

The monetary policy response to COVID-19: direct impacts and spillovers

The COVID-19 pandemic triggered the worst global economic downturn in almost a century. Since the onset, countries around the world have rolled out extraordinary macroeconomic measures to save people's livelihoods, limit economic damage and kickstart recovery. With less room to reduce interest rates than during the 2008-2009 global financial crisis, central banks, especially in developed countries, relied more heavily on unconventional monetary policy tools. The most notable involved large-scale asset purchases to spur liquidity, prevent financial meltdown and stimulate economic activities.

These policies were effective in stabilizing financial markets and boosting aggregate demand during the early stages of recovery. But initial positive effects have lost strength over time. The continuation of ultraloose monetary policies, with central banks pumping massive amounts of liquidity to keep long-term interest rates low, could worsen the mispricing of risks and further inflate equity prices in major financial markets, while exacerbating wealth inequality.

This chapter reviews the global monetary response to COVID-19, focusing on large-scale asset purchase programmes (APPs) deployed by central banks in developed and developing countries. It discusses how these policies have supported economic recovery and assesses negative side effects and risks. It presents the challenges major central banks face in tapering asset purchases and managing risks of financial market instability that could arise from a disorderly adjustment of asset prices.

The global monetary response to COVID-19

The monetary response to the pandemic has broadly followed the global financial crisis playbook but with unprecedented speed, scale and scope.¹ The initial COVID-19 shock presented two immediate challenges for central banks. First, the nature of the shock was highly unusual, with strongly correlated supply- and demand-side shocks amid unprecedented economic uncertainty. Second, after a decade of ultraloose monetary policies, central banks, especially in developed countries, had limited room for pursuing conventional monetary policies.

These twin challenges prompted central banks to deploy a wide range of monetary policy tools that included unconventional measures such as forward guidance, APPs and expanded lending operations (Cantú and others, 2021). In addition to expanding existing facilities and reactivating measures adopted during the global financial crisis, central banks established many new programmes. The monetary

The pandemic triggered an unprecedented monetary response

¹ English, Forbes and Ubide (2021) provide a comprehensive review of the monetary response to the COVID-19 pandemic.

response strongly complemented fiscal policies, often blurring traditional distinctions between the two (Bartsch and others, 2020).²

Amid continued uncertainty about the near-term economic outlook, central banks in developed countries have generally chosen to keep their monetary policy stances exceptionally accommodative well into 2021 to boost aggregate demand, reduce unemployment and close output gaps. A combination of supply-chain bottlenecks, energy price increases and the release of pent-up demand, however, has pushed inflationary pressures in many parts of the world, presenting an additional challenge. While economic recovery remains highly uncertain, a growing number of central banks, especially in developing and transition economies, have started to tighten monetary policy stances, pre-empting the prospect of higher inflation beyond the near term. At the same time, a few major developed country central banks have announced plans for gradual policy normalization. In the United States of America, the Federal Reserve started tapering its monthly asset purchases in late November 2021.

Interest rate measures and reserve policies

Aggressive cuts in interest rates and reserve requirements boosted liquidity

When COVID-19 hit in early 2020, central banks quickly and aggressively cut short-term interest rates to increase liquidity, reduce borrowing costs and support economic activity. Policy rates in developed countries were already at low levels, however – often close to or at the effective lower bound (figure II.1).³ This was due to a long-term decline in the natural rate of interest (i.e., the real interest rate consistent with full employment and stable inflation) and prolonged monetary accommodation. In February 2020, the GDP-weighted average policy rate in developed countries was 0.9 per cent, far below the 3.5 per cent in August 2008 before the global financial crisis.⁴ In as many as 23 developed countries (Denmark, Japan, Sweden, Switzerland and 19 euro area countries), policy rates were at or below zero when the pandemic began. Likewise, rates in developing countries were generally lower than at the onset of the global financial crisis although monetary conditions varied widely within this group. Among a sample of 36 developing countries, the average policy rate in February 2020 was 3.2 per cent compared to 7 per cent in August 2008. As a result, the magnitude of rate cuts in response to COVID-19 was considerably smaller than it was during the global financial crisis.

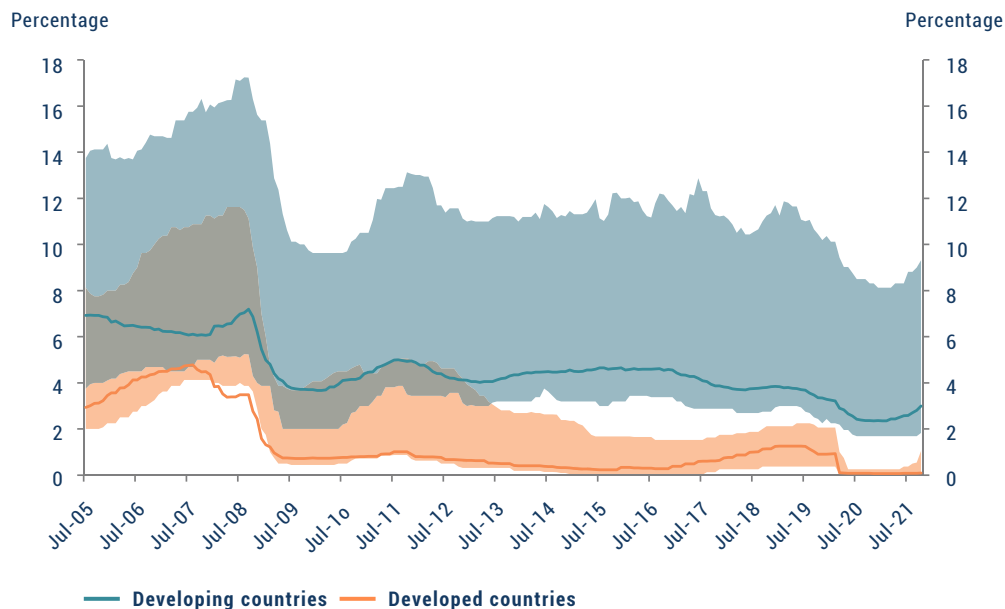
Several central banks provided additional liquidity to financial institutions by reducing the bank reserve requirement ratio (such as Brazil, China, Malaysia, the Philippines and the United States), lowering the remuneration rates on reserves (China, New Zealand and Turkey) or enhancing flexibility for instruments that count as reserves (Malaysia and the Philippines).

2 English, Forbes and Uribe (2021), for example, note that some central bank lending programmes amounted to quasi-fiscal operations.

3 The effective lower bound is the limit on how low policy rates can go. Below the lower bound, it becomes profitable for financial institutions to exchange central bank reserves for cash.

4 At the time of the Lehman Brothers collapse in September 2008, the average rate was still 3.1 per cent.

Figure II.1
Central bank policy rates in developed and developing countries



Sources: UN DESA, based on data from the Bank for International Settlements, CEIC and World Bank Open Data (accessed on 17 November 2021).

Note: The lines display the GDP-weighted average policy rates for a set of 36 developing countries and a set of 14 developed economies plus the euro area. The shaded areas indicate the range between the twenty-fifth and seventy-fifth percentile of the respective policy rates.

Expanded lending and foreign exchange operations

Most central banks in developed and developing countries expanded emergency lending operations at the outset of the pandemic. They adjusted existing facilities, for example, by increasing their size (such as China, Colombia and the Republic of Korea), broadening eligible collateral (Canada, Chile, Japan and Singapore) and changing the maturity of instruments (Canada, India and the United States). They also established entirely new programmes.⁵ In addition to providing short-term liquidity to banks and other financial institutions, central banks deployed measures to support the flow of credit to households and non-financial corporations. “Funding for lending” programmes, which provide banks with access to low-cost funding to lend to businesses and consumers, have become an important policy instrument (Casanova and others, 2021). In 2020, several central banks introduced such programmes, including the European Central Bank (ECB) through the third phase of the Targeted Long-Term Refinancing Operations Programme, the Bank of England, the Reserve Bank of Australia, the Saudi Arabian Monetary Authority and the Swiss National Bank. These programmes differed from standard lending facilities in that banks could only access the funds if they increased lending to the private sector – either generally or to certain segments such as small and medium-sized enterprises or industries hit hard by the pandemic. In a similar vein, many developing country central banks, especially in Latin

Central banks supported credit availability for the private sector

⁵ For instance, in March 2020, the Central Bank of Argentina approved a new scheme of credit lines for micro-, small and medium-sized enterprises. The Bank of Canada launched the Standing Term Liquidity Facility to provide temporary liquidity support for eligible financial institutions.

America and East Asia, introduced or expanded measures to channel credit to small and medium-sized enterprises. One example is Chile's Fondo de Garantía para Pequeños Empresarios (Small Business' Guarantee Fund), which expanded significantly in size and scope.

Extended and new currency swap lines helped stabilize exchange rates

During the early stages of the pandemic, capital outflows from developing countries threatened exchange rate stability, while soaring demand for dollar-denominated assets strained offshore dollar funding markets. In response, the Federal Reserve reduced the costs and extended the maturity of its standing dollar liquidity swap lines with the Bank of Canada, the Bank of England, the Bank of Japan, the ECB and the Swiss National Bank. With nine other central banks, it also reopened temporary swap lines activated during the global financial crisis (Australia, Brazil, Denmark, Mexico, New Zealand, Norway, the Republic of Korea, Singapore and Sweden). Developing country central banks used different forms of foreign exchange interventions to improve liquidity and mitigate exchange rate volatility. For instance, they signed or renewed currency swap lines with each other (such as Argentina and China, China and Thailand, China and Turkey, Indonesia and the Republic of Korea, and India and Sri Lanka), lowered foreign exchange reserve requirements for banks (China, Indonesia, Peru and Turkey) and conducted foreign exchange repurchase operations (Brazil) and exchange-rate hedging (Colombia).⁶

Forward guidance and asset purchase programmes

APPs have become a primary stimulus tool in developed countries

As policy rates in many countries reached or came close to their effective lower bound,⁷ central banks began to rely more heavily on unconventional monetary policy tools, including forward guidance and large-scale APPs.⁸

Forward guidance, used by major developed country central banks, signals that interest rates will remain low for a prolonged period. The Federal Reserve, for example, committed to keeping the federal funds rate at a target range between 0–0.25 per cent “until labor market conditions have reached [...] maximum employment and inflation [...] is on track to moderately exceed 2 percent for some time” (Federal Reserve, 2021). Other central banks have provided a combination of state- and time-contingent forward guidance.

Given limited conventional monetary policy space, large-scale APPs have become the primary stimulus tool for many developed country central banks during the COVID-19 crisis. The programmes have taken a variety of forms depending on the country context and institutional framework. Developed country central banks adjusted and massively expanded existing programmes introduced during the global financial crisis while also launching new ones. In developing countries, 27 central banks adopted APPs

⁶ A few countries, such as Argentina, China, India and Peru, also adjusted capital flow management measures, aiming to incentivize inflows and mitigate outflows (OECD, 2020).

⁷ In the second quarter of 2020, policy rates approached or hit their effective lower bound in almost all developed countries and several developing countries, including Chile, Israel, Peru, the Republic of Korea and Thailand.

⁸ Negative interest rates were not widely used in response to the pandemic. Denmark, Japan and Switzerland have remained the only economies with policy rates in negative territory.

as a new policy tool. The rest of this chapter will focus on the role of APPs in the crisis response, the macroeconomic and distributional implications, and challenges in exiting the policy.

Central banks' large-scale asset purchase programmes

Central bank purchasing of longer-term financial assets, also known as quantitative easing, is still a relatively new monetary tool, first introduced by the Bank of Japan in 2001.⁹ The Federal Reserve, the ECB and the Bank of England adopted quantitative easing in response to the global financial crisis in 2008-2009 after lowering short-term interest rates to close to zero. As economic growth remained subdued and inflation below target during much of the decade after the crisis, all four central banks continued to use the asset purchase mechanism albeit with some pauses.¹⁰

Mechanism and transmission channels

The ultimate objective of large-scale asset purchases by central banks is to boost economic activity and bring inflation back to target. In theory, APPs are expected to work as follows (for a more detailed look at several potential transmission channels, see box II.1). Central banks purchase long-maturity securities, such as government bonds or mortgage-backed securities, from banks and other financial institutions (for example, pension funds) in exchange for short-term liquidity in the form of cash-equivalent bank reserves. Central banks buy these long-term securities to complement demand from financial intermediaries, including during high economic uncertainty when the latter consider these securities too risky. Demand for mortgage-backed securities fell sharply during the global financial crisis, for instance, as market participants lost confidence in their financial value. Many considered them toxic assets even though they were collateralized debt obligations of issuers. The Federal Reserve's purchase of these securities pushed up their prices, reduced their yields and restored market confidence, a sine qua non for proper functioning of the financial market.

Asset purchases by central banks also inject additional liquidity, which, at least in theory, should encourage banks to lend more. At the same time, the decline in government bond yields reduces longer-term borrowing and debt-servicing costs in the private sector, for example, for mortgages, auto loans and consumer debt. This is expected to boost consumption and investment, stimulating economic growth and job creation as well as enabling the central bank to achieve its inflation target. APPs thus have multiple objectives: to restore market confidence and financial stability, lower long-term borrowing costs, boost credit flows and reduce the cost of servicing existing debt. All of these are expected to stimulate aggregate demand, employment and economic growth. How APPs work

APPs are expected to support market functioning and boost economic activity

⁹ The rest of the chapter mainly refers to the policy as APPs.

¹⁰ The Federal Reserve paused its asset purchases between October 2014 and March 2020; the ECB between January and November 2019.

in practice, however, varies significantly across countries and over time (see the discussion on APP achievements and side effects).

Box II.1

Transmission channels of asset purchase programmes

Since the global financial crisis, quantitative easing has received a great deal of attention in theoretical and empirical research. Yet its effects are still not fully understood and remain debatable if not controversial. While traditional benchmark models of monetary policy predicted that quantitative easing would be largely ineffective (see, for example, Eggertsson and Woodford, 2003; Woodford, 2012), new research has identified a variety of potential transmission channels to the real economy.^a A core argument for APPs is that central bank purchases of government bonds (or other financial assets) reduce long-term interest rates and boost asset prices through a portfolio rebalancing effect, a liquidity effect and a signalling effect.

The portfolio rebalancing effect is predicated on the assumption that investors have varying preferences for specific maturities. In this environment, a central bank's bond purchases change the relative supply of different assets, affecting their relative prices. In response, investors rebalance their holdings, bidding up the values of remaining government bonds and their close substitutes. As a result, long-term yields fall and the yield curve flattens. The portfolio rebalancing effect is associated with a decline in the term premium.^b

The liquidity effect is especially relevant during the immediate crisis phase, when central banks step in and, via APPs, provide a liquidity backstop to the financial market (Ferdinandusse and others, 2020). During financial turmoil, market participants lose confidence in the value of assets or, relatedly, in the solvency of their trading counterparts. This situation can quickly lead to liquidity spirals, fire sales and negative feedback loops as money markets "dry up" and uncertainty rises. When central banks enter with large APPs, they step in as deep-pocketed market makers of last resort. They provide a floor for asset prices, restoring confidence and liquidity in the market. This liquidity effect can help central banks address specific bottlenecks in financial market segments where liquidity is needed and confidence is low.

^a For an overview and discussion of various transmission channels, see, for example, Gern and others (2015), Bundesbank (2016) and Bernanke (2020).

^b The term premium is the amount by which the yield on a long-term bond is greater than the yield on shorter-term bonds.

Finally, the signalling effect is related to forward guidance strategies used by central banks to influence expectations about future short-term interest rates. Market participants may interpret large-scale asset purchases as an additional commitment by the central bank to keep short-term policy rates at (or close to) the effective lower bound for an extended period. As expectations for future short-term interest rates shift downwards, long-term interest rates also fall. The signalling channel is largely muted in the early stages of recovery when inflation is well below target. The effect becomes more

relevant as recovery progresses, inflation picks up and uncertainty about the future path of interest rates increases.

The reduction in long-term interest rates – through portfolio rebalancing, signalling, and, to a limited extent, additional liquidity – is expected to improve overall financing conditions in the economy and boost aggregate demand in several ways. For one, higher or restored asset prices are expected to give rise to a wealth effect, boosting spending by businesses and households. At the same time, lower yields should exert downward pressure on the domestic currency, potentially stimulating net exports, producing an exchange rate effect. In addition, lower long-term interest rates are likely to reduce borrowing costs for governments, providing extra room for fiscal expansions, resulting in a fiscal effect. Finally, quantitative easing may stimulate the real economy through a bank lending effect. As banks receive cheap liquidity in the form of central bank reserves, they have more room to increase lending to the private sector.

Author: Ingo Pitterle, United Nations Department of Economic and Social Affairs

Asset purchase programmes in developed economies: the trillion-dollar bazooka

The magnitude of APPs to respond to COVID-19 is reflected in the massive expansion of the balance sheets of major central banks. Since March 2020, the central banks of Japan, the United Kingdom, the United States and the euro area have added roughly \$10.2 trillion in security assets to their balance sheets, with total assets soaring to over \$25.9 trillion by the end of September 2021 (figure II.2a).¹¹ Balance sheets have also ballooned as a share of GDP. In the second quarter of 2021, total financial assets on central bank balance sheets ranged from 35 per cent of GDP in the United States to 130 per cent of GDP in Japan (figure II.2b).

Developed country central banks massively expanded their balance sheets

The Federal Reserve responded to distressed financial markets in the early stages of the crisis by expanding its balance sheet by about \$3 trillion between March and June 2020. Since then, it has been buying \$120 billion of Treasury securities and mortgage-backed securities each month. As a result, the Federal Reserve's total assets have more than doubled since the pandemic started, rising from \$4.2 trillion to about \$8.6 trillion.¹² In contrast to earlier quantitative easing programmes that focused on longer-term securities, the Federal Reserve has recently purchased Treasury securities across a broader range of maturities. In the second quarter of 2021, it held 24.8 per cent of total debt of the Government of the United States. In November 2021, the Federal Reserve began to taper its purchases of securities. After reducing the volume of net asset purchases by \$15 billion in November and December, the Federal Reserve decided to speed up the tapering process to counter persistently

¹¹ Total assets of the four major developed country central banks slightly exceeded the combined assets under management of the top four global asset managers.

¹² This amount includes \$2.6 trillion in mortgage-backed securities implicitly guaranteed by the United States Government and \$5.5 trillion in United States Treasury securities.

high inflation. From January 2022 on, net asset purchases are expected to decrease by \$30 billion per month and end in March 2022.

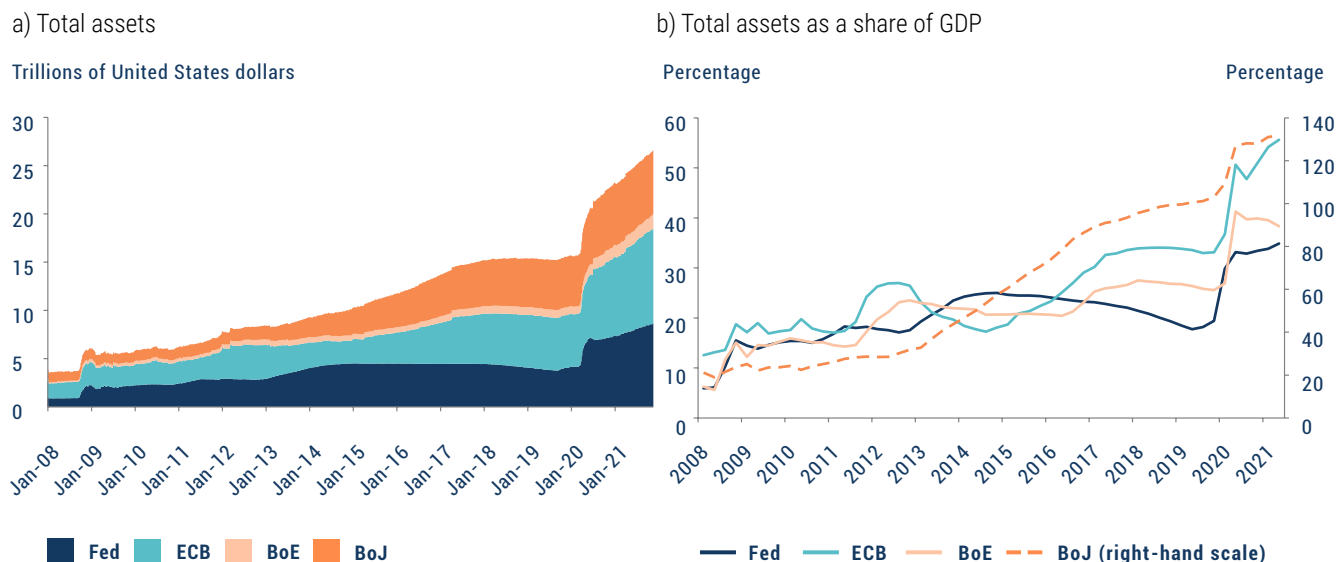
The ECB implemented its 1.85 trillion-euro Pandemic Emergency Purchase Programme (PEPP) in March 2020 to counter COVID-19-induced risks for the euro area.¹³ The programme complements existing APPs, which have a monthly target pace of 20 billion euros. Expected to end in March 2022, PEPP includes purchases of private and public sector securities, including corporate bond securities, asset-backed securities, covered bonds, central government bonds, and regional and local government bonds. The ECB's total assets have increased from about 4.7 trillion euros in March 2020 to 8.4 trillion euros in October 2021.

The Bank of Japan supported the flow of credit to the private sector by raising the upper limit on the amount of outstanding corporate bonds and commercial paper (long and short maturities) to 20 trillion yen. The additional purchases have been extended until at least the end of March 2022 (Bank of Japan, 2021). The bank committed to further supporting public finances by announcing potentially unlimited purchases of government bonds after already holding 43 per cent of outstanding government debt at the end of 2019 (Benigno and Pesenti, 2021). The Bank of Japan is the only major central bank to continuously engage in purchases of exchange-traded funds (ETFs) and Japan real estate investment trusts (J-REITs).

The Bank of England has expanded its quantitative easing programme by about £450 billion since the pandemic began. In total, it has purchased £895 billion worth of bonds since November 2009, almost exclusively United Kingdom government bonds. Unlike other major developed country central banks, the Bank of England already has an exit strategy from the extraordinary policies put in place during the crisis. It plans to raise the key policy rate from 0.1 per cent to 0.5 per cent before reducing its balance sheet by not reinvesting the proceeds.

¹³ The ECB announced the programme with an initial 750 billion euros, a sum that increased by 600 billion euros in June 2020 and by 500 billion euros in December 2020.

Figure II.2
Balance sheets of major developed country central banks



Sources: UN DESA, based on data from the Federal Reserve (Fed), the European Central Bank (ECB), the Bank of England (BoE), and the Bank of Japan (BoJ) (all accessed on 17 November 2021) and CEIC (accessed on 2 November 2021).

Note: For panel a, euro, yen and sterling values were converted into United States dollars by using constant exchange rates from August 2021. In panel b, the figure shows the total assets at the end of the quarter as a share of quarterly GDP (seasonally adjusted, annualized, current prices).

Asset purchase programmes in developing countries: a paradigm shift in monetary policy?

The pandemic has marked a turning point for monetary policy in developing countries. Many central banks introduced APPs for the first time as they experienced rapidly deteriorating financial conditions, large capital outflows and rising government financing costs. Over the course of 2020, 27 central banks – 10 in Africa, 9 in Asia and 8 in Latin America and the Caribbean – announced or implemented APPs.

While these programmes have been broadly modelled after those in developed economies, there are important differences in scope and purpose. Unlike central banks in developed countries, those in most developing countries still had room to cut policy rates when launching APPs. The measures were mainly introduced in response to market turmoil in the early stages of the pandemic, when investor panic, rising risk premiums and substantial capital outflows triggered a free fall in bond prices and a consequent sharp increase in yields as well as currency depreciation. These APPs mainly aimed to boost market confidence and reduce market dysfunctionality. Several central banks explicitly mentioned the need to reduce the costs of COVID-19 (such as Angola, Bolivia, Cabo Verde and Rwanda). Others used APPs to support fiscal needs (Ghana, Indonesia and Mauritius) (Fratto and others, 2021).

Many developing country central banks implemented APPs for the first time

Developing countries' APPs have been smaller and shorter in duration

Overall, developing countries' APPs have been much smaller in scale and shorter in duration than those in developed countries.¹⁴ The size of most APPs in developing countries ranged from just above \$300 million to around \$30 billion, accounting for 0.3 per cent to 6 per cent of GDP.¹⁵ A few developing country central banks conducted one-off purchases at various times between March and May 2020. By the second quarter of 2021, the Reserve Bank of India was the only major developing country central bank continuing with significant asset purchases (BIS, 2021a). While most developing country central banks have focused on purchasing public securities denominated in local currencies, several have also purchased private securities, bank bonds or even equities. The majority have conducted asset purchases in secondary markets but a few also resorted to purchasing bonds directly from governments, reflecting their intention to support fiscal needs (Fratto and others, 2021).

Have asset purchase programmes met their objectives?

Stabilizing markets during financial turmoil

APPs have been effective in addressing financial distress...

Central banks' large-scale APPs have become an important monetary policy tool to address financial distress in a crisis. During both the global financial crisis and the COVID-19 pandemic, the programmes helped to stabilize markets by providing liquidity, easing financial conditions and reducing uncertainty. Through the large-scale purchase of securities, central banks quickly injected sufficient liquidity in distressed markets, reducing risk premiums and facilitating arbitrage across asset classes. A fast and ambitious response helped avoid fire sales and destabilizing price spirals that could spur the collapse of financial systems (Schnabel, 2021).

The response to the global financial crisis demonstrated that asset purchases are particularly effective in filling liquidity gaps and stabilizing markets under certain conditions. First, when the balance sheets of market participants are weak, resulting in liquidity disruptions and widening bid-ask spreads, central bank purchases have a larger effect on prices. Second, APPs need to be very large and announced quickly. When markets are crumbling and uncertainty is soaring, central banks have no time to be modest and slow.¹⁶ Third, assets should be bought flexibly, allowing for targeted interventions as conditions in various market segments change over time. In the emergency phase, central banks should purchase securities from the most distressed segments of financial markets.

¹⁴ A lack of deep and liquid capital markets in developing countries means that APPs are not always a viable policy option.

¹⁵ By comparison, net purchases in the Federal Reserve's latest quantitative easing programme amounted to about 20 per cent of GDP in the United States during March 2020 and October 2021.

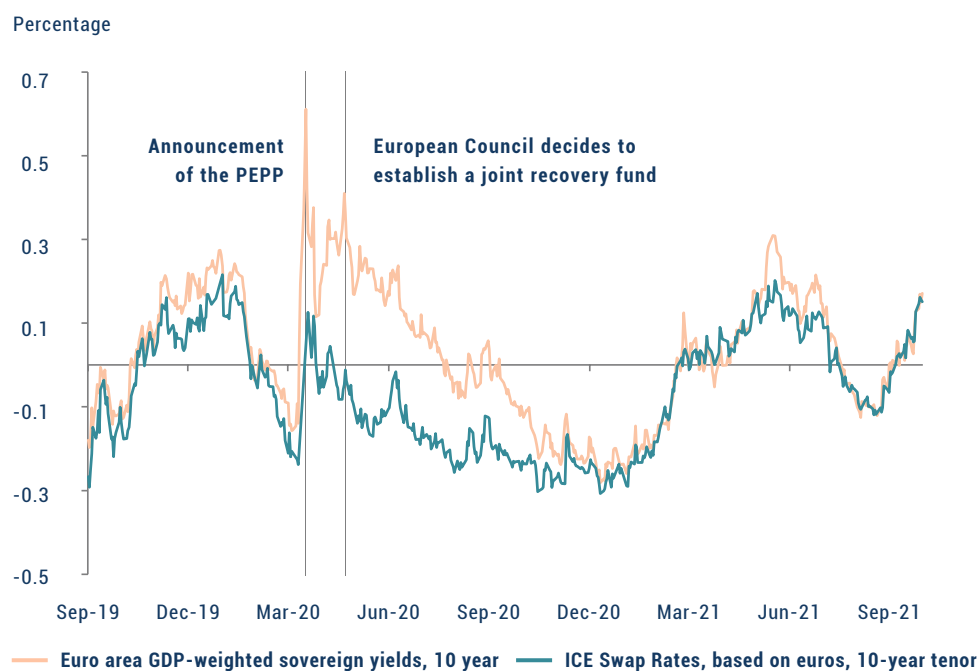
¹⁶ For instance, the significant size of the Federal Reserve's initial programme in 2008-2009, where total asset purchases accounted for about 10 per cent of annual GDP, and the quick absorption of provided liquidity stanching increasing panic on financial markets.

During the COVID-19 pandemic, developed country central banks generally followed these principles, drawing on lessons from the global financial crisis. In March 2020, financial markets across the world were in turmoil as key funding markets experienced severe dislocations. The market for United States Treasury securities, considered one of the world's safest assets, saw a sharp sell-off as panicked investors rushed to exchange them for cash (Schrimpf and others, 2020). In the European Union, liquidity dried up even in traditionally deep markets such as the German Bund market. Corporate bond spreads soared and stock prices plummeted.

In the face of acute financial stress, the major developed country central banks acted swiftly and boldly, announcing large programmes and buying more and different ranges of assets than during earlier APPs. The Federal Reserve made its purchases of Treasury and mortgage-backed securities open-ended. It also shed its unwillingness to purchase corporate bonds and joined the ECB, the Bank of England and the Bank of Japan in buying investment grade and later even lower-grade corporate bonds (Cantú and others, 2021). In Europe, the newly announced PEPP allowed flexible purchases based on markets and jurisdictions, which helped to break the cycle of worsening financial conditions and reduce market panic. Following the announcement of the PEPP and the European Union recovery fund, sovereign yield spreads in the euro area declined notably (figure II.3). At the same time, money market rates realigned with the ECB policy rate. The purchases quickly restored market functioning, safeguarding the transmission of monetary policy (Schnabel, 2021) (see box II.2).

...due to central banks'
swift and bold actions

Figure II.3
Euro area GDP-weighted sovereign yields and ICE swap rates



Sources: UN DESA, based on data from the ECB and Federal Reserve Bank of St. Louis (accessed on 11 November 2021).

Note: The ICE Swap Rate is the principal global benchmark for swap rates and spreads for interest rate swaps; it is a proxy for a risk-free rate. The PEPP is the ECB's Pandemic Emergency Purchase Programme.

APPs in developing countries reduced bond yields without weakening currencies

New APPs by developing countries also promoted financial stability during the emergency phase of COVID-19 (Fratto and others, 2021; Sever and others, 2020). It is difficult to disentangle the effects of APPs from those of other monetary policy interventions and from spillovers from accommodative macroeconomic policies in developed countries. Preliminary evidence, however, shows that APPs in developing countries have had some positive impacts as they reduced bond yields and boosted equity prices during periods of market illiquidity. The IMF (2020) estimates that the size of the impact of domestic APP announcements on local currency sovereign bond yields ranged from 20 to 60 basis points. In addition, decisive actions by developed and emerging market authorities may have supported investor confidence, helping to reverse panic selling and capital outflows. At the same time, APPs did not lead to a significant depreciation of currencies in developing countries.¹⁷

Benefits of APPs during the crisis phase should not mask potential risks

These positive experiences may motivate more central banks in developing countries to consider APPs as an additional monetary policy tool, especially if conventional policy space becomes limited. The recent successful experience with the programmes, however, may overstate their future effectiveness. This is because they were implemented simultaneously with uniquely accommodative macroeconomic easing in developed countries. Further, the financial markets did not anticipate these bold and timely measures. The element of surprise potentially maximized the impact of APPs, preventing asset fire sales and restoring market confidence. APPs in fact may only be suitable for developing countries under certain preconditions, such as stable economic fundamentals, credible monetary policy frameworks and good governance. Without these in place, APPs can carry substantial risks, contributing to higher inflation, increasing depreciation pressures and raising risk premiums while potentially undermining central bank credibility (Hofman and Kamber, 2020).

Box II.2

Backstopping sovereign bond markets via quantitative easing – the special case of the euro area

In the European Economic and Monetary Union (EMU), monetary policy is conducted centrally for all member States by the ECB, even though national governments continue to retain and exercise fiscal sovereignty and issue debt denominated in their common currency, the euro. This institutional set-up suggests an implicit responsibility for the ECB to guarantee the sovereign debt of individual member countries, which makes it difficult to pursue and achieve the primary goal of price stability in the euro area.

When financial turmoil due to the COVID-19 pandemic hit the EMU in March 2020, the resulting downturn affected member States asymmetrically. The effects were especially pronounced in some Southern European countries: Interest rate spreads between German and Italian sovereign bonds, for instance, doubled from 140 basis points to 280 basis points in less than a month. This difference in sovereign financing costs was in part due to varying perceptions of fiscal space in these two countries

¹⁷ This is likely due to the moderate size of the programmes and the fact that purchases were sterilized in many cases, with central banks intervening to offset the effect on exchange rates.

(Schnabel, 2021) and their potentially different ability to service existing debt during an economic crisis.

While the ECB initially refused to address rising sovereign yield spreads, worsening financial conditions prompted a public commitment from the ECB President to directly target sovereign spreads with backstop support for all European sovereign bonds. Preliminary evidence suggests that this announcement contributed to shrinking sovereign bond spreads and rebounding stock prices even more than the ECB's actual purchases of sovereign bonds during the immediate crisis phase (Corradin and others, 2021; Delatte and Guillaume, 2020). Similarly, during the European sovereign debt crisis of 2010-2013, when government bond yields spiked, the announcement of theoretically unlimited purchase programmes lowered the spreads of the sovereign bonds of distressed countries without programmes ever being activated (Acharya and others, 2019).

Compared to the large spreads during the European sovereign debt crisis, such as between German and Greek bunds, the divergence in March-April 2020 was relatively contained. Spreads followed a steady downward trend after the initial jump (Ortmans and Tripier, 2021). The difference between the two episodes may be explained by the prompt monetary and fiscal policy response to COVID-19 as well as significant EMU reform since the last crisis (Baldwin and others, 2015). Nonetheless, the sharp spike in sovereign yield spreads in early 2020 showed that not all member States have public debt with a safe asset status at all times. Without the ECB's public and explicit commitment, borrowing costs would remain higher for some countries, rendering them more vulnerable to external shocks and affecting financial stability in the entire EMU. As a sustainable solution, debt mutualization via European Commission bond issuance has been proposed (Brunnermeier and others, 2016) although several member States remain strongly opposed to it. In July 2021, member States agreed to pool debt obligations of up to 750 billion euros to finance a newly created recovery fund.

Author: Lea Steininger, Vienna University of Economics and Business

Fostering economic recovery

Once the initial objective of stabilizing financial markets is achieved, APPs are expected to foster economic recovery in the short run. Empirical evidence from the global financial crisis suggests that APPs have generally been effective in reducing long-term borrowing costs, which can be a necessary but not sufficient condition for economic recovery. Several studies of the euro area, the United Kingdom and the United States indicate that announcements of large-scale APPs were associated with significant reductions in the yields of government bonds and other assets (Gagnon, 2016; Krishnamurthy and Vissing-Jorgensen, 2011; Andrade and others, 2016; Christensen and Rudebusch, 2012). This translated to lower borrowing costs for the private sector.¹⁸

APPs have lowered long-term borrowing costs...

Several factors determine the effectiveness of asset purchases in reducing bond yields. First, the impact is stronger when there are no entrenched deflationary pressures. If the yield curve is already

¹⁸ Gilchrist and others (2015), for example, find that the efficacy of unconventional policy in lowering real borrowing costs has been comparable to that of conventional policy.

relatively flat, asset purchases can barely reduce yields further. Second, a credible commitment by the central bank to provide sustained monetary accommodation leads to a stronger effect on bond yields.¹⁹ When markets tend to believe that a central bank will not unwind asset purchases on a whim, lower bond yields can translate to lower borrowing costs for the economy as a whole especially during the early phase of recovery. And third, targeting a variety of long-maturity assets can lead to a more broad-based decline in borrowing costs. For example, the expansion of the ECB's APP in 2015 at a time of relative financial calm lowered long-term euro area sovereign bond yields by about 30-50 basis points within a day after the announcement. It also reduced the spreads of non-targeted corporate bonds by about 20 basis points compared to risk-free rates.

...helping to kickstart economic recovery

Record-low long-term borrowing costs have supported economic recovery at least in the initial stage. For instance, the economy of the United States was out of recession by the end of 2009, after the first round of quantitative easing was introduced in November 2008. Research estimates that the programme boosted economic output in the United States by 1-3 per cent (Kim, Laubach and Wei, 2020). Preliminary evidence suggests that pandemic-related APPs have also helped kickstart economic recovery, allowing the major developed countries to emerge quickly from recession. A study by Feldkircher and others (2021) finds that in the United States, APP-related monetary expansion stimulated economic activity during the early stages of the crisis mainly through a rise in stock market returns and an easing of financial conditions. Investment growth responded positively right after stimulus measures were introduced. Gross fixed capital formation in the euro area, the United Kingdom and the United States expanded strongly in the third quarter of 2020 after contracting in the previous two to three quarters. At the same time, consumption of durable goods recovered quickly in the second half of 2020, especially in the United States.

Providing longer-term support to economic growth

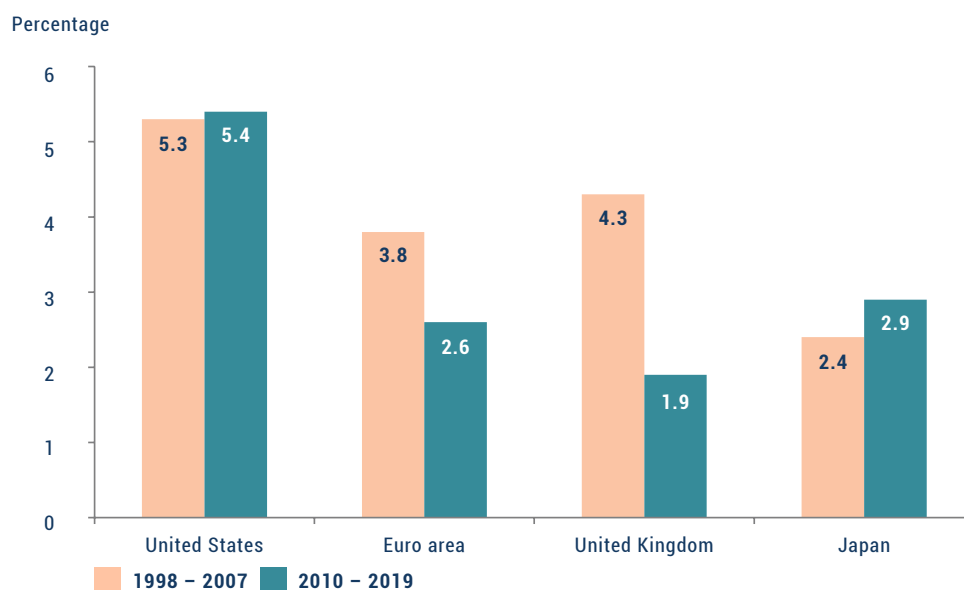
APPs become less effective after the early recovery phase

While there is broad-based consensus that APPs are an effective policy tool during periods of financial distress and can also help to initiate economic recovery, the benefits of sustained use are less clear. When normal market functioning is restored and the economy is recovering, the macroeconomic effects, including through liquidity provision and portfolio rebalancing, will likely become less important. Once long-term yields are at very low levels, new purchases do not provide significant additional stimulus (see, for example, Gern and others, 2015; United Kingdom, House of Lords, 2021). In addition, transmission channels to the real economy can be hampered by several structural factors, such as the underpricing or mispricing of risks, adverse incentives for banks to lend to the real sector and asymmetric wealth effects from rising asset prices sustained by APPs.

¹⁹ For example, the unconventional monetary policy measures adopted by the Bank of Japan between 2010 and 2012 had only a limited impact. Stronger effects were associated with measures adopted in 2013 when the Government provided political backing for the Bank of Japan to pursue an aggressive monetary stimulus (Dell' Ariccia and others, 2018).

The slow economic recovery from the global financial crisis in terms of both output and employment suggests that the effectiveness of central bank asset purchases may dissipate quickly beyond the crisis and early recovery phase. It may also point to the limitations of sustained monetary expansion without supportive fiscal policies. Although monetary policies remained exceptionally accommodative after the global financial crisis, investment failed to pick up significantly. In the euro area and United Kingdom, for example, investment in equipment and machinery grew much more slowly from 2010 to 2019 than from 1998 to 2007 (figure II.4).

Figure II.4
Annual growth in non-residential fixed investment in equipment and machinery



Sources: UN DESA, based on data from CEIC, Eurostat and Federal Reserve Economic Data (FRED).

Note: Growth rates are calculated by taking geometric means of investment (in constant prices) during the reference periods. Data on the United States include only private investment.

A persistently weak bank lending channel partly explains why large-scale asset purchases did not necessarily boost private investment in major developed economies. Evidence on asset purchases after the global financial crisis indicates that commercial banks responded in part by shifting their portfolios into assets with low-risk weights rather than lending to the real economy. They did this to minimize the requirements of regulatory capital. Fatouh and others (2019), for example, find that banks in the United Kingdom that received reserve injections through the Bank of England's APP in 2009-2012 engaged in carry trade strategies towards bonds from other European Union sovereigns, such as Greece, Italy, Ireland, Portugal and Spain.²⁰ In the euro area, Horst and Neyer (2019) find that

Cheap liquidity has often not stimulated bank lending to the real economy...

²⁰ For the United States, Rodnyansky and Darmouni (2015) did not find any impact on bank lending when asset purchases targeted treasuries in the second phase of quantitative easing after the global financial crisis. When mortgage-backed securities were targeted, as in the first and third phases of quantitative easing, there was a positive effect on lending.

increasing excess reserves can have no or even a contractionary impact on the supply of bank credits because banks may face rising marginal costs from holding deposits due to regulatory issues.

Preliminary evidence from the United States during the COVID-19 crisis also suggests APPs play a limited role in enhanced bank lending. Bank lending in 2020 was hampered by financial constraints at the firm level rather than the bank-level constraints observed in 2008. Many banks in the United States entered the pandemic in strong financial positions, well capitalized and with ample liquidity. Since APPs can mainly relax financial constraints at the bank level rather than at the firm level, the programmes have likely been less effective (Sims and Wu, 2020). Similarly, since bank reserves were much larger in 2020 than in 2008, the direct effect of a further increase in reserves on the liquidity premium is smaller, reducing the overall effectiveness of APPs (Occhino, 2020).

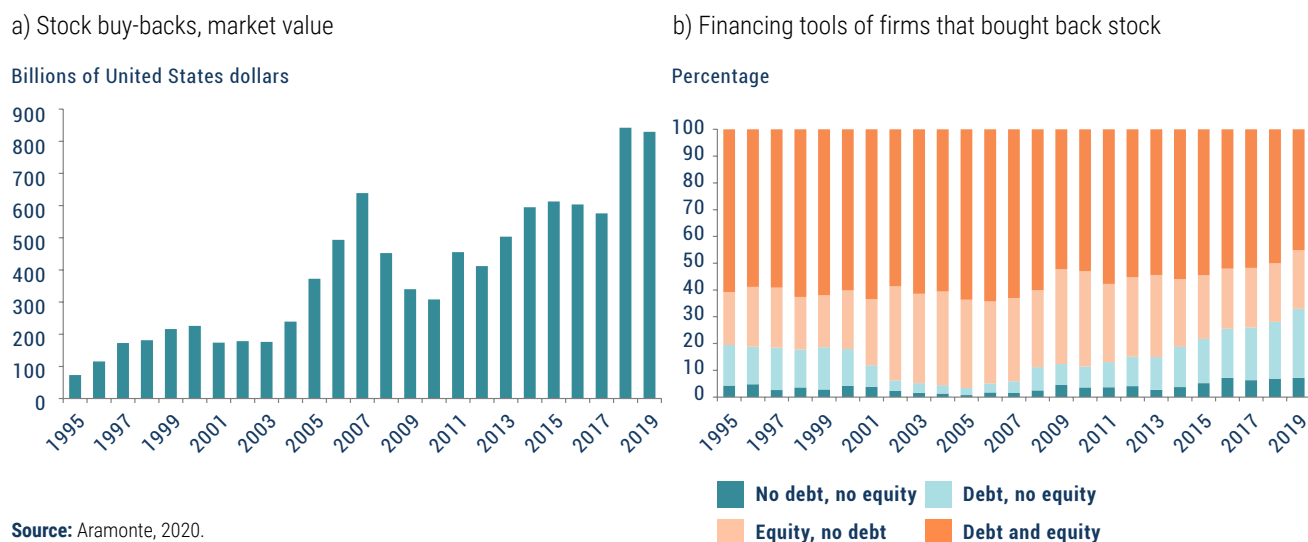
...while encouraging the creation of “zombie firms” with low productivity

Abundant liquidity, ultralow interest rates and reduced financial pressure have also led to a rise in so-called “zombie companies”, defined as firms that are unable to cover debt-servicing costs from current revenue over an extended period. Banerjee and Hofmann (2018) find that such companies deleveraged at a slower pace after the global financial crisis. On the one hand, weak banks allowed them to roll over loans rather than writing them off. On the other hand, low interest rates raised incentives for assuming excessive risks or taking bank loans for low-productivity investments that would have been deemed infeasible with higher interest rates. The greater share of zombie companies is likely to have weighed on aggregate productivity not only because these firms are less productive than others but also because they may crowd out investment and employment in healthy firms (Caballero and others, 2008; Adalet McGowan and others, 2017).

Firms use additional liquidity for stock buy-backs rather than productive activities

An additional factor holding back investment is a massive increase in stock buy-backs. While in many countries, including China, Japan, France and the United Kingdom, the volume of stock repurchases has risen considerably since the global financial crisis, the trend has been most pronounced in the United States (Aramonte, 2020). Amid persistently low interest rates and large tax cuts in 2017, share buy-backs reached a record level prior to the COVID-19 crisis (figure II.5). After a pause in the early stages of the pandemic, firms resumed these. In the second quarter of 2021, buy-backs among companies listed on the Standard and Poor’s (S&P) 500 index totalled \$199 billion, equivalent to about 3.5 per cent of the GDP of the United States. This marked an increase of 124.3 per cent from the second quarter of 2020 and was only 11 per cent below the all-time high of \$223 billion in the fourth quarter of 2018. Buy-backs have increasingly been debt financed, contributing to a faster rise in corporate leverage and increasing financial fragility. In 2019, about a quarter of firms bought back stocks by issuing new debt, compared to only 4 per cent of companies in 2007. While pushing up stock prices, large-scale buy-backs may negatively affect capital accumulation and reduce firms’ abilities to cope with an economic downturn, especially if they are funded with new debt. Moreover, increases in stock prices often just benefit senior corporate executives and major shareholders while depressing investments in productive capital.

Figure II.5
Stock buy-backs in the United States and the financing tools of firms that bought back stock



Prolonged implementation of APPs will likely reduce their effectiveness. First, the signalling effect gradually weakens as recovery progresses and market participants adjust their expectations. Evidence suggests that late-stage programmes shift expectations less than earlier programmes (Yu, 2016). Second, low long-term yields could convey a negative signal about economic prospects, undermining consumer and investor confidence. Third, wealth effects may not boost private consumption significantly since wealthy households with very low marginal propensity to consume primarily benefit from rapidly rising asset prices. As a result, rising wealth is unlikely to translate into significantly stronger aggregate demand. Separately, persistent low rates due to APPs may impair bank profitability and negatively affect credit supply as net interest margins become compressed (Hesse and others, 2018).

Prolonged implementation of APPs could be self-defeating

Side effects and risks of large-scale asset purchase programmes

Large-scale APPs have played an important role in stabilizing financial markets and reviving economies following the COVID-19 shock. A prolonged period of ultraloose monetary policies has also created macroeconomic and financial vulnerabilities, however. If not managed well these could undermine global recovery. By continuously providing an immense volume of liquidity through asset purchases, central banks risk feeding inflationary pressures while further encouraging search-for-yield and speculative behaviour among investors. This is due to the underpricing of risk, which aggravates

APPs adversely affect wealth distribution and may increase macrofinancial risks

the misallocation of capital and increases financial stability risks. At the same time, concerns have been growing over the distributional effects of APPs as rising asset prices disproportionately benefit wealthy households.

Macroeconomic effects

Inflationary concerns

When major developed country central banks began large-scale asset purchases after the global financial crisis, there was widespread concern that the expansion of balance sheets and resulting increase in the monetary base would trigger higher inflation and potentially de-anchor inflation expectations.²¹ Figure II.6 illustrates how the monetary bases in Japan, the United Kingdom, the United States and the euro area have increased since 2008 (including a jump since March 2020). Massive expansion of the monetary base, however, has not led to higher inflation in these economies. On the contrary, headline inflation has generally remained low, frequently falling short of central banks' 2 per cent target rate. In the decade after the crisis, consumer price inflation averaged 2.3 per cent in the United Kingdom, 1.6 per cent in the United States, 1.3 per cent in the euro area and 0.3 per cent in Japan.²²

Concerns about higher inflation after the global financial crisis proved unfounded...

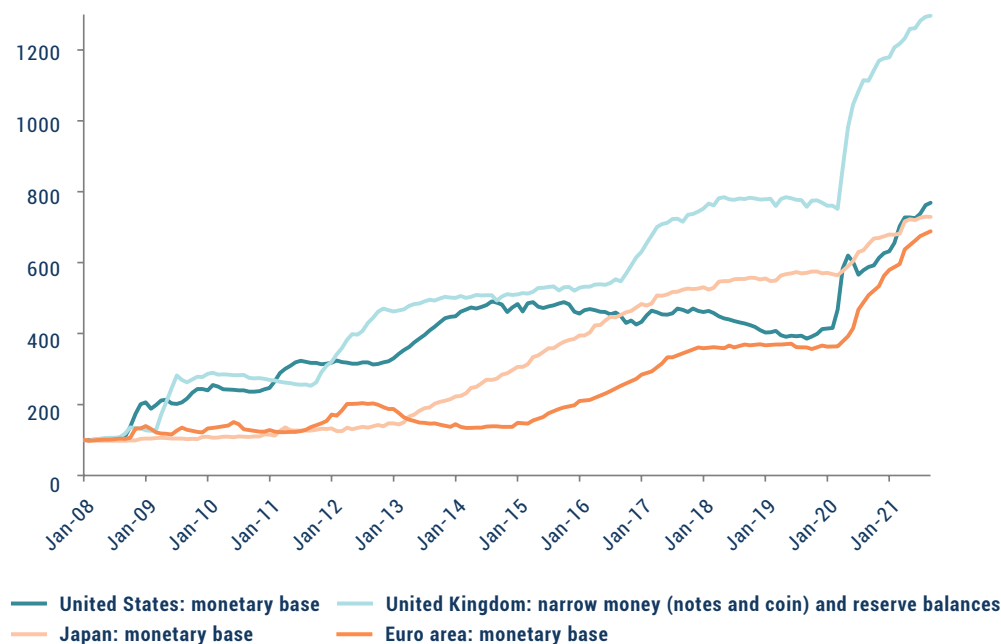
An evaluation of APPs launched in response to the global financial crisis suggests that the impact on inflation has been very limited past the medium term. For instance, based on options data for the United States, Reis (2016) shows that while early rounds of quantitative easing had a sizeable effect on expected inflation, further rounds had little or no effect. Similarly, euro area evidence indicates that APPs put upward pressure on inflation only during the first two years (Gambetti and Musso, 2017; Clemens and others, 2017) and that APP announcements raised inflation expectations only modestly by 20 to 30 basis points (Rieth and Gehrt, 2016).

²¹ When purchasing long-term securities from financial institutions, central banks create new bank reserves, thus expanding the monetary base (i.e., the sum of currency in circulation and bank reserves).

²² Core inflation, excluding volatile food and energy prices, was even lower.

Figure II.6
Base money in selected major developed economies

Index, January 2008 = 100



Sources: UN DESA, based on data from the Federal Reserve Bank of St. Louis, Bank of England, Bank of Japan and ECB (accessed on 30 October 2021).

Why has the rapid expansion of the monetary base not led to significantly higher inflation? The main reason is that after the initial crisis phase, most of the additional liquidity created by central banks did not reach the real economy. In fact, the global financial crisis weakened financial intermediation with consequences felt beyond the immediate crisis phase. Rather than increasing credit flows to households and firms, banks and other financial institutions used additional liquidity to shore up their balance sheets (figure II.7a). For their part, financially stressed households and firms were often reluctant to borrow or invest. In the United States, for instance, growth of total bank credit in the 10 years after the crisis was weaker than during the decade before the crisis (figure II.7b). Similar trends were observed in the United Kingdom and the euro area.²³

Monetary conditions today, however, differ considerably from those after the global financial crisis. Inflation risks are now emerging as a concern in many developed economies. Unlike during the global financial crisis, economies have faced both demand-side and supply-side shocks during the pandemic. While the demand-side shocks dissipated by the third quarter of 2020, the supply-side shocks persist in the major developed economies. The rapid increases in headline inflation over the past year are primarily due to quickly recovering demand amid strongly supportive fiscal policies and across-the-board supply-side disruptions, including massive dislocation in labour markets. Consumer demand in

...but monetary conditions today are very different

²³ From a monetary perspective, the rapid increase in the monetary base was offset by declines in the money multiplier and the money velocity.

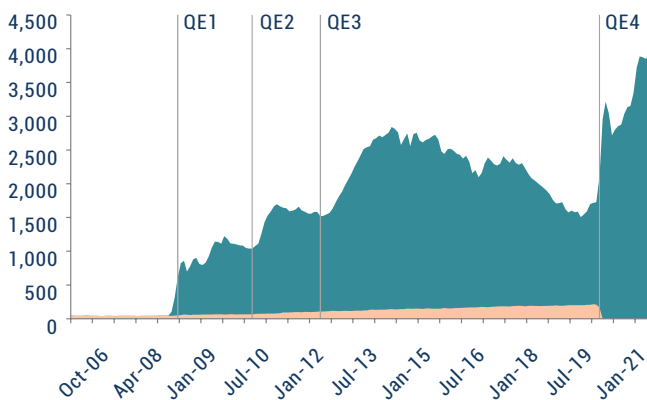
the United States and the euro area recovered much faster than supply. Unfortunately, central banks do not have specific tools at their disposal to address supply-side bottlenecks such as labour gaps, shortages of products such as semiconductors, or other supply-chain disruptions impeding the flow of goods and services and increasing inflationary pressure.

Notwithstanding prevailing supply-side constraints, APPs may indirectly exacerbate supply-side pressures and contribute to inflationary pressures if bank lending channels remain weak in the near term and firms face constraints in increasing investments and boosting productive capacity, as discussed above. To ease supply-side bottlenecks and inflationary pressures, it will remain critical for central banks in the developed economies to ensure that banks extend credit to the real sectors of the economy and do not just finance stock buy-backs or financial speculation.

Figure II.7
Reserves of depository institutions and growth of total loans in the United States

a) Reserves of depository institutions

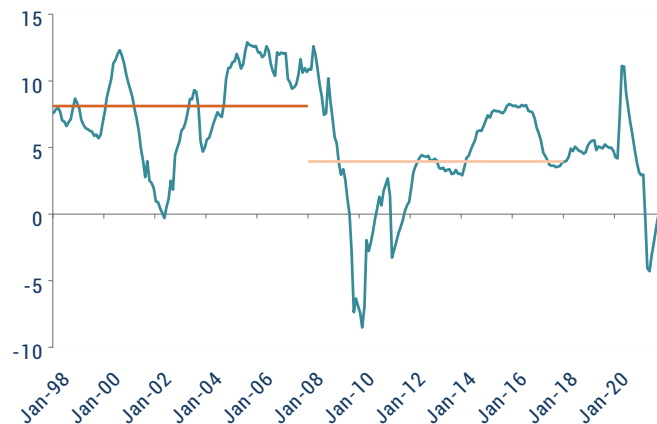
Billions of United States dollars



■ Excess reserves of depository institutions
■ Required reserves of depository institutions

b) Growth of total loans

Percentage



— Growth of total loans
— Average growth of total loans, 1998 – 2007
— Average growth of total loans, 2008 – 2017

Source: UN DESA, based on data from the Federal Reserve Bank of St. Louis (accessed on 30 October 2021).

Note: QE1 to QE4 are the Federal Reserve's quantitative easing programmes.

Source: UN DESA, based on data from CEIC (accessed on 30 October 2021).

Asset prices and financial instability

While asset prices are affected by many factors other than monetary policy, the additional liquidity from large-scale APPs has fuelled asset price inflation in virtually every asset class. The most immediate impact has been on bond prices. Over 2020, the average price of the S&P Global Developed Sovereign Bond Index increased by 12 per cent compared to about 2 per cent per year from 2015 to 2019.²⁴ Prices of corporate bonds have also experienced sharp increases. After a dip in March 2020, the returns rebounded quickly, growing by 12 per cent in the United States and 5 per cent in the euro area (figure II.8b).²⁵

As investors rebalance their portfolios and search for higher risk-adjusted returns, prices of other asset classes have increased as well. Stocks have recorded especially large gains in the United States. In the 10 years after the first round of quantitative easing implemented by the Federal Reserve in response to the global financial crisis, the S&P 500 and the NASDAQ Composite Index rose by over 200 per cent and nearly 380 per cent, respectively. By comparison, both indices had not recorded gains in the 10 years before that point despite some fluctuations (figure II.8a). Since the Federal Reserve announced its latest APP in March 2020 to combat the COVID-19 crisis, the S&P 500 has surged by 75 per cent while the NASDAQ Composite Index has doubled (figure II.8b). Equity prices have also moved higher elsewhere albeit less strongly than in the United States. In the European Union, for example, the Dow Jones Euro Stoxx Index recovered quickly from the pandemic, rising by almost 70 per cent during March 2020 and November 2021 (figures II.8a and II.8b).²⁶

Ultraloose monetary policies have driven down mortgage rates and pushed up real estate prices since the global financial crisis and particularly since the onset of the pandemic. Globally, residential property prices adjusted for inflation were 6 per cent higher in the first quarter of 2021 than in 2019. Again, price increases have been particularly strong in the United States, where the Case-Shiller Home Price Index rose by a staggering 23 per cent between March 2020 and July 2021 (figure II.8b). Historically low interest rates have also boosted the prices of other financial products, such as high-yield bonds, and prompted increased speculative activities in meme stocks and cryptocurrencies. The price of the S&P 500 High-Yield Corporate Bond Index increased by 38 per cent from March 2020 to October 2021; the price of Bitcoin, the dominant cryptocurrency, soared by nearly 80 per cent during the same period.

APPs have fuelled asset price inflation

Equity prices have soared during the pandemic...

...along with prices of real estate, bonds and other assets

²⁴ Based on the [S&P Global Developed Sovereign Bond Index](#) (accessed on 29 October 2021).

²⁵ As of September 2021.

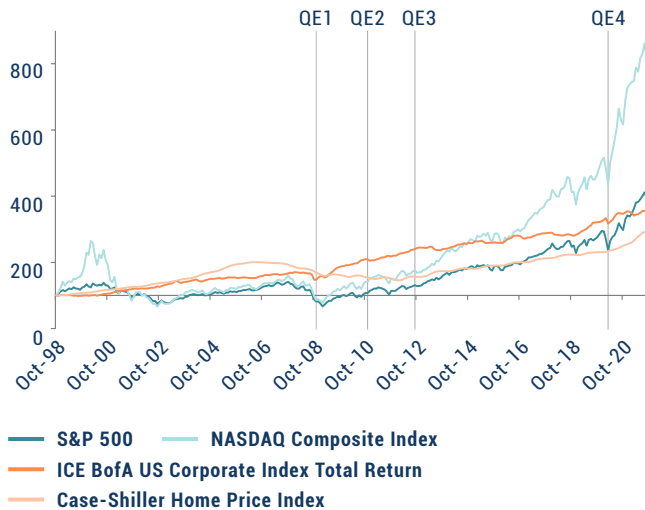
²⁶ Unlike the major United States stock market indices, the Dow Jones Euro Stoxx remains lower than it was before the global financial crisis and the dot-com bubble.

Figure II.8
Asset valuation changes and asset composition in the United States and Europe

(a) Asset valuation changes since October 1998

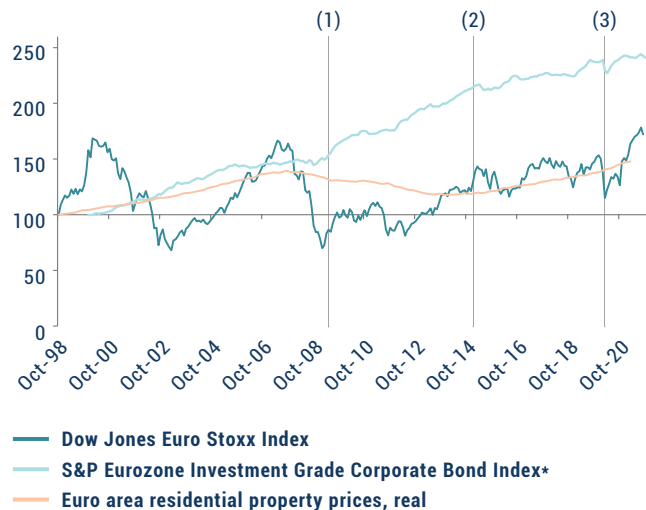
UNITED STATES

Index, October 1998 = 100



EUROPE

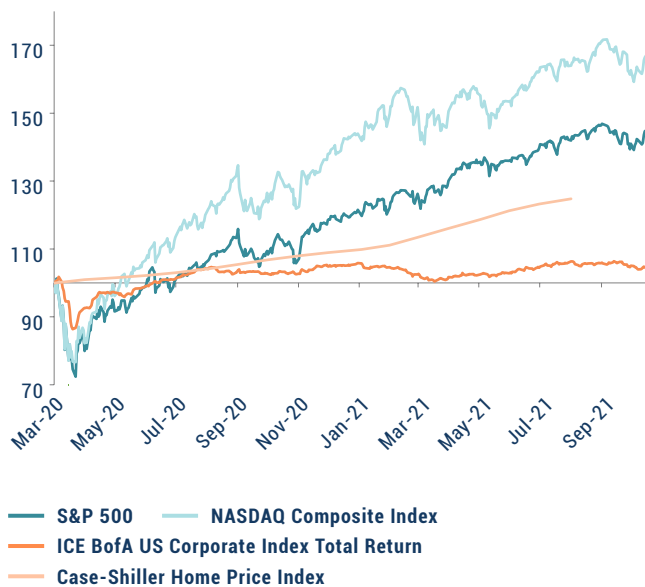
Index, October 1998 = 100



(b) Asset valuation changes during the COVID-19 pandemic

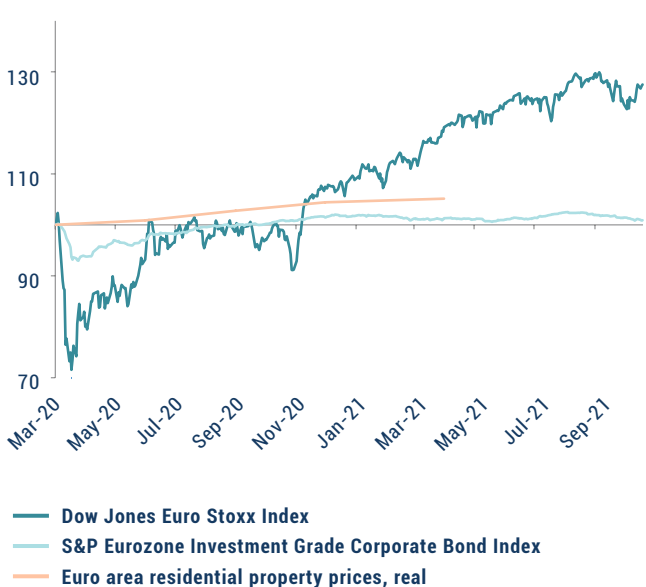
UNITED STATES

Index, 1 March 2020 = 100



EUROPE

Index, 1 March 2020 = 100



Sources: Bank for International Settlements (accessed on 19 October 2021), Federal Reserve Bank of St. Louis (accessed on 11 November 2021), Investing.com (accessed on 20 October 2021) and S&P Global (accessed on 29 October 2021).

Notes: S&P = Standard and Poor's. BofA = Bank of America. Panel a, right figure: (1) The ECB engaged in the large-scale purchase of covered bonds in May 2009; (2) the ECB announced an expanded APP in January 2015; (3) the ECB announced its PEPP in March 2020. *The S&P Eurozone Investment Grade Corporate Bond Index starts from December 1999 and is thus indexed by using December 1999 = 100. QE1 to QE4 are the Federal Reserve's quantitative easing programmes.

The valuations of different financial assets, especially equities, appear increasingly detached from underlying fundamentals. In the United States, for instance, the cyclically adjusted price earnings (CAPE) ratio, which measures the relative price of equities by comparing their current price to the average 10-year earnings, has risen by over 50 per cent since April 2020, more than after any other recession in the past 120 years.²⁷ As a result, equity markets in the United States have rarely seemed more overvalued than they are now, with CAPE ratios approaching levels only seen prior to the bursting of the dot-com bubble in 2001.²⁸

This has spurred fears of ever-expanding asset price bubbles as the disconnect between financial markets and economic fundamentals continues to widen. Table II.1 shows that while investment in developed economies bounced back after the collapse in the second quarter of 2020, the upward momentum slowed significantly in the first half of 2021. Despite some recovery in investment during the second half of 2020, global economic conditions are currently characterized by persistent supply-side bottlenecks that have been feeding inflationary pressures. It is likely that supply-side bottlenecks will persist, in the United States and other economies, at least until the first quarter of 2022. If monetary conditions shift abruptly, with the Federal Reserve quickly tapering asset purchases and raising policy rates, asset price bubbles may burst. Sharp market corrections could trigger a rising number of bankruptcies and cause substantial macroeconomic damages, with adverse global spillover effects.

Asset bubbles may burst due to abrupt monetary policy shifts

Table II.1
Changes in quarterly gross fixed capital formation

Percentage

	2019 Q3	2019 Q4	2020 Q1	2020 Q2	2020 Q3	2020 Q4	2021 Q1	2021 Q2
Euro Area	0.4	-0.5	-4.3	-12.3	14.8	2	0.8	0.7
United Kingdom	1.3	-1.6	-1.2	-20.7	19	4.4	-1.8	-0.5
United States	0.7	0	-0.1	-7.2	5.2	3.7	2.3	0.5
Japan	0.9	-3.1	0.2	-3.2	-2	2.9	-0.9	1.4

Sources: CEIC and OECD (accessed on 29 October 2021).

Note: Data are quarter-on-quarter growth rates of gross fixed capital formation (constant prices, seasonally adjusted). Euro area data exclude Cyprus, Ireland and Malta.

Financial stability concerns are compounded by the higher risk exposure of investors as APPs have pushed market participants towards higher-yielding assets. As a result, portfolios have become more sensitive to interest rate changes and market volatility. Excessive risk-taking may accelerate any negative shock, leading to broader financial instability. Since leverage on corporate balance sheets was

²⁷ Data on the CAPE ratio for the United States are provided by Robert Shiller.

²⁸ Stock market valuations in other large economies are generally not as high as in the United States but in some cases still appear stretched in view of subdued economic prospects.

already at an all-time high before the pandemic, the latest round of APPs may have further aggravated financial stability risks.²⁹

APPs affect the composition of global liquidity and climate risks

In addition to inflating asset prices, APPs can undermine financial stability in other ways (Caldentey, 2017). While base money expansions did not translate into more money circulating in the economy at large, asset purchases have had an indirect impact on the composition of global liquidity. Through the portfolio balancing effect, they have altered the relative profitability of investing in various asset classes, strengthening the international bond market. Rapidly growing bond markets have facilitated additional debt issuances and the build-up of the asset management industry, which in 2020 controlled about \$103 trillion of assets globally, up by 11 per cent from 2019 (Heredia and others, 2021). The high level of concentration, interconnectedness and procyclicality of the asset management industry poses substantial risks to financial stability (Caldentey, 2017). Moreover, central banks' purchase operations and portfolio holdings have climate implications that may trigger physical and financial risks given market failure and externalities (box II.3).

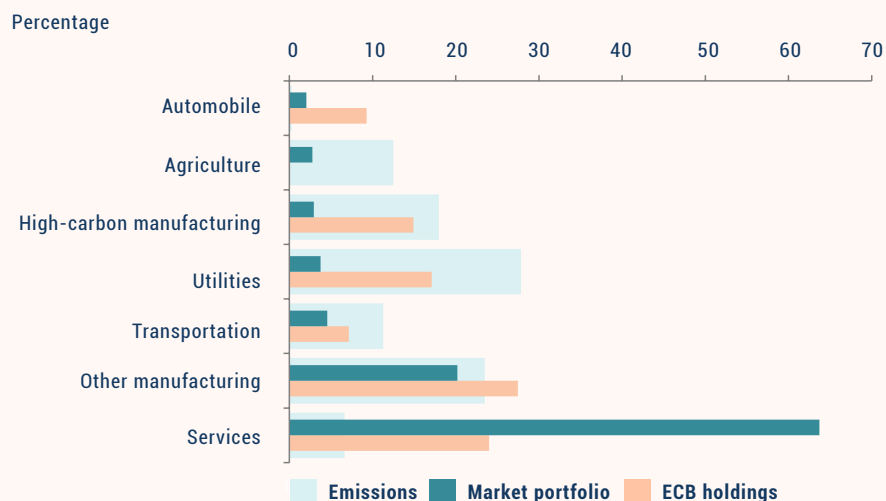
Box II.3

Greening asset purchase programmes to mitigate climate risks

Asset purchases by central banks are not necessarily market neutral. When central banks purchase bonds, they tend to give greater weight to sectors with a higher share of carbon emissions. This is because highly carbon-intensive firms are overrepresented in the bond market as they can easily use their large holdings of fixed assets as collateral for issuing bonds (Papoutsi and others, 2021) (figure II.3.a). For instance, the ECB has exhibited a tendency to purchase bonds in carbon-intensive sectors like utilities and transportation (Barker, 2015; Matikainen and others, 2017). As of July 2020, carbon-intensive sectors comprised 62.7 per cent of the value of outstanding corporate bonds held by the ECB (Dafermos and others, 2020a). Likewise, 57 per cent of the value of all bonds in the Bank of England's Corporate Bond Purchase Scheme was from carbon-intensive sectors as of June 2020 (Dafermos and others, 2020b).

²⁹ The adverse effect of asset purchases on bank profitability has also been seen as a potential financial stability risk but so far these concerns appear largely unfounded.

Figure II.3.a
Sector shares of the market portfolio, ECB holdings and emissions



Source: Papoutsi, Piazzesi and Schneider, 2021.

The carbon bias of APPs has had undesirable side effects. When central banks purchase bonds irrespective of their ecological footprint, they provide an implicit subsidy to fossil fuels and other high-emissions industries, encouraging investment in these sectors. Climate change, in turn, poses different risks to the stability of the financial system, including physical, liability and transition risks.

Tackling climate change requires a “whole-of-government” approach. While central banks may not be at the very centre of climate policies, as public institutions, they play an important role in promoting the transition to a low-carbon economy. Monetary policies should do more to address climate-related risks and provide necessary incentives to green the financial system. Central banks have taken some action by forming the Network for Greening the Financial System, with a membership of 100 central banks and financial regulators as of November 2021. Its primary objectives include integrating sustainability into central bank portfolio management.

Central banks ought to acquire low-carbon assets, such as green bonds, sustainability bonds, or assets that meet minimum environmental, social, and governance (ESG) standards. The ECB, for example, has made green bonds and sustainability-linked bonds eligible for central bank operations (ECB, 2021). Sweden’s Riksbank announced that it would “only offer to purchase bonds issued by companies deemed to comply with international sustainability standards and norms” from January 2021 onwards (Riksbank, 2020). Similarly, in November 2021, the Bank of England published details of how it will green its Corporate Bond Purchase Scheme (Bank of England, 2021). Such policy moves will promote the growth of green financial markets and reduce the cost of capital for investments in clean energy relative to carbon-based energy. Moving beyond climate considerations, central banks can also play a more active role in fostering sustainable investments more broadly.

Distributional effects: making the rich richer?

Higher asset prices have disproportionately benefited the rich...

After early studies largely focused on the macroeconomic and financial effects of APPs, interest in their distributional impact has grown in recent years (for example, Bernoth and others, 2016; Metzger and Young, 2020; Bonifacio and others, 2021; BIS, 2021b). As discussed, central bank asset purchases affect financial markets and the real economy, and, consequently, distributional outcomes, in various ways. In principle, faster economic growth and improved job markets, which are key longer-term objectives of APPs, should benefit low-income groups. Experiences in the past decade, however, have raised doubts about the long-run positive effects of the programmes on output and employment. While they have boosted prices across a broad range of asset classes, these have disproportionately benefited wealthy households as they not only hold more assets but also larger shares of risky assets than other groups. While the distributional impact of APPs is not uniform across countries and time periods, the programmes have likely increased wealth inequalities, especially in developed countries.

...as income and wealth composition differ across groups

APPs affect different groups unevenly due to large variations in sources of income. Capital gains account for a significant share of total income for top earners, especially the top 1 per cent, but are negligible for other groups (figure II.9a). Low-income earners, in turn, rely heavily on transfers and welfare programmes. The sharp increase in asset prices has thus primarily lifted the incomes of the wealthy.³⁰

Another factor in the impact of APPs on wealth distribution is that different groups own varying asset types. Wealthy households hold a large share of their wealth in financial assets, especially stocks (figure II.9b), which at least in the United States have recorded stronger price gains than other asset classes in the past two decades.³¹ In addition to directly owning shares of publicly listed companies, many wealthy households invest in private equity and venture capital firms, which have also experienced sharp increases in value. By contrast, less wealthy individuals hold most of their assets in real estate, where prices have grown at a slower pace.

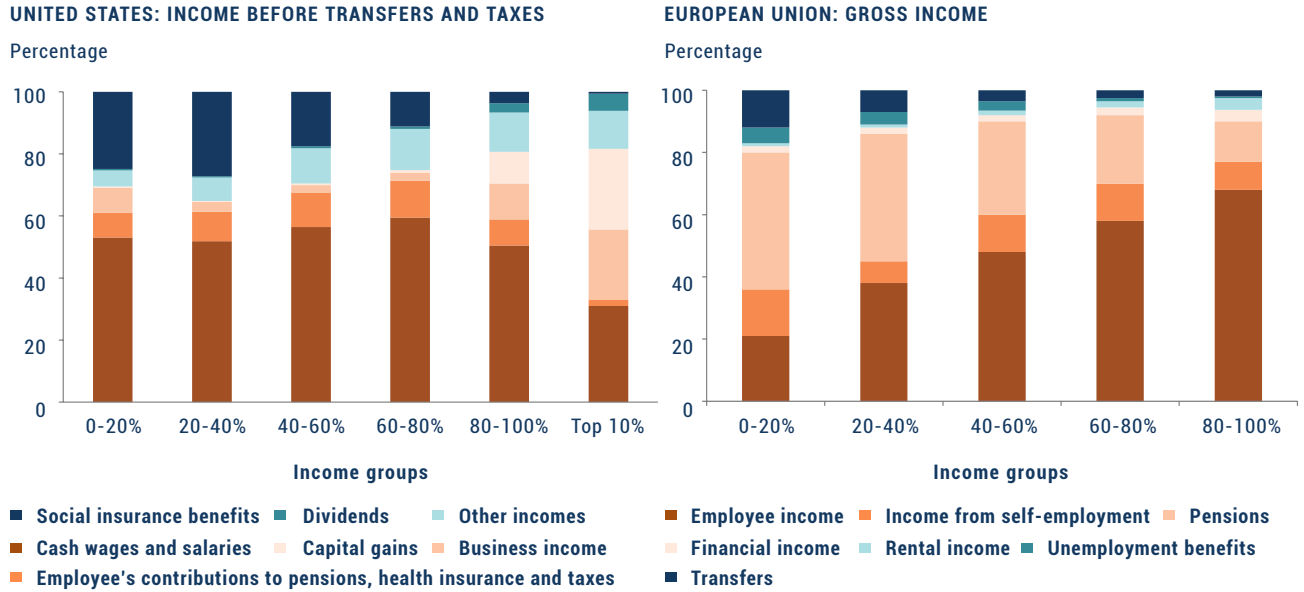
Rapid but uneven increases in asset prices, coupled with differences in the composition of asset holdings across wealth groups, imply that wealthy households have reaped most of the direct gains from APPs. In the United States, the wealthiest 10 per cent of households held nearly half of all assets in stocks in 2016, while the corresponding figure for the bottom 20 per cent was only 2 per cent (figure II.9b). Assuming this asset composition still holds, the top 10 per cent in the United States may have recorded wealth gains of about 44 per cent since March 2020, compared to only 15 per cent for the bottom 20 per cent as of October 2021. In the European Union, likewise, the top 10 per cent has held a

³⁰ By contrast, transfer or welfare programmes usually vary little with economic activity (Amaral, 2017).

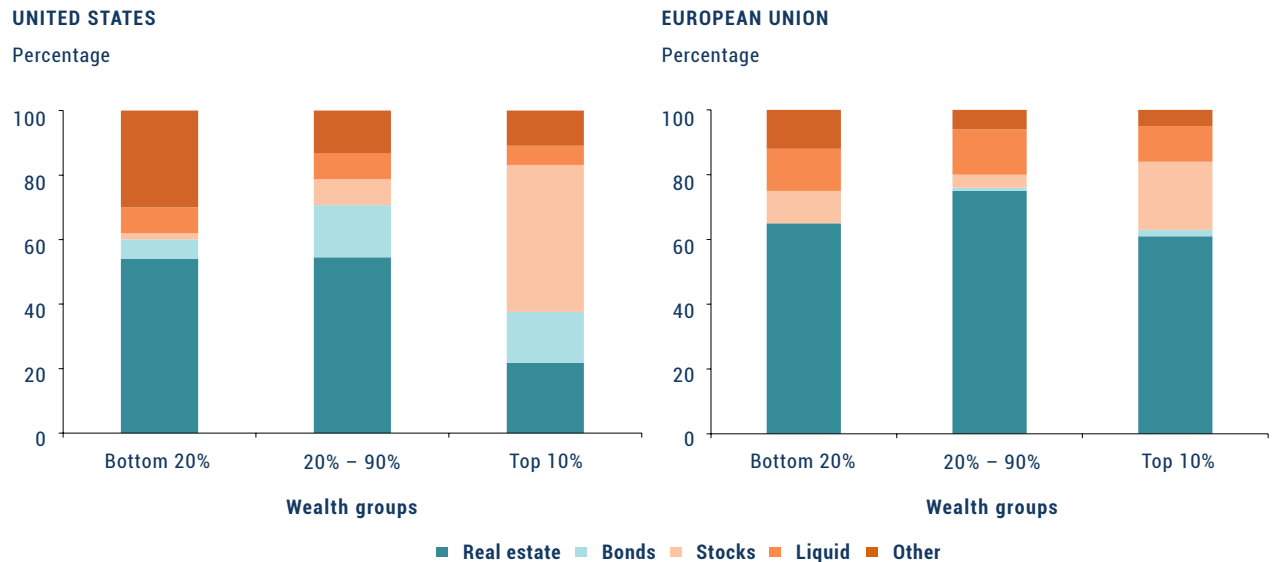
³¹ In fact, ownership of stocks is heavily concentrated among the wealthiest households. In the United States, over 90 per cent of those in the top 10 per cent of the wealth distribution owned stocks in 2019 compared with 21 per cent of those in the bottom 25 per cent (Smart, 2021).

Figure II.9
Income and asset composition in the United States and Europe

(a) Income composition



(b) Asset composition



Sources: Panel a, left: United States, Congressional Budget Office, Distribution of Household Income 2017 (accessed on 25 October 2021). Panel a, right: Lenza and Sacalek, 2018. Panel b: Bonifacio and others, 2021.

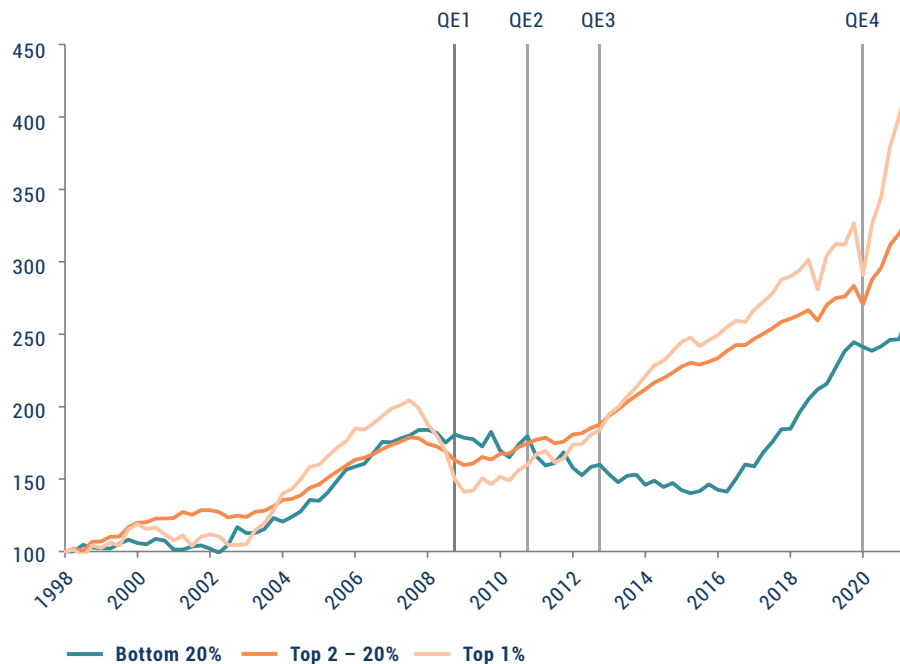
larger share of wealth in stocks than other groups and is estimated to have recorded stronger wealth gains since the beginning of the pandemic.³²

The top 1 per cent have experienced the largest wealth gains

The asymmetric effect of APPs is more striking when considering absolute wealth gains. Between the first quarter of 2020 and the second quarter of 2021, the top 1 per cent of income earners in the United States registered net wealth gains of about \$3.5 million per person, while the bottom 20 per cent recorded only an increase of about \$5,300 per person.³³ Longer-term wealth trends provide further evidence of the negative distributional effects associated with APPs. In the 10 years before the global financial crisis, the wealth of the top 20 per cent and the bottom 20 per cent of income earners in the United States grew at a similar pace (figure II.10). After three rounds of quantitative easing, wealth trends diverged sharply among income groups, widening further after a fourth round in 2020.³⁴

Figure II.10
Growth of wealth across income groups in the United States

Index, Q1 1998 = 100



Sources: UN DESA, based on the [Federal Reserve Distributional Financial Accounts](#) (accessed on 21 October 2021).

Note: QE1 to QE4 are the Federal Reserve's quantitative easing programmes.

³² The smaller gap in wealth gains in the European Union compared to the United States is consistent with Domanski, Scatigna and Zabai (2016), who argue that increases in house prices tend to decrease inequality if home ownership prevails, while increases in other asset prices tend to increase inequality.

³³ Calculated based on data from the [Federal Reserve's Distributional Financial Accounts](#) (accessed on 4 October 2021).

³⁴ Other factors, such as the slow and uneven labour market recovery from the global financial crisis, contributed to diverging wealth trends.

Developed countries other than the United States that have implemented APPs have experienced similar trends in income and wealth inequalities. For instance, Bernoth and others (2016) indicate that ECB asset purchases have likely increased wealth inequality in the euro area due to increases in stock prices. In the United Kingdom, research finds that positive effects from APPs are higher at the top of wealth and income distribution and lower at the bottom. The richest 10 per cent of households gained, on average, £350,000 during the first round of quantitative easing in 2009, more than 100 times the gains seen by the poorest 10 per cent (United Kingdom, House of Lords, 2021). The Bank of Japan's QE and QQE (quantitative and qualitative easing) programmes increased income and wealth inequality through a rise in the price of financial assets that benefited primarily richer income groups and widened income gaps among different income groups (Yoshino, Taghizadeh-Hesary and Shimizu, 2018). In a recent speech, the Governor of the Bank of Canada admitted that quantitative easing can widen wealth inequality as the programmes boost the value of assets that are not evenly distributed across society (Macklem, 2021).

APPs have widened inequalities in several developed economies

Since APP effects are primarily transmitted via higher asset prices, the programmes also have an implicit gender bias, favouring men over women. On average, women have lower incomes and less wealth. They tend to be more risk averse, with ownership rates of risky financial assets lower for women than men. APPs are thus likely to benefit men more strongly than women (Metzger and Young, 2020). When APPs are sustained over a long period, they can also increase intergenerational inequality. In the United States, for example, older persons tend to be more active in investing in equity markets. In 2019, 43 per cent of stocks in value terms were owned by investors aged 65 and above (Smart, 2021). Older persons may thus benefit disproportionately from asset price increases.³⁵

APPs may contribute to gender and intergenerational inequalities

Besides boosting asset prices, APPs also have distributional implications by affecting inflation, employment and wages. In most cases, however, the adverse distributional effects from higher asset prices likely outweigh the positive effects associated with modest employment and wage gains.³⁶

³⁵ APPs impact pension funds as well but the actual impacts remain inconclusive. For those under defined contribution schemes, although APPs could increase the prices of both bonds and equities held in the pension funds, a fall in yields will reduce the annuity rate. For those under defined benefit schemes, while APPs could increase the value of their assets, they could also raise the value of their liabilities due to a fall in yields (BoE, 2012).

³⁶ One study finding a slightly positive overall effect is by Lenza and Slacalek (2018). Based on a sample of four European countries, they estimated that a sudden increase in asset purchases could lower the unemployment rate by 0.7 percentage points. This would mainly benefit the incomes of the bottom 20 per cent of households and slightly reduce the Gini coefficient.

Spillover effects on developing countries

Developed countries' APPs have created significant spillovers

The large-scale APPs introduced by developed country central banks have had significant spillover effects on developing countries through several well-established channels. First, by boosting aggregate demand in the originating country, APPs may generate positive spillovers for developing countries through stronger demand for their goods and services.³⁷ Second, since APPs reduce long-term bond yields in developed countries, investors turn to assets in developing countries for higher risk-adjusted returns. Consequently, yields in developing countries are expected to fall as asset prices rise.³⁸ Third, in a world of well-integrated financial markets, APPs are expected to boost global liquidity.³⁹ Fourth, APPs can impact developing countries' exchange rates, especially where currencies are fully convertible (Fic, 2013).

Countercyclical capital inflows could benefit developing countries...

The additional liquidity generated by central bank asset purchases can benefit developing countries if their business and financial cycles are synchronized with those of developed countries. In this case, stronger capital inflows into developing countries should ease their financing constraints. During both the global financial and COVID-19 crises, developing countries initially experienced sharp reversals of capital flows as capital flew to safety and liquidity dried up (figure II.11). Aggressive monetary easing measures in developed countries, including the introduction of APPs, helped alleviate financial conditions, supporting a revival of portfolio capital flows to developing countries (Batini, 2020).

...while procyclical capital inflows raise overheating and financial stability risks

APPs can increase the procyclicality of capital flows when the origin and destination countries are in different phases of the business cycle. In this case, APP-induced capital flows to developing countries raise the risk of overheating, sudden stops and reversals, increased inflationary pressure and excessive credit growth. This may require domestic policy tightening, which, at least temporarily, may attract even more capital inflows. In the aftermath of the global financial crisis, many developing economies saw growth rebound whereas the major developed countries experienced a slow and fragile recovery. Developed country central banks responded with even larger APPs, triggering major capital flows to developing and emerging economies. The Brazilian economy, for example, experienced a sharp rise in equity prices, credit growth and currency appreciation pressures during the post-APP period (Barroso, da Silva and Sales, 2016). China also observed rising equity prices and inflationary pressure and responded with monetary tightening (Chen and others, 2015).

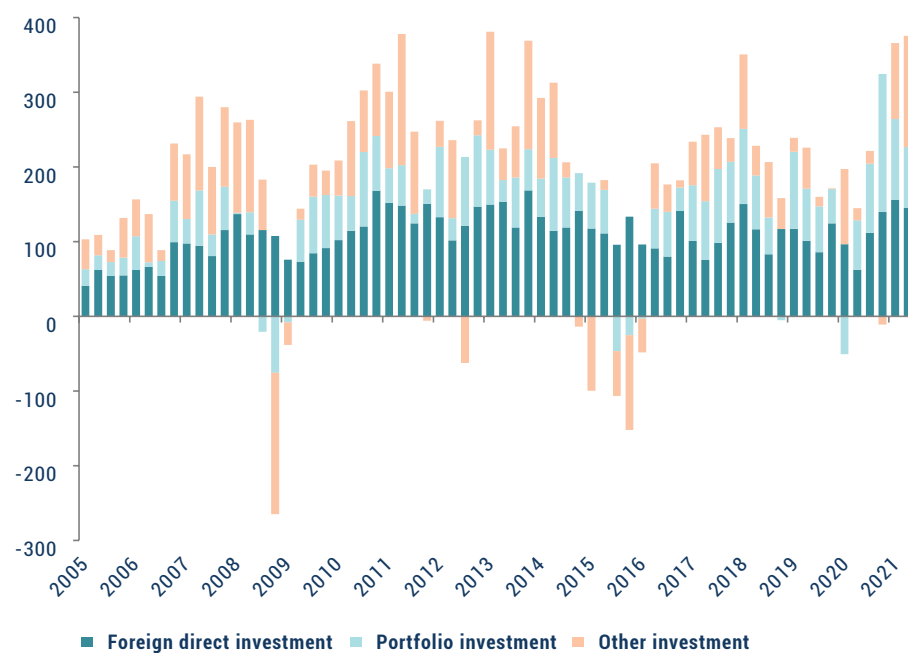
³⁷ Empirical analysis finds that net exports of developing countries do not respond significantly to APPs in developed countries, however, because APP-induced currency appreciation in developing countries offsets increasing demand for their exports (Bhattarai, Chatterjee and Park, 2021).

³⁸ Fic (2013) studied APPs launched by the Federal Reserve, Bank of England, Bank of Japan and ECB during 2018 and 2012, estimating that the programmes could have decreased long-term yields by about 175 basis points in Brazil, and about 25 basis points in China, India and the Russian Federation. Moore and others (2013) estimate that a 10-basis-point decline in long-term United States Treasury yields results in a reduction of approximately 1.7 basis points in emerging market economies' government bond yields.

³⁹ For a sample of 60 developing countries, Lim, Mohapatra and Stocker (2014) estimated that APPs in the United States accounted for more than 20 per cent of the total increase in cross-border capital flows during 2009 and 2013.

Figure II.11
Capital flows to G20 developing countries

Billions of United States dollars, by quarter



Sources: UN DESA, based on IMF International Financial Statistics (accessed on 22 November 2021).

Note: Values above zero are capital inflows and values below zero are capital outflows.

APPs in developed economies were among the major triggers of a borrowing binge in a number of developing economies. Public and publicly guaranteed debt in low and lower-middle-income countries owed to private creditors rose by 264 per cent during 2010-2019. In comparison, the public external debt of these countries declined by 7 per cent from 1998 to 2007.⁴⁰ The search for higher yields has encouraged private creditors from developed countries to find new debtors in the developing world. In the wake of the global financial crisis, governments and public sector entities in developing countries joined the bandwagon of borrowing from the international capital market, hoping to take advantage of ultralow interest rates.

APPs have supported a borrowing binge in developing countries

Sovereign bonds – debt owed to private creditors – now account for 40 per cent of all public and publicly guaranteed debt in low and lower-middle-income countries, up from 23 per cent in 2010. The expectation of lower borrowing costs, however, has often remained elusive for developing countries that have borrowed from the international capital market. As private creditors search for higher yields, the cost of borrowing for developing countries has remained high despite very low interest rates. The coupon rate on developing country sovereign bonds issued during the post-crisis period averaged more than 7 per cent, indicating that these countries continued to pay a very high risk premium.

⁴⁰ The decline in total external debt during this period is in part due to debt relief provided under the Heavily Indebted Poor Countries Initiative.

Excessive external borrowing, especially from private creditors, along with high borrowing costs have clearly exacerbated debt sustainability concerns for many developing countries. The pandemic further aggravated the situation, with APPs in the developed economies doing little to reduce borrowing costs for developing countries. The latter have faced fewer constraints in borrowing from the international capital market but that has not necessarily reduced their borrowing rates. In March 2021, Ghana, for example, raised \$3 billion with Eurobonds as the country continued to grapple with the pandemic, agreeing to pay 7.75-8.875 per cent interest on the debt. Kenya, facing a high risk of debt distress, raised \$1 billion with a Eurobond issue in June 2021, with a coupon rate of 6.3 per cent. These high borrowing costs will significantly increase debt-servicing costs and may undermine debt sustainability.

The size of spillover effects depends on economic fundamentals

Developing countries with a more open capital account and greater financial linkages with the United States and euro area economies are more susceptible to APPs pursued by the Federal Reserve and ECB (Apostolou and Beirne, 2017). Countries' economic fundamentals also affect the scale and duration of APP impacts. Developing countries with economic and financial imbalances, especially those with high levels of external debt denominated in foreign currencies prior to the crisis, are facing significant debt distress and default risks.

The bumpy road ahead: looking beyond asset purchase programmes

Unwinding APPs will support future efficacy of this policy tool

Large-scale asset purchases are an effective policy tool to ease financial stress and propel economic recovery following a crisis. But they cannot be a magic wand for boosting investment, employment and economic growth in the long term. Over time, the costs of sustained APPs are likely to outweigh their benefits, as the programmes exacerbate macroeconomic and financial risks, while adversely impacting wealth distribution and debt sustainability. To maintain their efficacy as a monetary policy tool, central banks need to unwind APPs when financial and economic stability objectives are realized.

Challenges in unwinding unconventional monetary policies

As the world economy recovers from the pandemic, higher consumer price inflation and record inflation in asset prices are pressuring major developed country central banks to scale back, if not unwind, their APPs. This time, tapering asset purchases could happen at a much faster pace than after the global financial crisis.⁴¹ The Federal Reserve has already begun to slow monthly asset purchases. The Bank of England has also started reducing the scope of its APP. While tapering is underway, it is unlikely that major central banks will completely exit APPs any time soon. The assets on their balance sheets will likely remain as it will be too costly to push these back to the financial markets.

⁴¹ This would follow the breakneck pace of asset purchases undertaken at the outset of the pandemic.

Unwinding and eventually exiting APPs will not be easy. The developed country central banks, especially the Federal Reserve and the ECB, face the challenge of scaling back bond purchase programmes without creating financial market turmoil and destabilizing global financial flows. The risk of policy mistakes, either by withdrawing stimulus too fast or by waiting too long with tightening, is substantial. Beyond this immediate challenge, the more fundamental question is if – and if so, how quickly – central banks will reverse asset purchases and reduce the size of their balance sheets.⁴²

Central banks face difficult trade-offs in unwinding policy support

Reducing and eventually stopping new purchases and gradually selling off assets involves risks for monetary and fiscal authorities as well as financial markets. When central banks taper asset purchases and eventually shrink their balance sheets, markets could face upward pressure on the yield curve. Rising interest rates could pose a financial risk for central banks' massive balance sheets as these will increase debt-servicing risks and the roll-over risks of debt (especially public debt). Central banks will need to manage risks from the maturity mismatch of assets and liabilities on their balance sheets. As interest rates rise, the costs of central bank liabilities (in the form of commercial bank reserves bearing floating interest rates) may increase quickly, whereas the interest income from central bank assets (in the form of long-term bonds) could grow more slowly (Allen, Chadha and Turner, 2021). At the same time, central banks face the risk that reducing large holdings of long-term government bonds will disrupt bond markets.

Rising interest rates could create a maturity mismatch on balance sheets

For fiscal authorities, debt service costs in several developed countries have become more sensitive to short-term interest rates, in part due to APPs. If interest rates were to rise more sharply and rapidly than expected, public finances could come under pressure, especially in countries with high debt burdens, such as Canada, Italy, the United Kingdom and the United States. In the United States, interest expenses accounted for about 10 per cent of total government revenues in 2020. This ratio is forecast to increase to about 14 per cent by 2030 in the baseline scenario but may soar to 22 per cent in 2030 under a higher interest rate scenario, which could force the United States Government to cut back on essential spending.⁴³ The United Kingdom's Office for Budget Responsibility (OBR, 2021) estimates that if short- and long-term interest rates were both 1 percentage point higher than in the baseline scenario, interest expenditure on debt would increase by 0.8 per cent of GDP in 2025-2026. This "would make the task of keeping debt on a sustainable path more difficult".

Debt service costs are sensitive to interest rate increases

The fiscal implications of a sudden unwinding of APPs could be equally consequential for developing countries, especially those with open capital accounts and high levels of external public debt. Higher interest rates, following the end of APPs, will likely trigger capital outflows and further aggravate debt sustainability for many developing countries with high levels of hard currency-denominated external debt.

⁴² Tapering slows the pace of asset purchases and leads to an outright reduction of the balance sheet. After purchases have ended, central banks are expected to gradually reduce the size of their balance sheets by letting maturing securities roll off (Milstein, Powell and Wessel, 2021).

⁴³ Under the higher interest rate scenario, the interest on 10-year Treasury notes would rise to about 4 per cent in 2025.

Abrupt unwinding of APPs could delay economic recovery

An abrupt unwinding of APPs, in essence, would have the same adverse effect as premature austerity in both developed and developing countries. It would likely lead to cuts in fiscal spending that would not only delay recovery but could also push many economies into recession. It will remain critical for the major central banks to calibrate and coordinate their decisions to taper APPs and reduce their balance sheets, keeping in mind that there will be significant macroeconomic externalities not only in their own economies but also in economies in the rest of the world. Externalities from a sudden unwinding of APPs will be large especially for countries exposed to the international capital market.

The “taper tantrum” of May 2013 serves as a reminder of these risks. At that time, equity and government bond prices dropped immediately. The sell-off of Treasury bonds spilled into corporate bond markets and in less than two months drove a 5 per cent decline in the price of the S&P 500 Investment Grade Corporate Bond Index. The abrupt tightening of financial conditions created major negative spillovers for many developing countries. The sudden stop and reversal of capital flows affected exchange rates and asset prices, resulting in a deterioration of broader balance of payment and economic conditions.

The need for complementary policies

When central banks taper asset purchases and eventually exit from unconventional policies, they will need to ensure that they manage market expectations and minimize both short- and long-term risks. One important lesson from the 2013 “taper tantrum” is that careful communication about balance sheet policies is imperative to avoid market overreaction.

Macroprudential policies can help mitigate the adverse impacts of APPs

Macroprudential policies can play an important role in strengthening the resilience of the financial system, thus helping to limit the adverse effects of APPs and facilitating the unwinding process. Macroprudential measures can slow asset price growth and restrain excessive risk-taking, especially in sectors that pose greater risks to the financial system. For instance, to tackle rising property prices, a few countries (such as Canada, the Netherlands and New Zealand) have tightened loan-to-value limits and applied higher floors on interest rates for banks to evaluate mortgage affordability (BIS, 2021a). Some form of lender-targeted measures can reduce the sensitivity of domestic credit cycles to cross-border capital flows. In the aftermath of the global financial crisis, for example, the Republic of Korea applied a withholding tax on foreign purchases of Treasury and Monetary Stabilization Bonds and imposed a levy on banks’ non-deposit foreign exchange liabilities (Ryoo, Kwon and Lee, 2013).

Central banks should green APPs to foster low-carbon activities

APPs offer central banks an opportunity to contribute to mitigating climate risks (Martinez-Diaz and Christianson, 2020). When unwinding their asset purchases, central banks may choose to hold on to assets of sectors and firms with lower carbon footprints. In the process, they would reward climate action and sustainable investments, such as those related to energy efficiency or renewable energy, by private sector firms. At the same time, they could develop new principles and guidelines to acquire low-carbon assets for future APPs.

Reforms of fiscal and taxation policies are needed to address the adverse distributional effects of APPs. On the revenue side, more progressive income taxation, combined with targeted measures to reduce wealth disparities, can help to reduce inequalities. A levy on capital gains, for example, could partly offset rising wealth inequalities that result from the rapid growth of asset prices. Similarly, taxing corporate stock buy-backs may improve both macroeconomic and distributional outcomes.⁴⁴ On the expenditure side, social programmes and targeted government transfers, such as unemployment benefits, along with increased access to and improved quality of education and health care can protect the most vulnerable during crises and enhance their resilience to future shocks.

Fiscal policies are needed to address rising inequalities

APPs have allowed central banks to inject liquidity and ease financial stress in times of crisis, especially when policy rates reached their effective lower bound. While the programmes have expanded the monetary policy toolkit, they are no silver bullet. Continuation of APPs cannot replace structural policies to boost investment in the real economy or sustain long-term economic growth. Integrated policy frameworks, including macroprudential and fiscal policy measures, are needed to help countries address APP-related inequalities and climate risks, ensuring fair and sustainable recovery.

⁴⁴ In the United States, a new legislative proposal includes a 1 per cent excise tax on the amount a publicly traded firm spends on buying back its own stock.