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In this issue

Inflation continues to slowly fall in most of the countries under review, but remains high (except in Switzerland). After a pause in June, the US Fed raised the key interest rate range again in July, with other central banks also raising their rates. By contrast, the Polish NBP has already lowered its interest rates, while the Hungarian MNB is gradually lowering some of its rates. There were further developments regarding the monetary policy reviews of some central banks, which we discussed in detail in the June issue. Turkey has seen a monetary policy reversal, and the Japanese central bank has increased the flexibility of its yield curve control.

Spotlight focuses on the communication of central bank forecasts and their related uncertainties, discusses the advantages and disadvantages of the individual approaches, and describes the practices of the central banks under review. In our selected speech, BoE Deputy Governor Dave Ramsden describes the bank's experience with quantitative tightening since last year.

This publication aims to familiarise experts with recent monetary policy developments, monetary policy strategy, and communication by selected central banks.

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

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The cut-off date for this issue is 14 September 2023.

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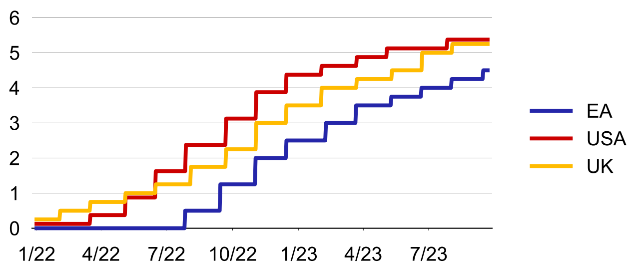
I.1 KEY CENTRAL BANKS IN THE EURO-ATLANTIC AREA

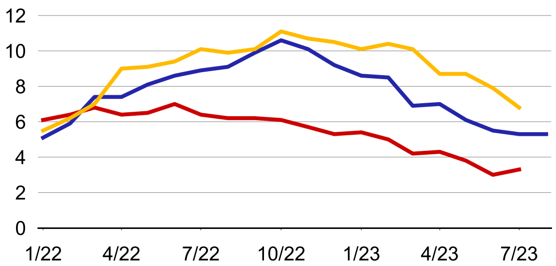
	euro area (ECB)	USA (Fed)	United Kingdom (BoE)
inflation target	2% (HICP)	2% (PCE)[1]	2% (CPI)
latest inflation	**5.3%** (8/2023, flash)	**3.3%** (7/2023)	**6.8%** (7/2023)
current basic rate	**4.5%**	**5.25–5.50%**[2]	**5.25%**
MP decision publication (rate changes)	27 July (+0.25) 14 September (+0.25)	26 July (+0.25)	22 June (+0.50) 3 August (+0.25)
expected MP decisions	26 October 14 December	20 September 1 November 13 December	21 September 2 November 14 December

Note: [1] index PCE (Personal Consumption Expenditures); [2] graph shows range centre.

Key interest rates



Inflation



The **ECB** raised interest rates by 25 bp in both July and September. It also decided in July to pay 0% interest on minimum reserves (see News). Inflation in the euro area continues to fall, yet is still expected to remain too high for too long. In its September forecast, the ECB revised its inflation outlook upwards for both 2023 and 2024, primarily due to a higher energy price path. Financing conditions have tightened further, dampening consumer demand, an important factor in ensuring that inflation falls towards the target. The still-strong services sector is also weakening. The labour market remains resilient for the time being. Expected economic growth has declined substantially due to cooling demand and a weakening international trade environment. Since July, there has been no reinvestment of principal payments from maturing securities purchased under the APP. According to the ECB's current assessment, interest rates have reached levels that, if they last long enough, will significantly contribute to a timely return of inflation to the target. However, the ECB will continue to make decisions based on incoming data.

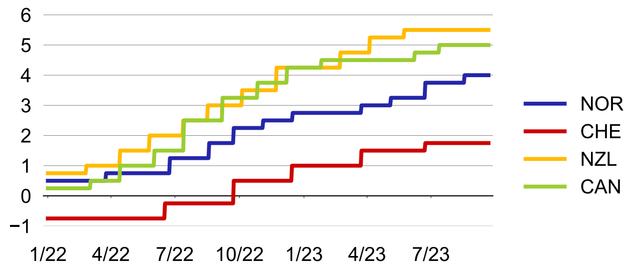
In July, the **Fed** raised the target range for its key interest rate to 5.25%–5.50%, and it continues its quantitative tightening as planned. Recent indicators suggest that economic activity is growing at a moderate pace. Consumer spending growth slowed compared with the start of the year. Although housing sector activity has increased, it remains well below the levels observed a year ago. The labour market is still relatively tight. The tightening of credit conditions for households and corporations is likely to be reflected in a slowdown in economic activity, weaker recruitment, and a fall in inflation. According to the Fed, however, the extent of these effects remains uncertain. Although inflation has moderated compared to last year, it remains some way off target. Core inflation, in particular, is still high. The Fed was cautious about the interest rate outlook. The assessment of whether the current monetary policy is sufficiently strict will only be conducted on the basis of new data and an updated economic outlook.

The **BoE** continued to tighten monetary policy in both June and August, raising its interest rates by 50 bp and 25 bp respectively. GDP growth remains lower over the medium term than before the pandemic, reflecting a relatively weak potential product and weakening fiscal policy support. The British economy has recorded excess demand in recent quarters due to a tight labour market and higher-than-usual capacity utilisation rates in firms. New data indicate greater persistence of the inflationary environment. Inflation is gradually falling yet remains high. Although the BoE expects inflation to fall to 5% by the end of the year, it is not forecasted to reach the target until 2025. The fall in inflation this year is mainly due to the stabilisation of energy prices. By the end of the year, this will be joined to a lesser extent by a slowdown in the growth of prices of food and core goods. By contrast, growth in service prices will remain high. Overall, second-round effects on price and wage developments stemming from external cost shocks will continue to fade out for some time. The BoE assessed the risks associated with the current inflation forecast as being tilted upwards. The BoE will continue to monitor inflation persistence and the resilience of the economy as a whole and, depending on them, will assess whether monetary policy needs to be tightened further.

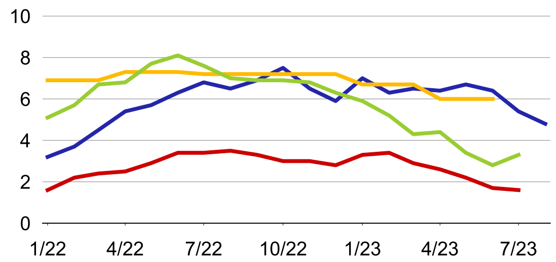
I.2 SELECTED NON-EU CENTRAL BANKS WITH INFLATION-TARGETING REGIMES

	Norway (NB)	Switzerland (SNB)	New Zealand (RBNZ)	Canada (BoC)
inflation target	2% (CPI)	0-2% (CPI)	2% (CPI)	2% (CPI)
latest inflation	**4.8%** (8/2023)	**1.6%** (7/2023)	**6.0%** (2023 2Q)	**3.3%** (7/2023)
current basic rate	**4.00%**	**1.75%**	**5.50%**	**5.00%**
MP decision publication (rate changes)	22 June (+0.50) 17 August (+0.25)	22 June (+0.25)	12 July (0.00) 16 August (0.00)	12 July (+0.25) 6 September (0.00)
expected MP decisions	21 September 2 November 14 December	21 September 14 December	4 October 29 November	25 October 6 December

Key interest rates



Inflation



In line with its previous communication, the **NB** increased interest rates at both the June and August meetings by 50 bp and 25 bp, respectively. The NB is probably not finished with tightening monetary policy, as it anticipates another rate hike in September. Although energy price inflation, the initial source of high inflation, has eased, consumer price inflation remains high, mainly due to rapidly rising prices of food, goods and services. Economic activity is still strong, but due to the high interest rates, it is already descending from the peak of the business cycle reached at the end of 2022. Household consumption grew faster than expected. The labour market is tight and has seen the fastest wage growth in 15 years. If the Norwegian krone remains weaker than forecasted and inflation pressures persist, the NB may raise rates more sharply than it announced in June. By contrast, if inflation falls significantly, interest rates may not necessarily rise.

At its June meeting, the **SNB** increased its basic interest rate by 25 bp. The main reason for this policy tightening was the build-up of inflationary pressures over the medium term. At the same time, the SNB admitted the possibility of further raising the rate at one of its forthcoming meetings, if necessary. To ensure appropriate monetary conditions, the central bank remains ready to actively enter the foreign exchange market, where it can act against the weakening of the Swiss franc by selling foreign currency. The June inflation outlook until the end of 2023 was lower than in the previous forecast owing to lower prices of oil, natural gas and a stronger Swiss franc. By contrast, the inflation outlook is higher from 2024 despite an increase in the key interest rate. This is due to continued second-round price effects, higher electricity prices and rents, and more persistent inflation pressures from abroad. GDP growth was solid in the first quarter of this year, but will moderate for the rest of the year due to subdued foreign demand, the population's loss of purchasing power due to inflation, and more restrictive financial conditions. The forecast is subject to a high degree of uncertainty, while the SNB considers a sharper economic slowdown abroad to be the main risk.

The **RBNZ** left its basic interest rate unchanged at 5.5% in July and August. It also plans to keep the interest rate at this restrictive level over the outlook horizon to ensure that inflation returns to the 1–3% target band while supporting maximum sustainable employment. Economic activity is slowing, especially in interest-sensitive segments. Labour shortages are being dampened by falling demand and the arrival of new immigrants. Headline inflation and inflation expectations are gradually falling. Nevertheless, inflationary pressures persist in view of the still weak supply capacity vis-à-vis relatively strong demand. However, these are expected to gradually ease, partly as a result of restrictive monetary policy.

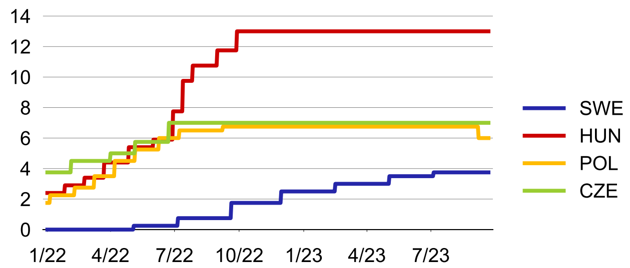
After raising the rate by 25 bp in July, the **BoC** left the interest rate unchanged in September. It is continuing its quantitative tightening. Price data suggest that inflation pressures persist in many segments. Core inflation remains at around 3.5%. Economic growth in Canada slowed sharply in the second quarter. This reflected a significant weakening of consumption growth and a decline in housing activity, as well as the impact of the fires that affected many regions of the country. Growth in loans to households decelerated as a result of higher rates, which have curbed consumer spending. Total domestic demand grew by 1% in the second quarter, driven by government expenditure and corporate investment. The tight labour market situation gradually moderated further, yet wage growth persisted at around 4–5%. The BoC stands ready to raise rates further if necessary, but this will depend on incoming data.

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

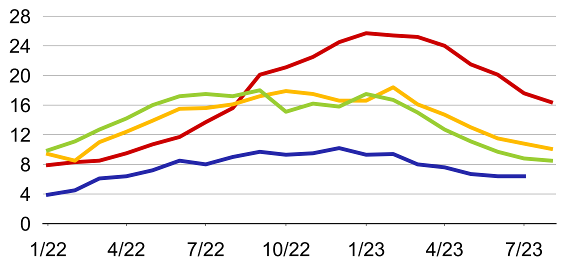
	Sweden (Riksbank)	Hungary (MNB)	Poland (NBP)	Czech Republic (CNB)
inflation target	2% (CPIF)[1]	3% (CPI)	2.5% (CPI)	2% (CPI)
latest inflation	**6.4%** (7/2023)	**16.4%** (8/2023)	**10.1%** (8/2023, flash)	**8.5%** (8/2023)
current basic rate	**3.75%**	**13.00%**	**6.00%**	**7.00%**
MP decision publication (rate changes)	29 June (+0.25)	20 June (0.00)[2] 25 July (0.00)[2] 29 August (0.00)[2]	6 July (0.00) 6 September (-0.75)	21 June (0.00) 3 August (0.00)
expected MP decisions	21 September 23 November	26 September 24 October 21 November	4 October 8 November 6 December	27 September 2 November

Note: [1] CPIF (consumer price index including a fixed interest rate); [2] at all these meetings, the MNB left its formally main interest rate unchanged, but lowered some of the other rates used – see below.

Key interest rates



Inflation



The **Riksbank** further raised the key interest rate by 25 bp in June. The tightening of monetary policy should bring about a cooling of economic development, including the labour market. In addition to domestic demand pressures, inflation in Sweden is being driven by a persisting weak krona. A decision to increase the volume of government bond sales from SEK 3.5 billion to SEK 5 billion monthly with effect from September could contribute to this appreciation. The central bank expects inflation to return to the target during 2024. According to the current forecast, the key rate will increase at least once again this year, while monetary policy will remain restrictive for a relatively long time going forward. However, future developments are subject to considerable uncertainties. If it becomes necessary to tighten monetary policy further, interest rates are the main tool for the Riksbank, while sales of government bonds are to be predictable and contribute to the normalisation of the central bank's balance sheet.

The **MNB** left its key interest rate at 13% at all three of its most recent meetings. However, to strengthen monetary policy transmission, the MNB is using adjustments to other rates, the increased levels of which are gradually normalising and converging with the policy rate. It lowered the overnight deposit rate in June, July and August by 100 bp to the current 14%. The MNB also lowered the interest rate on voluntary reserves, as well as the O/N collateralised borrowing rate, to the current 14% and 16.5% respectively, while leaving the O/N deposit rate at 12.5% for the time being. The voluntary reserves rate will be merged with the basic interest rate from October. Although the inflation is falling from its peak, it is still the highest among the countries under review. Economic activity was dampened by cautious behaviour by households and firms in the first half of the year due to rising costs. The central bank expects inflation to fall to single-digit levels in the autumn but that it will not reach the tolerance band around the target until early 2025.

After a prolonged period of rate stability, the **NBP** surprisingly lowered its basic interest rate by 75 bp. The latest data point to weaker demand pressures and a faster fall in inflation towards the target than the bank had previously expected. Economic activity in Poland fell in Q2 due to worsening global economic conditions. According to the flash estimate, inflation was still just above 10% in August, but the NBP sees inflation pressures gradually fading in both the external and domestic environment, as confirmed by falling core inflation. According to the NBP, the marked fall in inflation is being accompanied by falling inflation expectations. The NBP also considers that a faster return of inflation to the target would be helped by a strengthening of the zloty's exchange rate.

The **CNB** left the 2W repo rate unchanged at its June and August meetings. In August, it formally ended the intervention regime announced in May 2022 and at the same time resumed the programme of sales of part of the income on international reserves. According to the CNB, the current interest rate settings are sufficiently strict to ensure that inflation returns to the target. The strong cost-push inflation pressures stemming from the external environment and demand pressures stemming from the domestic economy are fading in the Czech economy. According to the forecast, inflation will fall sharply close to the inflation target of 2% at the start of next year. Domestic economic activity is below its potential, will be broadly flat this year and will return to growth next year. The baseline scenario of the forecast implies a gradual decline in interest rates from the third quarter of this year onwards, while the Bank Board expects interest rates to be higher than in the baseline scenario in the quarters ahead.

II. NEWS OVER THE LAST THREE MONTHS

Developments in monetary policy reviews

In June's Central Bank Monitoring, Spotlight focused on monetary policy reviews by central banks, especially in the context of New Zealand's RBNZ, the Australian RBA, the British BoE and the Japanese BoJ. Here we summarise the subsequent developments in this area for the banks mentioned:

- The RBA is beginning to implement some of the recommendations resulting from the review. Among other things, from next year it will cut the number of monetary policy meetings from 11 to eight per year. However, they will last longer and this change will allow for deeper discussions. All the members of the *Reserve Bank Board* (i.e. including external members) will be able to attend meetings with RBA experts in advance of monetary policy meetings and discuss more with them. Announcements of monetary policy decisions taken will not be issued by the governor himself, but by the entire *Board*, and each meeting will be followed by a press conference by the governor. The monetary policy regime should be reviewed every five years in cooperation with the Treasury. The RBA is also working on changes to the management and organisation of the bank. All these changes were announced in July by Governor Philip Lowe, whose seven-year term expiring on 17 September was not extended by the Australian government and who will be replaced on that date by current RBA Deputy Governor Michele Bullock.

- Updated documents defining the central bank's overall mandate and strategy have been published in New Zealand: *MPC Remit* (issued by the Ministry of Finance) and *MPC Charter* (based on an agreement between the Ministry of Finance and the RBNZ). There have been some changes to the documents, but this is more about clarifying or formalising some issues that already work in practice to a large extent – this is not a fundamental change to the RBNZ's strategy. The changes include the addition of a requirement to seek a deeper understanding and explanation of the relationship between monetary and fiscal policy and the impacts of monetary policy on financial risks, the clarification of some issues in the area of public communication by MPC members, and the transfer of the requirement to take into account the impacts of monetary policy on property prices from the *MPC Remit* to the *MPC Charter*. The RBNZ should continue to seek decisions by consensus, while voting should only take place if no consensus is reached. In its recommendation to the Ministry of Finance regarding the *MPC Remit*, the central bank proposed the introduction of a clear hierarchy of objectives (price stability should be the main objective according to the recommendation, with maximum sustainable unemployment only secondary), yet the Ministry of Finance retained the current dual mandate.

- In June, the BoJ published a description of its approach to the preparation of monetary policy review. In the review, the bank will focus on the impact of a number of unconventional instruments used over the past 25 years, including their impact on the financial system. It will also focus on a deeper understanding of long-term changes in the economic environment (e.g. economic globalisation and Japan's ageing population), their impact on household and corporate behaviour, and their implications for monetary policy. In addition to internal BoJ analyses, the work on the review will also include discussions and consultations with representatives of the private sector, and public and foreign experts (including at upcoming conferences). The BoJ will publish materials related to the review in a newly created part of its website.

- The review of the BoE forecasting processes announced in June will be led by Ben Bernanke, former chairman of the Fed during the financial crisis and Nobel Prize winner in economic sciences. The results of the review should be published in the spring of next year.

The ECB and CNB to end remuneration of minimum reserves

At its July meeting, the European Central Bank decided to apply 0% interest to the minimum reserve requirements that banks must hold with it effective from 20 September. The ECB stated that this should improve the effectiveness of monetary policy by reducing the total amount of interest paid. At the same time, the ECB expects to maintain the current degree of control over the monetary policy setting and the full pass-through of monetary policy decisions to money market rates. In the past, the ECB remunerated these reserves at its base rate for its main refinancing operations, and last October decided to remunerate them at the deposit rate (which, in an environment of excess liquidity, is in practice the key rate at which the ECB withdraws liquidity, thus better matching the rates at which banks could otherwise trade reserves on the money market). Now, the central bank has further reduced interest payments, de facto abolishing the remuneration of minimum reserve requirements.

The Czech National Bank took a similar step when it announced in September that it had ended remuneration of reserve requirements with effect from 5 October in order to reduce the costs of conducting monetary policy while maintaining its effectiveness.

Bundesbank to stop paying interest on government deposits

The German central bank will apply a 0% rate to domestic government deposits from October this year. At the euro area level, the remuneration of government deposits has been subject to a ceiling of the €STR reduced by 20 basis points since May this year, but national central banks may also apply a lower rate.

A traditional conference in Jackson Hole

In August, the annual conference of central bankers took place in Jackson Hole in America, this year focusing on structural shifts in the global economy. The speech by the chair of the US Fed Jerome Powell was made in the spirit of previous communication by the Fed – inflation has already peaked in the US, but is still high and it is possible that the situation will force another rate hike, while the Fed will make its decision according to incoming data. ECB President Christine Lagarde and BoJ Governor Kazuo Ueda also spoke at the conference.

A U-turn in Turkey's monetary policy

Turkey's central bank, newly headed by Governor H.G. Erkan, has significantly changed its approach to monetary policy. After a period of lowering interest rates despite runaway inflation, the bank has raised its basic interest rate three times since June – from 8.5% to the current 25%. After winning the election, President Erdogan, who has a strong influence over the country's central bank and who has advocated a low-interest-rate policy in the past, now speaks of the need for a tight monetary policy. Turkish inflation reached 58.9% year on year in August.

The Bank of Japan has adjusted its approach to yield curve control

Japan's BoJ adjusted its implementation of yield curve control at its July meeting, and will now approach it with greater flexibility. While it has technically left the upper limit of the tolerated ten-year government bond yield band at 0.5%, this limit will be taken as a benchmark rather than an insurmountable limit. The bank will offer to buy ten-year bonds with a yield of 1% almost every business day, and theoretically it can thus allow yields to rise to this level – it will no longer tolerate higher bond yields.

Change to ECB leadership, Fed board of governors complete again

Fabio Panetta, a member of the ECB's six-member Executive Board, has been appointed the new governor of the Banca d'Italia effective from 1 November this year. Although he will leave the Executive Board as a consequence, as Governor of the Italian central bank he will continue to be a member of the ECB's main monetary policy body, the Governing Council. Banca d'Italia Deputy Governor Piero Cipollone, the only nominee for the post of ECB Executive Board member Panetta will vacate, is likely to head in the opposite direction.

The seat on the US Federal Reserve's Board of Governors vacated by Lael Brainard's departure to President Biden's administration will be filled by economist Adriana Kugler, whose nomination was approved by the US Senate in September. Philip Jefferson was approved as Vice Chair of the Board of Governors, and Lisa Cook was given an extension of her mandate on the Board of Governors for a full 14 years – both have been members of the Board of Governors since last year.

III. SPOTLIGHT: COMMUNICATION OF CENTRAL BANK FORECASTS AND THEIR UNCERTAINTIES

Economic developments are inevitably accompanied by unexpected events, prompting central banks to seek to communicate the uncertainties and risks associated with macroeconomic projections. In doing so, central banks use various ways to inform the public and other economic entities about the variety of possible future scenarios. While some institutions prefer greater transparency and express the uncertainties surrounding the projections, for example, through fan charts or alternative scenarios, they do not quantify other risks and uncertainties and describe them in qualitative terms. The roles (and hence also the subsequent related communication) of interest rates and the exchange rate in the preparation of the forecast also differ between central banks.

There has been a significant improvement in central bank transparency in recent decades. This trend towards greater transparency is mainly driven by a better understanding of the importance of expectations, the credibility of central banks, and how communication can be an effective monetary policy tool. One key aspect of transparency is the publication of macroeconomic projections. As monetary policy works with a certain lag and should thus be forward-looking, these estimates of future macroeconomic developments are a key (albeit not the only) input for decision-making on the current monetary policy stance. The publication of forecasts thus helps in the understanding of any monetary policy actions taken, and helps anchor firms' and households' long-term inflation expectations, which are important for the transmission of monetary policy and the achievement of central bank objectives. In addition to the baseline scenario of the forecast itself, an analysis of the risks and uncertainties associated with it is an integral part of decision-making in monetary policy. Owing to the events of recent years, such as the COVID-19 pandemic, the Russian invasion of Ukraine and the associated significant surge in inflation, central banks have also become a focus of attention for the general public. The degree of uncertainty regarding future economic developments increased significantly at the same time. For a better orientation in central bank communication, it is therefore a good idea to orientate oneself both in the approach to interest rates and the exchange rate during the creation and subsequent communication of forecasts, as well as in the way they reveal the uncertainty associated with forecasts and the related pitfalls – and these are precisely the issues this Spotlight focuses on.[1]

Interest rates and the exchange rate in forecasting models

Central banks usually forecast a series of macroeconomic variables, with inflation and GDP being the most important for virtually all banks. However, banks differ in their approaches to interest rates and the exchange rate as two key monetary policy components that can be incorporated into the prediction model in various ways. For example, they may be considered endogenous[2] variables, may be derived from market expectations, or may be chosen as constants. In the first case, therefore, the rates and the exchange rate are the forecast output, whereas in the other cases mentioned they are assumptions for forecasting the other variables. When central banks make forecasts for interest rate and exchange rate movements as an endogenous path, the question arises as to the advantages and disadvantages of publishing them.

The publication of interest rate forecasts contributes to enhancing the transparency of a central bank's monetary policy, which in turn enhances the central bank's credibility and enables market participants and the public to better understand its decisions. The publication of these forecasts thus makes it possible to better anchor inflation expectations and influence market interest rates with longer maturities. Greater openness means the central bank is also facing increased pressure to improve the quality of the forecasting system. This benefits both the public and the central bank itself.

On the other hand, as pointed out by Clinton et al. (2017), the main concern associated with the publication of an explicit expected interest rate path is the risk of misinterpretation by the public. There is the possibility that the public would regard such a path as a firm commitment regardless of future changes in economic developments, or would underestimate the forecast-related uncertainties. The central bank's task is not to blindly follow its interest rate forecast, but to decide on the monetary policy stance needed to hit the inflation target on the basis of all the information available at a given point in time, and to flexibly react to incoming information. In this context, it should be stressed that the interest rate forecast is only one factor in monetary policy decisions, and that overall decision-making also includes the expert assessment of risks and

[1] It is thus loosely based on older Spotlights from June 2011, which introduced readers to the issue of central bank communication, and from September 2015, which focused on regular reports on inflation from central banks.

[2] The endogeneity of monetary policy means that both interest rates and the exchange rate react in the forecast to the evolution and expectations of all the remaining macroeconomic variables included in the model, and interact with them. The forecast thus also incorporates the expected behaviour of the central bank itself, meaning that it shows the development of interest rates and the exchange rate as consistent with the overall outlook.

factors over and beyond the forecast. The publication of the interest rate path therefore increases the communication requirements on the central bank if it actually deviates from its forecast.

As regards the exchange rate, this variable is of considerable importance for monetary policy, especially in small open economies. The publication of its path fosters transparency and communication of the future effect of monetary policy through the exchange rate component of the monetary conditions. The development of the exchange rate is also conditional on the forecast interest rate path – comparing the actual development of the exchange rate with the forecast helps the financial markets and analysts better estimate the central bank's future decisions. On the other hand, like interest rates, an exchange rate forecast may be viewed as a commitment. Moreover, the exchange rate is a variable that is difficult to predict, and this may be reflected in large deviations between actual developments and the forecast.

Risks and uncertainties as a natural part of any forecast

Central banks communicate in an environment full of uncertainties. The timing and extent of monetary policy impacts are uncertain, as are the shocks that can affect an economy. Some central banks respond to this situation by publishing their forecasts together with the degree of uncertainty regarding future economic developments and the risks of the expected monetary policy direction (Rholes & Petersen, 2021). They can do so using several methods.

*We associate the concept of **risk** with events whose probability of occurrence can be grasped and quantified in a certain way. The concept of **uncertainty** includes general unknowns for which there is insufficient information or data to determine the probability or outcome of a given event.*

One of these is to create fan charts for key forecasted variables. In these charts, the centre line shows the baseline forecasting scenario (i.e. the most likely development of the variable), while the ranges (confidence intervals) around it show the range of uncertainty of the forecast. Symmetric fans indicate the overall uncertainty around the baseline scenario and are typically constructed based on historical forecasting errors.[3] Some central banks use asymmetric fans. Compared to symmetric ones, these make it possible to better capture the perceived direction of the risks associated with the forecast, but their disadvantage is that it is more complicated to construct them (a number of risks and uncertainties may be very difficult to quantify). Central banks may also publish additional scenarios and sensitivity analyses showing the alternative development of variables if economic developments in a component deviate from the assumptions of the baseline scenario. Finally, banks can summarise their perception of the size and direction of the risks of the forecast verbally in their statements.[4]

Fan charts versus point forecasts and their role in influencing market expectations

As regards the advantages of publishing fan charts, it is important to emphasise that forecasts of macroeconomic variables are inherently uncertain. According to Rholes & Petersen (2021), central banks publish fan charts with the aim of maintaining credibility when faced with an uncertain economic outlook and future policy directions. In this way, excessive expectations regarding the accuracy of the point forecasts can be avoided. Clinton et al. (2017) stress that the publication of a fan around the endogenous interest rate development reduces the risk of the forecast being viewed as a commitment.

By contrast, Rholes & Petersen (2021) state that, despite the increasing trend in communicating uncertainty using fan charts, there is hardly any empirical or theoretical evidence that this could improve central banks' ability to influence markets through their forecasts. The authors believe that precise point forecasts are more effective in managing inflation expectations. This is because they consider fan charts lead to greater uncertainty about the central bank's forecasts and reduce their credibility. On the other hand, Mokhtarzadeh & Petersen (2020) show that comprehensible fan charts (combining point forecasts with confidence intervals) are effective in managing inflation expectations. However, their findings could not separate the effect of the fans from the point forecasts themselves.

[3] Confidence intervals calculated using a statistic called root mean square error (RMSE) are often used to construct the range around the centre line.

[4] These approaches to the communication of risks and uncertainties are not mutually exclusive – central banks may use a combination of them.

Practices of the central banks under review

The current practices regarding the publication of forecast risks and uncertainties for the central banks under review are summarised in the following table.

Table: Comparison of communication of forecast risks and uncertainties

	Forecast horizon *(years)*	**Symmetric fan charts**	**Asymmetric fan charts**	**Quantification of uncertainty**	**Alternative scenarios**
ECB	2.5-3.5	✓	✗	average absolute errors of past forecasts excluding outliers	✓
Fed	2-3*	✓	✗	RMSE of past forecasts	✗
BoE	3	✗	✓	combines two normal distributions with different variances, adjusted by the MPC	✓
NB	3-4	✗	✗	✗	✗
SNB	3	✗	✗	✗	✗
RBNZ	3	✗	✗	✗	✗
BoC	2–3	✗	✗	✗	✓
Riksbank	3	✗	✗	✗	✓
MNB	2.5-3.5	✓	✗	RMSE of past forecasts	✓
NBP	2.5-3.5	✗	✓	combines two normal distributions with different variances	✗
CNB	1.5-2.5	✓	✗	RMSE of past forecasts	✓

Note: We also present the forecast horizon for comparison in the table. However, this should be viewed as indicative. For example, the CNB's spring forecast published in May has a horizon until the end of the next year (i.e. just over 1.5 years) and the summer forecast published in August extends this horizon by another calendar year (i.e. to just under 2.5 years).

* In addition to the forecast for the coming years, the Fed also publishes a long-term outlook for forecasted variables.

Source: Central bank websites.

Symmetric fan charts are used by the ECB, MNB and CNB to communicate uncertainties

The ECB publishes its forecast separately four times a year, entitled Macroeconomic projections for the euro area. The June and December projections are produced by Eurosystem experts, while the March and September projections are produced by ECB staff without the involvement of national banks. The forecast is conditional on market expectations of interest rates and a constant effective exchange rate. The two main macroeconomic variables, real GDP and HICP inflation, are shown in the form of colour-differentiated fan charts. This practice was interrupted by the ECB due to the extreme uncertainty following the outbreak of the COVID-19 pandemic, but it returned to it in March this year. The ECB publishes fan charts with prediction confidence intervals of 30%, 60% and 90%.[5] In addition, alternative scenarios for the economic outlook in the euro area are also published (these were particularly relevant during the pandemic and after the outbreak of the war in Ukraine, when fan charts were not published).

[5] The methodology for deriving the ranges used in these fan charts assumes a normal distribution of past absolute errors, while outliers are removed. The mean absolute errors are calculated as the average of the absolute differences between the projections for a given quarter and the actual figures for the following quarter.

Similarly, the Hungarian MNB publishes GDP and inflation forecasts in the form of symmetric fan charts which, however, are defined using the deviation of the observed values from past forecasts in the form of RMSE. The section entitled “Impacts of alternative scenarios on our forecast” also regularly discusses alternative scenarios, while in some cases a quantitative forecast is also given.

The CNB also presents its key macroeconomic variables – including the endogenous path of interest rates and the koruna exchange rate – using symmetric fan charts that expand linearly. As for the inflation rate, the fans expand only for the first five quarters, after which they remain constant. This reflects past predictive power and the stabilising role of monetary policy. As regards the interest rate forecast, the lower fan boundary is limited by zero. The CNB is the only central bank to publish a bilateral exchange rate (CZK/EUR) forecast. Besides the baseline scenario, other possible economic development scenarios are also included in the Monetary Policy Report.

Asymmetric fan charts are published by the BoE and NBP

The British BoE publishes three macroeconomic variables (GDP, unemployment and inflation) in colour-differentiated fan charts with asymmetric prediction intervals.[6] The BoE allows MPC members to influence the shape of the chart according to their own risk assessment and the underlying assumptions of the chart. The forecast in the baseline scenario is conditional on market expectations of future interest rates. In addition, there are regular comments on an alternative scenario based on constant interest rates. The Polish NBP also publishes asymmetric fan charts (with prediction intervals at 30%, 60% and 90% confidence levels[7]) for GDP and inflation. Risks are described in the section “Sources of forecast uncertainty”. These projections are based on the assumption of constant interest rates.

The US Fed is a special case

The US Fed publishes its forecasts through a publication entitled (Summary of Economic Projections, SEP). These forecasts are produced by Federal Open Market Committee (FOMC) members, while detailed underlying forecasts prepared by Fed staff are only published five years later. The forecasts given in the SEP depend on each participant’s individual opinions regarding appropriate monetary policy (Kahn and Palmer, 2016). These forecasts cover four main macroeconomic indicators: real GDP, the unemployment rate, PCE inflation (including core PCE inflation) and interest rates. The forecast for real GDP, unemployment and inflation is presented first by means of a table and charts revealing the level of uncertainty associated with the forecast. For each indicator in each forecast year, a central tendency range is presented, excluding the three highest and three lowest projections, and then the overall range covering all participants’ predictions, from the lowest to the highest. The interest rate forecast is then presented using dot plots. Each dot on the chart represents the anonymous opinion of one FOMC participant regarding the appropriate interest rate settings at the end of the relevant calendar year and in the long term. In addition, the forecast for these four key indicators is presented in the form of fan charts with a single symmetric fan at a confidence level of 70%. However, the Fed emphasises that the shape of the fan charts may not fully take into account the individual opinions of the FOMC members, so further charts showing the degree of uncertainty perceived by the FOMC members compared with the degree of uncertainty shown in the fan chart are added. These charts therefore assess the overall direction of the risks associated with the monitored indicators.

Several banks publish only a point forecast in the form of line charts, i.e. without indicating uncertainty

This is the case, for example, with Norway’s NB and New Zealand’s RBNZ, which produce and publish a forecast with an endogenous interest rate path. The Swedish Riksbank also publishes an endogenous rate path. Previously, it also published fan charts for inflation, GDP and interest rates, but in April 2020, after the outbreak of the COVID-19 pandemic, it only published a chart on interest rates, and this (due to the high level of uncertainty) only for a year ahead. It subsequently returned to the publication of a fan chart on interest rates with a longer time horizon, but for the inflation forecast the fan chart was published only irregularly and for GDP not at all. The latest two forecasts (in April and June 2023) were published without any fan charts, meaning the Riksbank currently only presents point estimates of all forecasted variables, including interest rates. Besides the baseline scenario, however, it also prepares other possible scenarios in which it comments on the risks and uncertainties of the forecast.

The Swiss SNB also publishes a point forecast that does not contain an endogenous interest rate path, but is based on the assumption of a constant rate. If it changes, the forecast contains two scenarios – with the new and the previous interest rate. The Canadian BoC forecast is also point-based, and also assumes constant interest rates as well as a

[6] These intervals are created using a split (two-piece) normal distribution, a combination of two normal distributions with the same mode, but different variance. The modus represents the median path of the forecast, while the variance is determined from past forecast errors and is further adjusted to take account of the current uncertainty regarding exogenous and conditional variables (Britton et al., 1998).

[7] The skewness of the distribution is determined by analysing alternative scenarios conditioned by the stability of interest rates and an expert assessment of the likelihood of their realisation (Pońsko & Rybaczyk, 2016).

constant exchange rate for the Canadian dollar against the US dollar. The "Risks to the inflation outlook" section sometimes also contains a quantitative forecast of an alternative scenario.

Conclusion

Different banks have different approaches for including the key components of monetary policy, i.e. interest rates and the exchange rate, in their prediction models. These variables can be included as endogenous variables, derived from market expectations or selected as constants.

In a context of inevitable uncertainty in the economic environment, central banks are trying to communicate this uncertainty to the public. In many cases, they use fan charts when publishing forecasts. Specifically, the ECB, the MNB and the CNB use symmetric fan charts, while the BoE and the NBP rely on asymmetric fan charts. By contrast, the Riksbank, the Norwegian NB, the New Zealand RBNZ, the Swiss SNB and the Canadian BoC publish point forecasts in the form of line charts, i.e. they do not include a measure of uncertainty in the charts. Some banks also present alternative scenarios and sensitivity analyses that show the possible evolution of the variables in the event of the materialisation of risks or in the event of a different central bank monetary policy response.

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IV. SELECTED SPEECH: Dave Ramsden: Quantitative tightening – the story so far

Sir Dave Ramsden, Deputy Governor for Markets and Banking at the Bank of England (BoE), discusses the Bank of England's findings from the quantitative tightening (QT) programme so far in a speech to the Money Macro and Finance Society in July.

At the beginning of his speech, Sir Ramsden recalls that the BoE's Monetary Policy Committee (MPC) set out its strategy for the mix of monetary policy instruments to gradually deliver tighter monetary policy in its Monetary Policy Report of August 2021. Since then, those principles have been put into practice in this strategy. QT was commenced in February 2022, initially through maturities and augmented last autumn with a programme of gilt sales. In September 2022, the MPC voted to reduce the stock of gilts held in the Asset Purchase Facility (APF) by GBP 80 billion per year. The BoE also sold off most of its previously purchased corporate bonds, but their volume was significantly lower than the gilts.

Quantitative tightening in principle and practice

As the BoE Deputy Governor describes, to ensure the smooth unwind of the APF gilt portfolio, the MPC set out its approach to QT based on three key principles. First, the MPC had a preference to use the Bank Rate as its active policy tool when adjusting the stance of monetary policy. Second, sales would be conducted so as not to disrupt the functioning of financial markets. And third, to help achieve that, sales would be conducted in a relatively gradual and predictable manner over a period of time.

According to Ramsden, the BoE has therefore designed its approach to QT through these three key principles. The QT settings made it possible to adjust the execution of sales with regard to market conditions. The sales were designed to operate in harmony with the market wherever possible. The BoE sells bonds through a series of frequent auctions of smaller volumes, predetermined through a quarterly calendar of operations. The bank also introduced a new instrument for short-term repo operations to ensure that QT does not exert undue upward pressure on short-term money market rates. Together, these elements have helped the bank implement QT in a way designed to minimise its potential impact on gilt yields and financial markets.

Limited impact on gilt yields

Precisely because of the way QT is designed to work in the background, it is difficult to measure its impact with any certainty. While QT is, in theory, the opposite of quantitative easing (QE), the bank always stressed the state contingency of the associated transmission channels. The MPC’s approach to QT effectively turns off some of the channels that were important during QE, exploiting this state contingency. According to Sir Ramsden, the overall impact of QT on gilt yields appears to have been small. The vast majority of the ~300 bp increase in UK 10-year gilt yields since February 2022 has been driven by increases in expected policy rates. The experience so far, as a very rough indication of scale, is that bank staff estimate a one-off additional GBP 80 billion of QT relative to expectations is likely to increase 10-year gilt yields by less than 10 bp in prevailing market conditions. Based on the experience of QE, that would map across into an impact on activity and inflation of less than 0.2% and 0.1 pp respectively.

Sir Ramsden further asserts that, based on the BoE experience to date and in line with the second of the MPC’s key principles, they have found no evidence that their operations have themselves disrupted market functioning. There is also some evidence that their QT sales have had an additional positive effect on the gilt market. Over the first half of 2022, they saw signs of scarcity of short-dated bonds in particular, driven by increased demand for collateral. Since the BoE started selling bonds through QT, this scarcity effect has been alleviated. Taking all market intelligence evidence together so far, QT sales auctions have operated in line with expectations since sales started in November 2022.

What has the BoE learned so far and what is next?

Sir Ramsden thinks the story is “so far, so good”. QT is having only a limited impact on gilt yields, all else being equal. There has been no discernible impact from the sales operations on market liquidity, and there have been some signs that the sales may have helped alleviate collateral scarcity somewhat. Taken together, Sir Ramsden supports a carefully considered increase in the pace of reduction in the stock of gilts in the twelve months ahead, reflecting the completion of the corporate bond unwinding as well as the evidence so far on marketing functioning. Sir Ramsden, however, emphasises remaining careful – like the MPC, he wants QT to set a gradual and predictable pace for unwinding and to let it operate in the background. The MPC should announce its next decision on pace during September.

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