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CNB CZECH NATIONAL BANK

In this issue

Central banks are currently expecting a period of great uncertainty stemming from the tragic events in Ukraine. As regards its economic impacts, the war will further increase inflation pressures (primarily through higher prices of energy and commodities and also through currency depreciation in some countries) and will also negatively affect economic activity. In the months ahead, central banks will thus face the challenge of determining the optimal pace of monetary policy normalisation, in a situation where another negative supply shock has occurred amid high inflation and fragile economic growth. Retaliatory sanctions have also been targeted at the central bank of Russia. Although the war in Ukraine has not yet been reflected in the measures and forecasts of most of the banks we monitor, the CNB and the NBP have started intervening in the foreign exchange market.

Key central banks (the ECB and the Fed) have so far been reluctant to raise rates and are scaling back their unconventional monetary policy instruments. On the other hand, the banks which have been using unconventional instruments to only a limited extent or not at all (the CNB, the NBP and the RBNZ) have now increased their policy rates significantly.

The current *Spotlight* discusses the ongoing tapering of quantitative easing and, in some cases, the start of the balance sheet reduction process in central banks that have been pursuing QE. In our *Selected Speech*, Banque de France Governor François Villeroy de Galhau describes forward guidance and conduct of monetary policy in very uncertain times and puts them into the context of the ECB's current communications.

This publication aims to provide economists and other specialists with information on the latest monetary policy developments, strategies and communications at selected central banks.

Current and past issues can be downloaded free from the *Monetary policy* section of the CNB website: https://www.cnb.cz/en/monetary-policy/monitoring/, where you can also download a file containing a list of all the thematic articles and speeches.

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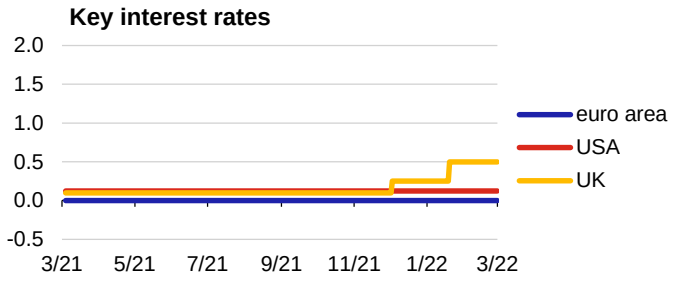
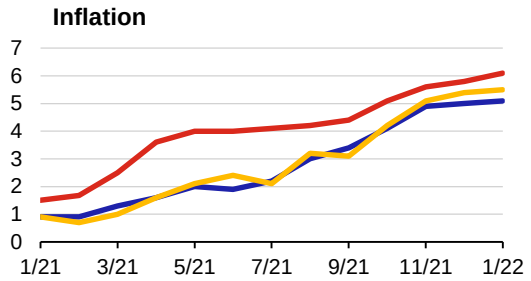
I. LATEST MONETARY POLICY DEVELOPMENTS AT SELECTED CENTRAL BANKS

I.1 KEY CENTRAL BANKS OF THE EURO-ATLANTIC AREA

	Euro area (ECB)	USA (Fed)	United Kingdom (BoE)
Inflation target	2%	2%[1]	2%
MP meetings (rate changes)	3 Feb (0.00);(0.00)[2] 10 Mar (0.00);(0.00)[2]	25–26 Jan (0.00)	2 Feb (+0.25)
Current basic rate	0.00%; -0.50%[2]	0–0.25%[3]	0.50%
Latest inflation	5.8 % (Feb 2022)[4]	6.1% (Jan 2022)[5]	5.5% (Jan 2022)
Expected MP meetings	14 Apr 9 Jun	15–16 Mar[6] 3–4 May	17 Mar 5 May
Other expected events	9 Jun: publication of forecast	20 Apr: publication of Beige Book 1 Jun: publication of Beige Book	5 May: publication of Monetary Policy Report
Expected rate movements[7]	→	↑	↑

Note: [1] long-term average (August 2020 definition) as measured by PCE (Personal Consumption Expenditures) index; [2] deposit rate; [3] chart shows centre of band; [4] flash estimate; [5] PCE index; [6] meeting associated with summary of FOMC economic forecasts; [7] direction of expected change in rates in next three months taken from Consensus Forecasts.





The **ECB** left interest rates unchanged and revised the APP schedule. Monthly net purchases will stand at EUR 40 billion in April, EUR 30 billion in May and EUR 20 billion in June. If the incoming data support the expectation that the medium-term inflation outlook will not weaken after the end of its net purchases, the ECB will conclude the purchases in Q3. Any interest rate adjustments will take place some time after the end of net purchases under the APP and will be gradual. As announced earlier, the ECB will discontinue asset purchases under the PEPP at the end of March 2022. In view of the high uncertainty caused by the war in Ukraine, the ECB extended the Eurosystem repo facility for central banks (EUREP) until 15 January 2023. EUREP will complement the regular euro liquidity-providing arrangements for non-euro area central banks. The ECB forecast includes a first assessment of the consequences of the war. Real GDP growth in the euro area is expected at 3.7% (previously 4.2%) in 2022, 2.8% (2.9%) in 2023 and 1.6% (1.6%) in 2024. The inflation forecast has been revised significantly up to 5.1% (3.2%) this year, 2.1% (1.8%) in 2023 and 1.9% (1.8%) in 2024.

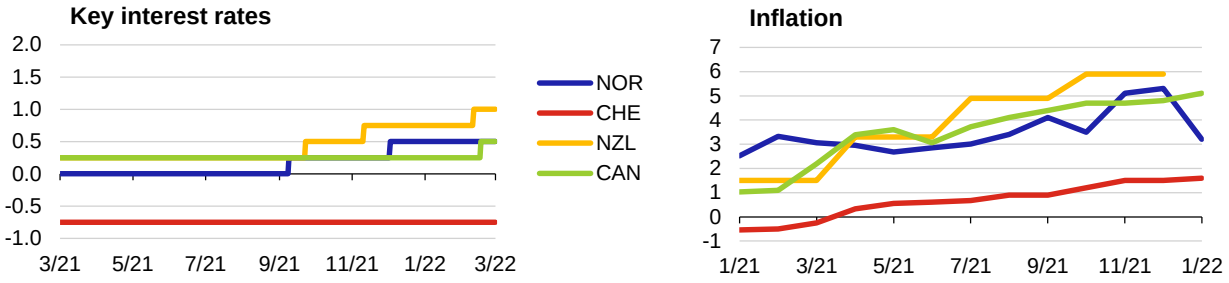
The **Fed** kept the key federal funds rate at 0–0.25%. The FOMC decided to further reduce the monthly pace of net asset purchases by USD 30 million in February. The FOMC minutes show a consensus on the need to raise rates due to rising inflation and high employment. The rate of decline in inflation will thus be key for the FOMC members. Most of them expect inflation to fall rapidly in 2022 H2. If it doesn't, a faster pace can be expected for removing policy accommodation. Markets expect rates to start increasing at the March meeting. The asset purchase programme is scheduled to end in March. A general framework for reducing the size of the balance sheet has also been presented (see *Spotlight*). It will be preceded by a policy rate hike and will take place primarily by reducing reinvestment of maturing assets. The latest FOMC forecast was published on 15 December 2021. According to the median projections of the FOMC members, real GDP can be expected to grow by 4.0% this year, 2.2% in 2023 and 2.0% in 2024. The unemployment rate will be 3.5% this year and for the next two years. According to the median projections, PCE inflation will be 2.6% in 2022, 2.3% in 2023 and 2.1% in 2024. The interest rate (midpoint) is forecasted at 0.9% this year, 1.6% in 2023 and 2.1% in 2024.

Following an unexpected hike of 15 bp in December, the **BoE** further raised its key interest rate by 25 bp to 0.5% in order to return inflation sustainably to the 2% target. Four of the nine MPC members even voted to increase the rate by 50 bp. The BoE also began to reduce the stock of government bond purchases by ceasing to reinvest maturing assets; the same goes for corporate bonds. Depending on economic circumstances, government bonds in the BoE's portfolio will not be sold actively before the key interest rate reaches 1%. According to the February forecast, the BoE expects inflation to peak at 7.25% in April, almost 2 pp higher than expected in the November forecast. UK GDP grew by 7.5% last year.

I.2 SELECTED INFLATION-TARGETING NON-EU COUNTRIES

	Norway (NB)	Switzerland (SNB)	New Zealand (RBNZ)	Canada (BoC)
Inflation target	2%	0–2%	2%	2%
MP meetings (rate changes)	20 Jan (0.00)	16 Dec (0.00)	23 Feb (+0.25)	26 Jan (0.00) 2 Mar (+0.25)
Current basic rate	0.5%	-0.75%	1%	0.5%
Latest inflation	3.2% (Jan 2022)	1.6% (Jan 2022)	5.9% (2021 Q4)	5.1% (Jan 2022)
Expected MP meetings	24 Mar 5 May	24 Mar	13 Apr 25 May	13 Apr 1 Jun
Other expected events	24 Mar: publication of Monetary Policy Report	30 Mar: publication of Quarterly Bulletin	25 May: publication of Monetary Policy Statement	13 Apr: publication of Monetary Policy Report
Expected rate movements[1]	↑	→	↑	→

Note: [1] direction of expected change in rates in next three months is taken from Consensus Forecasts or, in the case of New Zealand, from RBNZ survey, and, in the case of Norges Bank, from forecast.



The **NB** left its policy rate at 0.5% in January. The policy rate will most likely be raised at the meeting in March, when a new economic forecast will also be presented. According to the current NB forecast, the policy rate will rise to 1.75% over the next two years. Higher interest rates will help counter a build-up of financial imbalances and inflation risks. According to the NB, a gradual normalisation of the policy rate is consistent with continued high employment. The current NB forecast projects inflation of 2.7% this year and 1.5% in 2023. GDP growth will be 4.3% this year and 2.5% next year.

The **SNB** kept its interest rate at -0.75% in December 2021 and reiterated its willingness to intervene in the foreign exchange market against appreciation of the Swiss franc. A monetary meeting has not been held since December 2021, and the next one will take place on 24 March. The SNB's December forecast expected inflation of 1% this year due to higher import prices, above all for oil products and for goods affected by global supply bottlenecks, and 0.6% next year. Inflation stood at 1.6% in January. GDP is forecasted to grow by around 3% this year. The SNB proposed reactivation of a sectoral capital buffer of 2.5% in January. The buffer applies to risk-weighted exposures secured by residential property. The deadline for compliance is 30 September 2022. The Swiss franc has appreciated significantly over the past few weeks due to the escalation of the conflict in Ukraine.

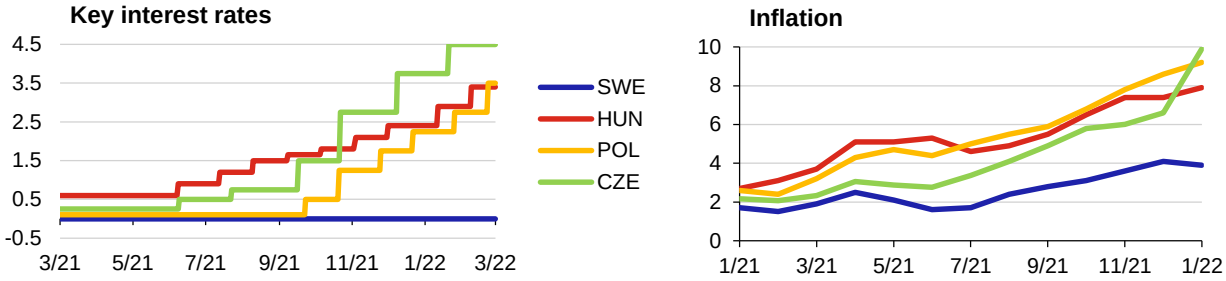
The **RBNZ** increased its key interest rate by 25 bp to 1% in February. It also decided to reduce its bond holdings under the LSAP programme – through both bond maturities and managed sales. Capacity pressures in the New Zealand economy have continued to tighten. Employment is now above its maximum sustainable level, with a broad range of other indicators highlighting that the economy continues to perform above its potential. Headline inflation is well above the target. According to the RBNZ forecast, it will peak in March (6.6%) and return towards 2% over the next two years. The near-term rise in inflation is accentuated by higher oil prices, rising transport costs and supply shortfalls. These price shocks risk generating more generalised price rises given the current capacity constraints.

The **BoC** removed its forward guidance in January and increased its key interest rate by 25 bp to 0.5% in March. The BoC is continuing its reinvestment phase, keeping its holdings of bonds roughly constant until such time as it becomes appropriate to allow the size of its balance sheet to decline. Given the rapid growth of the economy (6.7% in 2021 Q4) and still elevated inflation pressures, the BoC expects interest rates will need to rise further. Price increases have become more pervasive, and measures of core inflation have all risen. Poor harvests and higher transport costs have pushed up food prices. The invasion of Ukraine is putting further upward pressure on prices for both energy and food-related commodities. The BoC projection expects GDP growth of 4% this year and 3.5% in 2023.

I.3 SELECTED CENTRAL BANKS OF INFLATION-TARGETING EU COUNTRIES

	Sweden (Riksbank)	Hungary (MNB)	Poland (NBP)	Czech Republic (CNB)
Inflation target	2%[1]	3%	2.5%	2%
MP meetings (rate changes)	9 Feb (0.00)	25 Jan (+0.50) 22 Feb (+0.50)	4 Jan (+0.50) 8 Feb (+0.50) 8 Mar (+0.75)	22 Dec (+1.00) 3 Feb (+0.75)
Current basic rate	0%; -0.1%[2]	3.4%	3.5%	4.5%
Latest inflation	3.9% (Jan 2022)	8.3% (Feb 2022)	9.2% (Jan 2022)[3]	11.1% (Feb 2022)
Expected MP meetings	27 Apr	22 Mar 26 Apr 31 May	6 Apr 5 May 8 Jun	31 Mar 5 May
Other expected events	27 Apr: publication of Monetary Policy Report	24 Mar and 30 Jun: publication of Inflation Report	15 Mar and 15 Jul: publication of Inflation Report	12 May: publication of Monetary Policy Report
Expected rate movements[4]	→	↑	↑	→[5]

Note: [1] CPIF – consumer price index including fixed interest rate; [2] deposit rate; [3] flash estimate; [4] direction of expected change in rates in next three months taken from Consensus Forecasts or, in the case of the CNB, from central bank's forecast, [5] the CNB's winter forecast does not expect any further increase in interest rates, but the Bank Board assessed its risks as being slightly inflationary.



The **Riksbank** left its repo rate at 0% and its deposit rate at -0.1% in February. The forecast for the repo rate indicates that the rate will be raised during 2024 H2, slightly earlier than in the November forecast. As the Riksbank announced, it will purchase bonds for SEK 37 billion in 2022 Q2 to compensate for assets maturing in this period. The currently high inflation is a result of rapid increases in electricity and fuel prices – inflation excluding energy is close to 2%. According to the Riksbank, energy prices will not increase further this year and inflation will therefore fall back. The forecast thus projects inflation (CPIF) of 2.9% this year and 1.9% in 2023. GDP will grow by 3.6% this year and 2.0% in 2023.

The **MNB** raised its key interest rate in January and February, by 50 bp each time, to 3.4%, in order to anchor inflation expectations and mitigate second-round inflation risks. The O/N deposit rate is now at the same level and the collateralised lending rate (lombard) is 5.4%. This asymmetrical corridor towards higher rates is contributing to monetary policy tightening. The MNB intends to hold government bonds purchased under quantitative easing to maturity. Hungarian GDP grew by 7.1% in 2021 as a whole, but the MNB expects it to slow to 5.0% in 2022. Inflation stood at 7.9% in January; the MNB expects inflation at 4.7–5.1% in 2022 as a whole. Owing to the record depreciation of the forint due to the war in Ukraine, the MNB announced in early March that it stood ready to intervene in the foreign exchange market.

The **NBP** raised interest rates again, by 175 bp overall to 3.5%. The continued tightening is led by a strong need to reduce inflation back to the target and by an effort to curb inflation expectations. According to a preliminary estimate, GDP grew by 7.3% in 2021 Q4. As Polish exports to Russia and Ukraine have a low share of total exports, the NBP expects domestic economic conditions to remain favourable. According to the March forecast, GDP will grow by 4.4% in 2022 and 3.0% in 2023. Inflation is forecasted at 10.8% this year and 9.0% in 2023, around 5 pp higher than the previous forecast. After the outbreak of the war, the NBP intervened in the foreign exchange market against depreciation of the zloty.

The **CNB** continued to raise its key rate sharply in December and February – by 175 bp overall to 4.5% – in response to exceptionally strong price pressures from the domestic and foreign economies. The interest rate increase will ensure that inflation returns close to the 2% the target at the monetary policy horizon and will help anchor inflation expectations. Consistent with the February forecast is a substantial rise in market interest rates, followed by a gradual decline from the second half of this year onwards. The Czech economy will grow by 3.0% this year and 3.4% the next. Inflation will surge this year, peaking in in the second half of the year and then gradually falling (8.5% in 2022 and 2.3% in 2023). After the outbreak of the war in Ukraine, the CNB started to intervene in the foreign exchange market against depreciation of the koruna (see *News*). It also decided to raise the countercyclical capital buffer rate to 2.5% with effect from 1 April 2023.

II. NEWS OVER THE LAST THREE MONTHS

Sanctions imposed in response to war in Ukraine also target Russian central bank

The Russian invasion of Ukraine has triggered a series of retaliatory measures by a large part of the world community, aimed primarily at Russia's economy. One of the strongest economic sanctions is a freeze on the Russian central bank's foreign exchange reserves, announced in a joint statement of top officials of the European Commission, France, Germany, Italy, the United Kingdom, Canada and the United States, a move later joined by Japan.

As a result, the Bank of Russia has lost the ability to use a significant portion of its approximately USD 630 billion of foreign exchange reserves, leaving it basically only with reserves in Chinese renminbi and gold (which, however, has low liquidity in the current circumstances), or possibly cash. In a situation where confidence in the Russian economy and the rouble has declined sharply as a result of numerous other sanctions and general sentiment, the Russian central bank has very limited options to mitigate the economic impact of these events by selling foreign exchange reserves and supporting the rouble. In the first two days of the war – before sanctions were imposed – the Russian central bank was, in its own words, actively intervening in the market, using over USD 1 billion worth of foreign exchange reserves to support the rouble (in addition to liquidity support programmes).

On Monday 28 February (the first business day after the announcement of the FX reserves freeze and other sanctions), the Bank of Russia raised its key monetary policy rate from 9.5% to 20% in an effort to combat the depreciation of the rouble at least partially. At the same time, it released the capital buffer in the banking sector. The central bank and the state also imposed a number of capital controls and other restrictions – companies were ordered to exchange at least 80% of their foreign currency income into roubles, cash withdrawals and exports in foreign currencies were restricted, and the sale of rouble-denominated securities to non-residents was banned, among other things. The Moscow Stock Exchange remained closed altogether.

CNB and NBP launch foreign exchange interventions

Russia's aggression in Ukraine has caused Central European currencies, which are globally regarded as risky by investors, to depreciate significantly. The Czech CNB, the Polish NBP and the Hungarian MNB therefore initially declared they stood ready to enter the foreign exchange market and intervene in favour of their currencies. Subsequently, the Polish and Czech central banks did indeed start to intervene actively in the foreign exchange market to counter the depreciation of their currencies and smooth excessive exchange rate volatility. The banks did not make further details of these actions public. The CNB's foreign exchange reserves exceed 60% of Czech annual GDP, and while the NBP has reserves in excess of 20% of Polish annual GDP.

Norway's sovereign wealth fund to sell out of Russia

One of the many reactions to the outbreak of the war in Ukraine has been the Norwegian government's decision to sell off Russian investments in its sovereign wealth fund. The assets of the fund, managed by Norges Bank, amount to approximately USD 1.3 trillion. According to the Financial Times, the value of the assets held in Russia at the end of 2020 was around USD 3.3 billion. Norges Bank has been told by the government to immediately freeze all new investments in Russia and to begin selling assets there (although this sell-off may be complicated by regulatory restrictions on asset sales by foreign entities imposed by the Russian state).

Current NATO leader to head Norges Bank

The Norwegian government has named the current NATO Secretary General and former Norwegian prime minister Jens Stoltenberg as governor of the country's central bank. The previous Norges Bank governor, Øystein Olsen, resigned from his post in February 2022 due to age. Stoltenberg's current NATO mandate expires in September this year, and he is expected to join Norges Bank at the end of the year. In the meantime, Norges Bank is temporarily headed by current deputy governor Ida Wolden Bache.

New head of Bundesbank is Joachim Nagel

The German government has appointed Joachim Nagel as president of the country's central bank. Nagel took office at the beginning of this year. He has extensive experience of working at the Bundesbank, having spent more than 15 years of his career working in various positions there, including on its Executive Board. Prior to his appointment to lead the institution, he worked at the Bank for International Settlements (BIS). As the president of the Bundesbank (who is also a

member of the ECB's Governing Council, the monetary policy decision-making body in the euro area), Nagel succeeded Jens Weidmann, who resigned at the end of 2021.

Nominations for Fed's Board of Governors still pending

In January, US President Joe Biden announced three nominations for vacant seats on the Fed's Board of Governors: Sarah Bloom Raskin (who would also be Vice Chair for Supervision), Lisa Cook and Philip Jefferson. The first nominee, however, has raised some controversy among Republican senators, who have blocked the vote for now. Because of that, the vote on the other two nominations has not taken place yet either, so Cook and Jefferson, just like Raskin, are still waiting for confirmation of their positions in the Fed's management.

Fed releases publication summarising CBDC…

The US Fed has published a paper examining the implications of the hypothetical implementation of a US central bank digital currency (CBDC). The paper summarises the current state of the payment system and examines the potential benefits and risks of CBDC. The publication takes a neutral approach to the adoption of CBDC itself – it does not make any specific recommendations, but just summarises various aspects of the topic, and thus represents a first step in the discussion on the possible implementation of CBDC in the US. The Fed also invited the public to contribute to this debate by commenting on the various questions concerning CBDC that still remain open.

…British parliamentary committee warns of CBDC...

A committee of the House of Lords, the upper house of the UK Parliament, has issued a report questioning some of the benefits of CBDC and highlighting the risks for financial stability and privacy protection. The committee also states that the eventual adoption of CBDC should require a decision of the UK Parliament and not just of the Bank of England. According to its report, the committee found few compelling reasons for the introduction of CBDC so far and describes the concept as "a solution in search of a problem".

…while CBDCs are at advanced stage in many developing countries

Although the attitude towards central bank digital currencies in developed countries is rather cautious, in many developing countries there is considerable interest in CBDCs, as they may address, among other things, the problem of poor availability of banking services and the lack of access to electronic payments for many inhabitants. For example, Jamaica is currently planning to launch CBDC after successfully completing its pilot project. India's RBI is expected to launch a digital rupee by 2023. The Mexican government has announced that the local central bank will introduce CBDC by 2024. In contrast, the Eastern Caribbean Central Bank has experienced problems with its large-scale CBDC pilot project and had to suspend the project in January due to technical issues and only resumed it in March. For now, full-version CBDCs (i.e. not just tests and pilots) are operating in the Bahamas and Nigeria.

III. SPOTLIGHT: CURRENT QE TAPERING IN CENTRAL BANKS

In response to the outbreak of the coronavirus pandemic, many central banks launched or extended asset purchase programmes (quantitative easing) in order to mitigate its economic impacts. However, most central banks are currently facing a surge in inflation and are gradually tightening monetary policy and scaling back quantitative easing. Some stopped buying assets last year and are now starting to sell them, while others have taken a more gradual approach and are only now beginning to lower the pace of purchases.

Quantitative easing (QE) is an unconventional monetary policy tool which many central banks started to apply after 2008 due to the outbreak of the global financial and economic crisis.[1] QE involves a programme of large-scale purchases of assets (primarily government bonds) by central banks and related growth in central banks' balance sheets. It is usually deployed when nominal interest rates – the standard instrument – reach their lower bound and it is no longer possible or desirable to lower them further, and when the economic situation requires further monetary easing.

A new wave of QE was set off by the outbreak of the coronavirus pandemic in spring 2020, when many central banks created new asset purchase programmes (or extended their existing ones) to mitigate the economic impacts of the pandemic and support an economic recovery.[2] By contrast, they tightened monetary policy and tapered or discontinued QE after their economies bottomed out and started to face strong global inflation pressures during 2021. This article will first present the general principles of tapering and then compare central banks' approaches to this issue.

The course and timing of tapering

The process of tapering QE and then normalising monetary policy can be divided into several stages. First, the central bank starts to slow the pace of asset purchases (tapering) – it still pursues expansionary monetary policy, buys assets and thus increases the size of its balance sheet, but it scales down this activity. The next step is the termination of net purchases, where the central bank stops buying new assets but continues to reinvest the principal payments from its securities holdings. The size of its balance sheet thus remains roughly constant. In the third stage, the central bank reduces or ends the reinvestment of principal payments (that is, it reinvests only part of the principal or stops reinvesting it altogether). The central bank's balance sheet then starts to shrink gradually as bonds are progressive redeemed. The final step may involve the central bank actively selling its asset holdings and hence reducing the size of its balance sheet faster than it would if it just stopped reinvesting principal.[3] Policies leading to a reduction of the central bank's balance sheet (the last two stages described above) are referred to as quantitative tightening (QT).

It is not necessary for a central bank to go through all the above stages. The central bank may, for example, decide merely to reduce the size of its balance sheet at a slower pace by terminating the reinvestment of maturing bonds and not to sell assets. The durations of the assets held, i.e. their (weighted) average residual maturities, may also play a role in the choice of approach. Where the central bank's assets consist largely of assets with relatively short residual maturities, merely terminating the reinvestment of maturing ones will lead to quite a rapid reduction of its balance sheet; conversely, it may be necessary to sell assets actively if most of them have long times to maturity.

If the economic situation following the launch of QE no longer requires further monetary stimulus but instead warrants monetary tightening, there is naturally the question of coordinating the timing of tapering and the start of interest rate increases. The standard approach is to increase rates only after all net purchases have ended. However, the central bank may also gradually raise rates while it is still reinvesting maturing bonds. In such case, the precise coordination of interest rate increases and QE is a matter of the specifics of the economy concerned and fine calibration of monetary policy. One advantage of rate increases is that their transmission mechanism is better researched.

We can illustrate the tapering process using the example of the US Federal Reserve over the last ten years (see Figure 1), when the Fed moved into the most advanced stage of this process. The Fed undertook QE in three waves after the outbreak of the Great Recession in 2008 and announced the end of the last wave in late 2013. It first started tapering, i.e. reducing the pace of asset purchases, in January 2014. It ended the purchases in October of that year and then only continued to reinvest maturing assets. The Fed increased rates for the first time in December 2015. In autumn 2017, it reduced reinvestments of maturing assets, and its balance sheet thus started to decrease in size (however, it continued to reinvest part of the maturing assets, so the pace of balance sheet reduction was relatively gradual). In Autumn 2019, the Fed began to buy Treasury securities. This, however, was not viewed as a renewal of QE, as it was done not to support the economy

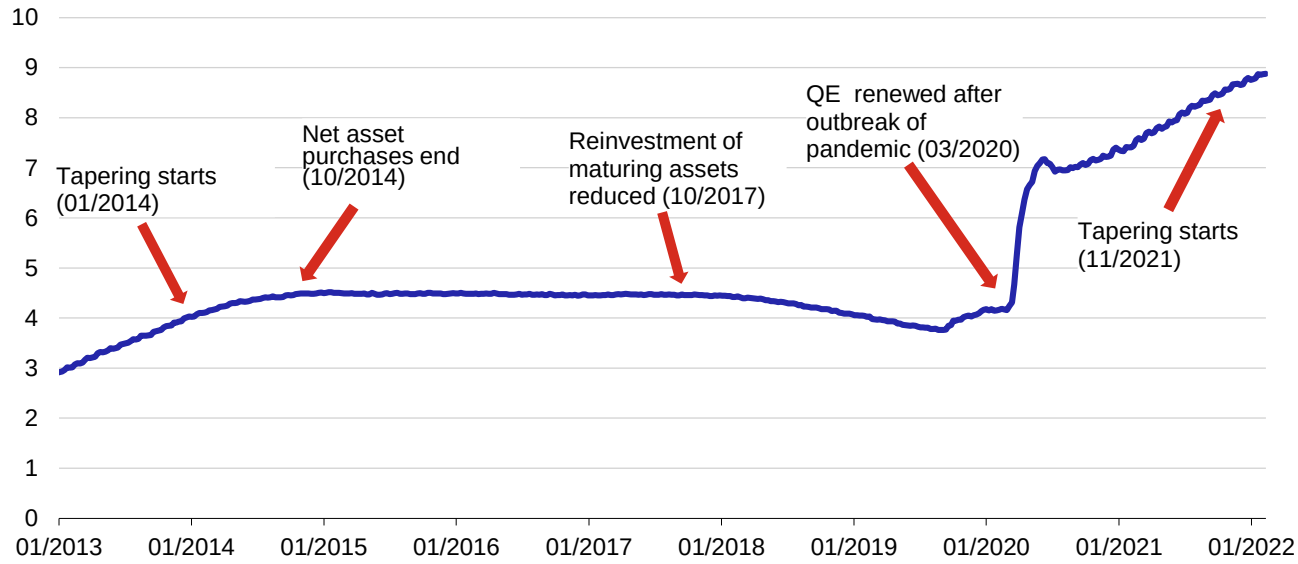
[1] Before this crisis, QE had been applied in Japan.

[2] A detailed overview of the measures taken in response to the outbreak of the pandemic can be found in Central Bank Monitoring – June 2020.

[3] In the case of non-maturing assets (such as shares), the only way of reducing the balance sheet is to sell them. However, the vast majority of central banks' QE purchases were bonds, primarily those issued by governments.

but to ensure sufficient liquidity on the interbank market. The Fed's balance sheet expanded slightly again as a result. The Fed definitively ended this cycle of tapering QE and subsequently pursuing QT in March 2020, when it reintroduced QE and increased its balance sheet markedly.

Figure 1: Size of the Fed's balance sheet (USD trillion)



Source: Fed

Impacts of changes in the size of central banks' balance sheets

When a central bank pursues QE, it finances purchases of securities – such as government bonds – with newly created reserves. Its balance sheet thus expands on the asset side by an amount equal to the new securities purchases and on the liability side by an amount equal to the new reserves. Commercial banks' balance sheets increase in a similar way – by an amount equal to these new reserves on the asset side and to the deposits of the sellers of these securities on the liability side. If sellers do not regard the deposits and government bonds sold as perfect substitutes, they will use their new deposits to buy other assets, such as corporate bonds (the portfolio rebalancing channel). By doing so, they transfer the central bank's initial activity on the government bond market to markets for other securities. The growth in demand for securities increases their prices and hence reduces their yields. Long-term interest rates therefore fall and, with short-term rates near zero, the yield curve flattens out. The subsequent impact of low interest rates on the economy is similar to the standard transmission of conventional monetary policy.[4]

QT is de facto the opposite process to QE, consisting in a reduction of the central bank's balance sheet. In principle, its impacts can thus be expected to be the opposite of those of QE transmission. If, for example, an issuer redeems a maturing bond to the central bank, the central bank's balance sheet shrinks on the asset side by the value of the bond and on the liabilities side by the value of the reserves. Commercial banks' balance sheets decrease on the asset side by the amount of the reserves and on the liability side by the amount of the deposits. If the issuer rolls over the redeemed bond by issuing new debt, there is no longer a large buyer in the form of the central bank present on the market and more bonds are thus available to other buyers. Their prices fall and their yields grow, and long-term interest rates also increase. This tightens the monetary conditions. However, the above QT mechanisms do not necessarily imply that QT will have equally strong macroeconomic impacts (but with the opposite sign) as QE of the same magnitude. For example, FOMC member James Bullard in 2019 expressed the view that the impacts of changes in the size of the central bank's balance sheet may be asymmetric – according to Bullard, the monetary stimulus stemming from QE is stronger than the subsequent restriction stemming from QT. This asymmetry is due to the lower bound on interest rates – QE is usually introduced when rates are near the lower bound, but this is not a limiting factor during QT (with rates near the lower bound, the impacts of QE are stronger due to its signalling effects).

[4] This is a schematic description of QE transmission. Economic theory identifies other possible QE transmission channels. The exact impacts of this tool depend on a range of factors, such as the type of securities and their seller, the degree of liquidity on the market, the central bank's accompanying communications and the size and openness of the economy. A more detailed description of the QE transmission mechanism can be found, for example, in Joyce et al. (2011), Bowdler and Radia (2012) and Bernanke (2020).

The impact of changes in the size of the central bank's balance sheet can be estimated using shadow interest rates. They show the hypothetical rate path (in the absence of a lower bound) consistent with the degree of monetary easing/tightening delivered by asset sales/purchases. Estimates of shadow rates and a projection of their future path for the Fed and the ECB are presented in a CNB blog post by Luboš Komárek and Petr Polák (available in Czech only).

Note that the impacts of QT on the financial markets and the economy as a whole are yet to be fully researched. Even the QE transmission mechanism has been less researched than the transmission of interest rates (the main monetary policy tool), but the frequent use of QE over the last ten years has greatly increased economists' and other analysts' understanding of it. However, experience with reducing the size of central banks' balance sheets is scarce – the Fed's experience in 2017–2019 remains an exception. Moreover, its balance sheet reduction process was very gradual and quite short-lived. Central banks see a need to reduce their – now record-high – balance sheets as part of the process of monetary policy normalisation. At the same time, however, they are quite cautious about this process and are declaring that interest rate increases remain the primary policy tightening tool, while balance sheet reduction is a complementary one. That the transmission mechanism of rate increases has been better researched than QT was also admitted in the minutes of the December meeting of the FOMC (the body which sets the Fed's monetary policy). According to the FOMC, there is "less uncertainty about the effects of changes in the federal funds rate on the economy than about the effects of changes in the Federal Reserve's balance sheet".

Current tapering in selected central banks

The Fed, which had previously been purchasing assets at a pace of USD 120 billion a month, launched tapering in November 2021, when it started to reduce net purchases of government bonds by USD 10 billion a month and net purchases of MBS (agency mortgage-backed securities) by USD 5 billion a month. At the December meeting, it announced a doubling of the pace of tapering as of January 2022. At the January meeting, it reduced the asset purchases by a further USD 30 billion a month beginning in February and scheduled the end of net asset purchases for March. Following the January FOMC meeting, the Fed published principles for reducing the size of its balance sheet. According to these principles, the Fed will commence the process of reducing the size of its balance sheet, i.e. QT, after it begins to increase the target range for the federal funds rate (which is still viewed as the primary tool for monetary policy normalisation and whose first increase is expected to come soon, probably at the March meeting). The Fed will conduct QT mainly by reducing reinvestment of maturing assets. In particular, it wants to reduce its MBS holdings and thus plans to hold primarily government bonds in the future The principles do not contain a specific timing for QT, and the statements made by individual Fed representatives indicate that there is no consensus on this. However, according to the minutes of the January meeting, the FOMC expects the balance sheet to shrink faster than it did in 2017–2019.

The ECB has so far bought assets under two different programmes – a longer-term APP launched in 2014 and an extraordinary PEPP introduced in March 2020 in response to the outbreak of the coronavirus pandemic. At its December 2021 meeting, the ECB decided to end net asset purchases under the PEPP in March this year. The principal payments from maturing securities purchased under the PEPP will be reinvested until at least the end of 2024. To ensure a smooth reduction in asset purchases after the end of the PEPP, the ECB also decided to temporarily double the monthly net purchase pace under the APP to EUR 40 billion. According to the ECB's March decision, this amount will apply in April but then decrease to EUR 30 billion in May and EUR 20 billion in June. Net purchases may end in 2022 Q3, depending on the incoming data (the previous plan was to reduce them to EUR 20 billion monthly from October 2022 onwards). The first increase in rates is expected to take place some time after the end of the net purchases. The ECB will subsequently continue reinvesting, in full, the principal payments from its assets for an extended period of time.

The UK's BoE ended its net asset purchases at the end of last year, when the stock of securities held in the Asset Purchase Facility (APF) reached the target of GBP 895 billion (comprising GBP 875 billion of government bonds and the remaining GBP 20 billion of corporate bonds). Before the pandemic, the BoE had been maintaining GBP 435 billion of bonds (of which GBP 10 billion of corporate bonds) in the APF, and it gradually raised the target in the course of 2020. The BoE outlined its approach to balance sheet reduction in its August 2021 Monetary Policy Report, in which it announced that it would cease to reinvest maturing bonds when the key interest had reached 0.5% and would consider actively selling bonds only once the rate had risen to 1%. In line with this, the BoE in February 2022 announced an end to the reinvestment of maturing securities (for illustration, around GBP 70 billion of government bonds held will mature over 2022 and 2023), along with an increase in the rate to 0.5%. The BoE also decided to begin actively selling corporate bonds to unwind fully its stock of corporate bond purchases (although no earlier than towards the end of 2023).

New Zealand's RBNZ was purchasing government bonds under the Large-Scale Asset Purchase (LSAP) programme. Bond purchases under the programme, whose target amount had been set at NZD 100 billion, were supposed to last until June 2022. However the programme was ended in June 2021 due to inflationary trends in the economy and hence a decreasing need for monetary accommodation. Bond purchases under the programme stood at around NZD 53 billion.

Following several interest rate increases, the RBNZ decided in February 2022 to start reducing the size of its balance sheet by not reinvesting the proceeds of any bond maturities and commencing managed bond sales.

The Bank of Canada was initially purchasing government bonds at a weekly pace of CAD 5 billion in 2020, but reduced the pace to CAD 4 billion at the end of the year. During 2021, it continued to lower its weekly net purchases to CAD 3 billion and subsequently CAD 2 billion before concluding them in October of that year. Since then, the BoC has been reinvesting maturing bond principal to keep the size of its balance sheet approximately constant. However, a timetable for winding down the balance sheet by reducing reinvestment has yet to be presented and the process will thus be guided by the BoC's ongoing assessment of the economy.

Sweden's Riksbank was buying assets with a total envelope of SEK 700 billion. The programme was discontinued at the end of 2021. The Riksbank will reinvest maturing bonds during 2022 to keep the size of its portfolio approximately unchanged and intends to start reducing its balance sheet gradually in 2023. However, according to its current communications, it will not begin to raise interest rates before 2024.

As for Central Europe, Hungary's MNB was active on both the government and corporate bond markets. However, it gradually reduced its net purchases of both types of assets in 2021 and discontinued them at the end of the year (interest rates in Hungary started to rise in 2021). The MNB is currently planning to hold its assets to maturity, that is, neither reinvest them nor actively sell them. Poland's NBP purchased government bonds and government-guaranteed debt securities in 2020–2021 without publicly disclosing the amount of the purchases or any other details.

Table 1: Overview of current tapering in the central banks monitored

	End of net asset purchases	End/reduction of maturing principal reinvestment	Asset sales
Fed	Expected 03/2022 (tapering since 11/2021)	Announced without timetable	-
ECB	PEPP 03/2022 APP 2022 Q3 (depending on incoming data), tapering ongoing	PEPP after 2024 at earliest	-
BoE	12/2021	02/2022	Only once interest rate has risen to 1% (corporate bonds from 02/2022)
RBNZ	07/2021	02/2022	02/2022
BoC	10/2021	Announced without timetable	-
Riksbank	12/2021	Gradual balance sheet reduction beginning in 2023	
MNB	12/2021	12/2021	-
NBP	2021	No details about tapering specified	
NB	QE not applied		
SNB			
CNB			

Source: Central banks' websites

At this point we should also mention the increased uncertainty stemming from the attack on Ukraine by the Russian military and the impacts of the retaliatory sanctions imposed by a large part of the global community. From the perspective of its economic consequences, the war appears to be a stagflationary shock. In other words, it will foster higher inflation (mainly through higher energy and commodity prices) while having a downward effect on economic growth. This will further intensify the previously existing dilemma of the appropriate monetary policy response in a situation where inflation is high and a slow monetary policy response is jeopardising the anchoring of inflation expectations, and where the economy is fairly fragile and excessive monetary policy tightening could conversely trigger a recession. The specific approaches taken by central banks to this issue are thus a matter of fine monetary policy calibration depending on the detailed circumstances

of each economy. This is ultimately also increasing the uncertainty regarding the above plans for tapering QE and commencing QT at individual central banks.

Conclusion

Faced with high inflation and renewed economic growth, central banks are gradually phasing out the quantitative easing programmes they introduced or extended after the outbreak of the coronavirus pandemic. The central bank of New Zealand, and partly also that of the UK, have already started to sell part of their previously purchased assets. The ECB has so far only been reducing its asset purchases and is planning to engage in QE for at least another several months. Other central banks fall somewhere between these two approaches. However, reducing asset purchase programmes in one form or another is a common topic across all the monitored central banks that have been operating such programmes. The pace of further tapering of QE and subsequent pursuit of QT is subject to great uncertainty stemming from, among other things, the still unclear impacts of Russia's invasion of Ukraine.

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IV. SELECTED SPEECH: François Villeroy de Galhau: Monetary policy in uncertain times

In his speech given at the London School of Economics on 15 February, the Governor of the Banque de France François Villeroy de Galhau discusses central banks' forward guidance in such uncertain times and outlines how the ECB is currently using this instrument.

Forward guidance in theory and practice

In economic theory, forward guidance is considered to be a powerful central bank instrument in situations where monetary policy interest rates are at their effective lower bound and conventional monetary policy is no longer sufficient. It can include, for example, a verbal commitment to keep interest rates low for longer, departing from the standard reaction function. As long as financial markets find this credible, medium-term interest rates will be lower, giving the economy the stimulus it needs. However, this works perfectly only in the textbooks; turning theory into practice raises additional issues, especially in periods of high uncertainty. On the one hand, forward guidance can reduce unnecessary volatility. On the other hand, policy makers need to keep some flexibility in the face of unexpected data or events. In this regard, Governor Galhau discusses three issues related to the use of forward guidance in practice:

- The time horizon of forward guidance: In theory, even a small commitment reaching into the distant future is enough to have a powerful impact today. However, in practice, even in normal times, forward guidance loses power over the longer term. Therefore, the greater the uncertainty, the shorter the forward guidance should be. Its reasonable horizon at present should be a matter of quarters rather than years.
- Definition of commitment: The most common form of forward guidance used by central banks today is Odyssean, involving a time-based or state-based commitment. In the first case, the commitment is clear and easy to understand. However, it is the commitment that is the most hostage to fortune, as the situation can change significantly in the interim. Therefore, a time-based commitment should only be used in the short run, when it is an effective tool for influencing economic agents' expectations. But beyond the horizon of some months, it is more preferable to use the second type of commitment, which is conditional on the evolution of an economic indicator (such as inflation). This gives the central bank flexibility on timing. However, such a commitment should rely on both forecasts and actual data, as forecasting models are fragile in uncertain times.
- Degree of commitment: Especially in times of increased uncertainty, the central bank cannot totally bind its hands with rules and should keep some room for unexpected events. This will make monetary policy predictable but not precommitted.

How can the ECB ensure predictability and optionality?

The basic elements of ECB predictability are: one course – a 2% inflation target; and two ways to achieve this course – sequencing of monetary policy decisions and forward guidance. Governor Galhau stresses that the ECB will do what is necessary to bring inflation back firmly and durably to 2%. To keep this course, the ECB must take steps in sequence – first ending net asset purchases, then starting to raise interest rates, and eventually reducing the balance sheet. This sequence is reasonable, because if, for example, the ECB started to raise rates before the end of net purchases, there would be a risk of flattening or even inverting the yield curve.

Governor Galhau notes that the forward guidance on the APP asset purchase programme differs from that which prevailed until December 2018. Previously, the APP was considered a separate instrument from the interest rate instrument. Today, it can be seen as a complementary instrument that is hierarchically subordinated to interest rates, in terms of both purpose and timing. The main advantage of this change was to support the "low rates for longer" strategy at the time and strengthen the impact on the whole yield curve.

The ECB has defined three state-dependent criteria on its forward guidance: (i) inflation reaches 2% well ahead of the end of the projection horizon, (ii) and durably for the rest of the projection horizon, and (iii) realised progress in underlying inflation is sufficiently advanced to be consistent with inflation stabilising at 2% over the medium term. From the Governor's point of view, the first and third criteria are fulfilled, as headline inflation has been significantly above 2% since summer 2021 and underlying inflation is close to or slightly above 2%. According to the December forecast, only the second criterion is not met. This could possibly change in the next quarters. However, any interest rate hike should only happen after the net asset purchases end.

Galhau also offers a key reminder that forward guidance never commits the central bank to an automatic decision, but always leaves room for a possible assessment of the situation. Therefore, even if these three criteria are fulfilled, the ECB does not necessarily have to raise interest rates, as it can take into consideration exogenous or exceptional contingencies, including geopolitical ones.

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