Analysts. There are similar patterns in other expert surveys and in market-based indicators. The surveys of households and firms are also consistent with fairly stable long-term inflation expectations.

FIGURE 14 EVOLUTION OF LONG-RUN INFLATION EXPECTATIONS OVER SURVEY ROUNDS

(percentage of respondents)



Source: Survey of Monetary Analysts.

Notes: The three groups are based on the HICP long run forecasts provided by respondents on the macroeconomic projections question of the SMA.

CONCLUSIONS

The aim of this chapter has been to provide a narrative guide to the ECB's monetary policy decisions during 2021-2023 in response to the inflation surges that took place in 2021 and 2022. Looking to the next phase of monetary policy, ensuring the convergence of inflation to the target on a sustainable basis will determine the future path of policy rates. The retrospective analysis of this period will doubtless be much analysed and researched in the years to come, with alternative forecasting techniques retrofitted and many counterfactual policies examined.

In reviewing monetary policy decisions during this period, any study has to take on three types of uncertainty. First, there is uncertainty in diagnosing the nature of the inflation shocks that occurred during this period. Second, there is uncertainty about the propagation of these inflation shocks through various second-round adjustment mechanisms. Third, there is uncertainty about the transmission of monetary policy, especially in the context of possible non-linearities in transitioning from super-accommodative policy settings to restrictive policy settings. Since there is an array of interdependencies across these different types of uncertainties, a wide range of scenarios can be examined and the design of optimal monetary policy also has to incorporate the variation over time in these risk factors, especially taking into account data-dependent learning from meeting to meeting. In turn, in calculating the sensitivity of inflation and output realisations to alternative monetary policy paths, it is necessary to take into account the full yield curve in the transmission of monetary policy, with anticipations

of future rate decisions playing a key role in addition to the current rate setting. For this reason, minor variations in the timing of rate decisions are unlikely to materially affect inflation outcomes.

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CHAPTER 4

The Bank of Japan's monetary policy in response to surging global inflation

Shinichi Uchida

Bank of Japan

INTRODUCTION

As in other countries, prices have been rising in Japan since the recovery phase from the COVID-19 pandemic. However, the policy response of the Bank of Japan (BoJ) during the period has differed from that of central banks in Europe and the United States, which have pursued rapid interest rate hikes.

The first half of this chapter explains the BoJ's basic stance on monetary policy, taking into account developments in Japan's economic activity and prices. The second half describes the BoJ's specific policy actions since 2021.

BASIC STANCE ON THE CONDUCT OF MONETARY POLICY

Since the late 1990s, when Japan's economy fell into deflation, the BoJ has continued with aggressive monetary easing by introducing quantitative and qualitative monetary easing (QQE) in 2013 and QQE with yield curve control in 2016. These policy measures enabled Japan's economy to achieve a situation where it was no longer in deflation, in the sense of a sustained decline in prices.

However, the BoJ assesses that sustainable and stable achievement of the price stability target of 2% is not yet envisaged with sufficient certainty and it will patiently continue with monetary easing. This shows a significant difference in the monetary policy stance of the BoJ compared with central banks in Europe and the United States, which have raised policy interest rates rapidly since 2022.

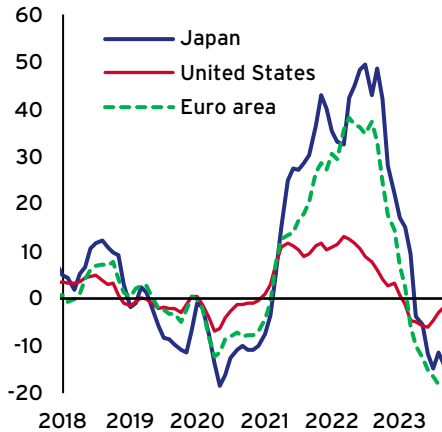
The background of this contrast in monetary policy stance is (1) differences in inflation dynamics, and (2) differences in inflation expectations and the relevant policy challenges. The following section summarises these points, focusing on developments since the outbreak of the COVID-19 pandemic.

Increasing global inflationary pressures and Japan's inflation dynamics

Since 2021, inflationary pressures have been rising worldwide due to a series of supply shocks, and their impact has also been felt in Japan. The rise in international commodity prices, such as energy and grains, pushed up Japan's import prices significantly (Figure 1).

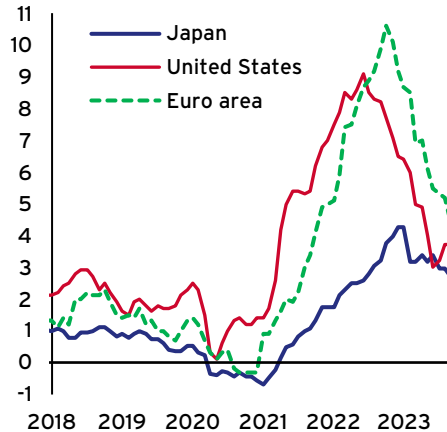
In this situation, consumer prices in Japan have also risen to a certain extent. Nonetheless, the rate of increase has been lower than in the United States and Europe (Figure 2).

FIGURE 1 IMPORT PRICE INDEX
Year-on-year change, %



Note: Figures are based on local currency.
Sources: Bank of Japan; Haver.

FIGURE 2 CPI
Year-on-year change, %



Sources: Ministry of Internal Affairs and Communications;
Bank of Japan; Haver.

As background, it can be pointed out that, until recently, wage growth in Japan had been moderate and the rate of increase in service prices had been suppressed, mainly for the following two reasons.

First, the behaviour and mindset based on the assumption that prices and wages will not increase easily remained deeply entrenched in Japan due to the past experience of deflation. This norm was entrenched in the wage- and price-setting behaviour of many firms in Japan, and, before the COVID-19 pandemic, they were cautious about raising wages, especially for full-time employees, which would lead to an increase in fixed costs.

Second, there were differences between Japan and the United States and Europe, and particularly between Japan and the United States, in the methods used to adjust employment during the pandemic and in the subsequent labour supply situation. In response to the significant decrease in economic activity during the pandemic, US firms reduced employment drastically, and the US government chose to support households through measures such as an expansion of unemployment insurance. In contrast, in many European countries and in Japan, governments chose to provide subsidies to firms to enable them to keep their employees within the firms. As a result, in the economic

recovery phase following the pandemic, the number of job openings in the US increased rapidly, while in Japan and Europe those developments were limited. On the labour supply side, the return to the labour market of workers who left the market during the pandemic period, especially the elderly, has been gradual in the United States. In Europe, the decline in labour supply was also prolonged due to factors such as a decrease in immigration. In contrast, the impact of the pandemic on Japan's labour supply was limited.

These factors contained the rate of wage growth in Japan until recently. This suggests that price rises in Japan since 2021 can be attributed mainly to the upward pressure of costs led by the rise in import prices.

Status of inflation expectations

In addition to the difference in inflation dynamics, the difference in the level of inflation expectations between Japan, the United States and Europe is another factor causing differences in policy response.

In the United States and Europe, medium- to long-term inflation expectations have been anchored at around 2%, which is the price stability target. Central banks in the United States and Europe have proceeded with policy responses against the risk of inflation expectations becoming de-anchored upwards from 2%, given the rapid rise in prices.

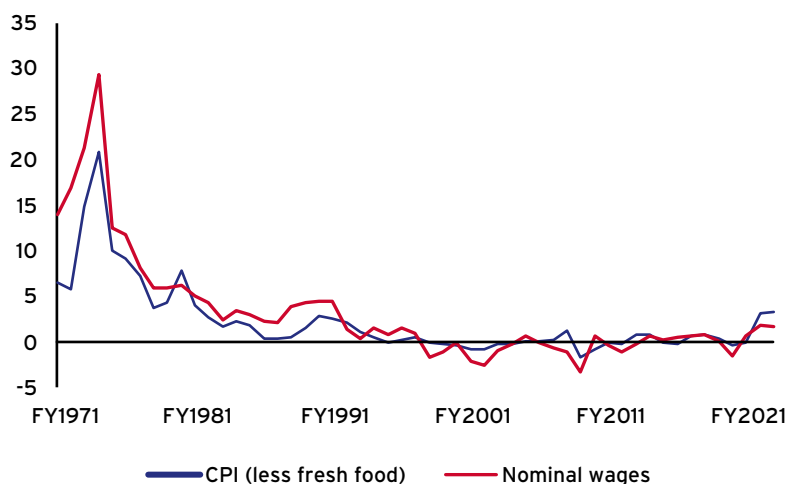
On the other hand, medium- to long-term inflation expectations in Japan have been typically below the price stability target of 2%. As mentioned earlier, the behaviour and mindset based on the assumption that prices and wages will not increase easily has remained deeply entrenched in Japan. For this reason, raising inflation expectations to 2% is a considerable challenge for the BoJ in conducting its monetary policy. Although medium- to long-term inflation expectations have risen with the rise in prices, the forecasts of economists in the private sector, for example, are still below 2%.

Recent changes in prices and monetary policy stance

However, there have been signs recently of a change in the wage and price developments in Japan as firms' behaviour has begun to shift more towards raising wages and prices in some areas. The wage growth rate agreed in the 2023 annual spring labour-management wage negotiations, which are important in determining wages for full-time employees in Japan, marked its highest level in three decades (Figure 3).

FIGURE 3 DEVELOPMENTS IN WAGES AND PRICES

Year-on-year change, %



Notes: 1. The CPI figures are staff estimates and exclude the effects of the consumption tax hikes, policies concerning the provision of free education, and travel subsidy programmes. Figures for nominal wages are for establishments with 30 or more employees up through fiscal 1990, and with 5 or more employees from fiscal 1991 onwards. 2. Figures for fiscal 2023 are April-August averages.

Sources: Ministry of Internal Affairs and Communications; Ministry of Health, Labour and Welfare.

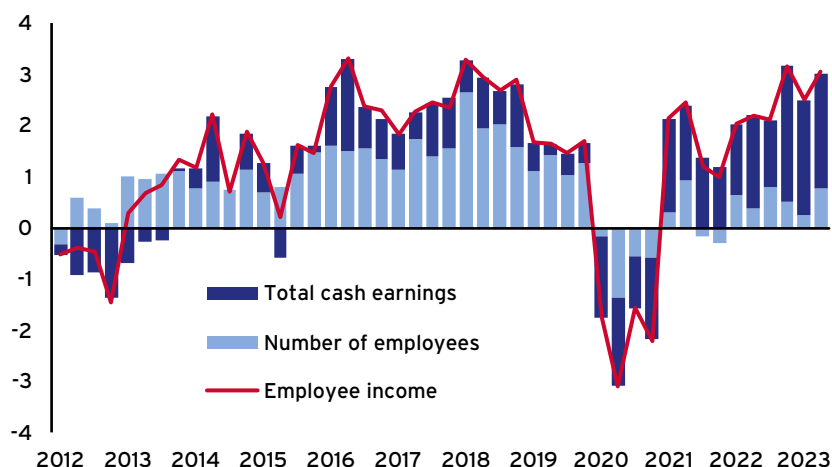
This high wage growth rate was triggered by the rise in consumer prices, which was due to cost-push pressure caused by the rise in import prices. However, the reason these price increases have led to solid wage increases can also be attributed to a severe labour shortage. Since 2013, with the BoJ promoting monetary easing, the labour market has gradually tightened in Japan. The year-on-year rate of change in employee income has remained at around 2-3% over the past decade. Prior to the pandemic, the increase was driven by a rise in the number of employees. Recently, however, the increase has been led by a rise in wages, given less slack in the labour market and the limited room for additional labour supply of women and seniors (Figure 4).

Although the base pay agreed in the annual spring labour-management wage negotiations increased, it is still only about 2%. At this point, there are uncertainties surrounding sustainable and stable achievement of the price stability target accompanied by wage increases, as changes in firms' wage- and price-setting behaviour become more widespread.

The BoJ assesses that the downside risk of missing a chance to achieve the 2% target due to a hasty revision to monetary easing currently outweighs the upside risk of monetary tightening falling behind the curve (Uchida 2023). The BoJ will patiently continue with monetary easing to carefully support these nascent developments of changes in firms' wage- and price-setting behaviour to mature.

FIGURE 4 EMPLOYMENT INCOME

Year-on-year change, %



Source: Ministry of Health, Labour and Welfare.

THE BOJ'S MONETARY POLICY RESPONSES SINCE 2021

As explained in the previous section, the BoJ's basic stance on monetary policy is to patiently continue with monetary easing. On this basis, the various measures introduced by the BoJ to respond to the pandemic have been gradually discontinued with the impact of the pandemic waning, and the Bank has also implemented some policy calibrations from the perspective of patiently continuing with monetary easing while striking a balance between its positive effects and side effects.

Termination of the Special Programme to Support Financing in Response to COVID-19

In spring 2020, in response to the pandemic, the BoJ introduced a special programme to support corporate financing. The programme consisted of (1) the Special Funds-Supplying Operations, which was a fund-provisioning measure to encourage financial institutions' lending to firms by providing funds to the institutions on favourable terms; and (2) an increase in purchases of commercial paper (CP) and corporate bonds.

In December 2021, as financial conditions in Japan had improved on the whole, the BoJ decided to complete its additional purchases of CP and corporate bonds at the end of March 2022 as scheduled. On the other hand, the BoJ decided to extend the Special Programme to Support Financing in Response to the COVID-19 in part by six months until the end of September 2022, with a view to continuing to support financing, mainly of small and medium-sized firms (Table 1).

TABLE 1 SPECIAL PROGRAMME TO SUPPORT FINANCING IN RESPONSE TO COVID-19

		Special Programme to Support Financing in Response to COVID-19			
		Special Funds-Supplying Operations to Facilitate Financing in Response to COVID-19		Fund-provisioning against private debt pledged as collateral	Additional purchases of CP and corporate bonds
	Non-government-supported loans	Government-supported loans			
Dec. 2021 (at the Monetary Policy Meeting [MPM])	Extension of Programme End Date (from the end of Mar. 2022 to the end of Sep. 2022)	Extension of Programme End Date (from the end of Mar. 2022 to the end of Sep. 2022, with changes to some conditions)		Completion at the end of Mar. 2022 (as scheduled)	Completion at the end of Mar. 2022 (as scheduled)
End-Mar. 2022	↓	↓		Completion of new offer	Completion of additional purchases offer
Sep. 2022 (MPM)	Extension of Programme End Date (from the end of Sep. 2022 to the end of Mar. 2023)	Extension of Programme End Date (from the end of Sep. 2022 to the end of Dec. 2022)			
End-Dec. 2022	↓	Completion of new offer			
End-Mar. 2023	Completion of new offer				

Furthermore, in September 2022, the BoJ decided to phase out the Special Funds-Supplying Operations, which had been continued with the aim of providing financing support for small and medium-sized firms. Following this decision, new offers for the operations ended at the end of March 2023.

Conduct of yield curve control with greater flexibility

Since 2016, the BoJ has been pursuing monetary easing under the framework of yield curve control, in which the short-term policy interest rate is set at minus 0.1% and the target level of ten-year Japanese government bond (JGB) yields is around 0%. In its policy statement, the BoJ has made a commitment to continue with the framework, aiming to achieve the price stability target, as long as it is necessary for maintaining that target in a stable manner.

In conducting yield curve control under the current policy framework, the BoJ has been striking a balance between its positive effects and side effects from the viewpoint of keeping in mind the impact on the functioning of financial intermediation and the market, while continuing with monetary easing in a sustained manner. The balance between the positive effects and side effects changes depending on the situation, especially on inflation expectations of people and market participants. When inflation expectations rise, not only the easing effects but also the side effects on market functioning strengthen. It is necessary to strike an optimum balance between the two (Figure 5).

In December 2022, the BoJ modified the conduct of yield curve control by expanding the range of ten-year JGB yield fluctuations from around plus and minus 0.25 percentage points to around plus and minus 0.5 percentage points from the target level (Bank of Japan 2022). In 2022, given that inflation rates abroad remained extremely high and the rate in Japan also rose, inflation expectations increased for most of the year. As nominal interest rates were unchanged, a rise in inflation expectations lowered real interest rates and strengthened the effects of monetary easing, while the side effects of monetary easing on market functioning became larger. The BoJ purchased a large amount of ten-year JGBs in order to avoid the yields exceeding 0.25%. As a result, its holding of the bonds reached 100% and distortions were seen in the relationship between those yields and yields on JGBs with other maturities; for example, yields on bonds with eight to nine years of maturity had been higher than those on bonds with ten-year maturity. In the corporate bond market, yield spreads between corporate bonds and JGBs widened unnaturally. Therefore, modification of the conduct of yield curve control was necessary to patiently continue with monetary easing.

Furthermore, in July 2023, the BoJ decided to conduct yield curve control with greater flexibility. Specifically, the BoJ allowed ten-year JGB yields to fluctuate in the range of around plus and minus 0.5 percentage points from the target level, while regarding the upper and lower bounds of the range as references, not as rigid limits, in its market operations (Bank of Japan 2023a). Accordingly, the Bank allowed the yields to move beyond the range depending on market conditions. At 1.0%, fixed-rate purchase

operations for consecutive days, through which the BoJ purchases an unlimited amount of JGBs at fixed rates, are conducted to strictly contain the rise in interest rates. When the rates are between 0.5% and 1.0%, the BoJ contains an excessive rise in the rates by making nimble responses through, for example, increasing the amount of JGB purchases and conducting fixed-rate purchase operations for nonconsecutive days and the Funds-Supplying Operations against Pooled Collateral, depending on factors such as the levels and the pace of change in long-term interest rates.

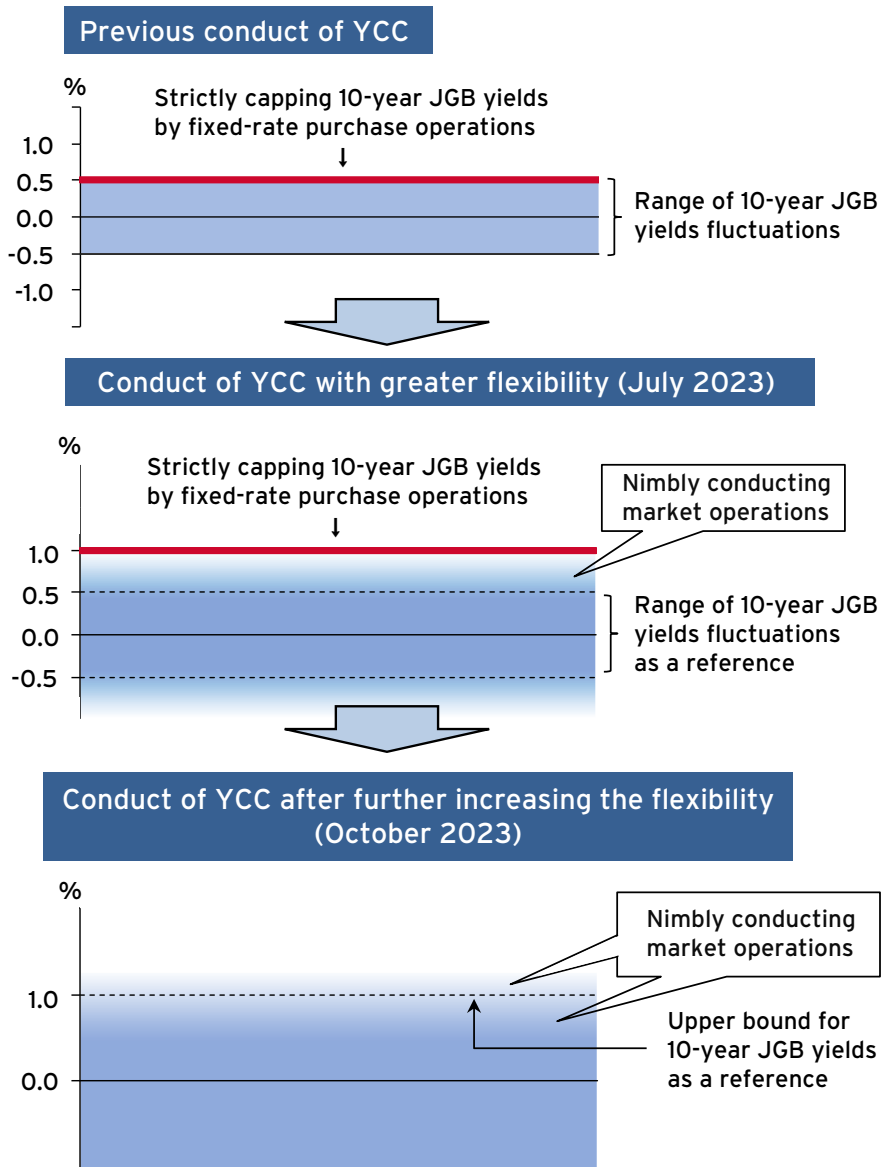
At this time, side effects, such as distortions on the yield curve, were not as evident as in December 2022, when the BoJ first modified the conduct of yield curve control. The BoJ's decision to conduct yield curve control with greater flexibility aims to be prepared for any possible changes in economic and price conditions, so that the Bank can continue with monetary easing without causing confusion, while nimbly responding to both upside and downside risks under extremely high uncertainties for economic activity and prices at home and abroad.

As signs of change began to be seen in firms' wage- and price-setting behaviour, inflation expectations showed some upward movements again. If these developments had continued, ten-year JGB yields could have risen to 0.5%. If the BoJ had tried to strictly cap ten-year JGB yields at 0.5% at that time, the side effects of monetary easing on market functioning would have strengthened, and volatility in other financial markets could have been affected. The purpose of conducting yield curve control with greater flexibility was to pre-empt these side effects and to enhance the sustainability of monetary easing.

In October 2023, the BoJ decided to further increase the flexibility in the conduct of yield curve control, given extremely high uncertainties surrounding economies and financial markets at home and abroad, so that long-term interest rates would be formed smoothly in financial markets in response to future developments. Specifically, the BoJ decided to cease the conduct of fixed-rate purchase operations for consecutive days, through which it offered to purchase an unlimited amount of ten-year JGBs at 1.0% every business day (Bank of Japan 2023b). The BoJ also decided to conduct yield curve control, with the upper bound of 1.0% for these yields as a reference, and control the yields mainly through large-scale JGB purchases and nimble market operations; this is because, while long-term interest rates remained close to 1.0 percent due to rising rates in the United States, the BoJ considered that strictly capping long-term interest rates by fixed-rate purchase operations at 1.0% for consecutive days, which it had offered every business day in principle, would have strong positive effects, but could also entail large side effects.

As such, the BoJ has tried to mitigate these side effects by conducting the yield curve control with greater flexibility and by adjusting the operations in line with inflation expectations. By doing so, the Bank considers that it can continue with monetary easing without causing confusion in the markets.

FIGURE 5 CONDUCT OF YIELD CURVE CONTROL WITH FLEXIBILITY (JULY 2023 AND OCTOBER 2023)



CONCLUSION

The BoJ has long been tackling the difficult task of raising both inflation and inflation expectations. Since the BoJ has for many years supported Japan's economic activities through monetary easing, firms' behaviour has begun to shift more towards raising wages and prices in some aspects, and wage growth and inflation expectations have shown a gradual increase recently.

However, the BoJ assesses that sustainable and stable achievement of the price stability target of 2% is not yet envisaged with sufficient certainty. It is necessary to closely examine whether changes in firms' wage- and price-setting behaviour will become widespread and the virtuous cycle between wages and prices will intensify. With extremely high uncertainties surrounding economies and financial markets at home and abroad, the BoJ will patiently continue with monetary easing while nimbly responding to developments in economic activity and prices, as well as financial conditions. By doing so, it aims to achieve the price stability target of 2% in a sustainable and stable manner, accompanied by wage increases.

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ABOUT THE AUTHOR

Shinichi Uchida took office as Deputy Governor of the Bank of Japan in March 2023. Prior to that, from 2017 to 2023, he served as Executive Director, where his main responsibility was monetary affairs, financial markets, and payment and settlement systems. From 2013 to 2017, he held the role of Director-General of the Monetary Affairs Department. Since joining the Bank in 1986, he has been primarily involved in monetary policy. His experience includes the zero interest rate policy (1999-2000), QE (2001-06), and QQE (2013-). He received a B.A. in Law from the University of Tokyo and an LL.M. from the Harvard Law School. He worked as a visiting attorney at the Board of Governors of the Federal Reserve System in 1994-95.

CHAPTER 5

The Riksbank's response to the post-COVID period of high inflation

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Stefan Ingves¹

Former Governor, Sveriges Riksbank

In the autumn of 2021, as inflation was picking up in the United States and the United Kingdom, the focus of the monetary policy analysis in Sweden (and much of Europe) was still on the effects of the pandemic, since core inflation was still subdued despite rising energy prices. The concern was whether there would be a renewed COVID surge in the Northern hemisphere, causing new economic restrictions and a new downturn in the economy. Then, in early 2022, the scene changed dramatically, with energy prices rising even more rapidly after the Russian invasion of Ukraine and headline inflation taking off. This chapter describes the response of the Sveriges Riksbank, the central bank of Sweden, during 2022.

BACKGROUND

In order to properly convey the rationale underlying the decisions taken in 2022, it is necessary to start a few years earlier. Early in 2020, a pandemic was declared by the World Health Organization and a series of events unfolded that meant a lockdown of the world economy. Across the world, the drop in GDP was large and immediate (see Figure 1 with data from the United States, the euro area and Sweden). It can be noted that GDP fell less and recovered faster in Sweden. The various measures taken by the Riksbank during 2020 to handle the economic effects of the pandemic are described in Jansson (2021), a chapter in the 2021 CEPR eBook on the central bank response to COVID. As discussed there, the two pillars of the monetary policy response by the Riksbank were liquidity support and asset purchases. Since interest rates were already low (the policy rate was zero), the key was to ensure a stable supply of credit to the economy.

Most of the policy measures were put into place in a very short time in mid-March 2020. During the rest of 2020, decisions were made to increase the size of the asset purchases. In 2021, the monetary policy strategy was essentially unchanged, which meant striving to keep interest rates of all maturities low. As the economy found firmer ground and began to improve, the speed of asset accumulation on the Riksbank balance sheet slowed,

¹ This chapter concentrates on the events during 2022, with a short summary of 2023, relying on official Riksbank publications. Nonetheless, the views expressed here are my own and not necessarily those of the Executive Board of Sveriges Riksbank. I am grateful for discussions and help from Petra Lennartsdotter, Marianne Nessén, and Anders Vredin.

and by early 2022 the balance sheet ceased to grow (see Figure 2). The plan was to keep asset holdings stable and eventually to put them in a run-off mode. It can be noted that the Riksbank balance sheet grew at a slower pace in 2020-2021 than other central bank balance sheets.

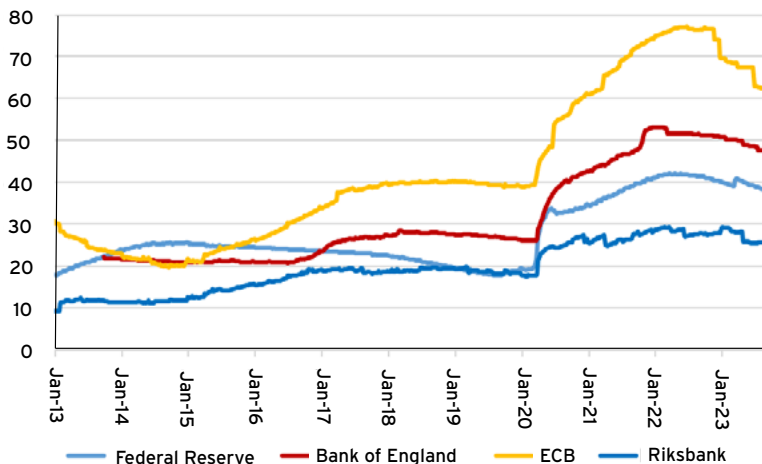
FIGURE 1 GDP IN LEVELS: SWEDEN, UNITED STATES AND EURO AREA

Index, 2019 Q4= 100, seasonally adjusted data



Source: National sources and the Riksbank

FIGURE 2 CENTRAL BANK BALANCE SHEETS (% OF GDP)



Source: National sources and respective central bank.

It should be added that the conduct of monetary policy and the monetary policy debate in Sweden was until early 2022 dominated by the fact that inflation had been low – at times too low – for a decade. The inflation target is 2% and during 2012-2017 inflation was below this target. The policy rate had been at zero per cent or lower since October 2014, i.e. over seven years.² Asset purchases had been introduced in 2015 and then extended during the pandemic.

POLICY DECISIONS DURING 2022

Coming into 2022, which is the focus here, the situation regarding inflation in Sweden was different from that in the United States and the United Kingdom. At the time of the first monetary policy meeting of 2022 in February, the latest available figure for headline inflation (as measured by CPIF, the Riksbank's target variable) was above target, at 4.1%. Headline inflation had picked up in the second half of 2021 due to rising energy prices, but later than in the United States and the United Kingdom (see Figure 3 for inflation in Sweden, the United States, euro area and the United Kingdom).³ But the core inflation measure of CPIF excluding energy (CPIF_{xe} for short) was 1.7%, which also was lower than in the two preceding months. Around this time, there had been a lively debate internationally about whether the rise in US inflation would prove to be transitory (i.e. it would subside without any monetary policy measures) or be more long-lived. The assessment made at the February meeting was that the rise in CPIF would be transitory, since energy and electricity prices were not expected to rise much further and there were no clear signs of a broader rise in inflation (see also the discussion in the next section).⁴ The published forecasts pointed to continued low core inflation. Thus, the decision at the meeting was to stick to the earlier strategy, meaning that the policy rate was kept at zero. Some small changes were made to the forward guidance, hinting at hikes in the second half of 2024.

The situation changed dramatically only a few weeks later. The Russian invasion of Ukraine on 24 February set off a further surge in energy prices. This transmitted into rising prices in other parts of the CPI-basket, inflation accelerated and became more broad-based, much like in other countries. CPIF_{xe} inflation increased for 12 consecutive months, from 2.5% in January 2022 to 9.3% in February 2023. CPIF inflation rose to over 10% towards the end of 2022, by far the highest rate of inflation during the 30-year period with an inflation target.⁵

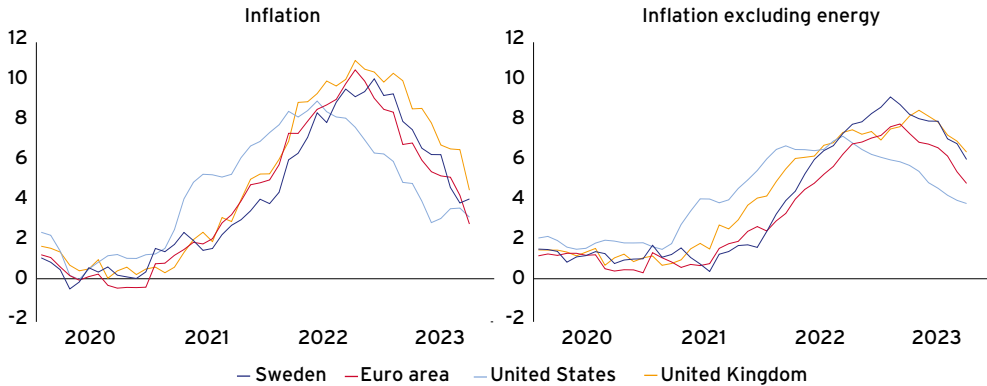
2 The policy rate was negative between February 2015 and November 2019, i.e. almost five years.

3 Note that this is the December 2021 number for inflation. Inflation statistics in Sweden are published with a two-week lag, meaning that at the time of the 9 February 2022 meeting, the December print was the latest information available to the Riksbank.

4 The reason for the rising energy and electricity prices were rising prices of oil internationally, disruptions in the European market for electricity (including low supplies of natural gas from Russia), abnormally low water levels in Nordic reservoirs and little wind. These factors were judged to be temporary, and thus energy and electricity prices were not expected to continue to rise (which they then did). At the same time, to highlight the uncertainty regarding this assessment, the February 2022 Monetary Policy Report contained a scenario where inflation became higher and more persistent and where the policy rate would need to be raised much earlier than what was indicated by the published policy rate path.

5 The inflation targeting regime was adopted in early 1993, following the fall of the fixed exchange rate regime.

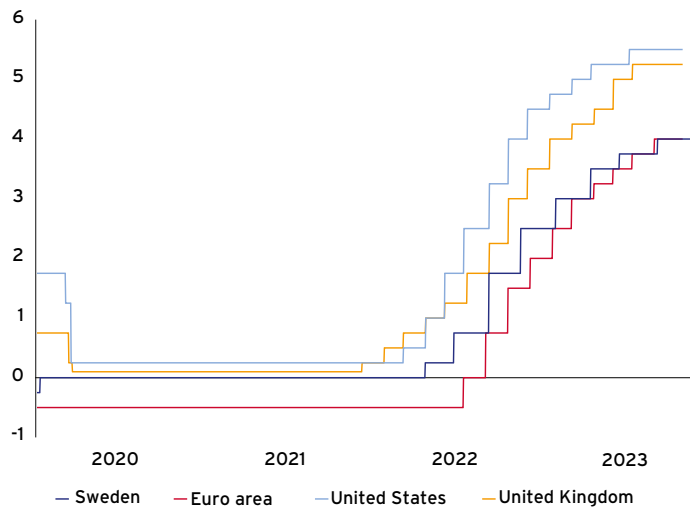
FIGURE 3 INFLATION, HEADLINE AND CORE: SWEDEN, UNITED STATES, UNITED KINGDOM AND EURO AREA (ANNUAL CHANGE, %)



Note: Refers to CPI for Sweden, HICP for the euro area and the CPI for the United Kingdom and United States.
Source: Eurostat; Statistics Sweden; US Bureau of Labor Statistics; UK Office for National Statistics.

There were four more monetary policy meetings in 2022 – in April, July, September and November. At these meetings the policy rate was increased by 25, 50, 100 and 75 basis points, respectively, bringing the rate to 2.5% at the close of 2022 (see Figure 4). Following the asset purchases made during the pandemic, the balance sheet of the Riksbank had grown to about 30% of GDP. As can be seen from Figure 2, at the time that the Riksbank balance sheet was at its largest, it was still smaller than many major central banks.

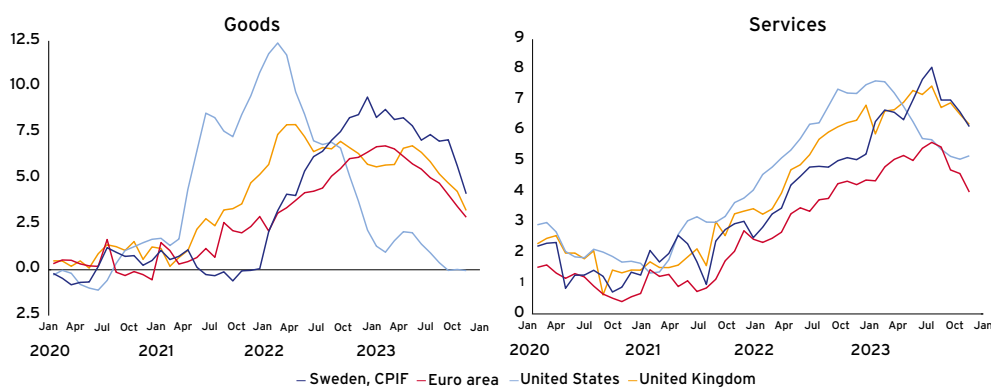
FIGURE 4 CENTRAL BANK POLICY RATES: SWEDEN, UNITED STATES, UNITED KINGDOM AND EURO AREA (%)



Sources: Bank of England; ECB; Federal Reserve; Riksbank.

To summarise how inflation developed, the initial shock to Swedish inflation came from rising energy prices. Also, higher rates of inflation among Sweden's major trading partners fed into rising prices in the Swedish economy. It should be pointed out that in contrast to many of the major developed economies, Swedish fiscal policy was not expansionary. However, the exchange rate depreciated by about 10% in trade-weighted terms during 2022, contributing to the rise in inflation. In line with this, goods prices were the first to take off in early 2022, almost a year after goods prices in the United States and the United Kingdom rose rapidly (see Figure 5). Later, and more gradually, services price inflation began to pick up, and has proved to be more persistent than goods price inflation.

FIGURE 5 INFLATION IN GOODS AND SERVICES: SWEDEN, UNITED STATES, UNITED KINGDOM AND EURO AREA



Sources: Statistics Sweden; Eurostat; U.S. Bureau of Labor Statistics; UK Office for National Statistics.

Rapidly rising inflation during 2022 proved to be hard to predict in real time, and the inflation forecasts had large forecast errors. This added to the general uncertainty regarding the appropriate policy response (see the discussion below).

DISCUSSION

Having gone through the details of the policy decisions made in 2022, I now turn to some general aspects of monetary policy in 2022.

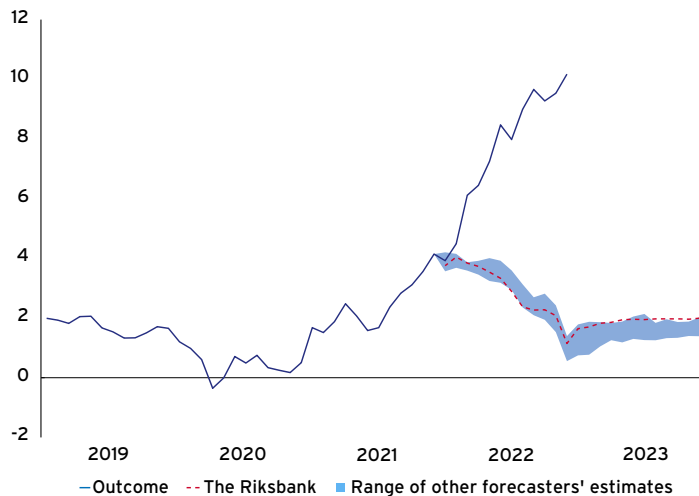
The timing of the policy response

Much has been written about the rise in inflation in the United States during 2021. With the benefit of hindsight, mistakes seem to have been made there and elsewhere in evaluating the effects of the supply-side disruptions during 2020 and 2021, and of the US fiscal stimulus packages put into place during 2020 and 2021. Early on in the inflationary phase, the Federal Reserve judged that much of the rise in inflation was transitory, implying that no monetary policy response was necessary. Indeed, the Fed Funds rate

was not raised until March 2022 when inflation had reached around 8%. In the euro area, inflation picked up later than in the United States, and the ECB did not raise its policy rate until the summer of 2022, when inflation there had reached about 9%. The conduct of US and ECB monetary policy, respectively, of course mattered a great deal to the corresponding debate in Sweden.

As in many other countries, a common question in Sweden has been why the policy rate was not raised earlier. As described above, in early 2022 there were still no clear signs of a broader-based rise in Swedish inflation. The Riksbank forecast, and the forecast of non-Riksbank forecasters, was that inflation would not rise materially (see Figure 6). One can attribute this assessment to, for example, adaptive expectations and the two-decade history of low Swedish inflation that had proved to be surprisingly unresponsive to many years of very expansionary monetary policy. From the policymakers' perspective, there was also an element of risk aversion and a determination to avoid going back to a period with too low inflation, which would entail a new round of asset purchases and possibly even more negative interest rates. At the same time, waiting to raise the policy rate for, say, a quarter to get a clearer picture of underlying inflationary trends would not materially affect the path of inflation. Thus, the fact that it had taken almost a decade of very expansionary monetary policy to, first, get inflation back to the target of 2%, and then to keep it there made the monetary policy strategy asymmetric. The readiness to let inflation overshoot the target was explicit (e.g. Sveriges Riksbank 2022b).

FIGURE 6 FORECASTS IN FEBRUARY 2022 OF SWEDISH INFLATION: RIKSBANK AND OTHER FORECASTERS (CPIF, ANNUAL CHANGE, %)



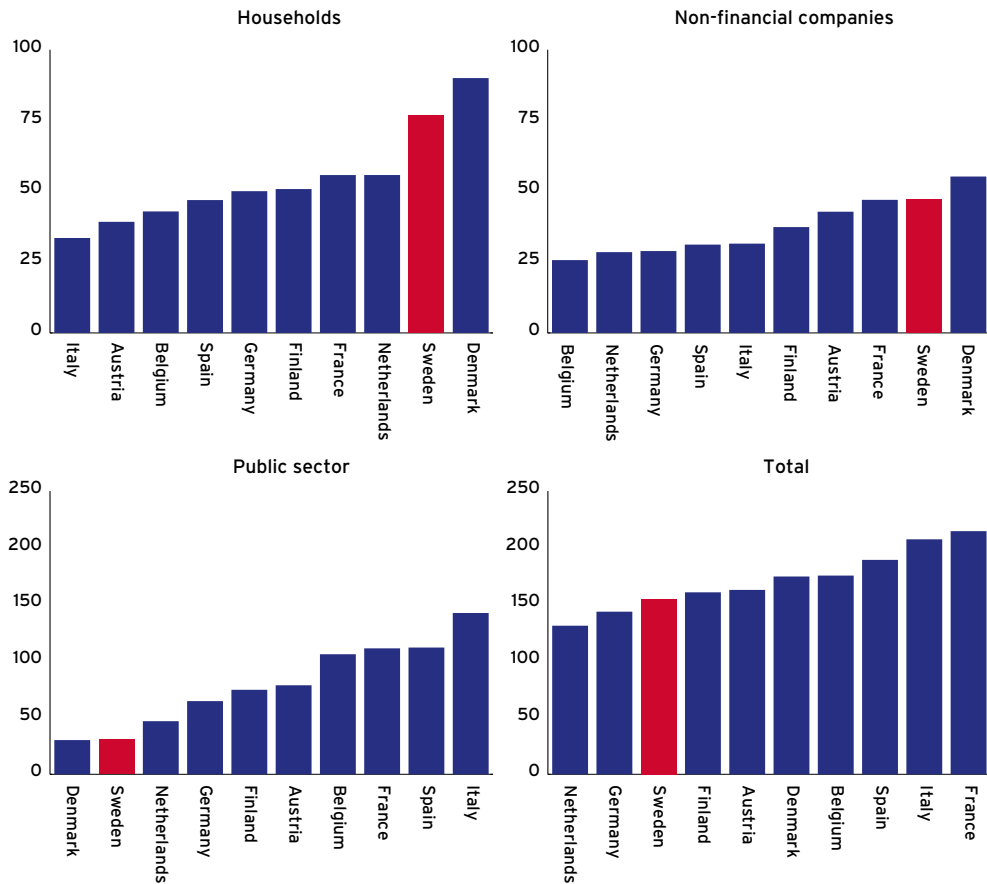
Note: Refers to forecasts based on outcomes for the CPIF to the end of December 2021. The Riksbank's forecast is the CPIF forecast in the *Monetary Policy Report February 2022*. The interval shows the spread between the highest and the lowest projections made by other analysts.

Source: Sveriges Riksbank (2022a).

Then, during the spring of 2022, it became clear that the policy rate would need to be raised by a substantial amount. An immediate concern was how this would affect highly indebted households. Swedish household debt is very high in an international comparison (see Figure 7). It should be noted that Swedish households also hold large amounts of assets, mainly due to mandatory pension schemes (Nilsson et al. 2014). However, these are very illiquid assets. Thus, the high level of household indebtedness has for many years been identified by the Riksbank and by Finansinspektionen (the Swedish FSA) as a primary risk to financial instability.

FIGURE 7 INDEBTEDNESS IN DIFFERENT COUNTRIES

Debt stocks (% of GDP)



Note: Non-seasonally adjusted data. "Total" refers to the sum of household, non-financial company and public sector debt as a percentage of GDP. Data refer to the second quarter of 2023.

Source: ECB; Eurostat.

In order to give households, firms and financial market participants time to prepare for higher interest rates, the policy rate hikes were spread out over time. The first hike was 25 basis points, followed by larger hikes the rest of the year (see Table 1). One could say that the gradual hikes in the face of rapidly rising inflation were the result of taking

real and financial stability into account. Also, this was the first ever rate hike cycle in the inflation-targeting era with household and corporate debt dominating the financial sector, underscoring the need to proceed cautiously. Adding to the complexity of the situation is the fact that most of Swedish household debt is at a variable interest.

TABLE 1 CHRONOLOGY OF RIKSBANK MONETARY POLICY DECISIONS IN 2022 AND 2023

2022	
9 February	Policy rate kept unchanged at 0%. Decision to continue asset purchases during first half of 2022, at a pace consistent with keeping asset holdings roughly constant.
27 April	Policy rate raised by 0.25 percentage points to 0.25%. Decision to continue asset purchases in second half of 2022, at a reduced pace so that asset holdings would begin to decline.
29 June	Policy rate raised by 0.50 percentage points to 0.75%. Decision to further reduce rate of asset purchases in second half of 2022.
19 September	Policy rate raised by 1 percentage point to 1.75%.
23 November	Policy rate raised by 0.75 percentage points to 2.5%.
2023	
8 February	Policy rate raised by 0.50 percentage points to 3%. Decision to start selling government bonds at the rate of 3.5 billion SEK per month, starting in April.
25 April	Policy rate raised by 0.50 percentage points to 3.5%.
28 June	Policy rate raised by 0.25 percentage points to 3.75%. Decision to increase amount of government bonds sold to 5 billion SEK per month, starting in September.
20 September	Policy rate raised by 0.25 percentage points to 4%.
22 November	Policy rate kept unchanged at 4%.

Summing up, the policy decisions during 2022 were made with the aim of carefully guiding households, firms and the financial sector into a new environment, an environment that was fundamentally different from what had been the case during the preceding decade. Instead of ‘low for longer’, interest rates would have to be much higher going forward.

The role of communication and forward guidance

Communication was used extensively in 2022 to guide expectations. Here, the practice of publishing an interest rate path, which the Riksbank had done since 2007, proved to be useful. While the policy path published in February 2022 quickly proved to be outdated,

subsequent policy rate paths were useful in conveying to the financial press, the markets, price- and wage-setters and the public at large that the Executive Board saw it as essential to continue raising the policy rate for some time in order to defend the inflation target.

Communication became focussed on getting inflation back to target “within a reasonable time frame” with the aim to keep long-run inflation expectations anchored at 2%. The basic idea of flexible inflation targeting – to let inflation go back to the target gradually following a shock – was not used. The Executive Board made the assessment that the credibility of the inflation target was at stake, and that a clear message to price- and wage-setters was important in order to avoid a price–wage spiral. Judging by the modest growth in nominal wages during 2022, the strategy and the communication were seen as credible.

The policy rate forecasts published during 2022, however, turned out to be too low, as were the inflation forecasts. As inflation rose rapidly during 2022, inflation forecast errors were large. In this regard, the Riksbank was not alone. Many central banks made poor forecasts during this period. A recent study by Håkansson and Laséen (2024) has analysed the inflation forecasts made in 2021 and 2022 by ten central banks. Their conclusion is that the forecast errors made by the Riksbank were ‘in the middle of the road’ in comparison with peers.⁶ This will be an important research topic in the years to come, explaining why central banks and other forecasters were unable to predict the extent to which inflation would rise once it started to increase.

Balance sheet policy during 2022

As described in Jansson (2021), the Riksbank used QE during the pandemic to support the economy by ensuring functioning markets and a stable supply of credit. Interest rates were kept low. After the pandemic subsided, asset purchases were gradually downscaled, with the aim of keeping the holdings of assets roughly stable (see Figure 2). In 2022, once the policy rate hikes began, the asset holdings were put on a path of ‘passive QT’, meaning that the asset holdings would be put in a run-off mode. The reasoning behind this strategy was to proceed carefully and gradually when exiting from an era of low policy rates and a large balance sheet.

Other policies and policy coordination

In the decade prior to the pandemic, when inflation was too low in most developed economies despite massive monetary policy stimulus, the issue of a different policy mix between monetary and fiscal policy was raised by many. The idea was simply to ‘lift some weight off’ monetary policy. After the pandemic, when inflation started to rise quickly, the debate regarding policy coordination became different. The focus turned to the importance of sticking to agreed policy frameworks (see the box in Sveriges Riksbank

⁶ The forecasts studied are those made by the central banks in the United States, the United Kingdom, the euro area, Canada, Norway, Australia, New Zealand, the Czech Republic and Poland. The relative ranking regarding forecasting performance depends on the evaluation method used.

2022c). One can say that more attention has been given to more fundamental issues regarding the rules guiding both monetary policy and fiscal policy, and not just the policy mix at a certain point in time. In the early days of inflation targeting, the interlinkages between monetary and fiscal policy were largely ignored, at least in practice.⁷

There are also important complementarities and interactions between monetary policy and macroprudential policy, which motivates some degree of coordination as far as this is consistent with the respective goal functions and monetary policy independence. In Sweden, macroprudential policies can be said to have reinforced, or at least worked in the same direction as, monetary policy during 2022.⁸

Developments in 2023

My term as Riksbank governor ended in 2022, but for the sake of completeness a few words on 2023 should be added. First, regarding monetary policy decisions, in 2023 the policy rate continued to be hiked until the last meeting of the year in November, when it was kept unchanged at 4% (see Table 1 and Figure 4). Thus, the policy rate was increased by 1.5 percentage points during 2023, on top of the 2.5 percentage points in rate hikes that were decided during 2022. Furthermore, the Riksbank began a policy of active QT, i.e. selling assets on the balance sheet. At the first monetary policy meeting of 2023 in February, a decision was made to start selling government bonds. Central government debt in Sweden is low by international comparisons, at around 17% of GDP, and towards the end of 2022 the Riksbank was holding around half of the total outstanding debt. Thus, the sales announced in February were expected to have a clear impact on the volume of safe and liquid assets in the Swedish market. The rate of government bond sales was later increased at the July meeting (see Table 1). Second, concerning the development of inflation, it began falling early in 2023 as the earlier energy price hikes no longer affected the 12-month changes (see Figure 3). However, CPIF excluding energy remained elevated throughout the year, reflecting sticky goods and services prices. Towards the end of the year there were, however, encouraging signs of a clear deceleration in inflation, something that could be seen from annualised one- and three-month changes in CPIF excluding energy. Regarding growth, the Swedish economy had fared better than some

7 See Leeper (2018) for a discussion on Sweden's fiscal framework and monetary policy.

8 During the pandemic, the Swedish FSA, Finansinspektionen (FI) temporarily relaxed some macroprudential requirements: reducing the countercyclical capital buffer (CCyB) requirement from 2.5% to 0% and temporarily giving banks the option of granting all mortgage borrowers exceptions from the current amortisation requirement (the exemption ended on 31 August 2021). The purpose was to reinforce household liquidity and banks' capacity to supply credit. In Q3 2021 FI decided to begin building up the CCyB again, with a first increase to 1% entering into force in Q3 2022. In March 2022, FI introduced a positive neutral rate of 2% in its approach to calibrating the CCyB. (The neutral CCyB rate is the level targeted during a phase when systemic risks are neither high nor increasing.) In June the CCyB rate was raised to 2%, with a 12-month implementation period. The decision was motivated by the combined strength of the economic recovery and the banks' strong financial position and sound profitability, meaning that the higher buffer rate would not have a negative impact on credit supply. Furthermore, during 2022 the government tasked FI with assessing whether it would be appropriate to, at least temporarily, relax the current amortisation requirement. FI found that relaxing the measure would not be an efficient way to target those households that were under the most pressure in the current economic situation. Few of those own their own house or apartment and subsequently have no mortgage. FI also noted that relaxing the measure would work against monetary policy. The requirement remained unchanged.

others during and immediately after the pandemic, as mentioned above. But in 2023, GDP growth turned negative, reflecting high interest rate sensitivity in the private sector and a stable and modest fiscal policy.

CLOSING REMARKS

The events of the past four years have been challenging, with two huge shocks. For central banks, the task in 2020 and after was to mitigate the economic fallout from the pandemic, preventing a long-lasting recession, possible deflation and avoiding financial instability. Thanks to central bank and fiscal policy measures, and in particular to the rapid roll-out of newly developed vaccines, such a scenario was avoided. Then, in 2022, the Russian full-scale invasion of Ukraine caused inflation to accelerate dramatically in Europe. The humanitarian toll from these two shocks has been enormous. At the same time, it should be said that our economies have fared better than expected. The rebound in growth after the pandemic was much quicker than expected by most. And at the time of writing, central banks have managed to keep inflation expectations stable around their inflation targets. In this sense, central banks seem to have passed the credibility test. Yet there are important lessons for monetary policy to be learnt from the post-COVID surge in inflation. One is the importance of supply side factors and fiscal policy in determining inflation.⁹ Another is that financial dominance can arise due to large private sector debt, i.e. even in the absence of high government debt (see Figure 7). The large financial losses incurred by central banks as interest rates have risen in the past two years have also spurred an important debate, where the implications for central bank independence is a key aspect. Thus, while institutional setups regarding monetary policy will vary across different countries, the overall conduct of monetary policy is also affected by local circumstances.

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Stefan Ingves was Governor and Chairman of the Executive Board of the Sveriges Riksbank from 2006 to 2022. He has also been head of the Monetary and Financial Systems Department at the IMF and Deputy Governor of the Riksbank. Mr Ingves has held numerous international positions among them Chairman of the Basel Committee on Bank Supervision. Mr Ingves holds a PhD from the Stockholm School of Economics.

CHAPTER 6

The Swiss National Bank's monetary policy response to the post-COVID period of high inflation

Thomas J. Jordan¹

Swiss National Bank

In response to the economic downturn due to the COVID-19 pandemic and the measures taken to contain it, expansionary monetary and fiscal policies were put in place in many countries. These policies contributed to a quick turnaround in economic activity. With the economic recovery, inflation began to rise globally. This inflation surge also reflected the effects of supply chain disruptions in the wake of the pandemic. Initially, rising inflation was widely thought to be transitory. In 2022, sharp increases in energy prices due to the war in Ukraine further fuelled inflation, which already stood well above central banks' targets in many countries. This chapter explains the response of the Swiss National Bank (SNB) to that rise in global inflation.

SNB STRATEGY AND INSTRUMENTS

The policy response of the SNB to the post-COVID inflation surge reflected its mandate and monetary policy framework. The SNB's mandate is to ensure price stability and, in so doing, to take due account of economic developments. In its monetary policy strategy, the SNB equates price stability with a rise in the Swiss consumer price index of between 0% and 2% per annum. Therefore, unlike many other central banks, the SNB does not have a point target for inflation. Furthermore, in setting its monetary policy, the SNB focuses on the medium-term inflation outlook, and therefore does not need to counteract temporary deviations from price stability in all cases.

For a small open economy like Switzerland, this definition of price stability has many advantages. It anchors inflation expectations at a low level while at the same time giving monetary policy the flexibility of not having to respond aggressively to every shock affecting inflation. This flexibility allows the SNB to trade off costs and benefits of different monetary policy options, since temporary inflation deviations above 2% or below 0% can be justified. This degree of flexibility for monetary policy is particularly

¹ The author would like to thank Samuel Reynard for his support in preparing this essay. He also thanks Christian Grisse, Carlos Lenz, Alexander Perruchoud, Petra Tschudin and SNB Language Services for their helpful comments.

important for Switzerland, which in recent years has been subject to frequent and large shocks from abroad due to its open economy, as well as the Swiss franc's role as a safe-haven currency.

The SNB implements its monetary policy by setting the SNB policy rate and, if necessary, using additional monetary policy measures to influence the exchange rate or the interest rate level. The SNB policy rate is the main instrument. It indicates the SNB's monetary policy stance and is thus the focus of its communications.

Since the global financial crisis (GFC), foreign exchange (FX) interventions have become important as an additional policy instrument that can be used flexibly to influence monetary conditions. They were first used in a global environment of very low and even negative interest rates, when the scope for further rate cuts was limited and the Swiss franc was experiencing strong appreciation pressures. The SNB has subsequently used FX interventions in conjunction with policy rate changes to steer monetary conditions. Policy measures can transmit quickly to inflation through the exchange rate channel, and in particular via the prices of imported goods and services. FX interventions affect the economy and inflation more narrowly than policy rate changes because they only work through the exchange rate channel. Interest rate changes also affect exchange rates but have additional influences on monetary conditions (for example, lagged effects via the credit channel). FX interventions thus allow the SNB to respond directly and quickly to foreign shocks.

BEFORE INFLATION TOOK OFF

After the GFC, Switzerland experienced more than a decade of very low inflation. This was similar to other countries, but downward pressures on inflation were more pronounced and were mainly due to appreciation pressures on the Swiss franc. Those pressures were related to the Swiss franc's role as a safe-haven currency and to more expansionary monetary policy in major currency areas.

In response to the GFC, central banks cut policy rates close to their effective lower bound. As other central banks had started out with higher interest rates, these cuts compressed the traditionally large interest rate differential between other countries and Switzerland, which in turn led to persistent appreciation pressures on the Swiss franc. In response, the SNB intervened in the FX market, which led to a strong expansion of its balance sheet. Moreover, for several years, the SNB maintained a negative policy rate. Lowering the policy rate to -0.75% was, however, not sufficient to re-establish the pre-crisis interest rate differential, and further FX interventions were occasionally necessary.

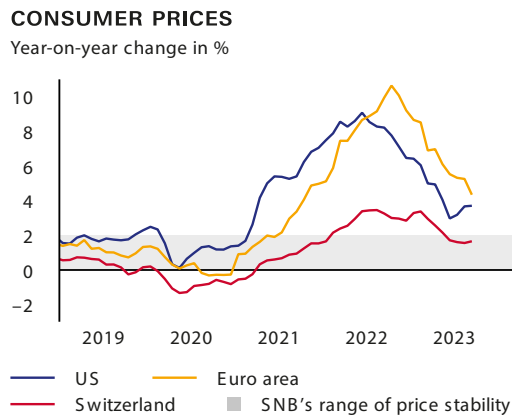
The COVID-19 crisis led to an extreme economic downturn and put further downward pressure on inflation globally. In response, in many countries monetary and fiscal policy was eased substantially. This contributed to a quick recovery of economic activity. In Switzerland, monetary policy was already expansionary when COVID-19 hit, with the

SNB policy rate at -0.75% . The pandemic was associated with renewed appreciation pressures on the Swiss franc. The SNB responded swiftly by stepping up its FX interventions.

SUDDEN PICKUP IN GLOBAL INFLATION

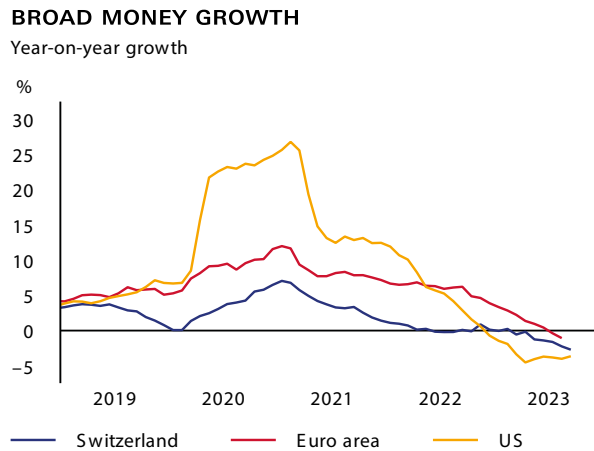
With the rebound in late 2020 from the sharp economic contraction, inflation began to increase. Figure 1 shows inflation developments in Switzerland, the US and the euro area since the year before the COVID-19 pandemic. In 2021, as inflation was progressively rising back above zero in Switzerland, it picked up strongly in the US and increased markedly, albeit somewhat less strongly, in the euro area.

FIGURE 1 INTERNATIONAL INFLATION



Source: Refinitiv Datastream; SFSO.

The fact that inflation increased more gradually in Switzerland than abroad can be attributed to several causes. The increase in energy prices hit US and euro area inflation more strongly than Swiss inflation, as energy has a relatively low weight in the Swiss CPI. Moreover, particularly in the US, strong demand – fuelled in part by expansionary fiscal policy – in combination with constrained supply led to sharp price rises. More generally, monetary and especially fiscal policies abroad became relatively more expansionary in response to the COVID-19 pandemic. This is illustrated in Figure 2 by the development of broad monetary aggregates, which increased less strongly in Switzerland than in the US and the euro area. The medium-term focus of the SNB's policy strategy made it possible to tolerate the temporary low inflation outlook. This partly explains why monetary stimulus was smaller in Switzerland. Furthermore, the SNB's response to the rise in inflation was also crucial.

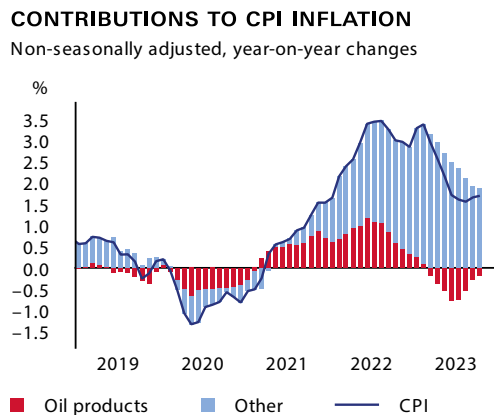
FIGURE 2 COVID-19 PANDEMIC MONETARY STIMULUS

Note: M3 for Switzerland and the euro area, M2 for the United States.

Source: Board of Governors of the Federal Reserve System; FRED; OECD; SNB.

EARLY AND DECISIVE SNB ACTION

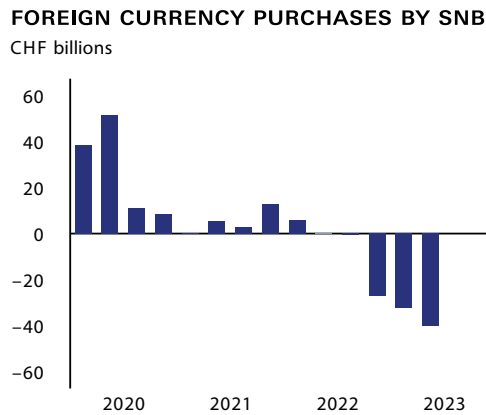
In 2021, inflation in Switzerland was rising but it was still within the range of between 0% and 2% that the SNB equates with price stability. Inflation in major currency areas had risen well above central banks' targets, but this increase was widely believed to be transitory. Given the sharp increase in global inflation and the unusual combination of factors driving inflation – a strong economic recovery, negative supply shocks due to disruptions in global supply chains, and highly expansionary monetary and fiscal policies – the SNB saw upside risks to medium-term inflation.

FIGURE 3 RISING INFLATION INITIALLY DRIVEN BY OIL PRODUCTS

Source: SFSO.

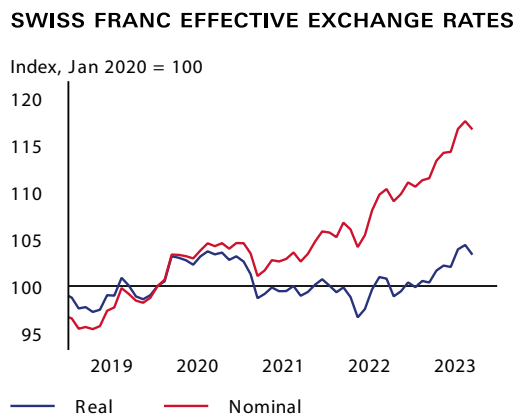
In Switzerland, the increase in inflation was initially driven by imported inflation, and in particular by energy price increases (cf. Figure 3). The SNB therefore began to adjust its FX interventions in the second half of 2021. As shown in Figure 4, FX purchases were relatively low in Q3 2021, increasing somewhat in Q4 2021 on the back of renewed appreciation pressures on the Swiss franc (cf. Figure 5). In response to these pressures, the SNB calibrated the scaling down of FX purchases so as to allow the currency to appreciate nominally. Allowing the Swiss franc to appreciate in nominal terms was intended to help prevent a depreciation in real terms (cf. Figure 5), to hold inflation down, and to stabilise real economic conditions.

FIGURE 4 SNB FX QUARTERLY INTERVENTIONS



Source: SNB.

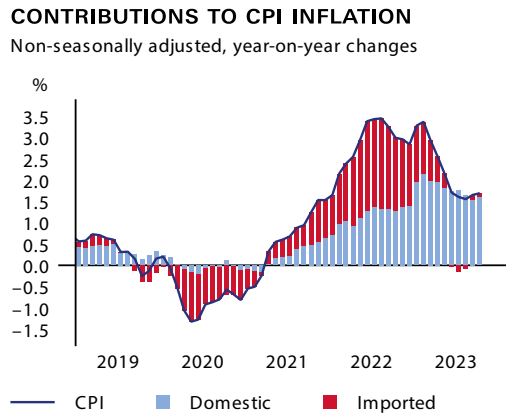
FIGURE 5 REAL AND NOMINAL SWISS FRANC EXCHANGE RATES



Source: SNB.

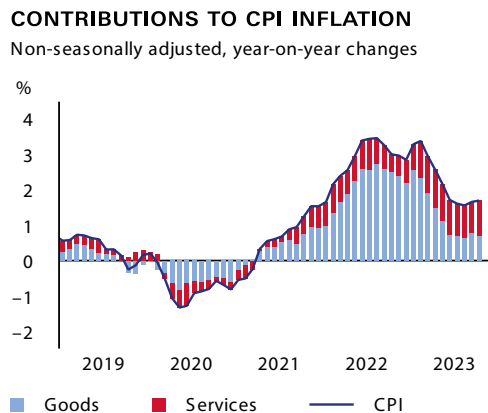
In early 2022, it was becoming increasingly clear that the global rise in inflation was proving more persistent than previously thought. In Switzerland, inflation pressures broadened to domestic inflation (cf. Figure 6), as external shocks (raw materials, bottlenecks, pent-up demand) were followed by second-round effects, which spread first to domestic goods and then to services inflation (cf. Figure 7). At the same time, the onset of the war in Ukraine further increased uncertainty about the economic outlook. In light of this, at its March 2022 monetary policy assessment, the SNB decided to keep its policy rate unchanged.

FIGURE 6 DOMESTIC VERSUS IMPORTED INFLATION



Source: SFSO.

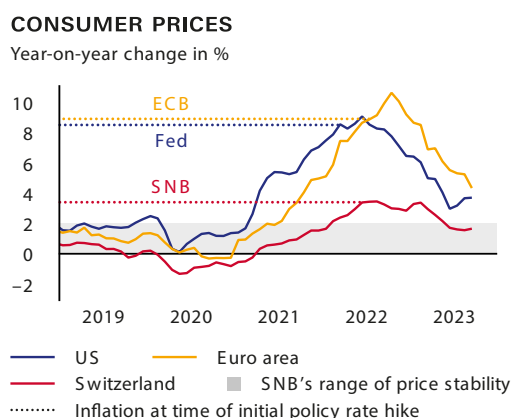
FIGURE 7 GOODS VERSUS SERVICES INFLATION



Source: SFSO.

In June 2022, the SNB increased its policy rate by 50 basis points to -0.25% . As shown in Figure 8, this first interest rate hike occurred at a much lower inflation level than in many other currency areas, including the euro area and the US. The SNB emphasised that inflation pressures were spreading to goods and services not directly affected by the war in Ukraine and the consequences of the pandemic, and stressed the threat of second-round effects. Moreover, the SNB communicated that it remained willing to be active in the FX market as necessary, considering not only purchases but also sales of foreign currency.

FIGURE 8 INFLATION AND INITIAL POLICY RATE HIKE TIMING



Source: Refinitiv Datastream; SFSO.

The SNB continued to raise its policy rate in subsequent quarters (cf. Table 1), while also remaining willing to intervene on the FX market. The policy rate became positive in September 2022, necessitating a new approach to monetary policy implementation (cf. Box 1). Moreover, from March 2023 onwards, the SNB clarified that the focus of its activity on the FX market was on sales of foreign currency.

In net terms, the SNB sold foreign currency worth around CHF 30 billion in both Q4 2022 and Q1 2023, and about CHF 40 billion in Q2 2023 (Figure 4). As a result, the Swiss franc appreciated strongly in nominal terms from the start of the tightening cycle (Figure 5), despite the fact that the SNB raised its policy rate less than the major central banks had. Since Q2 2023, the Swiss franc also appreciated in real terms, additionally contributing to the monetary policy tightening.

TABLE 1 CHRONOLOGY OF MAIN MONETARY POLICY DECISIONS

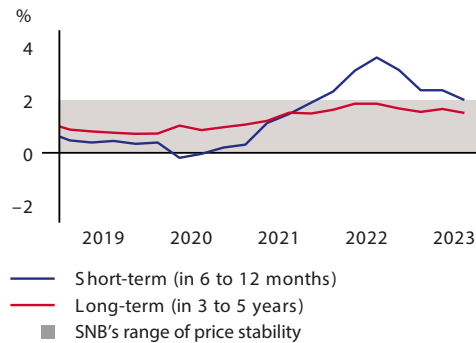
Date	Inflation	Inflation forecast	Monetary policy decisions
Q2 2021	0.6%	0.8%	The SNB keeps its policy rate at -0.75%.
Q3 2021	0.9%	0.8%	The SNB keeps its policy rate at -0.75%.
Q4 2021	1.5%	0.8%	The SNB keeps its policy rate at -0.75%. At the news conference, it notes that it has been able to prevent a stronger rise in inflation by allowing a certain amount of nominal appreciation.
Q1 2022	2.2%	1.1%	The SNB keeps its policy rate at -0.75%. The uncertainty related to Russia's invasion of Ukraine is stressed in the press release.
Q2 2022	2.9%	2.1%	The SNB raises its policy rate by half a percentage point to -0.25%. At the news conference, the SNB announces that if the Swiss franc were to weaken, it would consider selling foreign currency.
Q3 2022	3.5%	2.0%	The SNB raises its policy rate by 0.75 percentage points to 0.5%.
Q4 2022	3.0%	2.1%	The SNB raises its policy rate by 0.5 percentage points to 1.0%.
Q1 2023	3.4%	2.1%	The SNB raises its policy rate by 0.5 percentage points to 1.5%. In its press release, it notes that the focus has been on selling foreign currency in recent quarters.
Q2 2023	2.2%	2.1%	The SNB raises its policy rate by 0.25 percentage points to 1.75%.
Q3 2023	1.6%	1.9%	The SNB leaves its policy rate unchanged at 1.75%.

Notes: Inflation: mid-month (year-on-year) of the corresponding quarter. Inflation forecast: conditional (constant policy rate over the forecast horizon) three-year-ahead (last quarter, year-on-year) inflation forecast. Monetary policy decisions are taken on a quarterly basis (or more frequently, if necessary) by the SNB's Governing Board, at its monetary policy assessment.

By allowing the Swiss franc to appreciate – first by reducing FX purchases, then by making FX sales – the SNB therefore dampened the effects of rising imported inflation on Swiss consumer prices. Moreover, early and decisive SNB actions limited the impact of second-round effects due to the initial price increases. Here again, the flexibility afforded by the SNB's monetary policy strategy of allowing inflation to temporarily exceed the upper end of the 0% to 2% range was helpful. Even with the rise in global inflation, long-term inflation expectations in Switzerland remained relatively stable and well anchored within the range of price stability (Figure 9).

FIGURE 9 INFLATION EXPECTATIONS

INFLATION EXPECTATIONS FROM COMPANIES' PERSPECTIVE



Source: SNB regional network.

BOX 1 IMPLEMENTING THE SWITCH FROM NEGATIVE TO POSITIVE INTEREST RATES

The transition from a negative to a positive SNB policy rate had important implications, not only for the SNB's monetary policy stance, but also for its implementation of monetary policy. From the time it introduced negative interest rates until September 2022, the SNB implemented its monetary policy by charging negative interest on the sight deposits held by banks and other financial market participants at the SNB in excess of a given exemption threshold. The negative interest rate corresponded to the SNB policy rate. In deciding at its September 2022 monetary policy assessment to raise the SNB policy rate from -0.25% to 0.5%, and thus into positive territory, the SNB adopted a new approach to implementing its monetary policy.

The new approach uses two levers, which together ensure that the secured short-term Swiss franc money market rates are close to the SNB policy rate. The focus in this regard is the interest rate for secured overnight money, the Swiss Average Rate Overnight (SARON). The first lever is a remuneration of the sight deposits that banks and other financial market participants hold at the SNB. This remuneration enables effective steering of money market rates when the SNB policy rate is positive and there is high excess liquidity. A system of tiered remuneration of sight deposits is used here, which creates an incentive to trade sight deposits in the Swiss franc money market, and thereby contributes to the robustness of SARON. Sight deposits up to a certain threshold are remunerated at the SNB policy rate. Sight deposits above that threshold are remunerated at the SNB policy rate minus a discount.

The second lever is the absorption of reserves by way of open market operations. Liquidity-absorbing repo transactions and the issuance of short-term SNB debt certificates (SNB Bills) are used to reduce sight deposits, and thus to reduce the liquidity supply in the money market. As a result, SARON can be kept close to the SNB policy rate.

By June 2023, inflation was back below 2%, i.e. consistent with the SNB's definition of price stability. At its September 2023 quarterly monetary policy assessment, inflation was forecasted to rise only briefly above 2% in the following quarters due to higher rents and energy prices. The SNB left its policy rate unchanged at 1.75%, while not ruling out

that a further tightening of monetary policy might become necessary to ensure price stability over the medium term. The SNB stated that it was also willing to remain active in the FX market as necessary, with the focus on selling foreign currency.

CONCLUSIONS

With the post-COVID rise in global inflation, the challenge faced by central banks was to assess the effects of a unique combination of extraordinary shocks. For example, today's integrated global economy had never before been subject to such extreme supply chain disruptions, which made their effects on inflation difficult to judge. In addition, the war in Ukraine rendered the economic outlook even more uncertain.

Given the elevated uncertainty and the information available at the time, the SNB responded swiftly and decisively to rising inflation pressures. Delaying the policy action required would have made sharper policy rate increases necessary later, with adverse effects on economic activity. Decisive monetary policy tightening was also important for maintaining central bank credibility and thus for keeping medium-term inflation expectations anchored.

The flexibility afforded by its monetary policy strategy served the SNB well during this post-COVID rise in inflation. The fact that the SNB could live with medium-term inflation forecasts in the lower part of its price stability range after the powerful negative shock due to the COVID-19 pandemic reduced the need for more extreme monetary policy measures. This also meant that expansionary monetary policy was less of a factor driving up inflation as the economy recovered from the pandemic than it was in other countries. Later, with inflation increasing temporarily above the SNB's price stability range, longer-term inflation expectations remained well anchored. By mid-2023, inflation could be brought down towards the range consistent with price stability without a significant rise in unemployment.

The SNB used two monetary policy instruments – policy rate increases and FX interventions – to fight the increase in inflation. These instruments complemented each other: policy rate increases signalled the tightened monetary policy stance and were transmitted broadly to the real economy and inflation, while FX interventions could be used flexibly, and quickly limited imported inflation. The SNB's monetary policy strategy thus enabled an appropriate response to the surge in inflation.

ABOUT THE AUTHOR

Thomas J. Jordan is Chairman of the Governing Board of the Swiss National Bank (SNB). He received his PhD in economics from the University of Bern in 1993. Following a three-year post-doctoral research position at the Department of Economics at Harvard University, he joined the SNB as an Economic Advisor in 1997. The University of Bern appointed him lecturer in 1998 and honorary professor in 2003, and he received an

honorary doctorate from the University of Basel in 2017. In 2007, the Federal Council appointed Thomas J. Jordan to the position of Member of the SNB's Governing Board. In 2010, he was appointed Vice Chairman and in 2012 Chairman of the Governing Board.

Thomas J. Jordan is Governor of the International Monetary Fund (IMF) for Switzerland. He is a member of the Board of Directors of the Bank for International Settlements (BIS) in Basel, and Chairman of its Banking and Risk Management Committee. He represents Switzerland in the Plenary and the Steering Committee of the Financial Stability Board (FSB), and is Chair of the FSB's Standing Committee on Budget and Resources (SCBR).

CHAPTER 7

The Federal Reserve's responses to the post-COVID period of high inflation

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Jane Ihrig and Chris Waller¹

Federal Reserve Board

In the face of the COVID-19 pandemic in March 2020, the Federal Reserve committed to using its full range of tools to support the US economy. Over the next year and a half, with progress on vaccinations and strong policy support, indicators of economic activity and employment strengthened while inflation moved higher. Faced with a tight labour market and elevated inflation, the Federal Open Market Committee (FOMC) began a process of unwinding the very accommodative stance of monetary policy and moving to a restrictive policy stance to address inflation pressures. In this chapter, we review the sequence of actions taken by the Committee between late-2020 and mid-2023 as well as discuss some issues it contemplated along the way; the table in the appendix provides a chronological list of key events over this period.

To set the stage, the FOMC was using three tools to conduct policy during the worst of the COVID pandemic: the target range for the federal funds rate, balance sheet policy, and forward guidance.^{2,3} The target range is the Fed's primary tool, while the other two tools are supplemental. By March 2020, the target range was at the effective lower bound and the Federal Reserve announced plans to purchase enormous amounts of Treasury securities and agency mortgage-backed securities (MBS) to address severe market dysfunction. By mid-year, purchases were moved to a steady pace of \$80 billion per month in Treasury securities and \$40 billion per month of agency MBS to provide additional policy accommodation. Forward guidance was used to give the public some understanding of when these policies would be adjusted.

As the FOMC planned for the time when the economy had healed enough to start removing accommodation, it knew the importance of clear and early communications. As a result, in September and December 2020, respectively, the FOMC laid out guidance for raising the federal funds rate off the zero lower bound and for tapering asset purchases.

1 The views in this chapter are solely the authors and should not be interpreted as reflecting the views of the Board of Governors of the Federal Reserve System or of any other person associated with the Federal Reserve System. Much of this discussion leans on speeches given by Governor Waller on 6 May and 18 June 2022 (Waller 2022a, 2022b). Unless otherwise noted, quoted text is from documents available on the Federal Reserve Board's website at www.federalreserve.gov/monetarypolicy/fomccalendars.htm.

2 Forward guidance provides information about the Committee's intentions for interest rate and balance sheet policies.

3 Besides the standard tools of monetary policy, the Federal Reserve introduced new liquidity and credit market facilities to support the flow of credit to households, businesses, nonprofits, and municipalities during the peak stresses of the pandemic. For more information on these tools, see Federal Reserve (2022).

The lift-off statement said that the Committee expected to maintain the target range at the effective lower bound until “labor market conditions have reached levels consistent with the Committee’s assessments of maximum employment and inflation has risen to 2 percent and is on track to moderately exceed 2 percent for some time.”⁴ The balance sheet guidance noted that the Fed would keep buying \$120 billion per month in securities “until substantial further progress has been made toward the Committee’s maximum employment and price stability goals.”⁵

A fair question is: what did these words mean? And, in particular, what did the phrases “substantial further progress” for tapering and “for some time” for lift-off mean? In large part, the interpretation hinged on how the Committee anticipated the economy would recover from the pandemic. Looking across forecasts at the time by Committee participants and the private sector, no one expected substantial progress toward both our goals to happen very soon. At the end of 2020, the economy had begun to recover, but COVID was bad and getting worse, vaccines were just arriving, and no one knew how soon schools would reopen and people would get back to work. In November and December 2020, the unemployment rate was 6.7% and inflation seemed to be in check: 12-month personal consumption expenditures inflation was declining, and core inflation, which excludes volatile energy and food prices, was more or less steady at 1.5%. The Summary of Economic Projections (SEP) by FOMC participants in December 2020 had the unemployment rate moving down to 4.2% at the end of 2022 and inflation moving up to 2% only in 2023.⁶ Only one participant had lift-off occurring by the end of 2022.

Based on this SEP, the FOMC participants generally did not expect the economy to recover quickly. And, looking at the Federal Reserve Bank of New York’s Survey of Primary Dealers in January 2021, the median respondent thought tapering of asset purchases would start in the first quarter of 2022 and lift-off wouldn’t occur until the end of 2023 or later.

To move forward, policymakers had to evaluate “substantial further progress” and “for some time.” The phrases, admittedly, are not concrete in their meaning. The Committee did not define how much above 2% is moderate and how long some value of elevated inflation should be tolerated. In addition, for assessing progress on the health of the labour market, different policymakers prefer different measures that may not provide the exact same signal. On top of this, the data used to measure progress in the labour market can revise substantially and reshape the evaluation of the strength of this market quite quickly. For example, a key input – payroll data – in the latter half of 2021 painted a picture of a slowing labour market. But revised data over several subsequent months revealed that the slowdown never happened. Instead, job gains were quite robust. In

4 See paragraph 4 of the September 2020 FOMC statement.

5 See paragraph 4 of the December 2020 FOMC statement.

6 More information is available in the Summary of Economic Projections released following the December 2020 meeting of the Federal Open Market Committee.

particular, initial reports of job creation between August and December 2021 were a cumulative 1.4 million, but by February 2022 that number was revised up to nearly 2.9 million.

Early in 2021, inflation broke loose. Most of the suspected contributors to this surge in inflation appeared to be temporary: supply-chain bottlenecks that previous experiences suggested would ease soon, a surge in demand for goods, and the second and third Economic Impact Payment checks sent to households. Reflecting this view, the April 2021 FOMC statement pinned the rise in inflation on “transitory factors.”⁷ Meanwhile the labour market and other data related to economic activity suggested a healthy economy. In the June 2021 SEP, seven participants had lift-off in 2022 and only five participants projected lift-off after 2023.⁸ Thus, after observing high inflation for only three months, many FOMC participants were moving in a hawkish direction and were considering tapering sooner and pulling lift-off forward.⁹

At the July 2021 FOMC meeting, the minutes show that most participants believed that “substantial further progress” had been made on inflation but not employment.¹⁰ The progress on inflation reflected the fact that some measures of average inflation were moving above, or would soon move above, the Committee’s 2% goal. Meanwhile, by September, looking at the progress of the labour market since December 2020, a number of participants assessed that the standard of substantial further progress toward the goal of maximum employment might soon be reached. At this point, the FOMC stated that if progress continued broadly as expected, that a moderation in the pace of asset purchases might soon be warranted. Based on the incoming data, the FOMC announced the start of tapering at its early November 2021 meeting, reducing the monthly pace of its net asset purchases by \$10 billion for Treasury securities and \$5 billion for agency MBS.¹¹

Then, the October and November 2021 consumer price index reports showed that the deceleration of inflation from April to September was short lived and that year-over-year inflation had topped 6%. It became clear that the high inflation realisations were not as temporary as originally thought. And the October 2021 jobs report showed a significant rebound with 531,000 jobs created and big upward revisions to the previous two months. It was at this point – with a clearer picture of inflation and revised labour market data in hand – that the FOMC took a number of steps to tighten policy. At its December 2021 meeting, the Committee removed the word “transitory” from the statement, accelerated

7 See paragraph 2 of the April 2021 FOMC statement.

8 More information is available in the Summary of Economic Projections released following the June 2021 meeting of the Federal Open Market Committee.

9 In early 2021, based on positive experience with unwinding accommodative policy after the Global Financial Crisis, the FOMC thought it would be appropriate to use the same sequence of steps to unwind the very accommodative stance of policy in response to COVID: taper asset purchases until they ceased, then lift rates off the effective lower bound, then gradually and passively reduce our balance sheet by redeeming maturing securities. Most importantly, through various communications, the FOMC made it clear that tapering of asset purchases would have to be completed before rate liftoff to avoid the conflict that would occur by easing via continuing asset purchases versus tightening through rate hikes.

10 More information is available in the minutes of the 27-28 July 2021 Federal Open Market Committee Meeting.

11 More information is available in the November 2021 FOMC statement.

tapering, and signalled the tapering pace would likely evolve in a manner that purchases would end by March 2022.¹² The SEP showed that each individual participant projected lift-off in 2022, with a median projection of three rate hikes in 2022.¹³

The year 2022 was one of historic adjustment in policy. In January, the Committee stated that “with inflation well above 2 percent and a strong labour market, the Committee expects it will soon be appropriate to raise the target range for the federal funds rate.”¹⁴ Then, in March, the Committee ended net asset purchases and lifted the target range off the effective lower bound.¹⁵ Over the course of the year, the FOMC raised the target range a total of 425 basis points, from 0.0–0.25% to 4.25–4.5%. This path of policy tightening was very different than the one following the Global Financial Crisis (GFC). The latter process, reflecting the economic environment at that time, was much more gradual: tapering of asset purchases took 11 months, the first hike of the policy rate did not occur until more than a year after purchases ended, and the target range was increased in only 25 basis point increments.

The FOMC’s actions in 2022 reflected its commitment to bring inflation down at a time when it was quite elevated and while the labour market was very tight. At the time, there was debate amongst economists as to whether policy tightening, especially at a quick pace, could bring down inflation without harming the labour market. What we learned was that the FOMC can move at what seems like an aggressive pace without leading to substantial increases in unemployment.¹⁶ In fact, the Committee’s actions hardly budged unemployment and ensured the FOMC’s credibility remained intact.

Balance sheet policy was pushed to the background in 2022, and the focus of conducting policy was the setting of the target range. Of course, the FOMC needed to determine how to reduce the size of its substantial asset holdings accumulated from asset purchases during the strains of COVID. In January, the Committee provided a set of Principles for Reducing the Size of the Federal Reserve’s Balance Sheet, and in May it announced plans to significantly reduce the size of the Federal Reserve’s balance sheet that were consistent with those principles.¹⁷ The May statement outlined the Committee’s intention to reduce the Federal Reserve’s securities holdings over time in a predictable manner primarily by adjusting the amounts reinvested of principal payments received from securities held in the System Open Market Account.¹⁸ The reduction in the balance sheet started on 1 June.

12 More information is available in the December 2021 FOMC statement.

13 More information is available in the Summary of Economic Projections released following the December 2021 meeting of the Federal Open Market Committee.

14 See paragraph 3 of the January 2022 FOMC statement.

15 More information is available in the March 2022 FOMC statement.

16 For more discussion about how a reduction in job vacancies is a viable mechanism for reducing labour demand in a very tight labour market, see Figura and Waller (2022).

17 Additional details can be found in the 4 May 2022 press release regarding the Plans for Reducing the Size of the Federal Reserve’s Balance Sheet, available on the Board’s website at <https://www.federalreserve.gov/newsevents/pressreleases/monetary20220504b.htm>.

18 Additional details can be found in the 26 January 2022 press release regarding the Principles for Reducing the Size of the Federal Reserve’s Balance Sheet, available on the Board’s website at <https://www.federalreserve.gov/newsevents/pressreleases/monetary20220126c.htm>.

At each meeting from March 2022 to May 2023, the FOMC raised the target range for the federal funds rate. The initial increase was 25 basis points, but subsequent moves were larger, including increasing the target range by 75 basis points at each of the June, July, September and November 2022 meetings. The swift tightening path reflected the fact that the labour market was very tight, so the Committee could focus on its price-stability goal at a time when inflation was persistently elevated.¹⁹ Acknowledging that alarmingly high inflation is especially painful for lower- and middle-income households that spend a large share of their income on shelter, groceries, gasoline and other necessities, the Committee moved the target range up toward a restrictive stance as quickly as it judged practical to bolster the public's confidence that the Fed could get inflation down.

In the first half of 2023, with inflation still well above the FOMC's 2% objective and with labour market conditions remaining very tight, the FOMC continued to raise the target range for the federal funds rate. However, the FOMC slowed the pace of policy firming relative to late 2022. Factors motivating the slowing included the cumulative tightening of policy in 2021, the additional tightening in credit conditions following the emergence of banking-sector strains in March 2023, and any lags with which monetary policy affects economic activity and inflation. Overall, the FOMC raised the target range 25 basis points at its January, March and May 2023 meetings, and it held the range steady at its June 2023 meeting. After the June meeting, the target range was set at 5-5¼%.

By mid-2023, in determining the extent of additional policy firming that would be appropriate to return inflation to 2% over time, the FOMC planned to "take into account the cumulative tightening of monetary policy, the lags with which monetary policy affects economic activity and inflation, and economic and financial developments."²⁰ The FOMC indicated that it would "continue to monitor the implications of incoming information for the economic outlook . . . [and] would be prepared to adjust the stance of monetary policy as appropriate if risks emerge that could impede the attainment of the Committee's goals."²¹ The path forward was uncertain. Policymakers faced standard challenges, such as determining the neutral rate of interest that they should steer the economy toward in the longer run, as well as challenges particular to this tightening cycle, such as understanding how supply chain dislocations affect inflation and labour market dynamics.²²

19 The FOMC could focus on the appropriate setting of monetary policy over this period despite the March 2023 serious difficulties at a small number of banks. This ability reflected the fact that the Federal Reserve has macroprudential tools that are independent of its monetary policy tools. For the former, the Fed, along with other governmental agencies, took actions to protect the US economy and to strengthen public confidence in the banking system. The Fed's actions included the use of the discount window - its long-time liquidity tool - as well as creating the Bank Term Funding Program that allowed banks that held safe and liquid assets to borrow reserves against those assets at par, if needed.

20 See paragraph 3 of the June 2023 FOMC statement.

21 See paragraph 4 of the June 2023 FOMC statement.

22 For more discussion of uncertainties and risk management the FOMC faced in the latter half of 2023 and onward, see Powell (2023).

As reported in the September SEP, the median of policymakers' projections for the appropriate level of the federal funds rate at the end of 2023 was 5.6%, slightly above the target range of 5¼–5½% at that time.²³ The policy rate was expected to remain elevated throughout 2024 as indicated by the projected median end of year value of 5.1% being quite a bit above the median longer-run value of 2.5%. Of course, time and data would direct the FOMC to what additional actions, if any, were needed to continue to move the economy toward the Fed's dual mandate.

With policy now restrictive, we can ask, knowing what we know now, should the FOMC have started removing accommodation differently? To be clear, by asking this question, the intent is not to criticize the decisions of the Committee; rather, it is to assess these policy strategies should central banks be confronted with a similar crisis in the future.

One question to ask is whether the guidance issued was too “constraining”; in other words, did it allow enough flexibility for the FOMC to begin raising the policy rate when it was appropriate to do so? Recall, the Committee had decided that raising the policy rate would not begin until the tapering of asset purchases had finished. But to finish, tapering must start – for a given pace of tapering, the longer it takes to start tapering, the longer it will be before the policy rate can be raised. Of course, one can keep the lift-off date fixed and simply taper at a much faster rate, including the possibility of a hard stop of asset purchases. But concerns about financial market functioning, including the ability of markets to absorb the purchases the Fed stops making, typically limit the speed of tapering, particularly given the amount of asset purchases we were making at the time (\$120 billion per month).

Given the tapering criteria and subsequent data, the FOMC ultimately had to pivot hard to accelerate the tapering pace. In fact, unlike the normalisation timeline after the financial crisis, the Committee completed the tapering of purchases just a few days before it lifted off. If, however, it had less restrictive tapering criteria and had started tapering sooner, the Committee could have had more flexibility on when to begin raising rates. So one might argue that requiring substantial further progress toward maximum employment to even begin the process of tightening policy locked the Committee into holding the policy rate at the zero lower bound longer than was optimal.²⁴

A possible takeaway is that a less restrictive tapering criteria would have allowed more flexibility to taper “sooner and gradually,” as opposed to the relatively “later and faster” approach that occurred. Experience has shown that markets need time to adjust to a shift from accommodation to tightening, which was surely a factor in how FOMC statements framed the criteria for key policy actions during the recovery from the GFC

23 More information is available in the Summary of Economic Projections released following the September 2023 meeting of the Federal Open Market Committee.

24 The FOMC statement noted that the Committee was prepared to adjust the stance of monetary policy if risks emerged that could impede the attainment of the Committee's goals, but no such adjustments were taken.

and the pandemic. So, when issuing such criteria, one should be careful to use language that allows the Committee the flexibility it needs to respond to changing economic and financial conditions.

Now let's turn to the lift-off criteria: "labour market conditions have reached levels consistent with the Committee's assessments of maximum employment and inflation has risen to 2 percent and is on track to moderately exceed 2 percent for some time." This criteria was also quite restrictive, and one might argue that it required the economy to be in a situation where our dual mandate had been achieved. Was this the correct criteria? For example, in December 2012, the FOMC, following closely from the Evans rule, pledged that the target range would remain at the effective lower bound "at least as long as the unemployment rate remains above 6½ percent, inflation between one and two years ahead is projected to be no more than a half percentage point above the Committee's 2 percent longer-run goal, and longer-term inflation expectations continue to be well anchored."²⁵ This criteria was considered very dovish policy guidance at a time when the economy was in a slow, grinding recovery. Had the Committee instead adopted this Evans rule in late 2020, the lift-off criteria would have been met in the spring of 2021. This alternative language gives some idea of how restrictive the 2020 guidance was for lift-off, which, recall, was not implemented until March 2022. A lesson is that perhaps more flexibility should be considered in future lift-off criteria.

On top of the lift-off criteria, there is an implication of the expected path of tightening once rates began to rise. For example, most Taylor rules at the end of 2021 suggested the policy rate should be well above zero and close to its neutral value. Consequently, if the rules that use the current state of the economy are specifying that policy should be at neutral and actual policy is at zero, then the policy rate needs to rise quickly. So it should not have been a surprise that the policy rate rose fast in 2022. Rate hikes needed to be larger and more frequent than the 2015–2018 tightening pace to get back to neutral. Looking back, should the Committee have signalled a steeper rate path once the lift-off criteria had been met? Perhaps another lesson is that giving forward guidance about lift-off should also include forward guidance about the possible path of the policy rate after lift-off.

Overall, the FOMC's response to tightening after the COVID pandemic was not textbook. It involved much faster tightening of policy than had been seen in more than 30 years. From this experience it should not be a surprise that when looking back, there are lessons to be learned. But policymakers' actions have coincided with stable financial markets, a strong labour market and inflation moving down from its peak.

25 See paragraph 5 of the December 2012 FOMC statement. For a discussion of the Evans rule, see Evans (2011).

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APPENDIX

Key policy actions in response to post-COVID high inflation

September and December 2020	Federal Open Market Committee (FOMC) laid out guidance for raising the federal funds rate off the zero lower bound and for tapering asset purchases
April 2021	FOMC statement introduced language that inflation was due to “transitory factors”
November 2021	Fed began tapering asset purchases
December 2021	FOMC removed “transitory” language from the statement The Committee accelerated pace of tapering and signalled the tapering pace would likely mean the end of purchases in March 2022
January 2022	FOMC statement indicated that the Committee expected it would soon raise the target range Fed released Principles for Reducing the Size of the Federal Reserve’s Balance Sheet
March 2022	Fed ended asset purchases FOMC lifted the target range from the effective lower bound
May 2022	FOMC released detailed plans for significantly reducing the size of the Fed’s balance sheet (consistent with January Principles)
June 2022	Fed began reducing its holdings of securities
March 2022 - June 2023	10 rate hikes varying in size from 25 to 75 basis points The target range moved from 0-0.25% to 5.0-5.25%

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Christopher J. Waller took office as a member of the Board of Governors of the Federal Reserve System on December 18, 2020, to fill an unexpired term ending January 31, 2030. Prior to his appointment at the Board, Dr. Waller served as executive vice president and director of research at the Federal Reserve Bank of St. Louis since 2009.

In addition to his experience in the Federal Reserve System, Dr. Waller served as a professor and the Gilbert F. Schaefer Chair of Economics at the University of Notre Dame and was also a professor and the Carol Martin Gatton Chair of Macroeconomics and Monetary Economics at the University of Kentucky. Prior to that, he was director of graduate studies at Indiana University's Department of Economics, where he also served as associate professor and an assistant professor. Dr. Waller received a BS in economics from Bemidji State University and an MA and PhD from Washington State University.

PART 2

MONETARY POLICY RESPONSES IN EMERGING ECONOMIES

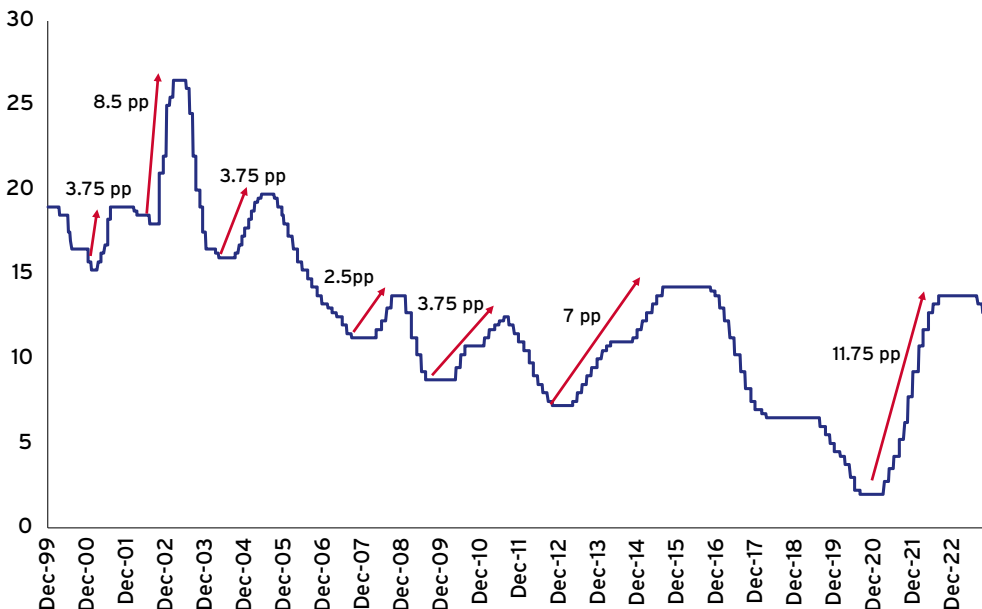
CHAPTER 8

The Central Bank of Brazil's response to the post-pandemic inflationary spell

Fernanda Guardado
Banco Central do Brasil

Between March 2021 and August 2023, the Central Bank of Brazil's (Banco Central do Brasil, or BCB) Monetary Policy Committee (Copom) increased the Selic rate (the Brazilian federal funds rate) by 11.75 percentage points to reach 13.75% – the sharpest tightening cycle of its inflation targeting period and the highest level for the interest rate since 2016. Despite starting the fight against the global inflation spell that took place after the pandemic earlier than most, the persistent deterioration in prices, expectations and the balance of risks led the BCB to increase the pace and revise the total size of the hiking cycle, or budget of hikes, several times throughout that process.

FIGURE 1 THE SELIC RATE (% PER ANNUM)



A noticeable feature of the post-pandemic years is the increased level of uncertainty that has surrounded scenarios and projections. As time has progressed, the sources of uncertainty have changed while the visibility of the future has remained clouded. This has made decision making more difficult and riskier. The BCB opted to minimise the risks of remaining ‘behind the curve’ as inflation surprised upwards, acknowledging that the costs of bringing down inflation might rise steeply if credibility is lost.

In this chapter, I outline the strategy and the reasoning behind the most relevant decisions regarding monetary policy in Brazil during these trying times.

THE HIKING CYCLE BEGINS

As 2020 came to an end, the COVID lockdowns were still coming and going in Brazil and many parts of the world, but it was already evident that the feared depression that had been predicted during the height of the lockdowns was not materialising. Brazilian GDP declined 4% in 2020, with a much better performance than expected in the first half of the year and a strong outcome in the fourth quarter. The decline in inflation was also a lot smaller than feared: the CPI ended that year with a 4.5% increase, very close to the BCB’s target (4.0%). Despite the high uncertainty related to the pandemic, the world economy also suggested a robust recovery.

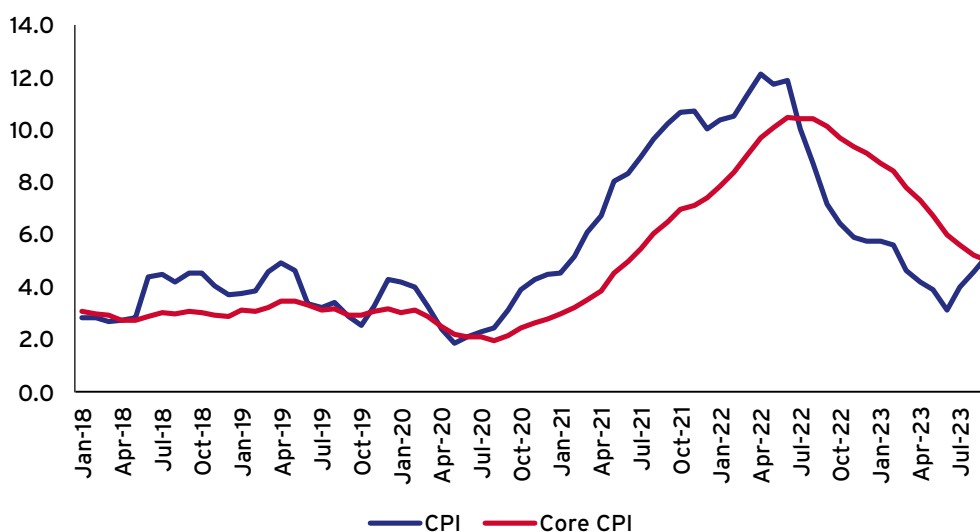
As 2021 began, high-frequency indicators were showing a picture of robust domestic consumption of goods, with retail sales rebounding and 2020Q4 GDP posting a 3.2% quarter-on-quarter growth, while services were in the doldrums. Global commodity prices were recovering, with foodstuff items such as soybeans and wheat rising 14% and 40% over the year, respectively, accompanied by a strong rebound in oil prices. Despite these developments, inflation expectations were anchored, with forecasts for 2021 and 2022, respectively, at 3.4% (below the target) and 3.5% (then at the target for 2022).¹ However, inflation prints started to surprise to the upside in the first quarter, with headline 12-month CPI inflation expected to surpass 6% in March and PPI inflation (the IGP-M index) reaching 31% year-on-year in the same month.

Inflation bouts are not taken lightly in Brazil, a country with a history of persistent inflation. As recently as 2015, the BCB had to fight a strong inflationary surge that saw inflation reach 10% that year, driven by excessive fiscal expenditures and readjustment of administered prices that had been frozen previously, taking interest rates to 14.25%. With the economy recovering and inflation pointing to target levels, the need to maintain an extraordinarily easy monetary policy was fading fast, and the expectation that interest rates would start to be normalised soon consolidated in markets’ and analysts’ forecasts.

1 Source: BCB Focus Survey, between 2019 and 2024 inflation targets were set on declining path from 4.5% towards 3% in 2024.

By March, expectations for 2021 inflation had increased to 4.6% (2022 remained at 3.5%), but the BCB's own forecasts for the year were higher and close to the upper limit of the tolerance interval for the inflation target² at 5% – despite already incorporating a cycle of 250 basis points of hikes for the year. Copom then decided to start a hiking cycle aimed at bringing the monetary policy stance to levels closer to neutral and increased the Selic rate by 75 basis points to 2.75%. This pace was then seen as sufficiently nimble to remove, in a short time frame, most of the extraordinary monetary stimulus brought about by the unprecedented interest rate level of 2% reached in the previous year. Due to the uncertainties related to new waves of COVID and their impact on the economic recovery, the Committee also suggested that this pace would be maintained in its next decision, calling the projected path a “partial normalisation” of interest rates, thus suggesting that not all accommodation would be removed in the envisioned path until end 2022. This was seen as forward guidance on the budget of hikes that were foreseen by the Committee.

FIGURE 2 HEADLINE AND CORE CPI (IPCA, % YEAR-ON-YEAR)



Copom proceeded with the 75 basis point hiking pace in its two successive meetings, in May and June of 2021, as it had suggested and anticipated. But it was becoming clear that not only was the recovery of activity on a better-than-expected trend, despite new waves of COVID and lockdowns, but also inflation was rising faster than anticipated. By the middle of the year, another shock had also materialised: due to lower-than-normal rainfall, generation of electricity from hydroelectrical plants – the major source of electricity generation in Brazil – was low and therefore electricity bills rose over 21%

² The target for that year was 3.75%, with a tolerance band of 1.5 percentage points and therefore a ceiling for the band of 5.25%

during the year to curb demand. The impact on headline CPI was considerable, with one percentage point of 2021 CPI inflation coming from electricity bills alone.³ Core inflation was also surprising to the upside, on the back of strong gains in industrial goods.

Therefore, the “partial normalisation” strategy was no longer appropriate to deal with the unmooring of inflation expectations and the larger-than-expected inflationary pressures becoming visible in the economy. The term was substituted in June for the aim for a “neutral” level. In July, with the reopening of the economy gaining speed and with inflation expectations increasing to 6.8% for 2021 and 3.8% for 2022, and core inflation already above 7.5%, there was a clear need to be more aggressive and increase the pace of tightening, as well as its budget.

PACE VERSUS BUDGET

At the August 2021 Copom meeting – this author’s first one at the BCB – the Committee decided to increase the pace of hikes to 100 basis points, anticipated the intention to proceed in the same pace in the following meeting, and reported that it now saw a tightening cycle reaching a level “above neutral”, i.e. a level that would be contractionary for economic activity. This move did not come as a big surprise for analysts and economists, despite the Committee foreseeing for August the same pace of rate increase it delivered in June. The statement from that previous meeting had mentioned that “a deterioration of inflation expectations for the relevant horizon may require a quicker reduction of the monetary stimulus”⁴ and the BCB Focus Survey had already upgraded the median expectation for the Selic rate to 7% for the end of the year.

Therefore, not only did the pace of hikes need to be adjusted, but importantly the Committee started to suggest more forcefully that the tightening cycle might need to go beyond the scenario underlying its inflation projections. The September meeting did deliver the rate increase suggested in the previous statement, with the view that it was “appropriate to advance the process of monetary tightening further into the restrictive territory”, and foresaw a similar hike at its next meeting.

But upside risks around the inflationary scenario kept rising. Inflation continued to surprise to the upside and inflation expectations to deteriorate, giving rise to calls for the BCB to be more nimble in its strategy or risk losing credibility on its commitment to inflation convergence. As the economy reopened, services prices were expected to accelerate in order to recoup the losses suffered relative to the other prices in the economy during the lockdowns – and as demand rebalanced away from goods towards services, it was expected that industrial goods inflation would decelerate. But what was observed in the second half of 2021 and the beginning of 2022 was the continuation of supply chain bottlenecks that kept many goods and commodities prices under pressure, while services

3 The March 2022 Inflation Report provides a breakdown from inflation contributions for the year (BCB 2022a).

4 Copom statements are available at <https://www.bcb.gov.br/en/monetarypolicy/copomstatements>

inflation was starting to accelerate. On the global scene, along with the inflationary pressure from supply chains and increase in commodity prices, other emerging markets were also reacting to higher inflation and initiating tightening cycles. It was also becoming clear that advanced economies would soon be forced into tightening monetary policy and removing accommodation through 'quantitative tightening' – a scenario that had proved challenging in the past for emerging economies such as Brazil because it usually entailed depreciations and volatility. Therefore, most drivers of inflation were pointing to the upside.

In this context, both the pace and budgets were adjusted in the last two meetings of that year. In October, rates were increased by 150 basis points to 7.75%, and again in December to 9.25%. Copom tweaked its view on the tightening cycle “to advance the process of monetary tightening even further into the restrictive territory”, in another nod towards a higher budget of hikes. By December, Focus Survey inflation expectations for 2022 reached 5%, well above the year's target.

Doubts over a possible increase in neutral rates were also a topic of debate in the Committee. In the December Inflation Report (BCB 2022b), the estimate for the real neutral interest rate was raised by 50 basis points to 3.50%, another indication of continued tightening. Inflation ended 2021 at over 10%, with core prices rising 7.4%.

FISCAL POLICY CONSIDERATIONS

Fiscal policy was mentioned as one of the upside risks to the inflationary scenario since the beginning of the hiking cycle. In particular, the risk that extraordinary measures such as fiscal transfers and credit support lines for companies would be extended repeatedly meant an extra impulse to an economy reopening with surprising strength.

By June 2021, with the risk of another extension to the *Auxílio Brasil* transfer programme, Copom cautioned that “further extensions of fiscal policy responses to the pandemic that increase aggregate demand and deteriorate the fiscal path may pressure the country's risk premium” and mentioned that “in spite of the recent improvement of debt sustainability indicators, the elevated fiscal risk creates an upward asymmetry in the balance of risks, i.e., in the direction of higher-than-expected paths for inflation over the relevant horizon for monetary policy”.

Fiscal issues started to weigh more heavily on the balance of risks around the inflationary scenario in October. As mentioned previously, upside risks from activity and prices were already evidently larger. Still, government discussions were around further extending the emergency expenditures in transfer programmes, threatening to add more fuel to consumption and decrease the efficacy of monetary policy, in a scenario of above-target inflation and rising inflation expectations. During that month, after the announcement of a constitutional amendment that would in effect allow more expenditures and transfers, affecting the credibility of the fiscal framework, Focus Survey inflation expectations for

the following year jumped by 22 basis points in a week to 4.4% – almost a full percentage point above target. These developments contributed to the decision for a greater pace of hikes (150 basis points) that was maintained until the February 2022 meeting.

Continued fiscal support remained an important topic in Copom's balance of risks in the following months, tilting it towards an asymmetric upside risk to inflation. During 2022, the uncertainty surrounding the fiscal framework that imposed a limit on the growth of overall expenditures increased as discussions to further extend the transfers programme intensified,⁵ along with new tax cuts on fuels and a constitutional amendment that allowed judicial debts to be postponed.⁶ These developments had an impact not only on asset prices but also on inflation expectations, which continued to increase for both 2022 and 2023. However, primary fiscal results surprised substantially to the upside, boosted by strong revenue coming from robust activity and high commodities prices. In March 2022, Copom acknowledged that, despite the improvement in current fiscal results, some of the deterioration related to the future of fiscal accounts was already being reflected in expectations and asset prices.

Tax cuts on fuels did indeed bring a decrease in headline inflation, but they also resulted in an increase in 2023 inflation forecasts due to the expectation that the cuts would be reversed – therefore shifting some of the 2022 inflation into 2023. Most importantly, they increased the uncertainty regarding future fiscal results.

Longer-term inflation expectations would again react to fiscal developments during the approval of the 'Transition Amendment',⁷ which was negotiated by the incoming government at the end of 2022 to allow extra expenditure of approximately R\$145 billion above the existing expenditure cap for 2023. Inflation expectations for December 2025 and 2026 rose from 3% (which was expected to be the target for those two years) to 3.25% and 3.15%, respectively, reflecting mostly greater uncertainties around the fiscal scenario for the country. These expectations would continue rising over January 2023 to reach 3.5%.

THE UKRAINE WAR

It could be argued that the war in Ukraine that began in February 2022 was the third consecutive inflationary shock for the Brazilian economy since 2020 – following the pandemic (and the ensuing depreciation of the real and expansive fiscal policies) and the increase in electricity bills.

5 Constitutional Amendment 01/2022, or 'Kamikaze PEC', approved in July 2022, allowed an extra R\$41 billion in expenditures in 2022, including larger transfers to families and fuel subsidies to truck and taxi drivers. The extra expenditure was envisioned to last only for 2022.

6 Constitutional Amendment 114/2021, approved in December 2021

7 *PEC da Transição*, or PEC 32/2022.

As the invasion of Ukraine unfolded at the end of February, commodity prices soared. In particular, Brent crude prices peaked at almost US\$128 in mid-March, rising almost 24% between the Copom meetings, leading gas prices in Brazil to increase by almost 19% (diesel prices rose 24%) in the week prior to the March meeting. Focus Survey inflation expectations for 2022 and 2023 increased further to 6.4%, and 3.7%, respectively, well above the targets of 3.5% and 3.25%.

The increased level of uncertainty, the sharp impact of those price increases on headline inflation in an environment of already elevated headline and core inflation, and strong economic activity, led Copom to revise upwards its inflation forecasts (to 7.1% in 2022 and 3.4% for 2023) and to present an alternative scenario where oil prices would moderate throughout the year, leading to lower forecasts. Visibility on the future of the conflict and its impacts on the world economy, financial conditions and commodity prices remained low. The Committee called for serenity in assessing the size and duration of the new shock, focusing initially on its second-round effects and proceeding with the tightening strategy it had envisioned in its communication in the prior meeting – raising the Selic rate by 1 percentage point to 11.75% and foreseeing a similar rise in the next meeting. The committee also cautioned that “if those shocks prove to be more persistent or larger than anticipated, the Committee will be ready to adjust the size of the monetary tightening cycle”, and that it would persist in its strategy until the disinflation process and the expectation anchoring around its targets consolidated.

That would indeed prove to be the case. Rates would be hiked again by 100 basis points in the May meeting, as foreseen in March, and twice again by 50 basis points in the June and August 2022 meetings, bringing the Selic rate to 13.75%. By then, the uncertainty and levels of several commodity prices had diminished somewhat, although prices remained relatively high and logistical bottlenecks remained a source of pressure on world inflation. On top of that, the strength of core inflation and the acceleration in services prices were turning out to be greater and more persistent, requiring a more contractionary monetary policy stance to reaffirm the commitment of policymakers to achieve the inflation target. Importantly, the extension in the hiking cycle also reflected the upward revisions of Copom's forecasts for 2022 and 2023 inflation (to 7.3% and 3.4%, respectively, in May) as well as in the Focus Survey (4.1% in 2023). The environment of higher uncertainty and strong growth entailed larger upside risks around the Committee's forecasts and to the anchoring of longer-term inflation expectations.

ADJUSTING THE LEVEL OF TIGHTNESS IN MONETARY POLICY

In its September 2022 meeting, Copom decided to halt its hiking cycle to better observe the evolution of inflation trends relative to expectations, as well as the impacts of the rapid tightening cycle implemented since 2021. Considering that a major share of the impacts of monetary policy decisions on inflation were estimated to take up to 18 months to materialise, most of the tightening done in that year would only be more evident by

mid-2023. That decision brought with it some conditionalities, as uncertainties and risks around the inflationary scenario were elevated and confidence over the estimates of the output gap and the deceleration of the economy was not high. In particular, the Committee cautioned that “[it] will not hesitate to resume the tightening cycle if the disinflationary process does not proceed as expected”.

By the first half of 2023, many of the shocks that had impacted inflation over the previous two years were subsiding. Supply chain pressures had been unwound, energy tariffs were back to normal levels and commodity prices had retraced from the peaks reached in 2022. Still, inflation expectations were on the rise, and the decrease in services inflation in particular was expected to be slow. Focus Survey forecasts for 2025 and 2026 soared to 4% by March, as markets participants began to anticipate the possibility of an increase in the long-run inflation target set by the National Monetary Council (CMN).⁸ The de-anchoring of inflation expectations, along with a robust labour market, demanded more caution and patience from the Committee regarding its next steps.

With the confirmation of a long-term 3% inflation target by the CMN at the end of June, expectations only partially retracted their rise and remained at 3.5% at the time of writing. This partial re-anchoring happened despite a disinflation process that was materialising as expected by the Committee particularly in services inflation, while headline inflation declined somewhat more than expected over the first half of the year due to a big help from decreases in food and industrial prices.

After a year-long period of stability of the Selic rate at 13.75%, Copom decided to adjust the tightness of its policy as inflation declined and there were concerns that ex-ante real rates would stealthily rise if rates were kept at their current level. At its August 2023 meeting, in a divided decision,⁹ Copom decided to cut interest rates by 50 basis points to 13.25%, and anticipated that it would keep this pace of cuts over its next meetings.

Despite the growing confidence in the disinflationary path, the Committee remained concerned about the level of risks surrounding its scenario, and in particular the unmooring of longer-term inflation expectations. Copom debated different hypotheses as to why long-term expectations remained unanchored,¹⁰ but felt it was up to the monetary authority to continue to show its determination to achieve convergence of inflation towards the target, and that monetary policy would still need to remain tight over the relevant period in order ensure the convergence of inflation and expectations. Rates were cut again by the same amount at the September and November meetings, as the disinflation process proceeded as expected. At its November meeting, the Committee forecasted inflation to end 2023 at 4.7% and to reach 3.6% by 2024 and 3.2% by 2025.

8 The CMN is responsible for setting the inflation target as well as formulating monetary and credit policies, aiming to preserve Brazilian monetary stability, and to promote economic and social development. It is composed by the Minister of Finance, the Minister of Planning and the BCB Governor.

9 The Committee voted five-to-four for the 50 basis point cut, with the four members favouring a smaller 25 basis point initial cut.

10 See paragraph 11 of the August 2023 minutes (<https://www.bcb.gov.br/en/publications/copomminutes>)

UNWINDING OF LIQUIDITY PROVISION AND OTHER POLICIES

During the height of the pandemic, the BCB mainly pursued three types of interventions to help sustain economic growth and financial stability, as described in Nechio and Serra Fernandes (2021): it intervened in currency spot markets to provide liquidity in dollars on onshore and offshore markets; it imposed a set of policies aimed at supporting the credit flow to households and firms; and, within the Basel framework, it eased regulatory capital requirements to release balance sheet buffers of financial institutions. Throughout this period, the BCB did not make any changes to its counter-cyclical buffer.

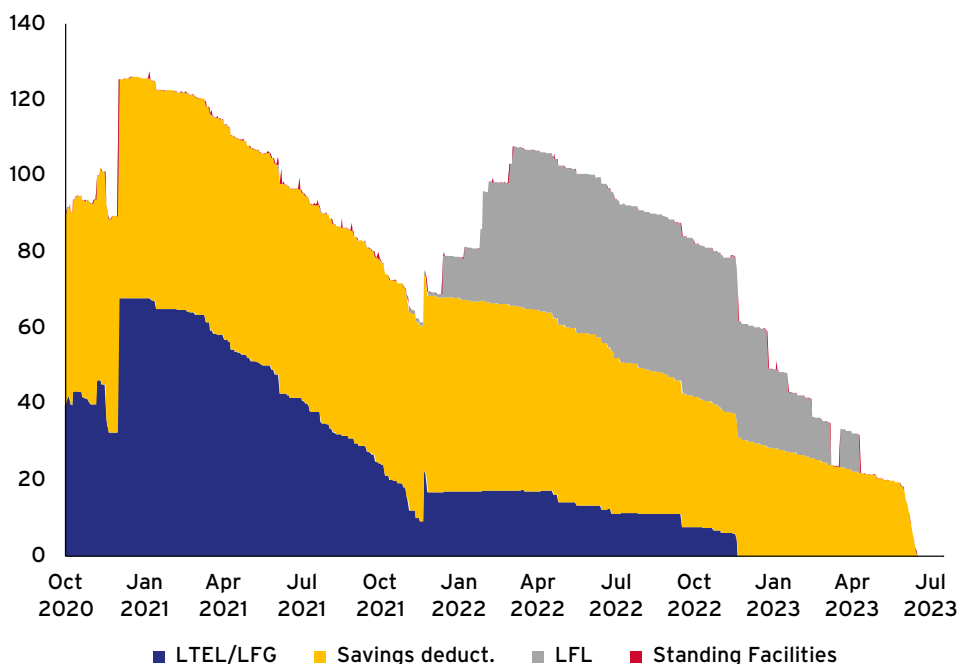
The temporary decrease in required reserves on term deposits, from 31% to 17% between February 2020 and March 2021, had the potential to unfreeze R\$205 billion (3% of GDP), and allowed systemically important institutions to operate with liquidity coverage ratios temporarily below the regulatory level of 100%. The required reserve ratio (RRR) eventually rose back up to 20% but was never reinstated to its pre-pandemic level, in part because the BCB allowed banks to deduct 3 percentage points of term deposits by generating limits in its newly instated standing liquidity lines, with the pre-pledging of the necessary collateral. In June 2023, the deductibility of up to 6 percentage points of the reserve requirement on savings accounts of the Term Deposit with Special Guarantees (DPGE) line, which allowed these funds to be redirected to working capital operations of small and medium-sized enterprises during the second half of 2020, expired.

In addition, during the pandemic, the BCB inaugurated two Special Temporary Liquidity Facilities (LTEL-Debentures and LTEL-LFG)¹¹ to supply extraordinary liquidity to financial institutions that did not access liquidity through the reserve requirement easing, backed by a basket of loans and securities. The liquidity of LTEL-Debentures was aimed at the purchase of corporate debt in the secondary market, while LTEL-LFG was aimed at the repurchase of the financial institution's own issuances of long-term Financial Letters. The latter measure sought to increase the demand for fixed-income assets issued by the private sector, thereby reducing fire-sales of these assets by investment funds. LTEL-Debentures ended by October 2020 with a small uptake, but it was successful in stabilising the market for corporate debt after its announcement. In December 2021, the BCB only partially rolled over its LTEL-LFG line to allow for a smoother end to the liquidity provision, from a stock of R\$68 billion at the end of 2020 to R\$17 billion, with higher interest rates charged¹² and more stringent limitations on spreads and on amounts, reflecting the normalisation in credit and economic conditions. The LTEL-LFG were mostly repaid by December 2022. In total, the liquidity offered by the BCB reached R\$126 billion by end-2020; it decreased to R\$107 billion by the beginning of 2022 and had totally disappeared by mid-2023.

11 LTEL-LFG stands for *Linha Temporária Especial de Liquidez para aquisição de Letra Financeira com garantia em ativos financeiros ou valores mobiliários*.

12 The spread rose from 60 basis points in the initial concession to 75 basis points over the Selic rate.

FIGURE 3 TOTAL AMOUNT OUTSTANDING FROM DIFFERENT DIFFERENT BCB LIQUIDITY INITIATIVES (R\$ BILLION)



The implementation of the LTEL lines showed the importance of having standing liquidity facilities that were more permanent, reliable, and that could provide funds for a longer term. Therefore, the BCB established in 2021 two separate liquidity lines, in the form of loans backed by pre-approved pledged collateral: (1) *Linha de Liquidez Imediata* (LLI), a standing short-term line of loans up to 45 days; and (2) *Linha de Liquidez a Termo* (LLT), a line tapped on demand aimed at longer-term liquidity (one year).

CONCLUSION

The post-pandemic years can be well described as a period of very high uncertainty, stemming from different sources over time, and many consecutive shocks to the global and Brazilian economies. The BCB chose to act in a fast and timely manner to the budding inflation risks evident by the beginning of 2021 and implemented the largest and fastest tightening cycle in its inflation targeting history. As disinflation proceeds in 2023, the strategy seems to be working, but a scenario still full of risks and uncertainties continues to demand caution on the part of central bankers.

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APPENDIX

TABLE A1 THE BCB'S COPOM MONETARY POLICY DECISIONS

Date	Decision	Target rate	Inflation forecast (12 m ahead - Focus)
March 2021	+0.75	2.75%	4.39%
May 2021	+0.75	3.50%	4.06%
June 2021	+0.75	4.25%	4.36%
August 2021	+1.00	5.25%	4.29%
September 2021	+1.00	6.25%	5.30%
October 2021	+1.50	7.75%	5.39%
December 2021	+1.50	9.25%	5.25%
February 2022	+1.50	10.75%	5.37%
March 2022	+1.00	11.75%	5.84%
May 2022	+1.00	12.75%	5.46%
June 2022	+0.50	13.25%	6.08%
August 2022	+0.50	13.75%	5.61%
September 2022	0.00	13.75%	4.92%
October 2022	0.00	13.75%	5.07%
December 2022	0.00	13.75%	5.15%
February 2023	0.00	13.75%	5.46%
March 2023	0.00	13.75%	5.44%
May 2023	0.00	13.75%	5.02%
June 2023	0.00	13.75%	3.98%
August 2023	-0.50	13.25%	4.15%
September 2023	-0.50	12.75%	4.09%

ABOUT THE AUTHOR

Fernanda Guardado was the Deputy Governor for International Affairs and Corporate Risk Management at the Banco Central do Brasil (BCB) from July, 2021, until December, 2023, when her term expired. She was a member of the board of the BCB and its Monetary Policy Council (COPOM).

Fernanda is an economist, and holds a Master's and PhD degree in Economics from the Catholic University in Rio de Janeiro, where she has also taught. Her studies have focused on monetary economics. Fernanda has a long career in the financial sector, having held the position of Senior and Chief Economist at several banks and asset managers in Brazil, focusing on the analysis and evaluation of the global as well as the Brazilian economies.

CHAPTER 9

Monetary policy in Chile through inflation and disinflation, 2021 to 2024

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Elías Albagli and Pablo García

Central Bank of Chile; Universidad Adolfo Ibáñez

Inflation in Chile reached a decades-long peak in August 2022, when it hit 14.1% – the highest level in 30 years and the highest since the adoption of an inflation forecast targeting regime in 2000. Under this regime, the monetary policy strategy must be consistent with bringing projected inflation back to the 3% target at or before the two-year horizon. In fact, since the inflation-targeting regime was implemented only in 2008 – right before the main impact of the Great Recession – inflation had approached double digits (a 9.9% peak). Two-year ahead inflation expectations of professional forecasters, analysts and firms became unanchored from the 3% target. Indeed, the post-pandemic inflation posed the most substantial risk to the credibility of the Central Bank of Chile (CBC) in its stated goal of sustaining 3% inflation.

Nevertheless, after a little more than a year after its peak, inflation in Chile fell to near 3.9% in December 2023, and expectations indicate that it will fall further to 3% by the second half of 2024. This chapter will highlight the main policy measures taken that explain the rapid reversal in inflation which, although qualitatively similar to that experienced by other countries, also bears important differences worth highlighting.

The first section describes the principal drivers of the inflation and disinflation shocks. Understanding why inflation goes up is the precondition to setting policies to bring it down. The second section will provide some background to the set of policies that ended up contributing to the successful disinflation, and how this process – so far – has been different than that experienced by other economies. The third section will conclude with some lessons for the future.

IDENTIFYING THE INFLATIONARY SHOCK

The traditional approach to understanding inflation is the accelerationist Phillips curve. Under this view, inflation increases if marginal costs remain above their natural level. Marginal costs depend on the state of the business cycle, but can also be determined by imported cost pressures, such as the exchange rate and import prices. If current and expected conditions derived from the real economy imply stable inflation, expectations and credibility about the inflation target take centre stage. Therefore, a parsimonious

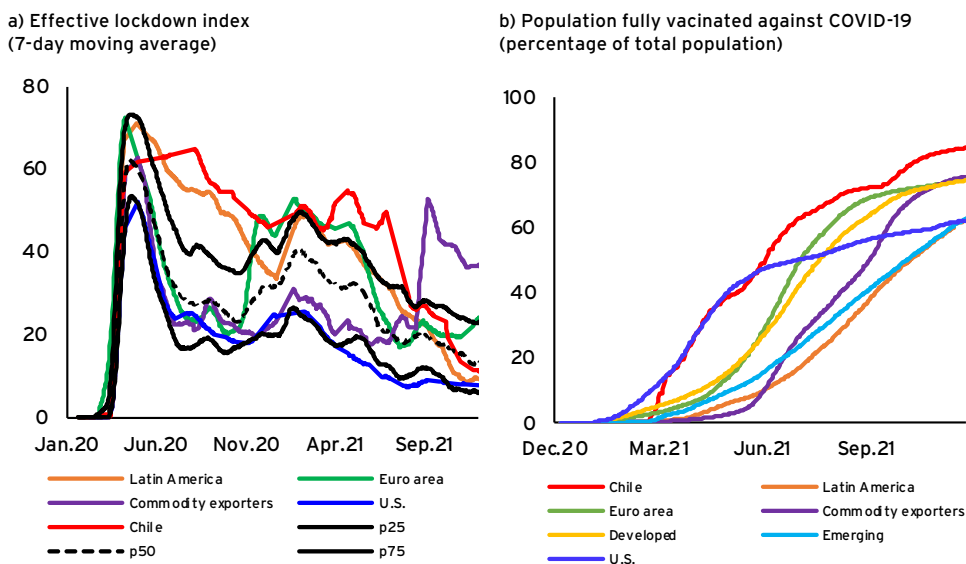
approach to determining inflation should consider the current and expected evolution of aggregate demand and aggregate supply, real and financial developments, and domestic and external shocks.

The pandemic provided a rich and unprecedented source of such shocks: *inter alia*, massive liquidity injections and unconventional support from central banks; fiscal transfers to households and firms; private sector confidence gyrations; sectoral shifts in productivity associated with the effects of the pandemic in specific markets; changes in labour supply and mobility restrictions; logistical bottlenecks in international supply chains; and large fluctuations in the exchange rate and international commodity prices. A simple yet powerful explanation for the surge in inflation worldwide is the combination of a (net) negative aggregate supply shock from all the disruptions associated with the pandemic, coupled with a (net) positive aggregate demand shock from policy support. The Russian invasion of Ukraine provided a further shock that exacerbated the already existing inflationary tensions worldwide.

Each country in the interconnected global economy experienced this process in different ways, not only due to structural differences but also the idiosyncrasies of pandemic policies, the magnitude of domestic policy support and political developments. The Chilean macroeconomy displayed extreme versions of all the latter factors from 2020 to 2022. On the one hand, the application of lockdowns was long-lasting, even though the roll-out and public acceptance of the vaccination campaign was quick (Figure 1). Also, monetary policy reacted swiftly, reaching its technical minimum (deemed to be 0.5%) in April 2020, followed by asset purchase programmes and special conditional lending facilities to banks (where the conditioning depended on the use of such funds for corporate loans (see the CBC's June 2020 *Monetary Policy Report*). Total liquidity injections by the CBC topped US\$50 billion.

But above all, liquidity support to households far exceeded international standards, resulting from the roughly simultaneous implementation of direct transfers from the government of \$20 billion and legislative measures which allowed household to tap their pension savings for \$60 billion. All in all, household liquidity support exceeded 30% of GDP, rolled out between August 2020 and December 2021. At the same time, other domestic political developments associated with the electoral cycle and a process of constitutional change elevated the risk premium on Chilean assets during 2021, with the currency depreciating more than 20%. Naturally, this behaviour of the exchange rate amplified the inflationary consequences of the huge liquidity disbursements to households.

FIGURE 1 STRINGENCY OF LOCKDOWNS AND VACCINATION COVERAGE



Note: For Latin America, simple average of Brazil, Peru, Argentina, Mexico and Colombia is used. For euro area, simple average of Germany, France, Spain and Italy. For commodity exporters, simple average of Canada, New Zealand and Australia.

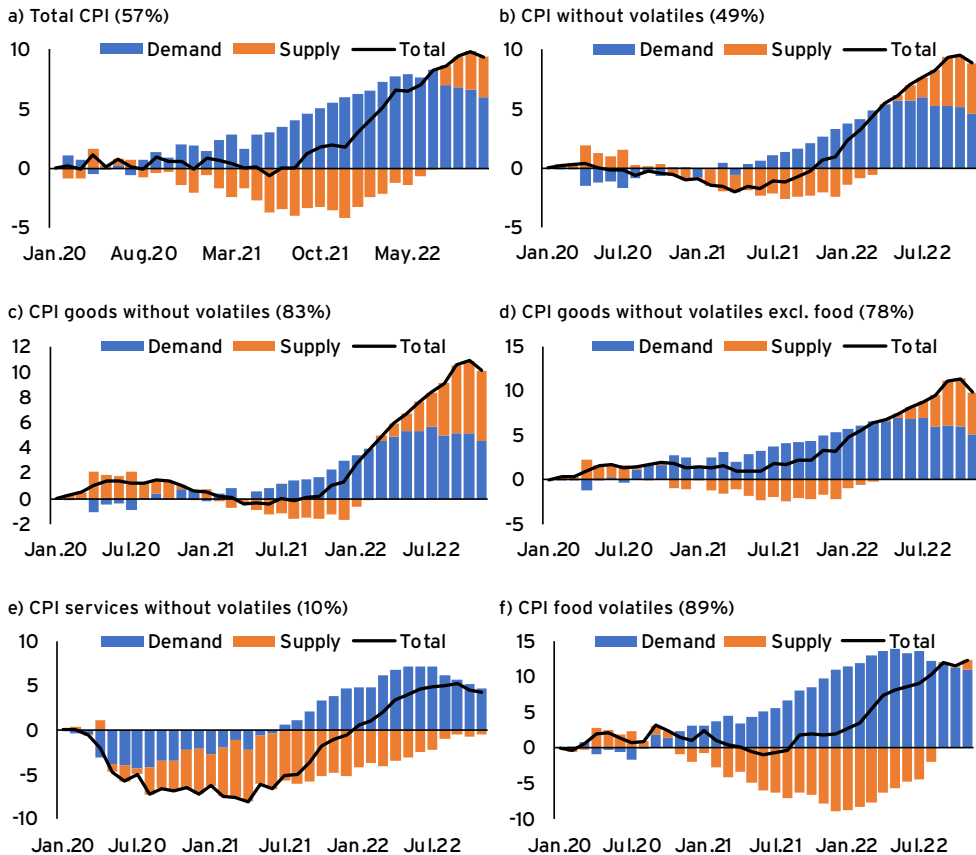
Source: Goldman Sachs; Our World in Data.

Against this backdrop, inflation increased from 3.5% in January 2020 to 14.1% in August 2022, while the economy grew at close to 12% in 2021 (private consumption grew more than 20%). After providing ample liquidity during the pandemic and lowering the monetary policy rate (MPR) to its effective lower bound, the Board of the CBC initiated an aggressive hiking cycle in June 2021, culminating in an average increase of 100 basis points per meeting, until the MPR reached 11.25% in November 2022.

Demand and supply

The first task the CBC had to face was to understand and communicate, in a simple yet convincing manner, the nature of the inflation process, to justify this aggressive monetary policy strategy. In this task the CBC benefitted greatly from the work stream on the use of microdata for macroeconomic analysis undertaken since 2015. Thanks to the availability of price and quantity data for individual transactions derived from electronic invoices, it was possible to distinguish between supply and demand shocks driving higher prices. Simply put, if an individual transaction saw higher prices but the associated quantities fell, it could be argued that higher prices were due to supply shocks. Conversely, if higher prices were associated with higher quantities, demand shocks were at play. The decomposition of CPI inflation in Carlomagno et al. (2023), shown in Figure 2, using this identification strategy, shows that a significant share of the increase in inflation up to 2022 was due to demand shocks. This micro-data approach was also confirmed by the traditional structural models used for medium-term forecasting.

**FIGURE 2 HISTORICAL DECOMPOSITIONS OF MAIN CPI AGGREGATES
(PERCENTAGE POINTS)**

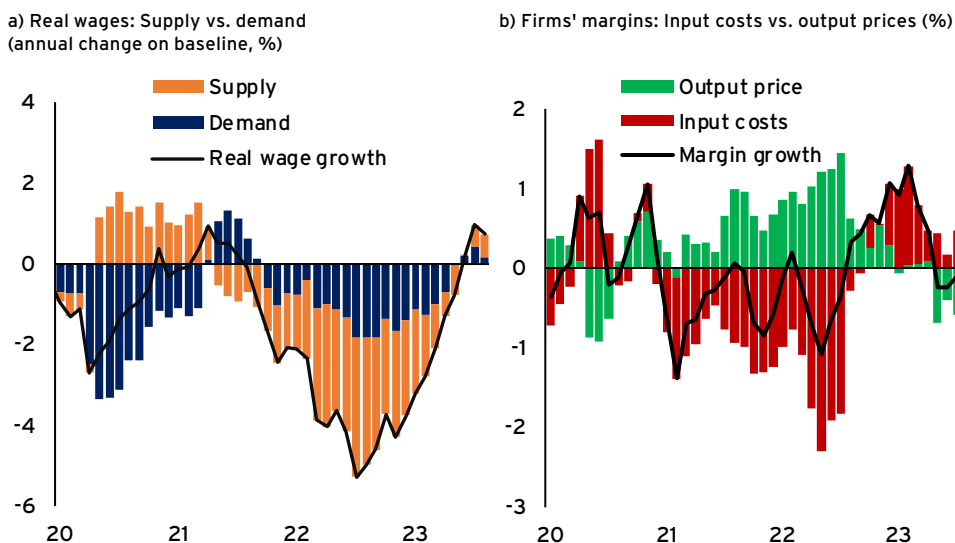


Note: The decompositions are expressed as deviations from zero. Index January 2020 = 0 and cumulated onwards. Values in parentheses show the percentage of the total aggregate covered by electronic payment data.

Source: Carlomagno et al. (2023).

The distinction of supply versus demand on the goods side also has implications for the assessment of cost pressures and profitability at the firm level. Moreover, using aggregate data, it is also possible to assess demand versus supply determinants of the labour market. In Figure 3 one can see three periods. First, as the economy contracted by the middle of 2020, demand for labour fell sharply. This fall in wages was mitigated only partially by lower labour supply driven by lockdowns. Prices fell, but costs fell even more, improving firms' margins initially.

FIGURE 3 LABOUR COSTS AND FIRMS' MARGINS DETERMINANTS



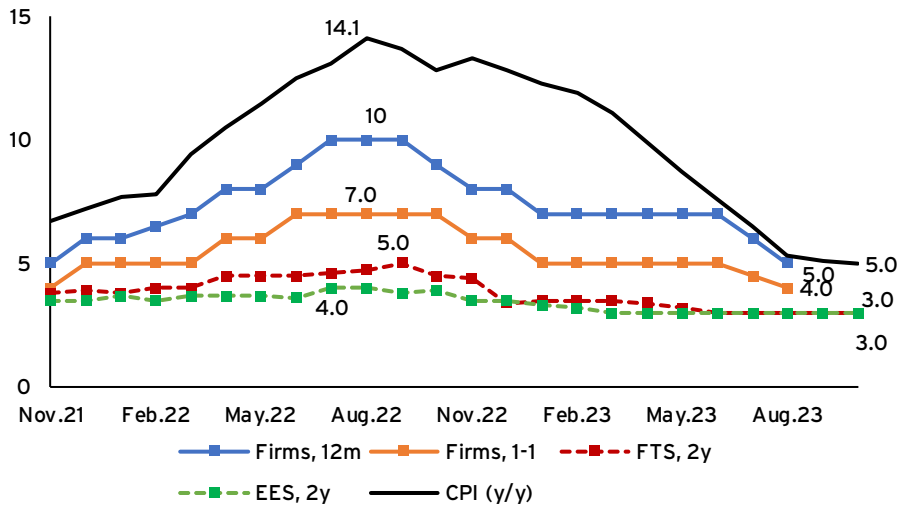
Note: SVAR decomposition based on Brinca et al. (2021). Seasonally adjusted series of real labor cost index (CMO) deflated using CPI and salaried. Baseline corresponds to the wage trend in absence of supply and demand shocks.

Source: Central Bank of Chile; National Statistics Institute.

In the second period, from late 2020 onwards, demand surged fuelled by stimulus. Labour demand recovered and labour supply contracted, probably influenced by fiscal stimulus and the tapping of pension savings. Real wages increased as a consequence. Firms faced sharp cost increases, due both to higher demand and also global supply bottlenecks. Note that these bottlenecks arose both from an increase in demand in advanced economies and from stricter lockdowns in key nodes of the logistics network (Carrière-Swallow et al. 2023). Prices started to increase more markedly, lowering real wages – a standard Neo Keynesian effect from a demand (and supply) shock. Yet, price increases fell short of costs, reducing firms' margins. This is actually a standard Neo Keynesian prediction (Lorenzoni and Werning 2023).

The expectations channel

Alongside the increase in actual inflation, expected inflation also ticked up (Figure 4), including that derived from firm-level data for Chilean firms. Albagli et al. (2022) merge firm-level domestic invoicing and import transactions with firm-level responses in inflation surveys, allowing them to estimate the impact of changes in the cost pressures in actual inflation expectations by firms. Some results are presented in Table 1.

FIGURE 4 INFLATION EXPECTATIONS (ANNUAL CHANGE, %)

Note: Median responses. Firms' expectations from the Survey of Expectations and Price Determinants (EDEP). The Financial Traders Survey (FTS) considers the last survey published in the month. In the months where no survey is published, the latest available one is used. EES corresponds to Economic Expectations Survey.

Source: Central Bank of Chile.

TABLE 1 FIRM-LEVEL PHILLIPS CURVES

	NK PC (1)	Hybrid PC (3)
Lag of inflation expectations	0.989*** (0.362)	0.675** (0.272)
Real marginal costs	0.055*** (0.012)	0.041*** (0.009)
Lagged dependent variable		0.327*** (0.030)
Wald test lag of inflation exp. = 1 (F-test)	0.0	1.4
Firms	429	429
Observations	10.131	10.131
R-squared	0.208	0.293

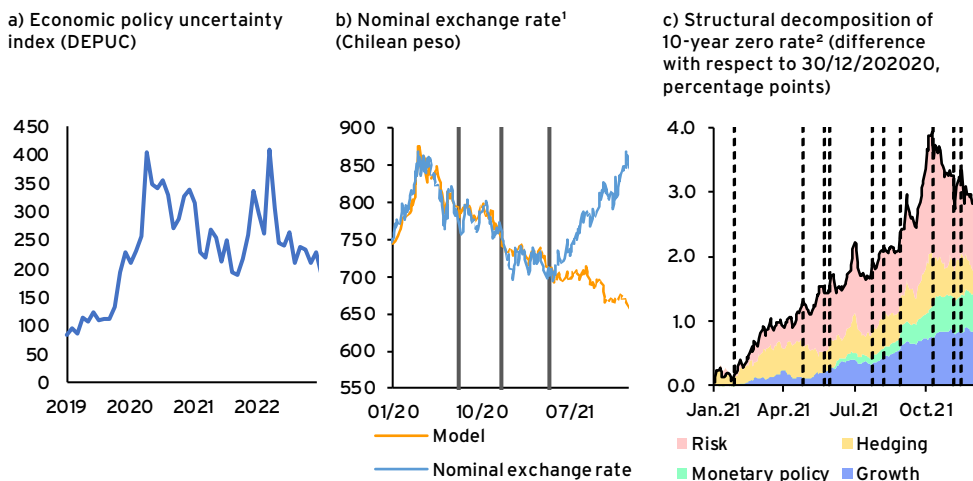
It clearly appears that firms rely on price changes observed along their supply chain to form expectations about aggregate inflation, and end up with a complete pass-through to sales prices. It is found that this is the case even if changes in input costs do not determine the inflation outcome. The peculiar policy implication from these findings is that they tend to reject the full-information rational-expectations hypothesis and are consistent with firms' disagreement about future inflation and inattention to macroeconomic news.

Moreover, the micro-level estimations document that firms' beliefs about inflation are a key determinant of their price-setting decisions, putting a larger onus on the credibility of monetary policy to affect inflation through the expectations channel.

The potential fragility of the expectations channel in ensuring an anchoring of expected inflation around the target could have been at play during 2020-2022. The large macroeconomic imbalances over this period were occurring against a backdrop of significant political tensions that likely added fuel to the fire of higher inflation. The constitutional agenda was hotly debated, and concerns about the medium-term implications for fiscal and financial soundness were raised, even though the central bank chapter in the proposed constitution was not a dramatic departure from the current norms.

The large amounts of pension fund withdrawals played a prominent role beyond their direct impact on aggregate demand and consumption. They also had financial stability implications, as reported in the *Financial Stability Report* of the CBC. In particular, during the discussion of the third (eventually successful) pension fund withdrawal by Congress, perceptions quickly grew that an eventual complete liquidation of private pension fund assets, which initially stood close to 90% of GDP in early 2020, was a serious possibility. This fuelled a sharp increase in the country risk premium, reflected in a sharp increase in long-term rates but also a significant depreciation of the currency of more than 20% throughout 2021, while its traditional determinants (interest rate differentials, copper prices, etc.) were pointing in the other direction (Figure 5).

FIGURE 5 FINANCIAL IMPLICATIONS OF POLICY UNCERTAINTY



Note: (1) Vertical lines from left to right correspond to: 1st pension fund withdrawal (23 July 2020), 2nd withdrawal (3 December 2020), 3rd withdrawal (27 Apr 2021). (2) structural decomposition based on Cieslak & Pang (2021). For more details, see notes in Figure V.10, Box V.1 in MP Report December 2021.

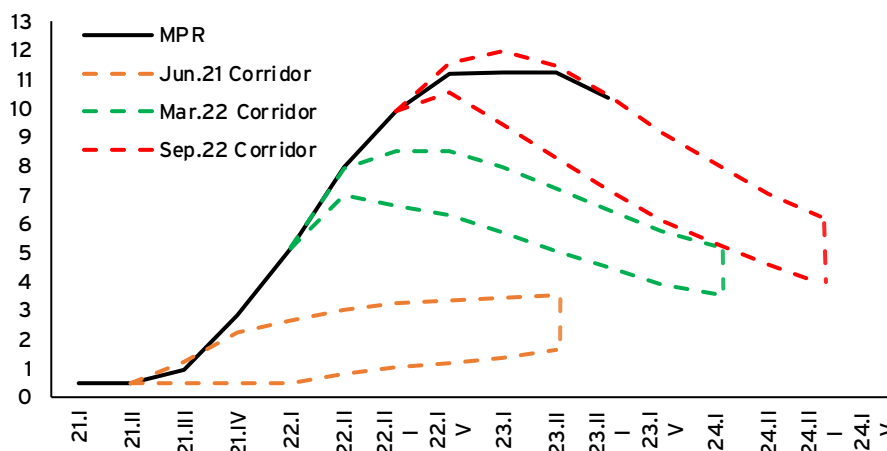
Source: Central Bank of Chile.

In effect, the political and associated economic uncertainty had the effect of reversing the usual correlation between the business cycle and the exchange rate – a currency which appreciates during booms – thus amplifying the inflationary consequences of high demand and a booming economy with a sharp drop in the value of the domestic currency.

THE POLICY RESPONSE

The combination of imbalances between aggregate demand and aggregate supply plus the other idiosyncratic elements at play required a strong policy response to restore macroeconomic equilibrium under a credible medium-term inflation outlook. This was initiated in July 2021, when the CBC started raising interest rates. Over the year and a half when the policy rate was increased on average by close to 100 basis points per meeting, it is possible to distinguish three stages. From July 2021 to March 2022 the policy rate was increased by 25, 75, 125, 125, 150 and 150 basis points, reaching 7.0% right after the outbreak of the war in Ukraine. This early batch of tightening was perceived by the CBC as sufficient to chart a course that would allow smaller increases of the MPR going forward, reaching around 8.5% by mid-2022, and then a gradual decline as inflation receded. Figure 6 shows the ‘monetary policy corridors’, which represent the range of expected paths for monetary policy rates depending on the sensitivity to alternative scenarios to the baseline forecast.

FIGURE 6 MPR CORRIDOR (QUARTERLY AVERAGE, %)



Note: The corridor is constructed following the methodology in Box V.1 in March 2020 MP Report and Box V.3 in March 2022 MP Report

Source: Central Bank of Chile.

Here, it is important to mention that the CBC explicitly communicated that, since the bulk of the inflation problem was demand-driven (amplified by a domestically driven currency depreciation), taming inflation would require the resolution of the large imbalances in activity, and especially private consumption, experienced in 2021. In

other words, the inflation problem – the top priority of household economic worries according to all polls – could and would be resolved, but at the cost of contracting output and aggregate demand. This was explicitly communicated in several *Monetary Policy Reports*. Indeed, since the 2022 *Monetary Policy Report*, medium-term projections for 2023 have systematically predicted an economic contraction.

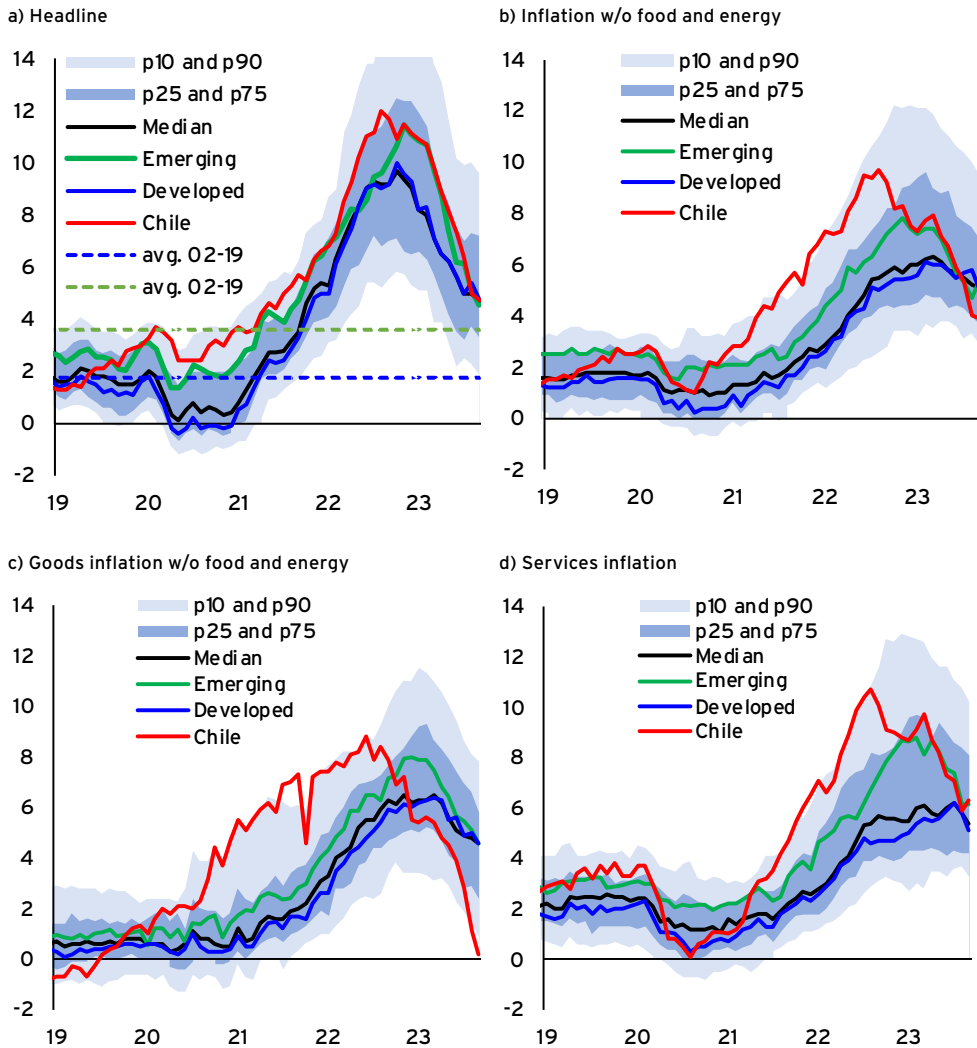
However, the immediate impact of the war on commodity prices and overall uncertainty, the significant resilience that domestic consumption kept showing, and the lingering domestic tensions associated with the constitutional discussions and potential further withdrawals signalled that monetary policy would have to continue tightening. This point should not be underestimated: it is quite likely that the high marginal propensity to consume the large liquidity disbursements received by households could have been due to the perception that more measures were still on the way. The immediate inflation prints kept surprising on the upside, and expected inflation remains well above the inflation target. A second stage of tightening then proceeded with increases of 125, 75, 75, 100 and 50 basis points between May and October 2022, reaching 11.25%. Moreover, domestic political uncertainty reached a peak before the September constitutional plebiscite, actually leading the CBC to intervene in the foreign exchange market (García 2022).

At that stage, the CBC deemed that a sufficiently tight monetary policy stance had been achieved. This was apparent, for instance, by the fact that the yield curve had inverted significantly through the monetary policy increases in this second stage, and that even with elevated inflation expectations, ex-ante real rates were clearly in highly contractionary territory. Although it was arguable whether an MPR slightly above or slightly below 11.25% could be warranted, the Board of the CBC decided to communicate that in this third stage, the precise calibration of the extent of tightening necessary to bring inflation down would be through the extent of time that policy remained at 11.25%. An easing cycle would only commence if the process of disinflation was deemed to be sufficiently consolidated.

The strong disinflation observed not only in overall CPI but also in core inflation convinced the Board that that point was reached roughly by mid-2023, and since July the CBC has undertaken a sequence of reductions of the monetary policy rate, bringing it down to 8.25% by early 2024. Here, it is worthwhile mentioning that the reduction in core inflation has not only occurred in goods, as in many other countries, but also in services, which is at odds with the recent evolution of inflation elsewhere (see Figure 7) but is consistent with an economy that has resolved its large imbalances, together with the corresponding weaker labour market.

Expectations are that this process should continue, at a pace that is determined by the overall process of rebalancing of the global and domestic economy.

FIGURE 7 WORLD INFLATION (ANNUAL CHANGE, %)



Note: Harmonised CPI (HICP) of 57 economies; see Bajraj et al. (2023).

Source: Central Bank of Chile.

Complementary policies

The cycle of monetary policy tightening was the key policy tool through which the inflation cycle was turned. A number of other policies were also active during this time, but their impact on the disinflation strategy was not direct. Rather, monetary policy decisions took these other aspects of the policy mix and the economic environment as given, and the policies were not aimed specifically at substituting monetary policy actions.

The first one of these was, of course, fiscal policy. The implementation of quasi-universal transfers during 2021, leading to a structural deficit of 10.8% of GDP at a time when the economy was already on the upswing and had recovered all the slack created by the pandemic recession, was clearly ill-timed and exacerbated the macroeconomic imbalances. The budget proposed and implemented in 2022 completely reversed this situation, as the balance turned to a modest surplus in that year and the path of public debt was sharply moderated. The fact that this occurred without major political tensions reflected that the recognition of the need for stable public finances was shared across the political spectrum.

The second policy was the unwinding of the unconventional policy measures. This was implemented through a number of channels. On the one hand, the liquidity facilities for banks deployed in 2020 were term-limited at a very low rate for banks, and they could use their own loan book exceptionally as collateral. Given that, by 2024, most of these facilities would be coming due, the CBC announced in advance a programme of mandatory replacement of these exceptional collaterals with standard ones. On the other hand, the CBC announced that the returns on those assets purchased during 2020 and 2021 would not be reinvested, therefore allowing for a gradual winding down of those balances. The potential contractionary effects of these measures could be mitigated by the fact that they were announced well in advance, and thus any macro-relevant effects could be managed through the pace of monetary policy tightening. A similar approach applied to the implementation of the countercyclical capital buffer in early 2023 and the continued convergence to Basel III standards by 2025.

The third policy was foreign exchange intervention measures. The need to apply large FX liquidity injections right before the pandemic – due to the social unrest episode of late 2019 – and then again during 2022 meant that reserves needed to be reaccumulated in the interim periods. The higher frequency of FX measures during this period posed a challenge for the communication of monetary policy. The CBC had to clearly and frequently state that, in a floating exchange rate regime, exceptional FX measures are associated with the need to have sufficient liquidity for times of need and are not geared towards an exchange rate objective or towards substituting for monetary policy.

Finally, the large decrease in risk premia after the rejection of the draft constitution in September 2022 probably played a role in reducing uncertainty and financial volatility, thus indirectly combining with monetary policy in restoring macroeconomic balances. The facts that the MPR reached its high level around the same time, and that inflation expectations commenced a steady but continuous reduction towards target by the end of 2022, are suggestive of this relationship between the overall tone of financial markets and the success of monetary policy in re-anchoring inflation expectations.

SOME LESSONS FOR THE FUTURE

The inflationary and disinflationary episode in Chile during 2020 to 2024 leaves us with three lessons for the future. First, the fact that inflation ended up being a transitory phenomenon does not imply that inflation cycles per se are transitory. The shocks that initiate inflation could well be transitory, but the propagation of these shocks to the underlying tendencies and to inflation expectations is closely linked to how central banks and monetary policy respond to them. A passive approach, hoping that inflation will ‘just go away’ because the shock that sparked it is transient, is a very dangerous strategy. Figure 7 shows that inflation in Chile, though it increased more, faster and earlier compared to the rest of the world, has come down swiftly, particularly in the core metrics. Services inflation broke the trend of acceleration earlier than in the rest of the world.

Second, and related to the above, the observation that inflation is a global phenomenon does not mean that domestic policies do not have a bearing on resolving the problem. The shocks that triggered the inflation surge worldwide were clearly of a global nature, but as mentioned above, they had an important excess demand component, and very much so in the case of Chile. Moreover, even if such shocks were transitory – a hypothesis with fewer and fewer proponents in retrospect – the propagation of the inflation process to expectations, underlying inflation and wages resulted from the extent to which domestic imbalances allowed these shocks to contaminate the price-setting process.

Third, the standard benchmark for understanding inflation – in terms of supply and demand balances – coupled with the appropriate assessment of specific cost pressures and the role of expectations remains a relevant tool for guiding policy. It is true that the lack of traction of unconventional monetary policies in the aftermath of the Great Financial Crisis sparked a debate on the ability of monetary policy to prevent the zero lower bound and other maladies. The experience of the pandemic inflation is suggestive that aggregate demand expansion does end up having the expected inflationary consequence. Maybe one answer to this debate is that monetary policy, under conditions of structural financial weakness, is a much less potent tool than fiscal policy. In that sense, the tenets of the standard Neo Keynesian approach to aggregate demand management do not seem to have been seriously compromised. At least in the case of the CBC, the fact that activity, aggregate demand and inflation have evolved roughly in line with our main Neo Keynesian structural projections model since the tightening started is interpreted as a validation of our forecasting processes and tools – significantly enhanced with rich, new datasets. In short, the Phillips curve could well have flattened but, to paraphrase Mark Twain, reports of its demise were greatly exaggerated.

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ANNEX: TIMELINE OF EVENTS, 2021 TO 2023

Date	Monetary policy	FX interventions/ programmes	Non-conventional policy	Financial policy	Fiscal policy
7-Jan-21			Coupons reinvestment in the maintenance of the stock of bank bonds		
13-Jan-21		Announcement of International Reserve Replacement and Expansion (+RRII) program (MMUSD10,000)			
27-Jan-21			FCIC 3		Enactment of the Law of Fogape-Reactiva program
27-Jan-21	MPR: Rate unchanged at 0.50%				
30-Mar-21	MPR: Rate unchanged at 0.50%				
5-Apr-21					Enactment of the Law for the strengthening of the Social Protection Network
27-Apr-21					Publication of the Public Finance Report for the 1st quarter of 2021.
13-May-21	MPR: Rate unchanged at 0.50%				
5-Jun-21					Approval of the universal Emergency Family Income (IFE)

Date	Monetary policy	FX interventions/ programmes	Non-conventional policy	Financial policy	Fiscal policy
8-Jun-21	MPR: Rate unchanged at 0.50%				Enactment of the Law for economic relief aimed at micro and medium sized enterprises through liquidity injection
12-Jul-21					Publication of the Public Finance Report for the 2nd quarter of 2021.
14-Jul-21	MPR: Change in rate to 0.75% (+25bp)				
10-Aug-21					Extension of IFE for two more months and creation of new employment subsidy (Employment IFE).
31-Aug-21	MPR: Change in rate to 1.50% (+75bp)				
15-Sep-21				CBCCh publishes document to implement CCyB	
28-Sep-21					Publication of the Public Finance Report for the 3rd quarter of 2021
13-Oct-21		Suspension of the +RRII programme (reached 7,440 MMUSD)			
13-Oct-21	MPR: Change in rate to 2.75% (+125bp)				

Date	Monetary policy	FX interventions/ programmes	Non-conventional policy	Financial policy	Fiscal policy
22-Nov-21					Approval of the 2022 Budget Law (US\$ 82,135 millions)
14-Dec-21	MPR: Change in rate to 4.00% (+125bp)				
26-Jan-22	MPR: Change in rate to 5.50% (+150bp)				Approval of the Universal Guaranteed Pension (PGU)
11-Feb-22					Publication of the Public Finance Report for the 4th quarter of 2021.
23-Mar-22					Approval of bill that modifies the Fuel Price Stabilization Mechanism (Mepco) after oil price increases caused by war in Ukraine.
29-Mar-22	MPR: Change in rate to 7.00% (+150bp)				
3-May-22					Publication of the Public Finance Report for the 1st quarter of 2022.
5-May-22	MPR: Change in rate to 8.25% (+125bp)				
11-May-22					Approval of the initiative to expand resources for the Petroleum Price Stabilization Fund (FEPP)
17-May-22				FPM: Non-activation of CCyB	

Date	Monetary policy	FX interventions/ programmes	Non-conventional policy	Financial policy	Fiscal policy
18-May-22					Approval of the minimum wage adjustment and new instruments to support micro, small and medium sized enterprises and the protected basic basket.
7-Jun-22	MPR: Change in rate to 9.00% (+75bp)				
8-Jun-22					Approval of the bill to add US\$3 billion to the Fuel Price Stabilization Mechanism (Mepco).
11-Jul-22		Verbal Intervention			
12-Jul-22					Publication of the Public Finance Report for the 2nd quarter of 2022.
13-Jul-22	MPR: Change in rate to 9.75% (+75bp)				
14-Jul-22		FX Spot Foreign Exchange Intervention Announcement (MMUSD 10,000) FX NDF Intervention Announcement (MMUSD 10,000) FX Swap Announcement (MMUSD 5,000)			

Date	Monetary policy	FX interventions/ programmes	Non-conventional policy	Financial policy	Fiscal policy
20-Jul-22					Approval of Chile Support winter subsidy, extension of Employment IFE, among others.
6-Sep-22	MPR: Change in rate to 10.75% (+100bp)				
26-Sep-22		Suspension of FX spot, FX Swap and REPO operations. NDF remains in effect (MMUSD 9,910)	Suspension of FX spot, FX Swap and REPO operations. NDF remains in effect		
5-Oct-22					Publication of the Public Finance Report for the 3rd quarter of 2022.
12-Oct-22	MPR: Change in rate to 11.25% (+50bp)				
19-Oct-22					Approval of Fogape Chile Support aimed to provide financial support to small and medium sized enterprises
2-Nov-22			Central Bank Reports Adjustments in Financial Operations FCIC: Standardization Program for Eligible Collateral (1/18)		
8-Nov-22				FPM: Non-activation of CCyB	
29-Nov-22					Approval of the 2023 Budget Law (US\$81,599 millions)

Date	Monetary policy	FX interventions/ programmes	Non-conventional policy	Financial policy	Fiscal policy
6-Dec-22	MPR: Rate unchanged in 11.25%				
27-Dec-22		NDF Renewal Announcement			
18-Jan-23					Approval of the bill that expands universe of beneficiaries of the Universal Guaranteed Pension (PGU)
19-Jan-23					Approval of the initiative that modifies the Fuel Price Stabilization Mechanism (Mepco), so that its price adjustments are made every three weeks
26-Jan-23	MPR: Rate unchanged in 11.25%				Approval of Fogaes program to support families in obtaining a mortgage loan and the construction sector
16-Feb-23					Publication of the Public Finance Report for the 4th quarter of 2022
23-Mar-23					Enactment of the Law on Economic Security Measures (March Subsidy, Family Subsidy, among others)
4-Apr-23	MPR: Rate unchanged in 11.25%				

Date	Monetary policy	FX interventions/ programmes	Non-conventional policy	Financial policy	Fiscal policy
21-Apr-23		NDF Unwind Announcement (10% pace)			
10-May-23					Publication of the Public Finance Report for the 1st quarter of 2023
12-May-23	MPR: Rate unchanged in 11.25%				
23-May-23				FPM: Activation of CCyB at 0.5% of RWA	
31-May-23					Enactment of the Law of minimum wage adjustment and support to micro, small and medium sized enterprises
9-Jun-23		Announcement of International Reserve Replacement and Expansion (+RRII) program (MMUSD10,000)			
19-Jun-23	MPR: Rate unchanged in 11.25%				
12-Jul-23					Publication of the Public Finance Report for the 2nd quarter of 2023
28-Jul-23	MPR: Change in rate to 10.25% (-100bp)				
5-Sep-23	MPR: Change in rate to 9.50% (-75bp)				

Date	Monetary policy	FX interventions/ programmes	Non-conventional policy	Financial policy	Fiscal policy
26-Sep-23			Central Bank Reports Adjustments in Financial Operations FCIC: Implement a Liquidity Deposit (DL) Issuance Program		
3-Oct-23					Publication of the Public Finance Report for the 3rd quarter of 2023
26-Oct-23		Suspension of the +RRII programme (reached 3,680 MMUSD)			
26-Oct-23	MPR: Change in rate to 9.00% (-50bp)				
7-Nov-23				FPM: CCyB unchanged at 0.5% of RWA	

CHAPTER 10

Quelling the post-pandemic inflation surge: The Indian experience

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Michael Debabrata Patra and Binod B Bhoi¹

Reserve Bank of India

1 INTRODUCTION

Under the onslaught of the once-in-a-century COVID-19 pandemic, India suffered one of the deepest contractions in the world in April–June 2020, when real GDP shrank by 23.4%. With the enforcement of social distancing norms amidst a nationwide lockdown, logistical disruptions broke supply chains, resulting in a sharp decline in fixed investment, private consumption and exports. On the supply side, a mass migration of labourers from cities into the hinterland to escape the pandemic led to a steep fall in manufacturing and construction activity, while trade and transportation plummeted well below their pre-pandemic levels. The unemployment rate reached 24% in April 2020. Exports plunged 61% in April, with a commensurate decline in imports.

In response, the Reserve Bank of India (RBI) undertook a panoply of conventional and unconventional measures to (i) improve policy transmission; (ii) facilitate and incentivise credit flows from banks and other regulated institutions; (iii) ease liquidity constraints in specific sectors; (iv) rejuvenate markets by reducing financial stress; and (v) maintain financial stability.²

A wan recovery commenced towards the close of 2020 as the first wave of COVID infections ebbed, only to be interrupted by a second wave in early 2021 and a third wave towards the year's close. By July–September 2021, however, signs of stabilisation became evident as the level of GDP returned to its pre-pandemic level, though weighed by downside risks. During the pandemic, the price collection mechanism became non-functional and inflation had to be imputed by the National Statistical Office (NSO) for purposes of business continuity. Official data when released for June 2020 indicated a surge in inflation to 6.2%. Inflationary pressures got accentuated thereafter, with headline inflation remaining above the upper tolerance threshold of 6%³ up to November

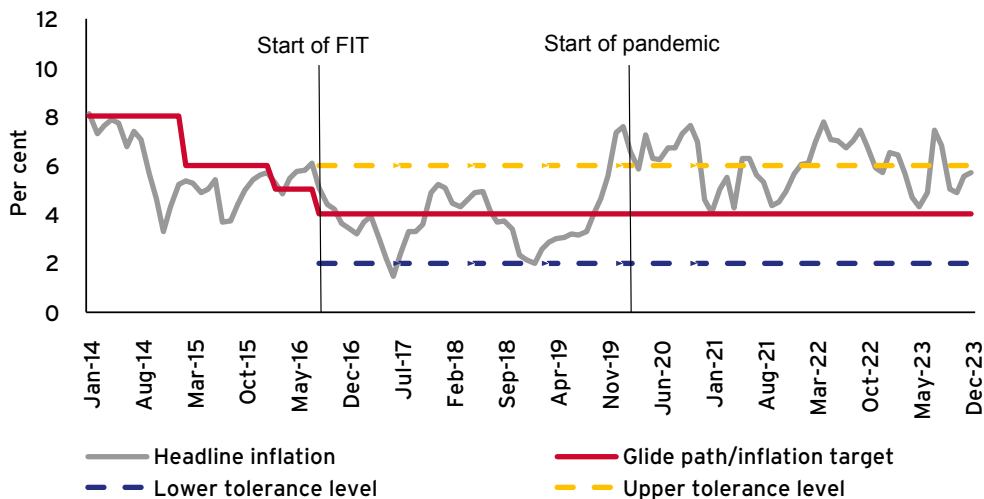
1 The views expressed in this chapter are those of the authors and not of the institution to which they belong. All other usual disclaimers apply. The authors thank Indranil Bhattacharyya, Snehal S Herwadkar and Vineet Kumar Srivastava for their assistance.

2 See Patra and Bhattacharyya (2022) for a comprehensive review of pandemic time monetary policy interventions by RBI and an assessment of their impact on key macroeconomic and financial variables.

3 In India, under the flexible inflation targeting (FIT) framework instituted in 2016, the target for headline inflation is 4% with a tolerance band of +/- 2% around it.

2020 before fleetingly easing during December 2020–April 2021 (Figure 1). With the onset of the second wave of infections, inflation rose again and breached the upper tolerance level again in May–June 2021. By September, it subsided to 4.3% before being propelled upwards by climatic vagaries to 5% during October–December 2021.

FIGURE 1 HEADLINE INFLATION AND INFLATION TARGET



Source: National Statistical Office (NSO), Government of India (Gol) and authors' calculations.

Thus, on the eve of the war in Ukraine, a tenuous normalisation was setting in, with growth in positive territory and inflation within the tolerance band, albeit interrupted by intermittent spikes. From October 2021, the RBI ceased its pandemic operations and regulatory forbearance. It also engaged in a gradual rebalancing of the liquidity overhang created by conventional and unconventional measures.

The outbreak of geopolitical hostilities drastically altered this uneasy balance. In particular, inflation veered away from its target under the impact of multiple and overlapping food and energy shocks. By April 2022, inflation touched a peak of 7.8%.

Against this backdrop, the RBI stepped up the unwinding of pandemic stimulus. This was greatly enabled by their design features, as the next section will set out. This provided a launching pad for an all-out anti-inflationary policy response. The rest of this chapter is divided into three sections. The rationale and sequencing of policy normalisation and shift to a restrictive policy stance to contain the post-war inflation surge are addressed in Section 2. Aspects of monetary-fiscal coordination in holding down inflationary pressures is the subject of Section 3. Section 4 concludes by drawing lessons from this experience and providing some perspectives on the path ahead.

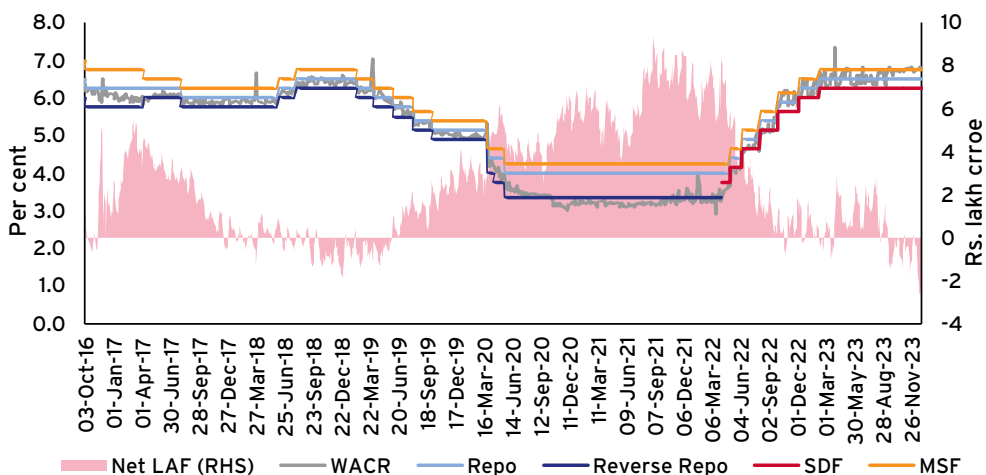
2 SEQUENCING THE NORMALISATION OF THE PANDEMIC RESPONSE

Anticipating that the inflation cycle was about to turn up, the RBI embarked on a gradual rebalancing of liquidity in the second half of 2021, as stated earlier. The withdrawal of liquidity commenced through variable rate reverse repo (VRRR) operations (with progressively enhanced size of auctions), which pulled up the uncollateralised overnight money market rate or the weighted average call rate (WACR) – the operating target of monetary policy – from its pandemic lows.

Restoring the liquidity management framework

Recognising that the prolonged ultra-low levels to which money market rates had been reduced during the pandemic may lull the financial system into a state of complacency that could lead to mispricing and financial stability risks, the liquidity management framework instituted in February 2020 (which was suspended during the pandemic into a *de facto* floor system) was reinstated in steps from mid-January 2021 (Figure 2). This consisted of (i) reintroducing the 14-day variable rate repo/reverse repo auction as the main liquidity management tool, alongside fine-tuning operation of shorter and longer maturities; (ii) replacing the collateralised overnight fixed reverse repo rate with an uncollateralised standing deposit facility (SDF) as the floor of the liquidity adjustment facility (LAF) corridor in April 2022; (ii) restoring symmetry to the LAF corridor by setting it at +/- 25 basis points around the policy rate (during the pandemic, it had been widened to 90 basis points by reducing the floor rate to 65 basis points below the policy rate) in April 2022; and (iv) restoring the drawdown limit under the marginal standing facility (MSF) – the ceiling of the LAF corridor – to its pre-pandemic level of 2.0% of net demand and time liabilities (NDTL), effective January 2022.

FIGURE 2 POLICY CORRIDOR AND LIQUIDITY



Note: A positive net LAF indicates surplus liquidity/liquidity absorption and a negative net LAF indicates deficit liquidity/liquidity injection.

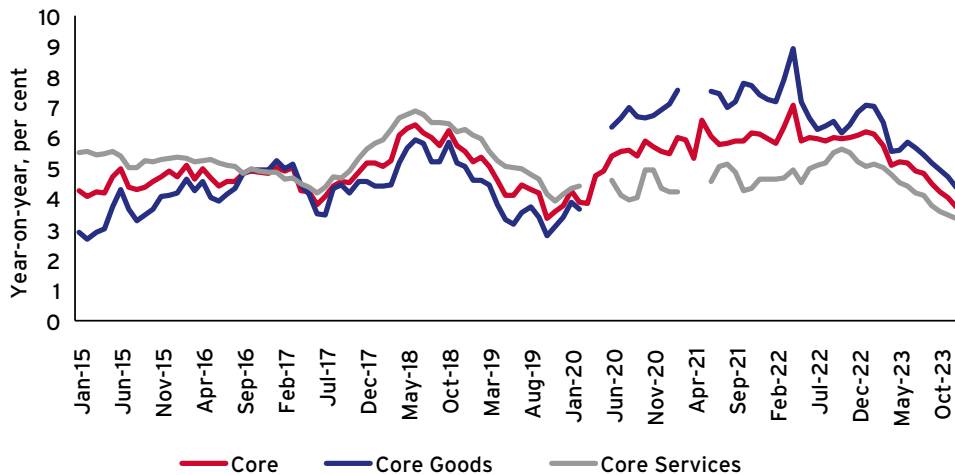
Source: Reserve Bank of India and authors' calculations.

As a part of liquidity rebalancing, the cash reserve ratio (CRR), which was reduced to 3.0% during the pandemic, was restored in two phases to its pre-pandemic level of 4.0% by May 2021. Subsequently, the CRR was increased by 50 basis points to 4.5%, effective from the fortnight beginning 21 May 2022 to impound liquidity in a durable manner. It was kept unchanged thereafter (Annex 1).

Monetary policy: Withdrawal of accommodation

The gradual withdrawal of liquidity that commenced from January 2021, through the reintroduction of VRRR, had effectively started the tightening of monetary policy by raising money market rates by 25 basis points by March 2022. It was to set the stage for a front-loaded orthodox monetary policy response to inflationary pressures. In its scheduled meeting in April 2022, the Monetary Policy Committee (MPC) shifted the stance of policy from “accommodative” to “withdrawal of accommodation”. In an unscheduled off-cycle meeting in May 2022, the MPC raised the policy rate by 40 basis points to 4.40%, seeing that risks to the near-term inflation outlook were rapidly materialising and warranting resolute and calibrated steps to anchor inflation expectations and contain second round effects. The MPC further noted that inflationary pressures are broadening across the world and that core inflation (i.e. CPI excluding food and fuel) in India will likely remain elevated in the near term (Figure 3). This was followed by rate hikes of varying sizes in the five subsequent meetings till February 2023, resulting in a cumulative increase of 250 basis points during May 2022–February 2023 that took the policy rate to 6.50%.

FIGURE 3 CORE INFLATION



Note: Core inflation is defined as CPI excluding food and fuel.

Source: NSO, GoI and authors' calculations.

Unwinding of unconventional measures

The World Health Organization (WHO) declaration of COVID-19 as a pandemic had triggered panic in India. Domestic financial markets plunged into a state of seizure, with liquidity drying up amidst extreme risk aversion and heightened volatility. Consequently, the flow of financial resources – the lifeline of the economy – choked up and economic activity came to a grinding halt. The RBI had announced liquidity support of around 8.7% of GDP (Table 1) through both conventional and unconventional measures to ensure adequate liquidity in the system, stimulate the economy, and maintain financial stability.

TABLE 1 LIQUIDITY MEASURES DURING THE PANDEMIC, 6 FEBRUARY 2020 TO 31 MARCH 2022 (AMOUNTS IN TENS OF MILLIONS OF RUPEES)

Measures	Start date	Announced	Availed	End date
LTRO	17-Feb-20	2,00,000	125,117	17-Mar-23
Variable rate repo	23-Mar-20	225,000	90,017	06-Apr-21
SLF for PDs	24-Mar-20	7,200	6,000*	17-Apr-20
CRR cut	28-Mar-20	137,000	137,000	21-May-21
MSF (dip by additional 1% in SLR)	27-Mar-20	137,000	-	31-Dec-21
TLTRO	27-Mar-20	1,00,000	100,050	13-Apr-23
TLTRO (2.0)	23-Apr-20	50,000	12,850	21-Apr-23
Net OMO purchases + G-SAPs (1.0 and 2.0)	-	370,000	570,250	-
Special Liquidity Facility for Mutual Funds	27-Apr-20	50,000	2,430	11-May-20
Refinance to NABARD, SIDBI & NHB and EXIM Bank	17-Apr-20	141,000	129,802*	31-Mar-23
Special liquidity scheme for NBFCs	01-Jul-20	30,000	7,126	30-Sep-20
56-day term repo	11-Sep-20	1,00,000	1,000	06-Nov-20
On Tap TLTRO	21-Oct-20	1,00,000	9,045	26-Dec-24 (Maturity)
SLTRO for small finance banks	05-May-21	10,000	3,055	26-Dec-24 (Maturity)
On tap liquidity for Emergency Health Services	05-May-21	50,000	-	30-Jun-22
On-tap Liquidity Window for Contact-intensive sectors	04-06-2021	15,000	-	30-Jun-22
Total		1,722,200	1,193,742	
As per cent of Nominal GDP for 2020-21		8.7	6.0	

Note: *Maximum during the period. GSAP: Government securities acquisition programme in the secondary market. G-SAP 1.0 was announced in April 2021 and G-SAP 2.0 in June 2021. Under G-SAP, RBI purchased both liquid and illiquid securities across the maturity spectrum.

Source: Reserve Bank of India; Adapted from Patra and Bhattacharyya (2022).

An important aspect of the unconventional measures undertaken by the RBI is that each measure had been issued with a pre-specified sunset date. Accordingly, they were allowed to mature on due dates without disrupting financial markets or unhinging market expectations. Banks were also encouraged to benefit from the benign interest rate environment by prematurely returning the funds availed even ahead of their end-dates at their volition.

The process of normalisation began by the RBI ceasing from October 2021 its asset purchase operations – GSAP 1.0 and GSAP 2.0 (Table 1). During the pandemic, these operations had consisted of purchases of government securities in the secondary market on the rationale that the orderly evolution of the yield curve is a public good in such unprecedented times, the benefits of which accrue to all stakeholders in the economy. The GSAP operations were instrumental in keeping overall borrowing costs and spreads in the economy low during the pandemic as yields on government securities are benchmarks for bond markets (Figure 4).

FIGURE 4 MOVEMENT IN 10-YEAR G-SEC YIELD



Source: Reserve Bank of India.

In the next stage, the other unconventional measures were allowed to lapse. These consisted of long-term repo operations (LTROs); targeted long term repo operations (TLTROs) and on-tap TLTROs aimed at specific sectors;⁴ a liquidity window for mutual funds; and a special liquidity scheme (SLS) operationalised through a special purpose vehicle to improve the liquidity position of non-banking financial companies (NBFCs) and housing finance companies (HFCs).

4 In October 2020, the scheme was announced covering five sectors - agriculture, agri-infrastructure, secured retail, MSMEs, and drugs, pharmaceuticals and health care. In December 2020, 26 sub-sectors were brought within its ambit.

A notable feature of India's pandemic response was the special liquidity support provided by the Reserve Bank to apex refinancing institutions in the face of acute risk aversion among banks to on-lend central bank liquidity to pandemic affected entities. These lines of credit were channelled to more than 500 financial intermediaries/entities (as of 31 March 2022), including co-operative banks, regional rural banks (RRBs), housing finance companies (HFCs), microfinance institutions (MFIs) and small finance banks (SFBs). In normal times, the Reserve Bank abstains from the use of sector-specific lending facilities, but the usage of refinance during the pandemic times served well in meeting the funding needs of targeted entities. These facilities were terminated on various dates, the last one being in March 2023.

Withdrawal of regulatory forbearance

Pre-emptive regulatory measures were announced to provide relief to the borrowers in the form of moratorium on loan repayments. This was followed by a Resolution Framework 1.0 introduced in August 2020 to enable resolution of viable accounts of individuals and corporates, including micro, small and medium enterprises (MSMEs), impacted by COVID-19 while classifying such exposures as standard assets. Loan-to-value ratios for loans against gold ornaments and jewellery was increased from 75% to 90%. Risk weights on individual housing loans were rationalised.

In May 2021, the RBI had announced measures to allay difficulties in loan servicing under its Resolution Framework 2.0, which allowed restructuring of loans taken by individuals, small businesses and MSMEs with an exposure cap. Fresh lending to MSMEs (up to a specified limit) was allowed an equivalent exemption from the CRR. Lending by SFBs to MFIs was made eligible for reckoning under directed lending requirements.⁵ Banks were also allowed to utilise 100% of floating provisions/ countercyclical provisioning buffer held by them as at end of 2020 for making specific provisions for non-performing assets (NPAs).

All these measures had sunset clauses in view of financial stability considerations and were phased out at various points in time (Table 2).

5 Priority sector lending.

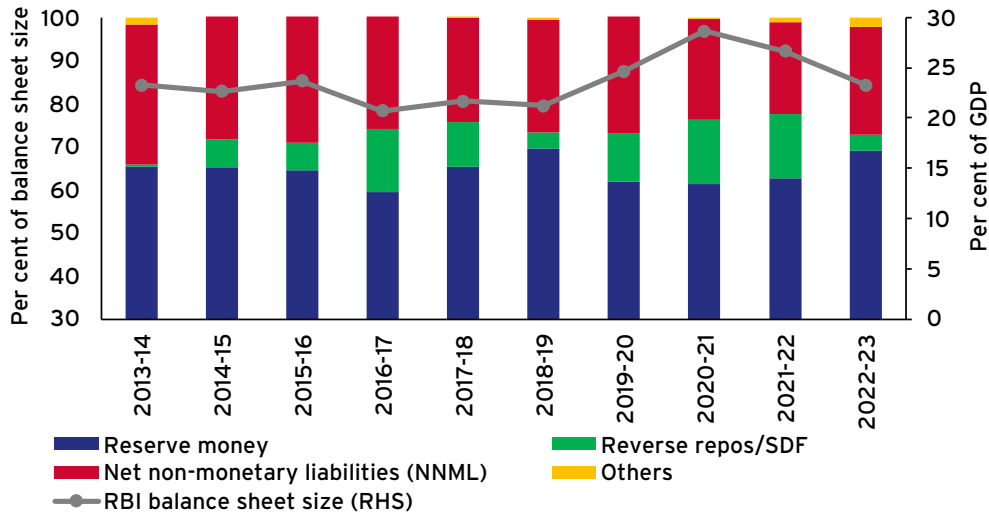
TABLE 2 PANDEMIC REGULATORY POLICIES: IMPLEMENTATION AND SUNSET CLAUSES

Policy	Implementation clauses	Sunset clauses
Loan moratorium	Six-month moratorium on loan instalments for all term loans outstanding as on 1 March 2020, no asset classification downgrade.	Ended on 31 August 2020.
Resolution Framework (RF)	RF 1.0 - corporate borrowers and personal loans. RF 2.0 - loans not been restructured under RF 1.0, and MSMEs, small businesses and personal loans.	RF 1.0 had to be invoked by 31 December 2020. Had time till 30 September 2022 to achieve the operational parameters. RF 2.0 had to be invoked by 30 September 2021. The resolution plan had to be implemented within 90 days from the date of invocation.
Capital conservation buffer (CCB) and net stable funding ratio (NSFR)	NSFR guidelines and last tranche of 0.625% of CCB deferred.	Implemented with effect from 1 October 2021.
Loan-to value (LTV) ratio for loans	On 6 August 2020, LTV ratio was temporarily increased from 75% to 90% for loans against gold ornaments and jewellery for non-agricultural end-uses.	Available till 31 March 2021.
Risk weights on housing loans	Risk weights for all new individual housing loans sanctioned between 16 October 2020 and 31 March 2022 were rationalised, irrespective of amount.	Available till 31 March 2022.
Exemption on MSME loans	On 5 February 2021, banks were allowed to deduct the amount equivalent to credit disbursed to new MSME borrowers up to Rs. 2.5 million per borrower from their NDTL for calculation of CRR.	Available till 31 December 2021.
Loans by small finance banks (SFBs) to micro-finance institutions (MFIs)	On 5 May 2021, priority sector lending (PSL) classification was permitted to fresh credit extended by SFBs to eligible MFIs.	Valid up to 31 March 2022.
Provisions for NPAs	On 5 May 2021, banks were permitted to utilise 100% of floating provisions/ countercyclical provisioning buffers held by them as on 31 December 2020 for making specific provisions for NPAs.	Permitted up to 31 March 2022.

Source: Reserve Bank of India.

With the calibrated withdrawal of liquidity in the post-COVID period, the balance sheet size of the Reserve Bank was also shrunk from 28.6% of GDP in 2020-21 to 23.3% of GDP in 2022-23,⁶ i.e. close to its pre-pandemic level. Notably, it was ensured that realised capital buffers prescribed under the RBI's economic capital framework were maintained through the pandemic and subsequent years (Figure 5).

FIGURE 5 RESERVE BANK'S BALANCE SHEET (LIABILITY-SIDE COMPONENTS)



Note: NNML: Net non-monetary liabilities comprise economic capital, RBI employee provident fund account, IMF quota subscriptions and other payments minus other assets.

Source: Reserve Bank of India and authors' calculations.

3 MONETARY-FISCAL COORDINATION FOR MANAGING INFLATION

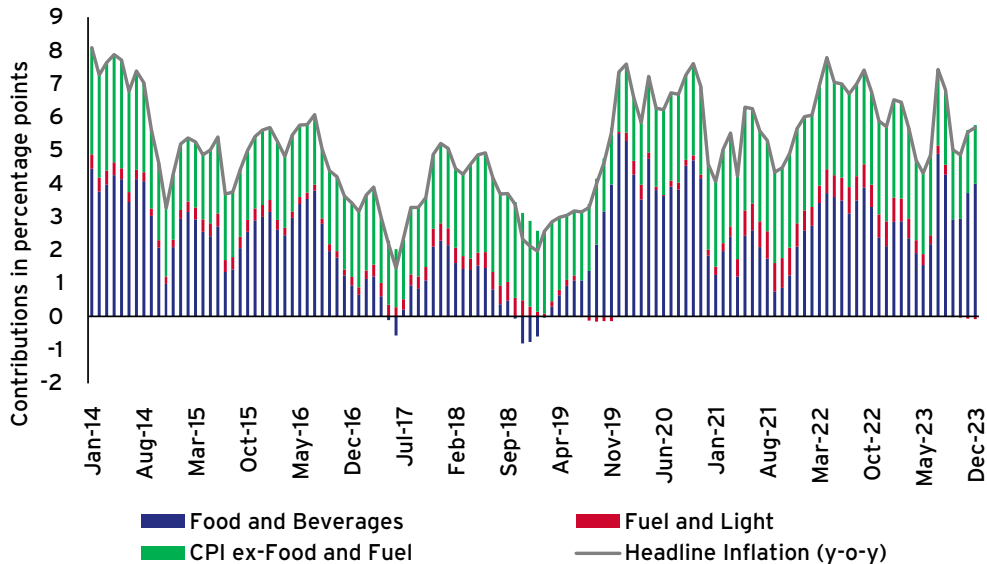
In India, food inflation and its volatility impinge on the trajectory of headline inflation, given the high weight of food (45.9%) in the CPI basket. During the pandemic and exacerbated by the war in Ukraine, there have been many food price spikes affecting headline inflation (Figure 6). Price pressures were especially seen in cereals, pulses, edible oils and vegetables due to both domestic weather disturbances and volatility in international food prices on account of supply chain disruptions.

In order to contain their inflationary consequences, temporary supply management measures were undertaken almost continuously (Annex 2). These measures included allowing free imports or reductions in import duties, restricting exports, increasing export duties, applying minimum export prices, prescribing stockholding limits on traders, wholesalers and retailers, as well as building buffer stocks and releasing from the buffer stocks in a timely manner to augment domestic availability and stabilise prices

⁶ For linkage between balance sheet size and inflation, please see Pattanaik et al. (2022).

of key inflation-sensitive food items. At the same time, the government had also cut the excise duties on petrol and diesel prices in phases during 2021 and 2022 to contain the pass-through of rising international crude prices to domestic inflation. The targeted supply-side interventions by the government have helped in addressing idiosyncratic food price pressures and provided monetary policy the necessary flexibility to sequence its normalisation process in line with the evolving inflation-growth dynamics.

FIGURE 6 DRIVERS OF HEADLINE INFLATION (Y-O-Y, PERCENT)



Source: NSO, Gol and authors' calculations.

To sum up, given the overlapping nature of shocks since the pandemic, it was realised early on that effective coordination between monetary and fiscal policy was necessary for managing inflation without undermining growth prospects. Accordingly, while monetary measures focused on normalising pandemic-era excess liquidity and anchoring inflation expectations, fiscal policy focused on containing idiosyncratic price pressures through pro-active supply management. These measures were undertaken without diluting the glidepath of fiscal consolidation to return the size of the fiscal deficit to pre-pandemic levels or impeding the reprioritisation of government expenditure towards infrastructure to ensure macroeconomic stability and expansion of productive capacity.

4 CONCLUSION AND WAY FORWARD

Inflation in India has begun to abate, albeit grudgingly. From September 2023, it has dipped into the tolerance band. Despite headline inflation being in elevated reaches relative to the target, the heartening feature of recent inflation dynamics is that core inflation (i.e. CPI excluding food and fuel) has been on a steady decline for ten months

consecutively and fell below 4% in December 2023. The RBI projects headline inflation to average 4.4% in the second half of 2024. This projected path may be subjected to food price shocks in view of the rising incidence of climate change and geopolitical risks, but the important lesson of experience is that the supply response has been nimble and often pre-emptive. Economic activity shows resilience, with the output gap turning positive and evidence of potential output rising again. The Indian economy is the fastest growing major economy of the world, contributing roughly a sixth of global growth, and is poised to become the world's third largest economy by 2027. The impulses of growth are strengthening in an environment of macroeconomic and financial stability as the next stage of structural reforms is set to begin.

What are the main lessons of India's experience with the great pandemic inflation? First, inflation in India did not rise to the levels seen in many advanced and emerging economies and it peaked earlier than the cross-country experience. While goods inflation reflected pass-through of input costs, services inflation remained subdued, especially due to housing. Second, the pandemic response of liquidity support was time-bound and targeted; consequently, unwinding was smoother. Third, the policy rate was not lowered to the zero lower bound, as in several advanced economies. Instead, it was lowered to the level of the inflation target. Fourth, the inflation targeting regime has in-built framework flexibility that stood India in good stead: a dual mandate that accords primacy to price stability while being cognisant of growth; an inflation target defined as an average rather than as a point; a tolerance band around the target rather than a point target; and achievement of the target over a period of time rather than continuously, with failure defined as three consecutive quarters of inflation lying outside the tolerance band rather than every instance of such deviation. This flexibility allowed the RBI to look through the first-round effects of the incidences of food price shocks, allowing supply management measures to balance supply with demand. Fifth, inflation management in India is a shared responsibility under which the government sets the target and the central bank achieves it. This allowed monetary-fiscal coordination without posing risks to financial stability, fiscal consolidation or growth. In fact, the balance sheet size of the RBI was brought down to its pre-pandemic level by 2022-23, while the public debt to GDP ratio is estimated by the IMF to decline from its peak of 88.5% in 2020 to 80.5% by 2028.⁷ Sixth, forward guidance is extremely useful and, in fact, a tool of monetary policy when interest rates are being lowered. This is because there is a finite limit – zero – to which they can be reduced. On the other hand, when monetary policy is being tightened and interest rates are being raised, the role of forward guidance is not intuitively useful and may even contribute more noise than signal.

7 Source: IMF Fiscal Monitor, October 2023.

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Binod B Bhoi joined the Reserve Bank in 2000 and has worked in diverse areas such as inflation, money and banking, balance of payments, and modelling and forecasting. In between, he had worked at the Monetary Analysis Directorate of the Bank of England during 2011-12 and at the Qatar Central Bank during 2014-17 on deputation. He has published articles in the areas of money and inflation and has contributed to various RBI publications including the Annual Report and the theme-based Report on Currency and Finance. He holds an M. Phil degree in Economics from Jawaharlal Nehru University, New Delhi and he is a Certified Associate of the Indian Institute of Bankers (CAIIB).

ANNEX 1: MAIN POLICY DECISIONS ON MONETARY POLICY NORMALISATION

Date	Policy decision
Monetary policy measures	
5 February 2021	Cash reserve ratio (CRR) to be restored in two phases to its pre-pandemic level of 4% by May 2021 - 3.50% from the reporting fortnight beginning 27 March 2021 and 4.00% from 22 May 2021.
8 April 2022	It was decided to fully restore the liquidity management framework instituted in February 2020, albeit with some refinements to enhance its effectiveness. Accordingly, Standing Deposit Facility (SDF) was introduced at 40 basis points (bps) above the fixed reverse repo rate (FRRR) and replaced the FRRR as floor of the liquidity adjustment facility (LAF) corridor. The SDF rate was placed 25 bps below (then prevailing) repo rate, i.e., 3.75%. Thus, the width of the LAF corridor was restored to the pre-pandemic configuration of 50 basis points, symmetrically around the policy repo rate, which was at the centre of the corridor.
18 April 2022	Restoration of regulated market opening time to the pre-pandemic level of 9:00 AM.
4 May 2022	In an off-cycle meeting, the MPC decided to raise the policy repo rate by 40 basis points to 4.40%. It was announced to increase CRR by 50 bps to 4.5% effective from the fortnight beginning 21 May 2022.
8 June 2022	The MPC decided to raise the policy repo rate by 50 basis points to 4.90%.
5 August 2022	The MPC decided to raise the policy repo rate by 50 basis points to 5.40%.
30 September 2022	The MPC decided to raise the policy repo rate by 50 basis points to 5.90%. The 28-day VRRR auction was merged with the fortnightly 14-day main auction.
7 December 2022	The MPC decided to raise the policy repo rate by 35 basis points to 6.25%. Extension of market timings to 5:00 PM for call/notice/term money, commercial paper, certificates of deposit, repo in corporate bond and rupee interest rate derivatives from 3:30 PM.
8 February 2023	The MPC decided to raise the policy repo rate by 25 basis points to 6.50%. The rate has remained unchanged thereafter. Extension of market timing for government securities to 5:00 PM from 3:30 PM.
Liquidity measures	
15 January 2021	Gradual restoration of pre-pandemic liquidity management framework instituted in February 2020 by reintroducing 14-day variable rate reverse repo (VRRR) as the main liquidity management tool. These operations were subsequently complemented by 28-day VRRRs and fine-tuning operations of three-eight days maturity.
6 August 2021	The 14-day VRRR auctions amount raised to Rs. 2.5 trillion on 13 August 2021; Rs. 3.0 trillion on 27 August 2021; Rs. 3.5 trillion on 9 September 2021; and Rs. 4.0 trillion on 24 September 2021.
October 2021	The secondary market G-sec acquisition programme (G-SAP) operations, which was announced with a view to enable stable and orderly evolution of the yield curve amidst comfortable liquidity conditions, was discontinued.

Date	Policy decision
8 December 2021	<p>In an effort to continue to rebalance the liquidity surplus, it was decided to enhance the 14-day VRRR auction amounts on a fortnightly basis in the following manner: Rs. 6.5 trillion on 17 December and further to Rs. 7.5 trillion on 31 December. Consequently, from January 2022 onwards, liquidity absorption was announced to be undertaken mainly through the auction route.</p> <p>Borrowing limit under the marginal standing facility (MSF) was restored to the pre-pandemic level of 2% of net demand and time liabilities (NDTL) from 3% effective 1 January 2022.</p> <p>As a step towards rebalancing the liquidity surplus, it was decided to provide one more option to banks to prepay the outstanding amount of funds availed under the targeted long-term repo operations (TLTRO 1.0 and 2.0) announced on 27 March 2020 and 17 April 2020, respectively.</p>
31 December 2021	<p>The extension of the on-tap targeted long-term repo operations (TLTRO) scheme announced on 9 October 2020 was limited to 31 December 2021. This is scheduled to end as per maturity in December 2024.</p> <p>Special three-year long-term repo operations (SLTRO) at repo rate for the SFBs, made available till 31 October 2021, was later extended to 31 December 2021 and made on-tap. This is scheduled to end as per maturity in December 2024.</p>
30 June 2022	<p>The on-tap liquidity window of Rs. 50,000 crore for emergency health services with tenors of up to three years at the repo rate instituted in May 2021 was limited to 30 June 2022.</p>
8 December 2022	<p>The enhanced held to maturity (HTM) limit of 23%, including statutory liquidity ratio (SLR) securities acquired up to 31 March 2024, to be restored to 19.5% in a phased manner by 31 March 2025, starting from the quarter ending 30 June 2024.</p>

Source: Reserve Bank of India.

ANNEX 2 SELECT SUPPLY MANAGEMENT MEASURES BY THE GOVERNMENT

Group/ item	Measures
Cereals	<p>Distribution of 5 kg of free food grains per person per month to the poor was announced under Pradhan Mantri Garib Kalyan Anna Yojana (PMGKAY) in March 2020 by the government. On 23 December 2022, the government decided to terminate PMGKAY from 1 January 2023 and at the same time to provide free ration to about 81.35 crore poor under the National Food Security Act (NFSA) for one year i.e. till 31 December 2023. On November 29, 2023, it was further decided to provide free food grains to the PMGKAY beneficiaries for a period of five years with effect from 1 January 2024.</p>
	<p>The central government introduced restrictions on wheat exports since May 2022 and banning of exports of wheat flour from August 2022; Relaxed procurement norms for procurement of wheat due to damages caused by unseasonal rains in April 2023; Imposed stock limits on wheat for Wholesalers/Traders, Retailers, Big Chain Retailers and Processors till 31 March 2024 in June 2023 and subsequently revised the stock limits in September 2023; Allowed uploading of wheat of 15 lakh metric tonne (LMT) under the Open Market Sales Scheme (OMSS) through e-auctions in June 2023, which was increased to 50 LMT in August 2023; Launched sale of 'Bharat' brand atta at MRP of Rs.27.50/kg through mobile vans and select stores of Kendriya Bhandar, NAFED and NCCF in November 2023 (and allocated 2.5 LMT of wheat for this purpose under OMSS, which was enhanced further to 4 LMT in December 2023) and the scheme is valid till end January 2024.</p>
	<p>The government restricted export of broken rice and imposed an export duty of 20% on non-basmati white rice, except parboiled rice in September 2022; Prohibited export of non-basmati white rice (semi-milled or wholly milled rice) from July 2023; Allowed offloading of rice under the OMSS for 5 LMT in June 2023, which was revised up to 25 LMT in August 2023; Stopped the diversion of subsidised rice to distilleries for ethanol production under ethanol blending programme (EBP) in July 2023; Imposed in August 2023 an export duty of 20% on exports of parboiled rice, which was extended till end March 2024 in October 2023, and also fixed a minimum export price (MEP) of \$1200 per tonne on basmati rice exports (which was reduced to \$950 per tonne in October 2023) to improve domestic supplies. However, the government had also allowed export of broken rice to select countries to meet their food security needs based on their requests on various occasions such as in May, August and November 2023.</p>
Pulses	<p>Buffer stock of pulses were maintained for price stabilisation during 2020-21, 2021-22 and 2022-23. Government also released stocks in the market in a calibrated manner. In June 2023, government decided to release <i>tur</i> (<i>arhar</i>) from the buffer stock in a targeted manner, through online auction among eligible millers. Three LMT of chana stock were released between June and August 2021 through OMS.</p>
	<p>The basic custom duty (BCD) on lentils (<i>masur</i>) was reduced from 10% to 0% in June 2020, which was extended in phases. Further, Agriculture Infrastructure Development Cess (AIDC) on lentils (<i>masur</i>) was reduced from 20% to 10% in July 2021 and further to 0% in February 2022; Zero AIDC extended in phases till March 2025.</p>

Group/ item	Measures
	<p>The government decided to provide 1.5 million tonnes of <i>chana</i> to states and union territories (UTs) at a discounted rate for distribution under various welfare schemes in September 2022; Suspended futures trading in <i>chana</i> in August 2021 and subsequently extended the suspension till December 2024; Launched sale of subsidised <i>chana dal</i> under the brand name 'Bharat Dal' in July 2023 at Rs. 60-55 per kg (for 1 kg/30kg packs) in order to make pulses available to consumers at affordable prices by converting <i>chana</i> stock into <i>chana dal</i>.</p>
	<p>Import of <i>tur</i>, <i>urad</i> and <i>moong</i> brought under 'Free Category' in May 2021 and its validity extended in phases till 31 March 2025. BCD on <i>tur</i> whole was reduced from 10% to 0% in March 2023. Import of yellow peas exempted from BCD and AIDC till March 2024. Minimum import price also removed for yellow peas till March 2024.</p>
	<p>Aiming to prevent hoarding and speculation, government imposed stock limits on all pulses except <i>moong</i> in July 2021; <i>Tur</i> and <i>Urad dal</i> applicable to wholesalers, retailers, big chain retailers, millers and importers in June 2023 and extended this in phases till December 2023. Further, government issued an advisory for mandatory stock disclosure of lentil (<i>masur</i>) in September 2023.</p>
	<p>In January 2024, government announced procurement of <i>tur</i> and <i>masur dal</i> directly from the farmers or primary agricultural credit societies to incentivise farmers and reduce import dependence. Further, to facilitate procurement of <i>tur dal</i>, government launched e-samridhi portal through which farmers can register and sell their produce to NAFED and NCCF.</p>
Edible oils	<p>BCD on crude palm oil was reduced from 27.5% in November 2020 to 15% in February 2021, but AIDC of 17.5% was introduced. Subsequently, BCD was reduced to 10% (June 2021), 2.5% (September 2021) and further to 0% (October 2021). Subsequently, AIDC on crude palm oil was also reduced in phases to 7.5% (October 2021) and further to 5% (February 2022).</p>
	<p>BCD on crude sunflower and soybean oil reduced from 35% to 15% in February 2021, but it was offset by introduction of AIDC of 20%. Subsequently, both BCD and AIDC were reduced in phases - BCD to 7.5% (August 2021), 2.5% (September 2021) and further to 0% (October 2021), while AIDC reduced to 5% (October 2021) and further to 0% (May 2022). These reduced rates are valid till 31 March 2024 under the tariff rate quota system.</p>
	<p>BCD on refined soya oil and sunflower oil was reduced in phases from 45% to 37.5% (August 2021), 32.5% (September 2021), 17.5% (October 2021) and further to 12.5% (June 2023) to ensure affordable prices of edible oils to consumers</p>
	<p>BCD on refined palm oil was also reduced gradually from 37.5% to 32.5% (September 2021) to 17.5% (October 2021) and 12.5% (December 2021).</p>
	<p>In May 2022, government exempted BCD and AIDC on yearly import of 2 million metric tonne each of crude soya bean and sunflower oil for the years 2022-23 and 2023-24.</p>
	<p>Export of de-oiled rice bran was prohibited in July 2023, and the prohibition was gradually extended till March 2024.</p>

Group/ item	Measures
	Stock limits for all edible oils and oilseeds were imposed in October 2021 for the period up to 31 March 2022, which was further extended to December 2022 in March 2022, albeit with some relaxations for wholesalers and big chain retailers (November 2022).
	Futures trading in mustard oil and oilseeds was suspended in NCDEX effective from October 2021.
	Tariff Rate Quota (TRQ) for import of crude soya bean and crude sunflower seed was discontinued from April 2023.
Vegetables	In July 2022, import of potatoes from Bhutan was permitted freely, without any license, up to June 2023, which was further extended till June 2024.
	In case of onion, an export duty of 40% was prescribed till December 2023 (in August 2023) with certain exemptions provided in September and October 2023. In October 2023, MEP of US\$800 per MT was imposed till December 2023 on all onions except Bangalore Rose and Krishnapuram varieties. In December 2023, export of onion was prohibited till end March 2024.
Fuel	The central government calibrated the excise duties (which includes the road and infrastructure cess or RIC) on petrol and diesel. The first phase of reduction in terms of Rs. 5 per litre on petrol and Rs. 10 per litre on diesel was made effective from November 2021 and the second phase of reduction in terms of Rs. 8 per litre on petrol and Rs. 6 per litre on diesel from May 2022.
	LPG, liquified propane and liquified butane were exempted from levy of AIDC from September 2023.
Others	In August 2021, import of 12 LMT of crushed and de-oiled genetically modified (GM) soya cake was allowed till 31 October 2021, while in May 2022, import of around 0.55 million tonnes of GM soymeal, a key ingredient in poultry feed, was approved.
	Restriction on sugar export imposed from June 2022 till October 2023 to ensure ample domestic supplies and subsequently this was extended beyond October 2023 until further orders.

Source: Central Board of Indirect Taxes and Customs (CBIC), Agricoop, Ministry of Agriculture, Solvent Extractor's Association of India and Newspaper Reports.

CHAPTER 11

Bank Indonesia's responses to the post-pandemic period of high inflation: Synergy and innovation to strengthen recovery and resilience

Perry Warjiyo

Bank Indonesia

The COVID-19 pandemic, which subsided at the end of 2020, spread again with the delta variant that quickly reached Indonesia in May-August 2021, threatening a health, economic and humanitarian crisis. Increasing global economic turmoil subsequent to the pandemic posed various challenges to efforts to accelerate the national economic recovery. The global risks were triggered by a protracted war between Russia and Ukraine that reignited political and economic fragmentation, and then also energy and food supply disruption, which led to high inflation in almost all countries around the world, including Indonesia. This chapter describes Bank Indonesia's responses to this period of high inflation and also rupiah currency pressure in the post-pandemic period. The chapter is divided into four sections. The first section describes the national economic strategy of the authorities in Indonesia, including Bank Indonesia with its mandates in the monetary, macroprudential and payment system. The second section describes Indonesia's achievements with regards to the economy, notably its economic growth in post-pandemic years. The third section discusses the framework that has been implemented by Bank Indonesia, i.e. the central bank policy mix. The last section elaborates how to implement the central bank policy mix, especially in the post-pandemic era of high inflation.

NATIONAL ECONOMIC SYNERGY AND INNOVATION TO PROMOTE RECOVERY AND MAINTAIN STABILITY

During the COVID-19 pandemic, strong national economic policy synergy between the government, the Financial System Stability Committee and Bank Indonesia effectively maintained momentum in the national economic recovery along with macroeconomic and financial system stability. Fiscal and monetary policy coordination extended beyond the conventional standard monetary policy framework to mitigate the impact of the pandemic on macroeconomic stability, economic growth, as well as people's welfare. This policy included Bank Indonesia's participation in funding the State Revenue and

Expenditure Budget (APBN) by purchasing government securities (SBN) in the primary market, in accordance with Act No. 2 of 2020. In 2021, Bank Indonesia continued to fund the APBN by purchasing SBN in the primary market pursuant to the first Joint Decree (KB I) totalling IDR143.32 trillion, consisting of IDR67.87 trillion through primary auction and IDR75.46 trillion through 'greenshoe' options (GSO) (Bank Indonesia 2022b). Furthermore, responding to the national call for state budget funding to finance the health and humanitarian aspects of the outbreak of the delta variant, Bank Indonesia also committed to purchase SBN directly from the government, based on the third Joint Decree (KB III), to the tune of IDR215 trillion in 2021 and IDR224 trillion in 2022. The rate on these securities was equivalent to the Bank Indonesia Reverse Repo Rate for three-month tenors, significantly lower than the market rate. In addition to the low interest rate, Bank Indonesia will repay a portion of the coupon revenue received from the SBN purchases, totalling IDR58 trillion in 2021 and IDR40 trillion in 2022, thereby reducing the government's interest payment obligations in the state budget. This demonstrates Bank Indonesia's avowed commitment to funding the health and humanitarian aspects of the state budget relating to COVID-19, while accelerating the national economic recovery in accordance with prevailing regulations.

Synergy and innovation in national economic policy have been the key to promoting economic recovery and maintaining stability. Fiscal-monetary policy coordination, through temporary and measured direct fiscal funding from Bank Indonesia, allowed the government to accelerate vaccinations and reinforce actions to tackle COVID-19, including restrictions on various social activities, which became a game-changer in controlling the spread of the delta variant. By controlling the pandemic spread sooner, the government was able to re-open priority sectors for sustaining momentum in economic recovery. To ensure the success of Indonesia's economic recovery, this fiscal-monetary policy coordination was also enhanced by a broader national policy synergy between Bank Indonesia, the government, the Financial Supervisory Agency (OJK), and the Deposits Insurance Corporation (LPS) within a Financial System Stability Committee (KSSK) to maintain financial stability while the economy continued to recover. In addition, innovation in the coordination of national economic policies, including fiscal-monetary, was implemented. While the government maintained an expansionary fiscal policy, with substantial fiscal stimulus actions to tackle the impact of COVID-19, Bank Indonesia focused its policy instruments on supporting economic recovery and safeguarding stability, OJK directed its microprudential policy towards strengthening banks' resilience as well as its intermediary function, and LPS secured public trust in the domestic financial institutions. Within this KSSK policy coordination, Bank Indonesia directed its instruments to supporting economic growth. On the monetary policy front, a loose monetary policy stance was employed via a low interest rate policy and liquidity injections to promote economic recovery. Furthermore, accommodative macroprudential policies were kept to promote lending to businesses and recovery of the national economy. Digitalisation of the payment system was also accelerated to support economic growth and enhance financial and economic inclusion. This policy mix was also strengthened

by policy synergy between the government and KSSK to safeguard the stability of the financial system and encourage lending to firms in priority sectors to promote economic growth, exports and economic and financial inclusion.

This close policy synergy and the performance of the economy in 2021 set the stage for a more robust recovery in 2022. Further measures were implemented to accelerate the pace of national economic recovery, underpinned by success in terms of one necessary condition – accelerated vaccinations and tackling of COVID-19 – which allowed the re-opening of priority economic sectors. Added to this are five policy responses that represent sufficient conditions for accelerating the pace of national economic recovery: (1) accelerated transformation of the real sector; (2) synergy of monetary stimulus and macroprudential policies with fiscal policies; (3) accelerated transformation of the financial sector; (4) digitalisation of the economy and finance; and (5) the green economy and finance (Bank Indonesia 2022a). Success in these areas will kindle optimism for more rapid economic recovery in 2022 and the following years to returning the economic to the pre- pandemic COVID-19.

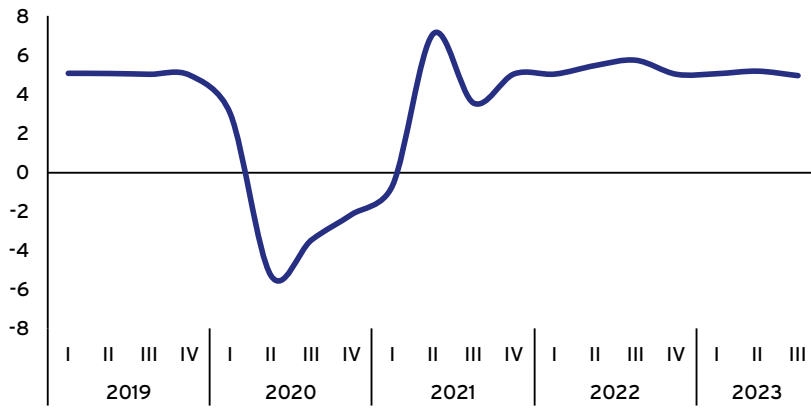
INDONESIA IS ONE OF BEST POST-COVID ECONOMIC PERFORMERS

Increasing global economic turmoil subsequent to the COVID-19 pandemic posed various challenges to efforts to accelerate the national economic recovery. The global risks were triggered by a protracted war between Russia and Ukraine that reignited political and economic fragmentation. In general, five interrelated issues emerged in 2022, each demanding vigilance due to the potential spillover pressures on the national economy. First, world economic growth moderated as a corollary of global political and economic fragmentation, with recession risk emerging in the United States and Europe (**slow growth**). Second, inflation skyrocketed in advanced economies due to food and energy supply disruptions (**high inflation**). Third, global monetary policy rates, such as the Federal Funds rate (FFR), increased sharply and are predicted to persist in response to soaring inflation (**higher for longer**). Fourth, there was broad-based US dollar appreciation in line with FFR hikes and global financial market uncertainty, triggering currency pressures globally, including the rupiah (**strong dollar**). Fifth, the '**cash is king**' phenomenon emerged given high risk perceptions among global investors, leading to capital outflows from emerging economies, including Indonesia, to more liquid investment instruments and cash equivalents. Such developments demanded increased vigilance and an appropriate policy response due to the potential risk of stagflation, or even recession, and a high inflation period.

Amid global economic turmoil, Indonesia's economy continued to perform strongly in 2022. Economic growth for the year was 5.3%, a trend that would continue into 2023 albeit edging lower to the midpoint of the 4.5-5.3% range, in line with the outlook for a global economic slowdown (Bank Indonesia 2023). Macroeconomic and financial system stability were also kept within prudent limits. The 2022 balance of payments was

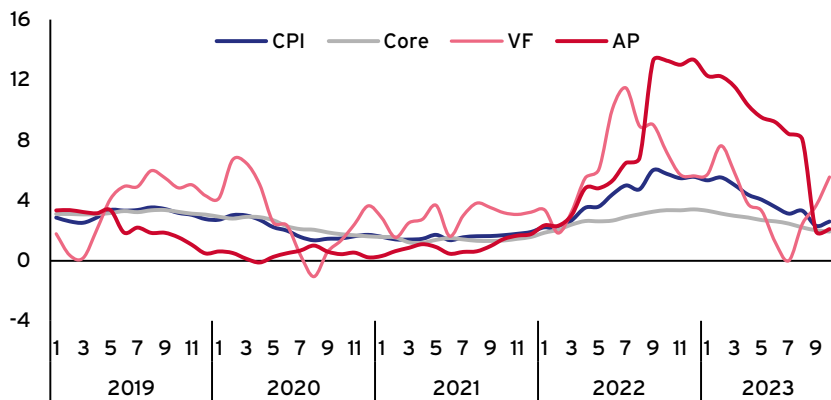
a surplus of 1.0% (of GDP), in line with the increased surplus in the current account, thus supporting stability of the rupiah exchange rate. At the end of 2022, inflation was recorded at 5.51% (year-on-year), above the target range for 2022 due to the impact of subsidised fuel prices adjustment, but still well below its initial projections. Financial system stability also remained firm, with prudently managed resilience and expansion in the intermediation function. In other developments, digital economic and financial transactions experienced rapid growth in line with the acceleration of the payment system digitalisation.

FIGURE 1 INDONESIA'S GDP (YEAR-ON-YEAR. %)



Source: BPS.

FIGURE 2 INDONESIA'S INFLATION (YEAR-ON-YEAR. %)



Source: BPS, calculated.

These positive achievements for the Indonesian economy would not have been possible without the consistency of Bank Indonesia's policy mix working in synergy with the national policy mix to support economic recovery and maintain stability. In 2022, Bank Indonesia carried out a recalibration of the policy mix in response to changes in the dynamics of and challenges to the economy. Bank Indonesia shifted the monetary

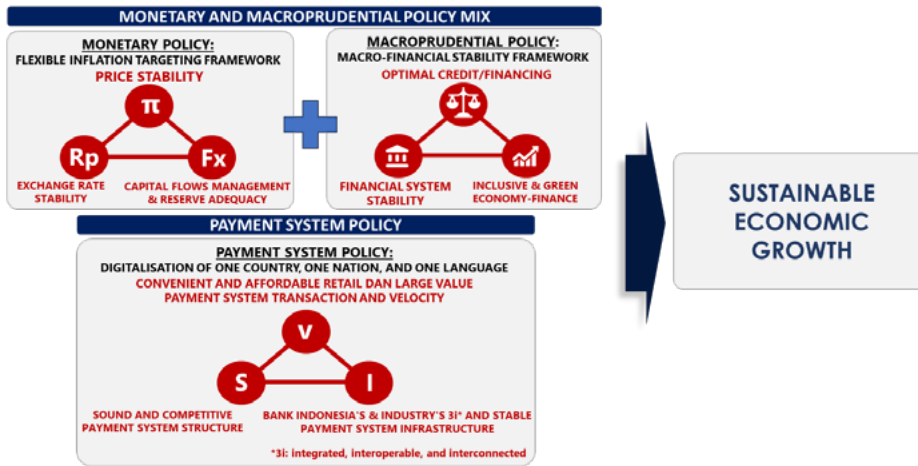
policy stance to prioritise stability (pro-stability), while leaving four other policies – macroprudential regulation, the payment system, money market development, and economic and financial inclusion – to support economic growth (pro-growth). The adjustment in monetary policy direction was implemented by upholding the principles of well-calibrated, well-planned and well-communicated policy formulation. These principles are important to facilitate a smooth and gradual adjustment process in the economy, including the banking system. More importantly, the shift in policy stance was also bolstered by effective policy coordination with the government and the Financial System Stability Committee, ensuring the continuation of Indonesia's economic recovery.

One important achievement deserving of mention is the strategic role of Indonesia's Presidency of the G20 in 2022, which adopted the theme of "Recover Together, Recover Stronger". As part of this important agenda, and amid heightened geopolitical tensions, Indonesia was able to articulate and advocate for the necessity of strengthening international coordination and cooperation to overcome various problems, in particular to prevent a global economic downturn. Indonesia's G20 Presidency succeeded in concluding a number of agreements and recommendations that member nations will take into account as points of reference and/or matters for consideration in future policy implementation. Together with the Ministry of Finance and other line ministries/central agencies, Bank Indonesia played an active role in the financial track to bolster coordination in efforts to mitigate short-term global economic risks and strengthen global economic resilience in the medium term. The success of the Indonesian G20 Presidency will be an important factor in the success of Indonesia's Chairmanship of ASEAN in 2023. Indeed, Bank Indonesia is extending its full support for the success of Indonesia's Chairmanship of ASEAN in 2023, working in close synergy with the government, with a focus on financial integration.

CENTRAL BANK POLICY MIX: THE FRAMEWORK

The increasingly complex economic challenges require the central bank to continue improving and enhancing its framework to produce innovative policy responses, beyond the standard policies, to mitigate economic risks in an effort to achieve multiple policy objectives. Many central banks, particularly in emerging and developing economies (EMDEs), no longer rely solely on monetary policy instruments but have shifted to a policy mix paradigm to achieve multiple objectives. The central bank policy mix approach provides guidance on formulating a combination of policy instruments, such as monetary, macroprudential, exchange rate intervention, and capital flow management, to achieve the objectives of price stability, financial stability, and external stability, while supporting sustainable economic growth (Warjiyo and Juhro 2019).

FIGURE 3 THE CENTRAL BANK POLICY MIX



The growing adoption of the policy mix approach has triggered the development of the Integrated Policy Framework (IPF) from the International Monetary Fund (IMF) and Macro-Financial Stability Framework (MFSF) of the Bank for International Settlements (BIS). The IPF and MFSF both aim to provide guidance for policymakers on how to use various policy instruments in an integrated and consistent manner to achieve macroeconomic objectives and maintain financial stability.

The policy mix framework considers simultaneously the role of four policies: monetary, exchange rate, capital flow management and macroprudential. Monetary policy is aimed at managing demand in order to maintain price stability and reduce output fluctuations. Exchange rate intervention can be used for several purposes, including inflation control, fostering foreign exchange reserves, dampening volatility in shallow financial markets, maintaining financial stability, and preventing currency appreciation, which can reduce competitiveness (Hofman et al. 2020). Capital flow management aims to influence the volume, composition, or direction of capital flows, especially those that are potentially disruptive to financial stability. Finally, macroprudential policy is used to manage credit growth and restrict the build-up of domestic vulnerabilities stemming from loose global financial conditions and to support resilience to shocks.

The concept of the policy mix has been widely adopted and implemented by several central banks around the world, including in Indonesia. Bank Indonesia, as one of the pioneers of the central bank policy mix paradigm, also actively encourages the IMF and BIS to continue to refine the IPF and MFSF concepts to provide better guidance for member countries. In addition, considering the rapidly changing strategic environmental conditions, Bank Indonesia continues to strengthen its support for the implementation of the policy mix transformation. There are several important aspects of the enhancement to the central bank policy framework and its operationalisation:

- First, **strengthening and optimising the policy mix** with an emphasis on a well-measured approach using multiple policy instruments (including monetary policy, FX interventions, capital flows management, macroprudential policy, payment system policy, and fiscal policy) to address various economic challenges. Strengthening the policy mix requires a focus on developing policy innovation, including unconventional policies, to respond to extraordinary conditions.
- Second, **strengthening quantitative models** as analytical tools of the policy mix, consisting of a wider set of policy instruments essential to guide an appropriate policy package in response to macroeconomic and financial shocks. Aspects of strengthening the quantitative models include: (1) the integration of macro-financial linkage in the analysis/model, particularly in the digital era, by optimising the use of granular data, big data, and AI/machine learning, and constructing a comprehensive systemic surveillance since financial institutions (banks and non-banks) are more interconnected; and (2) the enhancement of the non-linearity of quantitative models (in particular, the impact of policy instruments may vary depending on the phase of business and/or financial cycle).

The development of quantitative models that incorporate a wider set of instruments is very important in formulating and calibrating the optimal policy mix response pursued by the central bank. Deploying multiple instruments that are not yet captured in the analytical framework will result in a policy mix response that is less accurately calibrated and may therefore not be optimal in achieving the central bank's goals.

- Third, **implementing safeguards and guidance on the deployment of policy mix tools**. Certain policy mix tools, such as foreign exchange intervention and capital flow management, may have pronounced cross-border spillovers compared to other tools, so safeguards are needed to minimise the risk of inappropriate use of these instruments. In addition, FX intervention may also have the unintended consequence of hindering the development of market deepening.
- Finally, to narrow the gaps in the framework, central banks need to **strengthen their economic and financial cooperation**, including the exchange of views and learning from each others' experiences. Emerging market economies may need to further utilise the surveillance of international organisations, not only for each country but also at the multilateral and global levels. This is important for countries to obtain advice on well-planned, well-calibrated and well-communicated policy.

THE BANK INDONESIA POLICY MIX: IMPLEMENTATION

The direction of Bank Indonesia's policy mix in 2022 continues to be synergised, forming part of the national policy direction to drive the acceleration of economic recovery while maintaining stability. In light of the heightened risk of increased uncertainty in global

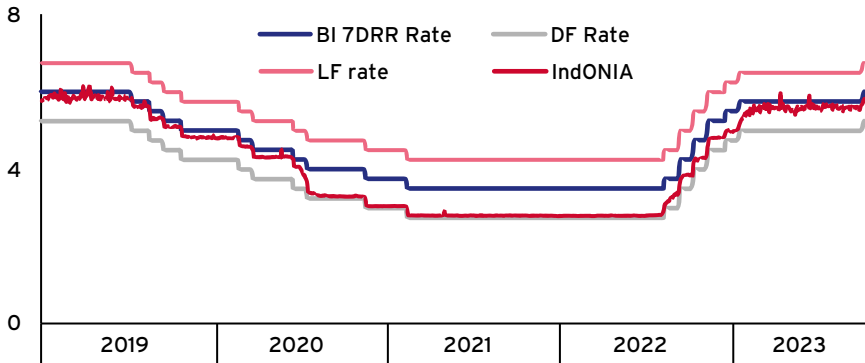
financial markets due to tightening monetary policies in major developed countries, particularly the United States, and considering the still early stages of Indonesia's economic recovery, Bank Indonesia has adopted a policy mix whereby monetary policy is aimed at preserving stability (**pro-stability**), while the other four instruments – macroprudential policy, digitalisation of the payment system, deepening of the money market, and inclusive and green economic and financial policies – are geared towards accelerating national economic recovery (**pro-growth**).

FIGURE 4 BANK INDONESIA'S POLICY MIX



Bank Indonesia recalibrated its policy mix to ensure macroeconomic stability while continuing to support the momentum of economic growth in responding to the heightened global economic uncertainty. Until mid-2022, core inflation remained managed at a low level (below 3% year-on-year), aligned with the limited inflationary impacts from demand, anchored inflation expectations, stable exchange rates, and fiscal policy support in maintaining subsidised fuel prices. However, the deepening global economic uncertainty led to a notable surge in global energy and food prices. The Indonesian government's decision to reallocate subsidised fuel prices to more targeted purposes had added to the upward trajectory of core inflation and its projections, further impacting inflation expectations. In response to these challenges, Bank Indonesia initiated a series of incremental adjustments to the BI-7 Day Reverse Repo Rate (BI7DRR), beginning with a 25 basis point increase in August 2022. Subsequent adjustments in the following months brought the rate to 5.75% by early 2023, with the aim of curbing excessively high inflation expectations (overshooting) and ensuring that core inflation remains below 3%. This move is geared towards bringing CPI inflation back to the target range of $3\pm 1\%$ in the first half of 2023. These policy rate adjustments also considered the imperative of fortifying policies to stabilise the rupiah exchange rate, given the strengthening US dollar and heightened uncertainty in global financial markets amid increased domestic economic demand. Furthermore, monetary policy operations were bolstered through an increase in the money market interest rate structure, aligning with the BI7DRR.

FIGURE 5 INDONESIA'S POLICY RATE (%)



Source: Bank Indonesia.

Bank Indonesia is normalising monetary policy through a gradual reduction of the excess liquidity in the banking sector. Liquidity policy normalisation is being implemented by raising the Rupiah Reserve Requirements (GWM) gradually in a well-calibrated, well-planned and well-communicated manner. With this approach, the incremental rise in the GWM rupiah ratio does not disrupt the banking sector's ability to extend credit and participate in the purchase of government securities (SBN) to finance the state budget (APBN). As a result, it will continue to support the maintenance of monetary and financial system stability while facilitating the ongoing process of national economic recovery. Additionally, this normalisation of liquidity policy will enhance the effectiveness of the transmission of the BI7DRR policy interest rate in influencing longer-term interest rates.

Stabilisation policy has been strengthened continuously to manage rupiah exchange rates in line with the currency's fundamental value and market mechanisms. Rupiah stabilisation policy was strengthened as part of the efforts to control inflation, particularly imported inflation. The policy was implemented through a triple intervention strategy targeting the spot market, the domestic non-deliverable forwards (DNDF) market, and buying/selling government securities (SBN) in the secondary market to increase the attractiveness of SBN yields for portfolio investment inflows. The latter was implemented through a 'twist operation' (namely, the buying/selling of SBN in the secondary market) to increase the attractiveness of SBN yields for short-term SBN portfolio investment and create a flatter SBN yield structure.

The accommodative macroprudential policy was strengthened in synergy with the Financial System Stability Committee's policies to promote lending to businesses and support national economic recovery. In this regard, Bank Indonesia refined the Macroprudential Inclusive Financing Ratio (RPIM), in particular through the commitment of banks to meet RPIM targets in line with their expertise and business models. With these enhancements, it is anticipated that bank financing to micro, small, and medium-sized enterprises (UMKM) and low-income individuals (PBR) will increase. Bank Indonesia also offered incentives to banks disbursing loans/financing to priority

sectors and MSMEs, and/or achieving the RPIM targets. These include an increase in the maximum incentive for priority sectors to 1.5%, up from the previous maximum of 0.5%; RPIM achievement incentives remain at a maximum of 0.5%. The coverage of priority subsectors has also expanded from 38 to 46 sectors. These policies strengthened previously implemented accommodative macroprudential policy measures by holding the countercyclical capital buffer (CCyB) at 0%, the macroprudential intermediation ratio (MIR) at 84–94%, as well as the macroprudential liquidity buffer (MPLB) for conventional commercial banks at 6% with repo flexibility of 6% and for Sharia banks at 4.5% with repo flexibility of 4.5%. Furthermore, Bank Indonesia maintained a looser loan/financing-to-value (LTV/ FTV) ratio for property loans/financing of up to 100% and the relaxation of down payment requirements for motor vehicle financing, set at a minimum of 0% for all types of new motor vehicles.

Bank Indonesia accelerated and expanded digitalisation of the payment system to expedite national integration of the digital economy with the finance ecosystem, while simultaneously driving the economic recovery. Aligned with the goals outlined in the Indonesia Payment System Blueprint (BSPI) 2025, the policy centres around three primary priorities: regulatory reform, the enhancement of retail payment system infrastructure, and the standardisation of payment systems. Regulatory reform is aimed at streamlining the licensing procedure, supported by strengthened regulations and supervision to nurture innovation and simultaneously mitigate risk in the payment system industry. Meanwhile, the development of an integrated, interconnected and interoperable (3I) payment system infrastructure continues to support the national digital economic and financial ecosystem. Furthermore, Bank Indonesia continued to expand the Quick Response Code Indonesia Standard (QRIS) for use as the QR national standard in order to accelerate payment system digitalisation. Implementation of the National Open API Payment Standard (SNAP) was strengthened by involving market leaders to accelerate development of the digital economic and financial ecosystem.

Acceleration of financial market development is continuing to strengthen the effectiveness of monetary policy transmission, the financing infrastructure and the corporate sector, thereby supporting the national economic recovery. Financial market infrastructure digitalisation and strengthening was continued by bolstering integrated, interconnected, interoperable, secure and reliable money market infrastructure. Seeking to strengthen the effectiveness of monetary policy transmission, in 2022 Bank Indonesia focused on developing repo transactions and strengthening rupiah benchmark rates. Bank Indonesia also deepened the foreign exchange market by focusing on the development of DNDF as well as expanding and strengthening the local currency settlement (LCS) framework. In addition, Bank Indonesia also developed financial instruments as a source of economic financing and strengthened risk management in synergy with financial sector authorities and market participants.

Several supporting policies were also instituted to shore up the national economic recovery. There has been close synergy with the government, banking industry and other institutions to accelerate development of the national Sharia economy and finance as a new source of inclusive economic growth. Bank Indonesia has also worked to formulate policies for an inclusive and green economy and finance, which further supports economic recovery by improving the competitiveness of MSMEs as a new source of national economic growth. On the external side, Bank Indonesia's international policy was implemented in cooperation with the government to further ensure macroeconomic and financial system stability, to support economic recovery, as well as to advance the interests of Bank Indonesia and the economic interests of Indonesia.

The Bank Indonesia policy mix was strengthened by a close policy synergy with the government and other authorities. In this regard, coordinated efforts by Bank Indonesia and the central and regional governments through Inflation Controlling Teams (TPIP/TPID) as well as the National Movement for Food Inflation Control (GNPIP) were bolstered to manage the second-round effects of fuel price adjustments as well as rising global food prices. Such efforts included coordinated inflation control on the supply and demand sides; additional fiscal budget support to lower regional inflation through the Regional Incentive Fund (DID) and use of Unexpected Expenditures (BTT); transportation subsidies using the General Transfer Fund (DTU), among others; and other stabilisation policies to dampen rising inflation.

This central bank policy mix stance has continued in 2023 in line with Bank Indonesia's efforts to strengthen economic resilience and accelerate economic recovery and revival in close synergy with national economic policy. The direction of the policy mix will simultaneously serve to dampen the spillover effects of global shocks on both macroeconomic stability as well as growth. To that end, the pro-stability monetary policy stance was strengthened by another BI7DRR increase of 25 basis points in October 2023 in response to a significant increase in global uncertainty, which led to pressure on the rupiah exchange rate and some upward risks on inflation forecasts through imported inflation. This policy rate increase was aimed at reinforcing the policy of stabilising the rupiah exchange rate in response to the heightened global uncertainty. It serves as a pre-emptive and forward-looking measure to mitigate the impact on imported inflation, ensuring that inflation remains controlled within the target range of $3.0\pm 1\%$ in 2023 and $2.5\pm 1\%$ in 2024. Simultaneously, the loose macroprudential policy is strengthened by enhancing the effectiveness of the Macroprudential Liquidity Incentive Policy (KLM) and reducing the Macroprudential Liquidity Buffer (PLM) ratio. This is done to encourage credit and financing for the growth of the national economy. The policy to accelerate the digitalisation of the payment system is continuously pursued to enhance digital economic and financial inclusion.

In summary, Bank Indonesia's unwavering commitment to implementing its policy mix, coupled with robust policy coordination with the government and other relevant institutions, has successfully restored macroeconomic stability while bolstering the

momentum of economic recovery. Regarding macroeconomic stability, CPI inflation has returned from its peak of 5.95% in September 2022 to the target of 3.0±1% by June 2023, much faster than our initial forecast, and is currently stable at a low level. Core inflation is also well maintained at below 3.0% thanks to well-anchored inflation expectations resulting from a bold and consistent monetary policy tightening stance. In term of economic growth, Indonesia continues to achieve impressive annual growth of around 5% despite a slowdown in global economic growth and weakening export commodity prices. This resilience is attributed to strong domestic demand supported by proactive policy stimulus from both the government and Bank Indonesia.

Looking ahead, the economic recovery in Indonesia is projected to remain intact in the near term and to gain momentum over the medium term. In 2023, the economy is forecasted to expand at a healthy pace, notwithstanding a slight moderation towards the midpoint of the 4.5–5.3% range in line with a softening of the world economic growth outlook. External stability will be maintained on the back of a solid balance-of-payments performance, supported by a healthy current account deficit ranging from -0.4% GDP to +0.4% GDP. Inflationary pressures will be maintained within the target of 3.0±1% in 2023 and 2.5±1% in 2024, while the stability of the financial system will be maintained. In the medium term, the national economy is expected to regain momentum on a path towards an Advanced Indonesia. This outlook is supported by the ongoing global economic recovery and stronger domestic economic performance in response to structural reforms in the real sector, the consistency of Bank Indonesia's efforts to maintain macroeconomic and financial stability, coupled with an acceleration of national economic and financial digitalisation.

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ABOUT THE AUTHOR

Perry Warjiyo was born in Sukoharjo, Indonesia in 1959. He received a Bachelor's degree in Accounting in 1982 from Gadjah Mada University, a Master's degree in 1989 and a PhD in 1991 in Monetary and International Finance from Iowa State University.

Dr. Perry has officially served as the Governor of Bank Indonesia since 24 May 2018 and was re-elected for a second term (2023-2028) in May 2023. Before serving as Governor, he was Deputy Governor from 2013-2018 for monetary policy, international policy, sharia economics and finance, and financial market deepening. Prior to this position, Dr. Perry served as the Assistant Governor for monetary, macroprudential, and international policy, a post he held after being Executive Director of the Economic Research and Monetary Policy Department since 2009. Before re-joining Bank Indonesia in July 2009, he served for two years as an Executive Director at the International Monetary Fund (IMF), representing the 13 member countries in the South-East Asia Voting Group (SEAVG). He has a long-standing career in Bank Indonesia in the areas of economic research and monetary policy, central banking studies and training, office of the Governors, monetary policy strategy and organisation transformation, foreign exchange management, and international issues.

Dr. Perry is also an extramural lecturer in post-graduate studies at the University of Indonesia, a distinguished lecturer on international economics and monetary economics at Gadjah Mada University, and a visiting lecturer at a number of reputable universities in Indonesia and abroad, including the University of Sydney. In addition, he has authored and published a number of books, journals, and papers on economic, monetary, and international issues. His latest book, *Central Bank Policy: Theory and Practice*, was published by Emerald Publishing Limited in July 2019. He has also delivered numerous high-level keynote speeches that have influenced public policy around the globe.

ANNEX: CHRONOLOGY OF POLICY

No.	Date	Policy mix	Policy
1.	20.01.2022	Monetary	Holding the BI7DRR at 3.50%, deposit facility at 2.75%, lending facility at 4.25%.
2.	20.01.2022	Monetary	Strengthening rupiah exchange rate policy to maintain exchange rate stability in line with economic fundamentals and market mechanisms.
3.	20.01.2022	Monetary	<p>Normalising liquidity policy:</p> <ol style="list-style-type: none"> i. Incrementally raising the rupiah reserve requirement (RR) for conventional commercial banks from the current average requirement of 3.0% and daily requirement of 0.5% as follows: <ol style="list-style-type: none"> a. From 1st March 2022, Bank Indonesia raise the reserve requirement by 1.5% to 5.0%, calculated fully as an average. b. From 1st June 2022, Bank Indonesia raise the reserve requirement by 1.0% to 6.0%, calculated fully as an average. c. From 1st September 2022, Bank Indonesia raise the reserve requirement by 0.5% to 6.5%, calculated fully as an average. ii. Incrementally raising the rupiah reserve requirement for sharia banks and business units from the current average requirement of 3.0% and daily requirement of 0.5% as follows: <ol style="list-style-type: none"> a. From 1st March 2022, Bank Indonesia raise the reserve requirement by 0.5% to 4.0%, calculated fully as an average. b. From 1st June 2022, Bank Indonesia will raise the reserve requirement by 0.5% to 4.5%, calculated fully as an average. c. From 1st September 2022, Bank Indonesia will raise the reserve requirement by 0.5% to 5.0%, calculated fully as an average.
4.	20.01.2022	Macroprudential	<p>Maintaining accommodative macroprudential policy by holding:</p> <ol style="list-style-type: none"> iii. Macroprudential Intermediation Ratio (MIR) in the 84-94% range with a lower disincentive parameter of 84% from 1st January 2022, and v. Macroprudential Liquidity Buffer (MPLB) at 6% with repo flexibility of 6% and the sharia MPLB at 4.5% with repo flexibility of 4.5%.
5.	20.01.2022	Macroprudential	Strengthening prime lending rate (PLR) transparency in the banking industry with a focus on interest rate spread by bank group.

No.	Date	Policy mix	Policy
6.	20.01.2022	Payment System	<p>Accelerating payment system digitalisation to stimulate economic recovery, particularly in terms of household consumption, while advancing an inclusive and efficient economy and finance by:</p> <ol style="list-style-type: none"> i. Expanding QRIS uptake through: (i) implementation of a strategy to attract 15 million new QRIS users in 2022 via collaboration with the industry, government ministries/agencies and the community, (ii) expansion of QRIS features, (iii) preparation of business models and the technical aspects of cross-border QRIS implementation with Malaysia. ii. Increasing the number of participants, expanding the services and garnering greater acceptance of BI-FAST for more efficient transactions between banks and members of the public. iii. Intensifying the electrification program through: (i) social aid program (Bansos) digitalisation, (ii) electrification of local government services, particularly the acceleration and expansion of regional digitalisation (P2DD), (iii) integration of different transportation modes. iv. Safeguarding the availability of quality rupiah currency fit for circulation throughout the territory of the Republic of Indonesia by strengthening the digitalisation strategy and expanding currency distribution, including the Sovereign Rupiah Expedition Program (Program Ekspedisi Rupiah Berdaulat) in outer, frontier and remote (3T) regions, while expanding the Rupiah Love, Pride and Understanding movement (Cinta Bangsa dan Paham (CBP) Rupiah).
7.	20.01.2022	Market Deepening	<p>Accelerating foreign exchange market deepening to support rupiah exchange rate stability, while expanding the availability of hedging instruments and promoting international trade and investment.</p> <ol style="list-style-type: none"> i. Implementing regulatory reform of the domestic foreign exchange market, primarily focusing on: (i) relaxing the threshold on spot transactions with an underlying from USD25,000 per month to USD100,000 per month, (ii) developing a non-US dollar reference rate against the rupiah as a fixing rate for derivative transactions to support hedging activity, (iii) standardising the instruments to support transaction digitalisation through the Electronic Trading Platform (ETP) and Central Counterparty (CCP). ii. Expanding the use of Local Currency Settlement (LCS) through socialisation activities targeting the banking industry, corporate sector and other potential users in cooperation with relevant institutions during January and February 2022.
8.	20.01.2022	Inclusive & Green Economy	<p>Strengthening policy for an inclusive and green economy and finance, particularly on the credit demand side, to support a sustainable economic recovery through MSME development and the empowerment of low-income individuals to level up MSMEs and sharia businesses, while strengthening Bank Indonesia's green and institutional policies to support the transition towards a low-carbon economy.</p>

No.	Date	Policy mix	Policy
9.	20.01.2022	International	Strengthening international policy by expanding cooperation with other central banks and international organisations, promoting trade and investment and ensuring the success of six priority agendas in the Finance Track in conjunction with the Ministry of Finance during Indonesia's G20 Presidency in conjunction with the Ministry of Finance during Indonesia's G20 Presidency in 2022.
10.	21.01.2022	International	Signing a MoU with MAS to promote collaboration on projects in relation to payments innovation, and formalise cooperation across an expanded range of central bank and regulatory functions
11.	21.01.2022	Monetary	Renewing Bilateral Currency Swap Arrangement (BCSA) with PBoC.
12.	27.01.2022	Payment	Launching the Cross-Border QR Payment Linkage between Indonesia and Malaysia.
13.	10.02.2022	Monetary	Holding the BI7DRR at 3.50%, deposit facility at 2.75%, lending facility at 4.25%.
14.	10.02.2022	Macroprudential	Providing incentives for banks disbursing loans/financing to priority sectors and MSMEs and/or achieving the RPIM target in the form of a 1% reduction in the average rupiah reserve requirement, from 1st March 2022.
15.	10.02.2022	Macroprudential	Strengthening prime lending rate (PLR) transparency in the banking industry with a focus on interest rate spread against neighbouring countries.
16.	10.02.2022	Payment System	Increasing the QRIS transaction limit from Rp5 million to Rp10 million per transaction, from 1st March 2022, to drive private consumption and accelerate the national economic recovery.
17.	10.02.2022	International	Expanding the use of Local Currency Settlement (LCS) as a means to settle bilateral trade and investment transactions with major trading partners, especially in Asia.
18.	16.02.2022	International	Signing a MoU with BoK in the area of monetary and macroprudential policy, financial system stability, payment and settlement system, as well as other areas of central banking.
19.	18.02.2022	Monetary	Renewing Bilateral Currency Swap Arrangement (BCSA) with RBA.
20.	01.03.2022	Macroprudential	Amending Macroprudential Inclusive Financing Ratio (RPIM) for conventional commercial banks, sharia banks and sharia business units with Bank Indonesia Regulation (PBI) No.24/3/PBI/2022 to support joint efforts with the Government aiming to unlock access to financing and development for micro, small and medium enterprises (MSME) as well as low-income individuals, while optimising the banking industry's contribution to RPIM.
21.	01.03.2022	Macroprudential	Issuing Bank Indonesia Regulation (PBI) No. 24/5/PBI/2022 concerning Incentives for Banks that Extend Funds for Specific and Inclusive Economic Activities, effective from 1st March 2022 to support national economic recovery efforts.

No.	Date	Policy mix	Policy
22.	09.03.2022	Monetary	<p>Agreeing five strategic measures to strengthen inflation control at a High-Level Meeting of the Central Inflation Control Team (HLM TPIP)</p> <ul style="list-style-type: none"> i. Strengthening policy coordination to maintain macroeconomic stability and nurture national economic recovery momentum. ii. Mitigating the impact of upside risks, including global liquidity policy normalisation and rising international commodity prices, on inflation and public purchasing power. iii. Controlling inflationary pressures on volatile food within the 3.0-5.0% range by maintaining supply availability and orderly distribution, particularly during national religious holidays (HBKN). Strategy implementation is focused on optimising the use of technology and end-to-end agricultural digitalisation, increasing connectivity and strengthening interregional cooperation. iv. Strengthening policy communication synergy to anchor public inflation expectations. v. Strengthening coordination between the central and regional governments to control inflation through the National Coordination Meeting on Inflation Control 2022, entitled Food MSME Digitalisation for Access and Price Stability.
23.	17.03.2022	Monetary	Holding the BI7DRR at 3.50%, deposit facility at 2.75%, lending facility at 4.25%.
24.	17.03.2022	Macroprudential	Maintaining Prime Lending Rate (PLR) transparency in the banking industry with a focus on granular PLR components and the affecting factors.
25.	17.03.2022	Payment System	Safeguarding the availability and distribution of rupiah currency throughout the archipelago as well as cash services during the approach to Ramadan and Eid-ul-Fitr.
26.	17.03.2022	Payment System	Preparing Payment System Providers (PSP), particularly first mover PSP, for National Open API Payment Standard (SNAP) implementation to support interlinkages between the banking and FinTech industries.
27.	31.03.2022	Monetary	<p>Under the auspices of the National Working Group on Benchmark Reform (NWGBR), the Ministry of Finance, Bank Indonesia, Financial Services Authority (OJK) and Indonesian Foreign Exchange Market Committee have agreed to:</p> <ul style="list-style-type: none"> i. Strengthening IndONIA as an overnight reference rate that will be used to establish reference rate for tenors from 1 week to 12 months. ii. Urging market participants to expand use of IndONIA as an interest rate reference (price) of various financial products and instruments denominated in rupiah and as an indicator of interest rates development in domestic money market.
28.	19.04.2022	Monetary	Holding the BI7DRR at 3.50%, deposit facility at 2.75%, lending facility at 4.25%.
29.	19.04.2022	Macroprudential	Maintaining prime lending rate transparency in the banking industry with a focus on sources of operating income in the banking industry.

No.	Date	Policy mix	Policy
30.	19.04.2022	Payment System	Ensuring adequate availability of currency fit for circulation, maintaining seamless currency distribution and prime cash services, while preparing BI-FAST implementation during the holy fasting month of Ramadan and Eid-ul-Fitr 1443H.
31.	19.04.2022	Payment System	Raising the maximum deposit limit for registered electronic money from Rp10 million to Rp20 million and the monthly transaction limit from Rp20 million to Rp40 million, effective from 1st July 2022.
32.	24.05.2022	Monetary	Holding the BI7DRR at 3.50%, deposit facility at 2.75%, lending facility at 4.25%.
33.	24.05.2022	Monetary	Accelerating liquidity policy normalisation by incrementally raising Rupiah reserve requirements as follows: <ul style="list-style-type: none"> i. Bank Indonesia will raise the Rupiah reserve requirements for conventional commercial banks from 5.0% currently to 6.0% on 1st June 2022, to 7.5% on 1st July 2022 and to 9.0% on 1st September 2022. ii. Bank Indonesia will raise the Rupiah reserve requirements for sharia banks and sharia business units from 4.0% currently to 4.5% on 1st June 2022, to 6.0% on 1st July 2022 and to 7.5% on 1st September 2022. iii. Bank Indonesia will provide 1.5% remuneration to banks fulfilling reserve requirements obligations after taking into account the incentives for banks disbursing loans/financing to priority sectors and MSMEs and/or meeting the target Macroprudential Inclusive Financing Ratio (RPIM).
34.	24.05.2022	Macroprudential	Increasing incentives for banks disbursing loans/financing to priority sectors and MSMEs and/or meeting the target Macroprudential Inclusive Financing Ratio (RPIM) from 1st September 2022 as follows: <ul style="list-style-type: none"> i. Relaxing statutory reserve requirements (SRR) by a maximum of 2%, namely through an incentive for disbursing loans/financing to priority sectors up to a maximum of 1.5% from 0.5% previously, with the maximum incentive for achieving the target RPIM remaining at 0.5%. ii. Expanding the scope of priority subsectors from 38 to 46 across three categories, namely resilient sectors, growth drivers and slow starters. iii. The incentives aim to increase the banking industry's contribution to inclusive financing and the national economic recovery.
35.	24.05.2022	Macroprudential	Maintaining prime lending rate transparency in the banking industry with a focus on lending rates for priority sectors.
36.	24.05.2022	MSME	Maintaining support for MSME development through the Karya Kreatif Indonesia (KKI) expo to support the economic recovery, including the National BBI Movement promoting pride in Indonesian-made products and Proud to Travel in Indonesia Movement (GBWI).

No.	Date	Policy mix	Policy
37.	24.05.2022	Payment System	Strengthening payment system policy to reinforce economic recovery and accelerate inclusive digitalisation by: <ul style="list-style-type: none"> i. Extending the grace period on a minimum credit card payments and late fees from 30th June 2022 previously to 31st December 2022 to support credit card transactions while mitigating credit risk. ii. Extending the 0% QRIS merchant discount rate (MDR) for micro merchants from 30th June 2022 previously to 31st December 2022 to continue efforts to expand the digital ecosystem and boost transactions, particularly amongst MSMEs.
38.	25.05.2022	Monetary	Bank Indonesia sinergized with various government ministries (Coordinating Ministry for Economic Affairs, Coordinating Ministry for Maritime and Investment Affairs, Ministry of State-Owned Enterprises, Ministry of Trade, Ministry of Industry and Ministry of Finance), the Financial Services Authority (OJK), Indonesia Deposit Insurance Corporation (IDIC), Indonesia Eximbank, Chamber of Commerce and Industry (KADIN Indonesia), Indonesia Employers Association (APINDO) and the Association of Appointed Cross Currency Dealers (ACCD), formed the National Local Currency Settlement Task Force on 25th May 2022 aims to accelerate LCS development.
39.	23.06.2022	Monetary	Holding the BI7DRR at 3.50%, deposit facility at 2.75%, lending facility at 4.25%.
40.	23.06.2022	Macroprudential	Maintaining prime lending rate transparency in the banking industry with a focus on the overhead cost component.
41.	23.06.2022	Payment System	Extending low National Clearing System (SKNBI) fees of Rp1 from Bank Indonesia to the banking industry and up to Rp2,900 charged by banks to their customers from 30th June 2022 to 31st December 2022 to increase cost efficiency and stimulate economic activity, while facilitating financial transactions to foster economic recovery.
42.	25.06.2022	Monetary	Bank Indonesia and the Bank for International Settlement (BIS), together with other central banks in Asia and the Pacific, namely Bank Negara Malaysia, the Hong Kong Monetary Authority, the Monetary Authority of Singapore, and the Central Bank of Chile, as well as the People's Bank of China (PBoC), signed the Renminbi Liquidity Arrangement (RMBLA).
43.	16.07.2022	Payment System	BI and RBI signed MoU to deepen relations between both central banks and strengthen the exchange of information and cooperation in the area of central banking, including payment systems, digital innovation in payments services, and regulatory and supervisory framework for Anti Money Laundering and Combating the Financing of Terrorism (AML-CFT)
44.	21.07.2022	Monetary	Holding the BI7DRR at 3.50%, deposit facility at 2.75%, lending facility at 4.25%.
45.	21.07.2022	Monetary	Strengthening monetary operations as a pre-emptive and forward-looking measure to mitigate the risk of rising inflation expectations and core inflation by increasing the interest rate structure in the money market and releasing SBN in the secondary market.

No.	Date	Policy mix	Policy
46.	21.07.2022	Monetary	Strengthening rupiah stabilisation policy to help manage inflation through foreign exchange market intervention, supported by stronger monetary operations.
47.	21.07.2022	Macroprudential	Maintaining prime lending rate transparency policy in the banking industry with a focus on consumer loan interest rates.
48.	21.07.2022	Payment System	Expanding cross-border QRIS by, among others, accelerating implementation, piloting local currency settlement (LCS) with other Asian countries and organising National QRIS Week to achieve the target of 15 million new users.
49.	21.07.2022	Payment System	Ensuring smooth and orderly operationalisation of the National Open API Payment Standard (SNAP), particularly for first mover payment service providers (PSP), while preparing for second mover implementation targeted for December 2022, as well as expanding cross-border QRIS by, among others, accelerating implementation and piloting LCS.
50.	10.08.2022	Monetary	Launching of National Synergy Movement to Control Food Inflation (GNPIP).
51.	18.08.2022	Monetary	<p>Coordinating with Government in National Coordination Meeting on Inflation Control. Indonesian President issued five instructions for maintaining price stability and increasing food security, thus supporting public purchasing power and the national economic recovery.</p> <ol style="list-style-type: none"> i. Strengthening the identification of sources of inflationary pressures regionally using macro, micro and granular data. ii. Expanding inter-regional cooperation to reduce supply and price disparity between regions. TPIP and TPID must identify surplus and deficit regions, while serving as facilitators to encourage inter-regional cooperation in terms of controlling inflation. iii. Reducing transportation costs by utilising inter-regional trade distribution facilities and lowering airfares by increasing the number of aeroplanes. iv. Optimising the use of unexpected expenditures to support regional inflation control efforts. v. Accelerating Regional Revenue and Expenditure Budget (APBN) absorption to support regional economic growth
52.	23.08.2022	Monetary	Increasing the BI7DRR to 3.75%, deposit facility to 3.00%, lending facility to 4.50%.
53.	23.08.2022	Monetary	Strengthening monetary operations by increasing the interest rate structure in the money market in accordance with the higher BI 7-Day Reverse Repo Rate (BI7DRR) to mitigate the risks associated with rising core inflation and inflation expectations.
54.	23.08.2022	Monetary	Strengthening rupiah stabilisation policy as part of the measures to control inflation through foreign exchange market intervention through spot and DNDF transactions as well as buying/selling SBN in the secondary market.
55.	23.08.2022	Monetary	Buying/selling SBN in the secondary market to strengthen rupiah stability by increasing the attractiveness of short-term SBN portfolio investment and creating a flatter long-term SBN yield structure considering the short-term nature of inflationary pressures that are expected to return to the target corridor in the medium-long term.

No.	Date	Policy mix	Policy
56.	23.08.2022	Monetary	Strengthening national and regional synergy to maintain price stability and bolster food security through a coordination meeting with national and regional inflation control teams (TPIP and TPID), while accelerating implementation of the National Movement for Food Inflation Control (GNPIP).
57.	23.08.2022	Macroprudential	Implementing policy incentives for banks disbursing loans/ financing to priority sectors and MSMEs and/or fulfilling the Macroprudential Inclusive Financing Ratio (RPIM) from 1st September 2022 as follows: (a) Increasing the incentives for disbursing loans/financing to priority sectors to a maximum of 1.5% from 0.5% previously and the incentive for fulfilling the RPIM target of up to 0.5%. (b) Expanding the scope of priority subsectors from 38 to 46.
58.	23.08.2022	Macroprudential	Maintaining prime lending rate transparency policy in the banking industry with a focus on interest rates by credit segment.
59.	23.08.2022	Payment System	Strengthening payment system policy to support the economic recovery and accelerate digitalisation, primarily by expanding QRIS and BI-FAST services and access to larger segments of the population through MSME empowerment and purchasing domestic products.
60.	29.08.2022	Payment System	Bank Indonesia (BI) and the Bank of Thailand (BoT) announced to move from piloting phase to the implementation phase of cross-border QR payment linkage.
61.	04.09.2022	Payment System	Bank Indonesia has launched S.I.A.P QRIS (Sehat, Inovatif, Aman, Pakai QRIS or Healthy, Innovative, Secure, Use QRIS) and BI-FAST programs as a continuation of efforts to accelerate digital payments nationally, particularly in the Solo Raya region.
62.	22.09.2022	Monetary	Increasing the BI7DRR to 4.25%, deposit facility to 3.50%, lending facility to 5.00%.
63.	22.09.2022	Monetary	Strengthening monetary operations by increasing the interest rate structure in the money market in accordance with the higher BI7DRR to lower inflation expectations and return core inflation to the target.
64.	22.09.2022	Monetary	Continuing operation twist through the buying/selling of SBN in the secondary market to strengthen rupiah stabilisation policy by increasing the attractiveness of SBN yields for foreign portfolio investment inflows by raising short-term SBN yields in line with the higher BI7DRR and creating a flatter long-term SBN yield structure considering the transient nature of current inflationary pressures, with inflation expected to return to the target corridor in the medium-long term.
65.	22.09.2022	Macroprudential	Maintaining prime lending rate transparency policy in the banking industry with a focus on bank profitability.
66.	22.09.2022	Payment System	Accelerating and expanding regional payment digitalisation by utilising the momentum created by announcing the winners of the National Working Group to Accelerate and Expand Local Digitalisation (P2DD) Championship.

No.	Date	Policy mix	Policy
67.	22.09.2022	Payment System	Accelerating the milestone of 15 million QRIS users and increasing BI-FAST use in payment transactions.
68.	30.09.2022	Market Deepening	The National Working Group on Benchmark Reform (NWGBR) issued a guide for using IndONIA as the Rupiah Reference Rate across various financial products.
69.	20.10.2022	Monetary	Increasing the BI7DRR to 4.75%, deposit facility to 4.00%, lending facility to 5.50%.
70.	20.10.2022	Macroprudential	Maintaining looser Loan/Financing-to-Value (LTV/FTV) ratios on property loans/financing to a maximum of 100% on all property types (landed houses, apartments and shop/office house) for banks meeting specific NPL/NPF criteria, to revive credit growth in the property sector in line with risk management and prudential principles, effective from 1st January 2023 to 31st December 2023.
71.	20.10.2022	Macroprudential	Maintaining looser down payment requirements on automotive loans/financing at 0% for all types of new motor vehicle in order to revive credit growth in the automotive sector, while applying risk management and prudential principles, effective from 1st January 2023 to 31st December 2023.
72.	20.10.2022	Macroprudential	Maintaining prime lending rate transparency policy in the banking industry with a focus on the assessment of policy rate transmission to interest rates on new loans in the banking industry.
73.	20.10.2022	Payment System	Strengthening payment system policy through digitalisation of the banking industry and non-bank financial institutions by expanding the participation, ecosystem and utilisation of BI-FAST, while accelerating the adoption of National Open API Payment Standards (SNAP) for banks and non-banks.
74.	04.11.2022	Monetary	Bank Indonesia (BI) and the Monetary Authority of Singapore (MAS) announced a further extension of bilateral financial arrangement to 3 November 2023. The arrangement comprises two agreements: <ul style="list-style-type: none"> i. A local currency bilateral swap agreement that allows for the exchange of local currencies between the two central banks of up to SGD9.5 billion or IDR100 trillion. ii. A bilateral repo agreement of USD3 billion that allows for repurchase transactions between the two central banks to obtain USD cash using G3 Government Bonds as collateral.
75.	14.11.2022	Payment System	Bank Indonesia (BI), Bank Negara Malaysia (BNM), Banko Sentral ng Pilipinas (BSP), Monetary Authority of Singapore (MAS), and Bank of Thailand (BOT) signed Memorandum of Understanding (MOU) on Cooperation in Regional Payment Connectivity (RPC).
76.	17.11.2022	Monetary	Increasing the BI7DRR to 5.25%, deposit facility to 4.50%, lending facility to 6.00%.
77.	17.11.2022	Inclusive Financing and Sharia Economy	Issuing Bank Indonesia Sukuk (SukBI) for use as underlying instruments in the form of inclusive financing securities (inclusive SukBI), which are recognised as SPBI (Surat Berharga Pembiayaan Inklusif), in line with BI commitment to support inclusive financing and develop the sharia economy and finance.

No.	Date	Policy mix	Policy
78.	17.11.2022	Macroprudential	Maintaining prime lending rate (SBDK) transparency policy in the banking industry with a focus on the response of interest rates in the banking industry to policy rate.
79.	17.11.2022	Payment System	Fostering the use of QRIS and continuing to develop QRIS features and services, including cross-border QRIS, after achieving the target of 15 million new users in October 2022.
80.	17.11.2022	Payment System	Fostering payment system innovation, including public acceptance of BI-FAST, by expanding participation and service channels, while maintaining effective regular public communication.
81.	30.11.2022	Payment System	Bank Indonesia has published a high-level design of Digital Rupiah development, as contained in a White Paper (WP), that launched in the Bank Indonesia Annual Gathering 2022.
82.	09.12.2022	Payment System	Bank Indonesia (BI) and The Japan Ministry of Economy, Trade and Industry (METI) signed a Memorandum of Cooperation (MOC) in the Area of Unified QR Code-Based Payment.
83.	22.12.2022	Monetary	Increasing the BI7DRR to 5.50%, deposit facility to 4.75%, lending facility to 6.25%.
84.	22.12.2022	Monetary	Issuing new foreign exchange monetary operation (MO) instruments to boost placement of Export Proceeds, especially from Natural Resource, domestically by banks and exporters to strengthen stabilization, including Rupiah exchange rate stability and national economic recovery. The foreign exchange MO instruments are applied with competitive yields based on a transparent market mechanism and incentives given to banks.
85.	22.12.2022	Macroprudential	Strengthening accommodative, inclusive, and sustainable macroprudential policy to boost the growth of credit/financing by banks, primarily non-recovering priority sectors, People's Business Credit (KUR), and green credit/financing, to support economic recovery through amendment the reserve requirement (GWM) incentive to be applied from 1 April 2023, including: <ul style="list-style-type: none"> i. Reclassification of 46 priority sub-sectors in 3 (three) business sector groups, namely resilience group, growth driver group, and slow starter group, according to the latest condition by maintaining credit/financing growth threshold that gets an incentive for slow starters at a minimum of 1%, and increasing threshold for resilience and growth driver groups from initially at least 1% to at least 5% and 3%, respectively. ii. Two-fold increase in GWM incentive amount to banks extending People's Business Credit and MSMEs credit becomes 1% at the maximum accompanied by addition of bank groups based on achievement of Macroprudential Inclusive Financing Ratio (MIFR), namely 30% - 50% and above 50%. iii. Incentive for green credit/financing in property and/or green automotive is 0.3% at the maximum. iv. Total GWM incentive which may be received by banks changes from previously 200bps at the maximum to 280bps at the maximum.

No.	Date	Policy mix	Policy
86.	22.12.2022	Payment System	<p>Strengthening payment system policy to increase efficiency to maintain economic recovery momentum by:</p> <ul style="list-style-type: none"> i. Continuing credit card policy by: <ul style="list-style-type: none"> a. Maintaining the maximum limit of credit card interest rate at 1.75% per month. b. Extending the validity of minimum payment by a credit card holder of 5% of the total billing amount from 31 December 2022 to 30 June 2023. c. Extending the validity of penalty for late credit card payment of 1% or Rp100,000 at the maximum from 31 December 2022 to 30 June 2023. ii. Extending the validity of QRIS Merchant Discount Rate (MDR) for merchants in the Micro Business category at 0% from 31 December 2022 to 30 June 2023. iii. Continuing validity of National Clearing System (SKNBI) tariff of Rp1 from Bank Indonesia to banks and maximum of Rp2,900 from banks to customers from 31 December 2022 to 31 June 2023.
87.	22.12.2022	Payment System	<p>Taking strategic steps to ensure orderly national payment system to anticipate Christmas and New Year by:</p> <ul style="list-style-type: none"> i. Ensuring the availability of quality rupiah currency fit for circulation throughout the territory of the Republic of Indonesia ii. Maintaining continuity of payment system operation by Bank Indonesia and payment system industry.
88.	22.12.2022	International	<p>Strengthening international cooperation with other central banks and partner country authorities, and facilitation of investment and trade promotion implementation in priority sector in cooperation with the relevant institutions. In addition, Bank Indonesia coordinates with the relevant Ministries/Institutions for successful 2023 ASEAN Chairmanship, especially through financial track.</p>

CHAPTER 12

The Bank of Mexico's response to the post-pandemic inflation

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Jonathan Heath and Jaime Acosta¹

Bank of Mexico

INTRODUCTION

Starting in December 2015, the Bank of Mexico (Banxico) carried out a restrictive monetary policy cycle that saw its target rate reach 8.25% by December 2018.² This led Mexico to register an inflation rate of 2.8% (below its target of 3.0%) and the beginning of a mild recession in 2019. As a result, the central bank started an easing cycle in the second half of that year. Beginning in August 2019, the monetary policy rate was reduced by 25 basis points on five occasions, reaching 7.0% in February 2020. Then the COVID-19 pandemic arrived.

The World Health Organization acknowledged that the COVID-19 outbreak was a “Public Health Emergency of International Concern” at the end of January 2020. By the time it was declared a pandemic in March, Banxico was well aware that safe distance and lockdown measures would be causing an economic meltdown and be raising financial stability concerns. As a result, the first stage of ‘pandemic easing’ was implemented, accelerating the pace of the easing cycle up through the beginning of 2021. Likewise, Banxico announced macroprudential measures aimed at improving liquidity, assuring the well-functioning of financial markets, and strengthening credit channels (Bank of Mexico 2020a, 2020b). Since the beginning of the pandemic, monetary authorities were anticipating a greater fall in economic activity compared to other countries in the absence of major fiscal policy impulse.

In a second intermediate stage, uncertain conditions led to a discussion as to whether the pandemic effects on economic activity and inflation were temporary or not. As lockdown measures started to ease, an unforeseen inflationary challenge emerged. Almost at the same time, improved financial conditions and a resilient financial system led to a gradual

1 The authors thank Alejandra Muciño and Edwin Tapia for providing excellent research assistance. Likewise, we are grateful to the Bank of Mexico's Financial Stability Department staff Jorge García, Alejandro Saucedo, Jorge Guerrero and Lorenzo Bernal for their comments and insightful data that made some of the graphic material possible.

2 Factors that motivated this cycle were the Fed's restrictive cycle, uncertainty derived from the Trump administration, a pronounced Mexican peso depreciation and, later on, an abrupt increase in gasoline prices in 2017. Similarly, events like the Mexican presidential election in 2018 and the cancelation of Mexico City's new airport contributed to the uncertain environment.

phasing out of the complementary and macroprudential measures that, along with a pre-existing strong regulatory framework, had prevented a major deterioration in the Mexican financial system.

Finally, a third stage emerged, that could be called the ‘pandemic tightening’. Starting in the second quarter of 2021, economic activity was showing a clear recovery, while mounting global and domestic pressures were causing a rapid increase in inflation could no longer be labelled ‘temporary’. As a result, Banxico began a tightening cycle that evolved into several phases as an exaggeratedly complex inflationary phenomenon unfolded. In this stage, that has not concluded, inflation peaked in September 2022 and finally began to decline. Despite the significant progress, Banxico still faces strong challenges in order to be able see inflation converge toward its 3.0% target and restore normal monetary conditions.

THE ‘PANDEMIC EASING’

The COVID-19 crisis represented a deep crisis followed by a prolonged recovery. Lockdown policies brought an abrupt GDP fall of 19% in the second quarter of 2020, the largest quarterly decline since the infamous Tequila Crisis. This implied that one out of every three Mexicans looking for a job did not have one.³ The recovery was not similar to the rapid one observed in the Tequila Crisis in part due to the magnitude of the pandemic shock and the lack of any significant fiscal stimulus (Figure 1). Notwithstanding some marginal fiscal measures announced, the support was far short of the magnitude of the economic backlash.⁴ Although this prolonged the recovery process, Mexico avoided the major debt hangover that many countries are suffering in the aftermath of the pandemic. At the time, in the absence of fiscal stimulus, there was limited coordination between fiscal and monetary policies responding to the crisis.

The immediate policy response was an increase in the pace of monetary easing and the announcement of macroprudential policies. The economy was in a mild recession prior to the outbreak COVID-19, while the unprecedented conditions triggered by the pandemic brought about the possibility of long-lasting economic effects and a serious threat to financial stability. For these reasons, Banxico speeded up the easing cycle with five consecutive 50 basis point reductions between March 2020 and August 2020.⁵ In September 2020, the central bank adjusted the target rate reduction pace to 25 basis points and spaced its decreases until it reached the level of 4% in February 2021. Despite cyclical conditions, the Bank’s assessment of uncertainty about the balance of risks for

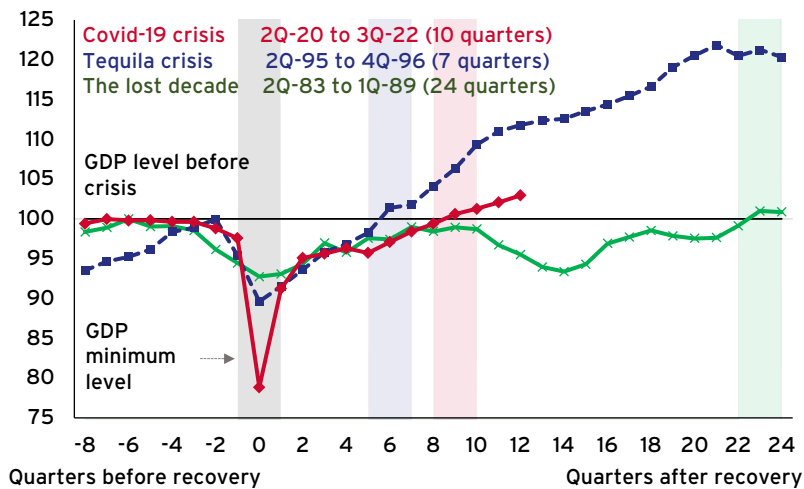
3 The extended unemployment rate, equivalent to the U-4 definition used by the U.S. Bureau of Labor Statistics, surged above 30%.

4 These measures amounted 242 billion pesos, approximately 1% of GDP at the time of the announcement. For a detailed description, see Bank of Mexico (2020c).

5 The March monetary policy decision was moved forward from 26 March to 20 March, while the April 2020 decision was made in an unscheduled announcement.

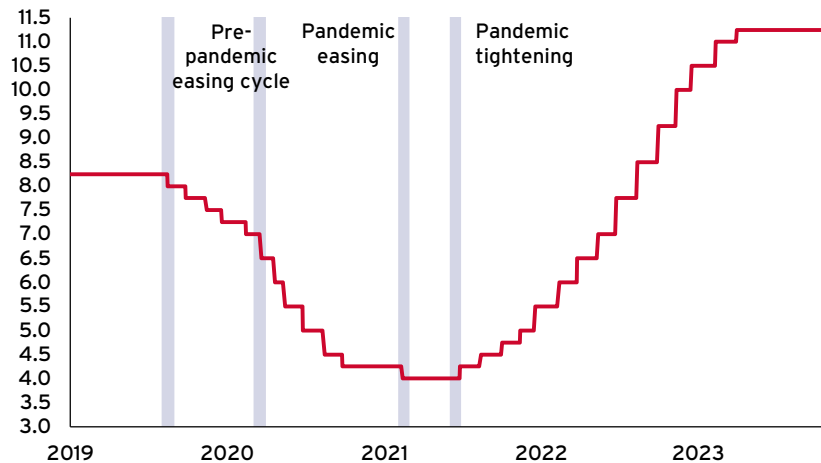
inflation⁶ prevented further monetary easing similar to other emerging economies. Likewise, quantitative easing (QE) was never implemented as the zero lower bound was never reached. Indeed, the only asset purchases by the Bank were those introduced with the complementary macroprudential measures listed in the next section.

FIGURE 1 GDP RECOVERY IN THE AFTERMATH OF MEXICAN ECONOMIC CRISES ⁷



Source: National Institute of Statistics and Geography (INEGI), update: 2Q-2023.

FIGURE 2 MONETARY POLICY TARGET RATE (ANNUAL RATE, %)

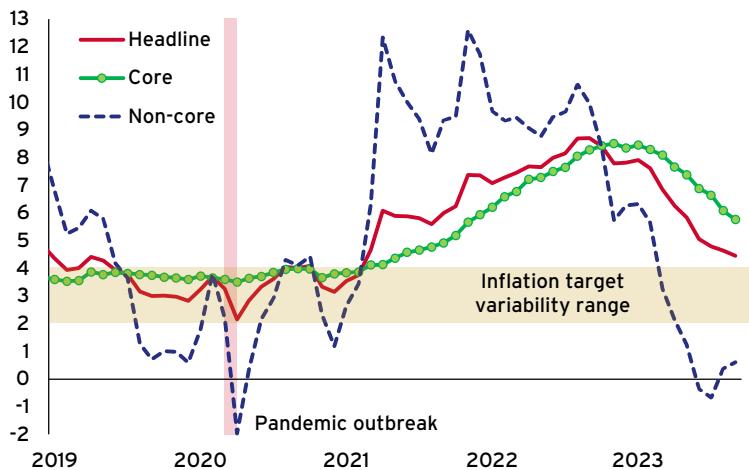


Source: Bank of Mexico, update: October 2023.

6 From June 2019 to February 2021, in the monetary policy statements the balance of risks for the expected inflation trajectory was deemed as uncertain.
 7 The GDP peak prior to each recession equals to 100. The zero-time lag represents the period where the GDP reached its minimum point. The shaded area represents the period when GDP reached its pre-recession level.

Banxico faced several challenges while easing monetary conditions.⁸ First, the pandemic financial distress and economic meltdown demanded quick stimulus that, unfortunately, could not be delivered given the limited effectiveness of monetary policy transmission mechanisms.⁹ Second, the lockdown, the sharp loss in household income and the shortage of some products and services led to a new composition of household spending and changes in relative prices. The demand for merchandises increased while demand for many services plummeted. The lockdown also led to negative supply shocks as many products faced restrictions in production resulting in price increases in spite of the huge negative output gap. Nevertheless, declines in prices of services were not strong enough to offset the increase in food prices.¹⁰ Indeed, Mexico's inflation gap was positive during almost all the pandemic period. Beginning in March 2021, inflation has been above the Bank's inflation variability target range. Third, the traditional reading of inflation indicators became harder, as CPI fixed weights stopped reflecting changes in household consumption patterns.¹¹ Fourth, with the likely reduction of potential GDP, the extent of the negative output gap became uncertain.¹² Thus, slackness conditions were less than what models suggested.

FIGURE 3 HEADLINE, CORE AND NON-CORE INFLATION (ANNUAL PERCENTAGE)



Source: INEGI, update: September 2023.

8 Banxico does not have a dual mandate like the US Federal Reserve; the priority mandate is price stability. Under the current inflation targeting framework, this means inflation centred at 3%, within a variability range of +/- 1%.

9 Monetary policy is less effective compared to major advanced and other emerging economies due to much lower financial inclusion, financial deepening, credit penetration, and a very high level of informality and banking system concentration. For some empirical evidence, see Jungo et al. (2022) and Arshad et al. (2021).

10 For more details see Bank of Mexico (2020f).

11 Compared to other countries, Mexico has higher CPI weights for food merchandise and lower weights for services; thus, changes in relative prices were amplified in headline inflation. In addition, given the changes in consumption patterns, traditional CPI weights were under-reporting true inflation for households' consumption basket at the time. For more details about challenges in CPI interpretation due to change in consumption patterns, see Reinsdorf (2020) and Tapia et al. (2022).

12 For a more comprehensive discussion, see Heath (2021).

Finally, the use of relevant forward guidance during most of the easing cycle was curtailed, given the perceived uncertainty of the balances of risks pertaining to inflation, growth and financial stability. The central bank communication was centred on highlighting the increasing challenges that the pandemic represented for monetary policy. Limited signalling about the direction of the target rate reductions was given towards the end of the easing cycle. In August 2020, the bank gave some assessment about the available room for further easing, while in September of that year it stated that such space was insufficient in order to signal a pause in the cycle. From February 2021 until June of that year, the central bank limited itself to expressing that all the decisions were data-dependent.

COMPLEMENTARY MEASURES AND OTHER MACROPRUDENTIAL POLICIES

Banxico's complementary measures

Banxico announced macroprudential measures on both 20 March and 21 April 2020,¹³ aimed at increasing liquidity, assuring the well-functioning of the payments system and enticing credit expansion for micro, small and medium-sized firms (MSMEs). The goal was to make sure that financial intermediaries would continue financing economy activity and to ease deteriorating domestic financial conditions. These measures could be classified into three groups, depending on their primary objective, although some could contribute to several objectives simultaneously.¹⁴

The first group sought to provide adequate liquidity in short-term funding markets and to strengthen commercial banks' financing to perform their operations under extreme volatility. Banxico allowed a partial reduction of fixed commercial bank deposits in the central bank,¹⁵ reduced the cost of some central bank liquidity facilities,¹⁶ and increased liquidity in the inter-bank repo market during trading hours.¹⁷ Similarly, given the stress in some securities trading, the Bank also opened a government securities term repurchase window,¹⁸ a temporary securities swap window,¹⁹ and a corporate securities repurchase facility.²⁰ The latter was crucial to reactivate the depressed corporate debt market at the time.

13 The press releases are available on Bank of Mexico (2020a, 2020b).

14 A summary of these measures was published in Bank of Mexico (2020c).

15 This involved a 50 billion pesos reduction out of 320 billion pesos in Monetary Regulation Deposits that were held on a permanent basis by commercial and development banks in the central bank.

16 The interest rate of the credits and repos made through the Ordinary Additional Liquidity Facility (FLAO, for its acronym in Spanish) was lowered from 2.0-2.2 to 1.1 times Banxico's target for the overnight interbank interest rate. Also, there was an increase of titles eligible for the FLAO collateral.

17 With this measure the bank maintained a daily level of excess liquidity during financial markets' trading hours.

18 In this window, the repurchase at longer terms than those of regular open market operations was allowed.

19 Aimed to specific illiquid instruments.

20 This provided liquidity to corporate securities.

The second group aimed to encourage an orderly behaviour of financial markets and to provide US dollar liquidity. For these goals, the Bank offered swaps of government securities.²¹ In collaboration with the Ministry of Finance, some amendments to the Government Debt Market Makers Program were made to foster more participation of the institutions enrolled in this program.²² Finally, by instruction of the Foreign Exchange Commission, to promote orderly operating conditions in the Mexican peso/ US dollar markets, Banxico granted US dollar financing to credit institutions²³ and a complementary foreign exchange hedge programme to be traded when Mexican markets were closed.²⁴

Finally, a third group of measures sought to strengthen credit channels by providing resources to the banking institutions to finance enterprises affected by the pandemic.²⁵ In addition, the Bank introduced a collateralised financing facility where commercial banks could use their corporate loans as collateral. As the corporate sector used their credit lines, commercial banks had their liquidity reduced. Hence, the goal of this facility was to provide additional resources to the banking sector that could be granted to MSMEs.

From their announcement, these measures sent a strong signal that Banxico was preventing a collapse in the financial system. These measures provided additional support to financial intermediaries that translated into an improvement of the liquidity position, capitalisation levels and availability of funds (Bank of Mexico 2020e). The measures fostered an orderly operation of financial institutions, even for those who did not use the facilities directly. Likewise, they improved the trading conditions of the fixed income and exchange markets, contributing to releasing some financial stress. Regarding the facilities geared towards strengthening credit channels, despite not providing direct lending from Banxico to the non-financial private sector, they gave access to resources that could be used by credit institutions to revert any potential credit crunch.

The Special Accounting Criteria and other macroprudential measures

The Mexican financial system was more resilient at the onset of the pandemic because of the financial reforms implemented since 2008. In Mexico, the development of the current macroprudential policy toolkit has been nourished by international experience and best practices recommended by international organisations, mainly the IMF and the Financial Stability Board (FSB), and the Basel III prudential regulations. In addition to this strength, the regulatory authorities deemed necessary the introduction of temporary macroprudential actions.

21 In these swaps, Banxico received long-term securities (ten years and longer) and delivered others with maturities of up to three years as long-term securities trading conditions had deteriorated.

22 For more details, see the press release of 20 March mentioned previously.

23 Using the temporary US dollar liquidity arrangement, the “swap line” with the US Federal Reserve, Banxico conducted US dollar auctions to increase the availability of dollar financing for private sector participants. This measure provided certainty of funding for the entire financial system and their mere announcement had calming effects.

24 These hedge transactions were settled by differences in US dollars.

25 This funding had to be channeled to MSMEs and individuals and could be guaranteed using DRM or some eligible securities.

TABLE 1 BANXICO'S COMPLEMENTARY MEASURES

	Size of the programmes ¹		Total amount allocated ²	
	(billion MXN)	(billion USD)	(billion MXN)	(billion USD)
I. Measures to provide liquidity				
Reduction of Monetary Regulation Deposits (DRMs, for its acronym in Spanish)	50		50	
Government securities term repurchase window	150		465	
Temporary securities swap window	50		63.1	
Corporate securities repurchase facility	100		44.8	
II. Measures to foster an orderly behaviour of financial markets				
Swaps of government securities	100		14.9	
Foreign exchange hedge programme (billion USD)		30		7.5
Financing in USD via credit swap line with the US Federal Reserve (billion USD)		60		15.2
III. Measures to strengthen credit provision				
Financing to MSME via DRM funds or term repo	250		13.9	
Collateralised financing facility for commercial banks with corporate loans to finance MSME	100		40.2	
Total measures implemented in billion MXN billion³	800		692.2	
Total measures implemented in billion USD		90		22.7

Note: 1) The size of the programs consider the amount announced and used in each measure, before the unwinding period of the facilities. 2) Include maturities and refinancing. 3) The total amount does not consider the increase in liquidity trading operating hours.

Source: Bank of Mexico.

On 29 April, the National Banking and Securities Commission (CNBV) issued a set of Special Accounting Criteria (CCEs from its acronym in Spanish) to relieve potential financial distress. The CCEs allowed the accredited population to defer totally²⁶ or partially capital and/or interest payments related to consumer residential mortgage and selected commercial loans.²⁷ This provided relief to financial institutions' balance sheets, as balances could be frozen without interest charges. The CCEs were freely adopted by credit institutions²⁸ and credit activity remained resilient during the lockdown months. Most of the loans related to these CCEs continued to make the scheduled payments that they would have had to make in the absence of said criteria and, therefore, represented a lower risk. In addition, the Mexican authorities provided additional flexibilities embedded in the international regulatory standards.²⁹ Finally, in Mexico, like in other countries, no capital flow controls were introduced.

The reversal of the complementary and macroprudential measures

The complementary measures in national currency announced by Banxico amounted to 800 billion pesos, equivalent to 3.3% of GDP at the time, and another \$90 billion in foreign currency. The total amount allocated to these measures, including maturities and refinancing, were 692.2 billion pesos and \$22.7 billion, respectively (see Table 1 for details). Based on an econometric model, Alba et al. (2023) found that these measures contributed to financial conditions, having a positive effect on the sovereign risk premium, the ten-year government bond yield, the slope of the yield curve, the yield spreads between Mexico and United States, and the exchange rate.

Considering the benefits of these measures and given the risks that persisted in the Mexican economy and financial system, Banxico announced on 15 September 2020 an extension until 28 February 2021. On 25 February 2021, some measures were extended once again till 30 September 2021 (for details, see Figure 4 and Bank of Mexico (2021)). The phasing out of the measures was clearly communicated in advance and at all times the authorities showed willingness to reinstall them or to introduce additional actions if necessary. Likewise, the authorities remained vigilant of potential insolvencies when regulatory relief facilities and financial support were fully unwound. The gradual unwinding avoided abrupt adjustments in financial institutions and did not represent a stress factor for financial stability.

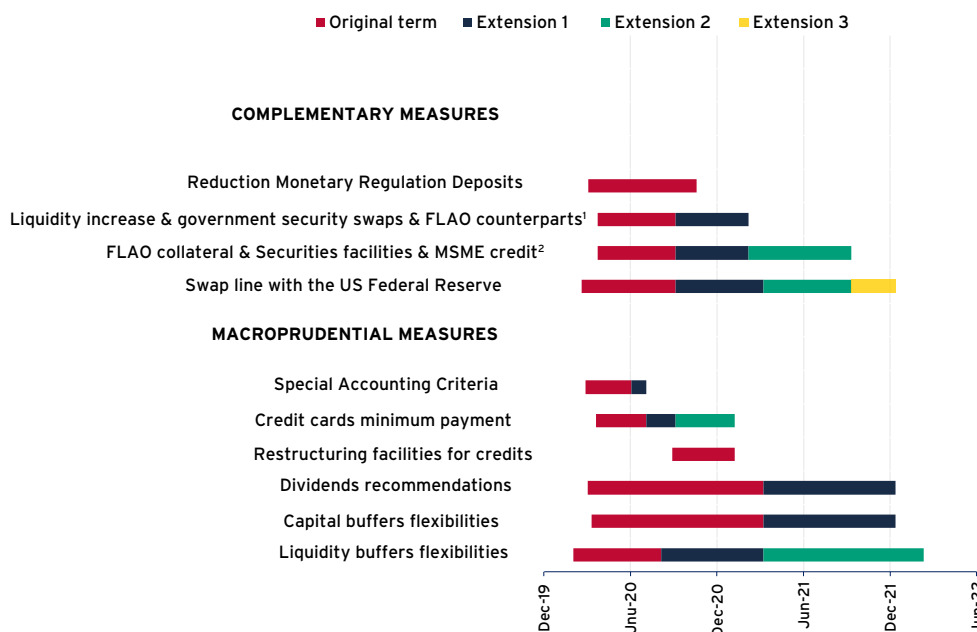
26 The deferral was for up to four months with the possibility of a two-month extension.

27 As long as the credit accounting was classified as current as of 28 February 2020 and the implementation was carried out within 120 calendar days following this date. Later, the CNBV allowed the inclusion of credits that were valid until 31 March.

28 Initially, the validity of the period of adhesion to the CCE concluded on 26 June 2020. However, the CNBV decided an extension until 31 July 2020.

29 For more details, see Bank of Mexico (2020d).

FIGURE 4 TERM OF COMPLEMENTARY MEASURES



Note: 1) Increasing liquidity in inter-bank repo market during trading hours and FLAO broader counterparts. 2) FLAO refers to the broader collateral eligibility, the adjustment to FLAO interest rate did not have a specific end date; Securities facilities includes: government securities term repurchase window, temporary securities swap window and corporate securities repurchase facility ; MSME credit includes: financing to MSMEs and individuals and collateralized financing facility for commercial banks to finance MSMEs.

Source: Banco de México, Minister of Finance (SHCP), National Banking and Securities Commission (CNBV)

THE 'PANDEMIC TIGHTENING' RESPONSE TO THE INFLATION SURGE

The complexity of the pandemic inflation

Even though inflation finished 2020 at 3.15%, the next year started out with a clear upward trend, surpassing 6% by April. The main causes were the mounting global pressures brought about by the pandemic, which disrupted supply chains worldwide and increased the cost of maritime transportation. At the same time, the excessive fiscal and monetary stimulus carried out by many countries contributed to explosive increases in commodities and food prices. The safe distance and stay-at-home policies caused significant shifts in household consumption. The result was increasing inflation in almost all countries. Mexico was not spared, especially because of its global presence in international trade.

Of all price groups worldwide, energy was one of the biggest victims, causing non-core inflation to increase well above core inflation in most countries. In Mexico, however, the government implemented a gasoline subsidy policy aimed at maintaining a quasi-fixed price. This effort curtailed sharp increases in consumer energy prices, limiting the peak of inflation to 8.7% in September 2022, (below the peak of 9.1% observed in the

United States in June of the same year). Without this policy, it is likely that headline inflation would have increased further to a double-digit number. Nevertheless, while this avoided inflation from reaching a higher peak, when gasoline prices started to decrease internationally, it also failed to accelerate the downward trend that many other countries experienced.

In spite of controlling gasoline prices, other energy prices, such as domestic gas, experienced large price swings. This, together with sharp increases in agricultural prices, led non-core inflation to peak at 12.6% in November 2021. Starting in 2022, the non-core component initiated a strong and continuous downward trend, reaching negative annual rates by mid-2023 and becoming the most important factor explaining the decline in headline inflation.

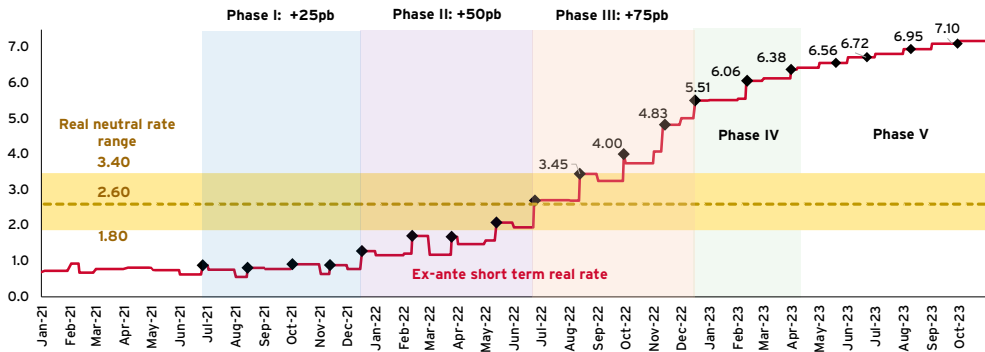
Banxico was very aware that the pandemic inflation was initially sparked by global pressures. As a result, it was clear that for inflation in Mexico to start declining, a necessary (but far from sufficient) condition was that global pressures must start dissipating. Almost all global pressure indicators for inflation did start declining in mid-2022, and by the start of 2023 Mexico saw a shift from global to domestic factors as the main pressure points feeding into inflation. The output gap turned positive, the unemployment gap reached a record negative level and labour costs continued to increase. Merchandise inflation started to decline, while service inflation (non-tradeables) showed at best a horizontal trend.

Monetary policy tightening

Fortunately, the initial discussion surrounding the transitory characteristic of inflation at the beginning of 2021 was left behind, as the reopening of economic activity, together with mounting global and domestic pressures of prices, called for abandoning the domestic expansionary monetary posture. By the beginning of June 2021, the ex-ante short-term rate of 0.8%³⁰ was well below the estimated neutral rate of 2.6%,³¹ implying a monetary posture deep in expansionary territory (Figure 5). As inflation and inflation expectations surged, the Bank needed to start increasing the target rate. Initial discussions were about achieving a neutral monetary stance, anticipating that inflation would soon peak and return back near its target. Nevertheless, it soon became apparent that this inflation episode was much more complex, and needed a much more restrictive stance. For this reason, Banxico started, nine months ahead of the Federal Reserve, a tightening cycle aimed at inflation convergence to its target.

30 The short-term ex-ante real rate is constructed using the target for the overnight interbank interest rate and 12-month inflation expectations from Bank of Mexico's Survey. At the time, the monetary policy target rate was 4% and 12-month inflation expectations were at 3.2%.

31 The neutral rate is estimated to be a middle point of 2.6% in a range of different estimations. For more detail, see Bank of Mexico (2019).

FIGURE 5 EX-ANTE SHORT-TERM REAL RATE (ANNUAL PERCENTAGE)

Note: The dotted line corresponds to the midpoint of the estimated range for the short-term neutral real rate in the long term.

Source: Bank of Mexico, update: October 2023.

In order to achieve a restrictive posture, the tightening cycle went through three initial phases, with each of them increasing the magnitude of target rate hikes. In the first phase, with the cyclical conditions showing a struggling economy in an uncertain recovery process, the Bank pursued a gradual tightening with four 25 basis point hikes. However, this was not enough to compensate for the deterioration of inflation and its expectations. As a result, by the end of 2021 the ex-ante real rate was practically at the same level as in June, six months earlier. Thus, in December 2021, the restrictive cycle continued with a second phase of four consecutive 50 basis point hikes. During this period, despite increasing the tightening pace, the ex-ante rate barely reached the lower bound of the neutral zone. The monetary stance was still far from being restrictive enough to cope with headline and core annual inflation rates above 7%, more than double the inflation target. As the Mexican economy displayed clear signs of recovery and inflation kept increasing, the restrictive cycle entered a third phase of another four consecutive target rate hikes of 75 basis points, a magnitude of increase never seen before.³² In October 2022, the real ex-ante rate finally entered into restrictive territory and started approaching a level that was considered appropriate to deal with the complexity of the inflationary environment. Headline inflation, after reaching maximum levels in September 2022, started a gradual reduction, while core inflation peaked in November and initiated a downward trend.

In a fourth phase, in December 2022 the Bank carefully calibrated the terminal rate with a gradual slowdown in the pace of upward adjustments. The terminal interest rate level was attained in March 2023 at 11.25% in nominal terms and near 6.5% in ex-ante real terms. This calibration was important given that, in principle, the nominal target rate would remain fixed for an extended period. During this stage, Banxico balanced between avoiding an early hiking pace deceleration without a significant improvement

³² The current monetary policy regime that uses an objective for the interbank overnight funding market started in 2008. Data prior to this point in time are not comparable.

in the inflationary outlook and reaching a higher-than-necessary terminal rate. The Bank decided to stop hiking considering the monetary policy stance already attained, the lags with which monetary policy operates, the progress in the disinflationary process, the prospects of inflation convergence to the target and the anchoring of inflation expectations.

Thus, starting in May 2023, a fifth phase of the restrictive cycle started with monetary policy management continuing in a passive mode. Although the target rate has remained unchanged at 11.25%, the ex-ante real interest rate has increased 72 basis points through the decline of inflation expectations.³³ In the following months, depending on the convergence of inflation to its target and the resilience of economic activity, the central bank might start a sixth phase with target rate fine-tuning to prevent the monetary policy stance from becoming too restrictive. During this stage, if implemented, the reference rate must begin declining alongside inflation expectations, in order to maintain an ex-ante real interest rate roughly within a range of 7.0% to 7.5%³⁴ for an extended period of time. Finally, in the last stage, a normalisation towards a neutral monetary policy stance should be adopted, once the inflation target is reached.

Banxico determines its monetary policy decisions through two important postures: an absolute one, defined by its real ex-ante overnight rate of the inter-bank funding market; and a relative posture, demarcated by the interest rate differential between the monetary policy rates of Banxico and the US Federal Reserve. Obviously, the two are linked and cannot be determined separately. However, at times one can be more important than the other. Because Banxico started increasing in June 2021, the monetary policy target rate differential increased from 375 basis points in the first half of 2021 to 575 basis points, nine months prior to the Federal Reserve's first increase in March 2022. Once it reached 600 basis points after Banxico's May meeting, the Bank focused on keeping the differential roughly fixed at that level, while trying to attain an appropriate real ex-ante rate. This allowed Banxico to basically ride with the Federal Reserve's increases up through March 2023, once it decided that it had reached a terminal rate. From that point on, the Federal Reserve's actions became less relevant, as Banxico's focus was on maintaining its policy rate at 11.25% for an extended period of time, as explained previously. It is foreseen that in the immediate future, Banxico will not follow the Federal Reserve if the latter decides to increase the Federal Funds rate any further.

After hovering near 20 pesos to the dollar since the beginning of 2021, the exchange rate started to move downwards as of October 2022, falling below 17 pesos by mid-July 2023. While most of this movement could be explained by the dollar depreciation, the peso basically outperformed most other emerging market currencies, with the notable exception of the Colombian peso. The high interest rate differential is pointed out by

33 With data up through the end of October 2023.

34 This range is a result of our own estimations and does not necessarily coincide with the Bank staff's.

most as being one of the most important factors. Nevertheless, non-residential holdings of Mexican public-debt bonds showed significant outflows throughout the time that the peso was appreciating.

Important studies carried out by Banxico have all concluded that Mexico's pass-through coefficient is very low.³⁵ Nonetheless, the significant appreciation has definitely contributed to lower global pressures throughout the last year. The strength of the peso not only has helped offset higher international prices, but has also contributed to preventing inflation expectations from increasing too much.

The major risks going forward

Headline inflation is expected to finish 2023 somewhere near 4.5%, with core edging towards 5.0%. Given that inflation is approaching the upper limit of the +/-1% variability range around its 3.0% target, many have called for the beginning of a downward cycle in the reference rate as soon as possible. The Bank of Mexico, however, is likely to proceed with caution and prudence as the balance of risks for inflation remains with a clear upward bias. Most of these risks come from a very resilient economy with a very tight labour market, and an expected fiscal boost in the first half of the year. All indicators of slack, including the output gap, are consistent with demand-side pressures. In particular, the prices of services are expected to keep increasing, given its cyclical behaviour. The favourable base comparison that was observed in 2023 is expected to revert, as well as the downward trend in non-core inflation. These risks point to a high degree of persistence, especially in core inflation.

The Bank's current forecast sees headline inflation finishing around 3.3% in 2024 and finally converging to its 3.0% target by the second quarter of 2025. This last push, however, will be more difficult than that achieved in the previous year, which definitely calls for maintaining a restrictive stance for an extended period, beyond 2024.

Banxico's communication during the restrictive cycle

During the first phase of the restrictive cycle, the use of forward guidance was limited. Indeed, from June 2021 until November 2021 the Bank stated in its monetary policy press releases the assessment that the inflationary shocks were largely transitory. Nevertheless, the horizon over which they could have an effect was unknown. This assessment was removed in December 2021, once the restrictive cycle reached its second phase of 50 basis point hikes.

35 For further details see Bank of Mexico (2012, 2017).

As the restrictive cycle advanced, forward guidance became key for managing market expectations. Since May 2022, specific words have been used in forward guidance to signal more aggressive hikes,³⁶ more data dependency,³⁷ or revisions in the rate of an increase of the target rate.³⁸ This wording has been effective since most market specialists have successfully anticipated the target rate movements. It is important to emphasise that these references do not represent an unchanged commitment by the central bank, since all decisions are subject to the information available and could be modified if something unforeseen occurs.³⁹ For now, the central bank's current forward guidance should keep signalling that the policy rate will remain fixed for an extended period⁴⁰ with a restrictive stance that will not yield until the primary mandate is fulfilled. As recently documented (Heath and Acosta 2023), Banxico should keep pursuing more clarity, better communication and more transparency in the conduct of monetary policy.

Given the current inflation forecast targeting framework, central bank credibility is essential for efficient monetary policy transmission. For this reason, the Governing Board aims at consistent policy action with the primary goal of low inflation all the time. Credibility is crucial to keeping inflation expectations anchored, despite some deterioration during this inflationary episode. The Bank still faces some challenges, such as consolidating short-term inflation expectations within the target range and achieving long-term expectations, centred at least around the same pre-pandemic levels. Likewise, it is imperative that our expected inflation trajectory stops being subject to major revisions in order to minimise any potential reputational cost.

CONCLUDING REMARKS

The COVID-19 crisis represented unprecedented complications. Throughout all the stages of the policy response, Banxico has set a key policy rate that is deemed consistent with inflation convergence. The policy decisions have been introduced in a timely manner, looking for an anticipation of the effect of the multiple shocks faced. The Bank has been using additional communication tools to manage market expectations. Likewise, the pursuit of additional mandates, such as promoting the sound development of the financial system and fostering the proper functioning of payment systems, has been addressed by complementary macroprudential measures. It is worth mentioning that the COVID-19 crisis did not have a significant effect on the stability of the financial system, due to the existing regulatory framework.

36 In May 2022, to suggest an increase of the hiking pace from 50 basis points to 75 basis points, in the press release it was stated that "taking more forceful measures may be considered". The wording "same forceful measures" was also used to refer to the 75 basis point hike in June 2022.

37 For example, in the monetary policy announcements of August, September and November 2022.

38 In December 2022, the forward guidance stated that the increases would continue, but the pace of the increase would be assessed and adjusted..

39 In February 2023, the Governing Board faced an upward surprise in inflation that prevented an anticipated reduction of the rate increase pace by some analysts.

40 Since May 2023, the forward guidance has signalled that "it will be necessary to maintain the reference rate at its current level (11.25%) for an extended period".

Although Banxico's priority mandate is price stability, monetary policy decisions have also considered cyclical positioning, particularly in the absence of expansionary fiscal policy and the uncertainty around the long-term effect on potential output. As the Mexican economy goes through a long recovery process, Banxico will exploit all the degrees of freedom that its primary mandate grants in order to successfully complete the normalisation process.

On a final note, it should be understood that monetary policy transmission in Mexico is less effective than in other countries, not only in comparison to developed economies but also compared with emerging countries that are considered peers. This is due mainly to the low levels of financial depth and inclusion, low credit penetration, the high levels of informality, and the lack of competition in the financial system. Many sectors of the economy with limited competition have seen firms with market power continuing to increase their prices, despite the fact that the supply shocks that drove the increases have dissipated. All said, these factors have slowed down the decline in inflation and increased the need for a longer period of monetary restriction.

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CHAPTER 13

The South African Reserve Bank's response to the recent inflation episode

Christopher Loewald

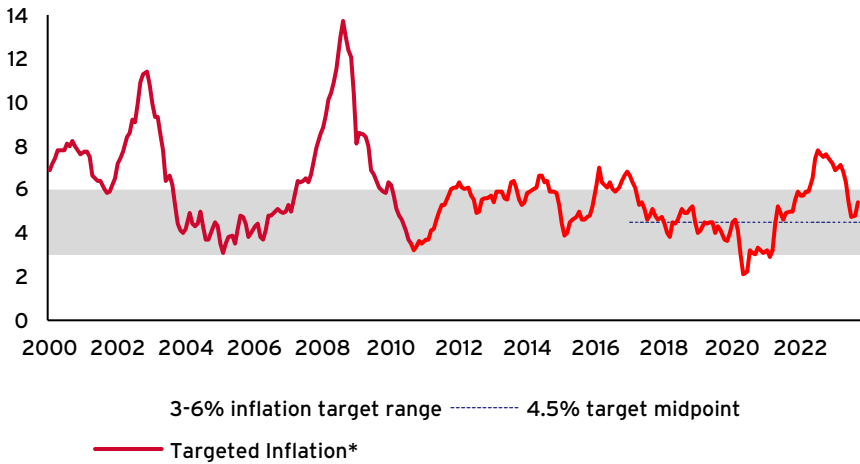
South African Reserve Bank

INTRODUCTION

South Africa's inflation surge hit a peak rate of 7.8% in July 2022, rising from an average of 3.3% in 2020 and well above the 4.5% midpoint target set by the South African Reserve Bank (SARB). Inflation has since returned to the 3-6% target range, briefly reaching the midpoint before exhibiting significant monthly volatility. Headline inflation accelerated once again to 5.4% in September 2023, before easing to 5.1% in December. Despite the moderation in price inflation, underlying price pressures look sticky and inflation risks are wide-ranging and to the upside.

This chapter outlines the measures taken by the SARB to address the post-pandemic inflation surge. These efforts include a significant tightening of policy rates, the mopping-up of excess liquidity, and stronger communications centered on anchoring inflation expectations at the midpoint of the target range.

The SARB's multi-channel approach to policy has helped contain inflation expectations across price-setters, despite a range of supply and demand shocks acting at global and domestic levels. The approach derives from a long-standing focus on the spillover of negative supply shocks into cost push inflation and careful discussion of the interactions of aggregate supply and demand in such a complex and volatile environment. In such conditions, pro-active policy and communications are required to maintain the anchoring of inflation expectations.

FIGURE 1 TARGETED INFLATION SINCE 2000

Note: *CPIX for metropolitan and other urban areas up to December 2008. Headline CPI for all urban areas from January 2009 onwards.

Sources: Stats SA and SARB.

THE ECONOMIC BACKDROP

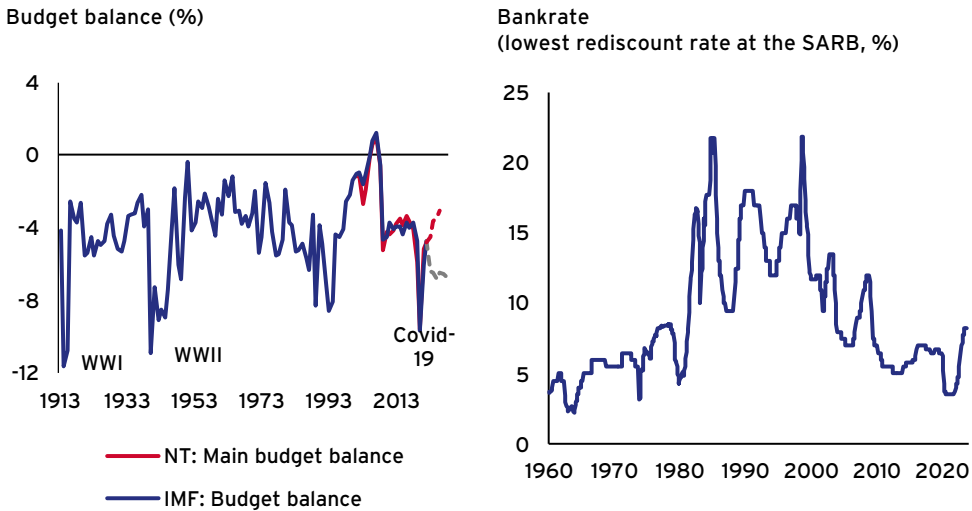
When the COVID-19 pandemic reached South Africa in early 2020, policymakers reacted quickly and forcefully. Between March and July 2020, the SARB cut the main policy rate by a cumulative 350 basis points, bringing borrowing rates to multi-decade lows.¹ Although the SARB has no formalised forward guidance framework, its published model forecasts suggested that interest rates would remain near historically low levels over the medium term, and in real, ex-ante, terms more negative than at any other point in the SARB's inflation targeting history. The SARB also implemented various market measures to improve liquidity and safeguard the banking system.² These measures were complemented by a set of fiscal measures, including direct transfers to households and small businesses owners, various tax exemptions, and a loan-guarantee scheme. Together with the automatic stabilisers that South Africa has in place, the fiscal measures doubled the consolidated budget deficit to 9.9% of GDP in the 2020/21 fiscal year. In turn, debt as a share of output jumped from 57% to 70%, a fresh record.³

1 These cuts were rapid; during the height of the pandemic, 200 basis points worth of cuts were delivered within a 26-day period.

2 For a full review of the SARB's policy response to Covid-19, see Loewald (2021).

3 Including state-owned enterprises, total consolidated public sector debt jumped from 112.8% in 2019/20 to 125.4% in 2020/21.

FIGURE 2 MACRO POLICY SETTINGS DURING THE PANDEMIC



Note: Dotted lines indicate forecasts (as of Oct 2023).
Source: National Treasury; IMF.

Source: SARB.

Despite the extraordinary policy stimulus of the time, an eventual inflation surge did not seem inevitable. The post-GFC experience suggested that even in the face of extraordinary policy stimulus, inflation for most advanced economies could undershoot their targets. Aggregate inflation for advanced economies was just 1.4% in 2019 and was not expected to overshoot the 2% mark throughout the forecast horizon.⁴

Additionally, the correlation between monetary growth and inflation appeared weaker, ascribed to improved central bank credibility, better-anchored inflation expectations, and wage determination aligned closely to productivity growth. Large stimulus measures would support households that were now liquidity-constrained but higher precautionary savings rates would last, keeping consumption low. The major policy debate remained centred on whether advanced economies would be able to avoid *deflation*.

Second, FX passthrough had weakened, limiting imported inflation. Although the rand depreciated by 17.5% against a basket of currencies between February and April 2020, its impact on the overall headline inflation rate was expected to be muted. Our estimates indicated that by 2019, for every 1% depreciation in the currency, headline inflation would increase by less than 0.15 percentage points at its peak. With headline inflation expected to remain within the lower half of the target band, exchange-rate shocks could be absorbed within the flexible inflation targeting framework.⁵

4 The aggregate inflation forecast for the 2021-23 period suggested prices would hover around 1.6%, and would only reach 1.9% by the end of the five-year forecast horizon.

5 Subsequent estimates have shown passthrough was actually as low as 0.09 in 2019. The number has since increased since the inflation surge, with estimates back to about 0.14 in 2023 (Rakgalane and Steinbach forthcoming, Kabundi and Mlachila 2018).

Third, and relatedly, monetary policy credibility was thought to have increased, generating space to ease policy substantially. By the end of 2019, longer-term inflation expectations had fallen from a previously sticky 6% level to the 4.5% target midpoint.

In the event, actual inflation outcomes were lower still, slipping below 4% in the second half of 2019, and continued to slide lower through much of 2020. Oil prices collapsed and services inflation was also unusually low. Housing inflation wilted as demand fell, while health inflation decelerated as medical insurance providers cut prices.⁶ Services inflation was also unusually low, thanks to a combination of weak housing inflation (weak demand, oversupply, and competitive mortgage rates), and an anticipated deceleration in health inflation (as medical insurance providers had larger than usual reserves). More broadly, a very wide output gap and appreciated currency would keep underlying inflationary pressures subdued for some time. For much of the 2020 period, the Monetary Policy Committee (MPC) assessed the overall balance of inflationary risks to be on the downside.

The response to the pandemic however, carried some potential inflation risks, in particular those posed by excess liquidity. Steps taken to expand liquidity were relatively quickly reversed or capped. The bond-purchasing programme was terminated in August 2020, and the Bank reverted to normal standing facility borrowing and lending rates. The effective repo rate rose by about 35 basis points, close to the repo rate set in the MPC.

Eventually, the assumption that global inflation would remain muted began to erode as global pent-up demand and policy stimulus interacted with severe global supply constraints.

EARLY WARNING SIGNS

By the beginning of 2021, South Africa's economic recovery was well underway, but far from complete. The economy had largely reopened, yet only a handful of sectors had recovered to their pre-pandemic levels of output. Pent-up demand from the lockdowns and a stronger currency helped support consumption expenditure, which had rotated towards more goods. Credit aggregates showed that low interest rates were transmitting through to purchases of homes, vehicles, and durable goods. The services sector, however, remained constrained: vaccines were not yet widely distributed, and new strains and variants of the virus meant ongoing (but better targeted) restrictions in the tourism and hospitality sectors.

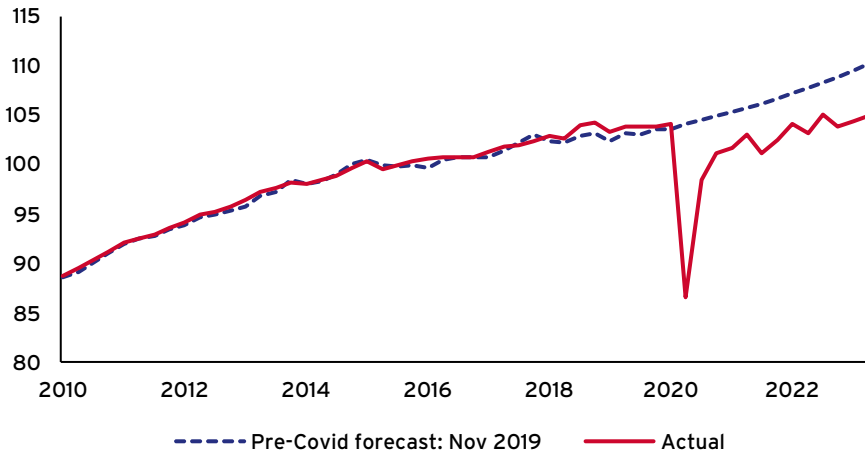
Weak import demand and rising commodity prices (for iron ore and platinum group metals) kept external balances in surplus. Windfall tax revenues meant that fiscal authorities could continue supporting the economy, despite relatively elevated debt

6 WTI famously turned negative, reaching -\$38/bbl on 20 April 2020, amidst a collapse in demand and concerns over storage capacity.

levels. Fiscal deficits were still expected to average about 7.6% over the medium term, far wider than their 3.9% pre-COVID levels. In turn, debt was unlikely to stabilise for at least four more years. So long as private saving remained high and the trade balance in surplus, the risk of inflation appeared low, even with the fiscal deficit and debt level. From early 2021, however, fiscal metrics deteriorated as growth underperformed and policy remained expansionary.

FIGURE 3 ACTUAL GDP REMAINS BELOW ITS PRE-COVID TRAJECTORY

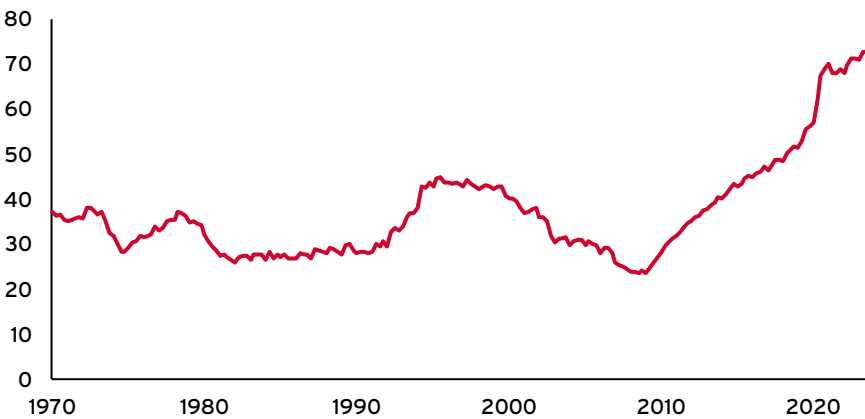
GDP levels (index: 2015=100)



Source: Stats SA; SARB.

FIGURE 4 PUBLIC DEBT CONTINUES TO CLIMB

Public debt (% of GDP)



Source: National Treasury; SARB.

By mid-2021, it was clear that global producer prices were starting to rise, prompted by strong demand for goods in the context of constrained supply chains. Trading partners' wholesale prices reversed aggressively from deflation to 9.3% in the second quarter. Domestically, producer prices for intermediate manufactured goods had already exceeded 11%, while prices for final manufactured goods had climbed to 6.7%.

The view that these price pressures would be transitory hinged on rapid vaccine distribution, allowing supply and demand balances to readjust back to a lower-price equilibrium. The SARB MPC remained wary of this view, however, and producer price developments prompted the MPC to flag upside risks to the inflation trajectory in May 2021. This assessment, the first of its kind since the pandemic began, signalled future policy normalisation but not yet lift-off. The recovery clearly was still incomplete, and local food price inflation remained muted, in clear contrast with global food price developments. With a negative output gap and inflation expectations still contained, core inflation was expected to remain well below the midpoint of the inflation target range throughout the forecast horizon. A jump in headline inflation in May 2021 to 5.2% appeared to be relatively short-lived, with prices slipping again during June and July, and longer-term forecasts remained largely unchanged.

The flexible inflation targeting framework therefore allowed the MPC to look-through the temporary shocks, and the first rate hike came only in the final meeting of 2021. The Committee instead opted to emphasize in its communications that the era of ultra-low interest rates would not last forever, that global inflation was expected to spillover into South African prices more strongly, and that 'normalisation' would occur despite uncertainty over its timing.

DEALING WITH THE INFLATIONARY SURGE

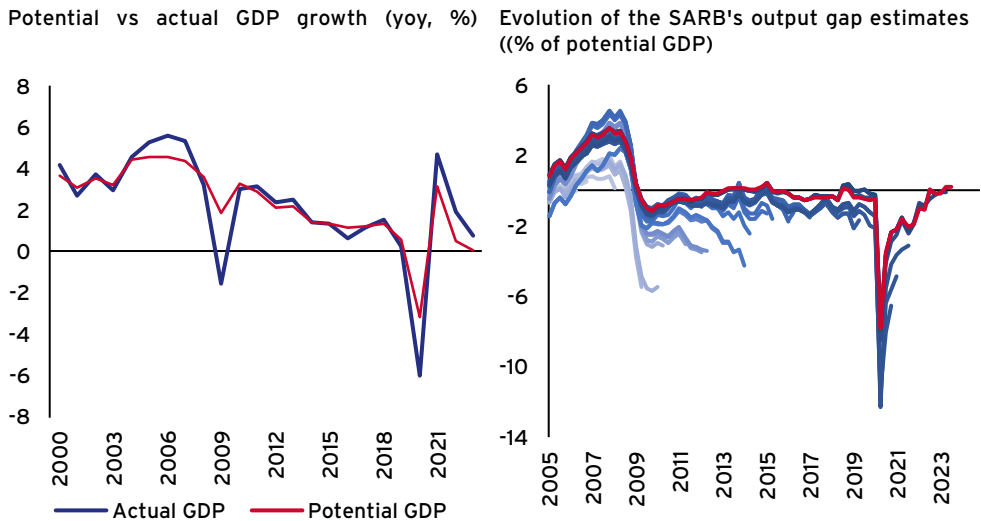
This balancing act of supporting the economic recovery despite rising inflationary risks continued until November 2021, when inflation risks began to materialise. The inflation print published the day before the policy announcement showed that prices jumped from 5% to 5.5% in October, with significant additional upside risks to the already finalized forecast.

It also became clear that the pace of growth that South Africa could sustainably achieve was falling. The rollout of vaccines had progressed at a faster pace, but underlying growth trends were soft. Social unrest during the second half of 2021 halted economic activity for a week in two large economic hubs (Gauteng and KwaZulu-Natal), while energy availability from the national electricity grid deteriorated. The jobs recovery remained weak, while investment remained muted. Arguably, the economy was experiencing scarring effects from the various economic shocks, and it was not clear how much more growth would come via the interest rate channel. By the end of 2021, the forecast showed that potential growth was slipping to sub-1% levels. In this period, the estimates of the

output gap were large and negative, but their role in pulling down inflation was unclear, leading the committee to consider whether even modest demand would risk once again pushing inflation too high.

This presented the Bank with the possibility of making the same policy error as in the aftermath of the global financial crisis. At that time, potential growth estimates were still far too high, resulting in a perennial output gap of about 1%, and with expansionary fiscal and monetary settings, contributed to a high-consumption weak-investment equilibrium and rising inflation. Whether from energy or other factors, potential output was now simply returning to the low levels reached in 2019 and the 2021 growth surge was simply a bounce-back from the pandemic.

FIGURE 5 POTENTIAL GDP AND OUTPUT GAP ESTIMATES



Source: Stats SA; SARB.

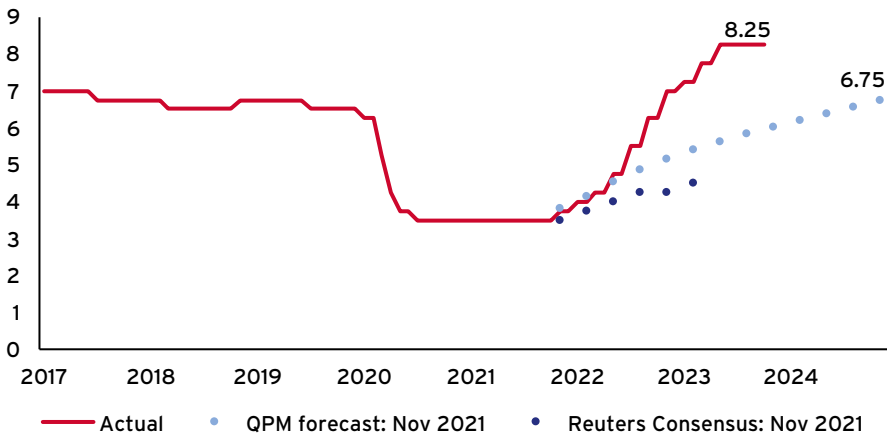
Note: Lines show output gap estimates at six month intervals

Source: SARB.

Though it was clear that ultra-low interest rates were unlikely to solve South Africa's weakening growth, it was still believed that this hiking cycle would be comparatively moderate. The Taylor rule for the SARB's main forecasting model, the Quarterly Projections Model, showed that the repo rate would need to rise by a cumulative 325 basis points (to about 6.75%) over a three-year period to keep inflation on target. Consensus forecasts and market pricing suggested an even slower trajectory, with rates expected to average just 4.75% in 2023. In the week before the November 2021 hike, the probability of a hike among analysts was just 47.5%.

FIGURE 6 POLICY RATE PROJECTIONS DURING NOVEMBER 2021 UNDERSHOT ACTUAL OUTCOMES

Repo rate: Expectations vs actual (%)



Source: SARB; Reuters Econometer Poll.

The MPC's strategy was to begin policy normalisation by raising real rates closer to a revised neutral level that emphasized its external (interest parity condition) and internal components (potential growth). This was communicated to the public and markets actively to soften further inflationary risks and shape inflation expectations. Guided in the Taylor rule and moderate domestic inflation, the real rates trajectory was expected to be slow and shallow enough to avoid aggressive deleveraging by households and firms.

A series of 25 basis point hikes occurred in November 2021, January 2022, and March 2022. However, as the effects of the Russian invasion of Ukraine transmitted to higher food and fuel inflation, along with the breaching of the upper-bound of the target range and the eventual lift-off by major advanced economies, the MPC tightened faster, first to 50 basis points in May 2022, then 75 basis points in the subsequent three meetings. Within a year, policy rates had risen by a cumulative 350 basis points. These hikes continued through the first half of 2023 (+125 basis points over the January, March and May 2023 meetings), with the MPC opting to pause its hiking cycle at 8.25% at the May 2023 meeting. Policy was finally deemed restrictive, with current and ex-ante real repo rates finally pushing past their neutral levels for the first time since the onset of the pandemic.

TABLE 1 MONETARY POLICY DECISIONS

Meeting date	Policy decision	Change (bps)	Inflation risk assessment	Growth risk assessment	Vote distribution
Jan-20	6.25	-25	Balanced	Downside	5 (-25bps)
Mar-20	5.25	-100	Balanced	Downside	5 (-100bps)
Apr-20	4.25	-100	Downside	-	5 (-100bps)
May-20	3.75	-50	Downside	-	2 (-25bps); 3 (-50bps)
Jul-20	3.50	-25	Balanced	-	2 (0bps); 3 (-25bps)
Sep-20	3.50	-	Balanced	Balanced	3 (0bps); 2 (-25bps)
Nov-20	3.50	-	Balanced	Balanced	3 (0bps); 2 (-25bps)
Jan-21	3.50	-	Balanced	Balanced	5 (0bps)
Mar-21	3.50	-	Balanced	Balanced	5 (0bps)
May-21	3.50	-	Upside	Balanced	5 (0bps)
Jul-21	3.50	-	Upside	Balanced	5 (0bps)
Sep-21	3.50	-	Upside	Balanced	5 (0bps)
Nov-21	3.75	25	Upside	Downside	3 (+25bps); 2 (0bps)
Jan-22	4.00	25	Upside	Balanced	4 (+25bps); 1 (0bps)
Mar-22	4.25	25	Upside	Balanced	2 (+50bps); 3 (+25bps)
May-22	4.75	50	Upside	Balanced	4 (+50bps); 1 (+25bps)
Jul-22	5.50	75	Upside	Downside	1 (+100bps); 3 (+75bps); 1 (+50bps)
Sep-22	6.25	75	Upside	Balanced	2 (+100bps); 3 (+75bps)
Nov-22	7.00	75	Upside	Downside	3 (+75bps); 2 (+50bps)
Jan-23	7.25	25	Upside	Balanced	2 (+50bps); 3 (+25bps)
Mar-23	7.75	50	Upside	Balanced	3 (+50bps); 2 (+25bps)
May-23	8.25	50	Upside	Balanced	5 (+50bps)
Jul-23	8.25	-	Upside	Balanced	2 (+25bps); 3 (0bps)
Sep-23	8.25	-	Upside	Balanced	2 (+25bps); 3 (0bps)

The voting distribution of the committee suggested robust internal discussion, with in one case the spread of votes reaching 50 basis points.⁷ The arguments primarily centred on how much frontloading the economy could handle and how material was the inflation risk assessment. On the one end, more rapid and larger increases would quickly return inflation to target, resulting in less hikes over the medium term. With falling potential growth and rising fiscal risks, the low appetite for the same policy errors of the post-GFC period raised the impetus for a quick normalisation of policy. On the other end, larger hikes could tip an already slowing economy into recession. For much of the period, the currency remained relatively stable, and with commodity export prices higher for longer the current account deficit was narrower than forecast. With underlying demand relatively subdued and few clear signs of overheating, inflation looked primarily like a supply-side phenomenon. A hike, then, was deemed to be quelling potential second-round effects, but it was unclear how much pre-emptive hiking would be needed relative to clear communication about the risks.

Overall, an unambiguous story about which view won out in the end does not quite reveal itself. Interest rates rose by more than anticipated by most commentators, but rates perhaps peaked later than others would have preferred. The committee was unanimous, however, on the need to normalise policy, with every member voting to hike rates in every meeting between March 2022 and May 2023.

South Africa's rate hikes were probably just about right. Although the hiking cycle started later than what the early warning signals would have suggested, the November 2021 lift-off date was actually earlier than those of key trading partners.⁸ Moving early helped: having a comfortable real rate differential to advanced economies buffered the exchange rate, even when other global factors were pushing prices higher. Typically, global surges in prices correspond with a depreciating exchange rate, but this time the exchange rate was not a significant pressure point. In turn, ex ante real rates were kept relatively contained, increasing by 432 basis points, a much smaller trough to peak change in real rates for, among others, the US, euro area, Brazil, Chile, and Russia.

Judged against the SARB's own inflation targeting history, this cycle does not appear austere. For instance, during the 2001-03 'rand crash', real rates rose by 506 basis points, while the pre-GFC cycle pushed rates up by 438 basis points. Given the source and magnitude of this inflation surge, the rise in real rates was relatively mild. Considering the difference between real interest rates and their neutral level, this shows that policy during this period was less restrictive than usual: during period of tightening, the gap is

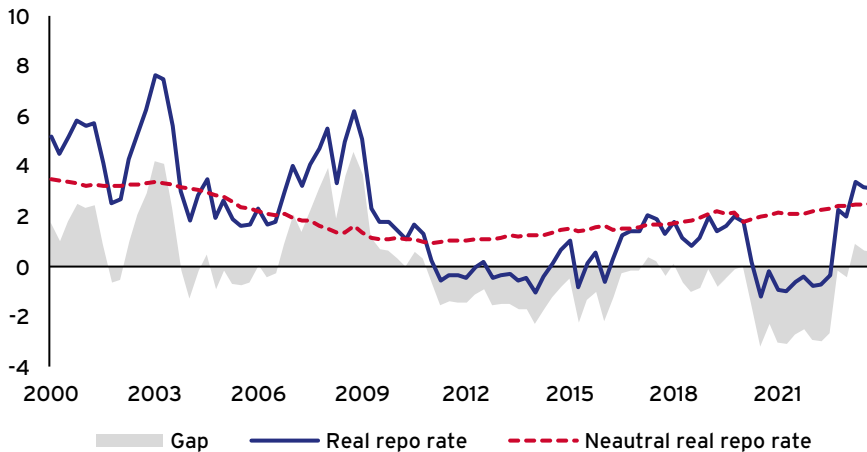
7 In July 2022, three members preferred the announced outcome of a 75 basis point hike. One member preferred a 50 basis point hike, while another preferred a 100 basis point hike.

8 The US Federal Reserve's first hike was only in March 2022 (+25 basis points), when CPI inflation had already surged to 8.5%. The European Central Bank's hike was similarly late, with the first comparatively large rate hike (+50 basis points) in July 2022.

on average 1.7 percentage points above r^* ; with peaks as high as 4.2 and 4.5 percentage points during the rand crash and GFC episodes, respectively. This time, the difference is currently just 0.7 percentage points, which is low even by peer standards.

FIGURE 7 INFLATION-ADJUSTED INTEREST RATES RELATIVE TO ITS NEUTRAL RATE

Real interest rates



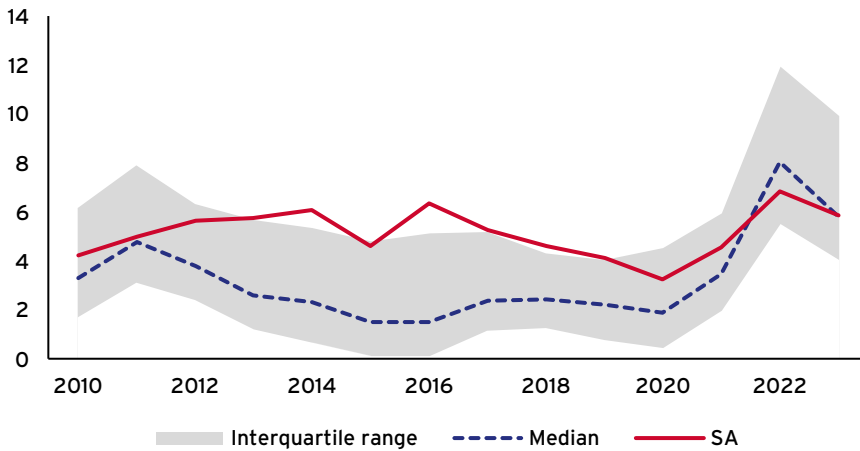
Source: SARB.

The inflation path was also better than earlier surges and in comparison with peers. While headline inflation spiked well above the target, the headline rate was lower than 60% of the global economy. This is unusual. For instance, during the GFC, South Africa’s inflation rate was as high as 11% versus the average 9% experienced by a typical emerging market economy. South Africa’s inflation from that point remained stubbornly high, with inflation rates on average higher than 75% of the overall global economy. If South Africa stayed at that 75% ranking, its inflation rate would be closer to the 12% level, which is far higher than the peak 7.3% level reached in July 2022. Moreover, core inflation rose by just 2.7 percentage points during the surge, again a much smaller change than many peers in both advanced and emerging markets.

Part of the reason may be because of the causes of inflation in the first place: with muted demand pressures, price pressures were lower than in countries with tighter labour markets and strong wage growth. Wages have remained unusually subdued within the South African context, and unit labour costs better behaved than expected. Better fiscal control over public sector wages may have played an important part here and private sector wages responded appropriately to the negative demand shock of the pandemic.

FIGURE 8 SOUTH AFRICAN INFLATION PERFORMED RELATIVELY WELL DURING THE INFLATION SURGE

SA inflation relative to the global economy (year-on-year, %)



Source: IMF; SARB.

Even though the exogenous component of inflation South Africa experienced was large, local producers were constrained by the slow recovery from passing those costs on to consumers: a quick calculation based on the GDP deflator shows that ‘greedflation’ due to higher gross operating surpluses was not a significant factor in the South African context.

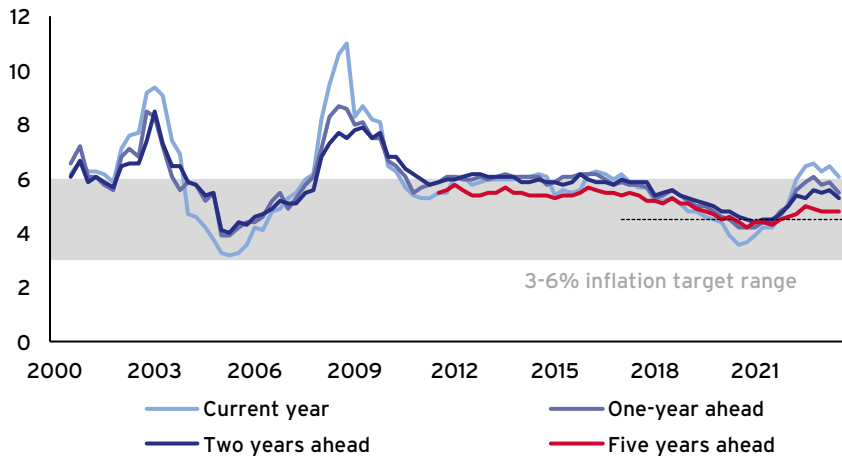
The other reason may have to do with the improved credibility of the SARB. As discussed above, in the early days of inflation targeting, external shocks quickly appeared in the headline outcomes. The introduction of a 4.5% midpoint target, and the SARB’s success in guiding inflation expectations down to that point, built up some much-needed space as this crisis hit. By flagging inflation as an upside risk, and moving early as those risks began to materialise, commitment to the mandate was highlighted. There was no longer any ambiguity about what the committee would be comfortable with: anything above 4.5% was considered too high, and the MPC was willing to act accordingly. In the political economy context, this was key for the communications strategy.⁹ In contrast to central banks facing deflation in the GFC and after, monetary policy in South Africa maintained a focus on second-round effects, thin demand and supply margins, and the implications of inflexible factor markets. The SARB’s messaging did not change and its credibility was undiminished, putting it in good stead in the face of this inflation surge.¹⁰

⁹ I discuss this in more detail in my previous CEPR contribution (Loewald 2021).

¹⁰ Research suggests that central bank communication in South Africa and other emerging markets outperformed their advanced economy peers (Evdokimova et al. 2023).

FIGURE 9 LONG-TERM INFLATION EXPECTATIONS REMAINED CLOSE TO THE TARGET MIDPOINT

Surveyed inflation expectations (%)



Source: BER; SARB.

OTHER POLICY ISSUES

The SARB relies on the repurchase rate as its main monetary policy tool, and so the discussion has so far primarily focused on the internal debates relating to the repo rate decision. The SARB does not use its balance sheet or intervene in the FX markets as a policy tool, nor does it regularly change the required reserve ratios. Nonetheless, one important innovation over this period has been a change in the Monetary Policy Implementation Framework to enhance the transmission of monetary policy.

From 1998, monetary policy was implemented using a classical cash reserve system, in which a shortage of bank reserves was created by the central bank and funding redistributed in the interbank and repo markets. Following failed FX interventions to stabilise the currency and the introduction of the inflation target, the SARB accumulated reserves, with the liquidity position turning positive in mid-2003. Over time, as FX reserves increased, the SARB needed to actively engineer scarcity to offset their liquidity-inducing effects and those of other policies. At the onset of the pandemic, surplus liquidity conditions deepened, despite stronger private demand for rand. Rather than take steps to increase the shortage, the SARB chose to redesign the operating framework and shifted from the classic shortage to a surplus system. The excess supply of bank reserves in the market is managed by paying interest on reserves, at the repo rate. A corridor was maintained for banks with overnight excesses and shortages relative to their quotas and to prevent the hoarding of reserves. While this framework has brought the effective policy rate closer to the announced repurchase rate of the SARB, ongoing work is required to

assess the impact of the surplus liquidity system on the monetary policy stance and other balance sheet effects. A particular risk lies in the assumption by the SARB of the full cost of sterilizing liquidity, which was previously shared with the National Treasury.

Finally, the chapter would be incomplete without a discussion on the monetary policy-financial stability nexus. This issue was quickly brought to the fore in the aftermath of the mid-size banking stress in the US, and purchase of UBS by Credit Suisse during March 2023. The banking sector turmoil had a relatively muted impact on South Africa's banking sector, where there is less exposure to interest rate risk. For South Africa's largest banks,¹¹ government bond holdings are just 16% of the total balance sheet, which tend to be longer-term, held to maturity, and are usually hedged against price fluctuations.¹² Nonetheless, rising interest rates have raised credit impairments, though at just 3.4% of total credit extended, these remain very low. This is in line with the generally low leverage of the private sector, which started in the aftermath of the GFC and was largely complete by 2017. South African banks are well capitalised, while non-bank financial institutions are well regulated. Our broad heatmap of local and global vulnerabilities shows a low risk of systemic financial stability risk. In turn, monetary policy has not been directly impacted by financial stability-related concerns.¹³

CONCLUSION: WHERE TO FROM HERE?

For now, the main priority is to get inflation back to target. The forecasts suggest that prices will only settle at 4.5% in the middle of 2025, nearly half a decade after the start of the price surge. Staying at this level will require long-term inflation expectations once again returning to the 4.5% level. Macroeconomic policy consistency has become more important as a continued path of fiscal slippage and weak underlying growth risks derailing the envisioned disinflation.

The price formation process would also benefit from the removal of longstanding structural impediments, such as product and labour market rigidities, poor education outcomes, inefficient infrastructure, weak governance, and high policy uncertainty. This would also help enough jobs, boosting investment and growth back towards emerging market averages, as well improving social outcomes amidst high inequality. The successful implementation of reforms will require a gradual but sustained approach and will depend on having strong and independent institutions.

11 There are 36 banks in South Africa, comprising of 33 commercial banks and 3 mutual banks. Of the 33 commercial banks, 15 are registered banks and 18 are local branches of foreign banks. However the banking sector is highly concentrated, with just five banks holding 90% of total bank assets.

12 On balance, higher interest rates have improved interest income of banks, potentially offsetting the unrealised losses of higher interest rates.

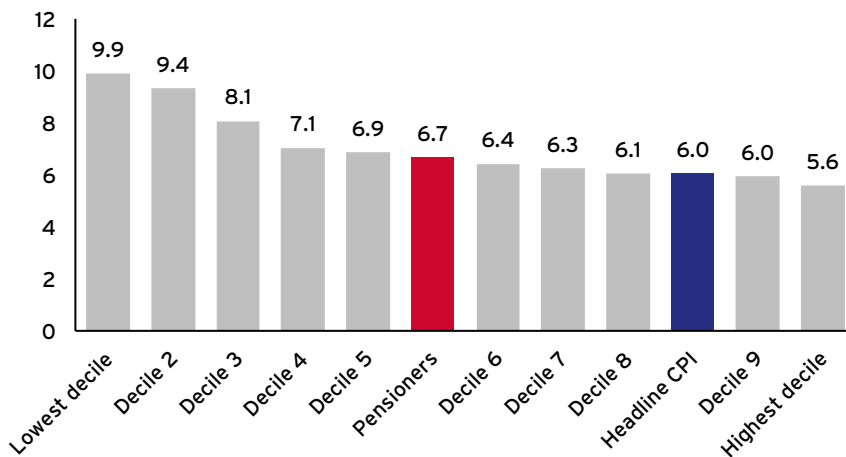
13 South Africa's macroprudential policy framework relies mostly on Basel III-based capital and liquidity tools. It is one of 66 countries that have adopted a countercyclical capital buffer, though it remains at zero, and research is currently underway on what the neutral level of a buffer should be (in order to deploy during periods of stress).

Over the longer term, the debate should pivot back to the need for an inflation target that is more in line with our trading partners. During this surge, inflation was better aligned with peers, resulting in relatively smaller policy adjustment than in some other countries. But the SARB's official 3-6% target remains unusually high, and so as inflation settles back for other countries, South Africa's inflation will inevitably return to its pre-COVID problems. Reducing the inflation target need not result in large output losses, as the literature shows, in large part in building on the well-established credibility of the flexible targeting framework practiced in the SARB (Loewald et al. 2022).

While surprise higher inflation temporarily lowers the real stock of debt, persistently high inflation outcomes result in permanently higher interest rates on all future debt. A lower target would help reduce debt service costs and would be particularly timely now given the need to rollover a large proportion of the public debt over the next few years. Critically, better policy coordination would lower the inflation premium and de-risk the economy, setting off a virtuous cycle of a stronger currency and reducing long-term yields, reducing borrowing costs for all borrowers in the economy. This would help spur stronger growth and investment in the economy. Reducing price distortions caused by inflation would be particularly beneficial to lower-income households, which tend to be punished the most by high inflation. This remains a key priority for the SARB over the medium term.

FIGURE 10 INFLATION IS HIGHEST FOR LOW-INCOME HOUSEHOLDS

CPI by expenditure decile, January-September 2023 average (%)



Source: Sources: Stats SA; SARB.

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CHAPTER 14

The Bank of Korea's policy response during the high inflation after COVID-19

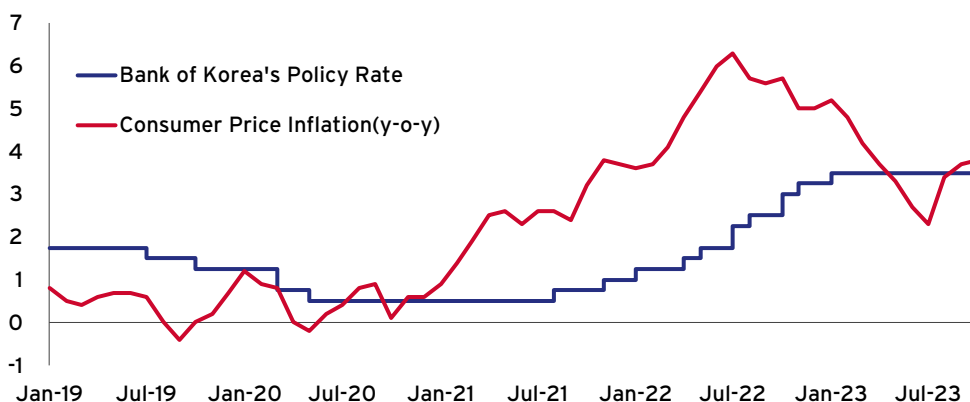
Chang Yong Rhee and Young Hwan Park¹

Bank of Korea

INTRODUCTION

Like other major economies, Korea was faced with unexpected high inflation after the COVID-19 pandemic. In response, the Bank of Korea (BOK) continued its monetary tightening stance in order to stabilise inflation at the target level, including the most rapid and substantial series of policy rate hikes² in the recent history of Korean monetary policy, moving from 0.5% to 3.5% (Figure 1). Throughout this process, the BOK encountered various policy challenges, such as a sharp currency depreciation and financial stress, from which the bank gained many valuable insights.

FIGURE 1 KOREA'S CONSUMER PRICE INFLATION AND THE BANK OF KOREA'S POLICY RATE (%)



Sources: Bank of Korea, Statistics Korea

- 1 We are grateful to Mr. Mincheol Park and to Ms. Sooji Kim at the Bank of Korea for their contributions and assistance in preparing this paper. The descriptions and discussion here are confined to October 2023. The views expressed in this paper do not necessarily represent the official views of the Bank of Korea or its Monetary Policy Board.
- 2 Since the BOK adopted inflation targeting as its monetary policy framework in 1998, there have been a total of four periods of policy rate hikes, with the current one being the most notable in both size and pace (see Table A1 in the appendix).

In the following section, we will walk you through the way in which the BOK's monetary tightening process unfolded during this high inflation period and share with you the lessons we have learned along the way.

THE BANK OF KOREA'S POLICY RESPONSE

Early move toward policy rate hikes

The BOK began to raise its policy rate in August 2021, somewhat earlier than other major central banks, and after two additional hikes, the policy rate had risen from 0.50% to 1.25% by early 2022, a total of 75 basis points.

In mid-2021, concerns about inflation remained relatively low, as core inflation was in the lower-1% range. However, due to the steady growth of household debt and the sharp increase in housing prices³ in an ultra-low interest rate environment, it was considered desirable to start the normalisation process of monetary policy as early as possible, as policy had been eased exceptionally in response to the COVID-19 pandemic.

It turned out that the proactive approach of initiating policy rate hikes ahead of other central banks, specifically in consideration of household debt, was beneficial in managing inflation. This approach has also provided the BOK with more flexibility to adjust the policy rate gradually, even in situations where rapid policy rate hikes have been observed in major economies since 2022.

Strengthening policy response for price stability

From February 2022, as inflation rose rapidly due to supply shocks, the BOK strengthened its policy response for price stability.

After the outbreak of the Russia–Ukraine war in February 2022, oil prices surged and inflation in major economies soared to levels as high as 8% to 10%. Affected by this, Korea's CPI inflation also escalated rapidly, reaching the 6% range. As both core inflation and short-term inflation expectations also rose to the 4% range, there was growing concern regarding price stability. Under these circumstances, a stronger policy response was called for in order to prevent high inflation from becoming entrenched. Accordingly, the BOK, for the first time in its history⁴, decided to take a so-called “big step” – a 50 basis point increase in its policy rate – in July 2022. In total, the BOK raised the rate by 125 basis points between April and August 2022, bringing it to 2.5%.

3 Housing prices (multifamily housing, actual transaction prices, Korea Real Estate Board) increased by 14.5% in 2020, followed by a further expansion of 16.3% in 2021. Household debt also continued to grow significantly, increasing by 128.7 trillion won in 2020 (6.6% of GDP) and by 123.5 trillion won in 2021 (5.9% of GDP).

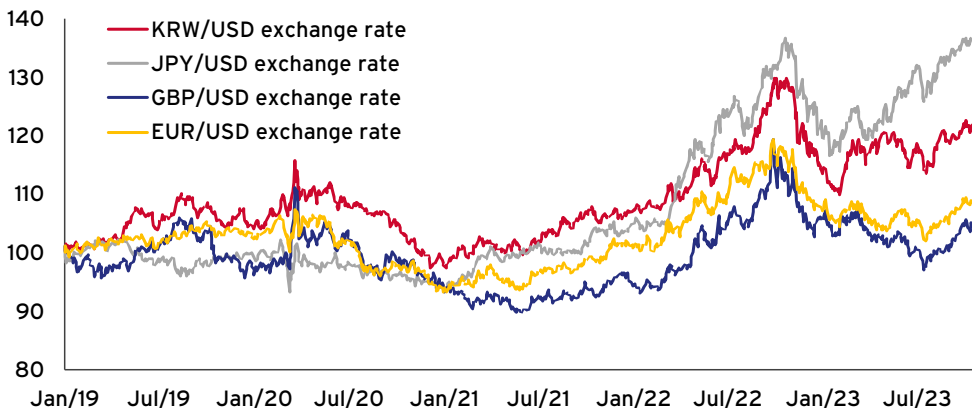
4 While the BOK has cut the policy rate by 50 basis points or more on six occasions in the past, July 2022 was the first time it had raised it by 50 basis points or more.

The second “big step” in response to currency depreciation

In October 2022, in response to an unexpected currency depreciation, the BOK decided to take a second “big step” in terms of policy rate hikes (+50 basis points), following the one implemented in July.

While inflation remained elevated in the 5% range in Korea, the US Federal Reserve tightened its monetary policy stance more significantly than expected going through the Jackson Hole meeting at the end of August and the September Federal Open Market Committee (FOMC) meeting. This, in turn, led to a sharp rise in the exchange rate of the Korean won to the US dollar. Recognising that an exchange rate surge not only exacerbates already elevated inflationary pressures but also increases capital outflow pressure, the BOK deemed a stronger policy response necessary (Bank of Korea 2022a). Consequently, the bank decided to raise the policy rate not by 25 basis points but by 50 basis points, bringing it to 3.0% (Figure 2).

FIGURE 2 EXCHANGE RATES OF MAJOR ECONOMIES (31 DECEMBER 2018=100)



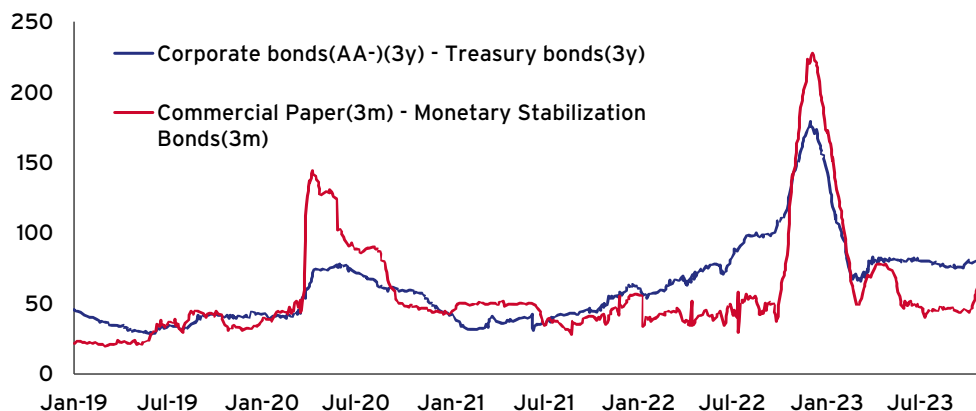
Source: Bloomberg.

Parallel measures for price stability and financial stability

By the end of 2022, while severe volatility in the foreign exchange market had somewhat eased, short-term financial market stress arose, particularly centred on real estate project financing (PF). The BOK responded to this through the provision of short-term liquidity, while simultaneously continuing to raise the policy rate to ensure price stability.

Against the backdrop of heightened credit risk-aversion due to rapid interest rate hikes and a housing market contraction, a debt default at a local government-guaranteed project⁵ triggered stress in the real estate PF market (Bank of Korea 2022b). The anxiety stemming from this situation quickly spilled over into the commercial paper and corporate bond markets (Figure 3).

FIGURE 3 CREDIT SPREADS IN KOREA (BASIS POINTS)



Sources: Bank of Korea; Korea Financial Investment Association.

As market interest rates rose significantly beyond what was intended by the monetary policy, and as bond issuance shrunk, the BOK judged that it was necessary to reduce risk premiums in order to ensure that the monetary policy transmission channel worked properly. In this regard, the BOK implemented some liquidity provision measures,⁶ such as an expansion of the range of eligible collateral for its lending facilities, as well as the securities eligible for open market operations, and conducted repurchase agreement (RP) purchases (Table 1). These stabilisation measures helped to gradually ease financial market instabilities.

While implementing market stabilisation measures to address financial stress, the BOK also continued its monetary policy tightening to cope with high inflation, hiking its policy rate by 25 basis points each in November 2022 and in January 2023. As a result, the policy rate was raised to a restrictive level of 3.5%, compared to estimates of the neutral interest rate (Bank of Korea 2023a).⁷

5 On 28 September 2022, the government of Gangwon Province decided to apply for corporate rehabilitation of the Gangwon Jungdo Development Corporation. Consequently, on 29 September, the A1-rated LegoLand PF-ABCP, which was backed by loans receivable from this corporation amounting to KRW 205 billion, had bills unpaid. In response to the growing repercussions of this event, the government of Gangwon Province committed to fulfilling the guaranteed debt on 11 October and completed the final repayment totalling KRW 205 billion on 15 December.

6 The Korean government also carried out market stabilization measures, such as the Bond Market Stabilization Fund, corporate bond and CP purchase programmes run by government financial institutions, and guarantee support for real estate PF loans.

7 The neutral interest rate is estimated to be in the 2-3% range, according to major empirical studies of Korea's neutral interest rate by Shin and Kang (2022), Lee and Ham (2021), Choi et al. (2021), and Cho (2020).

TABLE 1 THE BANK OF KOREA'S MEASURES TO STABILISE SHORT-TERM MONEY MARKETS

Measure	Details
Expansion of the range of eligible collateral for lending facilities and eligible securities for RP transactions (November 2022 to July 2023)	(Before) Korea Treasury bonds, Monetary Stabilization Bonds (MSBs), government-guaranteed bonds, MBSs issued by the Korea Housing Finance Corporation, specialized bank bonds → (After) In addition to the above, bank bonds and bonds issued by nine public institutions
Deferment of increase in the collateral securities ratio for net settlement	Deferment of increase in the ratio from 70% to 80% two times. (February 2023→May 2023→August 2023)
Temporary RP purchases (November 2022 to June 2023)	RP purchases from securities firms and the Korea Securities Finance Corporation totaling KRW 13.2 trillion on eight occasions
RP purchases from institutions contributing to the Bond Market Stabilization Fund (December 2022 to July 2023)	RP purchases totaling KRW 220 billion on three occasions

Source: Bank of Korea.

Maintaining a restrictive monetary policy stance while examining the need for further rate hikes

Considering changes in domestic and external conditions, the BOK has maintained its policy rate at 3.5% since February 2023, while continually examining the need for any further rate hikes.

First, on the domestic side, while the policy rate has moved up to a restrictive level, inflation had continued to moderate in its underlying trend up until July 2023, just as we forecasted. The economy had remained sluggish until the first half of the year and, in terms of financial stability, concerns about a hard landing of the real estate market had not been fully resolved, despite easing financial market stress. On the external side, volatility in the foreign exchange market had eased, with the US Federal Reserve adjusting the pace of its rate hikes, and oil prices had also remained stable up until the first half of the year. Given these policy conditions, the BOK assessed that it would be appropriate to determine whether to raise its policy rate further while monitoring the effects of the accumulated 300 basis point hike.

From August 2023, however, uncertainties surrounding policy conditions heightened again, deepening concern about monetary policy operations going forward. First, consumer price inflation, having fallen to 2.3% in July, rose above the previous forecast to the upper-3% level in September and October, affected by the rise in oil prices and by

adverse weather conditions. Furthermore, uncertainties related to the future inflation and growth outlook paths, and to risks in the foreign exchange sector, recently started to rise again due to the Federal Reserve's signal of high-for-longer rates and the Israel–Hammas conflict.

Concerning financial stability, the likelihood of a soft landing in the real estate market increased, despite the sharp increase in the policy rate, as the decline in housing prices was limited to approximately 15% and risks in the real estate PF market eased thanks to real estate market stabilisation measures taken at the end of last year and at the beginning of this year. On the other hand, some negative side effects also emerged, as macroprudential regulations eased somewhat while the policy rate remained at 3.5%. Household debt increased substantially again starting in the third quarter and expectations of rising housing prices heightened, particularly in Seoul and its surrounding areas. In this regard, the Korean government strives to strengthen macroprudential regulations, and household debt has become an important factor to consider in the future conduct of monetary policy, as well.

LESSONS LEARNED SO FAR

In the process of all these policy responses, the BOK has gained some valuable insights, particularly those differentiating Korea from major economies. These insights can be summarised into six lessons, on policy cooperation between the central bank and the government, labour market conditions, responses to currency depreciation, policy measures for financial stability, institutional improvements for financial stability, and policy communication.

Importance of policy cooperation between the central bank and the government

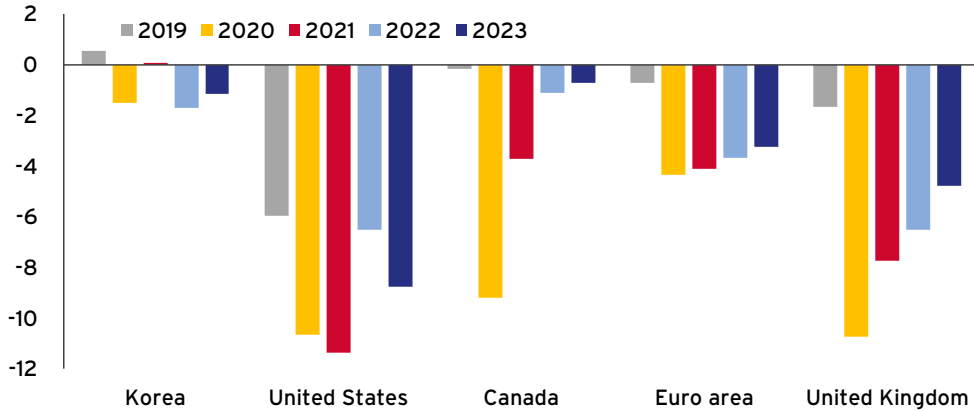
The first lesson is the importance of policy cooperation between the central bank and the government.

One of the features of the recent high inflation is that inflationary pressures on the Korean economy have been aggravated by the combined effects of oil price shocks and the exchange rate surge. In the past, oil prices and the US dollar were normally related inversely, offsetting each other's effects on domestic inflation. This time, however, these two variables have both been strong, escalating inflationary pressures.

In this regard, the role of fiscal policy, as well as monetary policy, was important in addressing inflation. Korea was able to achieve effective coordination between monetary and fiscal policies to ensure price stability, as the government operated a restrictive fiscal policy, unlike in major economies, as part of its sound fiscal management stance. When comparing the fiscal conditions in the United States and in Korea for 2023, fiscal expenditures increased by 6% year-on-year in the United States, while they contracted

by 6% in Korea. The cyclically adjusted fiscal deficit remains substantial in the United States, standing at around -8% to -9% relative to GDP, whereas it is estimated to be around -1% in Korea (Figure 4).

FIGURE 4 FISCAL BALANCES OF MAJOR ECONOMIES (% OF POTENTIAL GDP)



Source: IMF.

While the Korean government managed its total fiscal budget tightly, as seen above, the government cushioned the spillover effects of shocks from the oil prices and the exchange rate onto domestic energy prices by providing tax benefits and subsidies at the micro level. As a result, the rate of CPI energy price growth for 2021-2022 was 26.5% in Korea, which is much lower than in the United States (51.4%) or the euro area (54.5%). The judgement is that such smooth policy coordination contributed significantly to inflation in Korea peaking at a lower level than in major economies, and peaking relatively earlier.

For reference, in Korea the Ministry of Economy and Finance, the Bank of Korea, the Financial Services Commission, and the Financial Supervisory Service gather once a week, led by the Korean government, to exchange information about the economic and financial situation. This channel for regular communication plays a crucial role in facilitating prompt and effective policy coordination regarding areas in need, such as financial stability, while each organisation operates its own policies independently.

The labour market as a factor influencing lower inflation in Korea compared to major economies

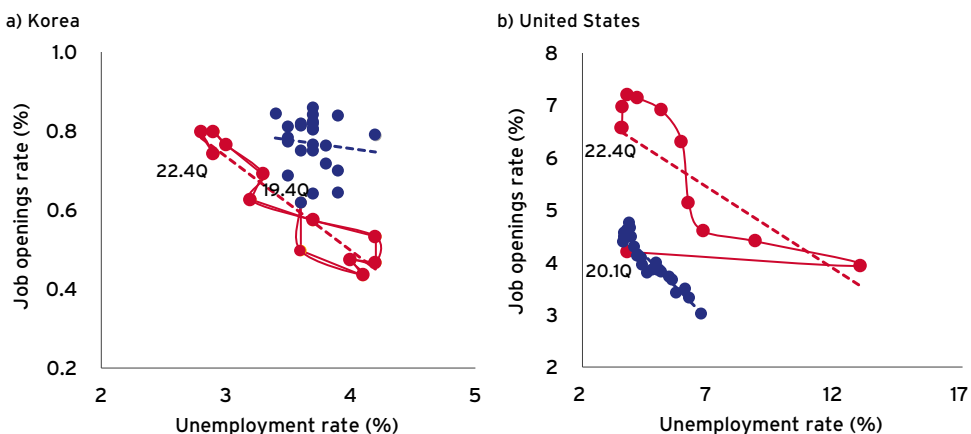
The second lesson we have learned so far is that differences in labour markets also significantly contributed to Korea’s lower inflation compared to major economies.

Labour demand rebounded rapidly in both Korea and in major economies, as economic activity returned to normal after the pandemic. However, the labour supply exhibited a variety of trends. In the United States, structural factors such as the Great Resignation and a decrease in immigration had a significant impact, resulting in a very slow recovery in the labour supply. In contrast, Korea experienced a relatively modest decrease in the

labour supply during the pandemic thanks to its successful pandemic control measures. Additionally, after the easing of these measures, the labour supply in Korea rebounded rapidly, driven by increased economic participation by the elderly and women.

Such differences are more prominently observed when comparing the Beveridge curves of the two countries. In the case of the United States, the job openings rate increased significantly after the pandemic, causing the Beveridge curve to shift upward. Conversely, Korea's Beveridge curve actually moved downward (Figure 5). The difference in the labour market tightness led to the differences in wage growth and service price inflation between the two countries. Looking at hourly wage growth, Korea experienced a substantial decrease, dropping from 4.7% in 2022 to 1.9% in the first half of 2023. In contrast, the United States maintained relatively high levels at 6.4% and 5.0% during the same period, respectively. Looking at inflation for personal services, which is significantly influenced by wages, it rose to 6.4% in October last year, then declined to 4.2% recently in Korea. In contrast, in the United States, it rose to 10.1% in February this year and still remains above 7% in September.

FIGURE 5 BEVERIDGE CURVES OF KOREA AND THE UNITED STATES



Sources: Statistics Korea; Ministry of Employment and Labor; BLS.

Korea's labour market is currently not experiencing a shortage of supply compared to demand, but there are concerns about a decline in supply due to the population ageing rapidly in the medium to long term. Therefore, going forward, when assessing the economic conditions based on labour market indicators such as employment levels and the labour force participation rate, it has become necessary to carefully distinguish between structural factors, such as demographic changes, and cyclical factors.

More flexible response to currency depreciation compared to the past

The third lesson we have learned is that, in the course of responding to inflation this time, the BOK and the government have been able to respond more flexibly to currency depreciation compared to in the past.

More flexibility was allowed because currency depreciation was a common phenomenon observed in most major economies. Also, the capacity to tolerate currency depreciation increased thanks to Korea's foreign reserves exceeding US\$400 billion and to structural changes in the foreign exchange market. Since the Global Financial Crisis, Korea's foreign exchange market has undergone significant changes in terms of the composition of products and the participants who lead capital flows. The composition of products has shifted from mainly bank loans to portfolio investments, and the participants transitioned from non-residents to residents. In particular, the great increase in overseas investment by residents, including portfolio investments, has made Korea a net external creditor,⁸ leading to an improvement in the absorption capacity at domestic financial institutions of any currency depreciation shock (Rhee 2022).

However, since severe volatility in the foreign exchange market could lead to increased uncertainty in the overall economy, the BOK has eased volatility by employing an appropriate policy mix, including FX intervention and rate hikes. Korea is closely linked not only to the United States but also to China and Japan, the other two major pillars of the global economy, as they are geographically close and major trading partners. As a result, the Korean won is significantly influenced by movements of the Chinese yuan and Japanese yen, in addition to the US dollar. Moreover, due to structural weakness in Korea's FX derivatives market, such as the short maturities and shallow market depth, rapid depreciation of the Korean won – well beyond market expectations – triggers margin calls on derivatives and hedging contracts. This can set off a vicious cycle of escalating funding requirements and further currency depreciation.

In September and October last year, these factors materialised simultaneously and had a rapid depreciating effect on the Korean won, so the BOK adjusted the pace of the currency depreciation through FX intervention and a “big step” rate hike (+50 basis points). Behind these policy responses were concerns stemming from the trauma of the 1997 currency crisis. It was feared that a rapid currency depreciation could lead to a slump in overall economic sentiment.

Monetary policy operation with financial stability in mind

Our fourth lesson is that there is a need to operate monetary policy while considering financial stability, as any unexpected financial stress can occur during periods of sharp interest rate hikes.

8 Korea's overseas portfolio investments increased from \$5.53 billion in 2000 to \$739.92 billion in 2022, and its net international investment position (NIIP) grew from -\$36.45 billion in 2000 to \$771.34 billion in 2022.

While in the United States, there was a concern about small and medium-sized banks due to the failure of Silicon Valley Bank (SVB), in Korea, at the end of 2022, financial market stress arose particularly centred on real estate PF. At that time, as interest rates rose, financial stability risks were heightening due to leveraged investments that had accumulated in an ultra-low interest rate environment. In particular, the impact of a 300 basis point hike in the policy rate on financial stability was no less significant than that of the 500 basis point hike by the Federal Reserve. This was due to the high proportion of floating rate household debt, which amounts to 80%. Against this backdrop, a credit event where a local government-guaranteed project triggered instability in real estate-related financial markets helped spread anxiety to the commercial paper and corporate bond markets.

Although the BOK had been consistently tightening its monetary policy in response to rising inflation, as a central bank responsible for both price stability and financial stability, it was inevitable that it would implement liquidity support measures,⁹ too. Actions such as the expansion of the range of eligible collateral for lending facilities and the range of securities eligible for open market operations, and RP purchases, were taken. These were temporary and targeted measures that did not run counter to the macroeconomic monetary policy tightening stance, and the RP transactions with securities firms were in line with Bagehot's dictum in that they were made at above-market interest rates against highly liquid securities as collateral (Table 1).

As part of this process, the BOK continued its policy rate hikes to address inflation. In hindsight, such parallel measures are judged to have achieved the desired outcomes to some extent on both fronts, of price and financial stability, given that inflation continues to slow in its underlying trend and as a soft landing of the real estate market has become more likely.

However, it is a matter of concern that in the recent soft landing of the real estate market, expectations for housing price increases have risen again and household debt has grown by a larger extent. As Korea's household debt-to-GDP ratio is already high and closely related to the real estate market, it could heavily weigh on the Korean economy if it were to get any higher. The BOK, together with the government, will consistently pursue a policy to lower the ratio over the medium- to long-term horizon.

9 In March 2023, Chairman Powell stated right after the FOMC meeting that monetary policy is focused on macroeconomic outcomes and that, for the situation with the banks, they are addressing them through lending facilities and other financial stability tools. President Lagarde also mentioned in a policy decision press conference that there was no trade-off between price stability and financial stability and that respective instruments would be used to address each of the two.

Necessity to improve lending facility to strengthen financial stability

Our fifth lesson is that there has been a greater need to improve our lending facility to strengthen its role in ensuring financial stability in the wake of the collapse of SVB in the United States.

During the SVB collapse, deposits were withdrawn much faster than in the past, and the BOK became alert to the fact that the speed of withdrawals could be even faster in Korea, where digital banking is highly advanced. The event also offered an important insight: that the Federal Reserve would take progressive action to provide ample liquidity swiftly using its discount window and prevent any spread of the collapse to the broader small and medium-sized bank industry.

The BOK also has a standing lending facility equivalent to the Federal Reserve's Discount Window, called Liquidity Adjustment Loans. However, these have rarely been used by financial institutions, as the interest rate is high and the range of eligible collateral has been limited to highly liquid securities, such as Korean Treasury Bonds. Their occasional use also raised worries about a stigma effect, leading banks to be more reluctant to use them. Against this backdrop, the SVB bankruptcy reaffirmed the need to improve this lending facility to allow speedy and sufficient liquidity provision in times of stress (Bank of Korea 2023b).

Considering what was discussed above, the BOK reformed its standing lending facility in July 2023. It lowered the spread from 1 percentage point to 0.5 percentage points, broadened the range of eligible collateral from mainly Korean Treasury Bonds to bank bonds and prime corporate bonds, and extended the maximum maturity up to three months. This reform is expected to enhance banks' access to the facility and contribute to strengthening the financial stability role of this facility. The BOK is also working on including loans receivable in the list of eligible collateral, referring to cases in other major economies (Table 2). As loans account for 70% to 80% of Korean financial institutions' assets, the inclusion of loans receivable as eligible collateral would enable the timely and ample provision of liquidity in times of stress and prevent financial market turmoil caused by a fire sale of marketable securities. Moreover, in consideration of the far greater share and role of non-bank financial institutions compared to in the past, the BOK will explore measures over the medium- to long-term horizon to also provide them with liquidity in times of emergency.

TABLE 2 REFORM IN LENDING FACILITIES AT THE BANK OF KOREA

Lending facility	Details
Liquidity Adjustment Loans	Cut the lending rate (policy rate + 100bp → policy rate + 50bp)
	Expanded ¹ the range of eligible collateral (bank bonds, bonds issued by local governments, prime corporate bonds)
	Extended maturities for loans (up to one month → up to three months)
Plan to include banks' loans receivable as eligible collateral	The BOK is reviewing legal and practical issues, and working on institutional improvements and the establishment of an IT system.

Note: 1) The broadened range of eligible collateral applies to the eligible collateral for intraday overdrafts, the Bank Intermediated Lending Support Facility, and the guarantee of net settlement.

Source: Bank of Korea.

Importance of managing inflation expectations by strengthening communication

Our sixth and final lesson is the importance of managing inflation expectations by strengthening policy communication.

In the past, the BOK maintained strategic ambiguity about any future policy direction. However, as inflation has maintained high levels in the 5% to 6% range last year amid growing concern about the entrenchment of high inflation, it became more important for the BOK to manage inflation expectations through greater transparency in its policy operations and through enhanced communication, rather than to maintain strategic ambiguity.

Accordingly, starting in October last year, the BOK enhanced its communication about any future policy direction by presenting forecasts by Monetary Policy Board members as to policy rates over the next three months (Laxton and Rhee 2022).¹⁰ The BOK has judged that presenting preconditions and corresponding policy directions helps to stabilise inflation expectations by mitigating volatility in financial markets and by enhancing policy effectiveness, despite high uncertainty surrounding domestic and external policy conditions. The overall market assessment is that this change has contributed to managing expectations of the policy rate and inflation, as policy directions are now delivered in a quantitative manner, unlike in the past.

Considering all of the above, the BOK believes that it is necessary to continue strengthening communication about future policy direction in the medium to long term. Since Korea is a small open economy where it is difficult to control external factors, a lot

¹⁰ At the press conference after the Monetary Policy Board meeting for monetary policy decision-making, the opinions of six of the seven Monetary Policy Board members, excluding the governor, are presented (see Table A2 in the appendix).

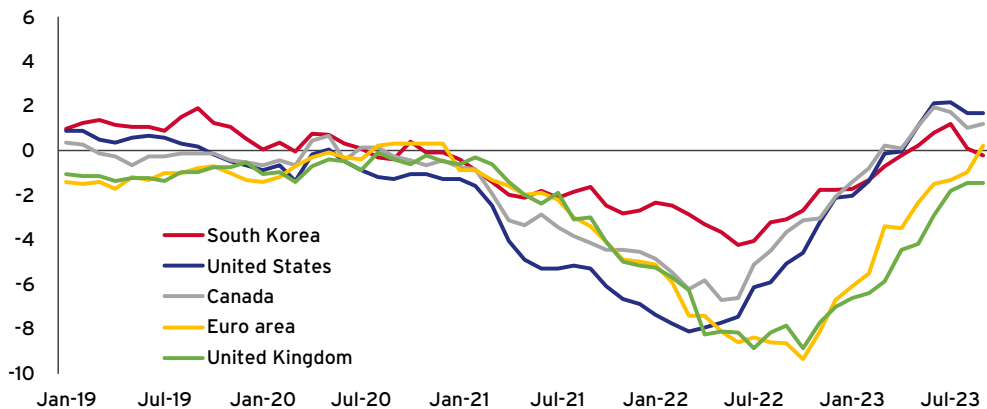
of discussion is ongoing about what instruments and methods should be used to deliver more detailed information than in the past to the market and to economic agents, given this realistic limitation.

CONCLUSION

The Bank of Korea has gained a lot of insight from its policy operations so far, and has achieved its desired outcomes to some extent with respect to both price and financial stability.

Some may assert that monetary policy in Korea is less restrictive than in major advanced economies, but that is not true considering the real policy rates reflecting inflation, despite the lower nominal policy rate than in major advanced economies¹¹ (Figure 6). The Bank of Korea raised the policy rate as rapidly as possible, reflecting domestic inflation conditions, and thanks to this tightening of monetary policy, inflation has continued to moderate in its underlying trend.

FIGURE 6 REAL POLICY RATES OF MAJOR ECONOMIES (%)



Sources: Central banks and their respective statistics bureaus.

In terms of financial stability, the Bank of Korea provided temporary and targeted liquidity support, which prevented any financial strain arising from the rapid monetary policy tightening process from spreading to the entire financial system. At the end of last year, the real estate PF market contracted greatly, and concerns about a hard landing in the real estate market were elevated, but now the possibility of a soft landing has increased, allowing for an orderly restructuring of the PF market.

¹¹ When comparing real policy rates of major economies, Korea had the highest rate as of the second half of last year. As of the period between January and September this year, Korea still stood higher than most other major economies, excluding the United States and Canada (see Table A3 in the appendix).

However, it is also true that the bank still has a long way to go. As oil prices have increased significantly since August 2023, the possibility has increased that the pace of slowdown in domestic headline inflation will be more moderate than previously expected. Also, uncertainties surrounding the future inflation path have risen greatly due to the Israel– Hamas conflict that broke out in October. Therefore, in judging the direction of future monetary policy operations, it has become more vital to identify the impacts of recent changes in price conditions on inflation expectations and underlying inflation trends.

Last year, the BOK was able to raise the policy rate to a restrictive level at a rapid pace, focusing solely on price stability, as there was little trade-off among policy variables. Now, however, the policy rate is already at a restrictive level and there is a greater trade-off among variables. Therefore, the bank is faced with the challenge of conducting monetary policy in a sophisticated manner while taking into account all of these factors (Table 3).

TABLE 3 MONETARY POLICY OPERATIONS IN THE POST-PANDEMIC ERA

Policy	Details
Policy rate hike	<p>The policy rate was raised by a total of 300 bp from 0.5% to 3.5% between August 2021 and January 2023 on 10 occasions.*</p> <p>* The rate was raised in August and November 2021, in January, April, May, July, August, October, and November 2022, and in January 2023. Of these, there was a 50 bp hike in July and October 2022.</p>
Increase in interest rate and reduction in lending amount for Bank Intermediated Lending Support Facility ¹	<p>The interest rate for the Bank Intermediated Lending Support Facility was raised by a total of 175 bp from 0.25% to 2.0%* between April 2022 and January 2023 on seven occasions.**</p> <p>* Lending rates for support programs for small and medium-sized enterprises (SMEs) affected by COVID-19 and for small businesses were maintained at 0.25%.</p> <p>** The rate was raised in April, May, July, August, October, and November 2022, and in January 2023.</p> <p>The amount of the Bank Intermediated Lending Facility was reduced* from KRW 39.6 trillion to KRW 26.5 trillion.</p> <p>* It was mainly attributable to the termination of support programs for SMEs affected by COVID-19 and for small businesses (October 2023).</p>
Phased termination of market stabilisation measures and special support programs	<p>Unlimited RP purchases were terminated in July 2020.</p> <p>The Corporate Bond-Backed Lending Facility was terminated in February 2021.</p> <p>The temporary expansion of the range of eligible collateral for lending facilities and securities eligible for open market operations was terminated in March 2021.</p> <p>New loan provisions to the Special Purpose Vehicle (SPV), which purchased corporate bonds and commercial paper, was terminated in July 2021.</p>

Note: 1) This is a lending system through which the BOK supplies loans to individual financial institutions at a low interest rate within certain ceilings, based on their lending to SMEs and other factors.

Source: Bank of Korea.

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ABOUT THE AUTHORS

Chang Yong Rhee is the governor of the Bank of Korea and the chairman of its Monetary Policy Board. He took office for a full term of four years on April 21, 2022. Prior to his appointment as governor of the central bank, Governor Rhee was director of the Asia and Pacific Department at the IMF (2014-2022) and chief economist of the Asian Development Bank (ADB) (2011-2014). Governor Rhee previously held teaching positions

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Young Hwan Park has been the head of the Monetary Policy Affairs Team at the Bank of Korea since February 2022. Prior to his current role, he had been in charge of research into the instruments and effects of monetary policy in the Monetary Policy Department. Since joining the Bank of Korea in 2000, he has worked in the Monetary Policy Department, the Research Department, and the International Affairs Department. Dr. Park received his PhD in economics from the University of Bristol in 2013, and his research interests are in the area of monetary policy.

APPENDIX

TABLE A1

Policy rate hike periods	(1) Oct. 2005 to Aug. 2008	(2) July 2010 to June 2011	(3) Nov. 2017 to Nov. 2018	(4) Aug. 2021 to Jan. 2023
Size of rate hike	200 bp (3.25% → 5.25%)	125 bp (2.0% → 3.25%)	50 bp (1.25% → 1.75%)	300 bp (0.5% → 3.5%)
Duration	2 years and 10 months	11 months	1 year	1 year and 5 months

TABLE A2

	Oct. 2022	Nov.	Jan. 2023	Feb.	Apr.	May, July, Aug.	Oct.
3.25%	2	1	-	-	-	-	1 ²
3.50%	4	3	3	1	1	-	
3.75% ¹	-	2	3	5	5	6	5

Note: 1) A view that it is necessary to leave open the possibility of raising the policy rate to 3.75%. 2) A view that it is necessary to be flexible with the direction of the rate, which opens the possibility of both a rate hike or a rate cut.

TABLE A3

Real policy rate(%)	Korea	United States	Canada	Euro area	United Kingdom	Australia	New Zealand
H2, 2022	-2.8	-4.5	-3.6	-8.3	-8.1	-5.1	-3.8
Jan. - Sept. 2023	-0.2	0.6	0.6	-2.7	-3.9	-1.6	-0.9

CHAPTER 15

Türkiye's (unique) response to post-pandemic inflation

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The synchronised and persistent low-inflation environment after the 2008-09 global financial crisis has been recently reversed by the post-pandemic dynamics. Inflation rates across the globe reached multi-decade highs before having partly eased recently, thanks to the swift monetary tightening cycles and the partial withdrawal of massive fiscal stimuli in many countries. Most of the emerging market economies had proactively raised policy rates against building inflationary pressures, even long before the advanced economies. Meanwhile, Turkish authorities implemented a unique monetary and financial policy mix by cutting interest rates and introducing a complex set of repression measures, which can be regarded as a natural monetary experiment in many aspects. This chapter summarises the post-pandemic policy mix in Türkiye, evaluates the consequences, and draws some lessons from this experience.

MONETARY POLICY DURING THE PANDEMIC AND THE INITIAL EXIT STRATEGY

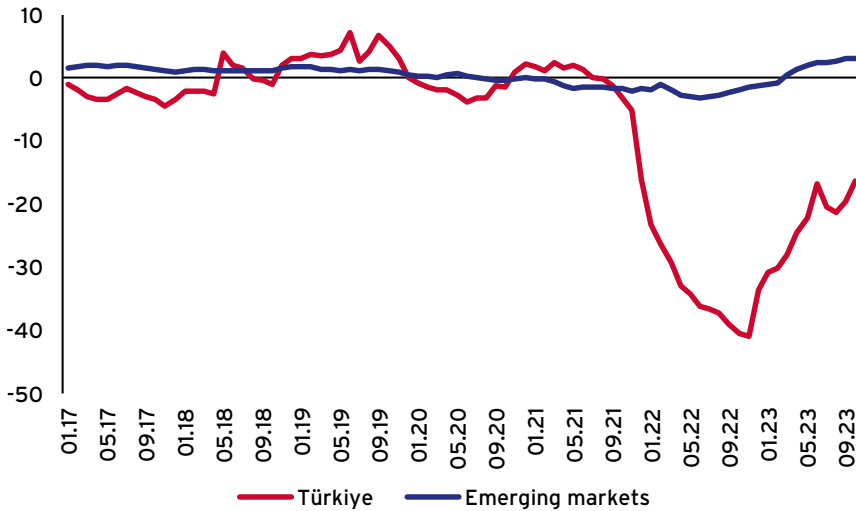
During the peak of the pandemic in 2020Q2, Türkiye launched several tools to support the economy, mostly through credit facilities.² The Central Bank of the Republic of Türkiye (CBRT), which had already brought the ex-post real policy rate to negative territory (Figure 1) just before the pandemic, delivered three additional rate cuts by 250 basis points in total, and reduced its key rate to 8.25% by mid-2020 against a level of 12% consumer inflation. The policy response also included providing targeted liquidity facilities to banks by allowing access to low-cost central bank funding, increasing OMOs and swap funding limits, lengthening the maturity of repo auctions, and extending both the coverage of swap auctions and the collateral pool. In addition, the CBRT eased rediscount credit regulations to exporting firms, expanded its balance sheet by outright purchases of government bonds, and propelled banks to sustain the flow of credit to corporates by deploying reserve requirements as an additional tool. The policy intention to spur loan growth was reinforced by the controversial 'Asset Ratio' (AR) rule,

¹ The views or opinions expressed in this chapter are solely those of the authors and do not reflect the views, policies, or positions of Akbank.

² See Kara (2021) for a more detailed assessment of the monetary policy in Türkiye during the initial phase of the pandemic.

introduced by the Banking Regulation and Supervision Agency (BRSA) in April 2020, which encouraged banks to either extend credit, purchase sovereign bonds or increase swaps by the CBRT as a weighted share of their Turkish lira (TRY) and FX deposits.³ Public banks have further contributed to massive credit expansion, with the quarterly growth of consumer loans in 2020Q2 exceeding 100% in annualised terms. This scheme was complemented with large-scale FX interventions to stabilise the currency, in coordination with the Treasury and the public banks.

FIGURE 1 REAL POLICY RATE (EX-POST, %)



Note: Real policy rates are calculated by using annual CPI inflation rates. Emerging market countries include Brazil, Chile, China, Colombia, India, Indonesia, Mexico, Poland, Romania, Russia, South Africa, Thailand.

Source: Bloomberg.

Although most of these measures were in line with international practices, perceptions of weakened instrument independence of the central bank (an implicit upper bound on the policy rate due to political constraints) have raised concerns regarding the inflation and currency outlook. While the primary motivation of the authorities was to minimise long-term scarring effects of the pandemic on the productive capacity of the economy, negative real interest rates and massive credit expansion produced significant costs in the form of increased capital outflows and dollarisation under weak policy credibility. The authorities restricted off-shore cross-currency swap market to avoid potential speculative attacks on the currency. Meanwhile, the central bank maintained monetary stimulus and used FX interventions to stabilise exchange rates. However, country risk premium responded sharply to the substantial depletion in international reserves, which

3 According to the BRSA Board decision on 18 April 2020, all deposit and participation banks had become subject to the Asset Ratio (AR) regulation, to be effective as of 1 May 2020. The AR rule required banks to calculate and meet the ratio at 100%. The formula, which was amended several times before repealed as of December 31, 2020, was initially set as follows: $\text{Asset Ratio} = [\text{Loans} + (\text{Securities} \times 0,75) + (\text{CBRT Swaps} \times 0,5)] / [\text{TRY Deposit} + (\text{FX Deposit} \times 1,25)]$. See www.bddk.org.tr/Duyuru/Detay/696.

created an adverse feedback loop. The destabilising nature of these policies eventually prompted monetary tightening in September and October 2020, which ended up with the dismissal of the central bank governor and the Minister of Treasury and Finance. This incident reinforced the view that the central bank policy rate was tightly constrained on the upside.

The new team came at a time when the global inflation was accelerating and leading advanced central banks were poised to exit from pandemic policies and hike rates. The Turkish authorities have gradually reduced the direct funding facilities, stopped motivating credit growth through reserve requirements, restrained loan growth through public banks, and switched back to a floating exchange rate regime under conventional inflation targeting with a strong promise to restore price stability. The policy rate was raised by 875 basis points to 19% in five months. However, the policy pivot to orthodoxy did not last long. Once again, the upper bound constraint on the policy rate became binding and the central bank governor was dismissed right after the 200 basis point interest rate hike in March 2021.

AN UNPRECEDENTED POLICY EXPERIMENT

The new central bank management initially maintained the policy rate at 19% for five months, before taking one of the most controversial policy actions in the history of central banking. In a surprise move, the CBRT started to cut the policy rate in September 2021, at a time when the inflationary pressures were building up and other central banks were expeditiously hiking rates. The officials of the CBRT announced that lower interest rates would lead to more competitive exchange rates and help close the current account deficit, which, in turn, would stabilise the currency, and hence inflation. Two deputy governors and one external Monetary Policy Committee (MPC) member, who had presumably opposed the rate cut decisions, were dismissed in October 2021. These developments have further undermined the central bank's operational independence. Meanwhile, the Minister of Treasury and Finance resigned in December 2021.

The MPC cut the policy rate in two separate easing cycles, first from 19% to 14% between September and December 2021, and then from 14% to 8.5% between August 2022 and February 2023. The interest rate cuts, which were politically motivated, started fuelling inflation quickly as the depreciation of the lira was reignited by the rising inflation expectations. The central bank's FX interventions backfired due to already low levels of reserves. Deeply negative real interest rates (Figure 1) further weakened nominal anchors and reinforced dollarisation, and the economy was caught up in an exchange rate-expectations spiral. The nominal value of the lira halved in the last three months of 2021, triggering a panic in the FX market. Banks started to face FX deposit withdrawals, which have been a harbinger of balance of payment crises historically. The situation was calling for an urgent policy response.

A NEW TOOL TO STABILISE THE CURRENCY

Amid intensifying inflationary pressures and the heightened probability of a run on FX deposits, the authorities opted for not raising the policy rate; instead they introduced a non-traditional instrument, ‘FX-protected (-linked) deposits’ (abbreviated as KKM in Turkish). Under this scheme, if the depreciation rate of the lira against the US dollar exceeds the interest rate return on lira deposits for a certain maturity, the government pays the difference directly to the depositor via banks. This facility practically provides a free insurance to lira depositors against exchange rate fluctuations by guaranteeing that, in the worst case, the US dollar value of lira deposits would remain constant. Anyone having a lira or FX deposit (including gold) was allowed to switch to KKM. The central bank was given the task of protecting (paying the cost of) KKM, which were converted from FX, while the Treasury assumed the responsibility of covering KKM converted from lira. When a depositor switched from FX deposit to KKM, the central bank purchased the FX from the bank, improving its net FX position and thus acquiring more firepower for FX interventions. In fact, as we will further elaborate in the next section, the central bank used these reserves to control the exchange rate for some time.

The facility initially stopped the flight to hard currency and the run on FX deposits, despite the deeply negative real policy rates. Furthermore, the government introduced sweeteners such as tax advantages for firms to promote participation in the KKM scheme. Banks were induced to increase their KKM portfolio through regulations, imposing obligatory holdings of long-term fixed-rate government bonds, should they not fulfil certain criteria on the reduction of FX deposits, i.e. meeting conversion targets, and increasing the absolute share of lira deposits. Reserve requirements and fees were also used for similar purposes.⁴

In addition to the introduction of KKM as an imperfect substitute for the policy rate, the scope of the reserve requirement policy was broadened so as to serve as an additional instrument for targeted credit and FX-management policies. Commercial loans in lira were held subject to reserve requirements, whereas selected ‘prioritised’ sectors, such as SMEs, exporters, and SEEs, as well as certain loan types including investment and agricultural loans, were kept exempt from the required reserve scheme. Reserve requirement ratios were also differentiated with respect to the conversion targets from FX to lira deposits in order to sustain a policy-induced de-dollarisation (the ‘liratisation’ strategy).⁵ In effect, the system gradually turned into a financial repression regime.

The regulatory structure has become more and more complicated over time (see the Appendix) as either financial institutions managed to circumvent rules or previously untested policies brought undesired outcomes, triggering new regulations and/or

4 “Press Release on Encouraging Conversion of FX Deposits to TL Time Deposits (2021-62)” (www.tcmb.gov.tr/wps/wcm/connect/EN/TCMB+EN/Main+Menu/Announcements/Press+Releases/2021/ANO2021-62).

5 “CBRT Press Release on Reserve Requirements (2022-24)” (www.tcmb.gov.tr/wps/wcm/connect/EN/TCMB+EN/Main+Menu/Announcements/Press+Releases/2022/ANO2022-24).

frequent amendments to the previous ones. Meanwhile, deeply negative policy rates have led to strong volatility in asset prices because of deteriorating inflation expectations and uncertainty about the future course of policy, leading to a market-driven tightening in financial conditions. In response, the authorities introduced further financial repression policies to suppress the market response, control FX markets, and bring down loan and bond interest rates.

As the participation in KKM deposits increased over time, their realised and potential fiscal costs became a major issue of public debate. Recall that under the scheme, the Treasury covered the KKM deposits converted from lira deposits. Therefore, any 'excess' depreciation of the domestic currency immediately translated into a fiscal cost, as the Treasury would have to pay the differential between the lira depreciation and the lira interest rate at a fixed maturity.

In an interlude to the presidential elections, by September 2022, the authorities introduced further incentives to promote the participation in the KKM scheme. The stock of the KKM deposits exceeded US\$125 billion by mid-2023, which amounted to almost one-quarter of the total banking system deposits, and the central bank net FX position excluding KKM further deteriorated to a deeply negative level of -\$63 billion. Meanwhile the current account deficit surged to 5.6% of GDP. With cash FX reserves almost depleted, portfolio inflows dried up, and FDI financing remained at historical lows, the situation was definitely not sustainable and thus called for either a policy reversal or capital controls. Türkiye opted for the former, putting an end to one of the most controversial monetary policy practices in its history.

ANOTHER U-TURN

Once again, the central bank governor and the Minister of Treasury and Finance were dismissed.⁶ The incoming team has reverted back to more traditional policies such as monetary and fiscal tightening to rebalance the economy. The central bank started hiking policy rates, and the authorities initiated an exit from the financial repression schemes as well as from the FX-linked deposit scheme. Successive rate hikes, starting in June 2023, have enabled the authorities to gradually simplify the complex set of regulations. These moves have enhanced the policy predictability and restored the effectiveness of monetary transmission to a large extent.

On the other hand, the new team maintained some of the unconventional tools such as discretionary FX interventions, targeted credit allocation, speed limits on credit growth, and restrictions on FX asset holding by corporates. The intention seems to be unwinding most of these facilities gradually as the level of the policy rate is fully normalised over time.

6 Between 2019 and 2023, four central bank governors were replaced in four years.

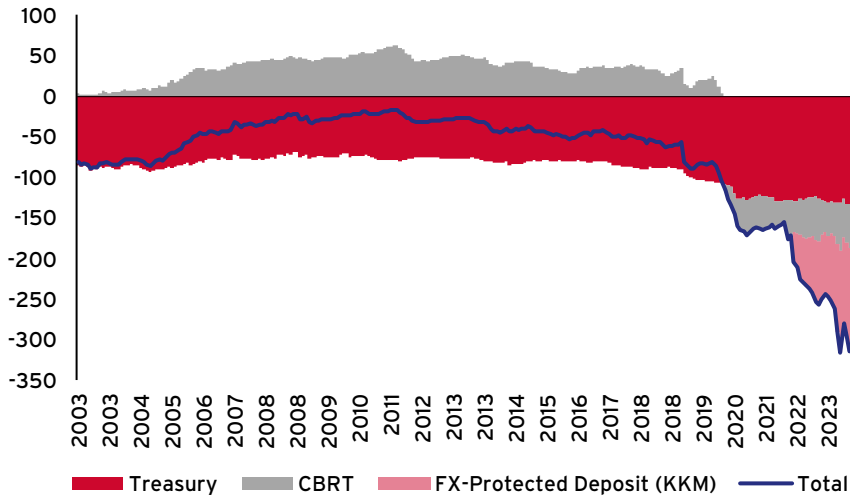
As of the writing of this piece, policy rates are up from 8.5% in May to 35% in October, while official inflation is above 60% and one-year-ahead inflation expectations are around 45%.⁷ The real policy rate is still significantly negative, in terms of both expected and actual inflation. The central bank underlines that overall financial conditions are tighter than implied by the policy rate alone. On the other hand, international and domestic investors perceive the level of the policy rate as a signal of instrument independence. Overall, further rate hikes may be needed to ensure the alignment of inflation expectations with the interim targets.

A key question is whether higher policy rates after some threshold would lead to financial or fiscal dominance. Financial dominance concerns are mainly two-faceted. The first relates to the banking sector's holdings of long-term fixed-rate government bonds and the impact of their duration risk on bank balance sheets.⁸ As of today, the risks to financial stability from this channel, which may arise from the prospective high-interest rate environment after a prolonged repression, seem to be less of a concern, as the share of long-tenor fixed-rate bonds in total assets of the banking sector is only around 4%. Regarding balance sheets, the second concern is a potential deterioration in asset quality under a sharp contraction and/or a protracted stagnation in economic activity. Keeping real costs of disinflation at a minimum will eventually depend on the degree of success in anchoring inflation expectations and reducing inflation inertia through rapid credibility build up.

The fiscal burden of the financial repression policies over the longer term may be considerable. As of mid-2023, Türkiye's primary balance is close to zero and the central government debt-to-GDP ratio is 34%, which is well below those of its peers. However, because of the financial plumbing activities during the previous episode, such as the high stock of KKM deposits and deeply negative net FX position of the central bank (due to \$80 billion worth of outstanding swap liabilities), the overall government balance sheet is highly vulnerable to currency risk. Including KKM, the total FX open position of the central bank plus the central government exceeded \$300 billion (about 30% of GDP) by mid-2023 (Figure 2). Reducing this risk will entail large amounts of FX purchases by the central bank and the unwinding of the KKM scheme, which would only be possible with sustained confidence in lira assets and improvement in external balances. Therefore, the monetary authority will have to adopt an unambiguously tight policy for an extended period.

7 Survey-based inflation expectations from the CBRT Survey of Market Participants, October 2023.

8 Recall that long-term government bond holding requirements served as one of the key financial repression instruments encouraging the banks to meet certain targets (on loan price/growth caps, share of lira deposits, conversion from FX deposits, etc.) as well as suppressing yields in the government bond market.

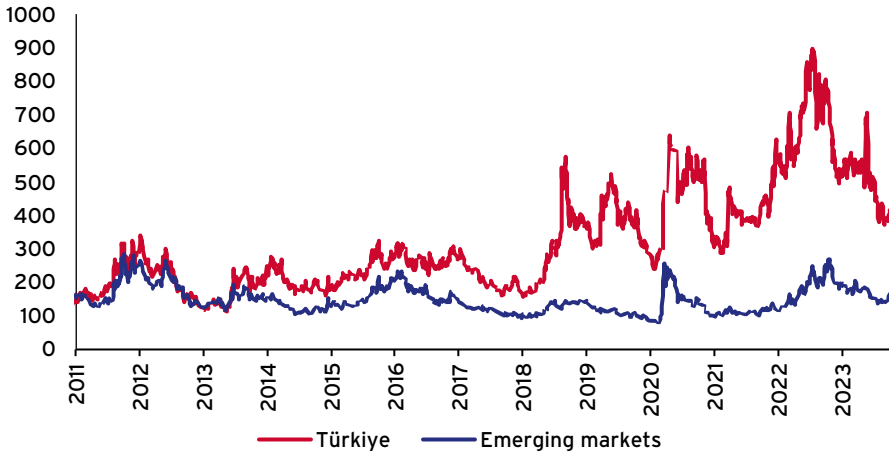
FIGURE 2 GOVERNMENT NET FX POSITION (BILLION US\$)

Note: FX-protected deposits are considered as a foreign exchange liability of the Treasury and the CBRT. Net FX position of the CBRT is calculated as the difference between net foreign assets and off-balance sheet swap liabilities.

Source: Ministry of Treasury and Finance; CBRT; BRSA.

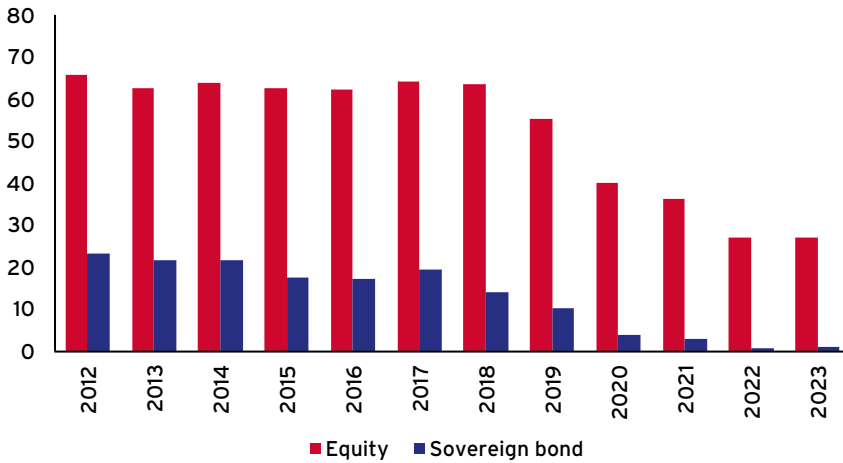
MACROECONOMIC IMPACTS OF THE LOW RATES AND FINANCIAL REPRESSION POLICIES

The cycle of policy rate cuts after September 2021, coupled with geopolitical risks and the war in Ukraine, immediately raised external financing concerns and led to a surge in Türkiye's sovereign risk. Türkiye's five-year CDS increased from 500 to 900, significantly underperforming peer economies (Figure 3). The authorities were able to partly reverse this deterioration by securing additional funding using bilateral relations and letting the bank deposit rates adjust freely to tighten financial conditions. The risk premium jumped for a second time during the presidential elections held in May 2023, but eased right after the elections with the appointment of more market-friendly economic actors bringing another reversal in the macro-financial policy approach.

FIGURE 3 COUNTRY RISK PREMIUM (FIVE-YEAR CDS, BASIS POINTS)

Note: Emerging market countries include Brazil, Colombia, Hungary, Indonesia, India, Mexico, Poland, Romania, South Africa.

Source: Bloomberg.

FIGURE 4 FOREIGN OWNERSHIP IN SELECTED ASSETS (%)

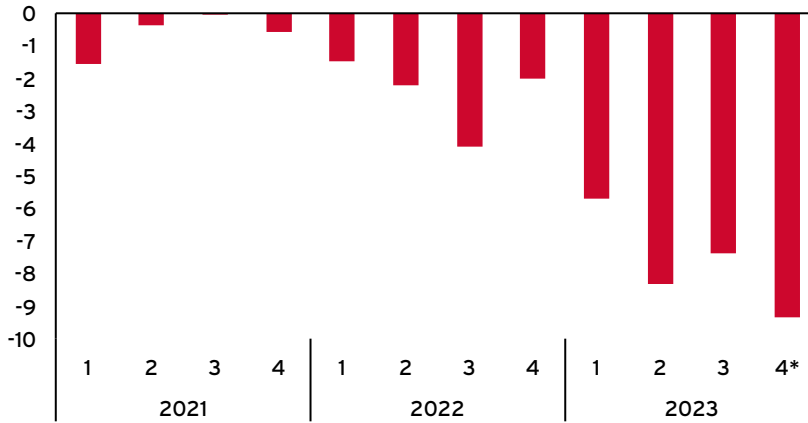
Note: Foreign share in QNBFB is excluded from the calculation for the equity market.

Source: Ministry of Treasury and Finance; Matriks.

The FX-linked deposit scheme and the financial repression policies have enabled the maintenance of excessively easy monetary conditions for some time, without running into a major disruption in the financial system. However, as time passed, the financial repression policies and elevated inflation expectations have led households to increase their demand for physical assets and durable goods such as gold, houses, and cars. Firms also have increased their stocks of intermediate and final goods, as well as capital expenditures, as a hedge against inflation. This tendency was further amplified

by exchange rate controls and regulations, which restricted firms' holding of FX assets. The strong momentum in the demand for imported goods widened the current account deficit, exacerbating the balance of payments risks (Figure 5).

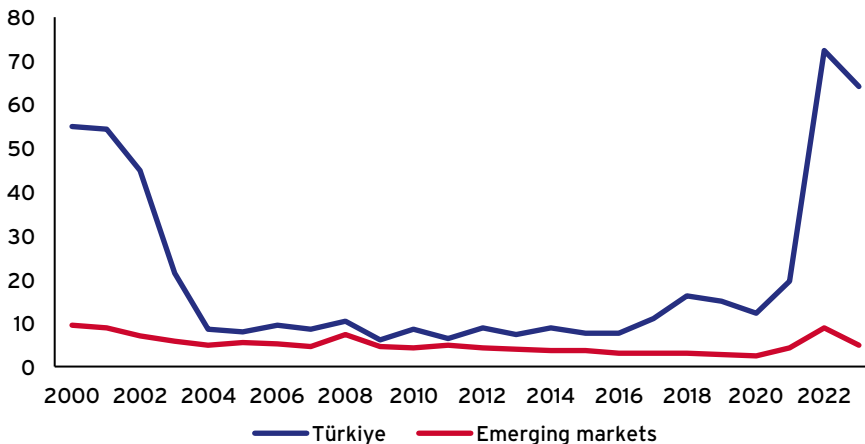
FIGURE 5 TRADE DEFICIT (LESS ENERGY AND GOLD, BILLION US\$)



Note: Seasonally adjusted. Last observation shows the October figure multiplied by 3.
Source: TURKSTAT; Ministry of Trade; own calculations of seasonal adjustment.

The imbalances caused by the low interest rates and excessively easy financial conditions have led to a rapid surge in inflation and inflation expectations. Consumer inflation jumped from 19% to 85% in one year, decoupling significantly from peer economies (Figure 6). Although the central bank started raising interest rates in the second half of 2023, inflation is projected to stay above 60% in the near term.

FIGURE 6 CONSUMER INFLATION (YEAR-ON-YEAR, AS OF DECEMBER, %)

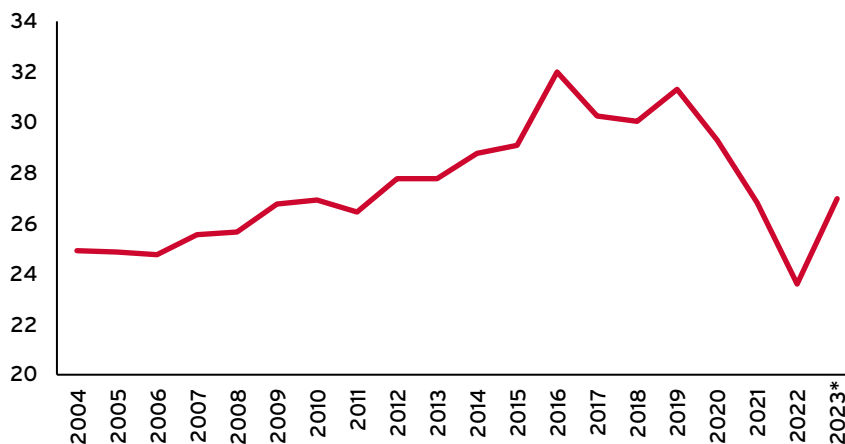


Note: Emerging market countries include Brazil, Chile, Colombia, Hungary, India, Indonesia, Malaysia, Mexico, Philippines, Poland, Romania, Russia, South Africa, Thailand.

Source: IMF.

Strong domestic demand and inflation uncertainty has triggered an increase in mark-ups. Price setters were able to easily pass the input costs driven by the exchange rate movements and energy prices to final prices under buoyant demand conditions and unmoored inflation expectations. Meanwhile, the labour share in GDP fell dramatically with the surprise inflation in 2021 and 2022, before partly recovering in 2023H1 as the government delivered significant hikes in minimum wages prior to the 2023 presidential elections (Figure 7).

FIGURE 7 LABOUR SHARE (% OF GDP)



Note: Last observation shows the first half of 2023.

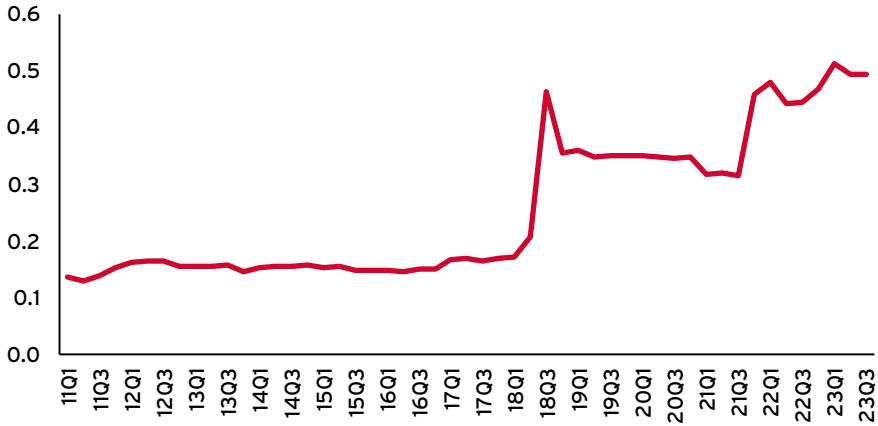
Source: TURKSTAT.

The lack of a systematic policy response to inflationary pressures in late 2021 and the consequent loss of nominal anchors have led to a substantial increase in the exchange rate pass-through to consumer inflation (Figure 8).⁹ Our estimations, based on an open economy Phillips curve model, suggest that three-quarters of the rise in annual consumer inflation by mid-2022 (from 17.5% in June 2021 to 78.6% in one year) can be explained by exchange rate movements (Figure 9). It is worth noting that stronger exchange rate pass-through beyond the cost-push effects could be attributed to an expectations-driven deterioration in pricing behaviour.¹⁰ The strengthened relationship between inflation expectations and exchange rate expectations due to the weaker policy response confirms this assessment (Figure 10).

⁹ The empirical findings of Carrière-Swallow et al. (2021) show that exchange rate pass-through is negatively related to monetary policy credibility.

¹⁰ See Box 2.5 in the CBRT Inflation Report 2023-III (CBRT 2023) for a recent discussion on the exchange rate pass-through in Türkiye. Although the study estimates the pass-through coefficient from the cost channel of around 25%, it does not conflict with our results by acknowledging the possibility of higher pass-through when the expectations channel is considered.

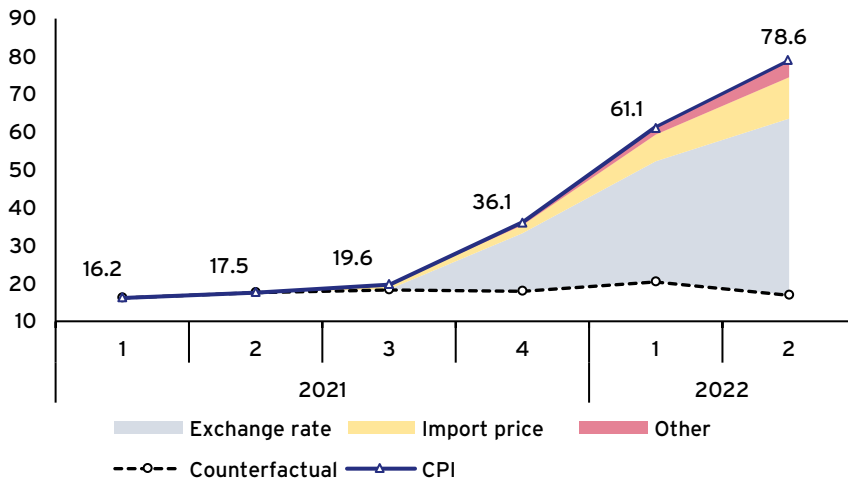
FIGURE 8 EXCHANGE RATE PASS-THROUGH (RESPONSE OF INFLATION TO 1% SHOCK, PERCENTAGE POINTS)



Note: Recursive parameter estimates of an open economy Phillips curve equation, explaining core inflation. Long-run pass-through is defined as the sum of contemporaneous and lagged exchange rate coefficients divided by (1-lagged inflation). The start of the recursive estimation window is fixed at 2006Q2, while the end of the sample for each run is shown by the x-axis. Last observation is 2023Q3.

Source: Update from Kara and Sarıkaya (2021).

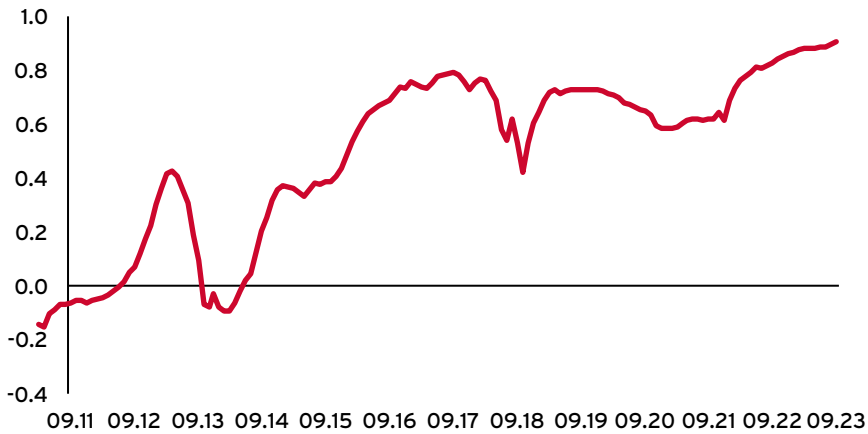
FIGURE 9 DRIVERS OF INFLATION (CONTRIBUTION TO ANNUAL CPI INFLATION, PERCENTAGE POINTS)



Note: Annual inflation figures show the y-o-y percentage change in the CPI for the last month of each quarter. The decomposition is based on an estimated open economy Phillips curve equation. The series labelled as “Counterfactual” represents a hypothetical forecast scenario where the explanatory variables remain constant after 2021Q2. The same procedure is applied to the respective variables to calculate their individual contributions.

Source: Own calculations.

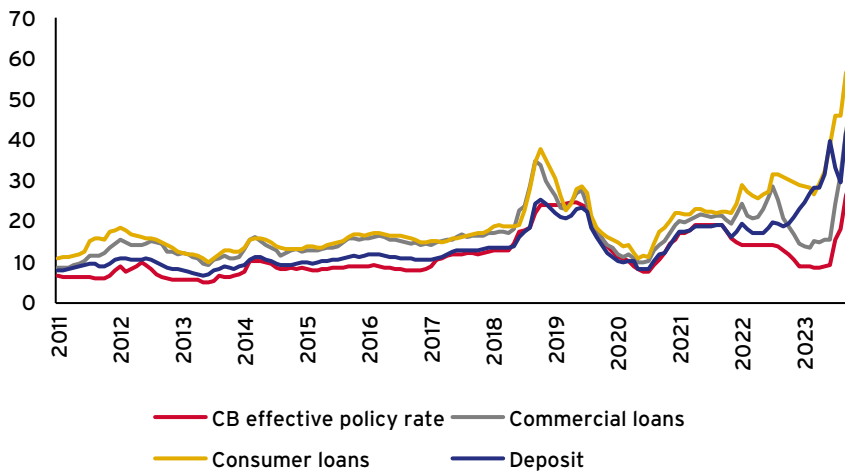
FIGURE 10 CORRELATION BETWEEN EXPECTATIONS FOR EXCHANGE RATE AND INFLATION (ONE-YEAR AHEAD, %)



Source: Update from Gülsen and Kara (2021).

Increased policy uncertainty due to vast numbers of frequently changing regulatory amendments hampered the transmission mechanism of the policy rate. Government bond and deposit yields were mainly driven by banks' obligatory securities holdings and de-dollarisation targets, while loan rates were capped by the multiples of the policy rate, varying with respect to the loan type. As a consequence, the central bank policy rate and market rates have decoupled considerably (Figure 11). The policy rate's diminished signalling power further complicated the communication of monetary policy, making it difficult to manage inflation expectations.

FIGURE 11 INTEREST RATES (%)



Source: CBRT.

AN EVALUATION OF TÜRKIYE'S POLICY RESPONSE FROM THE PERSPECTIVE OF ECONOMIC THEORY

The Turkish policy experiment conducted during 2021-2023 has largely confirmed the predictions of economic theory.¹¹ It is a widely agreed view among central bankers and academics that cutting the policy rate at time of rising inflation would lead to further deterioration in inflation expectations and the pricing behaviour.¹² The case of Türkiye has forcefully (and perhaps painfully) proved this. Inflation and inflation expectations increased substantially right after the policy rate cuts in 2021. Weakened policy credibility has led to an increase in the exchange rate pass-through (Figure 8) and triggered a spiral between the exchange rate, inflation, and expectations. Figure 10 depicts the correlation between expected exchange rate depreciation and expected inflation. This correlation should be low under an inflation targeting regime where monetary policy sufficiently responds to inflation and anchors expectations (Clarida and Waldman 2007). In the Turkish case, the correlation has become stronger over time, approaching 1 following the rate cut cycles in 2021 and 2022. This evidence confirms the long-established view on highly dollarised emerging economies that the abandonment of a proper monetary reaction to inflationary shocks results in de-anchoring of expectations for exchange rate and inflation, which may create a vicious cycle.

Another lesson drawn from the central bank's politically driven experiment may be that competitive devaluations backfire in the absence of a nominal anchor. When the central bank started cutting interest rates in September 2021, the lira depreciated sharply, initially yielding some price competitiveness. Nevertheless, pass-through to domestic inflation from exchange rates has increased substantially, quickly eroding the competitiveness gains acquired by the currency weakness. As a consequence, although the US dollar/lira rate moved from 8 to 18 in a couple of months, the price competitiveness implied by the real exchange rate turned out to be short-lived with the surge in domestic inflation and energy prices. Relative price changes from the large nominal depreciation in the last quarter of 2021 were completely eroded in the manufacturing sector by mid-2023 due to rapidly rising domestic costs (Figure 12).

Another well-known concept in international macro is the 'impossible trinity' (or 'policy trilemma') highlighted by the Mundell-Fleming paradigm: retaining control over both monetary policy and the level of exchange rates is possible only under capital flow restrictions. Interestingly, the Turkish authorities aimed to control both the exchange rate and interest rates without resorting to direct capital controls, and indeed managed

11 See Gürkaynak et al. (2023) for a more elegant exposition of this 'experimental' policy from the perspective of macroeconomic theory.

12 There are few exceptions in academic work labelled as 'neo-Fisherian', suggesting that lower interest rates would cause lower inflation as formalized by Uribe (2022).

to do so for some time.¹³ Practically, there were no restrictions on capital inflows and outflows for foreign residents, except for the limitations on the cross-currency swaps (short-term carry trade type of flows) to avoid speculative attacks on the lira.

FIGURE 12 REAL EFFECTIVE EXCHANGE RATE (PPI-BASED, 2003=100)



Source: CBRT.

How was Türkiye able to control the exchange rate under ultra-loose monetary policy with high inflation without implementing direct capital controls?

First of all, it is worth mentioning that the massive capital outflows that had already taken place since 2017 laid the ground for the implementation of the financial repression policies. The risk of speculative attacks on the currency was significantly reduced, with the off-shore swap market becoming dysfunctional and foreign participation in domestic capital markets declining to ten-year lows (Figure 4). In other words, the light positioning of foreign investors enabled the financial accounts to operate in a semi-closed form without resorting to outright capital controls.

Second, the authorities devised several instruments simultaneously in order to mimic capital controls:

1. Exchange controls on domestic corporates both through regulations and informal interventions (imposing transaction limits and conducting verbal suasion to alter the daily operations of banks and firms).
2. Providing free insurance to lira deposits against currency depreciation (KKM deposit scheme).

¹³ We adhere to the definition in Korinek and Sandri (2016), who describe capital controls as the restriction of financial asset transactions between foreign and domestic residents.

3. Policy-induced conversion of FX deposits into KKM deposits – an artificial de-dollarisation, by introducing carrots and sticks through security maintenance and reserve requirements.
4. Surrender requirements on exports' FX income.
5. Introducing limits on transaction volumes and timings in the FX market to reinforce the market-maker role.
6. Discretionary FX interventions through public banks.
7. Caps on loan rates and loan growth as well as cap differentiation for a selective, targeted credit allocation.
8. Certain informal hurdles on domestic residents' transfer of FX abroad, in the form of obligatory documentation, high transfer fees, etc.
9. Widening bid/ask spreads in the FX market to discourage short-term return seeking behaviour.

This list may extend further, but we will stop here as it suffices to provide an insight on how the authorities attempted to address the policy trilemma in the absence of outright capital controls.

Overall, Türkiye implemented a heavily managed exchange rate and credit regime by means of various financial repression measures after 2021 and until recently. This has enabled simultaneous control of monetary and financial conditions along with exchange rates, without imposing explicit restrictions on cross-border investment flows of non-residents. The whole set-up was engineered to extend the lifetime of the policy regime in the pursuit of maintaining low interest rates, strong domestic demand and high employment growth.¹⁴

Türkiye's economic growth remained relatively strong during this period, with clear signs of overheating.¹⁵ The domestic demand-driven growth, fuelled by excessive monetary expansion, has created significant macroeconomic imbalances, leading to stronger cost pass-through, higher inflation, and a wider current account deficit. Moreover, the central bank's net FX position has deteriorated substantially and the financial system has been heavily burdened with a complex set of regulations. In the end, the transversality condition over the stock of domestic FX savings has become binding and the repression scheme proved unsustainable as expected by theory: the impossible trinity turned out indeed to be impossible.

14 Such a policy mix aimed to stimulate domestic demand and at the same time to maintain a stable exchange rate – an appealing mix for the average voter prior to the elections.

15 Low policy rates, coupled with rapid credit expansion has led to excessive domestic demand-driven growth. Between 2019Q4-2023Q2, Türkiye's real GDP increased by 23%, outpacing G20 countries, China being the closest at 18.2% GDP growth during the same period.

The question of what the outcome would have been had the authorities still cut the real policy rates to deeply negative levels and adopted similar financial repression policies, but acted less aggressively in boosting credit growth, remains an intriguing, yet unanswered policy issue. We conjecture that the regime could have been optimised and maintained for a longer period under a more balanced approach, but eventually it would have had to be abandoned due to accumulated external and internal imbalances.

Turkish experiment with multiple tools echoes the ‘integrated policy’ approach put forward by international institutions in recent years (e.g. Basu et al. 2023). In this framework, policymakers use several instruments in coordination to achieve multiple objectives. These tools include interest rates, FX interventions, capital controls and macroprudential policies. Türkiye did not implement direct capital controls, but added financial repression policies and FX-linked deposits into the recipe.

It should be noted that the integrated policy framework, in the form promoted by international institutions, stipulates that price stability remains a key objective for monetary policy. In the Turkish case, this objective has waned since September 2021. Maintaining low interest rates and strong demand in the short term seems to have taken precedence over price stability. More importantly, macroprudential instruments, FX interventions, and other tools (particularly FX-protected deposits) have been used to substitute for proper monetary policy. The centralised and interventionist policy design rendered the monetary policy rate dysfunctional, while indirect tools were brought to the forefront as the main instruments to steer financial conditions. However, as Stein (2013) puts it, it is the monetary policy that “gets in all the cracks”. In the near absence of the interest rate as a policy tool, Turkish authorities had to implement financial repression and a very complicated set of regulations to fill in each crack separately, which might have hampered efficiency in the allocation of resources.

CONCLUSION

The Turkish central bank and other relevant authorities initiated a unique macro financial policy mix during the post-pandemic surge in inflation, especially after September 2021. The predominant feature of this ‘experimental’ policy mix, driven by political motives, was leaning against global trends by cutting policy rates substantially amid rising inflationary pressures. Real policy rates were brought down to deeply negative levels, and monetary policy was substituted by a complex set of discretionary and idiosyncratic instruments. The ultimate objective was to sustain high growth in economic activity and employment by maintaining an ultra-low interest rate environment for an extended period prior to general elections. Although the economy grew rapidly during this period compared to rest of the world, it came with significant macro imbalances such as high inflation, wide external deficit and weak central bank reserves, as well as substantial erosion in the credibility of the monetary institutions.

Eventually, the accumulated risks and sustainability concerns called for a drastic change in policy approach. By mid-2023, a new economy team had taken over, with the promise of a return to 'rational' policies by taking steps to normalise the policy rate, unwind the financial repression, and simplify the complex regulatory tools. This is a daunting task as the authorities have to deal with delicate balances in a complicated policy setup, while at the same time cooling down domestic demand and reducing inflation inertia by boosting policy credibility. Given that all this has to be executed amid heightened global uncertainty and geopolitical risks, it may take many years to fully repair the damage.

Overall, the politically driven economic policymaking in Türkiye during the post-pandemic period, particularly from September 2021 to June 2023, provides a natural experiment to validate the predictions of some basic principles in monetary economics and international finance. However, it is likely to be cited as one of the most expensive economic policy experiments in monetary history.

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Kara is a graduate of the New York University Economics PhD programme. He holds a BS from the Electrical-Electrical Department of the Middle East Technical University, and an MA in Economics from Bilkent University. Prof. Kara’s work has been published in scholarly journals including the *Journal of International Economics*, *Journal of Money Credit and Banking*, NBER Working Papers, and the *International Journal of Central Banking*.

Çağrı Sarıkaya is a former Head of Research and Monetary Policy Department of the Central Bank of the Republic of Türkiye (CBRT). He served as Deputy Executive Director (2016-2019) and the Executive Director (2019-2021) of Research and Monetary Policy. Sarıkaya assumed key roles in the establishment and advancement of the forecasting and policy analysis system during the preparation and implementation phases of the inflation targeting regime in Türkiye between 2002-2022.

Sarıkaya joined Akbank in 2022 as the Chief Economist and Head of Economic Research Division. He is responsible for leading the macroeconomic studies with regard to the Bank’s market positioning and strategy, advising the Board of Directors, and providing guidance to institutional clients, business partners and investors. He holds BSc and MSc degrees in Economics from the Middle East Technical University.

APPENDIX: CHRONOLOGY OF THE PANDEMIC EXIT POLICIES

Date	Authority	Policy
24 July 2020	CBRT	FX RRRs were increased by 300 bps
12 August 2020	CBRT	OMOs liquidity limits offered to primary dealers were reduced to zero
19 August 2020	CBRT	Banks' overnight borrowing limits at the CBRT Interbank Money Market were halved (CBRT Financial Stability Report, November 2020, p.4)
4 September 2020	CBRT	TL and FX RRRs were increased for banks fulfilling real credit growth conditions
4 September 2020	BRSA	The maximum term of consumer loans reduced to 36 months from 60 months (CBRT Financial Stability Report, November 2020, p.6)
24 September 2020	CBRT	The policy rate raised by 200 bps to 10.25%
22 October 2020	CBRT	The policy rate remained unchanged at 10.25%, while the margin between the late liquidity window (LON) lending rate and O/N lending rate widened. This enabled the CBRT to be able to raise its funding rate to 14.75% at its discretion
3 November 2020	CBRT	(i) Banks' borrowing limits at the CBRT Interbank Money Market were reduced to zero. (ii) TL interest rate applied to swap funding increased to 13.25% from 11.75%
7 November 2020	CBRT	Appointment of new Governor
19 November 2020	CBRT	The policy rate raised by 475 bps to 15%, and the operational framework of monetary policy was simplified by reinstating the one-week repo auction rate as the main policy rate
18 December 2020	BRSA	Credit card installment periods for purchases of selected consumption goods were reduced
24 December 2020	CBRT	The policy rate raised by 200 bps to 17%
25 December 2020	CBRT	RR policy was simplified by repealing the RR regulation that links the RRRs and remuneration rates to real loan growth rates
31 December 2020	BRSA	Asset Ratio rule was repealed
5 March 2021	CBRT	TRY RRRs were increased by 200 bps
18 March 2021	CBRT	The policy rate raised by 200 bps to 19%
20 March 2021	CBRT	Appointment of new Governor

Date	Authority	Policy
1 July 2021	BRSA	The maturity limits and loan-to-value ratios were reduced in consumer loans and financial leasing transactions extended for vehicle purchases. Credit card installment periods were reduced. Risk weights of personal credit cards and consumer loans were increased
6 August 2021	CBRT	FX RRRs were increased by 200 bps
16 September 2021	BRSA	The maturity limit for consumer loans (above TRY 50,000) was reduced from 36 months to 24 months (CBRT Financial Stability Report, November 2021, p.19)
23 September 2021	CBRT	The policy rate cut by 100 bps to 18%
1 October 2021	CBRT	(i) The facility for holding FX for Turkish lira reserve requirements was terminated. (ii) FX RRRs were increased by 200 bps
21 October 2021	CBRT	The policy rate cut by 200 bps to 16%
12 November 2021	CBRT	FX RRRs were increased by 200 bps
18 November 2021	CBRT	The policy rate cut by 200 bps to 15%
1 December 2021	CBRT	CBRT directly intervened in the FX market by selling USD 7.28 billion from December 1st to December 17th (CBRT Financial Stability Report, May 2022, p.12)
16 December 2021	CBRT	The policy rate cut by 100 bps to 14%
21 December 2021	MTF, CBRT	FX-protected TL deposit scheme was introduced to resident real persons. Extended to resident legal persons on 11 January 2022 (CBRT), and to non-resident Turkish citizens (YUVAM accounts) on 1 February 2022 (CBRT)
7 January 2022	CBRT	The amounts converted from resident real persons' FX deposit/ participation accounts to TL deposits/ participation accounts were kept exempt from RR. Extended to gold accounts on January, 21st, to legal persons' FX deposits on February, 4th, and to non-resident Turkish citizens' (YUVAM) FX accounts on March, 4th (CBRT Financial Stability Report, May 2022, p.12-13)
28 May 2022	Presidency	Corporate tax exemption was introduced on the earnings from FX-protected deposit and participation accounts to encourage firms to switch to TL time deposits
9 June 2022	BRSA	The maturity limits on consumer loans were reduced (CBRT Financial Stability Report, November 2022, p.16)

Date	Authority	Policy
10 June 2022	CBRT	(i) TRY commercial loans, excluding SMEs, export loans, tradesmen loans, agricultural loans, commercial credit cards, loans extended to financial institutions, were held subject to RRR at 10%. (ii) FX RRRs were differentiated with respect to the conversion rate of real person's FX accounts to TRY accounts.
8 July 2022	CBRT	RRR for TRY commercial loans were increased from 10% to 20%
29 July 2022	CBRT	Banks were required to maintain additional TRY long-term fixed-rate securities for FX deposits and participation funds with the Securities Maintenance ratio at 3%. The ratio was differentiated with respect to banks' real and legal person deposit conversion rates.
18 August 2022	CBRT	The policy rate cut by 100 bps to 13%
22 September 2022	CBRT	The policy rate cut by 100 bps to 12%
30 September 2022	CBRT	Securities Maintenance practice was initiated for commercial loans with specified caps on growth rate and interest rate
20 October 2022	CBRT	The policy rate cut by 150 bps to 10.5%
24 November 2022	CBRT	The policy rate cut by 150 bps to 9%
30 December 2022	CBRT	(i) Securities Maintenance ratio with respect to FX deposit conversion rates was revised from 3% to 5%. (ii) Security Maintenance conditions were changed to be based on the targets for the share of TRY deposits, instead of conversion rates.
1 January 2023	CBRT	The 'lirisation' target in TRY deposits was increased from 50% to 60% for the first half of 2023.
6 January 2023	CBRT	The commission rate, applied to FX RR accounts at the CBRT, was linked to the TRY share in both real and legal person deposit and participation funds. (CBRT Financial Stability Report, November 2022, p.15)
7 January 2023	CBRT	Securities Maintenance ratio raised from 5% to 10%. Over-delivering 60% target for TL share in real and legal person deposits would be subject to lower ratios by tranches.
23 February 2023	CBRT	The policy rate cut by 50 bps to 8.5%
9 June 2023	CBRT	Appointment of new governor
22 June 2023	CBRT	The policy rate increased by 650 bps to 15%

Date	Authority	Policy
25 June 2023	CBRT	Policy simplification process was initiated. CBRT reduced the target for TRY deposit share from 60% to 57%, and Securities Maintenance ratio from 10% to 5%.
20 July 2023	CBRT	The policy rate increased by 250 bps to 17.5%
21 July 2023	CBRT	The RRR for FX-protected deposit accounts raised to 15%.
25 July 2023	CBRT	Securities Maintenance practice based on loan growth and loan rates continued to be simplified
20 August 2023	CBRT	The implementation of a target for conversion from FX deposits to FX-protected deposits as well as the securities maintenance and reserve requirement practices based on the TRY share were terminated.
24 August 2023	CBRT	The policy rate increased by 750 bps to 25%
14 September 2023	CBRT	RRR for FX-protected deposits with maturities up to 6 months increased to 25%.
21 September 2023	CBRT	The policy rate increased by 500 bps to 30%
26 October 2023	CBRT	The policy rate increased by 500 bps to 35%
27 October 2023	CBRT	Securities Maintenance regulations continued to be simplified
2 November 2023	CBRT	RRR for FX-protected deposits with the maturity of up to 6 months was increased by 5 points to 30%.

Note: MTF: Ministry of Treasury and Finance, CBRT: Central Bank of the Republic of Türkiye, BRSA: Banking Regulation and Supervision Agency

PART 3

THE POST-PANDEMIC INFLATION: CAUSES, EFFECTS, AND IMPLICATIONS

CHAPTER 16

Analysing the inflation burst in eleven economies

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Ben Bernanke and Olivier Blanchard¹

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To assess whether central banks reacted appropriately to post-COVID inflation and are drawing the right lessons for the future – the focus of this volume – one needs to understand the forces that drove inflation. This paper presents some of the results from a study of the sources and mechanisms of post-COVID inflation in eleven economies.

The list of potential sources of post-COVID inflation is a long one, from macroeconomic stimulus and strong aggregate demand, to sharp increases in commodity prices, notably food and energy, to price spikes reflecting disruptions of supply chains, to attempts by firms to increase markups over costs, to increases in short- and long-term inflation expectations and real wage rigidity as amplifiers of the effects of the initial demand and supply shocks.

In Bernanke and Blanchard (2023), we offered a simple analytical model to organise thoughts, to think about how each of these factors played a role in the inflation process. We then estimated the model for the United States. A number of central banks found the approach potentially useful and decided to apply it to their own countries.² These efforts became a joint project, involving ten central banks plus ourselves for the United States. The ten central banks are the Bank of England, the European Central Bank, the Bank of Japan, the Bank of Canada, the Bank of France, the Bundesbank, the National Bank of Belgium, the Dutch Bank, the Bank of Spain, and the Bank of Italy.

The project is not yet finished, and this is a progress report. The final results, which may differ in their details from those reported here, will be published later in specific country publications and in a paper that describes and compares the country-level results, of which the present paper is a first pass.

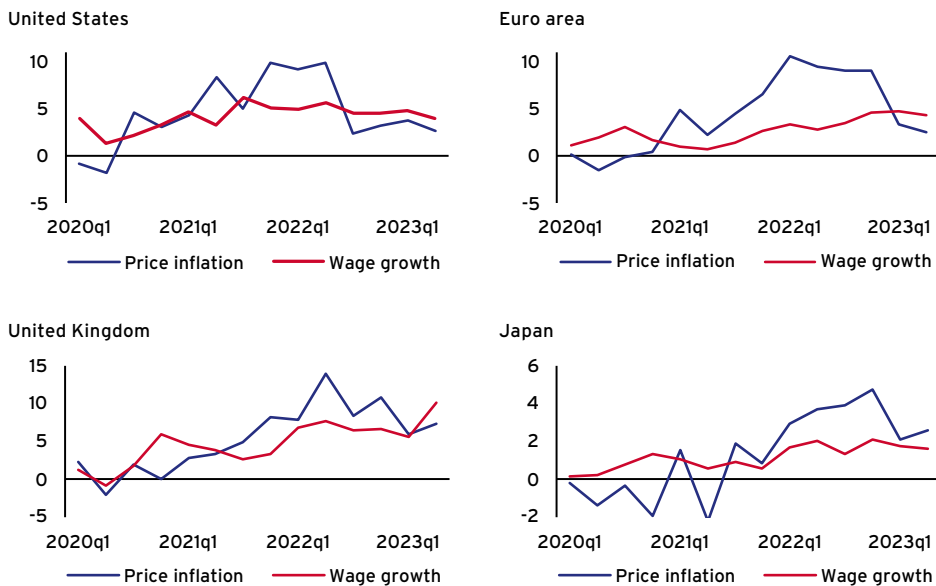
1 This chapter is based on the work of Pierre Aldama, Claire Le Gall, and Hervé Le Bihan for France; Koji Nakamura, Shogo Nakano, Mitsuhiro Osada, and Hiroki Yamamoto for Japan; Jonathan Haskel, Josh Martin and Lennart Brandt for the United Kingdom; Gregory de Walque and Thomas Lejeune for Belgium; Jan-Oliver Menz for Germany; Morteza Ghomi, and Samuel Hurtado for Spain; Oscar Arce, Matteo Ciccarelli, Carlos Montes-Galdón, and Antoine Kornprobst for the euro area; Fares Bounajm, Jean Garry Junior Roc, and Yang Zhang for Canada; Massimiliano Pisani and Alex Tagliabracci for Italy; Dennis Bonam and Beer Prujit for the Netherlands. In addition to the researchers cited above, we thank Sam Booker and Dilek Sevinc, and seminar participants at the Peterson Institute. Country-specific papers will be available in early 2024.

2 By an abuse of language, we shall refer to the teams as country teams, despite the inclusion of the ECB, which represents the euro area as a whole. An interesting further direction of the study, which we have not exploited yet, will be to compare the evolutions of inflation in the euro member countries with the evolution as seen in the euro area as a whole.

The bottom line of the project thus far is, on the methodological side, that the model has proven useful in allowing for a characterisation of shocks and their dynamic effects in each country, as well as a characterisation of similarities and differences in the inflation process across countries. Indeed, we believe that a set of country models with a similar structure can prove useful for central banks to analyse and compare inflation processes in the future.

On the empirical side, the country-specific models suggest a largely similar interpretation of the current inflation episode, namely, large price shocks dominating quarter-to-quarter movements, and, behind the scene, labour market pressure, leading to increases in underlying wage and, as a consequence, price inflation. This is most simply shown by plotting price and wage inflation for a few countries.

FIGURE 1 PRICE AND WAGE INFLATION IN THE UNITED STATES, THE EURO AREA, THE UNITED KINGDOM AND JAPAN, 2020:1 TO 2023:2



Note: Quarter on quarter annualised rates.

Sources: US: CPI-U, ECI; euro area: HICP, negotiated wages; UK: CPI, adjusted average weekly earnings; Japan: CPI, composite of cash earnings per hour for part time and full time workers.

Figure 1 shows these evolutions for the United States, the euro area, Japan, and the United Kingdom, from the first quarter of 2020 to the second quarter of 2023. (Given size limitations, it is not feasible to show results for all eleven countries. We have chosen these four countries because they are large, and because the behaviour of inflation in

these countries is representative of the larger set of countries).³ The figure clearly shows the large quarter-to-quarter movements in consumer price inflation, together with the smoother and typically smaller movements in wage inflation.⁴

1 OUR INTERPRETATION OF THE FACTS

Inflation was mainly triggered by price shocks of two types: large increases in the relative prices of energy and food, reflecting a combination of strong global demand and adverse supply shocks; and price spikes reflecting shortages, due to the combination of strong global demand and supply chain disruptions.

Conventional wisdom says that central banks should ‘look through’ temporary supply shocks. But these shocks kept coming quarter after quarter, dominating the news, and leading to sustained but variable inflation. Their relative importance varied across countries, with larger energy price shocks and sectoral price spikes in the euro area, mostly due to proximity to the Ukraine war – although with some exceptions within the euro area in countries where government subsidies limited the price of energy.

Despite their size, which led to large contemporaneous effects on inflation, the effects of these shocks to prices ultimately did not last for very long, for three reasons. First, to the extent that energy, and to a lesser extent food, are intermediate inputs in the production of other goods, one might have expected strong dynamic effects on the prices of these other goods. These effects however proved limited and short-lived. Second, to the extent that workers attempted to ‘catch up’, i.e. to induce employers to compensate them retroactively for the loss in real wages due to unexpected inflation, one might have expected increases in nominal wages and, by implication, in prices. Empirically, this generally was not the case. Third, and most importantly, to the extent that higher inflation led to higher expected inflation, both in the short term and the long term, one might have expected that inflation expectations would deanchor, leading to higher nominal wage increases, and consequently, further increases in prices. Again, this dynamic was not found empirically. Long-term inflation expectations remained firmly anchored, reflecting presumably the credibility of the target inflation rates set by central banks.

Together, the weakness of these three potential mechanisms had an important implication: the wage-price spiral that many worried might emerge and which had been a major determinant of high and lasting inflation in the 1970s played a minor role in this inflation episode. The increases in inflation due to price shocks were large but each one had little lasting effect.

³ Canada is the only excluded country that is not a member of the euro area. To a surprising extent, Canada has had a very similar evolution of inflation to the United States, and its historical decomposition of inflation sources looks very much like that of the United States presented below.

⁴ To anticipate a likely reaction to the US graph. US wage inflation was unusually high in 2020:1 (4.0% at annual rate, compared to 2.6% average over 2015:1 to 2019:4), leading to the misleading impression that there has been little or no wage pressure from 2020 on. Underlying wage inflation has increased since 2020.

In the background, however, in most although not in all countries, strong demand led to a tightening of the labour market. The tightening, which we measure in most countries by the ratio of vacancies to unemployment, was strongest in the United States, but was seen more generally: in all countries, this measure (or a slight variation upon it) was higher in the first half of 2023 than its average value over the 2010s.

In nearly all countries, however, tighter labour markets had relatively small effects on subsequent wage inflation. Put another way, the slope of the short-run wage Phillips curve was found in most countries to be statistically significant but small. One initial worry was that higher wage inflation, and by implication higher price inflation, would feedback on wage inflation and amplify the direct effects of tight labour markets on inflation. Again, the strong anchoring of expectations limited these amplification effects, and the effect of the labour market on inflation has remained small.

As price shocks have started receding or even reversing, inflation has substantially decreased, but it is still higher than central bank targets. What remains is largely driven by wage inflation, which is too high in most countries, both because of still tight labour markets, and because of the small increase in long run expectations due to the long sequence of higher inflation. What limited the rise in wage inflation in response to unemployment earlier (the relatively flat Phillips curve) now unfortunately implies that, if wage inflation must decrease enough to return inflation to target, getting back to target will require, absent favourable breaks, a period of higher unemployment – although the extent of the required increase in unemployment depends on the extent to which the labour market returns to pre-pandemic conditions (technically, whether the Beveridge curve returns to its pre-pandemic level).

2 THE ANALYTICAL AND EMPIRICAL FRAME

We cannot present the detailed model here.⁵ But it is useful to give a sense of how we thought about the inflation process, indicate how the various parts of the model fit the facts, and point to similarities and differences across countries.

The analytical model has four equations: an equation describing wage behaviour, an equation describing price behaviour, and two inflation expectation equations (one describing short-run expectations and the other describing long-run expectations). In estimating the empirical model, Bernanke and Blanchard (2023) and the country papers stayed close to the basic analytical formulation. In general, we used quarterly data from 1990:1 (subject to availability) to 2023:2 (the latest available data at the time of the project). We allowed for four lags for all relevant variables, and did not experiment beyond the specification implied by the analytical model.

5 For the analytical model and the estimation results for the United States, see Bernanke and Blanchard (2023). Details of estimation for the other ten countries will be given in the country specific papers, which will be ready by early 2024. For the time being, Haskel et al. (2023) is the source for the latest results for the United Kingdom, and the only available report.

Start with the wage equation. As mentioned above, wage inflation increased in all countries, but with substantial differences across countries. Using our measures of wages, wage inflation was equal to 4.4% for the first two quarters of 2023 in the United States, up from an average 2.2% in the 2010s, 7.8% up from 1.8% in the United Kingdom, 4.6% up from 1.7% in the euro area, and 1.7% up from 0.3% in Japan.

One can think of three potential factors behind those increases: a tight labour market increasing the relative bargaining power of workers; an attempt by workers to catch up, i.e. to recover some of the past real wage losses due to unexpected price increases; and an increase in short run inflation expectations, leading to higher nominal wage demands.

Following the US template, the country teams estimated an equation allowing for those three factors, together with productivity growth. In most countries, the teams used the ratio of vacancies of unemployment or some closely related variable as the measure of labour market tightness. All the teams used the difference between actual and expected inflation over the previous four quarters as a measure of the real wage loss (which determines the potential strength of the catch-up effect) and used a one-year inflation forecast as a measure of expected inflation.

Estimation of the model yielded two main conclusions:

- In all countries, the effect of the labour market variable was positive, although small, especially in Japan. In all countries but three, it was statistically significant. The relevant coefficient was in general neither larger nor smaller than the coefficient estimated on the pre-COVID sample, suggesting stability of the wage relation. The sequence of alternative coefficients on the vacancy unemployment ratio suggests that both the level and the change in the vacancy unemployment ratio matter for wage inflation.
- In most countries, we found, surprisingly, little or no evidence of catch up, i.e. little or no evidence that a past real wage loss led to stronger nominal wage inflation. The exceptions were the euro area and Belgium, where, in the latter, the finding of wage catch-up is likely explained by the remaining presence of wage indexation (a major factor in the United States and other countries in the 1970s, but much less prevalent today).

Of the four equations, however, the wage relation typically had the worst fit, likely reflecting institutional factors. Different country teams used different wage series, from compensation per hour, to compensation per worker, to new wage agreements. The homogeneity restriction, namely, that a permanent increase in inflation expectations leads eventually to an equal increase in wage inflation, was rejected in two countries. Perhaps not surprisingly given the effective lower bound on nominal wage decreases, the large initial increase in unemployment in some countries, especially in the United States, led to a much smaller decline in wage inflation than predicted by the estimated equation; this led us to use two dummies for 2020:2 and 2020:3 to avoid contaminating

the coefficients in the rest of the sample. In Japan, the labour market variable appeared to affect part-time workers' wages, but not full-time workers' wages. In Belgium, the timing of indexation payments led to large variations across quarters. It is clear that the equation could be improved to take account of some other country-specific characteristics.

Turning to the price equation, we assumed in our original model that price inflation depended on wage inflation, productivity growth, the rate of change of energy and food prices relative to the wage, and a measure of shortage – under the plausible assumption that shortages led to sectoral price spikes. Price inflation was measured using the consumer price index in all countries. The relative prices of energy and food were measured as the ratios of the energy and food components of the price index, divided by the nominal wage. Different variables were used for shortages in different countries. A number of countries used the variable we had used in the original paper, namely, counts of mentions of shortages in Google Trends for their part of the world. Others used other indices, including principal components of a set of publicly available proxies. The fit of the price equation was in general extremely good, and there was little evidence of subsample instability.

Estimation of the price equation yielded two main conclusions:

- In all countries, the effects of food and energy price shocks were highly economically and statistically significant. The shocks differed in size across countries. From 2020:1 to their respective peaks (between 2022:2 and 2022:4 depending on the country), relative energy prices increased by 18% in Japan, 29% in the United States, 45% for the United Kingdom, and 37.5% in the euro area. Interestingly, there were important differences within the euro area, due to more or less generous government subsidies, leading to an increase of only 20.7% in France versus 35.7% in Germany, and 65.7% in Italy.⁶ There were also substantial differences in relative food price increases across countries, 6.4% for the United States versus 14.7% for the euro area. While relative food prices have turned around in the United States, they have continued to increase in the other countries. In general, the long-run effect of these two shocks was only slightly larger than their share in the consumer price index, suggesting limited input-output price-price effects.
- The measure of shortages was typically significant, again with important differences across countries, notably a larger effect in the euro area in 2022. Thus, even controlling for food and energy, there were substantial relative price shocks within the traditional core measure of the CPI. Estimation results suggest that shortages were still playing a substantial role in most countries in 2023:2.

6 Energy prices were also affected by subsidies in Japan.

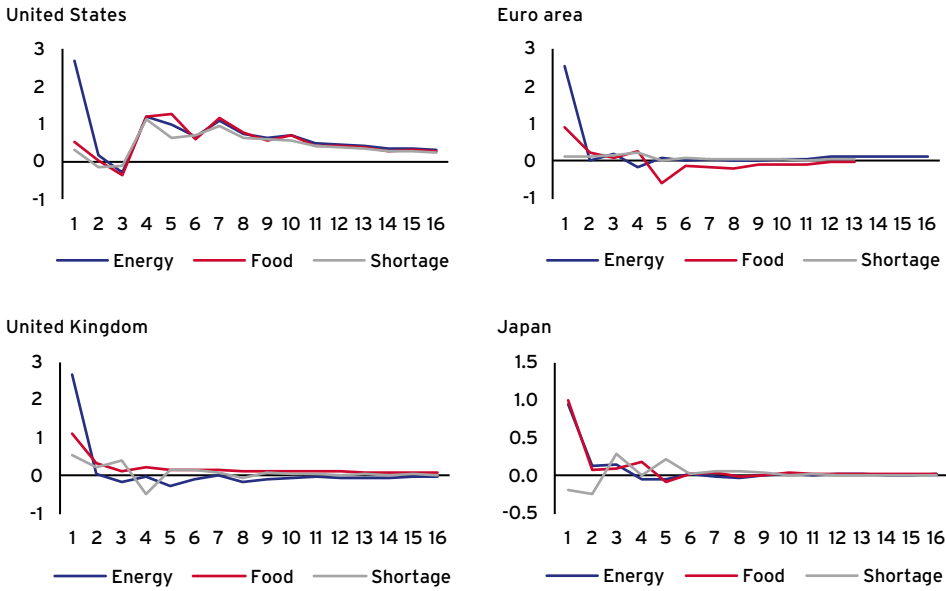
We did not allow in our estimation for further increases in markups over costs, an effect sometimes called ‘greedflation’. Shortages, in which demand operates on the vertical part of the supply curve, will generate an increase in prices, and an increase in profits if short-run demand is less than unit elastic. We capture this effect with the shortage variable. We are sceptical that firms systematically increased markups in non-shortage situations but have not explored it econometrically.

Turning finally to the two inflation expectation equations, we did not assume rational expectations but relied on public and private forecasts of inflation. Short-run forecasts have followed actual inflation, although moving substantially less than one for one with actual inflation. One-year forecasts peaked at 4.2% in the United States, at 4.0% in the United Kingdom, at 6.4% in the euro area, and have generally declined since the middle of 2022. Long-run forecasts, between three and ten years ahead depending on data availability, have moderately increased. In the United States, long-run forecasts first fell from 1.7% in 2019:4 to 1.3% in 2020:2, then increased and peaked at 2.4% in 2022: 2. They have decreased since then, down to 1.8% in 2023:2 (we measure inflation expectations using a composite variable constructed by the Federal Reserve Bank of Cleveland). In the euro area, long-run forecasts have increased from 1.7% in 2019:4 to 2.1% in 2023:2. In the United Kingdom, they have increased from 2.1% to 2.3%. In Japan, they have increased from 0.9% in 2019:4 to 1.3% in 2023:2.

The best way to show the main implications of the estimated models is to show their implied impulse responses to two types of shocks.

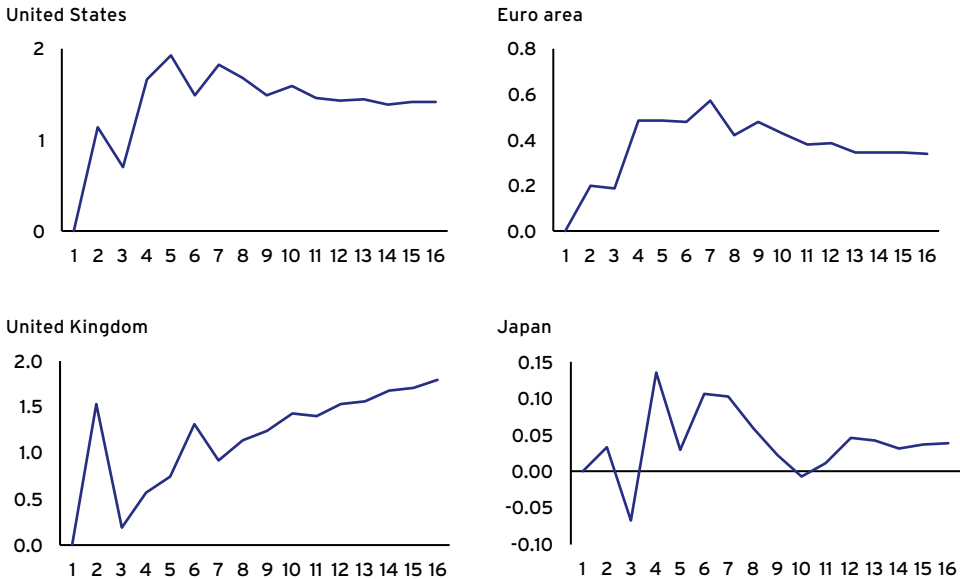
Figure 2 shows the effects of a one standard deviation (calculated over the post-COVID sample) permanent level increase (one-period growth increase) in the relative energy price, the relative food price, and the shortage measure, for the United States, the euro area, the United Kingdom and Japan. Figure 3 shows the effect of a one standard deviation permanent level increase in the vacancy to unemployment ratio (or the corresponding labour market variable used in the study). Again, we can only show results for a few countries. But their main characteristics are representative of the full set of countries.

FIGURE 2 IMPULSE RESPONSE FUNCTIONS TO A ONE-TIME PERMANENT INCREASE IN THE RELATIVE PRICE OF ENERGY, THE RELATIVE PRICE OF FOOD, AND THE SHORTAGE VARIABLE



Note: Quarter-on-quarter annualised price inflation

FIGURE 3 IMPULSE RESPONSE FUNCTIONS TO A ONE-TIME PERMANENT INCREASE IN THE VACANCY TO UNEMPLOYMENT RATIO



Note: Quarter-on-quarter annualised price inflation.

The figures suggest two main conclusions.⁷

- Figure 2 shows the effects of price shocks and shortages to be short-lived in all four countries. This reflects the limited price-price effects, the absence of catch up, and the anchoring of expectations in the estimated models. This is what we meant by the fact that quarter-to-quarter movements have been dominated by a series of price shocks, each with limited dynamic effects.
- Figure 3 shows how the effects of increases in labour market tightness built up over time, in different ways across countries: a slow and steady build up in the United States and Europe; a more jagged one in the United Kingdom, suggesting a strong effect of the change in addition to the level of the labour market variable on inflation; and a nearly insignificant effect in Japan. The model implies that a higher value of the ratio should eventually lead to steadily increasing inflation relative to a given benchmark. This effect is not visible – except for the United Kingdom – in the figure but is present when looking at a longer horizon. It is, however weak, reflecting again the flat slope of the wage Phillips curve and the limited amplification mechanisms.

These two sets of graphs support our statement in the introduction that quarter-to-quarter movements in inflation have been dominated by a series of shocks, each with limited dynamic effects, while, behind the scene, tight labour markets have led to some smaller but more persistent wage and price pressure.

3 HISTORICAL DECOMPOSITIONS.

The best way to summarise our results is to present historical decompositions, starting in 2020:1. Again, we present it only for four countries, the United States, the euro area, Japan, and the United Kingdom.

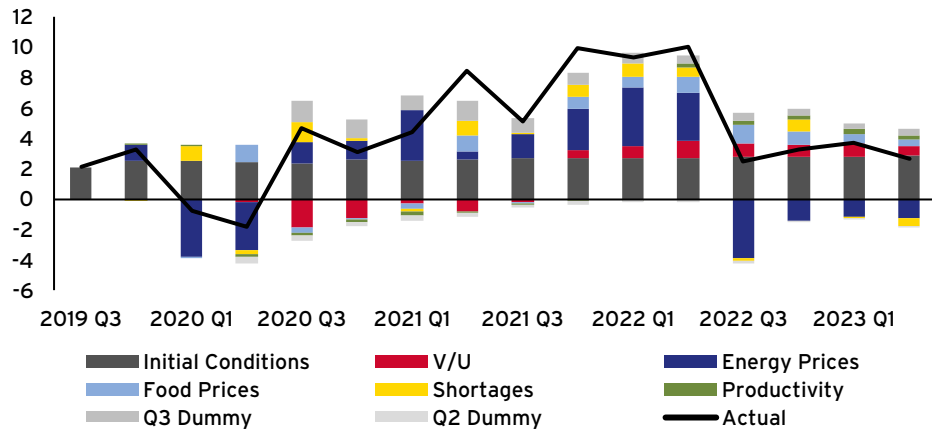
The first step in constructing these decompositions is to compute what inflation would have been, from 2020:1 on, in the absence of relative energy and food price changes, and if both the shortage variable and productivity growth had been equal to their pre-COVID averages. We refer to this trajectory in the figures as the evolution of inflation reflecting ‘initial conditions’. Except for the initial effect of lagged values of the variables, the trajectory depends on whether the value of the vacancy unemployment ratio in 2019:4 is above or below the model implied natural value. The figures suggest that the United States, the euro area, and Japan were roughly at their natural rate, but the labour market in the United Kingdom may have been too tight already.

7 Recall that we did not constrain the four-lag lag structures, which leads to more jagged responses than would be the case if we had restricted the dynamic responses.

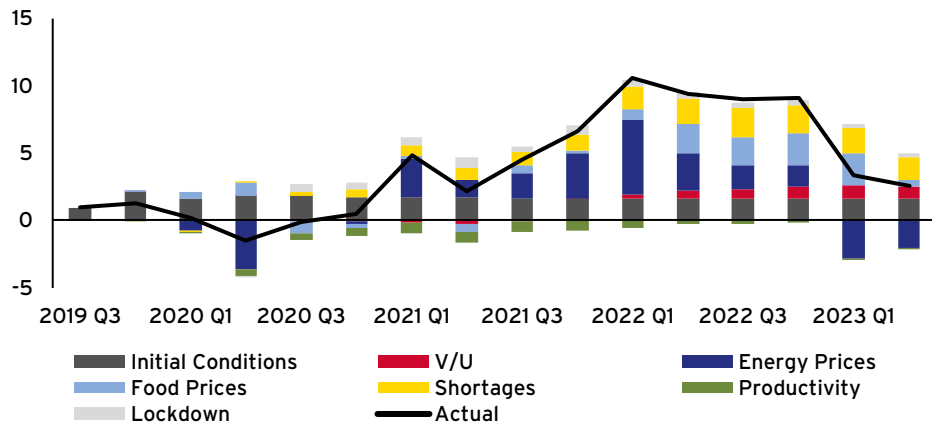
The next steps is to compute the effects of each of the variables we take as given, namely, the relative price of energy, the relative price of food, the shortage variable, the measure of labour market tightness, productivity, and the wage dummies corresponding to 2020:2 and 2020:3. As the model is linear, the sum of these effects plus initial conditions adds up to the fitted value of inflation in the model. The figures also plot the actual value of inflation. In general, the difference between fitted and actual inflation is small, reflecting small residuals. (In comparing graphs across countries, keep in mind the differences in the vertical scale. Movements in Japan have paralleled movements in other countries, but from lower initial conditions, and smaller variations.)

FIGURE 4 HISTORICAL DECOMPOSITIONS

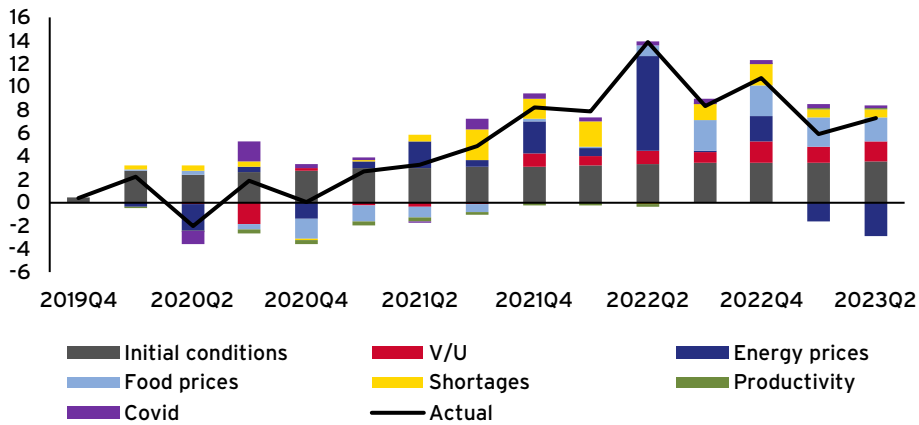
a) United States



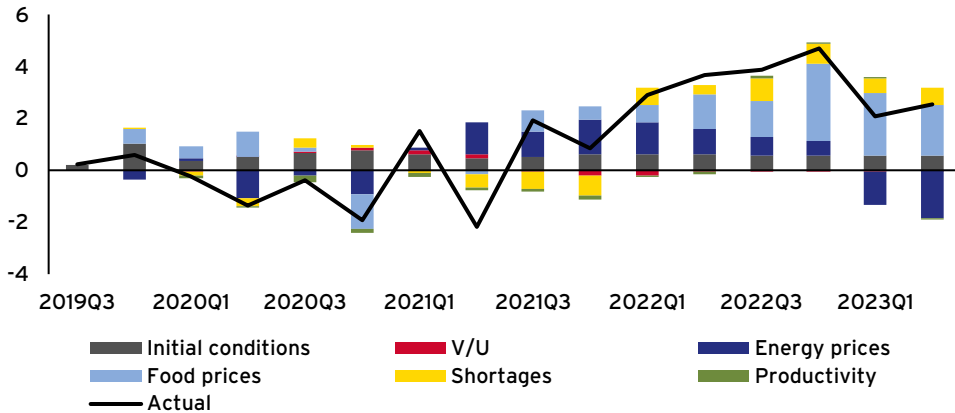
b) Euro area



c) United Kingdom



d) Japan



The decompositions yield one main and common conclusion: most of the quarter-to-quarter movements in inflation have been due to price shocks, not to pressure from the labour market; the contribution of the red bar has been small relative to the blue and yellow bars.

All three price shocks have played an important role, with clear differences across countries. Energy price shocks (the darker blue bar) have played the largest role, especially in the euro area. It was particularly high in the euro area and the United Kingdom in early 2022, due to the war in Ukraine. Much of the decline in inflation from the second half of 2022 has come from negative energy price shocks. Food price shocks have played a major role in the euro area and even more so in Japan and, unlike the energy price, have not turned around. Shortages still play a role, and appear to have played the largest role in the euro area.

In contrast, the contribution of labour market tightness has increased slowly, being actually negative in the United States in 2020, but then turning positive thereafter. Except in Japan, where reopening of the economy has lagged behind other countries, its contribution has slowly increased over time, but still accounted for only roughly 1–2% higher inflation in 2023:2 in most countries. This is a small contribution, but thinking about the future, it is a central one. Once price shocks have receded, this contribution is what will be left. The small effect of the labour market on inflation on the way up implies unfortunately an equally small effect on inflation on the way down. In the part of the research that we do not have space to report, country teams find that, in most countries, it will likely take some labour market loosening to go back to the 2% inflation target.

CONCLUSIONS

This chapter is only a progress report, and more will be done to analyse similarities and differences across countries. More ambitiously (but this is another project), it would be useful to trace the origin of the variables we have taken as given, namely, price shocks, price spikes and the state of the labour market, back to the respective roles of domestic and foreign fiscal and monetary policies on the demand side, and supply disruptions on the other side. For example, if monetary and fiscal policies had been tighter, would commodity prices have increased as much? Would shortages have been less intense? How much higher would unemployment have been? These important questions are left to future work.

As preliminary as they are, our findings have, however, clear monetary policy implications. Credibility of central bank targets has been precious: faced with a long sequence of adverse price shocks, long-run inflation expectations did not substantially deanchor, leading the effects of shocks to prices (energy, food, shortages) to mostly and quickly fade away. There are important lessons about how central banks should deal with supply shocks, so long as they have high credibility. Had the labour market not been too tight, there would have been little reason for central banks to react to inflation. Unfortunately, in most countries, labour markets are probably too tight, and this implies that the fight against inflation is not fully over.

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ABOUT THE AUTHORS

Ben Bernanke, a distinguished senior fellow at the Brookings Institution, received his Ph.D. from MIT in 1979. He was on the faculty of the Stanford Graduate School of Business (1979-1985) and Princeton University (1985-2002). In 2002 he was appointed to the Federal Reserve Board, and in 2005 he was the chair of the President's Council of Economic Advisers. From 2006 to 2014 he was the chair of the Federal Reserve, moving to Brookings at the end of his second term. In 2009 he was named TIME magazine's Person of the Year. He was the president of the American Economic Association in 2019.

Bernanke's academic research was in the areas of monetary economics, macroeconomics, and economic history. In a 1983 paper he argued that disruptions in credit markets were an important source of the Great Depression, supplementing the traditional monetarist explanation. His subsequent work, with Mark Gertler and others, developed the idea that financial factors are a source of both major economic downturns, including the Great Recession of 2007-2009, and of more ordinary economic fluctuations. He received the Nobel Prize in Economics in 2022.

Olivier Blanchard, senior fellow at the Peterson Institute for International Economics, is the Robert M. Solow Professor of Economics emeritus at the Massachusetts Institute of Technology (MIT). A citizen of France, Blanchard has spent most of his professional life in the United States. After obtaining his PhD in economics from MIT in 1977, he taught at Harvard University and returned to MIT in 1982. He was chair of the economics department from 1998 to 2003. In 2008, he took a leave of absence to serve as economic counsellor and director of the research department at the International Monetary Fund where he stayed until 2015. He then joined the Peterson Institute.

Blanchard has worked on a wide set of macroeconomic issues, including the role of monetary and fiscal policy, speculative bubbles, the labor market and determinants of unemployment, economic transition in former communist countries, and the nature of the Global Financial Crisis. In the process, he has worked with numerous countries and international organizations.

Blanchard is the author of many books and articles, including two textbooks on macroeconomics, one at the graduate level with Stanley Fischer and the other at the undergraduate level. He is a past editor of the *Quarterly Journal of Economics* and the *NBER Macroeconomics Annual* and founding editor of *American Economic Journal: Macroeconomics*. He is a fellow and former Council member of the Econometric Society, a past president of the American Economic Association, and a member of the American Academy of Arts and Sciences.

CHAPTER 17

COVID-19 and post-pandemic challenges: High inflation and labour markets

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Cassandra Castle and Clare Lombardelli

Organisation for Economic Co-operation and Development

INTRODUCTION

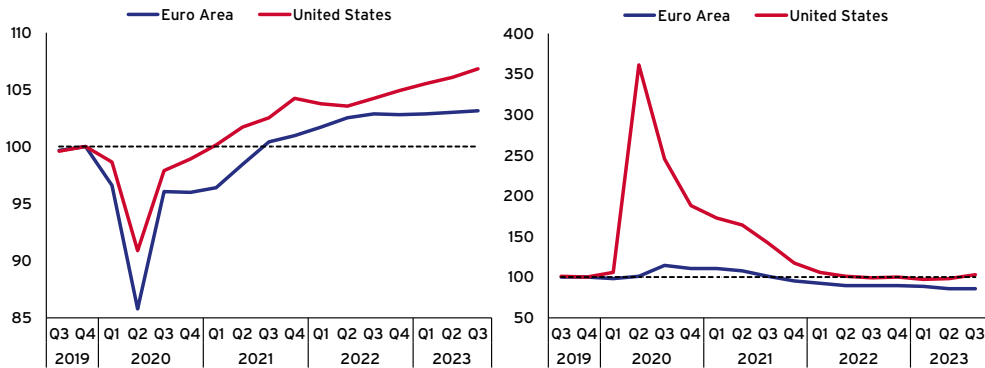
From 2020 to 2022, the global economy experienced two significant shocks: the COVID-19 pandemic and then an energy price shock. While the size and timing of impacts differed across countries, across all major advanced economies the policy support provided was exceptional. Labour markets across the OECD performed much better than anticipated, both in the early aftermath of the pandemic and to date – despite the monetary policy tightening undertaken to tame inflation (Figure 1). Unemployment rates are currently extremely low by historical standards, and employment and hours worked have reached historically high levels. However labour market dynamics have become difficult to understand because of a mix of both cyclical and structural factors. This makes the task of policymakers aiming to bring down inflation and to engineer a ‘soft landing’ particularly challenging.

THE SHOCKS WERE MET WITH UNPRECEDENTED POLICY RESPONSES

The COVID-19 pandemic caused a severe global economic recession, with a historic 4.9% decline in annual GDP across OECD countries in 2020, as governments responded to the pandemic with lockdowns, closures, and mobility restrictions (Figure 1). To mitigate the pandemic’s adverse effects on labour markets and incomes, governments implemented massive and often unprecedented support, while central banks lowered policy rates and increased quantitative easing in most advanced economies. Government support included significant measures for employment protection (via job retention schemes) and/or income support. The differences across countries and regions – in terms of both measures and labour market developments – were quite stark.

FIGURE 1 GDP AND UNEMPLOYMENT DEVELOPMENTS IN THE UNITED STATES AND THE EURO AREA

Indexed, 2019Q4 = 100



Note: GDP and unemployment development refers to the left and right chart respectively.

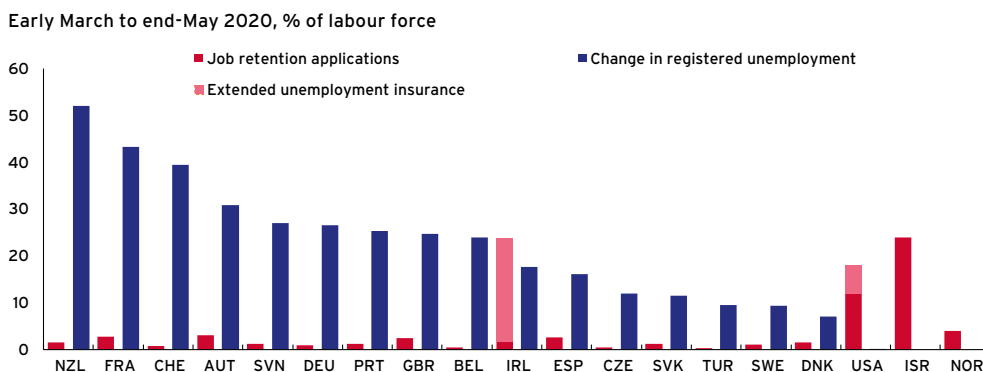
Source: Economic Outlook 114; and OECD calculations.

The virus and the restrictions put in place to control it reduced demand for many goods and especially for services. Government policy responses, while different in nature, shared a common goal of providing timely relief to firms and household incomes. In many countries, policy was designed to preserve employer-employee links.

In the United States and Canada, temporary layoffs were used extensively during the initial months of the pandemic. In the second quarter of 2020, temporary layoffs in Canada reached a high of 6% of the labour force. However, as the year progressed the reliance on this measure decreased significantly as Canadian workers either transitioned into open unemployment or resumed their jobs, often on a reduced-hours basis, supported by new income assistance programs. The United States sustained broader and longer-lasting coverage throughout 2020, with temporary layoffs affecting up to 11.5% of its labour force. Unemployment rates in April 2020 surged to 14% in both countries, a sharp rise from pre-pandemic levels (February 2020) of 5.7% in Canada and 3.5% in the United States. This spike was largely due to the implementation of temporary layoff schemes (OECD, 2021). In the US, generous unemployment insurance benefits, like the US CARES Act, replaced a large portion of earnings for many workers on temporary layoffs – though at the cost of severing the employer relationship and lost health insurance (Figure 2).¹

¹ Direct federal assistance from the initial CARES Act and enhanced unemployment insurance (UI) benefits totalled more than \$550 billion, and later the Consolidated Appropriations Act (CAA) and the American Rescue Plan Act (ARPA) bills added more than \$850 billion in direct payments and UI.

FIGURE 2 SMALLER INCREASES IN UNEMPLOYMENT IN COUNTRIES WITH JOB-RETENTION SCHEMES



Note: The change in registered unemployment refers to the difference between early March 2020 and the end of May as a fraction of the total labour force. Job retention applications refers to the workforce covered by applications to national job retention schemes since early March and until end of May, or closest available date.

Source: OECD.

By contrast, many other advanced economy OECD countries made large use of job retention schemes, which allowed companies to reduce or entirely halt employees' work while keeping them employed with (in most cases a large part of) their salaries covered from government funds. This took the form of either short-time work schemes that directly subsidise hours not worked (e.g. France, Germany, Italy), or wage subsidy programmes that subsidise hours worked but can also be used to top up the earnings of workers on reduced hours (e.g. Australia, New Zealand, Canada, Ireland, Poland, the Netherlands). These schemes replaced 50–90% of earnings (OECD 2020a). Differences in the use of job retention support across countries largely reflect the intensity of the crisis rather than differences in their broader institutional settings. For instance, take-up was very low in countries like Korea and Japan, which managed to contain the first wave of the epidemic and therefore resorted to less stringent government restrictions and experienced a smaller fall in output than most other countries (OECD 2021a). Where countries used job retention approaches, unemployment rates were relatively steady in the first months of the pandemic – this is particularly striking when comparing the euro area and the United States (Figures 1 and 2). The euro area unemployment rate rose gradually from 7.2% in March 2020 to 8.6% in August 2020 – an increase significantly lower than during the Global Financial Crisis and significantly less than in the US.²

² Source: OECD Short term Labour Market Statistics database (www.oecd-ilibrary.org/employment/data/labour-market-statistics_ifs-lms-data-en).

THE LABOUR MARKET IMPACTS DIFFERED ACROSS COUNTRIES

Despite the severe shock of the pandemic on labour markets, employment and labour force participation rebounded quickly, thanks to significant government support (Figures 3a and 3b). By mid-2021, labour markets showed signs of recovery, albeit unevenly across sectors and countries. Japan and a number of European economies had higher labour force participation rates in the last quarter of 2021 than they did just before the pandemic. By contrast, countries in Latin America, the United States, Türkiye, and Israel experienced the largest falls in labour force participation rates over the same period (Figure 3b) (OECD 2021b).

COVID-19 had lasting effects on employment across sectors. For example, across EU countries, sectors such as tourism and accommodation suffered particularly from the restrictions and resulting slowdown in activity (Figure 4a) and had not recovered by mid-2023. On the other hand, since the onset of the pandemic, the largest employment gains occurred in digital technology related sectors, where employment has since continued to increase. Similar declines in employment in the same industries were observed in the United States (Figure 4b), with almost all industries shown currently surpassing, or close to, pre-pandemic levels.

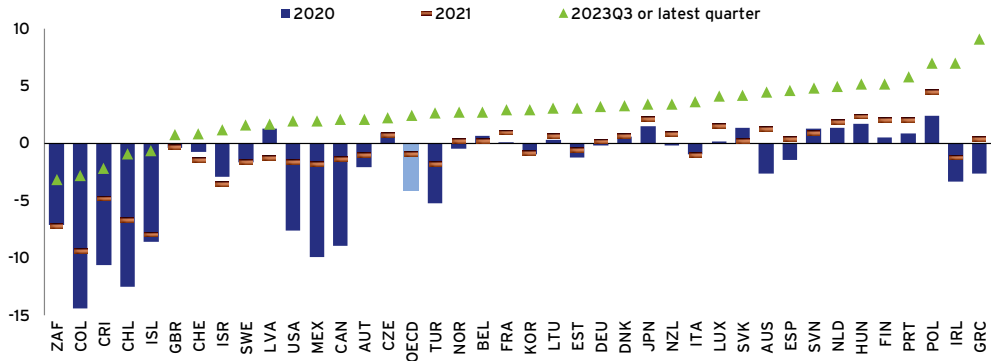
The impacts of the COVID-19 crisis also differed across socioeconomic and demographic groups, and the generosity of income support and job retention schemes exacerbated the unequal impact of the pandemic in some cases. Non-standard workers, including the self-employed, workers on fixed contracts and those who work part-time, constituted a significant proportion of the workforce in sectors heavily affected by containment measures in 2020. Prior to the pandemic, the share of non-standard workers made up almost 50% of total employment in some advanced OECD economies (OECD 2020b). Occupations with a high proportion of non-standard workers include healthcare, retail, personal care, food processing, and construction (OECD 2022a). In Europe, low-income groups faced the biggest income drop by the end of 2020 – three to six times more than their high-income peers in half of the EU countries (European Commission 2022).

These workers, often unable to work remotely, faced a dual challenge: increased risk of income loss and exposure to the virus while continuing in-person work. This group disproportionately included young people, those with less education, migrants, ethnic minorities, and those in low-paid occupations. Women faced compounding burdens, accounting for 70% of the global healthcare workforce and facing a greater risk of infection and challenges associated with longstanding gender inequalities in unpaid work and caring responsibilities (OECD 2020c). Frontline workers, experienced heightened job insecurity, reduced overall health, and compromised mental wellbeing during the crisis (OECD 2022a).

The vulnerability of workers on non-standard contracts was exacerbated by uneven access to social protection when compared to their employed or full-time counterparts. Many advanced OECD countries paid sick leave or unemployment benefits, and some also included temporary employees in short-time work schemes (OECD 2020b)

FIGURE 3A EMPLOYMENT RATES ACROSS MOST OECD COUNTRIES DECLINED IN 2020

Percentage point change from the pre-pandemic average (2015Q1-2019Q4)

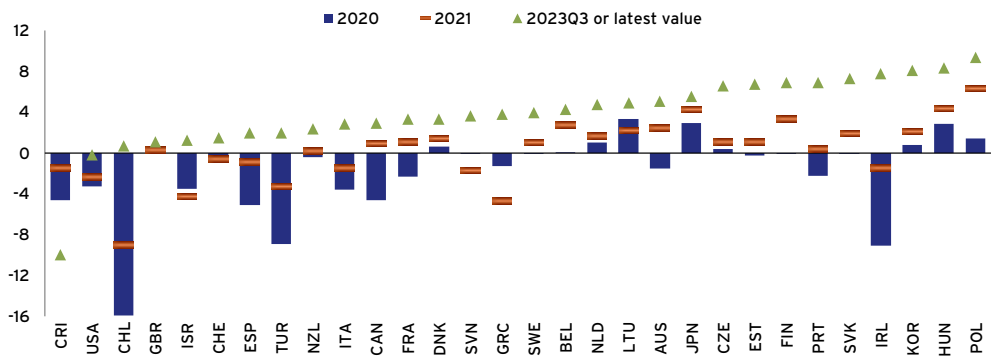


Note: Figure shows the percentage point difference of the pre-pandemic average employment rate compared to the minimum employment rate in 2020 and latest value. The rate is the share of the total working age population (15 - 64). Figures for AUT, BEL, CHE, CZE, DEU, DNK, ESP, EST, FIN, FRA, GBR, GRC, HUN, IRL, ISL, ITA, LTU, LUX, LVA, MEX, NLD, NOR, OECD, POL, PRT, SVK, SVN, SWE, TUR, ZAF are based on 2023Q2 data.

Source: OECD Employment Outlook 2023; OECD calculations.

FIGURE 3B LABOUR FORCE PARTICIPATION RATES SURPASSED PRE-PANDEMIC LEVELS BY 2021 IN MOST OECD ADVANCED ECONOMIES

Percentage point change from the pre-pandemic average (2015Q1-2019Q4)

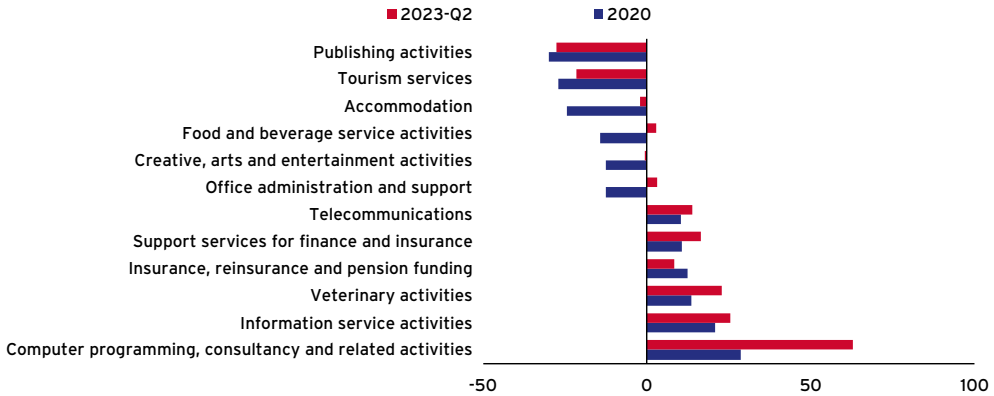


Note: Figure shows the percentage point difference of the pre-pandemic average labour force participation rate compared to the minimum recorded rate in 2020 and 2023. The rate is the share of the total working age population (15 - 64). Figures for BEL, CHE, CZE, DNK, EST, FIN, FRA, GBR, GRC, HUN, IRL, ITA, LTU, NLD, POL, PRT, SVK, SVN are based on 2023Q2 data.

Source: OECD Employment Outlook 2023; OECD calculations.

FIGURE 4A CHANGE IN EU EMPLOYMENT RATE: TOP FIVE AND BOTTOM FIVE INDUSTRIES

Percent change from pre-pandemic average (2015Q1-2019Q4)

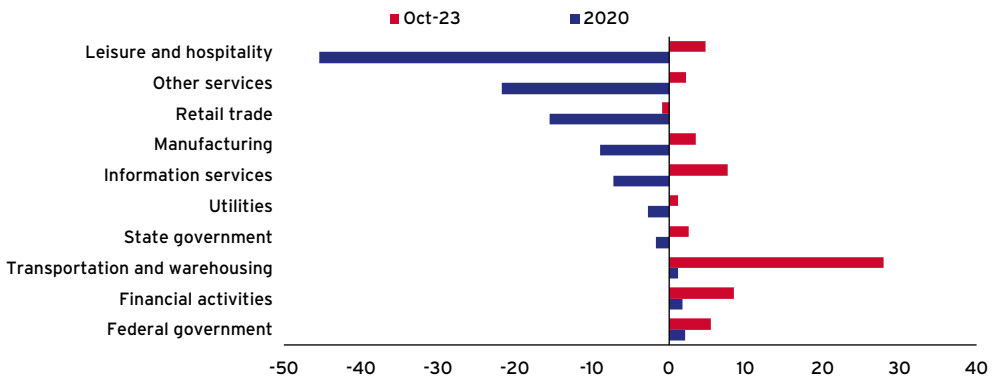


Note: 2020 reflects the minimum quarterly employment rate. Includes workers from 15 to 64 years.

Source: Eurostat; OECD calculations.

FIGURE 4B CHANGE IN US EMPLOYMENT LEVEL: TOP FIVE AND BOTTOM FIVE INDUSTRIES

Percent change from pre-pandemic average (Jan-2015 - Dec-2019)

Note: 2020 reflects the minimum monthly employment level³.

Source: U.S. Bureau of Labor Statistics; OECD calculations.

AS ECONOMIES REOPENED, INFLATION SURGED

Economic reopening came with new inflation challenges. The very rapid increase in demand strained already fragile supply chains, triggering an inflation surge from mid-2021 onwards. Striking imbalances emerged in labour markets. There were marked differences in the recovery across countries, reflecting national health conditions, the policy mix and sector composition. Acute labour shortages emerged in some sectors –

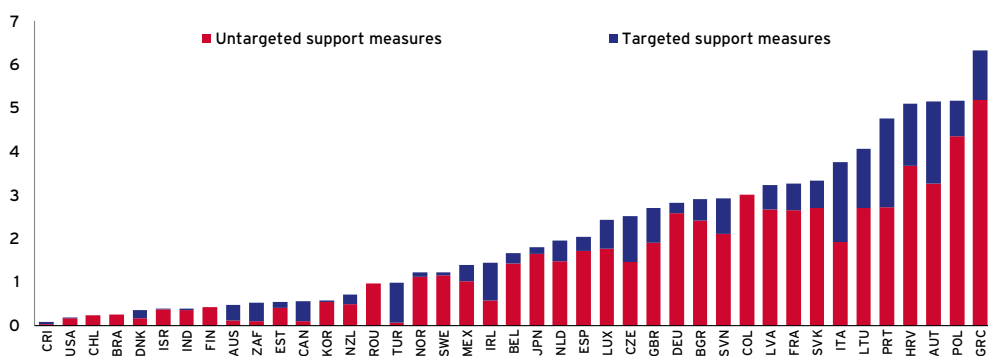
³ The Other services sector encompasses miscellaneous services not classified elsewhere, such as equipment and machinery repairing, religious activities administration, death care, pet care and temporary parking.

due to increased demand, and because employment and hours worked had not yet fully recovered. A persistent divide between supply and demand for some goods, together with higher food and energy costs, led to higher and more enduring price increases than expected (OECD 2022b).

Russia's invasion of Ukraine caused an additional price shock in early 2022 – further elevating headline inflation across OECD countries, with particularly sharp rises in food, fertiliser and energy. Impacts differed across countries, largely driven by whether they are energy importers or exporters and the pricing structure of their energy markets. In response, governments rapidly scaled up support measures to energy consumers. A recent OECD paper calculated that across 41 countries, approximately US\$400 and \$405 billion of support for 2022 and 2023 respectively, was announced.⁴ This corresponds to a gross budget cost of 0.7% of GDP in 2022 and 0.8% of GDP in 2023 in the median OECD economy (Hemmerlé et al. 2023). Countries facing broad impacts prioritised rapid support, leading to the dominance of fast-to-implement, untargeted measures, which constituted over 75% of total support in 2022 (Figure 5).

FIGURE 5 THE SUPPORT TO ENERGY CONSUMERS HAS BEEN EXTENSIVE

Gross fiscal costs of support measures, % of GDP



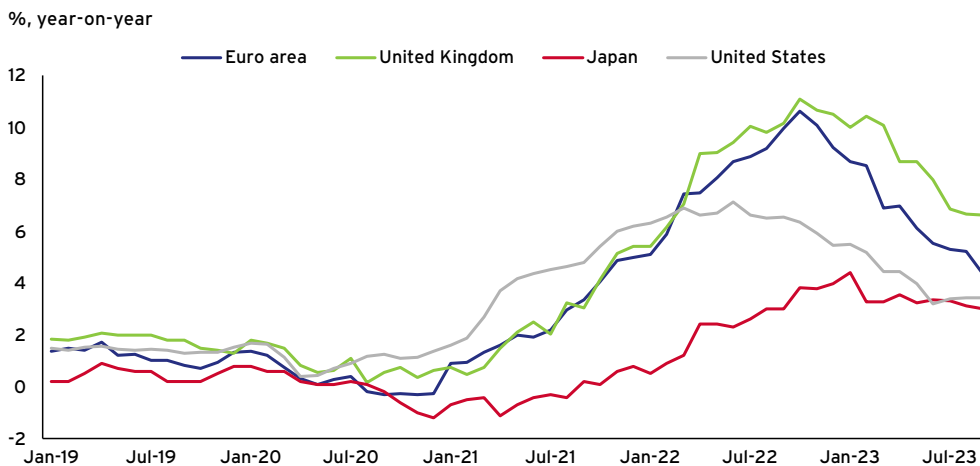
Note: Support measures are considered targeted if their main beneficiaries are not “all households” or “all firms” or “all energy users”. The figure includes both price and income measures. The figure shows fiscal measures current as of 23 May 2023.

Source: OECD Energy Support Measures Tracker.

Inflation spread across OECD economies as a result of COVID-19, the energy shocks and some of the policy responses. Headline inflation surged to a peak of over 10% in the OECD in the third quarter of 2022. The US PCE year-on-year rate reached 7.1% in June 2022, while the aggregate euro area rate reached 10.6% in October 2022.⁵ Many OECD countries experienced double-digit rates (Figure 6).

⁴ This figure comes from the OECD Energy Support Measures Tracker which covers 41 countries - 35 OECD countries and 6 non-OECD economies (Brazil, Bulgaria, Croatia, India, Romania and South Africa).

⁵ Personal consumption expenditures price index (PCE) for the United States; harmonised CPI for the euro area.

FIGURE 6 HEADLINE INFLATION ROSE RAPIDLY

Note: The chart refers to the personal consumption expenditures price index (PCE) for the United States, harmonised CPI for the euro area and consumer price index (CPI) for Japan. For the euro area, the August number is a flash estimate. Latest data are from September 2023.

Source: OECD Consumer Price database; Eurostat; OECD calculations.

The post-pandemic surge in economic activity triggered a rise in vacancies and rapid labour market tightening in late 2021. While vacancy growth slowed in Q1 2022, many countries sustained historically high levels of vacancies. By Q1 2022, vacancies were at least 50% higher than pre-crisis levels in Australia, Austria, Sweden, the United Kingdom, and the United States, and record highs were observed in Canada and New Zealand (OECD 2022c).

In part, this reflected pandemic-induced shifts in consumption patterns as people shifted demand from services to goods. This led to changes in the skills demanded by employers (OECD 2021b). Labour force participation also lagged in two of the largest OECD economies – the United States and the United Kingdom – contributing to significant increases in labour market tightness. Part of the higher labour market tightness in the United States relative to the euro area may have also indicated the slower recovery of labour supply in the United States (ECB 2023). Large declines in international migration since the onset of the pandemic also contributed to labour shortages in many countries.

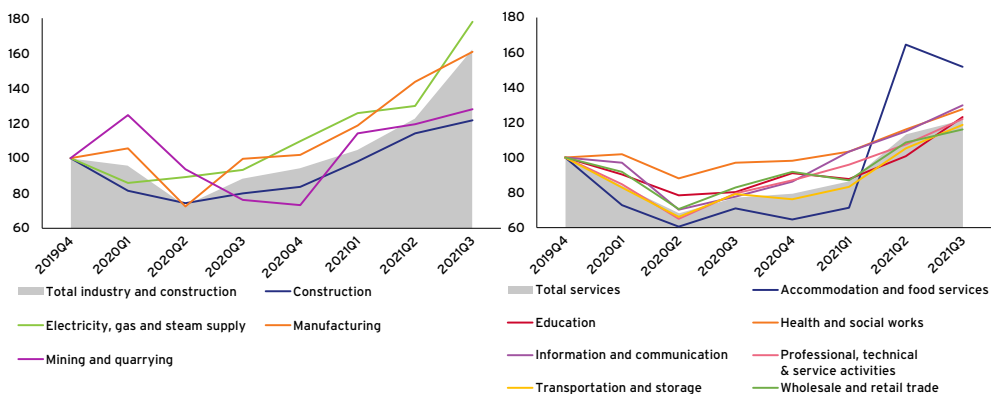
Some sectors experienced particularly acute labour shortages, suggesting the influence of non-cyclical factors shaping workers' preferences and hinting at potential shifts in the labour market landscape (Figure 7). An analysis by Causa et al. (2023), of the post-COVID-19 rise in labour shortages proposes that structural factors, such as the 'Great Quit' phenomenon, may explain declining labour force participation and higher vacancies in certain sectors. They suggest that workers, especially women and seniors, withdrew from the labour market during the pandemic due to contagion fears, health issues, and challenges like school closures and inadequate childcare facilities. The phenomenon, characterised by elevated quit rates, reflects a shift in workers' preferences

towards higher-quality jobs, particularly in sectors like retail, food, and hospitality. Simultaneously, health and care-related jobs across various countries grappled with recruitment tensions, exacerbating shortages that existed prior to the pandemic. This may explain why labour shortages were widespread in contact-intensive sectors such as accommodation, food services, and healthcare (Figure 7). Essential roles, such as nursing, face persistent challenges of low pay, demanding working conditions, and heightened risks.

Beyond contact-intensive services, labour shortages manifested in manufacturing, notably in Australia, Canada, and the United States. Additionally, the information and communication sector, especially in EU countries like France and Italy, confronts acute labour shortages due to the accelerated digital transformation prompted by the pandemic. This underscores the common challenges in digital skills development, and the need for policy responses.

FIGURE 7 THE RISE IN LABOUR SHORTAGES HAS BEEN BROAD-BASED ACROSS INDUSTRIES

Job vacancy rates across industries, 2019Q4 = 100, OECD average



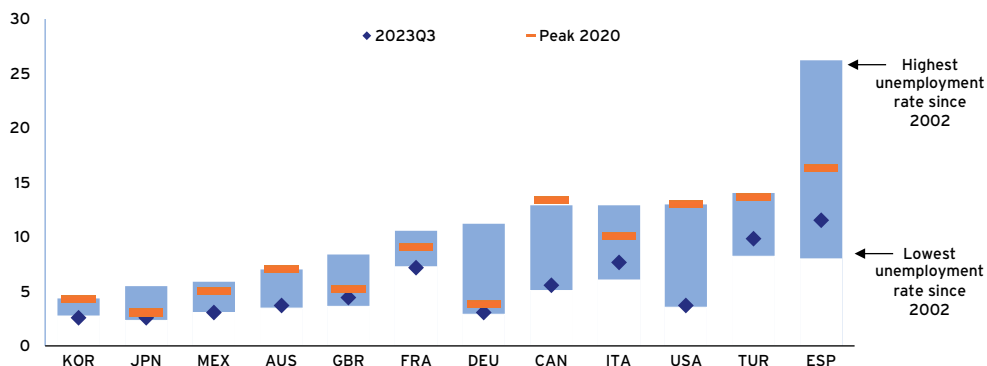
Note: Job vacancy rate data is on a quarterly basis and seasonally adjusted whenever possible, with exceptions listed in the Annex. Panel A: The (unweighted) cross-country average covers the following countries: AUS, BEL, CAN, CZE, CHE, DEU, DNK, ESP, EST, FIN, GBR, HUN, ITA, LTU, LUX, LVA, NLD, NOR, POL, PRT, SVK, SVN, SWE and USA.

Sources: Australian Bureau of Statistics (AUS); Statistics Canada (CAN); DARES (FRA); Office for National Statistics (GBR); Central Bureau of Statistics (ISR); US Bureau of Labor Statistics (USA); Eurostat (OECD-EU).

More recent data reveal that labour markets generally remain tight, with unemployment rates at or near multi-year lows (Figure 8) and vacancy rates still high by historical standards in most major advanced economies. However, the number of vacancies has fallen steadily, job growth has slowed and quit rates have started to ease (OECD 2023a). For the euro area, vacancy rates remain above their pre-pandemic averages across sectors, even after having receded from their 2022 peaks. Of these industries, labour market tightness has eased the most in accommodation and food services and information and communication sectors (Figure 4).

FIGURE 8 UNEMPLOYMENT RATES ARE LOW IN A HISTORICAL PERSPECTIVE

%, select G20 economies



Note: The grey bars represent the range of highest and lowest rates of unemployment between 2002 and 2023Q2.

Source: OECD Labour Market Statistics; OECD calculations.

WAGE GROWTH HAS TRAILED INFLATION, DRIVING LOSSES IN REAL LABOUR INCOME

Despite robust employment recovery and the lowest unemployment rates since the early 1970s, nominal wage growth has been trailing inflation in most countries from late-2022 to mid-2023 and driving real wage losses (Figure 9). The lagged and infrequent nature of wage negotiations also contribute to depressed nominal wage growth (OECD 2023b).

Wage developments differed substantially across the wage spectrum. In many countries, while real wages fell throughout a large part of 2023, they fell by less in low-pay industries. Among the 31 OECD countries with available data, real wages in low-pay industries performed better in Q1 2023 than those in mid-pay industries in 18 countries, and better than those in high-pay industries in 22 countries. Nominal statutory minimum wages outpaced inflation between December 2020 and May 2023 in the OECD as a whole, increasing by 29%, outpacing average price increases in the same period by some 4.5 percentage points (OECD 2023b).

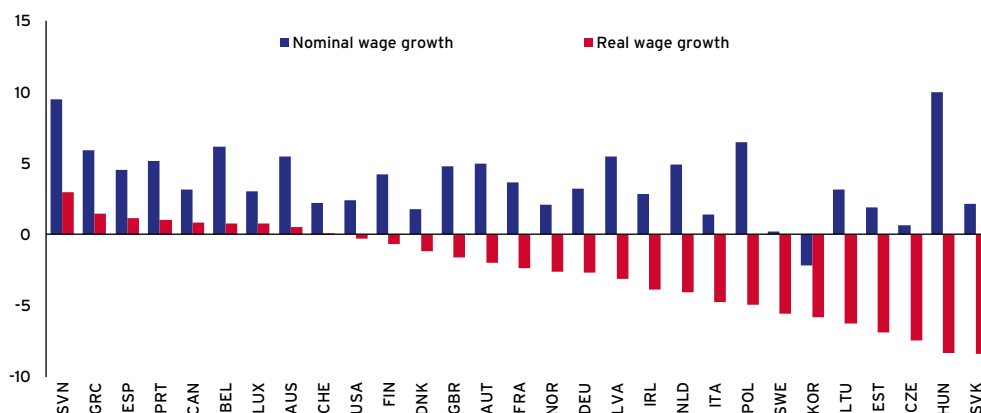
The impact of rising inflation on real incomes is more significant for lower-income households, exacerbating the challenges faced during the COVID-19 crisis. The increase in expenditure resulting from recent food and energy price changes represents a larger proportion of total spending for lower-income households, and those households have limited scope to offset this by drawing on savings or reducing discretionary expenditures (OECD 2020d).

More recently, as inflation receded, helped by the decline in energy prices over the past few months, wage growth has also started to stabilise in some major economies, albeit often at levels inconsistent with central bank inflation targets (Figure 10). In the United States, wages growth had stabilised by mid-2022 despite continued above-trend growth and only a small upturn in unemployment, with firms so far choosing to retain rather

than lay off workers. Also, faster growth in negotiated wages is likely in the coming quarters as the most recent wage bargaining rounds have tried to recoup some of the past losses in purchasing power (OECD 2023b). Real wages are projected to stop declining over the course of 2023 in most OECD economies.

FIGURE 9 ANNUAL WAGE GROWTH COMPARED TO PRE-PANDEMIC AVERAGE

Percentage point change between average annual pre-pandemic wage growth rate (2015Q1 - 2019Q4) and 2023Q2 or latest available quarter

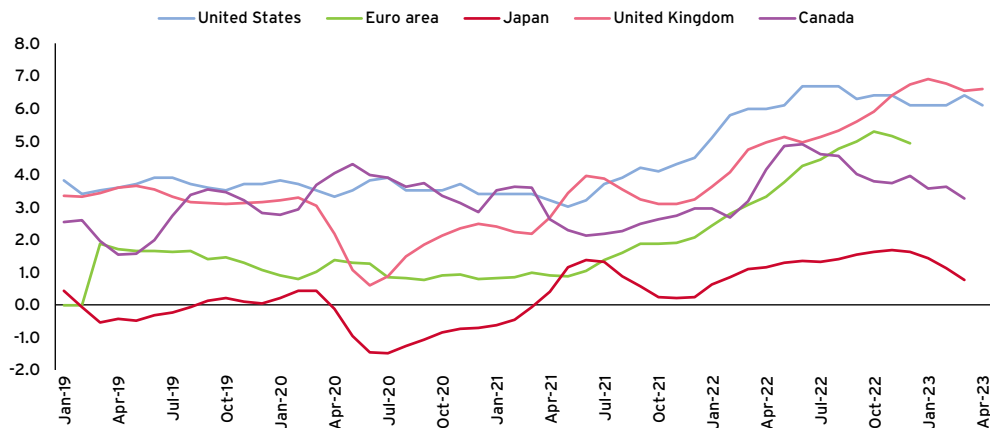


Note: Korea references 2022Q4 data.

Source: OECD Economic Outlook 114; OECD calculations.

FIGURE 10 WAGE GROWTH INDICATORS

%, year-on-year changes, 3-month average



Note: wage indicators vary across countries. United States: median change in hourly wage of individuals observed 12 months apart; Euro area: median of the annual change in wages and salaries advertised in job postings on Indeed; Japan: contractual earnings per employee for all establishments with 5 or more employees; Canada: fixed-weighted index of average hourly earnings for all employees; United Kingdom: median of annual pay growth for all individuals.

Source: OECD Economic Outlook 113 database; Federal Reserve Bank of Atlanta; Indeed; Ministry of Health, Labour and Welfare of Japan; Statistics Canada; Office for National Statistics; OECD calculations.

UNCERTAINTIES

The evidence remains unclear as to why, despite the labour market tightness observed since 2020, workers have been unable to maintain their real wages. The challenge of understanding current labour markets stems from the unprecedented nature, size, and mix of the COVID-19 and energy price shock, and the policy responses to them which took place alongside structural labour market changes from digitalisation, demography and potentially preference shifts. Labour markets have changed. Economies are functioning differently than in the past. This creates challenges for both monetary and structural policy in the efforts to reduce inflation and increase productivity to secure rising living standards.

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CHAPTER 18

Weathering the storm: How Latin America and the Caribbean navigated global inflationary pressures

Ilan Goldfajn

Inter-American Development Bank

INTRODUCTION

The COVID-19 pandemic triggered an unprecedented impact on economic activity. In response, countries worldwide enacted expansionary fiscal and monetary policies to provide relief and stimulate recovery. After decades of subdued inflation, significant pressures arose as global demand rebounded and production chain disruptions limited supply. In 2022, inflation intensified significantly due to the Russia invasion of Ukraine and its impact on energy and food prices. As in other regions, Latin America and the Caribbean (LAC) experienced inflation rates not seen since the 2008 financial crisis. The median inflation rate in LAC peaked at 11% in May 2022, a significant jump from the 4% average from 2015 to 2020.

This inflation spike was predominantly driven by external factors. A global principal components analysis indicates over 80% of the variation in LAC inflation since the pandemic began is explained by common international factors such as commodity prices, especially oil.

In response, central banks across LAC acted swiftly to raise interest rates, moving earlier than their advanced economy counterparts. The median policy rate reached 9% by February 2023, up 7.25 percentage points from February 2021. Rates were hiked most aggressively in Brazil, Chile, and Colombia. Some central banks complemented these interest rate hikes by reducing their balance sheet size after substantial expansion during the pandemic.

These proactive measures underscored central banks' commitment to anchoring inflation expectations and preventing a domestic inflationary spiral. Their policy response was critical in maintaining credibility and keeping expectations aligned with targets. The lessons of high and persistent inflation of the past seem to help build rapid consensus on the need for a swift reaction.

Fiscal reversals from the pandemic responses were an important supporting factor in the anti-inflation policy response. Fiscal deficits dropped from near 8% of GDP in 2020 at the peak of COVID stimulus to around 3% in 2023. Government debt declined to 60% of GDP from a pandemic high of 71%. These fiscal consolidations likely bolstered the effectiveness of monetary tightening.

Remarkably for a region with past experiences of persistent inflation, medium-term inflation expectations remained anchored near central bank targets, illustrating a possible new phase for inflation stability in the region. A few factors seemed to have played a role in this transformation, including (i) central bank independence; and (ii) effective coordination between monetary and fiscal authorities, both key to institutional credibility and effective impact on inflation.

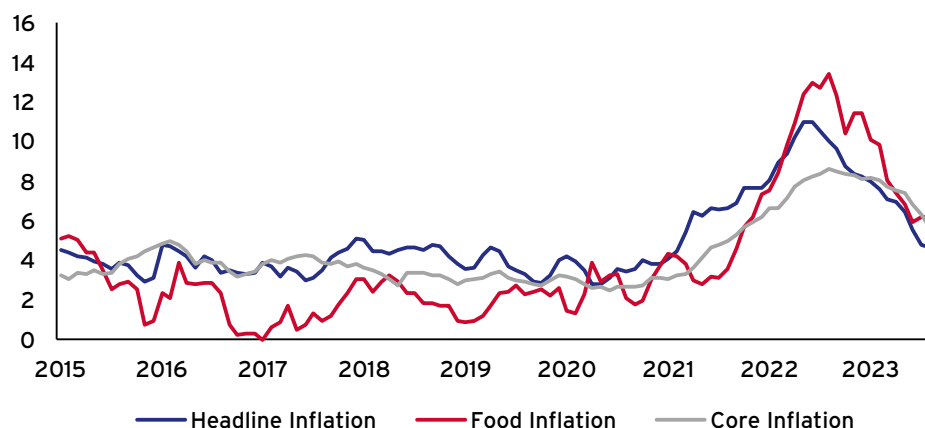
The early and decisive behaviour of central banks in tackling the inflationary surge has paid off. Median inflation has fallen from the peak of 11% to 4.3% in November 2023 and central banks have started to reduce interest rates, ahead of the rest of the world.

Challenges still remain. Global and domestic uncertainty remains high. As the global outlook evolves, policymakers must remain vigilant. But the policy response and structural improvements in LAC economies during this episode offer valuable lessons for managing inflationary shocks.

GLOBAL SHOCKS AND INFLATION IN LAC

In 2022, the post-pandemic economic recovery coupled with the fallout from Russia's invasion of Ukraine created inflationary pressure, particularly in the energy and food sectors. LAC faced inflationary headwinds not seen since the 2008 global financial crisis. As shown in Figure 1, the median regional inflation rate peaked at 11% in May 2022, jumping sharply from the 4% average from 2015-2020.¹ Alongside overall inflation, core and food price inflation also reached unprecedented levels. Food inflation hit 13.4% in August 2022, reflecting global supply disruptions. Core inflation peaked at 8.6% that month, indicating spreading price pressures.

1 Inflation surged across a spectrum of countries, spanning various monetary policy regimes. Notably, even in countries with fixed exchange rates and dollarised economies, annual inflation exceeded the 6% threshold. Like the trends observed in 2021, the primary drivers behind this inflationary surge were real factors, including shifts in global commodity prices, supply-side constraints associated with Russia's conflict in Ukraine, and lingering effects of the COVID-19 crisis (Cavallo et al. 2022).

FIGURE 1 MEASURES OF INFLATION IN LATIN AMERICA AND THE CARIBBEAN

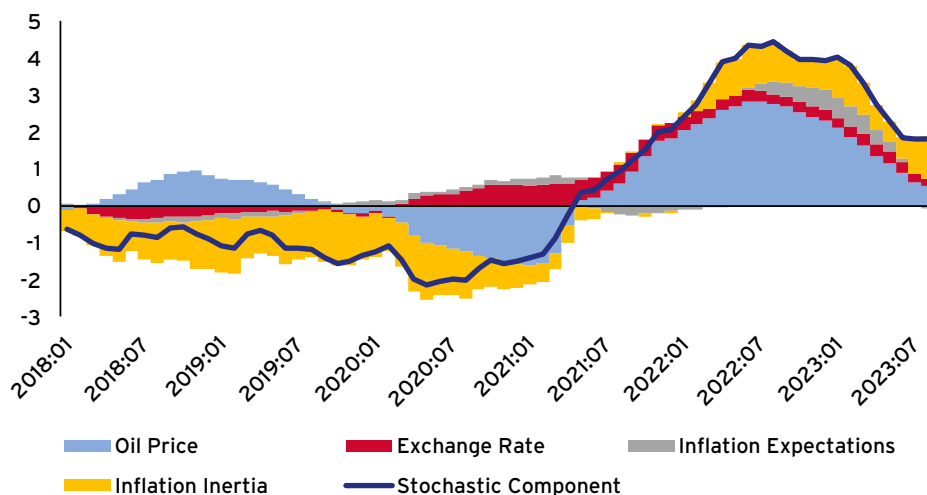
Source: HAVER.

Notes: The sample includes Argentina, The Bahamas, Barbados, Belize, Bolivia, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Guyana, Haiti, Honduras, Jamaica, Mexico, Nicaragua, Panama, Paraguay, Peru, Suriname, Trinidad and Tobago, and Uruguay.

The surge in regional inflation clearly demonstrated the highly globalised nature of price dynamics. LAC inflation moved in virtual lockstep with worldwide trends, reflecting common external drivers. A principal components analysis shows over 80% of LAC inflation variation since the pandemic began is explained by a single global factor (Ayres et al. 2023). Inflation rates co-moved tightly across countries, driven by fluctuations in prices of commodities such as oil. This synchronicity underscores global supply and demand factors as the foremost drivers of the 2022 inflation spike, rather than country-specific issues. The analysis reaffirms the interconnectedness of inflation worldwide – even as specific policy responses differed and had consequences, the underlying shock was shared.

As Galindo and Nuguer (2023a, 2023b) discuss, escalating fuel, food, and commodity prices drove the inflation upswing and inflation expectations higher. These price hikes stemmed from pandemic disruptions and supply impacts of Russia's invasion of Ukraine. Figure 2 shows a historical decomposition for several LAC countries. During the peak, over 60% of stochastic inflation variation was explained by rising oil prices (Galindo and Nuguer 2023b). As oil prices moderated after the invasion, global and regional inflationary pressures decreased somewhat. However, OPEC+ supply cuts in September 2023 and Gaza Strip war in October pushed oil over \$90 per barrel again. Though the medium-term impact remains uncertain, December 2024 futures over \$84 signal some persistence. Overall, the analysis highlights the dominant role of external commodity price shocks, especially oil, in driving global – but more specifically LAC – inflation.

FIGURE 2 HISTORICAL DECOMPOSITION OF INFLATION IN LATIN AMERICA AND THE CARIBBEAN



Source: Author's calculations based on Galindo and Nuguer (2023b).

Notes: The figure plots the historical decomposition of inflation based on estimating a structural VAR in which the oil price is assumed exogenous. The sample includes Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Mexico, Paraguay and Peru.

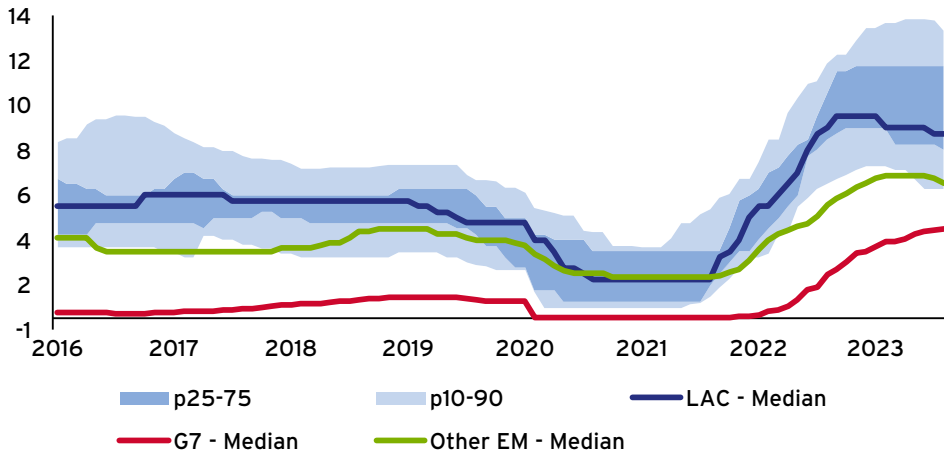
CENTRAL BANK POLICY RESPONSES

Central banks across the region responded resolutely to the sharp inflation uptick. They promptly raised interest rates and some shrank their balance sheets to restrain aggregate demand and stabilise expectations. These actions, along with moderating commodity prices, decelerated inflation in late 2022 and into 2023. Though external factors, including supply-side chain disruptions, triggered the surge, tightening underscored central banks' commitment to preventing a deanchoring of expectations and inflation spirals, which could perpetuate the pressures. Since global commodity swings affect headline inflation and influence expectations, decisive action was essential to avert rapid price changes across the board. The policy response demonstrated central banks' capacity and willingness to act pre-emptively against inflationary threats, which is crucial in a region plagued by a high inflationary past.

Median monetary policy interest rates reached 9 percentage points in February 2023, 7.25 percentage points higher than in February 2021 during the COVID-19 pandemic (Figure 3). However, there was significant variation among LAC countries: while Brazil, Colombia, and Chile raised rates by 11.75, 11.5, and 10.75 percentage points, respectively, Honduras maintained its policy rate constant.²

² Remarkably, this marked the first instance where central banks in at least ten countries in LAC had implemented significant and widespread interest rate hikes.

FIGURE 3 MONETARY POLICY REFERENCE RATES IN LATIN AMERICA AND THE CARIBBEAN



Source: Author's calculations based on HAVER.

Notes: The figure plots the median monetary policy rate for LAC and G7 countries, and the distribution for LAC countries. The sample of LAC countries includes Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Honduras, Mexico, Paraguay and Peru. Other Emerging Economies include Hungary, India, Indonesia, Malaysia, Philippines, Poland, South Africa, and Thailand.

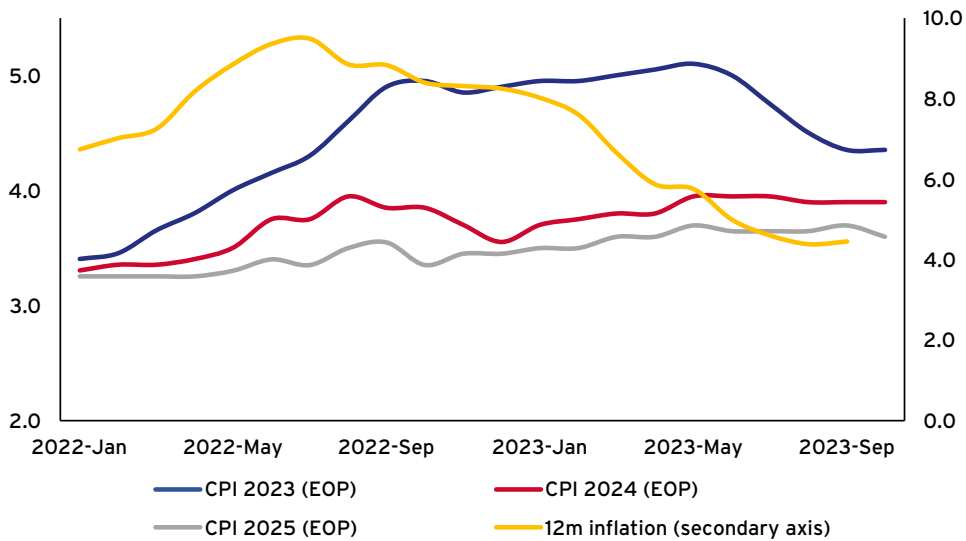
Notably, the reaction of central banks in LAC was relatively fast and anticipated that of advanced economies and other emerging markets. Countries like Brazil and Chile started to increase their policy rates as early as May and July 2021, respectively, as inflation started to increase. G7 economies followed course in December. The US Federal Reserve started its ascending phase in February 2022. LAC economies also raised their rates significantly more than other emerging economies.

In addition to adjusting policy rates, some central banks in LAC countries implemented adjustments to their balance sheets to contain inflation. Following the significant expansion of balance sheets during the pandemic (Cavallo et al. 2021, 2022), central banks initiated or continued a contractionary process starting in 2021.

If central banks were confident that the surge in inflation would be brief with no persistence, their response should have been minimal. However, their decisive actions underscored their belief that, without intervention, inflation was likely to persist, and that their policies had the potential to prevent inflation expectations from becoming unanchored.

Indeed, despite the inflationary surge, inflation expectations remained stable throughout the period (see Figure 4). In 2022, expectations for 2024 and 2025 remained consistently close to the central bank targets, which typically fall within the 2% to 4% range for the region. While expectations for 2023 followed the path of inflation, rising during the surge, they once again returned to a convergent trajectory as inflation was successfully curbed.

FIGURE 4 INFLATION EXPECTATIONS IN LATIN AMERICA AND THE CARIBBEAN



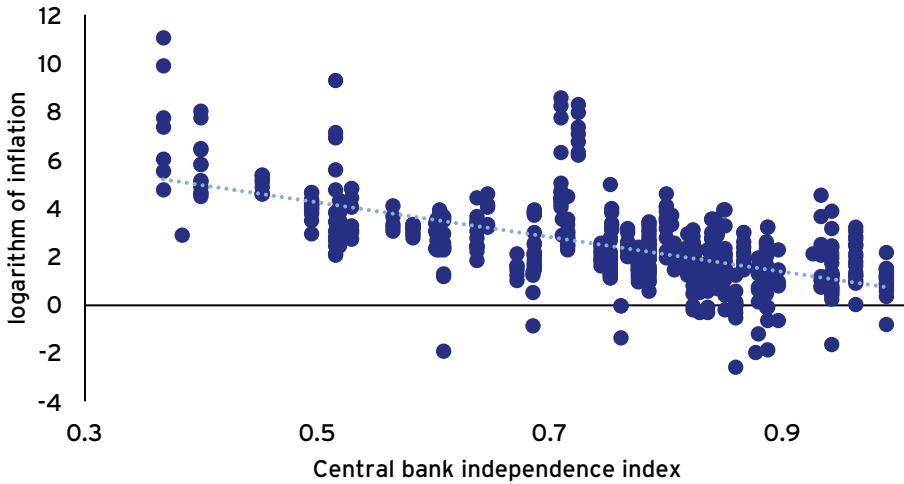
Note: Sample includes: Bolivia, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Honduras, Jamaica, Mexico, Nicaragua, Panama, Paraguay, Peru, Trinidad and Tobago, Uruguay.

A key feature of the disinflation during 2022-23 in LAC was the implicit coordination with fiscal policy. Following the fiscal expansion during the pandemic that led to historically high fiscal deficits and debt levels in the region, fiscal consolidation has taken place. Fiscal deficits, which reached nearly 8% of GDP in 2020, are now close to the 3% of GDP they had been before the pandemic. Sovereign debt, which peaked at 71% of GDP in the average LAC country in 2020, is now close to 60%. Fiscal consolidation probably contributed to the effectiveness of monetary policy.

Central bank independence was critical in the response. As noted by Jacome and Pienknagura (2022), central bank independence in LAC countries increased notably at the turn of the century and has remained high since. Independence is safeguarded by the structure of governance defined by a fixed-term appointment of central bank governors and their boards. In countries such as Brazil, Chile, Colombia, or Peru, central bank independence allowed them to adopt policy actions swiftly.

As illustrated in Figure 5, there is a strong correlation between the independence of central banks and low inflation rates. Central banks that operate autonomously are better positioned to instill confidence among all economic agents. This independence empowers them to anchor inflation expectations more effectively, ensuring stability and trust in the monetary policy framework.

FIGURE 5 RELATIONSHIP BETWEEN CENTRAL BANK INDEPENDENCE AND INFLATION IN LATIN AMERICA AND THE CARIBBEAN, 1980-2021



Source: IDB calculations with data from Jacome and Pienknagura (2022), Eikon-Refinitiv and World Bank's Global Database of Inflation.

CHALLENGES MOVING FORWARD

With inflation receding, some countries have started to ease policy, cutting interest rates ahead of their counterparts elsewhere. This is a major reward for the early tightening. However, central banks should remain vigilant; global inflation could resurge and exert renewed domestic pressures.

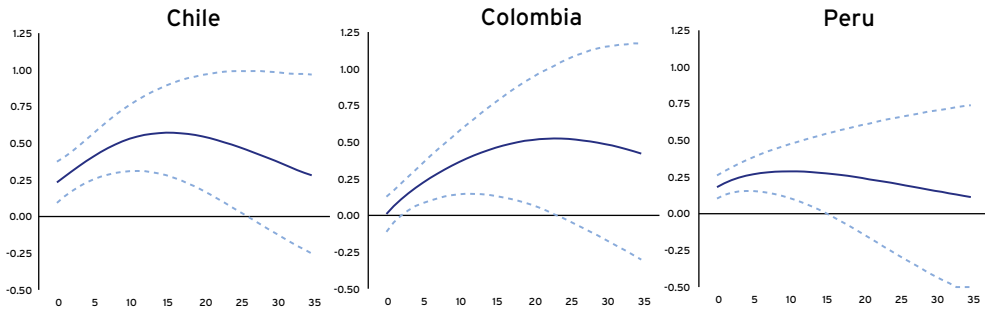
Largely due to the extensive integration of LAC economies with global capital markets, monetary policy reference rates tend to correlate with the US Federal Reserve rates. Impulse response functions, derived from structural vector autoregression (SVAR) models for a group of countries in the region, indicate that when the US interest rate experiences a shock, a significant portion of that shock is transmitted to the policy rates of the countries in the LAC region.³ According to these models, a 100 basis point shock to the US rate would result in an increase in the policy rates of the LAC countries of between 25 and 50 basis points at the peak of the response (Figure 6a).

3 The main structure of the VAR model is as follows. Let $y_t = [\text{oil price}_t, i_t^*, \text{EM Risk}_t, y_t, \pi_t, \text{ER}_t, i_t]^T$, where *oil price* is the price of Brent Crude, i_t^* is the Federal Reserve's policy rate, *EM Risk* is the average EMBI spread for emerging markets, y_t is industrial production, π_t is inflation, *ER* the exchange rate, and i_t the monetary policy interest rate. The model is estimated for each country separately with monthly data from January 2001 to August 2023. The general model takes the following form: $y_t = A_1 y_{t-1} + A_2 y_{t-2} + A_p y_{t-p} + e_t$, and restrictions to the coefficients in each A_j are imposed to ensure that the external variables, oil prices, i_t^* , and global EMBI risk, are exogenous to the domestic variables. The model also ensures that oil prices and US interest rates are exogenous with respect to the EMBI spread. A standard Choleski decomposition is used to identify the shocks. A notable feature of this specification is that the policy interest rate is assumed to respond contemporaneously to all variables in the system.

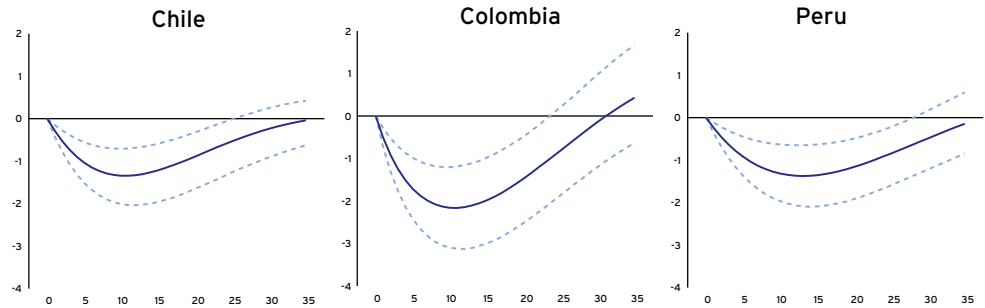
This behaviour can be partly explained by how exchange rates respond to monetary policy rate changes and the pass-through of exchange rate depreciations to inflation. According to estimations of the same model, reductions in policy rates may lead to exchange rate depreciations (Figure 6b), all other things equal, and depreciations can lead to inflation (Figure 6c). The combination of these reveals a complex trade-off for policymakers, who want to pursue an expansionary policy but may face volatile capital flows that may generate inflationary dynamics that could put pressure on reversing their initial policy decision.

FIGURE 6 IMPULSE RESPONSE FUNCTIONS

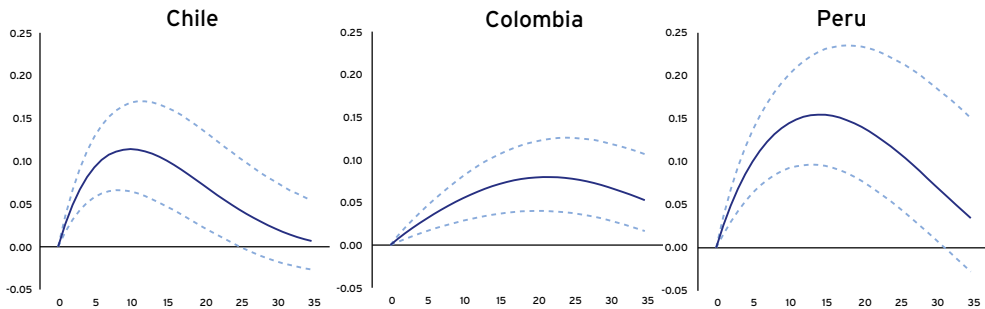
a) Response of monetary policy rates to a 100 basis point shock to the US interest rate



b) Response of the exchange rate to a 100 basis point shock to the monetary policy interest rate



c) Response of inflation to a 1% shock to the exchange rate



Source: Author's calculations based on SVAR models.

While this situation may be specific to the countries in which the model is estimated, it indicates the trade-offs faced by policymakers in financially integrated economies. At the current juncture, where the future remains particularly uncertain, central banks in the region need to be prepared to adjust monetary policy as needed.

A significant challenge currently facing countries in determining their domestic interest rate trajectory relates to the evolving fiscal policy landscape. Given expectations of a global economic slowdown, increased fiscal demands within each nation and elevated global financing costs, it remains uncertain whether governments in the region can sustain the trend for fiscal consolidation. The rise in global interest rates has led regional governments to allocate more than 2 percentage points of their fiscal revenue to financial obligations, compared to pre-pandemic levels. Coupled with growing fiscal requirements and the typically pro-cyclical nature of fiscal revenues, the consolidation trend is at risk. In this context, enforcing fiscal rules becomes crucial. While fiscal rules allow for counter-cyclical spending, their presence and mechanisms enhance market credibility, thereby helping to keep risk spreads contained even when temporary deficits arise.

Another factor that has recently become a concern globally is financial stability. Fortunately, LAC countries seemed to be more protected this time around. The region typically imposes high liquidity requirements on banks, and they often maintain even higher levels of liquidity. Furthermore, banks maintain substantial capital reserves, well above minimum regulatory requirements. The quality of bank capital tends to align with Basel III recommendations. Most regulatory and supervisory frameworks in the region encourage the market valuation of assets and impose restrictions on the reclassification of assets between trading and held-to-maturity books. This approach helps limit the potential for undisclosed losses stemming from fluctuations in asset prices on banks' balance sheets.

CONCLUSIONS

Like many regions around the world, Latin American and the Caribbean faced a formidable test from surging inflation in 2022-2023. Though largely externally driven by global supply chain disruptions, surges in global demand and the fallout from the Russian invasion of Ukraine, this inflation scare required decisive action to avert price instability. Independent central banks across LAC responded vigorously and pre-emptively, raising rates ahead of their advanced economy peers and, in some cases, rapidly reducing balance sheets to curb inflation and anchor expectations.

This timely tightening kept expectations anchored, averting runaway inflationary spirals that have plagued the region in the past. The policy response underscored central banks' commitment to price stability and their capacity to act decisively when anchoring expectations is at risk. Fiscal consolidation efforts also played a role in alleviating inflationary pressures throughout the region. The robustness of the financial system,

bolstered in part by policies promoting the marked-to-market valuation of assets, helped mitigate the adverse effects of high interest rate policies and reduced undisclosed banking risks.

Challenges remain as the global context remains uncertain. But by overcoming this threat, LAC policymakers reaffirmed their capability to safeguard stability amid external volatility. This episode imparted vital lessons, including on the value of pre-emptive tightening, fiscal-monetary coordination, central bank autonomy, and financial transparency. As LAC progresses, these lessons, along with strengthened institutions and policy frameworks, will prove invaluable assets for navigating future challenges. Policymakers in the region will confront the future reinforced by having passed the latest crisis test.

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CHAPTER 19

Unconventional fiscal policy in times of high inflation

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Mai Dao,^a Allan Dizioli,^a Chris Jackson,^a Pierre-Olivier Gourinchas^{abc} and Daniel Leigh^{a1}

^aIMF; ^bUC Berkeley; ^cCEPR

Inflation surged around the world in 2022 and became a major policy problem. It triggered numerous studies on the drivers of inflation (e.g. Cerrato and Gitt 2023) and on the effectiveness of policy responses. The purpose of this chapter is to shed light on both issues, focusing on the euro area and the United States, and on the role that ‘unconventional fiscal policies’ (UFP), defined as the set of fiscal measures aimed directly at countering the rise in energy prices – including but not limited to price subsidies and tax cuts – can play in reducing inflation.

We decompose headline inflation into core (underlying) inflation and deviations of headline from core. We seek to explain core inflation by long-term inflation expectations and the level of tightness in the labour market, and to explain the non-core component of headline inflation by price changes in energy and other industries. We also study the pass-through over time from these relative price shocks to core inflation, which can occur through the effects on wages and other costs of production. Our primary measure of core is weighted median inflation, which strips out the effects of unusually large price changes in certain industries.²

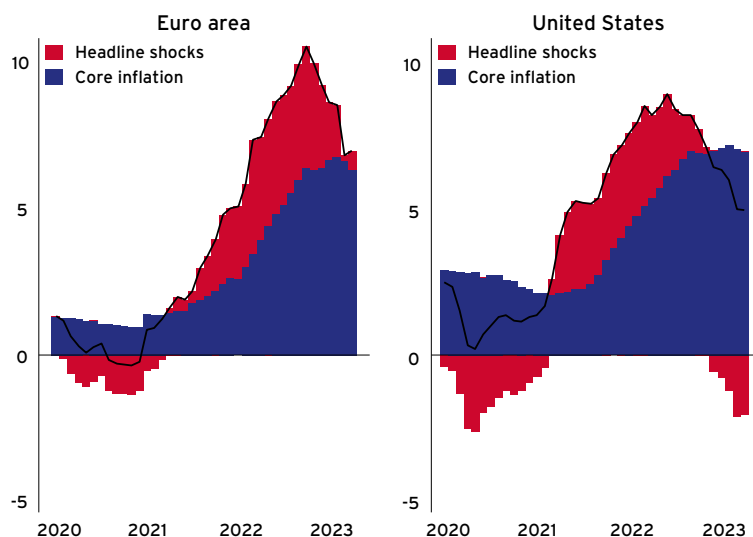
Figure 1 shows that on both sides of the Atlantic, the initial rise in inflation in 2021 was driven by headline shocks. But since mid-2022, headline shocks comprise a larger share of inflation in the euro area than in the United States. We also find that energy price inflation has played a more dominant role in driving headline shocks in the euro area than in the United States. Energy price inflation has driven the run-up in headline shocks in the euro area in the second half of 2021 and in 2022. The 12-month average of headline shocks peaked at 4.2 percentage points in October 2022. A simple regression

1 We are grateful to Laurence Ball, Olivier Blanchard, Giancarlo Corsetti, Philippe Martin, and Prachi Mishra for valuable comments. We thank Michal Andrle for providing us with weighted median inflation data for the euro area and Antoine Boiron for providing us with estimates of market reference prices for gas and electricity from the French Energy Regulatory Commission. Ignacio Gallardo, Mona Wang, and Canran Zheng provided excellent research assistance. Eduard Laurito and Rebecca Eyassu provided excellent editorial support. The views expressed in this chapter are the sole responsibility of the authors and should not be attributed to the International Monetary Fund, its Executive Board, or its management. A longer version of this chapter was presented at the 2023 ECB Forum on Central Banking and published in Dao et al (2023).

2 As Ball et al. (2021) explain, weighted median inflation isolates the core component of inflation more effectively than the traditional core measure of inflation excluding food and energy prices, especially during the COVID-19 era, when much volatility in headline inflation has come from price changes in industries other than food and energy.

of monthly headline shocks on monthly energy price inflation (minus median inflation) explains the entire run-up and the bulk of the subsequent decline in headline shocks.³ In the United States, energy price inflation also plays a sizeable role in explaining headline inflation shocks during the COVID-19 era (as documented by Ball et al. 2022) but has been running at a lower level. The contribution of energy inflation to US headline shocks was negative in early 2023.

FIGURE 1 HEADLINE INFLATION, CORE, AND HEADLINE SHOCKS, 2020-2023 (%)



Note: Headline inflation is HICP for euro area and CPI for US. Core inflation is median weighted inflation computed by IMF staff for euro area and obtained from Federal Reserve Bank of Cleveland for US. Headline shocks denote deviations of headline inflation from core inflation.

EXPLAINING THE RISE IN EURO AREA AND US INFLATION

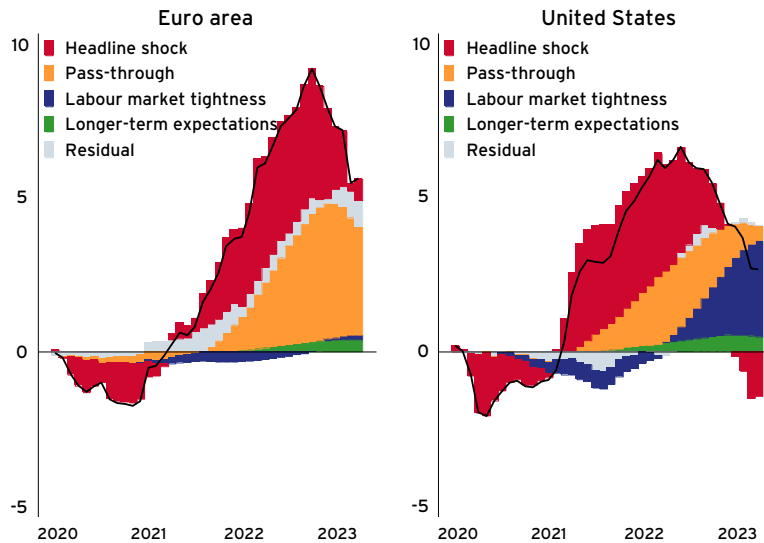
To understand the evolution of core inflation in the euro area and compare it with that of the United States, we use a Phillips curve framework that focuses on the role of three variables: expected inflation, labour market tightness, and headline shocks. We allow for nonlinearities in the effects of labour market tightness and of past headline shocks on core. In our baseline specification for the euro area, we measure labour market tightness based on deviations of unemployment from the natural rate of unemployment. We compare these estimates with those obtained for the United States based on the same specification with one difference: we measure US labour market tightness based on the ratio of job vacancies to unemployed to account for the observed shift in the US Beveridge curve (see recent studies, including Blanchard and Bernanke 2023).

3 The bivariate relation between headline shocks and energy relative price inflation has a tight fit with an R-squared of 72%. The fit is unchanged when controlling for two additional variables also considered by Ball et al. (2022): relative food price inflation and a measure of backlogs of goods and services orders from IHS Markit Economics, which we believe reflects the widely reported problems with supply chains. The estimated coefficients for these additional controls are statistically insignificant, while that on energy relative price inflation remains unchanged and highly statistically significant.

The results, reported in Figure 2, highlight the dominant role of energy price shocks in driving headline inflation in the euro area, both directly as well as through their pass-through effects on core inflation. At the peak in October 2022, headline inflation is 10.6% – 9.7 percentage points higher than in January 2021. Of this difference, 4.8 percentage points reflect the estimated direct contribution of energy price inflation to headline shocks, and 4.2 percentage points reflect the associated pass-through effects into core inflation, for a total of 9.0 percentage points (93% of the total rise).

FIGURE 2 ACCOUNTING FOR THE RISE IN INFLATION

Decomposition of change in 12-month headline inflation since December 2019 (percentage points)



Note: "Pass-through" denotes the pass-through of past headline shocks (deviations of headline from core) into core inflation. "Labor market tightness" denotes contribution of change in unemployment gap for euro area, and change in ratio of vacancies to unemployed for US. "Longer-term expectations" denotes contribution of change in longer-term inflation expectations (ECB Survey of Professional Forecasters for euro area, Survey of Professional Forecasters for the US). Based on estimates in Table 1 and Annex Table 1 in Dao et al. (2023).

With energy price inflation subsiding in late 2022 and in early 2023, the bulk of the remaining rise in inflation compared with the January 2021 level reflects the pass-through effects of past energy price shocks into core. Pallara et al. (2023) also find that past energy shocks have driven up core inflation in the euro area.

For the United States, the results are strikingly different. At the peak in June 2022, headline inflation is 7.5 percentage points higher than in January 2021. Of this difference, 2.8 percentage points reflect the estimated direct contribution of energy price inflation to headline shocks, and 0.6 percentage point reflects the associated pass-through effects. Headline shocks arising from other industries, and their associated pass-through effects, together account for 2.3 percentage points. Labour market tightness accounts for 0.8

percentage points of the rise through June 2022.⁴ However, with headline shocks later subsiding and turning negative, their direct and pass-through contributions fade. By April 2023, the remaining difference in inflation compared with the January 2021 level fully reflects labour market tightness.

THE IMPACT OF UNCONVENTIONAL FISCAL POLICIES

In such an environment, is there a role for fiscal policy in further reducing inflation? The textbook answer is an unambiguous “yes!”. Tighter fiscal policy can help monetary policy compress demand and reinforce the credibility of the overall disinflation strategy.

Yet, many European countries chose a more ‘unconventional’ fiscal policy path, one that aimed to directly counter the rise in energy prices. Using a combination of transfers, energy subsidies, and tax cuts, the aim was to contain the increase in the price of energy (including electricity and gas) for households and businesses.

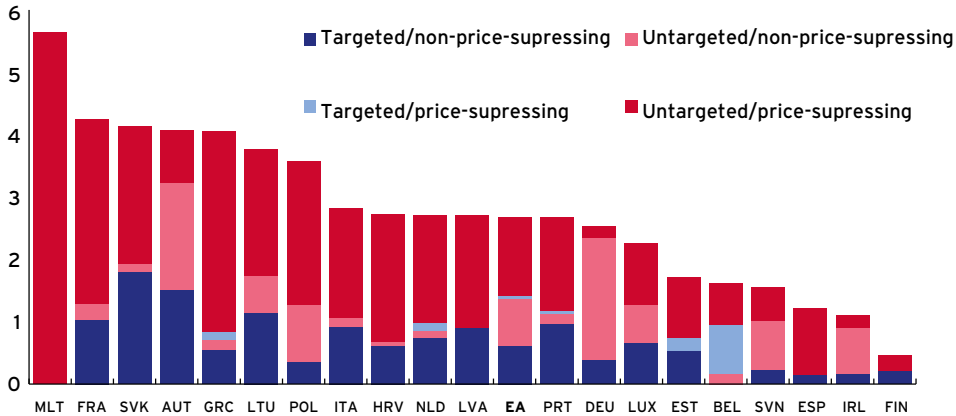
These fiscal measures have been costly. The estimated size of the overall energy fiscal support aggregating over all measures to provide relief to households and businesses is about 3.3% of euro area GDP (1.3% of GDP in 2022 and 2.0% of GDP in 2023). The total set of measures can be broken down into several elements. First, they include fiscal support targeted at households and small and medium-sized enterprises (SMEs) at 2.7% of GDP. Second, support measures to firms include tax credits for energy-intensive companies in Germany and Italy or subsidies to energy-intensive sectors in Spain. Fiscal costs budgeted for energy support to firms amounted to 0.6% of GDP in the euro area.⁵

Figure 3 breaks down fiscal spending in support of households and SMEs in each country into price-suppressing versus non-price-suppressing measures and targeted versus untargeted measures. Price-suppressing measures are those that suppress energy prices and include caps on energy retail prices or cuts to excise duties or value-added tax rates on energy products. We also classify block tariffs, which offer a discounted tariff for a limited consumption volume, as price-suppressing because they lower the marginal price below a certain consumption threshold. Most countries have also adopted measures that are not price-suppressing but largely untargeted, such as energy vouchers, lump-sum income tax credits, or cash transfers.

4 Ball et al. (2022) find that headline shocks other than energy that increased US inflation included shocks associated with backlogs of orders for goods and services, which, they argue, capture problems with supply chains, and changes in prices in auto-related industries.

5 For some countries, the total size is net of windfall profit taxes collected from firms (for example, energy producers in France). Some economies also introduced energy support measures in 2021.

FIGURE 3 FISCAL COSTS OF HOUSEHOLD AND SME ENERGY MEASURES IN 2022 AND 2023 (% OF GDP)



Note: Measures include those budgeted for support to households and small and medium-sized enterprises (SMEs) but not those for support to large firms. Chart indicates economies based on International Organization for Standardization (ISO) codes. EA indicates euro area.

Source: Arregui et al. (2022).

To investigate whether the measures reduced inflation, and if so, by how much, we use two approaches to construct counterfactual simulations: a semi-structural model-based approach and an empirical Phillips curve-based approach.

COUNTERFACTUALS: A MODEL-BASED APPROACH

We begin with a semi-structural multi-region model assessment of the effectiveness of the UFP measures using IMF's Flexible System of Global Models (FSGM) for the euro area as a whole.⁶ The FSGM incorporates countries' commodities production, consumption, and trade and includes hand-to-mouth as well as Ricardian households. It also contains a range of fiscal policy tools that allow us to capture the effects of the range of fiscal measures implemented in the euro area.

The simulations are first calibrated to capture the significant rise in energy prices. We create an energy index, which is an average of oil and natural gas prices weighted by their share in end-use energy consumption.⁷ The shares vary according to each country's or region's energy use mix. Futures energy prices use the energy price assumptions underlying the projections in the April 2023 IMF World Economic Outlook. The model was expanded to include indirect effects of energy prices on core inflation via supply chain effects, which we calibrate from estimates in the literature.⁸

⁶ For details on FSGM, see Andrieu et al. (2015).

⁷ Pass-through of energy shocks to inflation is fast in the model because it is calibrated to oil price shocks. The pass-through of natural gas prices to consumer prices, however, is typically more lagged. We capture this effect by taking a four-quarter average of natural gas prices and contemporary oil prices in the energy index.

⁸ See ECB (2010) where a 10% temporary energy price shock increases inflation by 0.35 percentage points and raises core inflation by 0.15 percentage points.

We then feed into the model the temporary discretionary fiscal measures announced in response to the energy shock (as reported in Figure 3). The FSGM's richness of fiscal instruments allows for a differentiated assessment of the impact of the fiscal measures on inflation and activity. For instance, transfers targeted toward liquidity-constrained households have a larger effect on activity and inflation than do untargeted transfers or tax cuts. Measures that reduce energy prices directly, including price caps and changes in energy taxes, are implemented using energy subsidies and taxes in the model. By directly and temporarily affecting local consumers' energy prices, these fiscal measures have the largest impact on headline and core consumer inflation. Moreover, these measures temporarily boost activity by increasing real disposable income, with the effect amplified by the presence of liquidity-constrained households.

The top panel of Figure 4 shows the effect of the UFP measures. The blue line reports the counterfactual path in the absence of measures for inflation (panel a) and output (panel b). The red line reports the paths when UFP measures are implemented. The results are reported for the euro area as well as for France, Germany, and Italy separately. Fiscal policy is estimated to stabilize inflation by lowering it during the energy price shock in 2022, and by raising it in 2024 when the energy price shock unwinds. Without the UFP measures, inflation overshoots the no-shock baseline by more in 2022 and undershoots it by more in 2024 as the measures are removed.⁹ The effects, like the energy price shock, are temporary. The measures also stabilise output: supporting it in 2022 (especially in France) and moderating it in 2024.

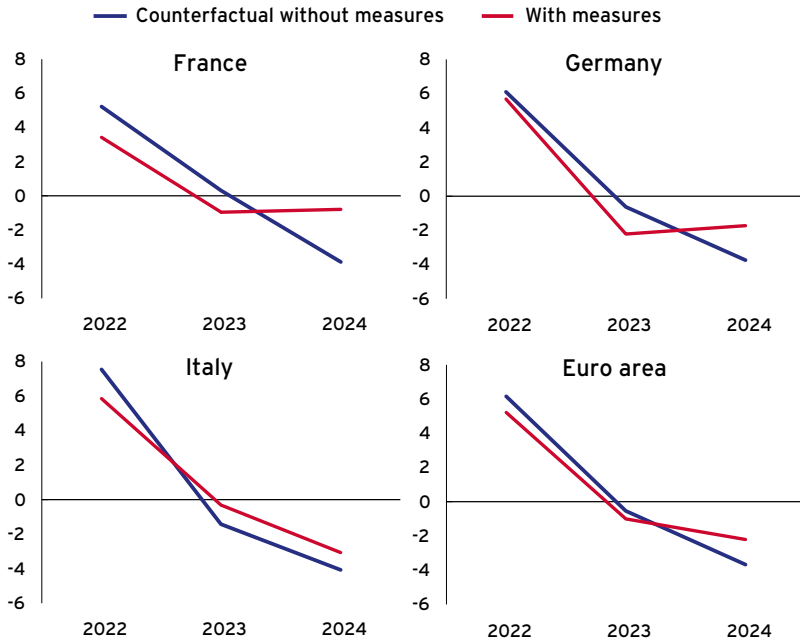
Overall, this simulation analysis suggests that UFP measures can reallocate inflation over time, which helps smooth out a large and temporary energy price shock. However, a potential drawback of the analysis is that the model assumes a linear Phillips curve, as is standard in most large-scale New Keynesian models used at policy institutions. Such nonlinearities have proved important to understand recent inflation dynamics (Gudmundsson et al. forthcoming). Hence, the impact of the shocks on inflation – and the impact of the fiscal policy measures on inflation – could be too low in settings that abstract from these relevant features.

This tells us that a more direct assessment of the impact of these measures is needed, one that considers the nonlinearities in the Phillips curve.

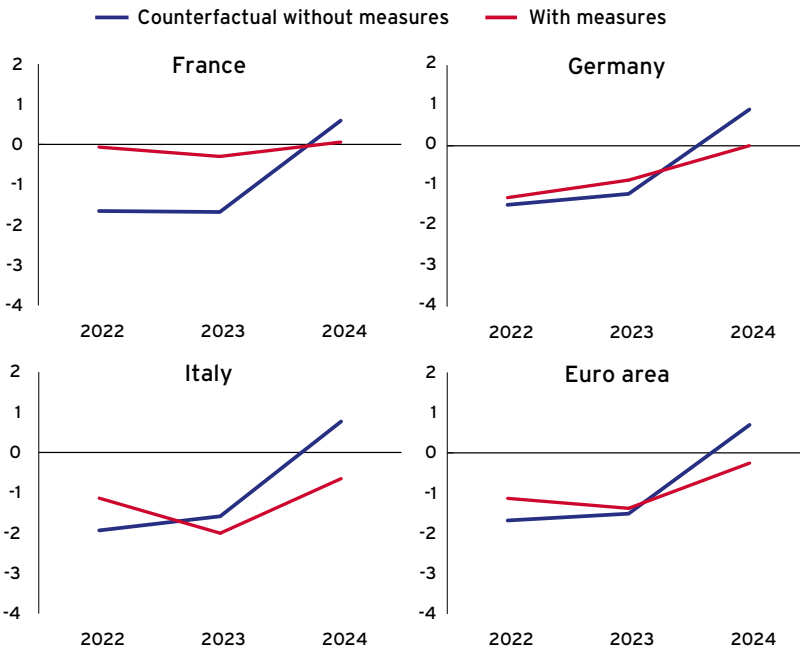
9 The marginal effect of the UFP measures is marginally higher if we assume no change in monetary policy. Moreover, one key assumption for the results is that fiscal measures are temporary and are perceived as temporary by economic agents.

FIGURE 4 EFFECT OF ENERGY PRICE SHOCKS ON HEADLINE INFLATION AND REAL GDP WITH AND WITHOUT DEFICIT-FINANCED ENERGY PRICE MEASURES (DEVIATION FROM NO-SHOCK BASELINE; PERCENTAGE POINTS)

a) Headline inflation



b) Real GDP level



Notes: Chart reports simulations based on the IMF Flexible System of Global Models.

COUNTERFACTUALS: AN EMPIRICAL PHILLIPS CURVE APPROACH

We now use our estimated Phillips curve framework to construct the counterfactual headline inflation paths that would have occurred in the absence of the fiscal energy measures, all else equal. The estimated Phillips curve approach allows, as explained above, for nonlinearities in the effects of labour market tightness and of past headline shocks on core inflation.

We use our estimated Phillips curve framework to compare the actual path of headline inflation to a counterfactual scenario without the UFP measures, proceeding in three steps:

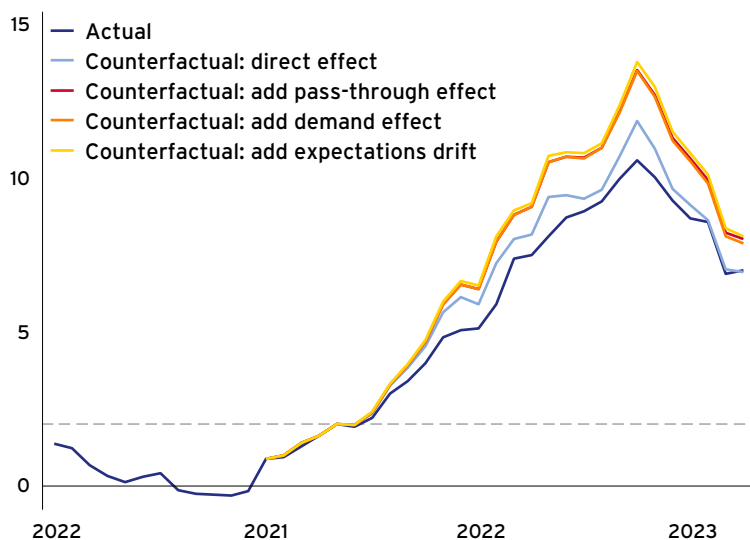
- First, we construct a monthly series of counterfactual headline shocks that would have occurred in the absence of the UFP measures. For this step, we use the gap between estimates of ‘market’ energy retail prices taken from official sources with actual retail prices.
- Second, we derive a counterfactual path of the core inflation gap. Given the path of counterfactual headline shocks, we compute the impact on the core inflation gap based on our monthly euro area Phillips curve estimates, which accounts for nonlinear pass-through from headline shocks to core. In addition, we derive the impact on the core inflation gap from an assumed unemployment path in the absence of the measures. For this step, we use the budgetary cost of the energy measures as well as conventional assumptions regarding fiscal multipliers and Okun’s law.
- Third, we calculate the counterfactual effect of the measures on inflation expectations based on the counterfactual core inflation gap and a process we estimate for the evolution of longer-term inflation expectations that allows for feedback effects from headline inflation into longer-term expectations.

We use the resulting counterfactual path of monthly headline inflation to compute the path of 12-month inflation, which we compare with the actual path of 12-month inflation. We explain these steps in greater detail, while acknowledging associated uncertainties, in an accompanying working paper (Dao et al. 2023).

The results of the analysis suggest that, without the unconventional measures, euro area headline inflation would have been higher in 2022 by about 2 percentage points (Figure 5). About one-third of this difference reflects the direct impact on headline inflation. Much of the remainder reflects a lower pass-through into core inflation. Moreover, despite their fiscal cost, the measures’ effects on raising core inflation by stimulating aggregate demand have been modest, in part because the euro area has not been excessively overheated (less so than the United States, for example). Our estimates

also suggest that longer-term inflation expectations, as measured by the ECB's Survey of Professional Forecasters, would have reached 2.5% by the end of 2022, 0.3 percentage points higher than the observed 2.2%, in the absence of the measures.

FIGURE 5 INFLATION: ACTUAL AND COUNTERFACTUAL WITHOUT ENERGY MEASURES, 2020-2023 (12-MONTH RATE, %)



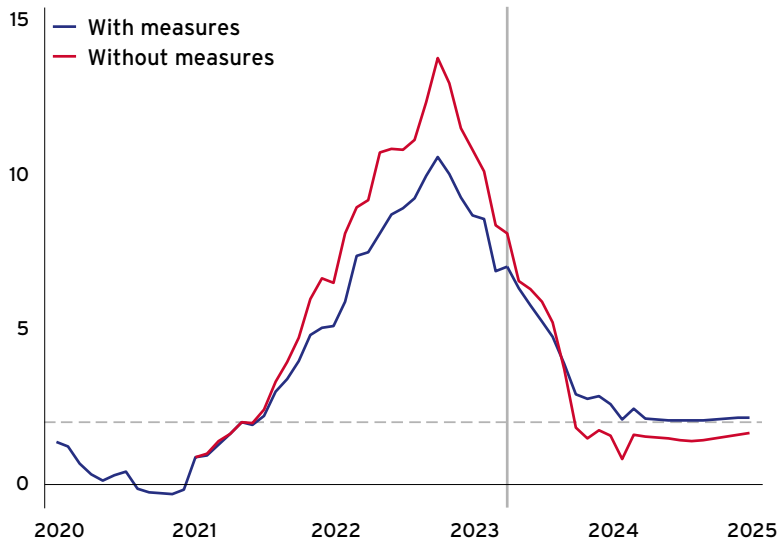
Note: Horizontal dashes show 2 percent target for HICP inflation.

SCENARIOS FOR FUTURE INFLATION: LUCK VERSUS SKILL

The preceding discussion concludes that the energy measures have so far reduced inflation. Where is inflation heading? We do not make unconditional forecasts but use our empirical Phillips curve framework to offer predictions conditional on available (IMF staff) forecasts of the unemployment gap and different assumptions regarding the future path of energy prices. We make the simplifying assumption that no further headline shocks stem from energy prices or other sectors starting from May 2023. We set headline shocks to zero for future months for this scenario – a natural benchmark given the historically unpredictable nature of headline shocks. The resulting 12-month headline shock, given zero monthly shocks starting in May 2023 and the earlier actual shocks, declines to zero in April 2024.

Figure 6 shows the simulated path of 12-month headline inflation under the assumptions of no further headline shocks and the IMF staff forecast of the unemployment gap (from the April 2023 IMF World Economic Outlook). The inflation rate declines from the April 2023 level of 7.0% to 2.8% by December 2023 and to 2.1% by December 2024.

FIGURE 6 SCENARIO: HEADLINE INFLATION WITH AND WITHOUT ENERGY MEASURES (12-MONTH RATE, %)



Note: Horizontal dashes show 2 percent target for HICP inflation. To complement this prediction, we compute a corresponding path of inflation in the absence of UFP measures. This path is an extension of the counterfactual path reported in Figure 6. We extend that path based on the assumption that 'market' energy prices converge with the level of actual regulated energy prices by December 2023 and remain at that level thereafter. This implies a gradually declining path for market energy prices. We compute the implied path of counterfactual (negative) energy inflation shocks, recompute the 12-month average of headline shocks, and use it to derive the impact on the core inflation gap using the Phillips curve. As before, we assume that the demand boost from the energy measures that reduce unemployment is absent, which also implies modestly lower inflation.

As Figure 6 shows, in this case without the energy measures, headline inflation falls from its counterfactual level of 8.1% in April 2023 to 1.6% by December 2024, modestly undershooting the target, primarily on the back of the lagged effects of the lower demand and declining core inflation.

Overall, in this scenario, European economies 'get lucky'. The energy price measures prevent a sharper rise in inflation in 2022 because of a temporary energy price spike. They also prevent a (more modest) undershoot of the inflation target later. The additional inflation stability – the smaller absolute deviations from target – from the energy price measures is substantial. Absolute deviations of inflation from target during 2021–24 are 24% smaller with the energy price measures than without them. Average inflation in 2021–24 is 0.5 percentage points lower with the measures, which implies a cumulative (price level) reduction of about 2.0%.

Overall, then, the measures have achieved some inflation stabilisation. Does this mean that measures of this kind should be part of the standard 'toolkit'? Here, we are more reserved. Two factors helped in the case of the euro area.

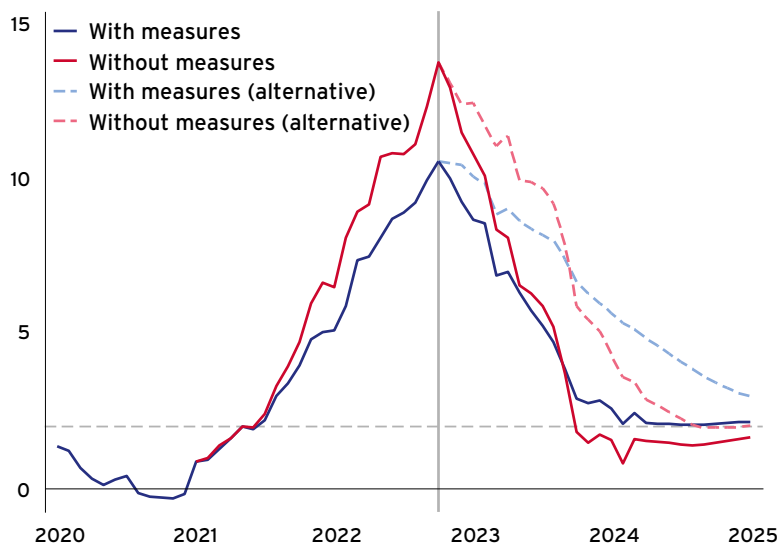
First, the energy shock turned out to be more transitory than expected. Had energy prices remained at their peak levels, avoiding the persistent inflationary effects would have required more costly – and probably unsustainable – fiscal interventions. In a

counterfactual scenario where the shock to energy prices is more persistent, with energy prices staying at their peak 2022 levels and the fiscal measures being gradually unwound in 2023, headline inflation, pass-through to core, and inflation expectations are substantially higher.

Figure 7 shows the scenario where market energy prices do not decline from their October 2022 peak levels, and actual energy prices end up rising to market levels by December 2023. In this case, because of the additional headline inflation implied by the increase in actual energy prices up to market levels in 2023, the associated pass-through into core, and the consequent upward drift in longer-term expectations, the simulated 12-month headline inflation path declines much more gradually. With the energy measures, inflation now averages 8.1% in 2023 instead of 5.5% with the more favourable scenario with declining energy prices. It reaches 6.0% by December 2023 instead of 2.8% and 3.1% by December 2024 instead of 2.1%. The figure also shows the corresponding counterfactual inflation path in the absence of energy measures. That path also declines more gradually, and this time there is no undershoot of the 2% inflation target.

Overall, since the temporariness of energy price shocks in real time is difficult to ascertain, this ‘unlucky’ case illustrates the risks associated with unconventional fiscal policy measures.

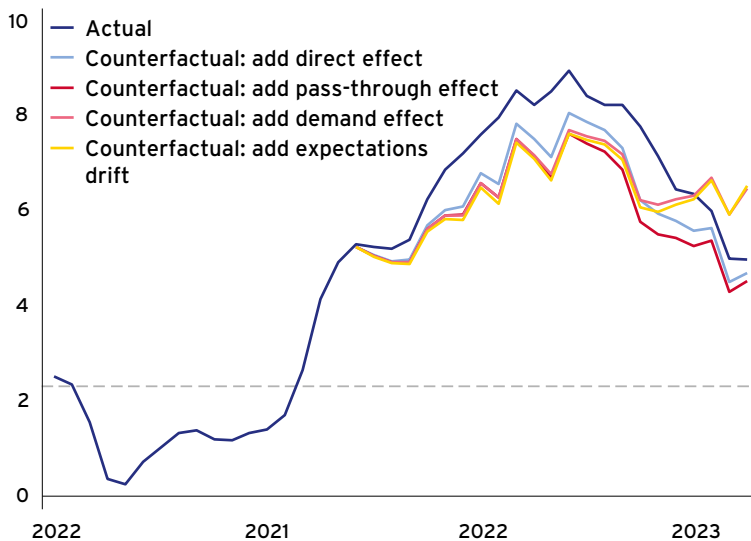
FIGURE 7 ALTERNATIVE SCENARIO WITH ENERGY PRICES STAYING HIGH: HEADLINE INFLATION WITH AND WITHOUT ENERGY MEASURES (12-MONTH RATE, %)



Note: Vertical line indicates October 2022 after which market energy prices assumed to be constant with actual retail prices rising linearly to their market price level by December 2023. Horizontal dashes show 2 percent target for HICP inflation.

A second reason for caution in interpreting the results is that European economies were not strongly overheated to start with. The demand effects of fiscal policy on inflation are stronger when the economy is already overheated, on a steeper part of the Phillips curve. In a counterfactual exercise, we implement euro area-style measures in the United States and find that headline inflation would have been lower by 1.2 percentage points on average in 2022 but would then have drifted upward in late 2022 and exceeded the actual level by about 1.6 percentage points by April 2023 (Figure 8). Using deficit-financed, price-suppressing measures to artificially hold down core inflation in the face of a significantly overheated economy only adds to the inflation fire. At the very least, it is preferable for these measures to be fiscally neutral.

FIGURE 8 US HEADLINE INFLATION: ACTUAL AND COUNTERFACTUAL WITH UNCONVENTIONAL FISCAL MEASURES (12-MONTH RATE, %)



Note: Horizontal dashes show 2.3% target for CPI based on 2% PCE target reported on Federal Reserve Bank of Atlanta Underlying Inflation Dashboard.

POLICY IMPLICATIONS

Overall, we conclude that the unconventional fiscal policy measures achieved some inflation reduction in the euro area and by more than standard models might have predicted.

Does this mean that measures of this kind should be part of the standard ‘toolkit’? We are much more reserved here. Two factors helped. First, quite a bit of luck was involved. The energy shock turned out to be more transitory than expected. Second, European economies were not strongly overheated to start with. Absent either of these conditions, the impact of UFP measures could have been much less favourable.

The upshot is that price measures on a sharp temporary energy price shock can help reduce inflation while maintaining expectations anchoring. But the approach is risky – the temporariness of energy price shocks in real time is difficult to ascertain.

Moreover, implementing similar price measures in a more overheated economy, as in the United States, would, our analysis suggests, have been counterproductive, thus causing a persistent rise in core inflation. The intuition is that the demand effects of fiscal policy are exacerbated when the economy is already overheated and is located on a steep part of the Phillips curve. Using deficit-financed, price-suppressing measures to artificially hold down core inflation in the face of a significantly overheated economy only adds to the inflation fire.

Given that the degree of economic overheating and the duration of energy price shocks are difficult to ascertain ex-ante, policy makers should deploy such measures with caution, given the risk of exacerbating price pressures if either economic slack is mismeasured or price shocks persist longer than expected, or both. At the very least, it is preferable for these measures to be fiscally neutral.

Finally, while it is beyond the scope of our analysis to fully account for the impact of price suppressing measures in one country on neighbouring countries, we note that the effectiveness of such measures depends on how segmented and inelastic energy supply is. In the case of total market segmentation and inelastic supply, measures that lower the price of energy for households and firms in one country drive up the wholesale price of energy for all countries in the same market (Auclert et al. 2023). This highlights the importance of coordination for euro area countries. Further work is needed to assess the overall elasticity of supply – which is different for oil, gas, or electricity – and the ability of countries to substitute across energy sources. Designing measures with the aim of preserving price signals at the margin, for instance via non-linear or block subsidies, would allow for demand compression, avoid the risk of shortages, and minimise the fiscal exposure.

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CHAPTER 20

The effects of the post-COVID inflation and the Federal Reserve's policy tightening response on financial markets

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The rise in inflation following the COVID-19 pandemic had profound implications on US financial markets, as investors adjusted their expectations for the economy and monetary policy and contended with one of the sharpest policy tightening cycles in decades. In this chapter, we review some key market developments over this period, including the interest rate and balance sheet actions taken by the Federal Reserve, and the response across major financial asset classes.²

We caution against drawing definitive conclusions since the disinflation process and policy tightening cycle are ongoing and the full impacts of recent policy adjustments are still to be realised. But, based on the experience to date, we advance the following observations. In the wake of several unanticipated shocks to the economy, policymakers and market participants were repeatedly surprised by the breadth, magnitude, and durability of the rise in inflation. In response to these inflation dynamics, the Federal Reserve responded more forcefully than both policymakers themselves and markets had previously anticipated. Financial conditions consequently tightened at a pace rarely experienced over the past four decades, though the transmission of tighter policy varied across specific sectors of the economy. Financial stress was nonetheless relatively contained compared to some past episodes, although the banking sector concerns in early 2023 were notable. Money markets have continued to function well and the Federal Reserve's implementation framework facilitated effective control of overnight rates – a key prerequisite of the policy transmission process. Lastly, and very importantly, longer-term inflation expectations have remained well anchored.

1 The views expressed in this chapter are our own and not necessarily those of the Federal Reserve Bank of New York or the Federal Reserve System. We would like to thank Fina Bertolotti and Manisha Ratakonda for their assistance with data and charts, and colleagues from across the Federal Reserve System for their many helpful suggestions.

2 This chapter and the accompanying exhibits cover developments through November 2023, unless otherwise specified.

This discussion is focused on the US experience, but it is worth noting that similar dynamics of higher-than-anticipated inflation and a consequent notable tightening in monetary policy and financial conditions occurred in many other jurisdictions.

INFLATION AND THE FEDERAL RESERVE'S RESPONSE

The extent and duration of the recent high inflation in the US notably exceeded market-implied expectations and most forecasts.^{3,4} Figure 1 shows market expectations for the path for headline inflation as implied by the Consumer Price Index (CPI) fixings market. These expectations consistently undershot the actual inflation path from early 2021 through mid-2022. Survey forecasts likewise proved inaccurate. As of early 2021, baseline forecasts were for inflation to run around target in the coming years. Figure 2 illustrates the significant core inflation forecast revisions over time within the New York Fed's Survey of Primary Dealers and Survey of Market Participants as inflation readings and other data came in stronger than expected.⁵

The reasons for such considerable misses are a topic for broader research. But, at a high level, we would note the US economy over the space of a couple of years had to contend with the supply chain difficulties induced by a once-in-a-century pandemic, the subsequent aggregate demand surge spurred by pent-up demand and the fiscal and monetary policy responses to the pandemic, and the spike in global energy prices that followed the beginning of Russia's war against Ukraine. These events proved inflationary for different reasons, but were difficult to anticipate *ex ante*, especially as they were outside of the realm of recent experience, which made estimating their effects challenging even on an *ex-post* basis.

As inflationary pressures first emerged, risk management considerations led Federal Reserve policymakers to initially emphasise the risk of overreacting to what *ex ante* could well have been a transitory and exogenous rise in inflation.⁶ A common theme in the monetary policy literature and historical accounts of central bank policy responses in past inflation episodes is that policymakers, in determining the appropriate path of policy, should 'look through' inflation shocks that are judged likely to prove temporary, as long as longer-term inflation expectations remain anchored. The fact that inflation had been frequently below target in the years following the Global Financial Crisis also suggested initial caution.

3 See, for example, historical results from the Federal Reserve Bank of Philadelphia's Survey of Professional Forecasters (www.philadelphiafed.org/surveys-and-data/real-time-data-research/survey-of-professional-forecasters), and the Federal Reserve Bank of New York's Survey of Primary Dealers (www.newyorkfed.org/markets/primarydealer_survey_questions) and Survey of Market Participants (www.newyorkfed.org/markets/survey_market_participants).

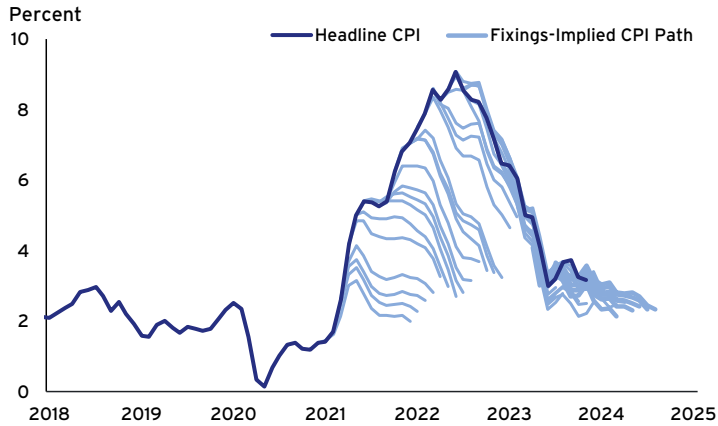
4 Of course, some external forecasts proved accurate. But, broadly speaking, financial markets and forecasters significantly underestimated the inflationary impulse.

5 A similar trend occurred for survey forecasts of headline inflation.

6 Indeed, initially inflation manifested itself only in some sectors that were clearly related to the disruptions induced by the pandemic - used cars would be a prime example.

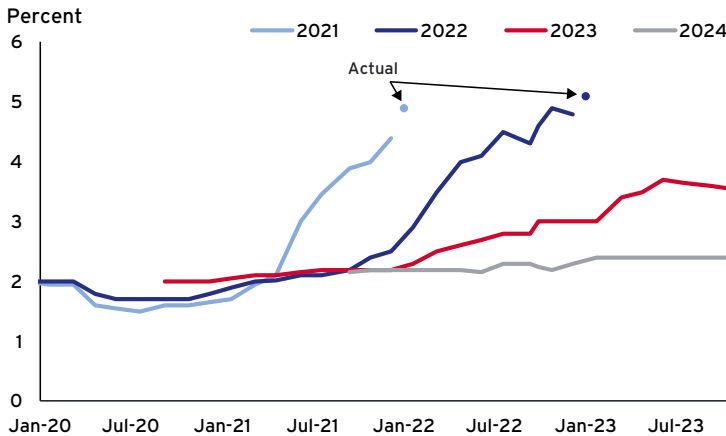
However, policymakers were also well aware of the risks of an uptick in inflation becoming more entrenched, particularly if inflation expectations adjust higher. As the persistence and intensification of inflation trends became clearer and as the recovery in the labour market and general economic activity became self-sustaining, the risk-management calculus changed, and Federal Reserve policymakers became resolutely focused in taking the necessary actions to bring inflation back to target.

FIGURE 1 REALISED HEADLINE CPI VS HEADLINE CPI FIXINGS (YEAR-ON-YEAR)



Source: Bloomberg LP; Bureau of Labor Statistics.

FIGURE 2 EVOLUTION OF CORE PCE (Q4/Q4) FORECASTS, BY YEAR



Note: Median forecasts from Survey of Primary Dealers and Survey of Market Participants.

Source: Bureau of Economic Analysis; Federal Reserve Bank of New York.

The policy adjustment process began from a very accommodative starting point. The Federal Reserve's targeted interest rate – the federal funds rate – had been brought back down to the effective lower bound (ELB) in March 2020. Additionally, the

Federal Reserve's balance sheet had expanded significantly due to the large-scale asset purchases that were implemented initially to restore Treasury and agency mortgage-backed security (MBS) market functioning (which had become impaired at the onset of the pandemic) and subsequently to support the economic recovery.⁷

The process of moving to a less accommodative stance began with communication. Policymakers had previously indicated that they would provide advance notice before making changes to their ongoing asset purchases (e.g. Board of Governors of the Federal Reserve System 2021d, 2021e). In September 2021, the FOMC statement indicated that a moderation of asset purchases could soon be warranted (Board of Governors of the Federal Reserve System 2021a). A tapering of asset purchases was announced at the subsequent November FOMC meeting and later accelerated at the December meeting (Board of Governors of the Federal Reserve System 2021b, 2021c). By its January 2022 meeting, the Committee confirmed asset purchases would be concluded by early March.

TABLE 1 SELECT FEDERAL RESERVE BALANCE SHEET COMMUNICATIONS AND ACTIONS

22 September 2021	Announce moderation in pace of asset purchases may soon be warranted
3 November 2021	Announce reduction in pace of asset purchases
15 December 2021	Accelerate reduction in pace of asset purchases, implying end in early March
26 January 2022	Release "Principles for Reducing the Size of the Federal Reserve's Balance Sheet"; confirm end of asset purchases in early March
16 March 2022	Begin policy rate tightening
4 May 2022	Release "Plans for Reducing the Size of the Federal Reserve's Balance Sheet"; announce balance sheet reduction to begin in June
1 June 2022	Implement securities redemptions, subject to monthly caps
1 September 2022	Increase monthly redemption caps

Market expectations for rate hikes started to build in late 2021, as discussed in the next section. This occurred as Federal Reserve communications – such as statements, press conferences, the Summary of Economic Projections, and speeches by individual participants – signalled rate increases ahead, albeit still modest ones. Rate hikes began

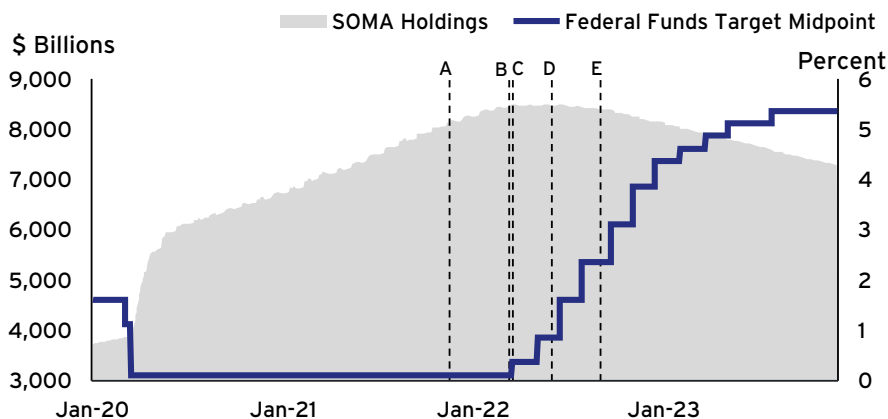
⁷ Until the July 2020 meeting, the Federal Open Market Committee (FOMC) conducted asset purchases to “sustain smooth market functioning.” Starting with the September statement, the Committee added that asset purchases would also “help foster accommodative financial conditions.” See also the discussion of these asset purchases in Federal Reserve Bank of New York (2021, 2022).

in March 2022, soon after the conclusion of the asset purchase programme (Figure 3). The pace was initially moderate but given continued very high inflation, it quickly evolved to a very fast one that included four consecutive 75 basis point moves between June and November 2022. The pace then moderated as inflation began to recede and policymakers judged that the stance of policy was approaching a level that would be sufficiently restrictive to return inflation to their target over time.

Consistent with past tightening cycles, policymakers used the target range for the federal funds rate as the primary instrument for tightening monetary policy. Still, policy firming also proceeded through a reduction of the size of the Federal Reserve's balance sheet. Policymakers had agreed that balance sheet reduction should occur at a predictable and consistent monthly pace after a phasing-in period and should commence after the policy rate tightening process had begun (Board of Governors of the Federal Reserve System 2022a, 2022b).

The FOMC announced the start of balance sheet reduction at the May 2022 meeting, with implementation starting in June. As discussed in the FOMC's Plans for Reducing the Size of the Balance Sheet, the process of reducing the Federal Reserve's securities holdings over time in a predictable manner primarily involved adjusting the reinvested amounts of principal payments received from securities held in the System Open Market Account (SOMA) (Board of Governors of the Federal Reserve System 2022b). Principal payments from securities held in the SOMA were reinvested to the extent that they exceed specific monthly caps. Redemption caps were initially set at \$30 billion per month for Treasury securities and \$17.5 billion per month for agency debt and MBS; after three months, the caps were increased to \$60 billion and \$35 billion, respectively.

FIGURE 3 SOMA HOLDINGS AND FEDERAL FUNDS TARGET MIDPOINT



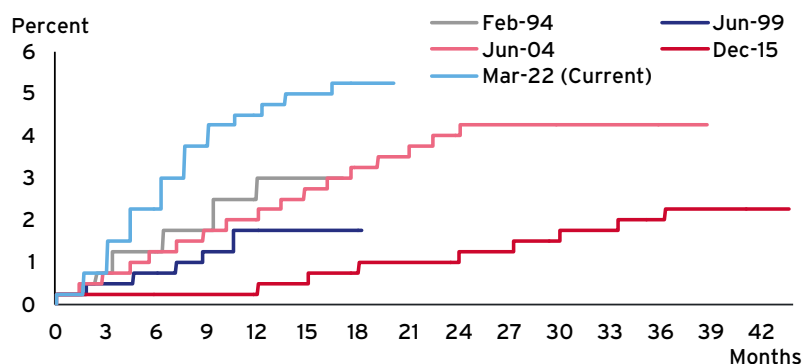
Note: A: implementation of asset purchase tapering; B: end of asset purchases; C: policy rate lift-off; D: start of redemptions; E: increase of redemption caps. Includes inflation compensation on TIPS holdings.

Source: Board of Governors of the Federal Reserve System.

Cumulatively, the policy response resulted in the most aggressive rate hiking cycle in decades and in a faster pace of balance sheet reduction than the 2017-19 experience with 'quantitative tightening' (QT).⁸ Up to the spring of 2022, the fastest tightening cycle of the post-Volcker era had been the one that took place between early 1994 and early 1995. That cycle was successful in addressing upside risks to inflation but also contributed to substantial market strains, both domestically and abroad (the portfolio losses experienced by Orange County in California and the Mexican devaluation crisis were among the most stressful episodes).⁹

As shown in Figure 4, the policy tightening that began in the spring of 2022 was nearly twice as steep as the 1994-95 cycle, even without considering the balance sheet component. In any circumstance, a tightening cycle of that magnitude could be expected to prompt significant changes in asset prices and, if the 1994-95 episode provided any guidance, material financial market stress as well.

FIGURE 4 CUMULATIVE CHANGE IN FEDERAL FUNDS RATE DURING SELECT HIKING CYCLES



Note: For prior cycles, chart shows cumulative change from start of policy rate tightening to first cut.

Source: Board of Governors of the Federal Reserve System.

Large shifts in asset prices surely occurred, as discussed in the next section. There was one notable episode of US market stress in the spring of 2023 – namely, the strains observed in the US regional banking sector.¹⁰ However, acute spillovers were contained given prompt policy actions by the official sector. US authorities facilitated orderly closures of three US banks (Silicon Valley Bank, Signature Bank, and, later, First Republic) and provided necessary liquidity to other banks.

⁸ At the time, the maximum redemption caps were \$30 billion and \$20 billion for Treasuries and agency MBS, respectively. The ramping up towards the maximum caps was also much more gradual (Board of Governors of the Federal Reserve System 2017).

⁹ See, for example, discussion of these events in Federal Reserve Bank of New York (1995), Whitt (1996), and Jorion (1997).

¹⁰ There were of course other stress episodes in other countries, such as the turmoil in the United Kingdom centred around liability-driven investment funds in September 2022 or the strains at Credit Suisse in the spring of 2023, which ultimately resulted in its absorption into UBS (e.g. Basel Committee on Banking Supervision 2023, Chen and Kemp 2023).

INTEREST RATES, VOLATILITY, AND LIQUIDITY

The move to tighter monetary policy had direct implications for money market and other policy-sensitive interest rates. Shorter-dated term rates, such as the two-year Treasury yield, began to increase in late 2021 in anticipation of tighter monetary policy and exhibited a fairly consistent trend higher alongside actual increases in the federal funds rate (Figure 5). The exception was a brief period surrounding the banking stress in the spring of 2023, when US investors began pricing the possibility of a pause in rate hikes and even of rate cuts. However, that episode was short lived thanks to the swift policy response.¹¹ Short-dated rates soon resumed their march higher, although some Treasury bill yields were buffeted as a potential debt ceiling standoff in June 2023 approached.

FIGURE 5 NOMINAL US TREASURY YIELDS



Source: Bloomberg LP.

Longer-dated Treasury yields also rose, but less than shorter-term yields, and the yield curve inverted significantly and for an extended period – longer than at other time in the previous 40 years.¹² Many market participants took the inversion as a sign of an impending recession.¹³ Such fears may have impacted investors' willingness to take risk, as reflected, for example, in lower equity prices, which we will discuss later.

Changes in nominal yields can, of course, reflect a variety of factors. As is often the case, it is useful to decompose yields into two parts: a portion that responds to the expected path of the policy rate over the life of the security, and the so-called term premium, which reflects potentially many factors that are separate from policy expectations. Since neither

¹¹ The Federal Reserve's policy response included the creation of the Bank Term Funding Program (Board of Governors of the Federal Reserve System 2023a) and, in conjunction with other central banks, the temporary increase of the frequency of dollar liquidity swap operations from weekly to daily (Board of Governors of the Federal Reserve System 2023b).

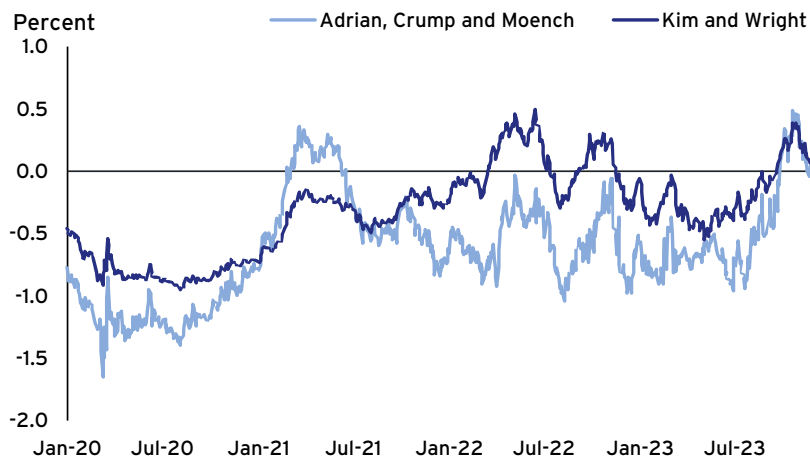
¹² As of this writing, the curve remains significantly inverted.

¹³ That said, there was debate around preferred yield curve spread measures and the interpretation of yield curve inversions as a recession indicator (e.g. Miller 2019, Engstrom and Sharpe 2022).

policy expectations nor term premiums are directly observable, we have to rely on either surveys or models to extract estimates of them from market prices (e.g. Adrian et al. 2013, Breach et al. 2020, D'Amico et al. 2018, Kim and Wright 2005).

These measures have their pros and cons, but they often agree on which component is more important in driving changes in Treasury yields at any given time.¹⁴ Looking across measures, we can say that policy expectations were clearly an important driver of rates across the curve. Policy expectations appear to have increased throughout most of the tightening cycle, as investors progressively adjusted up their estimate of how much the federal funds rate would have to be raised and how long policy would have to remain restrictive to bring inflation down. Meanwhile, model-based estimates of term premiums were volatile, with peaks early in the tightening cycle, in the fall of 2022, and again in the summer and early autumn of 2023 (Figure 6).

FIGURE 6 MODEL-ESTIMATED 10-YEAR TREASURY TERM PREMIUMS



Source: Bloomberg LP.

In general, the progressive rise in expected policy rates pushed up Treasury yields gradually at all maturities, and more so at shorter tenors, which are more sensitive to policy expectations. Term premiums, instead, appeared to contribute significantly to the volatility of long-term Treasury yields.

In the summer and autumn of 2023, coincident with the surge in term premiums that took place then, there was much talk among investors about a persistent move higher in term premiums. Market participants cited many factors that could have influenced such a shift, and broad uncertainty and risk surrounding the outlook was a prominent one. Sources of longer-run uncertainty were surely not lacking, from potential changes in the underlying structure of the US and global economies, to the risk of a secular widening

14 See discussion of term premium measures in Perli (2023a).

in the federal fiscal deficit, to potential geopolitical shifts. All of these factors can affect long-term interest rates in ways that are not directly tied to the longer-run outlook for monetary policy. However, it is currently too soon to tell whether term premiums have exited the compressed levels seen for much of the post Global Financial Crisis period or if the most recent peak will prove again to be temporary.

A different way to look at yield movements is to decompose them into changes in real interest rates and inflation compensation. Short-dated measures of inflation compensation were volatile throughout the inflationary episode, largely tracking changes in the actual path of inflation. However, forward measures of inflation compensation just a few years out rose only marginally. While forward measures rose in the autumn of 2023 to the upper end of post-pandemic ranges, they were still significantly below values registered in the early 2010s, when there was no serious contention that inflation expectations were at risk of becoming unmoored.

Of course, inflation compensation is not a clean measure of inflation expectations because it is contaminated by risk and liquidity premiums. To address that, we can use models (for example, the D'Amico et al. 2018 model) to try to separate inflation expectations from other extraneous factors. Doing so suggests that inflation expectations have risen in the post-pandemic period, but only to levels seen before the Global Financial Crisis (Figure 7). This result could be interpreted as inflation expectations returning to more normal levels after being depressed for much of the post financial crisis period.

FIGURE 7 MODEL-IMPLIED EXPECTED INFLATION, 5 TO 10 YEARS FORWARD



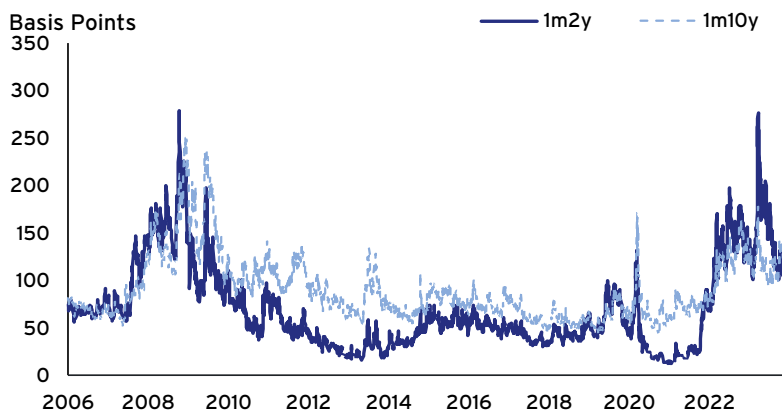
Source: D'Amico, Kim and Wei.

Even considering the inherent uncertainty embedded in these types of models, it is hard to conclude that longer-run inflation expectations were not well anchored around the Federal Reserve's target throughout this inflationary episode. We interpret this as a result of the credibility the Federal Reserve has accumulated over the years in its determination

to keep inflation at its long run objective of 2%.¹⁵ In the absence of such credibility, inflation may have increased substantially more, and substantially tighter policy – with all its consequences on the employment side of the Federal Reserve’s mandate – may have been necessary to regain control of inflation.

Amid significant realised volatility and profound uncertainty on the outlook, measures of implied interest rate volatility rose notably. The increase was especially pronounced for shorter tenors, but it was also significant at longer tenors. As shown in Figure 8, implied volatilities reached levels not seen since the Global Financial Crisis. There is an established relationship between interest rate volatility and market liquidity: as volatility increases, liquidity metrics tend to deteriorate (e.g. Duffie et al. 2023). Treasury market liquidity was challenged over the tightening cycle, but overall, this appeared consistent with the elevated levels of volatility, as shown in Figure 9. Importantly, Treasury market functioning remained orderly, in the sense that trades could be completed even in large sizes, albeit at higher transaction costs, and the response of yields to news, while often larger than in previous years, was in the expected direction. This contrasts with the experience at the onset of the pandemic, for example, when the relationship between volatility and illiquidity was well outside historical norms. At that time, yield changes were frequently not just large, but opposite in sign relative to expectations given macroeconomic events and policymaker communications.

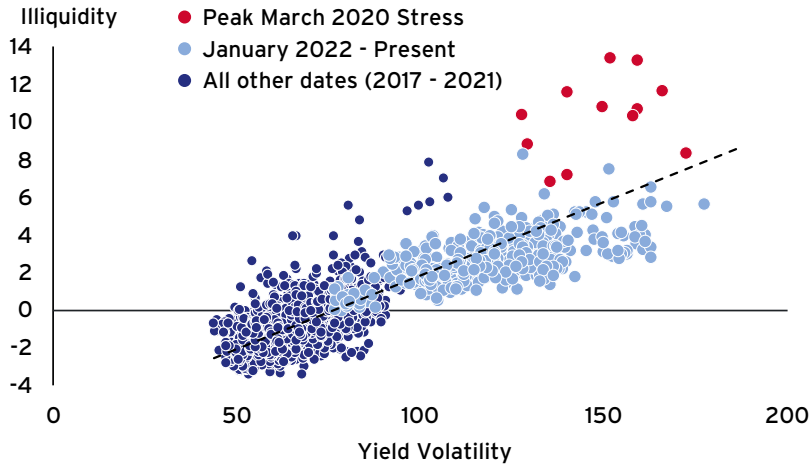
FIGURE 8 SWAPTION-IMPLIED INTEREST RATE VOLATILITY



Source: Bloomberg LP; J.P. Morgan.

¹⁵ The Federal Reserve adopted an official inflation target of 2% in January 2012; this target has been annually reaffirmed by the FOMC and emphasised in other communications. Before 2012, the Federal Reserve did not have a numerical target, but the analysis of Shapiro and Wilson (2019) indicates that FOMC participants generally felt comfortable with inflation in the range of 1.5-2%.

FIGURE 9 10-YEAR TREASURY ILLIQUIDITY VS VOLATILITY: 2017 TO PRESENT



Note: The illiquidity index for the 10-year Treasury note is constructed using principal component analysis using a variety of liquidity metrics calculated from BrokerTec data. The index itself is the first component (PC1). SOFR-based implied 1M10Y volatility is used for data from August 2021 onwards; LIBOR-based volatility is used earlier.

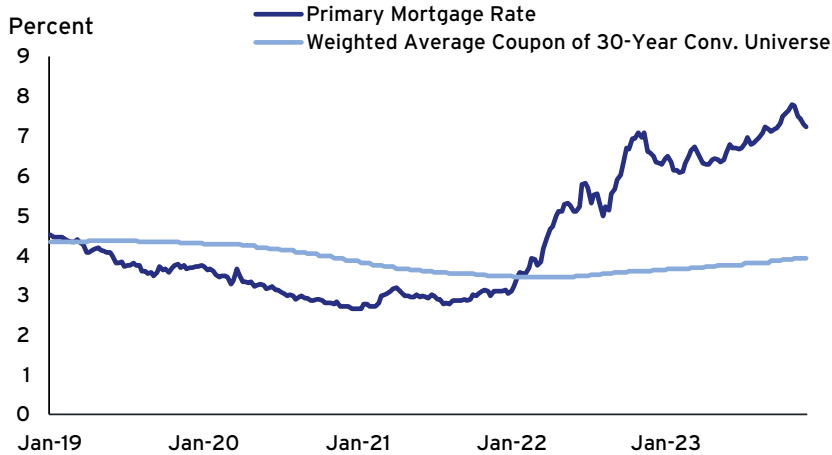
Source: Bloomberg LP; CME Group Inc (BrokerTec); FRBNY staff calculations.

PRIVATE BORROWING RATES

As monetary policy tightened, borrowing costs for households and businesses rose fast and significantly, primarily reflecting the sharp increases in Treasury yields. In addition, credit spreads widened, especially for lower-rated corporate borrowers, reflecting the higher risk associated with lending to businesses that had to redirect increasing portions of their income to debt servicing. Generally, however, credit spreads remained well below peaks previously associated with recessions.

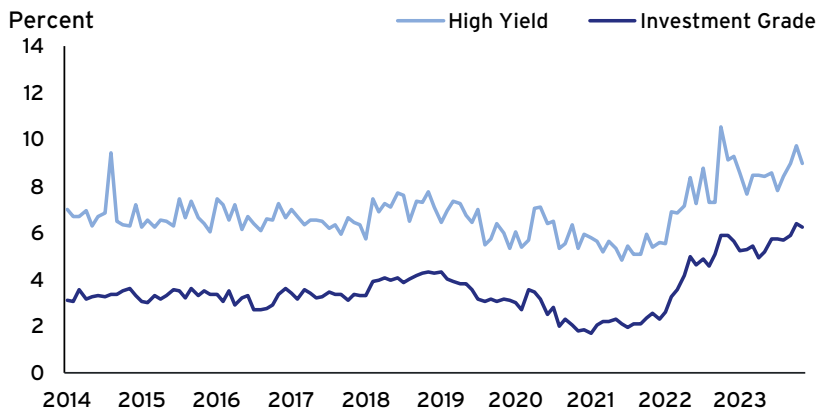
Higher borrowing costs obviously dampened new borrowing activity. For consumers, 30-year fixed mortgage rates rose to around 8% from a starting point in early 2021 of less than 3% (Figure 10). Consequently, refinancing incentives largely evaporated. The high cost of new mortgages also provided a strong disincentive for households to move and buy new houses. As a result, existing home sales diminished sharply, declining in the fall of 2023 to levels even lower than those seen at the onset of the pandemic. However, this also meant that the average rate across all outstanding mortgages only rose very slowly and not by much as of the fall of 2023. A way to interpret this is that monetary policy decisions passed through slowly and not yet in full to the household sector.¹⁶

¹⁶ Most mortgages in the United States are callable, or prepayable, which means that borrowers can repay the mortgage before maturity when they find it convenient to do so. This feature creates an asymmetry in the transmission of monetary policy decisions to the household sector. In a raising-rates environment, there is no incentive to prepay, and so debt servicing costs are slow to react to tighter monetary policy, as described above. By contrast, in a declining-rates environment, the incentive to refinance is strong and the impact of rate cuts is felt much more quickly.

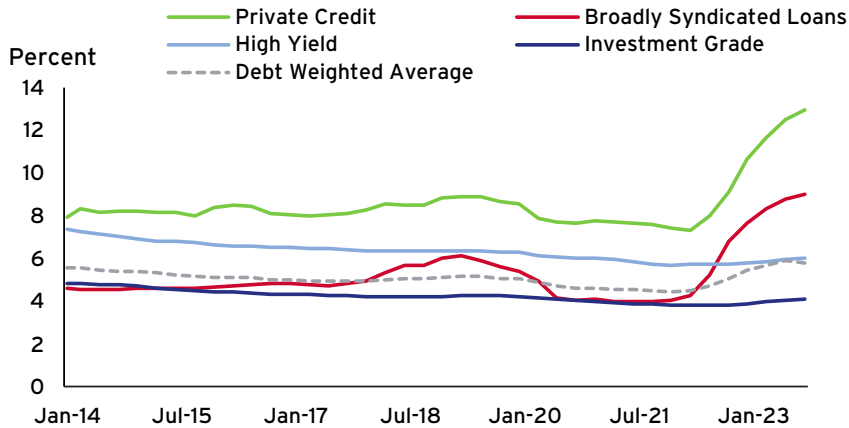
FIGURE 10 PRIMARY AND OUTSTANDING MORTGAGE RATES

Source: ICE (eMBS); Bloomberg LP.

Likewise, corporate borrowers with the ability to issue investment-grade and high-yield bonds often had limited financing needs or demand for new financing since they had previously borrowed at long tenors at low fixed rates. Similar to the household sector, while the cost of new borrowing increased in line with market rates, the average coupon paid on the entire corporate debt stack rose only slowly and marginally (Figures 11 and 12), showing that the pass-through of monetary policy decisions to these borrowers was also slow. Conversely, corporates that borrowed in the syndicated and private loan markets had to pay variable rates on their shorter-maturity borrowings and felt the impact of higher market rates much sooner and much more strongly. Averaging across all outstanding debt and all types of corporate borrowers, borrowing costs increased by under two percentage points – much less than the increase in market rates.

FIGURE 11 AVERAGE COUPON PAID ON NEWLY ISSUED CORPORATE BONDS

Source: Pitchbook Data, Inc.

FIGURE 12 AVERAGE COUPON PAID ON ENTIRE CORPORATE DEBT STACK

Note: Private credit based on portfolio holdings of business development companies. Data through Q3 2023.
Source: Bloomberg LP; ICE Data Indices LLC; Pitchbook Data, Inc.

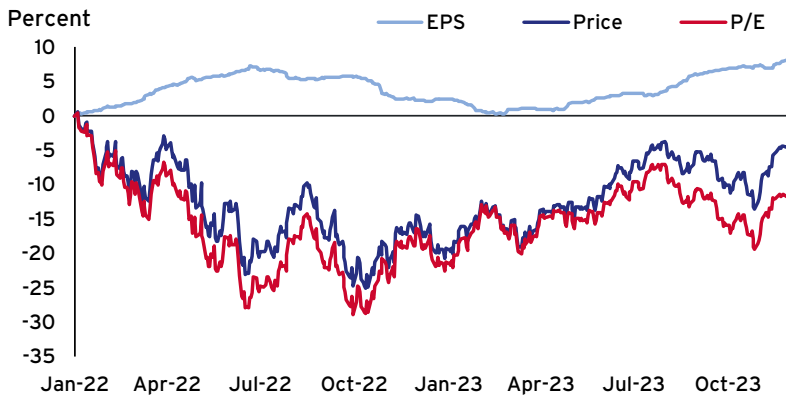
EQUITIES

As the policy tightening process began, equity prices were pressured by both a decline in earnings expectations and a compression of price-to-earnings multiples. Earnings estimates began to trend lower in mid-2022 as rate hikes intensified, likely reflecting perceived recession risks induced by tighter policy. Then, in the first half of 2023, as peak policy rates appeared more in sight and the economic activity remained resilient, earnings expectations stabilised and even picked up.

As is typical, swings in earnings multiples were a significant driver of overall equity prices (Figure 13). Earnings multiples compressed notably through late 2022, pressured by increasing Treasury yields. Multiples subsequently recovered as recession concerns receded and investor enthusiasm grew around the growth potential for certain equity market segments, particularly large technology-focused firms. But in the second half of 2023, multiples were again buffeted by the rise in long-dated term premiums.

Overall, broad equity valuations, as measured by price-to-earnings ratios for various stock indices, have remained at or above long-term averages throughout this inflationary episode (Figure 14). However, valuations were strongly influenced by a handful of mega-cap technology companies, the stock prices of which greatly outperformed for much of 2022 and 2023. Excluding these companies, equity valuations remained at, or even slightly below, their longer-term average.

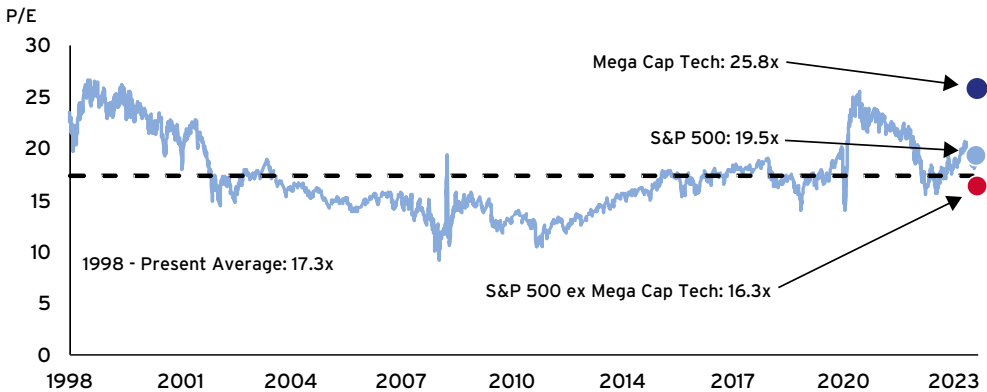
FIGURE 13 CHANGE IN S&P 500 PRICE, EPS AND PRICE-TO-EARNINGS RATIO (12-MONTH FORWARD)



Note: Indexed to 1/1/2022.

Source: Bloomberg LP.

FIGURE 14 S&P 500 PRICE-TO-EARNINGS RATIOS (12-MONTH FORWARD)



Note: Mega Cap Tech ratio is calculated from a basket provided by UBS.

Source: Bloomberg LP.

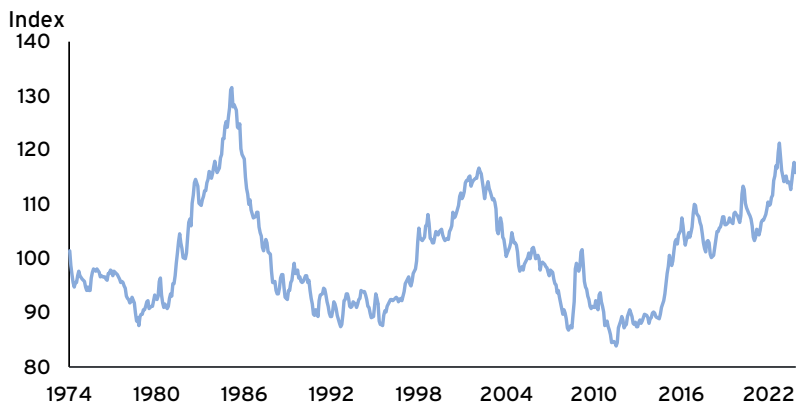
EXCHANGE VALUE OF THE DOLLAR

As is typical during US tightening cycles, the dollar appreciated broadly against both advanced economy and emerging market currencies. This reflected both a widening of interest rate differentials (especially against advanced economy currencies) as well as increased premiums on foreign assets generally perceived to be riskier than US assets. In the autumn of 2022, the real effective exchange value of the dollar reached peaks not seen in at least 20 years (Figure 15).

The rise in inflation after the pandemic shock was a global phenomenon. Many central banks found themselves in a similar circumstance as the Federal Reserve – confronting inflationary pressures from various forces – and responded by tightening policy rates, albeit starting at different times.¹⁷ Still, financial markets largely expected the Federal Reserve to raise rates by more than other advanced economy central banks for several reasons: the better perceived resilience of the US economy, US neutral rates that were estimated to be higher than in many other countries, and comparative insulation from the growth shocks from the war in Ukraine.

Mainly because of these different policy outlooks and related changes in interest rate differentials, the dollar strengthened relative to most other currencies. More appreciation occurred against advanced foreign economy currencies (notably against the yen, given continued negative interest rates in Japan). In contrast, early and large rate hikes in several emerging market economies provided support to emerging market currencies. After reaching multi-decade highs in late 2022, the real effective value of the dollar subsequently fell somewhat amid growing investor confidence that US inflation had peaked and the pace of Federal Reserve policy tightening could moderate.

FIGURE 15 US REAL EFFECTIVE EXCHANGE RATE



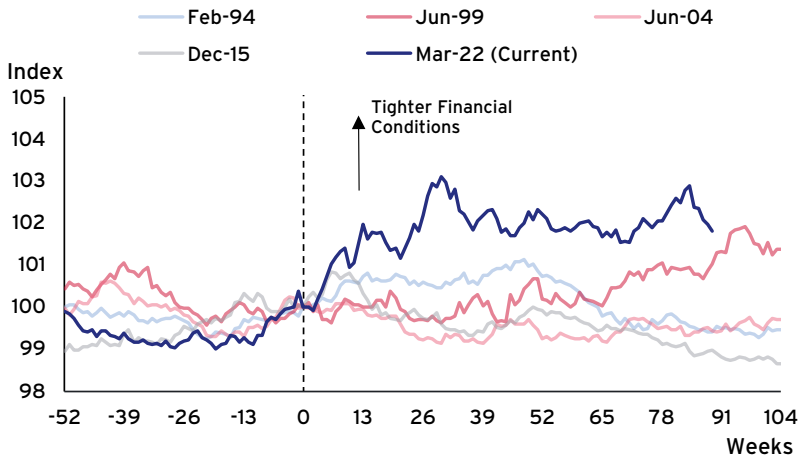
Source: Bloomberg LP.

¹⁷ The Bank of Japan remained a notable outlier in maintaining a highly accommodative monetary policy, although market expectations in late 2023 suggest a high likelihood of lift-off in 2024.

OVERALL FINANCIAL CONDITIONS

The asset price movements referenced above – rising Treasury yields and private borrowing rates, lower equity prices, and an appreciation of the dollar – resulted in the sharp tightening of overall US financial conditions, both on an absolute basis and relative to prior hiking cycles over recent decades (Figure 16). There was a clear transmission of tighter monetary policy to broader financial conditions, though with variable lags across markets.

FIGURE 16 GOLDMAN SACHS FCI DURING SELECT HIKING CYCLES



Note: Zero indicates the week of the first rate hike in each tightening cycle. FCI re-indexed to 100 at start of each cycle.

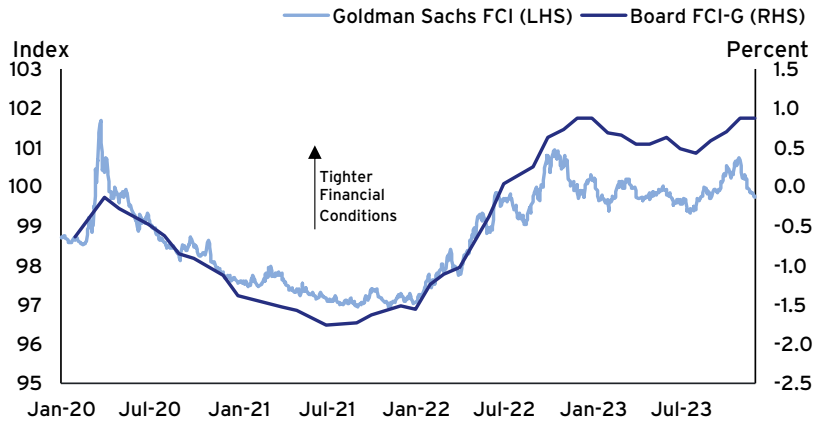
Source: Goldman Sachs.

There are several summary measures of financial conditions, each with different methodologies and inputs. Financial conditions indices (FCIs) that point to the impact of changes in market prices on economic growth – notably, the Federal Reserve Board’s FCI-G and the Goldman Sachs FCI – suggested a significant headwind to GDP resulting from the tighter conditions (Figure 17).¹⁸

In contrast, measures that pertain more to market functioning or financial stress did not tighten as significantly or persistently, reflecting the fact that market functioning was not significantly challenged over the tightening cycle to date, with the partial and brief exception of the March 2023 bank stress episode.

¹⁸ See discussion of the FCI-G in Ajello et al. (2023).

FIGURE 17 FINANCIAL CONDITIONS INDICES



Note: Board FCI-G represents a headwind/tailwind to GDP growth over the next year in percentage points and is calculated using a 3-year lookback window.

Source: Board of Governors of the Federal Reserve System; Goldman Sachs.

MONEY MARKETS AND MONETARY POLICY IMPLEMENTATION

Effective monetary policy implementation is critical for the Federal Reserve to be able to meet its mandated objectives. The Federal Reserve's implementation framework has worked well throughout this inflationary period. Even amid significant changes in the monetary policy stance and episodes of stress in money markets, overnight rate control remained very strong, with the federal funds rate moving as the Committee intended.

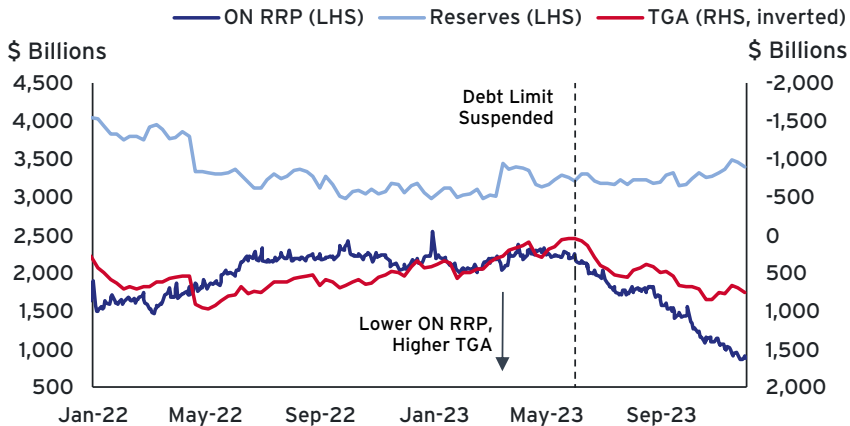
In January 2019, the FOMC communicated its intention to implement policy in an ample reserves framework. When reserves are ample, interest rate control is achieved primarily through administered rates rather than active management of the supply of reserves. Rate control is achieved via two administered rates that work together to maintain the federal funds rate within the target range indicated by the FOMC. The interest rate on reserve balances (IORB) sets a benchmark against which banks evaluate their lending and borrowing opportunities. The interest rate on the overnight reverse repo facility (ON RRP) provides a floor for overnight money market rates for a broader set of market participants.

When reserves are abundant – as has been the case to date over this tightening cycle given the post-pandemic expansion of the Federal Reserve's balance sheet – overnight rates may fall somewhat below IORB. That so-called leakage reflects limited needs on the part of banks to borrow reserves when reserves are already plentiful. Under those circumstances, the ON RRP offering rate has a direct influence on the distribution of rates in the federal funds market and strengthens the floor (Afonso et al. 2023).

Usage of the ON RRP facility was very large between late 2021 and mid-2023, but that was not surprising. In fact, the facility worked as expected, and its usage responded strongly to changes in private money market conditions.¹⁹ When market rates were below the ON RRP rate, take-up at the facility was elevated. As the supply of alternative investments increased and money market rates moved up, even marginally, ON RRP usage diminished notably, as was seen starting in the second half of 2023 (Figure 18). Between June 2022, when balance sheet runoff started, and the autumn of 2023, changes in the ON RRP largely offset the reserve draining effects from QT, leaving reserve balances little changed on net after more than a year of balance sheet reduction.

The Federal Reserve's implementation framework worked well through several stress tests this tightening cycle – notably, the March 2023 period and the federal debt limit episode and its aftermath (Perli 2023b). Indeed, not only has the federal funds rate remained well within the target range since the start of the pandemic and subsequent events, but its volatility relative to administered rates has been historically low (Figure 19). Overall, as of the autumn of 2023, the mechanics of monetary policy implementation were unaffected by the episode of high inflation and subsequent policy response. The Federal Reserve's operating framework allowed full control over the federal funds rate as well as a substantial reduction of the Federal Reserve's securities holdings without repercussions on market functioning or the stability of the financial system.

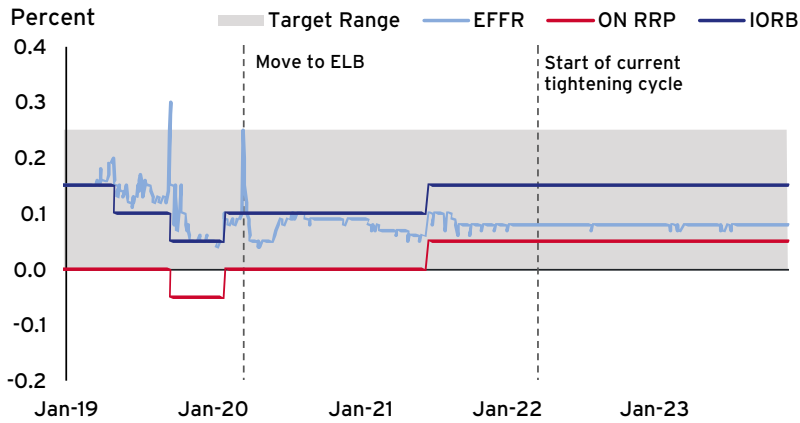
FIGURE 18 TREASURY GENERAL ACCOUNT, ON RRP AND RESERVE BALANCES



Source: Board of Governors of the Federal Reserve System; Federal Reserve Bank of New York.

¹⁹ The level of ON RRP usage also reflected an important role of the facility in broadening the distribution of Federal Reserve liabilities following the post-pandemic expansion of the Federal Reserve's balance sheet. The ON RRP provided an outlet for the abundant liquidity in the banking system and reduced pressures on bank balance sheets that can arise from the increase in reserves associated with Federal Reserve asset purchases (Afonso et al. 2022).

FIGURE 19 ADMINISTERED AND OVERNIGHT RATES (SPREAD TO BOTTOM OF TARGET RANGE)



Source: Board of Governors of the Federal Reserve System; Federal Reserve Bank of New York.

CONCLUDING POINTS

As of late 2023, inflation is still running above the Federal Reserve's target but has been greatly reduced from the peaks seen in 2022. Importantly, the full effects of policy tightening have likely not manifested themselves yet because of the lags with which monetary policy propagates to the economy. Still, we can offer a few preliminary observations as of the time of this writing.

First, financial market prices and economic forecasts proved quite poor predictors of the increase in inflation early on. This may not be too surprising given the nature of the shocks that affected global economies, given that most economists and market participants had not seen such a spike in inflation over their entire careers, and given that many models were trained with data that did not include periods of high inflation. This suggests that some caution may be in order in assessing the prospects for the future evolution of inflation, especially at times when the economy is subject to novel shocks. Still, the fact that inflation expectations appeared to remain well anchored was undoubtedly a positive and a testament to the inflation-fighting credibility that the Federal Reserve has accumulated through the years.

Second, financial conditions can adjust sharply based on shifting expectations for monetary policy. Financial conditions indices showed a significant tightening trend starting in late 2021, well before the first rate increase in March 2022. This suggests that market participants were able to anticipate the Federal Reserve's policy actions and effectively helped the transmission of monetary policy. However, we have also seen that financial conditions can vary a lot over a policy tightening cycle because

they are influenced by shifts in risk premiums and other factors that are beyond what policymakers can directly control. These extraneous factors can create uncertainty as to the calibration of the monetary policy response.

Third, the transmission of tighter monetary policy can vary significantly across financial markets, leading to long lags in policy propagating to the real economy. Although this is just a hypothesis at this time, it may be the case that sharp tightening cycles like the current one may lead to longer lags in the transmission of monetary policy because of the strong disincentive they provide to refinance long-term, fixed-rate mortgages and corporate borrowings. Preceding financial conditions are likely important too; the very low rates following the pandemic incentivised term financing.

Fourth, the Federal Reserve's operating framework and balance sheet reduction process worked well to date over this episode. This should support market confidence that the Federal Reserve has the appropriate tools to implement a tightening of monetary policy, as needed.

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Before joining the New York Fed, Mr. Perli was most recently Head of Global Policy at Piper Sandler. Previously, he co-founded Cornerstone Macro (a widely respected macroeconomic research firm that was acquired by Piper Sandler in 2022), was a managing director at International Strategy and Investment Group, and served on the senior monetary policy staff of the Board of Governors of the Federal Reserve System. Mr. Perli started his career as an Assistant Professor of Economics at the University of Pennsylvania.

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CHAPTER 21

Financial stability and the transition to tighter financial conditions

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Klaas Knot

De Nederlandsche Bank

In times of distress or transition, the resilience of the global financial system is put to the test. In the immediate aftermath of such a time – namely, the global financial crisis (GFC) – the Financial Stability Board (FSB) was established in 2009 by the G20 Leaders with the mandate to promote international financial stability. The FSB does so by identifying vulnerabilities, developing policies to address them and monitoring and evaluating agreed reforms. The current period of high inflation and tightening financial conditions can also be seen as a time of transition and potential stress, making the work of promoting financial stability all the more important.

There have been many important reforms since the GFC that have strengthened resilience in the core of the global financial system:

- The Basel Committee on Banking Supervision's standards for internationally active banks (Basel III) have been a centrepiece in this regard, strengthening supervision, regulation and risk management at banks. Basel III addresses banks' capital and liquidity buffers, aiming to correct the deficiencies in financial regulation that existed before the GFC.
- Another challenge after the GFC was to deal with institutions perceived as 'too big to fail' (TBTF). Various policy measures, including from the FSB, have since then addressed this, for example, by setting requirements for additional loss-absorbing capacity at systemically important institutions, enhancing the effectiveness and intensity of supervision for these institutions, periodic reviews of resolvability and strengthening core market infrastructures to reduce the potential for contagion. In the event that a financial institution does fail, the FSB's Key Attributes of Effective Resolution Regimes for Financial Institutions set out the core elements that the FSB considers to be necessary to resolve failing financial institutions. These elements aim to resolve an institution in an orderly manner, without taxpayer exposure, while maintaining continuity of critical economic functions.
- During the GFC, a deep and complex network of bilateral exposures to over-the-counter (OTC) derivatives also became apparent, triggered by the financial stress. The G20 agreed, in response, on a reform agenda for the OTC derivatives markets, to improve transparency and mitigate systemic risk.

- The FSB has also undertaken work with other standard-setting bodies to monitor developments and develop policies to address financial stability risks in non-bank financial intermediation (NBFI).

Taken together, important steps have been made since the GFC and the global financial system today is more resilient to shocks than it was before 2008. However, work to build resilience is not complete, nor is the regulatory rulebook. Vulnerabilities continue to emerge and, at the time of writing, the financial sector is experiencing deep structural change, including the need to respond to accelerating digitalisation and the impact of climate change (FSB 2023a). There is a need to continue monitoring vulnerabilities in the financial system, drawing lessons from episodes of distress, developing policies to address these vulnerabilities, and evaluate the effects of regulatory reforms after they have been implemented. This work is at the core of the FSB's mandate.

This chapter explains the FSB's framework for identifying vulnerabilities in a proactive, systematic and forward-looking manner. It then provides an assessment of the current vulnerabilities in the global financial system (banking and non-banking) in the context of higher interest rates. The chapter concludes by describing the FSB's policy work to address these vulnerabilities.

THE FSB SURVEILLANCE FRAMEWORK

One of the FSB's core tasks is the monitoring and assessment of vulnerabilities in the global financial system on an ongoing basis. This process starts with the identification of material vulnerabilities, which facilitates the monitoring of these vulnerabilities by relevant public authorities and, if needed, the formulation of policy action to address them. An essential part of the FSB's approach is the focus on 'vulnerabilities' instead of 'shocks'. Vulnerabilities are properties of the financial system – such as leverage and indebtedness, liquidity mismatches, and concentrated exposures – that, when acted upon by a shock, may lead to systemic disruption in the financial system. Vulnerabilities can be measured to some extent, using appropriate indicators. Shocks, on the other hand, are in their essence unpredictable. These are sudden events – such as a global pandemic, a sudden rise in interest rates or a geopolitical event – that typically cannot be targeted by policy action in the same way as vulnerabilities can.

In support of its work, the FSB developed a Financial Stability Surveillance Framework.¹ This surveillance framework applies a comprehensive, systematic and disciplined approach to identifying vulnerabilities spanning all parts of the financial system. Such a systematic approach is essential to ensure that vulnerabilities are not easily overlooked, to foster comparability and to facilitate discussion of the identified vulnerabilities. In this context, the FSB has developed a common terminology of key financial stability

1 Available on the FSB website (www.fsb.org/2021/09/fsb-financial-stability-surveillance-framework/).

concepts and a common taxonomy of vulnerabilities. The taxonomy is encapsulated in two vulnerabilities matrices: one for the financial sector (financial markets, banks and other financial institutions) and the other for the non-financial sector (households, corporates and sovereigns). The matrices list the types of vulnerabilities in the rows, and relevant parts of the financial and non-financial sectors in columns (Tables 1 and 2).

Apart from establishing a structured approach and common terminology, the FSB also gathers information on vulnerabilities from a variety of sources. So-called surveillance indicators provide a quantitative assessment, complementing qualitative input received via a vulnerabilities survey of FSB members, making it possible to track changes in vulnerabilities over time. The vulnerabilities survey allows the extensive financial stability analysis already undertaken by national authorities and international organisations to be leveraged and summarised in an efficient manner, and adds a forward-looking perspective. FSB internal analyses and workshops with the private sector are also taken into account in developing the vulnerabilities assessment.

In gathering input, the FSB makes use of its diverse membership and takes into account differences between jurisdictions. This means that the assessments recognise differences in countries' financial systems, macroeconomic policy frameworks and institutional structures, and the implications this may have for the relative importance of vulnerabilities. Although there will always be differences between jurisdictions, the application of this structured framework facilitates the comparability and analysis of vulnerabilities on a global scale.

In the assessment of vulnerabilities, the relationship with resilience – namely, the capacity of the financial system to absorb shocks – is taken into account. It is of course not always straightforward to separate vulnerabilities and resilience. Resilience does not only depend on specific, identifiable policy measures, but also on factors such as market practices, behavioural responses and the interplay between different parts of the financial system under stress.

The outcomes of the FSB surveillance framework are used for various purposes. Firstly, they can trigger further monitoring and more detailed analysis by the FSB to get a better understanding of the issue. In addition, they might lead to and inform policy actions, such as the formulation of recommendations. Lastly, the FSB regularly communicates about the vulnerabilities externally, for example in its *Annual Report*.

TABLE 1 EXAMPLE OF THE FSB VULNERABILITIES MATRIX FOR THE FINANCIAL SECTOR

	Financial markets	Banks	Other financial institutions ¹
Asset prices (financial and real)	<ul style="list-style-type: none"> • Mispricing (low risk-free rates, low credit spreads, high equity market valuations) 	<ul style="list-style-type: none"> • Exposure to marked-to-market losses and volatility • Incomplete hedging • Inability to levy capital • Collateral values (incl. potential over-valuation) 	<ul style="list-style-type: none"> • Exposure to marked-to-market losses and volatility • Incomplete hedging • Inability to levy capital • Collateral values (incl. potential over-valuation)
Asset quality	<ul style="list-style-type: none"> • Issuance of riskier securities • Securitisation • Defaults and ratings downgrades 	<ul style="list-style-type: none"> • Exposures to riskier segments (e.g. non-financial corporates (NFCs) with foreign exchange (FX) debt; real estate; commodities) • Concentration • Lending standards • Forbearance 	<ul style="list-style-type: none"> • Exposures to riskier segments (e.g. NFCs with FX debt; real estate; commodities) • Concentration • Lending standards • Financial health of FMI participants
Funding/liquidity	<ul style="list-style-type: none"> • Amplification mechanisms • Disruptions in liquidity allotment • Volatility 	<ul style="list-style-type: none"> • Duration mismatch • Liquidity mismatch • Reliance on wholesale market funding 	<ul style="list-style-type: none"> • Liquidity mismatch (e.g. open-end bond funds) • Duration mismatch • Reliance on wholesale market funding • Higher than expected insurance payouts (e.g. repeated catastrophic events)
Leverage	<ul style="list-style-type: none"> • Amplification mechanisms 	<ul style="list-style-type: none"> • Low bank capital • Off-balance sheet assets, leverage • Synthetic leverage • Low capacity to generate capital organically 	<ul style="list-style-type: none"> • Low capital • Off-balance sheet assets, leverage • Synthetic leverage • Inadequate default fund at central counterparties (CCPs)
Domestic interconnections and complexity	<ul style="list-style-type: none"> • Amplification mechanisms 	<ul style="list-style-type: none"> • Critical functions / too big to fail (TBTF) • Inter-bank funding • Uncleared over the counter (OTC) derivative exposures • Complex products • Common exposures / business models 	<ul style="list-style-type: none"> • Critical functions / TBTF (e.g. CCPs) • Inter-financial claims • Uncleared OTC derivative exposures • Complex products • Common exposures/ business models

	Financial markets	Banks	Other financial institutions ¹
Cross-border interconnectedness	<ul style="list-style-type: none"> • Exposure to foreign counterparties • Foreign investor activity in domestic equity, bond and derivative markets 	<ul style="list-style-type: none"> • Cross-border activity • Currency mismatches • Use of offshore wholesale funding • Deposit dollarisation • Foreign counterparties (e.g. hedging) 	<ul style="list-style-type: none"> • Cross-border activity • Currency mismatches • Use of offshore wholesale funding • Foreign counterparties (e.g. hedging) • Use of foreign-domiciled, or foreign-owned, FMI's
Operational vulnerabilities (including cyber/IT)	<ul style="list-style-type: none"> • Poor governance / risk culture • Reliance on third-party service providers • Amplification mechanisms • Widespread use of inappropriate benchmarks e.g. Libor 	<ul style="list-style-type: none"> • Poor governance / risk culture • Reliance on third-party service providers • Exposure to products hedging these risks • Widespread use of inappropriate benchmarks e.g. Libor 	<ul style="list-style-type: none"> • Poor governance / risk culture • Reliance on third-party service providers • Widespread use of inappropriate benchmarks e.g. Libor
Other vulnerabilities	<ul style="list-style-type: none"> • Other financial sector vulnerabilities that do not fit neatly into other categories, including emerging vulnerabilities 		

Note: 1 Including non-bank financial intermediaries and financial market infrastructures.

TABLE 2 EXAMPLE OF THE FSB VULNERABILITIES MATRIX FOR THE NON-FINANCIAL SECTOR

	Households	Corporates	Sovereigns
Borrowing	<ul style="list-style-type: none"> • High level of debt • High debt service ratio • Currency mismatches 	<ul style="list-style-type: none"> • High level of debt • High debt service ratio • High level of debt to rollover in the short-term • Currency mismatches • Use of offshore funding 	<ul style="list-style-type: none"> • High level of debt • High debt service • High level of debt to rollover in the short-term • Currency mismatches • Significant foreign investor base in debt
Assets	<ul style="list-style-type: none"> • Overvaluation • Exposure to foreign assets 	<ul style="list-style-type: none"> • Overvaluation • Exposure to foreign assets 	
Other vulnerabilities	<ul style="list-style-type: none"> • Other financial sector vulnerabilities that do not fit neatly into other categories, including emerging vulnerabilities 		

TRANSITIONING FROM 'LOW FOR LONG' TO 'HIGHER FOR LONGER'

After more than a decade of low interest rates globally (including near-zero interest rates in advanced economies), central banks have, over the past couple of years, raised rates rapidly in response to the emergence and persistence of high inflation. This has brought tighter financial conditions, more expensive funding, higher market volatility and downward pressure on near-term economic activity. Financial institutions and market participants have not experienced sharply rising interest rates for a long time, making the adjustment to a world of higher rates challenging. This transition could expose existing vulnerabilities in the financial system, largely built up in the preceding period of low interest rates.

In the transition to tighter financial conditions, vulnerabilities increase the chance of it leading to disruption and financial instability. Yet, the transition takes time and problems may materialise with a lag. For example, corporates will not need to rollover debt immediately after the interest rate increases, but in some instances months or years later. The extent to which corporates will be able to service the increased costs will not be apparent immediately, potentially creating a credit risk for financial institutions. Moreover, some jurisdictions have seen a decline in prices in the real estate sector. It remains to be seen to what extent this sector will be further impacted by the tightening financial conditions and if banks' assets in this sector will be substantially affected.

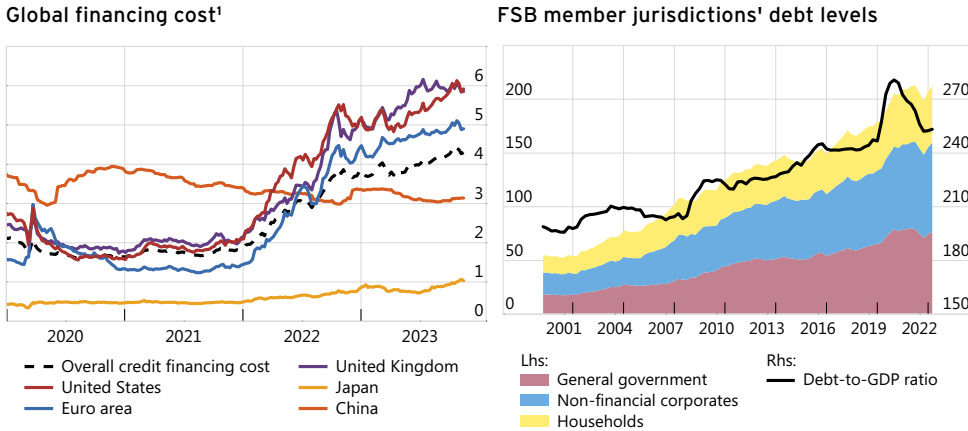
The current and potential vulnerabilities in the banking and NBFIs sectors will be discussed in the remainder of this chapter. It is these vulnerabilities that the FSB tries to address, to limit the potential impact to financial stability from the transition.

VULNERABILITIES AND RESILIENCE IN THE BANKING SECTOR

Because of the tightening financial conditions, credit quality challenges for banks are looming (FSB 2023e). The rising interest rates have made financing substantially more expensive in various jurisdictions, both for new borrowers and those borrowers needing to refinance their debt (Figure 1). Simultaneously, debt is at a historically high level among companies, households and governments. These high levels of debt point to a vulnerability, as reflected in the matrix under *borrowing*. As illustrated in Figure 1, governments' support measures during the pandemic amplified the levels of debt. Although government support measures during the pandemic were necessary and helped provide temporary buffers to the real economy and the financial system, the vulnerabilities from increased debt need to be carefully managed in this period of a transition to higher interest rates. In addition, the long period of post-GFC monetary accommodation, as well as the recent government support measures, may have made it more challenging for banks to assess the credit risk of their borrowers, based on historical data.

A slowdown in economic growth could exacerbate debt servicing challenges faced by borrowers, for example by affecting corporate profits. Unemployment rates might also increase, reducing household incomes. The combination of higher debt servicing costs and an adverse economic environment will likely bring about an increase in defaults among borrowers, leading to an increase in credit risk for financial institutions and deteriorating asset quality for the banking sector.

FIGURE 1 GLOBAL FINANCING COSTS AND FSB MEMBER JURISDICTIONS' DEBT LEVELS



Note: 1 The global financing cost is a weighted average of global government bond yields, corporate bond yields and interest rates on new bank loans. The weights used are the amount outstanding in bond markets and bank loans.

Sources: BIS; Bloomberg; FSB calculations.

Another vulnerability in banks' balance sheets is their concentrated exposure to residential and commercial real estate. Declines in real estate prices have already been seen in some jurisdictions, and the prospects remain uncertain, adding to concerns about the quality of the loans and of property investments by banks.

As described, (credit) risks from tightening financial conditions materialise with a lag. While we may not have seen the complete impact of the rises in interest rates on bank asset quality so far, this could become more apparent over time. In the meantime, the FSB will continue to closely monitor the evolution of vulnerabilities in the banking sector and consider ways to enhance resilience as part of its core mandate.

The March 2023 banking turmoil

The banking turmoil in March, which was the most significant systemwide banking stress since the GFC in terms of scale, was driven in part by the impact of tightening financial conditions. The episode led to the failure of some regional banks in the United States (Silicon Valley Bank (SVB), Signature Bank and First Republic Bank) and to the takeover of a global systemically important bank (Credit Suisse) in Switzerland.

These events illustrate how existing vulnerabilities can interact with shocks to cause significant distress at such institutions. The US bank failures specifically underscore the problems that the combination of vulnerabilities from liquidity and maturity mismatches can pose for the financial system during a time of significant monetary tightening. Unrealised losses on bank bond portfolios, resulting from higher interest rates, led to a loss of confidence and large deposit outflows, ultimately leading to the failures of these banks. Poor internal risk governance meant that the interest rate and liquidity risks were not managed properly,² constituting an operational vulnerability. The substantial and rapid deposit outflow was supported by the high concentration of uninsured deposits at these banks. Similarly, the events involving Credit Suisse also showed that some banks still need to address shortcomings in managing risks and instilling robust risk culture and governance arrangements. The build-up of the vulnerabilities at these banks was in turn not promptly identified or adequately addressed by effective action from supervisory authorities.

Nevertheless, the authorities in Switzerland and the United States acted swiftly and decisively to manage the bank failures. The G20 reforms introduced since the GFC and the already implemented Basel III reforms helped shield the global banking sector and real economy from a more severe banking crisis. The events underscored the importance of completing the implementation of the outstanding Basel III standards.

At the time of writing, the FSB and other standard setters are working to act on the lessons from these cases for the design and implementation of G20 financial reforms. The BCBS is considering the need to strengthen supervisory effectiveness and enhance standards on bank liquidity and interest rate risk. The FSB is investigating how the implementation and operationalisation of its resolution standard can be improved, for example in terms of having an effective public liquidity backstop, operationalising a range of resolution strategies, and enhancing cross-border communication in times of stress (FSB 2023d). In addition, the FSB is analysing lessons from this episode for the assessment of vulnerabilities associated with deposit runs, including the behaviour of uninsured versus insured depositors, and whether technology (social media and fast payments) have made deposits less sticky.

VULNERABILITIES AND RESILIENCE IN THE NBFİ SECTOR

The transition to tighter financial conditions does not only represent a risk for financial stability in the banking sector. Vulnerabilities can also be identified in the non-banking sector, or NBFİ (FSB 2022, FSB 2023b). Since the GFC, NBFİ has grown to almost half of global financial assets, reflecting its increasingly important role in managing the savings

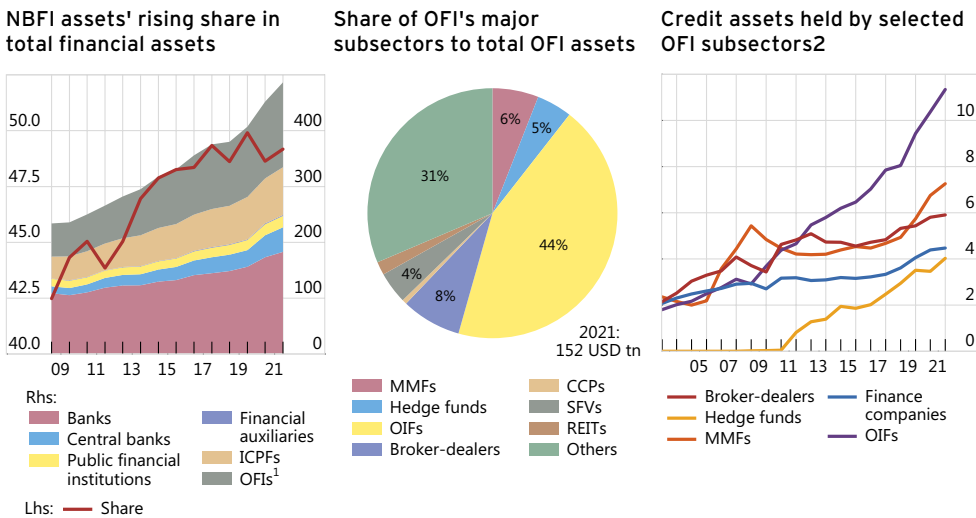
2 As also concluded by the Federal Reserve Board in its *Review of the Federal Reserve's Supervision and Regulation of Silicon Valley Bank* (FRB 2023).

of households and corporates, and its importance for financial stability (Figure 2). Non-bank entities are diverse and heterogenous, and include investment funds, insurance companies, pension funds, finance companies and other financial intermediaries.

The functioning and resilience of the NBFIs ecosystem depends on the availability of liquidity and its effective intermediation in stress. If liquidity imbalances become sufficiently large and pervasive, they may give rise to financial instability. These imbalances can be the result of the interaction of large and unexpected shifts in liquidity demand, insufficient supply of liquidity in stress and various amplification mechanisms. These interactions can give rise to asset fire sales and transmission of stress to other parts of the financial system and the economy.

Certain activities and types of entities may particularly contribute to aggregate liquidity imbalances and transmission and amplification of shocks due to their size, structural characteristics and behaviour in stress. For example, this includes mismatches between the daily liquidity offered to investors in certain money market funds (MMFs) and open-ended funds (OEFs) and the lower liquidity of their assets. Other factors that can contribute to liquidity imbalances in stress include unexpectedly large margin calls for derivatives and securities trades; currency mismatches (e.g. borrowing by non-US firms in US dollars); and excessive build-up of leverage.

FIGURE 2 TRENDS IN THE NBFI SECTOR



Notes: CCPs = central counterparties; ICPFs = insurance corporations and pension funds; MMFs = money market funds; OFIs = other financial intermediaries; OEFs = investment funds other than MMFs and hedge funds; REITs = real estate investment trusts and real estate funds; SFVs= structured financial vehicles. Data used in the charts cover 21 jurisdictions and the euro area. ¹ OFIs is a subset of the NBFIs sector, comprising all financial institutions that are not central banks, public financial institutions, insurance corporations, pension funds, or financial auxiliaries. OFIs include, for example, investment funds, captive financial institutions and money lenders (CFIMLs), CCPs, broker-dealers, finance companies, trust companies and SFVs. ² Increases of aggregated data may also reflect improvements in the availability of data over time at a jurisdictional level.

Source: FSB (2022); FSB calculations.

On the liquidity supply side, key amplifiers include factors that reduce the ability of bank and non-bank liquidity providers to absorb large spikes in liquidity demand; and the structure of core wholesale funding markets, which is characterised by limited standardisation, low levels of automated trading and turnover, and heavy reliance on dealer intermediation.

Recent market disruptions, including the market turmoil of March 2020, the collapse of Archegos in 2021 and the stress experienced by UK LDI funds in September 2022, have highlighted once again the need to enhance the resilience of the NBFi sector. The high interconnectedness between different entities within the NBFi ecosystem and with the banking sector suggests the need for a system-wide approach to assessing and addressing NBFi risks.

In the current period with a transition to higher interest rates, there is the potential for sudden movements, corrections and higher volatility in asset prices. This is particularly the case if interest rates stay at higher levels than currently expected by investors. Leverage taken by non-bank investors could be exposed by this volatility (FSB 2023c). Pockets of high borrowing among non-banks, combined with the synthetic leverage embedded in derivatives, could propagate strains through the financial system. Sharp changes in asset prices could generate significant spikes in collateral and margin calls, and these could induce fire sales of assets, worsening the market volatility. Liquidity mismatches in non-bank financial entities could also amplify market shocks. While these mismatches are not new, widespread redemptions at some MMFs and OEFs could lead to sales of assets across a number of markets at the same time.

The FSB has been developing a comprehensive set of international policies to address systemic risk in the NBFi sector, aimed at mitigating large liquidity imbalances during times of stress. Enhancing NBFi resilience is intended to ensure a more stable provision of financing to the economy and reduce the need for extraordinary central bank interventions. To do so, the FSB has already issued policy recommendations for MMFs. At the time of writing, the FSB is finalising revised recommendations for addressing liquidity mismatch in OEFs and developing new cross-sectoral recommendations for enhancing the liquidity preparedness of market participants for margin and collateral calls. The FSB is also currently assessing potential policies to address excessive leverage in NBFi. All of this work is taking place in close collaboration with other standard-setting bodies, particularly IOSCO.

CONCLUDING REMARKS

The current transition to higher interest rates, and the consequent tightening financial conditions, is testing the resilience of the financial system. As this chapter has shown, vulnerabilities could lead to financial instability if not properly addressed, as illustrated by the banking turmoil in March 2023.

The FSB promotes financial stability by identifying vulnerabilities in the financial system and coordinating work to address them. Its surveillance framework plays a central part in this effort, providing a systematic and comprehensive approach. We cannot easily predict or influence shocks, but we can identify, monitor and address global financial system vulnerabilities to build resilience.

Authorities worked together in developing the G20 reforms, recognising the benefits of international standards in promoting confidence in the financial system and the resumption of cross-border financial activity in the aftermath of the GFC. Maintaining this level of cooperation is critical, given the challenging combination of rapidly evolving financial conditions and structural change in the financial system. The FSB's cooperative approach has proven instrumental for the timely identification of financial vulnerabilities and the development of effective policy responses globally.

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CHAPTER 22

Macro-financial challenges in the post-COVID world

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Claudio Borio¹

Bank for International Settlements

Tremors have already appeared. Since central banks started tightening monetary policy to rein in the remarkable inflation surge, the financial sector has not escaped scot-free. The sovereign bond market came under stress in the United Kingdom in September 2022. It was then the turn of some regional banks in the United States and Credit Suisse, a global systemically important bank (G-SIB). Do these episodes represent the proverbial canary in the coal mine? Is there more to come?

To shed light on this question, this short chapter puts these strains in the broader macro-financial context and then looks at the risks ahead. The bottom line: so far so good, but we are by no means out of the woods yet. And longer term, we should not lose sight of a potential time bomb that policymakers need to start defusing without delay – the unsustainability of fiscal positions.

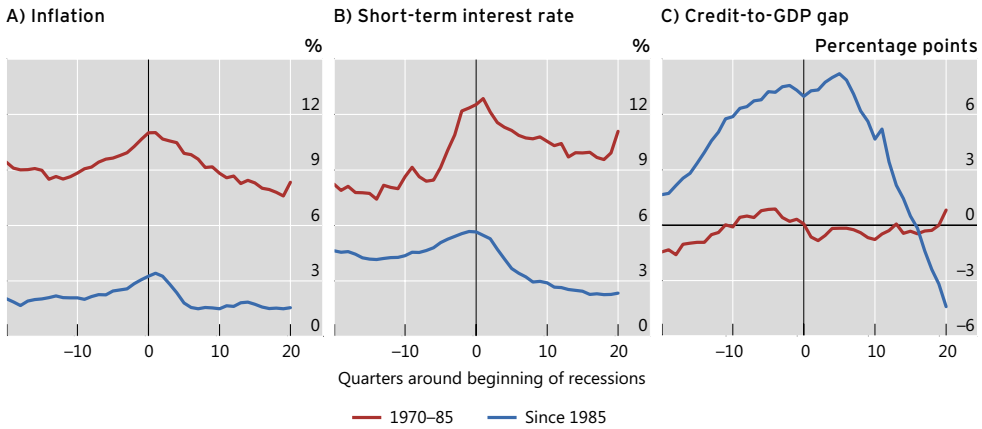
THE MACRO-FINANCIAL BACKDROP

Policymakers worldwide are facing an unprecedented constellation of challenges. They are confronted with recession risk in the context of a monetary policy tightening to quell inflation combined with widespread financial vulnerabilities. Most notably, debt levels – both private and public – are historically high, asset prices – especially for real estate – elevated, and financial markets overstretched. The legacy of an unusually long phase of unusually low interest rates is clearly with us.

Why an unprecedented constellation? Figure 1 illustrates the reasons. Until the mid-1980s, downturns were caused largely by efforts to rein in inflation. As finance was repressed, so too was the scope for overt financial fragilities. Thereafter, except for the one-of-a-kind COVID-19 recession, with inflation generally low and stable, downturns were caused by financial booms that turned into busts, as during the Great Financial Crisis (GFC). The current landscape combines elements of both these downturn typologies (Borio 2022, BIS 2023).

1 The views expressed are my own and not necessarily those of the BIS.

FIGURE 1 THE CHANGING NATURE OF THE BUSINESS CYCLE



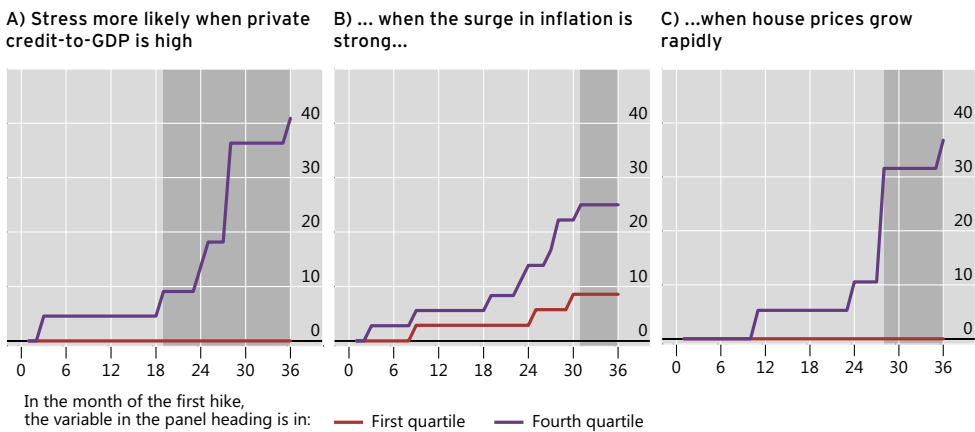
Note: The horizontal axis denotes quarters around recessions in the business cycles, with the peak date set at zero (vertical lines). Lines show the median evolution across 16 advanced economies and events in the respective time period.

Source: Borio et al. (2018: 59-71).

This heightens financial stability risks (Figure 2). Since the 1970s, banking crises have broken out around one-fifth of the time in the three years following the first interest rate hike. The incidence is much greater when private debt is high, property prices elevated or the increase in inflation stronger. The current macro-financial backdrop ticks all the boxes.

FIGURE 2 FINANCIAL STRESS DURING MONETARY TIGHTENING: DEBT, INFLATION, HOUSE PRICES

Frequency of banking stress, in percentage points



Note: The shaded areas indicate that the difference between the first and the fourth quartile is statistically significant at the 10% level.

Source: BIS (2023).

This configuration greatly complicates monetary policy. Should serious financial stresses emerge and inflation remain stubborn, the need to bring it back to target and to stabilise the financial system would pull in opposite directions – towards tightening and easing, respectively. Central banks would no doubt rise to the challenge. We saw this recently with the Bank of England's interventions in the gilts market or as banks ran into trouble. But policymakers' room for manoeuvre would be curtailed, as if forced to fight with one hand tied behind their backs. This contrasts sharply with experience from the 1990s on.

THE STATE OF THE FINANCIAL SYSTEM

Against this backdrop, one question looms large: how resilient is the financial system? Let's consider, in turn, banks and non-bank financial intermediaries (NBFIs).

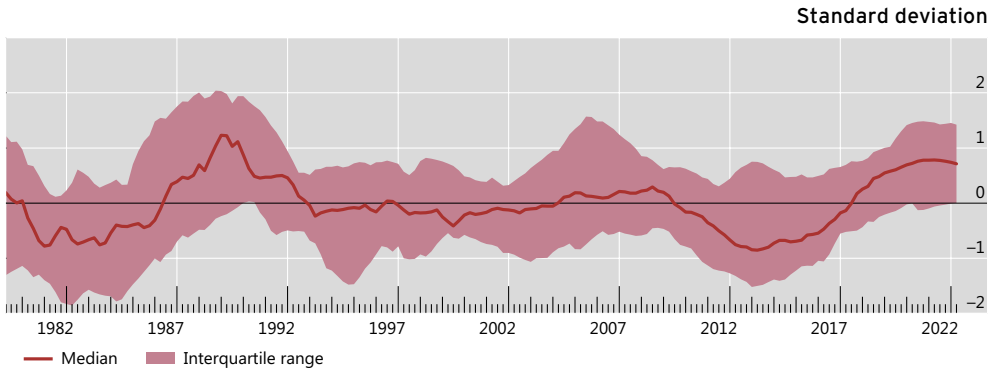
Banks

Banks are in much better shape than in the run-up to the GFC, thanks in no small measure to regulatory reforms (Borio et al. 2020). Their capital and liquidity buffers are considerably stronger than they were then. Indeed, during the COVID crisis, banks turned out to be part of the solution, not of the problem.

Still, there is no reason for complacency. We have already seen clear strains emerge. And dark clouds have not yet dissipated.

So far, problems have largely reflected the materialisation of interest rate risk. Stress has revealed the fragility of business strategies predicated on the view that interest rates would remain low far into the future. Think of the turmoil in the gilts market in the United Kingdom, prompted by a forced deleveraging of funds in which pension funds had invested and following a fiscal announcement that put policy credibility on the line. Or think of the run on US banks, such as Silicon Valley Bank and First Republic, following losses on their securities portfolios. In this context, Credit Suisse was to some extent *sui generis*, a kind of 'innocent bystander'. It was a case of an ailing bank with a failed business model caught up in environment of fragile confidence – investors looked around for a next victim and found it.

But the next, inevitable, stage is the materialisation of credit risk. We have seen the interest rate risk leg of the problems, but the credit risk leg is still to come. The lag between the two can be quite long. Financial cycles have started to turn across the world (Figure 3). Credit losses will come: the question is not whether, but when and how large they will be and how well the system can absorb them.

FIGURE 3 FINANCIAL CYCLE INDICATOR¹

Note: 1 The financial cycle as measured by frequency-based (bandpass) filters capturing medium-term cycles in real credit, the credit-to-GDP ratio and real house prices. The sample covers 38 economies (or less when data are not available).

Sources: National data; BIS.

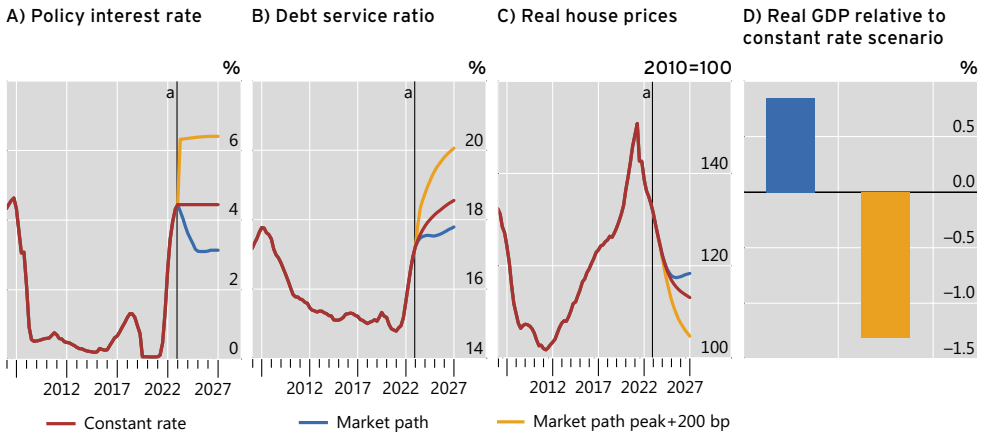
Tough tests may lie ahead. Some stylised exercises, updating those presented in the 2023 BIS *Annual Economic Report* (BIS 2023), can give a sense of how tough they might be. The future path of interest rates will be critical.

Take output first. In a higher-for-longer scenario, with policy rates reaching a peak 200 basis points above the market-implied one and staying there through 2027,² debt service burdens would rise substantially, asset prices would drop markedly and output in a representative sample of advanced economies could be some 1.5% lower at the end of a simulation horizon (Figure 4). Moreover, one should not rule out outsized responses should debt service burdens reach critical thresholds. So far, the lengthening of maturities that took place during the low-for-long era has helped shield borrowers. But at some point, this debt will have to be repaid or rolled over.

What about credit losses? They could be substantial, given banks' inevitable exposure to firms and households. The uncertainty surrounding the estimates is quite high. But in the stress scenario above, losses could be in line with those seen during the GFC (Figure 5). At that point, the cushions accumulated through higher capital and provisions will be tested (same figure). While the banking sector, in aggregate, is in much better shape than then, the distribution of those cushions is not even. Recall the recent credit rating downgrades of a number of US regional banks highly exposed to the commercial real estate sector – a sector buffeted by cyclical and COVID-induced structural cross-currents.

2 The scenarios are slightly less severe than those in the *Annual Economic Report* because the market's expected peak in the interest rate is lower and takes place later.

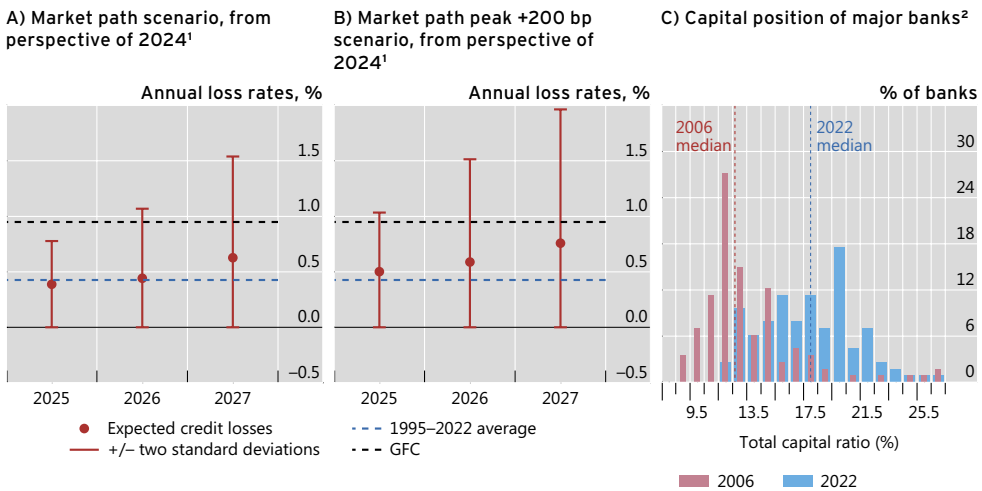
FIGURE 4 POLICY RATE SCENARIOS: IMPACT ON DEBT SERVICE BURDENS, ASSET PRICES AND OUTPUT¹



Notes: a Simulations begin. 1 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 (e.g. 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 each scenario, all variables other than the policy rate evolve according to their estimated relationships. The projection starts in Q1 2024.

Source: Updated from BIS (2023).

FIGURE 5 BANK CREDIT LOSSES COULD RISE AND CAPITAL POSITIONS WEAKEN

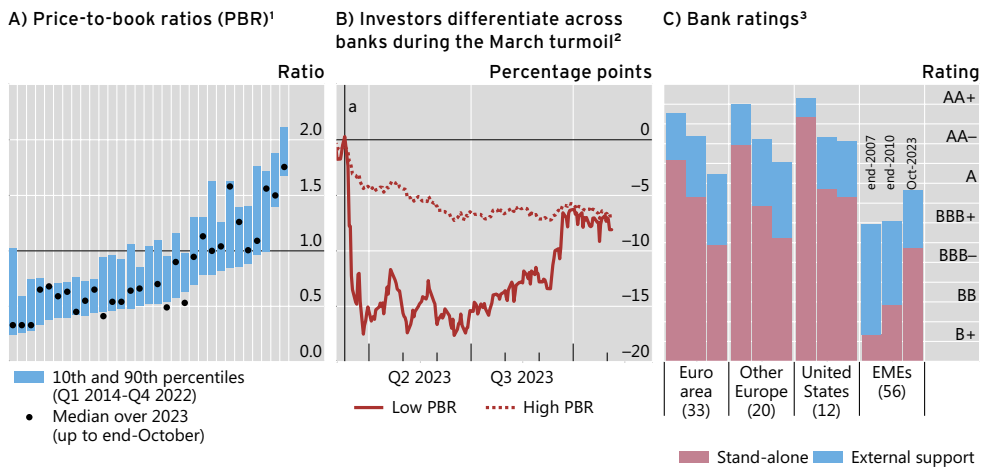


Notes: 1 Real-time (out of sample) country-specific forecasts of loss rates on bank loans in 12 large advanced economies, medians across countries. The underlying data include the private-sector debt service ratio and credit-to-GDP gap. The data are actual up to 2023 and simulated for 2024, based on the model simulations described in Graph 4. The methodology draws on Juselius and Tarashev (2020). 2 Based on 114 banks that reported their total capital ratios in both 2006 and 2022 (common sample).

Source: Updated from BIS (2023).

Against this backdrop, certain structural vulnerabilities in the banking sector could become more salient. The price-to-book ratios of many banks, including large ones, have been languishing far below one (Figure 6, left-hand panel). This reflects market scepticism about the underlying valuations and long-term profitability of those institutions. Admittedly, this is not new (Borio 2016), but in an environment of more fragile confidence, it could turn out to be a problem. The travails of Credit Suisse are a case in point. More generally, it was the banks with lower price-to-book ratios that were hit hardest during the turmoil in March (centre panel). And, from a longer-term perspective, bank credit ratings have deteriorated since their pre-GFC levels in advanced economies – whether one includes or excludes the implicit government support (right-hand panel). While those in EMEs have improved, they remain below those of their advanced economy peers.

FIGURE 6 STRUCTURAL VULNERABILITIES IN THE BANKING SECTOR



Notes: a Silicon Valley Bank failure. ¹ Based on data for 31 G-SIBs. ² Cumulative equity returns in excess of global equity index; average across high-valued (pre-stress price-to-book (PBR) ≥ 1) and low-valued (pre-stress PBR < 1) banks from advanced economies outside the United States. ³ Asset-weighted averages. Number of banks in parentheses.

Sources: Bloomberg; Datastream; Moody's; BIS.

Thus, given high debt levels and rich valuations, losses on exposures to firms and households could be substantial. Among the larger known unknowns are the potential losses on banks' direct and indirect exposures to NBFIs.

NBFIs

Indeed, before stress emerged among banks, all the attention was focused on vulnerabilities in the NBFIs sector. And with reason. The sector has grown in leaps and bounds since the GFC, and now accounts for over half of all financial assets globally. While, on balance, less leveraged than its banking counterpart, the sector is rife with hidden leverage and liquidity mismatches, especially in the asset management industry.

Not surprisingly, the sector has already been at the heart of several episodes of stress. It has been a source of large losses for banks, such as in the Archegos case – which, incidentally, hit Credit Suisse especially hard. And it was at the core of the March 2020 turmoil, which prompted large-scale central bank interventions. The latest tremors in the UK gilt market are a reminder that attention is still justified.

It is not hard to identify specific vulnerabilities in the sector. Just as with banks, they all share the same feature: they reflect business models and trading strategies designed for a world in which interest rates would stay low for long – for the foreseeable future – and are now facing one in which rates will be higher for longer.

Let me mention just a few examples. There are vulnerabilities in core government bond markets: quite apart from those linked to interest rate risk of specific structural features, they reflect the seismic shift to what has become a collateralised-based financial system. There are vulnerabilities in commercial real estate markets. There are vulnerabilities in private credit markets, where valuations are especially opaque. And there are vulnerabilities in the foreign exchange market, where the huge, rapidly growing and opaque FX swap market could greatly amplify US dollar funding squeezes (Borio et al. 2022).

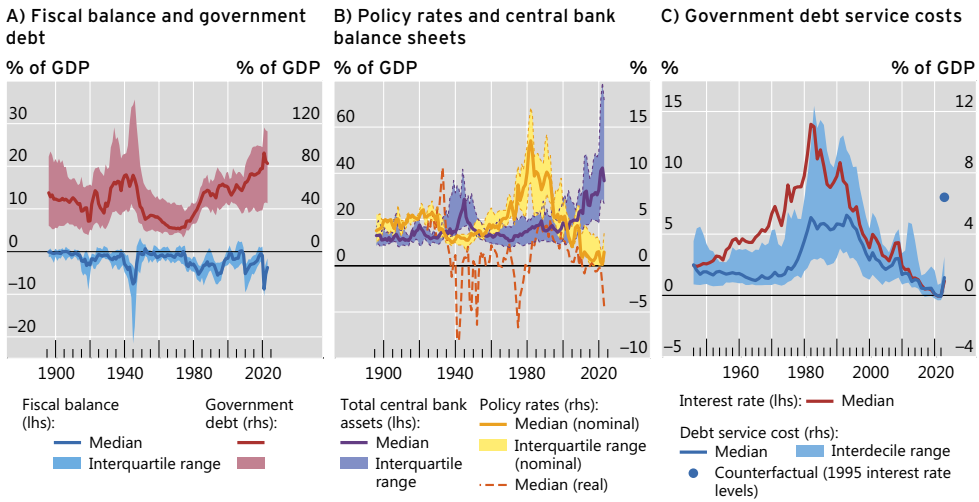
Sovereign debt

If private sector debt is an issue, the elephant in the room is public sector debt. After all, the sovereign is the ultimate backstop of the financial system: a weak sovereign means a vulnerable financial system.

The uniqueness of initial conditions, before Covid struck, is sometimes not sufficiently appreciated (Borio and Disyatat 2021, BIS 2023) (Figure 7). Globally, after a long streak of deficits, public sector debt was at its historical peak, roughly where it stood after World War II (left-hand panel). Interest rates were at historical lows, sometimes negative even in nominal terms, supported by central bank balance sheets that had reached, or exceeded, war-time levels (centre panel). As a result, the debt service burden never appeared so light (right-hand panel). Together with the expectation that interest rates would remain low as far as the eye could see, this provided a powerful incentive to keep piling on debt.

Since then, the fiscal position has worsened further and, after another easing round, interest rates have increased to restore price stability. As a result, higher interest rates are poised to test the resilience of public finances. Back-of-the-envelope calculations indicate that, should rates go back to mid-1990s levels, the debt service burden would climb to its historical peak – again, the one prevailing after World War II (Figure 7, right-hand panel).

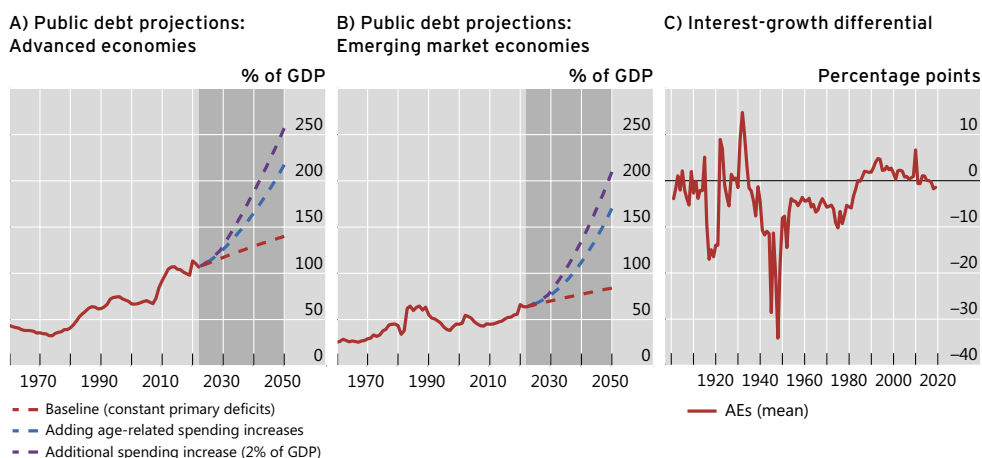
FIGURE 7 MONETARY AND FISCAL POLICY BUFFERS DANGEROUSLY THIN ALREADY PRE-COVID



Source: BIS (2023).

In the background, central banks' large-scale purchases of sovereign debt heighten this sensitivity. From the perspective of the consolidated state sector balance sheet – government plus central bank – they amount to a large debt management operation (e.g. Borio and Disyatat 2021). That is, long-term government debt is retired and replaced with debt indexed to the overnight rate, i.e. bank reserves. Again, back-of-the-envelope calculations suggest that, for the central banks that have used such purchases more actively, some 30–50% of long-term debt was, de facto, overnight in the immediate aftermath of COVID. This has already started showing up as lower central bank remittances to the government and hence lower government revenues. And central bank losses will not just mean a weaker fiscal position, they raise reputational and institutional challenges for central banks.

Indeed, looking further out, sovereign debt is probably the biggest, and most underappreciated, threat to monetary and financial stability. *Even if interest rates stay below growth rates*, absent consolidation, debt-to-GDP ratios are set to climb in the long term from their current historical peaks (Figure 8, left-hand and centre panels). The increase would be substantially larger if one factored in the impact of ageing populations as well as those of the green transition and higher defence spending linked to possible geopolitical tensions. Should interest rates exceed growth rates again, the self-reinforcing dynamics would be much stronger. Moreover, it is not uncommon for the differential to switch sign (Figure 8, right-hand panel) and higher debt makes the switch more likely. Things may look deceptively stable until, suddenly, they no longer are.

FIGURE 8 THE GOVERNMENT SECTOR DEBT THREAT

Source: BIS (2023).

CONCLUSION

The current environment and its likely future evolution will test policies to the full, both in the near term and the longer term (BIS 2023). A holistic policy approach, involving monetary, fiscal, prudential but also structural policies, is called for.

In the near term, the priority is to restore price stability while managing any financial stress that could emerge. Monetary policy will have to do the heavy lifting to bring inflation down. But fiscal policy should also play a role as needed: consolidation would reduce inflationary pressures, reduce the need to keep interest rates higher for longer and hence also the likelihood of financial stress. Prudential policy – both micro- and macroprudential – can then more effectively strengthen further the resilience of the financial system. As always, managing any serious stress that may arise would require a combination of the various policies to provide the necessary liquidity and solvency support as well as to resolve and restructure institutions in an orderly way.

In the long term, it is essential to put fiscal positions on a sustainable path. Otherwise, they could endanger both monetary and financial stability, as they already have through history (BIS 2023, Borio et al. 2023). No financial system can be sound if fiscal positions are out of kilter. No monetary policy can have sufficient room for policy manoeuvre if the creditworthiness of the sovereign is seriously doubted.

More generally, there is a need to adjust the approach to macroeconomic policy. The huge challenges we are now facing are, in no small measure, the result of monetary and fiscal policy testing the boundaries of what might be called ‘the region of stability’ (Carstens 2023, BIS 2023, Borio 2023). The region maps constellations of the two policies that foster *sustainable* macroeconomic and financial stability, and that keep tensions between the policies manageable. In no small measure, the boundaries have been repeatedly tested

in the past because of a de facto excessive reliance on those policies to drive growth – a kind of ‘growth illusion’. The most tangible sign has been progressive loss in the room for policy manoeuvre in the decades that preceded the inflation surge – safety margins had become dangerously thin. An economy operating without safety margins is exposed and vulnerable. Overcoming this growth illusion calls for a keener recognition of the limitations of demand management policies – a recognition that the only source of robust and sustainable growth is a dynamic supply side of the economy, which only more forceful and effective structural policies can deliver.

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CHAPTER 23

Implications for the Federal Reserve's monetary policy framework in the future

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In 2012, the Bernanke Fed adopted a long-run strategy for monetary policy that introduced an explicit 2% inflation objective for the United States. In some sense, this was not a major development because the Federal Open Market Committee (FOMC) had discussed its inflation objective off and on since the mid-1990s and largely agreed that 2% was about right.² But as an explicit statement and commitment for future Committees, this was a big step forward for institutionalising low and stable inflation for the US economy.

Over ten years later, it is difficult to overstate the importance of the explicit 2% commitment within the larger strategy statements. In 2019, the Powell Fed assessed the role of the 2012 strategy for monetary policy decision-making during the slow recovery and period of material inflation under-runs. The review led to several strategic adjustments. The 2020 strategy refresh enhanced the commitment to 2%, and embraced its role for maintaining anchored inflation expectations, especially when inflation averages 2% over time. In its dual mandate commitment, the strategy highlighted eliminating employment shortfalls only, thus allowing policy to support stronger labour market vibrancy so long as the price stability mandate remains in check. The September 2020 FOMC statement robustly implemented a flexible average inflation target (FAIT) period of accommodation to achieve a moderate overshoot of 2% inflation following a persistent undershoot and promote maximum, inclusive employment by eliminating employment shortfalls due to the COVID economic experience. But by June 2022, PCE inflation had surged to a peak of 6.9% and CPI inflation to 9.1%, and FOMC critics indicted aggressive FAIT as culpable (e.g. Summers 2022, Levy and Plosser 2022). As the next FOMC review team soon embarks upon its next five-year review of the strategy in late 2024, they will surely assess this episode's FAIT contribution for persistently high inflation beginning in 2021 and consider corresponding adjustments.

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2 Alan Greenspan, FOMC transcript, 2-3 July 1996.

In this chapter, I examine the contribution of the September 2020 FAIT forward guidance for generating and amplifying the high inflation beginning in 2021. It is still early as 2023 comes to a close, and the global high inflation episode is not yet behind us. But the Powell FOMC's aggressive rate tightening that began in earnest in June 2022 certainly suggests that central banks had the policy means to rein in high inflation. Disinflation had clearly begun by mid-2023. Notably, unemployment has remained below 4% through October 2023. Although improvement opportunities exist, the 2020 FOMC strategy still seems durable for future policymaking. First, both 2012 and 2020 strategy statements emphasise the crucial role of anchored inflation expectations for maintaining price stability in the face of various risk scenarios. The Fed's steadfast adherence to the 2% inflation objective provided a sturdy anchor for long-run expectations throughout. And second, when high and persistent inflation pressures emerged with great force in mid-2021, the Fed's willingness to pursue adequately restrictive policies by raising the Federal Funds rate – which it could do without bound – reinforced the 2% goal and underlying expectations. During the 2010-17 period, with inflation persistently below 2%, it was frequently mentioned that it was easier to fight above target inflation with higher policy rates than to provide necessary accommodation at the effective lower bound (ELB). Clearly, the pandemic period has been difficult, but the Powell Fed's actions demonstrate that the tools were available and used.³

Although uncertainties remain regarding how inflation will eventually settle out in the next two years, the recent disinflationary experience is a good start. The December 2023 Summary of Economic Projections (SEP) envisions a return of inflation to 2% by 2026 and with a minimal increase in unemployment to its assumed natural rate, maintaining a vibrant labour market with a soft landing. A long-run strategy that preserves these anchored expectations even when the policy response is delayed owing to unusual surprises will remain valuable. As I will discuss at greater length below, a few adjustments seem useful: (a) providing a more explicit state-contingent escape threshold when activating a period of FAIT; and (b) taking another shot at defining a symmetric objective inflation for normal times.⁴

CAN ANCHORED INFLATION EXPECTATIONS BE ENOUGH?

It was far from obvious to academic observers that Paul Volcker and Alan Greenspan's normal process of meeting-by-meeting decision-making alone could reduce unacceptably high inflation and produce an extended period of anchored inflation expectations consistent with low and stable inflation. Is that a sufficient strategic approach to anchor inflation expectations? Following the 1970s inflation experience, most monetary and

³ For full disclosure, I was an FOMC participant through December 2022.

⁴ Interestingly, at about the time of the Powell Fed's strategy review, Larry Summers offered the following commentary at a Brookings conference in June 2018: "A smaller, probably more practical short run step for the Fed would be taking the idea that the current 2% inflation target is symmetric seriously... Providing explicitly for the idea that inflation will rise above 2% during the late stages of expansions with the expectation that it will decline in subsequent recessions, would enable the Fed to push up average rates of inflation and relax zero lower bound constraints" (Summers et al. 2018).

macroeconomists didn't envision that an explicit inflation objective could be enough to anchor inflation expectations. First, Kydland and Prescott (1977) and Barro and Gordon (1983) persuasively argued that meeting-by-meeting discretionary policies would produce time-inconsistent policy choices and higher inflation than the Fed was pursuing *ex ante*. Second, in the 1970s, inflation expectations were unstable and Phillips curve estimates exhibited an accelerationist inflation component. Academic economists expected a tough road requiring institutional changes to achieve a credible commitment to price stability (in the aftermath of the Great Inflation that Volcker had to fight at so much cost).⁵

Despite these obstacles, it turns out that doggedly pursuing goal-oriented policies, transparently stating the inflation objective for better accountability, and accumulating a record delivering low inflation goes a long way.⁶ In the 1990s, Greenspan's inflation objective was simply lower inflation than recent experience,⁷ and accumulated low inflation success enhanced central bank credibility. The Greenspan Fed acted to reduce underlying high inflation from over 4% back in 1987. Progress was both deliberate (1988-95) and opportunistic in the late-1990s owing to strong productivity growth. By 2003, inflation risks had become two-sided and inflation expectations were near 2% (FOMC Statement, June 2003). This is the legacy that Alan Greenspan left for Ben Bernanke as he became Fed Chair, and it paved the way for flexible inflation targeting.

THE NEW STRATEGY WAS GOOD, BUT IMPLEMENTATION DETAILS MATTERED

In 2012, the FOMC's adoption of a long-run strategy with an explicit 2% PCE inflation objective was a high achievement for Ben Bernanke and the Fed. Establishing a North Star for an inflation objective was clearly helpful for anchoring inflation expectations, but details of policy implementation mattered, too. This became more apparent with the slow recovery following the Great Financial Crisis, persistent inflation under-runs below 2%, and emerging evidence that r^* had declined significantly. Policy rates were pinned at the ELB through 2015. Goal-oriented monetary policy called for more accommodation, and in the autumn of 2012, the FOMC turned to open-ended quantitative easing (QE₃) and threshold forward guidance for any eventual fed funds lift-off. By the spring of 2014, unemployment had fallen below the guidance level of 6½%. But repeated inflation under-runs with an inability to even modestly overshoot 2% during this period pointed to additional benefits from highlighting in the strategy that the 2% objective was symmetric. Inflation should spend time both below and above its objective. Additional emphasis on a "symmetric inflation objective" was provided in the 2016 ratification of

5 The Kansas City Fed's Jackson Hole conference has been a key focal point for public discussions of policy. Given the high inflation rates of the 1970s and early 1980s, the meeting in 1984 focused on the causes of inflation. A paper by McCallum (1984) represents an excellent vintage piece on how academic economists thought about the role of inflation and credible monetary policies.

6 Perhaps success was equal parts Rogoff's (1985) insight that conservative central bankers will bias-correct the high inflation risk or policymakers generally learned the lessons well (Ubide 2017).

7 FOMC transcript, July 1996.

the long-run strategy⁸ but without clear implications for how policy choices would adjust. Since the ELB concern was always that there was not enough monetary capacity, additional discussions, tools, and choices seemed necessary. Providing more details on how to achieve symmetry around this 2% objective seemed essential.

2020 REFRESH

The Powell review took direct aim at the long period of under-running the Fed's 2% inflation objective. A stronger foundation for more aggressive implementation when r^* was low seemed necessary. The 2012 strategy was already well suited for dealing with a high r^* economy that ran into inflationary pressures. No strategic adjustments were needed to address how the Fed would address above-target inflation. Ironically, from the standpoint of earlier academic sceptics, the larger monetary policy challenge was how to increase inflation when the capacity to provide monetary accommodation was limited by a low r^* and a looming ELB. For low inflation challenges at the ELB, where might strategic adjustments enhance the monetary policymaker's ability to increase inflation from below?

The 2019 Fed Listens workshops, the flagship research conference in June 2019 at the Chicago Fed, and FOMC reviews of these materials⁹ all reinforced the key role of anchored inflation expectations at the 2% objective. In the mid- to late-2010s, many macro analyses implied that underlying inflation was running under 2%.¹⁰ Mertens and Williams (2019) review several model specifications and show that the ELB imparts a downward bias on inflation. The refreshed strategic response became more explicit that inflation should average 2% over time to reinforce expectations at 2%. Clearly, averaging 2% after a period of below 2% required overshooting 2% for a time. This has been referred to as flexible average inflation targeting (FAIT),¹¹ and this is a tall order for central banks. Intentional overshooting has never been part of the playbook of conservative central bankers, although it is in keeping with the broader literature on make-up strategies as discussed at the research conference. Importantly, the revised strategy was asymmetric, in that it did not envision aiming for undershoots whenever inflation ran above 2% for a time.

Another key feature of the refresh was to emphasise that employment shortfalls should be eliminated by appropriate monetary policy, but employment over-runs were not mentioned. Emphasising the terms *shortfalls* and *inclusive employment* reminds the public that broad benefits accrue to many when maximum employment is achieved.

8 "Historical Materials by Year" (www.federalreserve.gov/monetarypolicy/fomc_historical_year.htm).

9 "Review of Monetary Policy Strategy, Tools, and Communications" (www.federalreserve.gov/monetarypolicy/review-of-monetary-policy-strategy-tools-and-communications.htm).

10 Footnote 15 has a representative excerpt of the TealBook A discussion from December 2017.

11 Flexible average inflation targeting was not referenced explicitly in the long-run strategy statement, nor was its asymmetry explicitly noted. Minutes refer to FOMC discussions of FAIT during strategic reviews in 2019-20. Nevertheless, the current terminology has clearly been adopted to refer to the qualitative approach in the long-run strategy as FAIT.

Don't kill a vibrant economy when it isn't necessary. But when is it necessary? From the perspective of calculating optimal policy responses, it has been convenient to posit quadratic loss functions in employment around a natural level. But positing explicit policy distaste for higher employment doesn't make sense per se. High employment alone should not be a negative. It may be sensible as a proxy for higher inflation risk, but conditions matter, and the inflation specification should contain those downsides. When employment is high, policymakers should redouble their efforts to discern whether the groundwork is being laid for future high inflation, but that will not always be the case.

SEPTEMBER 2020 FORWARD GUIDANCE IMPLEMENTATION

Reactions from many economists ran from wonderment at the strategy statement to greater consternation among many mainstream economists and former central bankers following the September 2020 implementation, which seemed radical to many.¹² First, the three-part guidance eliminated a good deal of pre-emptive policy ammunition against future inflation pressures if they had not yet emerged. Pre-emption has a long tradition, given the delayed arrival of inflation following expansionary policies. The FOMC committed to keep the funds rate at the ELB until employment was consistent with maximum levels, inflation had risen to 2% sustainably, and inflation was on track to moderately overshoot 2%. This largely took pre-emption off the table.¹³ Second, the FOMC was willing to overshoot the inflation objective to average 2% over time. But this was still stated conservatively as “moderate” overshooting. It was not difficult to ask FOMC participants at public events if they viewed 2.3% inflation as moderate and receive a response that suggested it was uncomfortable and on the high side of moderate.¹⁴ Another indication of timidity is in the strategy's statement that the ELB added a *risk of lower inflation*; while that is true, the literature showed it to be a *downward bias* (Mertens and Williams 2019). Putting this all together, the September 2020 forward guidance provided a forceful and full throated implementation statement that reinforced the strategic commitment to a more symmetric inflation outcome around 2%, but it also included more discomfort for mainstream economists and conservative central bankers.

12 The conference manuscript by Eggertsson and Kohn (2023) with Meade's discussion is an excellent representative accounting of this, and many useful criticisms of these issues. Levy and Plosser (2022) is also representative. On the wonderment side, for example, Eggertsson and Kohn express concerns that the ordering of the dual mandate elements was changed to be maximum employment and price stability.

13 One can reasonably argue with my use of “committed” here and my inference that pre-emption was not likely. As always, the Committee's statement was careful to describe the forward guidance with terms like “expects it will be appropriate to maintain”. And the later, less emphasized paragraph with caveats clearly stated: “[t]he Committee would be prepared to adjust the stance of monetary policy as appropriate if risks emerge that could impede the attainment of the Committee's goals.” At a minimum, the public commentary viewed any deviation from the forward guidance as a very high bar to clear.

14 For example, “Bostic: Inflation up to 2.3 percent 'would be fine' as long as it is stable”, Reuters, 18 September 2020.

THE SEPTEMBER 2020 IMPLEMENTATION: EXPECTING INFLATION THROUGH THE PHILLIPS CURVE FRONT DOOR

At the time of the September 2020 meeting and the FOMC statement's three-part forward guidance roll-out, it is easy to understand why the Fed and other forecasters were expecting only a slow increase in inflation. The median Summary of Economic Projections submission for 2020 real GDP growth was -3.7%, an unemployment rate in the fourth quarter of 7.6%, and core PCE inflation of 1.5%. With a recovery that expected the fourth quarter 2022 unemployment rate to be 4.6%, core PCE was projected to return to 1.8%. This corresponds to the Federal Reserve Board staff's assessment of the underlying inflation rate for earlier years in the last publicly available TealBook A (December 2017), and the inflation experience from 2018 into 2020 offers little reason to expect an upward revision by this meeting.¹⁵ A flat, non-accelerationist Yellen Phillips curve with lags of inflation and anchored inflation expectations delivered forecasts like this (Yellen 2015). Furthermore, prior to the onset of COVID, the December 2019 SEP remind us that the unemployment rate and core PCE inflation were expected to end 2019 at 3.6% and 1.6%, respectively. The 2019 combination, with inflation projected to only rise slowly over the medium term to the target 2% objective, suggested no obvious non-linearities in the Phillips curve, at least not at 3.5% unemployment. The stage was set to expect and monitor that rising inflationary outcomes would enter through the front door of demand pressures and a flat Phillips curve. This inflation experience was still evident in March 2021 when 3-month, 6-month and 12-month inflation rates were just below 2%.

Although 2021 brought very bad fortune to inflation prognosticators at the Fed and among most mainstream economic forecasters, the initial criticisms warning of rising inflation risks began with arguments that the Biden administration's COVID fiscal support programme (the American Rescue Plan, or ARP) was excessively large and would lead to overheating. This overshooting expectation was clearly debatable, far from a slam dunk assessment, and uncertain as of March 2021 when that debate was very loud. Summers (2021) and Blanchard (in comments in the *New York Times* on 21 March 2021) were representative and notable commentaries along this line: their assessment was that the fiscal stimulus was simply too large. Edelberg and Sheiner (2021) offered a contemporaneous analysis of the proposed \$1.9 trillion Biden package to address the ongoing pandemic. They projected that this stimulus would increase real GDP by 4% at the end of 2021 and exceed the pre-pandemic January 2020 CBO projected path by 1% in the fourth quarter. The additional overshoot in the first half of 2022 would be largely

15 Footnote 9, page 25 in the December 2017 TealBook A says it all. "In light of this year's [2017] surprisingly low inflation, in this forecast we have slightly pushed back the upward drift in our estimate of underlying inflation. (We define underlying inflation to be the level that we estimate inflation would return to in the absence of upward or downward pressure from resource utilization or supply shocks, and which we think is ultimately determined by the inflation expectations of wage and price setters.) We now assume that underlying PCE inflation remains at 1.8 percent in 2018—the same as in 2017 and previous years—and starts to edge up thereafter, reaching 1.9 percent in 2020; in previous projections it started to edge up in 2018 and reached 1.9 percent in 2019. This revision resulted in no perceptible changes to our forecast for core PCE inflation in the medium term. For 2018, our reaction to this year's low inflation had already been built into the forecast. For 2019, the small downward revision to trend was offset by other small influences."

closed by the end of 2022. Output gaps of this modest magnitude did not signal strong inflation concerns. In March 2021, Bianchi et al. (2021) provided a contemporaneous analysis of these Edelberg-Sheiner overshoot implications for inflation. In one of their specifications, the largest implied overshooting effect was a 0.7 percentage point increase in inflation. The other two analyses allowed for greater behavioural inertia and had a larger peak effect of 1.2 percentage points by late 2022, and then declining thereafter. None of these simulations approached what we actually saw.

Anchored long-run inflation expectations play an important role in these empirical specifications of expected disinflation. The 1970s-era Phillips curves displayed accelerationist inflation behaviour with unanchored expectations. Once the Greenspan Fed reduced the risks of above-2% inflation, anchored inflation expectations took their place in empirical Phillips curves and New Keynesian relationships. These inflation mechanisms, combined with more transparent monetary policy response functions, provide crucial roles for containing inflation. Without anchored inflation expectations, the fiscal risks for inflation would likely have been much higher. Presumably, the loudest warnings regarding this fiscal channel worried that expectations would become unanchored. Nevertheless, as of the March 2021 FOMC meeting, the Fed's baseline assessment still seemed reasonable and in line with expecting rising inflation to appear through the front door via the Phillips curve mechanism, with healthy assistance from the ARP. And the available February CPI inflation was 1.7% on a 12-month basis, still quite low.

BUT SUPPLY CHANNELS BROKE DOWN THE BACK DOOR AND ALLOWED INFLATION TO RUSH IN

Soon after the March 2021 meeting, it was more apparent that supply shocks were contributing a new dimension to rising inflation pressures. The May release of April 2021 CPI inflation showed that used car prices had exploded suddenly by 10% in a month. This was followed by 7% and 10% increases in the next months. These were monthly rates of increase, not annualised. The January and February changes in used car prices had been -0.9% each month, and March had been 0.5%. Shortages of semi-conductor chips were a key culprit, and this was widespread throughout manufacturing segments that utilised electronic chips.¹⁶ Labour shortages also reduced supply capabilities across numerous industrial and retail establishments attempting to re-start their business models. Fed participants and many business economist forecasters provided standard arguments pointing to the temporary nature of many of these shocks. But the implications of continued unrelenting arrival of more supply shocks with strong persistence eventually became clear to all. Inflation was coming through the back door via persistent supply effects across material shortages, numerous dysfunctions in logistics and transportation

¹⁶ Dziczek (2022) and Moore (2023) provide useful accounts of the evolution and role of semi-conductor chip shortages in the auto and related manufacturing sectors.

support, and labour force supply challenges. Russia's February 2022 invasion of Ukraine also generated sharp increases in global energy and commodity prices. Bernanke and Blanchard (2023) provide an insightful ex-post assessment of the role of these supply shortages. Their empirical assessment of a Phillips curve specification using vacancies-to-unemployed workers finds strong evidence that supply effects were the primary inflation catalyst through the inflation peak in 2022 and somewhat beyond. As the current elevated inflation period is not over, their analysis (and mine) leaves open the possibility that any stalls in disinflation on the way to the Fed's 2% objective may be due to strong demand influences – or to further disruptions in supply.

HOW COSTLY WAS THE FED'S WRONG-FOOTED, OVERLY PATIENT FAIT POLICY?

Considering the non-monetary nature of the back door, supply shock-driven inflation, it seems useful to note contributing factors: (1) large, persistent and unrelenting supply shocks that were far outside the historically experienced stochastic distribution; (2) relative price increases on many goods and services without any notable downward price movements in other goods and services to offset the aggregate price index implications (sticky prices with downward rigidities); and (3) strong FAIT monetary accommodation for too long, as it turns out. If policy had been sufficiently restrictive and the US economy exhibited extreme price flexibility, then sharply falling prices for services and other goods in principle could have allowed some relative prices to rise while maintaining low inflation. But that is not the nature of the US economy or other advanced economies except during depression-like economic downturns. So, when combined with highly accommodative monetary policy at the ELB, persistent and rising price increases emerged.

Clearly, the FOMC was late to address the rising inflation pressures, as were other central banks. Deaths from Covid were still high and surged further from August 2021 through February 2022 owing to the delta and omicron waves. Was it reasonable to expect a policy turnaround as early as the June 2021 meeting? The September 2020 forward guidance did say “the Committee would be prepared to adjust the stance of monetary policy as appropriate if risks emerge that could impede the attainment of the Committee's goals”. Still, such a policy pivot would have been extraordinary. Arriving supply shocks were still new and of unusual origin. Unemployment was still high at 5.8%, the inadequate supply of semi-conductors was often expected to increase at any moment, and shortages might plausibly be reduced with a greater COVID vaccine take-up and stronger returns in the labour force. The fiscal overshoot of ARP with a flat Phillips curve still seemed consistent with pre-pandemic lower inflation risks. The September 2020 FAIT forward guidance instructed the FOMC to look longer and past many of these growing concerns. And when policy was eventually adjusted, the first 150 basis points of Federal Funds increases would have simply represented reducing the monetary firehose strength somewhat, with much

more to do in the worst-case situation. The September 2020 FOMC commitment clearly led to delaying the eventual policy tightening.¹⁷ How costly was this delay, or how much better would things have been?

THE POWELL FED BECOMES HANSEN-SARGENT ROBUST CONTROL POLICYMAKERS

The Powell FOMC raised the Federal Funds target range by 25 basis points in March 2022 and by 50 basis points in May, and then became aggressive in June. The FOMC began an initiative to “front-load” the policy tightening. Front-loading was a sudden change in the policy choice that was arguably in response to Knightian uncertainty as presaged by the continued arrival of adverse supply developments. The aggressive 75 basis point increases at the June, July, September and November 2022 meetings seem qualitatively like the robust control response that Hansen and Sargent (2003) write about when the stochastic properties of the shocks are being distorted by a personification of nature as if it is an evil agent. The Hansen-Sargent stochastic structure allows more elements of Knightian uncertainty to be at work. In this situation, the intuition for the optimal plan is to guard against the very worst possible outcome quickly. Such an optimal response seems in line with the June 2022 Powell FOMC case: monetary policy pursued a very aggressive and restrictive policy to preclude an unanchoring and embedding of high inflation expectations. If this high inflation risk assessment had been too pessimistic and uncertainty was resolved more benignly, it would have been easier to unwind the restrictions before more permanent damage to the economy’s structure occurred. This is a risk-management judgement call, of course.

Once front-loading had been accomplished and the Federal Funds rate was arguably heading for more restrictive territory, the FOMC stepped down to a 50 basis point increase in December 2022, and then three 25 basis point increases in January, March, and May 2023. This brought the May 2023 target Federal Funds rate to a 5-5¼% range, and a meaningfully restrictive real Federal Funds rate when calculated with the committee’s year-end core PCE inflation projection of about 3½% (and modest allowances for quantitative tightening and Silicon Valley Bank distress effects). Through the December 2023 FOMC meeting, the Fed only increased the target range once, in July by 25 basis points to 5¼-5½%. As Chair Powell said at the December press conference, Fed policy was clearly restrictive.

17 The Committee’s plan to follow its previous practice of tapering and fully stopping asset purchases before lifting off likely also contributed to the delay.

SO WHERE ARE WE?

It seems clear that the September 2020 implementation of the FAIT approach delayed the Fed's policy tightening in response to the supply shocks in 2021. The 12-month increase in the CPI – the index with the larger weight on shelter prices – peaked in mid-2022 at 9.1%. Although the Fed's inflation objective is 2% PCE inflation, household and business expectations of higher inflation may be amplified by greater dispersion across all relevant price indices, as reflected in the CPI peak. Fortunately, long-run inflation expectations remained anchored throughout this episode (Table 1), and this seemed crucial for limiting the longer-term damage of the inflation surge.

TABLE 1 INFLATION EXPECTATIONS MEASURES

Inflation expectations	March 2021	March 2022	March 2023	September 2023
Michigan 5-10 years	2.8	3.0	2.9	3.0
NY Fed 5 years	N/A	3.02	2.54	2.84
SPF PCE 10 years	2.03	2.20	2.15	2.20
SPF PCE 6-10 years	2.08	2.00	2.00	2.00
TIPS 5Y5F	2.00	2.26	2.25	2.43

Source: University of Michigan, Survey Research Center, Surveys of Consumers via Bloomberg; New York Fed Survey of Consumer Expectations; Survey of Professional Forecasters (First Quarter and author's calculations), Philadelphia Fed; St. Louis Fed, 5-year, 5-year Forward Inflation Expectation Rate, on March 15 or September 15, retrieved from FRED.

Table 2 displays the FOMC's median projections for unemployment and core PCE inflation at various times. As the previous discussion suggests, anchored inflation expectations with appropriately restrictive monetary policy have led the FOMC to repeatedly expect inflation to return to 2% over the medium term. The recent December 2023 median projection for Core PCE inflation is 2.4% in 2024 and 2.2% for 2025, with the unemployment rate peaking at 4.1% over the medium term.

Although an earlier commencement of the FOMC's tightening in June 2021 would have presumably limited the peak inflation increase, counterfactual benchmark model comparisons by Barnichon (2022) and VAR analyses by van Roye and Wilcox (2023) suggest only modest inflation improvements. These studies find that an earlier monetary tightening in 2021 would have reduced peak inflation rates by about 1-2 percentage points, but the basic inflation trajectory would have been similar. The earlier tightening would have further reduced economic activity, too. The local nature of these counterfactual investigations seems consistent with relatively anchored inflation expectations playing a strong role and consistent with longer-run measures in Table 1.

TABLE 2 SUMMARY OF ECONOMIC PROJECTIONS, MEDIAN

Unemployment rate	2022	2023	2024	2025
March 2021	3.9	3.5		
March 2022	3.5	3.5	3.6	
March 2023		4.5	4.6	4.6
December 2023		3.8	4.1	4.1
Core PCE inflation				
March 2021	2.0	2.1		
March 2022	4.1	2.6	2.3	
March 2023		3.6	2.6	2.1
December 2023		3.2	2.4	2.2

Source: Federal Reserve website.

Recent research by Guerrieri et al. (2023) argues that patience by monetary policymakers to assess the temporal character of these supply-driven inflation shocks would be beneficial and appropriate. This is an interesting perspective that also challenges the risk tolerance of conservative central bankers. As changing relative price events have played out globally, giving disinflation developments more time to emerge seemed to have been possible given the eventual disinflation that is now emerging. In the United States, inflation risks have receded about as well as one could have imagined. Even if the asymmetric inflation targeting had not been introduced in September 2020, the new strategy’s “employment shortfalls only” emphasis may have also delayed the response a bit in line with a patient approach. All in all, the next review of the FOMC long-run strategy will likely reveal more updates on the Committee’s risk appetite for symmetric inflation and what is necessary to achieve the inflation objective.

Looking again at the FOMC’s December 2023 Summary of Economic Projections in Table 2, the outlook seems like the proverbial soft landing. Unemployment is projected to peak at 4.1%, and growth settles in at its assumed 1.8% trend assessments. Inflation declines to 2.4% in 2024 and to 2% by 2026. Without a strong Phillips curve channel restricting inflation, one wonders how much of the disinflation in these projections is due to monetary policy tightening? Although one story is simply immaculate disinflation following an unwinding of the supply channel boosts to inflation, Chair Powell has expressed a strong role for monetary policy with a more nuanced view. Tighter policy has restricted the growth of aggregate demand and kept demand better aligned with initially restricted supply conditions. As supply has improved and expanded, so has aggregate demand. In this explanation, policy has restricted aggregate demand without destroying

it and kept longer-term inflation expectations well anchored. In any event, one suspects that if a benevolent agent had been able to offer this scenario to the FOMC in March 2022, this would have been viewed as a highly attractive option.

Of course, the global high inflation episode is not over yet. The FOMC continues to assess whether a policy target range of $5\frac{1}{4}\%$ to $5\frac{1}{2}\%$ is restrictive enough to ensure a return of PCE inflation to 2%. Time will tell. But with recent months PCE inflation falling below 3% – down from well over 6% – any lasting damage from the prolonged FAIT delay in policy tightening seems contained, owing to a big assist from anchored inflation expectations.

KEY ISSUES FOR THE NEXT FOMC REVIEW OF THE LONG-RUN STRATEGY

At a recent IMF conference in November, Jay Powell announced that the next FOMC review would begin in late 2024. After reviewing the role of FAIT in the recent high inflation experience, it seems the following issues will need to be considered.

First, the one constant in economic analysis is change: all central banks need monetary strategies that are sufficiently flexible and nimble to address medium-term changes in r^* . The 2020 long-run strategy spelled out how monetary policy should address a low r^* economy which imparted a high risk that the ELB would limit the FOMC's ability to provide sufficient policy accommodation. Does the current strategy simultaneously spell out how policy should be implemented in an economy with a higher r^* and less ELB risk? I think the answer is yes because FAIT only emerges following periods of under-running inflation. Clarifying and stating FAIT's asymmetric implementation would likely be helpful. Otherwise, the strategy as stated now is largely unchanged from Bernanke's 2012 version, although the emphasis on *employment shortfalls only* raises the stakes somewhat for identifying emerging inflation risks. Additional analyses are warranted.

Second, what modifications to flexible average inflation targeting are necessary, if any? The unexpected development was the emergence of unrelenting supply shocks with unusual persistence. What additional guard rails are needed? There is a delicate balance between general statements of monetary strategy and the necessary implementation details needed to achieve goal-oriented policy outcomes. Meade (2023) properly pointed out that the September 2020 forward guidance did include allowances for unforeseen developments that could have been cited for earlier departures from FAIT, though Eggertsson and Kohn (2023) inferred less wiggle room for departures in their assessment. It may be useful for the strategy to foreshadow such guard-rails, and future FAIT implementations could include explicit references to loosely binding escape hatches that balance inflation averaging with limiting excess inflation. If the FOMC had contemplated an escape threshold of $3\frac{1}{2}\%$ core PCE over a three-month period or so, that may have allowed a quicker pivot. After all, rising inflation through the Phillips curve front door would not have approached $3\frac{1}{2}\%$ without very low unemployment or a remarkable steepening in the curve.

Third, Chair Powell stated clearly at Jackson Hole that the Fed would not be changing its inflation objective on his watch. In an environment where the central bank has a tight setting of its inflation objective relative to the ELB, it is that much more important to ensure that the implementation of policy is symmetric around the objective. I have previously called for a strong commitment to symmetry over the years (e.g. Evans 2017). It is interesting to recall Larry Summers' 2018 reference to enhancing this symmetry feature as a modest improvement ((Summers et al. 2018). Flexible average inflation targeting is a state-contingent approach to providing inflation symmetry around 2%. A bolder, unconditional approach would be to alter the description of the inflation objective: provide monetary and financial conditions so that inflation is above but close to 2%. Although this adjustment sounds like it is increasing the objective, recent experience suggests that actual inflation may still under-run 2% during economic downturns if the ELB is close. By striving for modestly above 2%, the 2% objective should not be viewed as a ceiling by conservative central bankers. This subtle adjustment in the approach could help achieve symmetry around 2% more often. And the FOMC would be more accountable for averaging 2% in this approach.

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ABOUT THE AUTHOR

Charles L. Evans is a former President and CEO of the Federal Reserve Bank of Chicago. He became President in September 2007 and served for 15 years. As a participant on the Federal Open Market Committee, his continued advocacy for transparent communications and forward guidance facilitated the Committee's adoption of threshold forward guidance in December 2012, more explicit Committee projections for future policy rates, and enhancements to the long-run strategy of the Committee for making monetary policy. He was previously Director of Research and is currently a Visiting Senior Research Associate at the Clark Center for Global Markets at the University of Chicago Booth School of Business.

Demand rebounded more rapidly than expected after the COVID pandemic. This interacted with a series of unprecedented supply-side shocks around the shutdown and reopening of economies, along with broad-based increases in commodity prices following the invasion of Ukraine. Inflation spiked to the highest level in decades. In response, central banks tightened monetary policy sharply. This book explores the commonalities and differences in countries' strategies, as well as lessons for the next inflationary episode.

The first two sections of the book summarise the responses by fifteen central banks from advanced and emerging economies, with chapters written by senior central bank officials and economists. Emerging market central banks were the first to raise rates in response to high inflation; they were more concerned about maintaining credibility and less constrained by asset purchase programmes and forward guidance. By contrast, advanced economy central banks were slower to adjust policy; they were more confident in the anchoring of inflation expectations and initially more constrained by earlier policy communication. As it became clear inflation would be much higher and for much longer than forecast, with risks of becoming embedded in wage and price setting, central banks responded more aggressively. They raised rates quickly, in large increments, and to the highest levels in many years, often combined with steps to shrink their balance sheets.

The final section of the book includes cross-country thematic chapters addressing broader issues around this high-inflation episode: the causes of the inflation spike, the interactions with labour markets, the role of energy shocks and energy policy, and the financial market responses. The final chapters discuss the implications for financial stability, international financial regulation, and monetary policy frameworks.

This comprehensive overview of the monetary policy responses to the post-pandemic inflation provides a unique reference for scholars, teachers, policymakers, and investors seeking to understand and draw lessons from this tumultuous period.

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