

# Forecasting for monetary policy making and communication at the Bank of England: a review

In July 2023 the Court of the Bank of England announced that Dr Ben Bernanke would lead an independent review into the Bank's forecasting and related processes during times of significant uncertainty. That Review, published on 12 April, provides a thorough assessment of the Bank's current forecasting approach, and the relationship between the forecast, monetary policy decisions, and their communication.

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## Preface and acknowledgements

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In July 2023 I accepted an invitation from the Court of Directors of the Bank of England to review economic forecasting at the Bank, with a particular emphasis on how forecasting can better support policymaking and communication during times of high uncertainty and structural change. This report is the product of that review. Earlier official reviews of the Bank's forecasting include [Stockton \(2012\)](#) <sup>[1]</sup> and [Independent Evaluation Office \(2015\)](#). I build to some extent on that earlier work. However, in light of the passage of time and, especially, the challenging economic environment of recent years, a fresh look at the construction and use of economic forecasts at the Bank seems timely.

In the process of conducting the review, I solicited a wide range of views. With the able assistance of Melissa Davey and her colleagues in the Bank's Independent Evaluation Office (IEO), including Michael Lever and Sophie Stone,<sup>[1]</sup> as well as of Sam Boocker, my research assistant at the Brookings Institution, I conducted some 60 interviews of individuals and small groups. Interviewees associated with the Bank included all current MPC members, selected past MPC members, senior Bank staff, the independent chairs of the Bank's Citizens' Forums, and Bank Agents (who serve as regional representatives and information gatherers for the Bank). Separately, the IEO team, Boocker, and I also hosted a series of working lunches with representative groups of Bank staff from different divisions and at all levels of seniority.

For the perspectives of people outside the Bank, we interviewed UK print and broadcast journalists, financial market participants, other UK forecasters (including representatives of the Office for Budget Responsibility and the National Institute of Economic and Social Research), academics, and economists of the Trade Union Congress. I also met with the chairs of the relevant Parliamentary committees in both the House of Commons and the House of Lords to update them on the project and to hear their views. I would like to express my gratitude to all the interviewees, who were uniformly generous with their time and forthcoming in their responses to our questions.

Some of the interviews and meetings were conducted online. However, Boocker and I spent three weeks at the Bank during the period running up to the 2 November 2023 policy decision and were consequently able to meet in person with many individuals and groups, both internal and external to the Bank. Boocker and I both attended staff meetings and meetings between staff and MPC members at which the forecast was developed and debated. With special permission I (without Boocker) attended the meetings at which the MPC discussed and finalised its policy decision. We reviewed relevant academic articles, official documents, and related materials. With the IEO taking the lead, we conducted case studies bearing on the Bank's forecasting and use of forecasts in recent years.

With substantial help from the IEO team, we compared the forecasting procedures and recent forecasting records of the Bank with those of six peer central banks: the US Federal Reserve, the European Central Bank, the Reserve Bank of New Zealand, the Bank of Canada, the Norges Bank (Norway) and the Sveriges Riksbank (Sweden). We also compared the Bank's forecast accuracy with that of external forecasters. For background information on the peer central banks, we held online meetings with the staff leading the forecast process at each of those banks (except for the Federal Reserve, with which I am already familiar) and reviewed publicly available materials. The central bank staff members with whom we spoke were eager to be helpful, going out of their way to help us better understand their forecasting procedures, the roles of staff and policymakers in forecast development, and the use of forecasts in policymaking and communication at their institutions.

The forecasting and policy challenges faced by the Bank of England in recent years were hardly unique, as peer central banks faced similar shocks and dealt with similar challenges. Still, the recent experience served as a stress test of forecasting at the Bank, including not only of the routine construction of forecasts but also of the use of forecasts in policymaking and public communication. The Bank, like other central banks and policy institutions, will be working to draw the appropriate lessons from this experience. The goal of this review is to assist in this effort.

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**12 April 2024**

## Executive summary

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This report reviews economic forecasting at the Bank of England. The report's remit is broad (see Annex A for the published terms of reference). Specifically, the charge of the review is to 'consider the appropriate approach to forecasting and analysis in support of decision-making and communications in times of high uncertainty from big shocks and structural change...'. To meet this charge, the report discusses and evaluates the current forecasting process at the Bank, including the adequacy of the forecasting infrastructure (data, software, and models); the utilisation of the staff; the process of constructing the quarterly forecast, including the interactions of the staff and the Monetary Policy Committee (MPC, or Committee); issues raised by high uncertainty and structural change; the use of the forecast in the MPC's policy decisions; and the role of the forecast in the MPC's communications with the public, the media, and financial market participants.

The structure of the report and its conclusions are summarised below. In brief, the recommendations made in this report have three broad objectives: first, to improve and maintain the Bank's forecasting infrastructure, including data management, software, and economic models; second, to support an effective policy process by equipping the MPC and the staff to learn from past forecast errors, to identify and quantify risks to the outlook, and to deal with uncertainty and structural change; and third, to help the MPC better communicate its view of the economy, the risks and uncertainties surrounding its outlook, and the basis for and implications of the Committee's policy choices.

Part I of the report sets the stage with some general observations, not specific to the Bank of England and optional for the informed reader, about the construction of economic forecasts and central banks' use of forecasts in policymaking and in communications with the public. With that background, Part II describes the Bank's current practices. Forecasts of the UK economy for the subsequent three-year period are constructed quarterly, in a process that begins in earnest some six weeks before a monetary policy meeting. Although Bank staff are responsible for producing a first draft of the forecast and providing supporting analysis, staff and MPC members work together to put together the final product, which is approved by the MPC. The forecast is subsequently published in the Bank's Monetary Policy Report (MPR) and summarised in other official releases. Relative to other central banks, the forecast plays a particularly large role in the Bank's public communications and accordingly receives considerable attention in the media and from financial market participants.

Part III compares the Bank's processes and recent forecast accuracy with those of a set of peer central banks since 2015. We find that, while the accuracy of the Bank's economic forecasts has deteriorated significantly in the past few years, forecasting performance has worsened to a

comparable degree in other central banks and among other UK forecasters. The recent period was characterised by a series of large shocks that were, by their nature, difficult to forecast, and were generally not predicted by financial markets or external experts. Among these shocks were the pandemic itself, along with its economic and policy consequences; the sharp increases in oil, gas, and other commodity prices, especially following Russia's invasion of Ukraine; and the sustained disruption of global supply chains during and following the pandemic. The large and correlated forecasting errors of central banks around the world during the past few years support the view that global shocks dominated local factors as sources of those errors at the Bank and elsewhere; and that, to the extent that deficiencies of forecasting methods or economic analysis account for the misses, the deficiencies were characteristic of the central banking community in general rather than the Bank alone. In short, given the unique circumstances of recent years, unusually large forecasting errors by the Bank during that period were probably inevitable. It is nevertheless important for the Bank to draw what lessons it can from the experience, including lessons regarding how it uses its forecasts, as other central banks will certainly do.

Part IV assesses the Bank's construction and use of its forecasts and makes recommendations, listed below. In accordance with the objectives of our report, the recommendations are organised according to three major themes: **building and maintaining a high-quality infrastructure for forecasting and analysis; providing a forecast process that better supports the MPC's decision-making; and using the forecast to communicate the MPC's outlook and policy rationale to the public.**

## **Building and maintaining a high-quality infrastructure for forecasting and analysis**

The most serious problems we found in our review are the deficiencies of the Bank's forecasting infrastructure – the tools the staff uses to produce the quarterly forecast and supporting analyses. Some key software is out of date and lacks important functionality. With the staff fully engaged in the production of the current forecast, particularly during periods of extraordinary volatility, insufficient resources have been devoted to ensuring that the software and models underlying the forecast are adequately maintained (updated, stress tested, and periodically re-estimated). In particular, the baseline economic model, known as COMPASS, has significant shortcomings. These deficiencies in the framework, together with a variety of makeshift fixes over the years, have resulted in a complicated and unwieldy system that limits the capacity of the staff to undertake some useful analyses, including producing alternative forecast scenarios, using information gleaned from forecast errors to improve model specifications and forecasting methods, and considering alternative modeling frameworks. A positive development is that an effort to upgrade the data management system is under way. This report describes the issues with the forecasting infrastructure and makes four recommendations.

**Recommendation 1. The ongoing updating and modernisation of software to manage and manipulate data should be continued with high priority and as rapidly as feasible.** At completion, the modernisation project should ensure that:

- (i) the economic and financial data available to the staff are comprehensive, covering all key sectors at the relevant frequencies; clearly defined, with sources provided; updated in a timely way; and easily searchable;
- (ii) staff are able to export and transform data series as needed to construct figures, tables, and routine econometric analyses quickly and efficiently and with adequate source control;
- (iii) large data sets, both time series and cross-sectional, can be ‘cleaned’ and used efficiently in substantive analysis and research; and
- (iv) the inputting of data to the suite of economic and statistical models, especially for routine operations including forecasting and scenario analysis, is automated to the extent possible.

The Bank might consider whether adding a few data specialists to work with economists in accessing and working with data, especially larger and more complex data sets, would make the forecasting process work more smoothly.

**Recommendation 2. Model maintenance and development should be an ongoing priority, supported by a significant increase in dedicated staff time and adequate resources, including specialised software as needed.** To be most effective, the dedicated staff should have ample opportunities to interact with ‘front-line’ forecasting staff, MPC members, and external experts. The maintenance and development staff should ensure that forecasting models are regularly evaluated, re-estimated when new data become available, stress tested against alternative scenarios, and modified as needed to reflect new perspectives on the economy.

**Recommendation 3. Over the longer term, the Bank should undertake a thorough review and updating of its forecasting framework, including replacing or, at a minimum, thoroughly revamping COMPASS.** The specific framework and models to employ should be decided over a period of time by the staff with MPC input. However, so that staff can respond to policymakers’ requests for new analyses in a timely way, flexibility, transparency, and ease of use (including automation of processes now carried out manually) should be important criteria for a restructured system.

**Recommendation 4. Based on the lessons of recent years, a revamped forecasting framework should include at least the following key elements:**

- (a) rich and institutionally realistic representations of the monetary transmission mechanism, allowing for alternative channels of transmission;
- (b) empirically based modelling of inflation expectations, with a distinction between short-term (eg, one-year) and longer-term (eg, five to ten years) expectations, and without the assumption that longer-term inflation expectations are always well-anchored;
- (c) models of wage-price determination that allow gradual adjustment and causation from prices to wages as well as from wages to prices;
- (d) detailed models of the financial sector, the housing sector, the energy sector, and other key components of the UK economy;
- (e) greater attention to, and ongoing review of, supply-side elements and their role in the determination of inflation and growth. Important supply-side factors include changes in productivity, labour supply, the efficiency of job-worker matching, supply-chain disruptions, and trade policy. Notably, analyses of inflation should consider supply-side factors as well as the state of aggregate demand.

Recommendation 4 is not intended to imply that the Bank's current framework lacks all these features by any means. Rather, it is a checklist of key elements that a revamped framework should be sure to include.

## **Providing a forecast process that better supports the MPC's decision-making**

The goal of the forecasting process, of course, is to help the MPC make better policy decisions and to effectively communicate those decisions to the public. This report reviews how the MPC uses the forecast today, noting the evident strengths of the process but also suggesting possible improvements.

To deliver a forecast process that better supports the MPC's decision-making, the report makes three related recommendations. We argue that the current bias toward making incremental changes in successive forecasts, together with the use of human judgements that paper over problems with the models, may slow recognition of important structural changes in the economy. Building on the joint analytical work of the staff and MPC during each forecast round, a systematic effort should be made to address these issues. In addition, policymaking could be made more systematic and coherent by supplementing the central forecast with additional information and analysis, notably insights drawn from alternative scenarios (including forecasts made based on alternative paths for the standard conditioning assumptions). Currently, the Bank regularly publishes a scenario that assumes constant interest rates, and in recent years it has occasionally



used scenarios to explore the consequences of energy price shocks and other risks. Expanded use of alternative scenarios would facilitate comparisons of possible policy choices, more accurately quantify the risks to the forecast, and help the Committee learn from past forecast errors. The report also suggests possible changes in the use of personnel, including incentivising the accumulation of experience in key substantive areas and making better use of the share of PhD researchers' time devoted to policy work.

**Recommendation 5.** Incrementalism (the practice of basing new forecasts on previous forecasts, with marginal adjustments) and the use of ad hoc judgements may obscure deeper problems with the underlying forecasting framework or unrecognised changes in the structure of the economy. **The staff should be charged with highlighting significant forecast errors and their sources, particularly errors that are not due to unanticipated shocks to the standard conditioning variables. Models and model components that may have contributed to forecast misses should be regularly evaluated and discussed, as well as the determinants of variables whose forecasts are consistently dominated by extra-model judgements. Staff should routinely meet with MPC members to consider whether structural change, misspecification of models, or faulty judgements warrant discrete changes to the key assumptions or modeling approaches used in forecasting.** Willingness to modify existing frameworks and to consider new data or other information is particularly important during periods of high uncertainty. The Bank should also build on existing vehicles for external engagement to capture a broad range of views.

**Recommendation 6.** **The Bank should review its personnel policies to determine if existing staff could be deployed in ways that improve the forecasting infrastructure and forecast quality.** In general, employees should be more strongly encouraged and incentivised to accumulate experience and expertise in specific substantive areas (eg, through in-role promotions), rather than being forced to change fields or responsibilities to get promotions and raises. Researchers with doctorates should continue to spend part of their time in undirected or loosely directed research, with the best researchers afforded the opportunity to continue working on their individual agendas throughout their careers. However, during the portion of their time devoted to current forecasting and analysis, employees with more advanced degrees should be rewarded for taking leading roles, especially in longer-term model maintenance and the development of new and existing models. PhD researchers can also contribute by undertaking substantive analyses directly related to current issues and, as appropriate, by being given the chance to lead in technical areas that make good use of their training and research experience.

**Recommendation 7. To improve the MPC’s policy discussion, the central forecast should be regularly augmented by alternative scenarios, with the specific scenarios ideally decided upon at an early stage of each forecast round by the MPC and staff.** Among the types of scenarios that could be considered are those that: (1) allow for direct comparisons of the likely effects of alternative policy paths on the outlook; (2) help to assess the effects and costs of possible risks to the outlook arising from unexpected changes in exogenous variables; (3) can be used to evaluate the effects of the Committee’s policy choices on the economy if one or more of its key assumptions about the structure of the economy are wrong; and (4) can be used to decompose historical forecast errors into portions due to judgements, conditioning assumptions, and other factors.

## **Using the forecast to communicate the MPC’s outlook and policy rationale to the public**

Effective communication is essential for effective monetary policy. Good communication helps the public understand the rationale and implications of policy choices and can make policy work better by helping to anchor inflation expectations and by influencing asset prices. Relative to other central banks, the Bank of England relies heavily on its central economic forecast (which, it should be emphasised, involves human judgement and diverse information sources as well as the output of econometric models) as a communications device. This report argues that the publication of selected alternative scenarios along with the central forecast would improve the Bank’s communications, providing the public with additional useful information about the rationales for policy choices, the risks to the forecast, and the robustness of the MPC’s policy plans in the face of uncertainty about key aspects of the economy’s state and structure.

**Recommendation 8. The publication of selected alternative scenarios in the MPR, along with the central forecast, would help the public better understand the reasons for the policy choice, including risk management considerations.** The publication of selected alternative scenarios could also provide the public with information about the Committee’s policy reaction function and its views of the monetary transmission mechanism. The MPC should determine which scenarios are published, choosing those that members deem to be most informative about the policy decision at a particular time. There should be no presumption that the same scenarios will be published in each MPR.

The Bank’s forecast is conditioned on a set of standard, externally determined assumptions

about the future course of policy rates, fiscal policy, exchange rates, and commodity prices. Unfortunately, these standard conditioning assumptions – for example, the assumption that future policy rates will follow the path revealed in futures markets – may not always accurately represent the views of the MPC, with the result that the central forecast may not fully reflect the Committee’s outlook for the economy. This report makes two related recommendations regarding the standard conditioning assumptions.

**Recommendation 9. Because the standard conditioning assumptions do not necessarily reflect the MPC’s views but can have potentially significant effects on the forecast, and because the central forecast by itself does not provide a clear rationale for policy decisions, the MPC should de-emphasise the central forecast based on the market rate path in its communications and be exceptionally clear in warning about situations in which it judges the standard conditioning assumptions to be inconsistent with its view of the outlook.** Methods for doing this include giving more attention to published alternative scenarios in discussions of the outlook and policy; emphasising to an even greater degree the conditionality of the forecast on exogenous assumptions not chosen by the MPC; and, when appropriate, using the MPC’s limited discretion to modify the standard conditioning assumptions. Judgemental adjustments might also be used to offset the effects on the forecast of conditioning assumptions with which the Committee disagrees, but that approach has the significant disadvantage of sending inaccurate signals to market participants about the MPC’s assessment of the rate path consistent with the Committee’s objectives.

**Recommendation 10. To put less emphasis on the central forecast, to simplify its policy statement, and to reduce repetitiveness in its communications, the MPC should replace or cut back the detailed quantitative discussion of economic conditions in the Monetary Policy Summary in favour of a shorter and more qualitative description, following the practice of most peer central banks.**

A more aggressive approach to addressing the problem of potentially inappropriate conditioning assumptions, following the practice of several peer central banks, would be to replace the market-based path for the policy rate with the MPC’s own forecasts of Bank Rate, based either on a collective judgement or by aggregation of individual member judgements. However, that change would be highly consequential and this report recommends leaving decisions on this issue to future deliberations.

Communicating to the public the high degree of uncertainty associated with any economic forecast is important. Currently, the MPC uses fan charts to convey the range of uncertainty in

forecasts of key economic variables at varying horizons. The report argues that fan charts suffer from significant analytical weaknesses and have outlived their usefulness.

**Recommendation 11. Despite their distinguished history, the fan charts as published in the MPR have weak conceptual foundations, convey little useful information over and above what could be communicated in other, more direct ways, and receive little attention from the public. They should be eliminated.**

However, it remains important to communicate the degree of forecast uncertainty and the balance of risks. A section in the MPR should be devoted to uncertainty and the balance of risks in the forecast. Beyond verbal discussion that describes uncertainty and risk in qualitative terms (terms that should be echoed in other Bank releases), this section could include the record of forecasting errors by the Bank, perhaps including new time series figures and discussion; an analysis of recent forecast errors, together with steps taken (if any) to correct the factors that contributed to those errors; and an overview of the risks to the outlook, possibly with reference to alternative scenarios published in the MPR. **Mean forecasts as currently constructed do not provide additional useful information and should also be dropped from publications in favor of more qualitative descriptions of risks and uncertainty surrounding the outlook.**

Importantly, this report's proposed changes to the use of the forecast in policymaking and communication are dependent on improving the capabilities and flexibility of the forecasting infrastructure. Accordingly, the last recommendation is about sequencing and resources.

**Recommendation 12. A phased approach to implementing changes proposed in this report, focused first on improving the forecasting infrastructure, while moving cautiously in adopting changes to policymaking and communications, is likely to be necessary. To facilitate infrastructure improvements and address existing deficits, the commitment of additional resources will be required, at least for a time.**

## Part I: Why and how do central banks forecast?

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Economic forecasting is difficult even under the best of circumstances. Modern economies are complex and ever-changing, and they are subject to unpredictable shocks, including non-economic shocks such as pandemics or wars. Even the current state of the economy is difficult to observe ('nowcasting' the economy is a specialised skill) as most economic data are available only with a lag and provide at best a rough, statistically noisy, and often subject to revision snapshot of current economic developments. Recessions – periods of economic contraction – are particularly difficult to anticipate. Many economists expected a recession to occur in the United States in 2023, for example, but economic growth and job creation remained strong. This is not to say that economic forecasting is impossible – both experience and formal studies confirm that forecasts made in real time do contain useful information about the future courses of key economic variables – but it is inevitably subject to a high degree of uncertainty, uncertainty which increases rapidly for forecasts of the more distant future and during periods of large shocks or rapid structural change.

So why do central banks and other policymakers continue to devote so much time and resources to making economic forecasts? For central banks, forecasts are important for two broad reasons: they aid in the **formulation of policy**. And they are a tool for **communicating** policy plans and rationales to the public and financial markets.[2]

### Policy formulation

Monetary policy makers understand that their actions affect the economy only over time – with 'long and variable lags', as Milton Friedman famously put it. Because of these inevitable lags, policymakers must take a view of how the economy is likely to evolve, at least in broad terms, which in turn provides a basis for choosing policies that promote the achievement of policymakers' objectives over time. Developing that view requires policymakers to do the hard work of analysing the forces affecting the economy and ensuring that their proposed policies are consistent with that view. At the same time, uncertainty about the structure of the economy and the inevitability of unanticipated shocks imply that forecasts can never be set in stone. Effective policymakers recognise that their view of the outlook and the associated policy strategy must be continually updated as new information arrives, and they communicate this point repeatedly to the public.

Astute policymakers also recognise that economic forecasts can be viewed as tests of their current understanding of the economy and the effects of policy. When a forecast proves to be significantly off target, in a way that is not easily explained by unanticipated shocks, analysis of the sources of the error can help improve that understanding. A tendency for forecasts to miss in

the same direction over an extended period is a particularly strong signal that the forecasters' implicit or explicit model of the economy should be re-thought and future forecasts and policy strategies modified accordingly.

A crucial distinction is that between unconditional and conditional forecasts. An **unconditional forecast** is an unqualified prediction of what is likely to happen in the future, given all the information currently available to the forecaster. A **conditional forecast** is a prediction that is contingent on specific, possibly counterfactual, assumptions. For example, policymakers might construct conditional forecasts to gain insight into how the economy would likely evolve if energy prices were 20% higher than in the baseline forecast or if the world economy were to slow more than currently expected. Forecasts can also be constructed conditional on alternative assumptions about how the economy works, eg, conditional forecasts could be used to estimate how the outlook would be affected if the sustainable rate of unemployment were lower than currently believed, or if the sensitivity of nominal wage growth to inflation were higher. Again, conditional forecasts do not necessarily reflect the forecasters' beliefs about what will actually happen in the future. Instead, they are attempts to provide insight into how the world might look conditional on alternative assumptions about the structure of the economy, or about forces influencing the economy – assumptions that may or may not reflect what the forecasters actually expect.

The comparison of alternative conditional forecasts, also called **scenario analysis**, can aid policy formulation in several ways. First, choosing the best policy strategy requires comparing the likely economic outcomes under alternative policies – that is, constructing a set of scenario analyses with differing assumptions about policy – and choosing the strategy that is forecast to best meet policymakers' objectives over time.

Second, scenario analysis can help policymakers adjust their strategy to account for risks to the outlook, eg, higher and more persistent inflation than implied by the baseline forecast. Under a policy approach known as **risk management**, policymakers might choose to take out some 'insurance' against bad outcomes. For example, in the case in which the most concerning risk is that inflation will be higher than in the central forecast, a risk management approach might involve running a tighter policy than would be chosen based on the main economic scenario alone. Scenario analyses can help quantify the economic consequences of various risks to the outlook, providing guidance about the extent to which risk management considerations should affect policy choices.

Third, similar considerations apply when policymakers are uncertain about a key parameter or some other structural element of their model of the economy. Scenario analyses can show how uncertainty about a structural feature translates into uncertainty about key aspects of the economic outlook. If the linkage is strong, policymakers may wish to invest more effort in improving their understanding of the underlying issue, and they may be more cautious in policy decisions whose effects are dependent on that feature.

Finally, scenario analysis can be used to decompose the sources of past forecast errors. For example, policymakers could reconstruct past forecasts under the counterfactual premise that the forecast's conditioning assumptions were accurately known in advance. The residual forecast errors in this scenario could then be attributed to factors other than unexpected changes in the conditioning variables, such as model misspecification or faulty judgements. Exercises of this type can be useful diagnostic tools for evaluating and improving the forecasting framework.

## Communication with the public and financial markets

The regular publication of an economic forecast by the central bank has several communication functions. Perhaps most obviously, the forecast provides the public with a broad rationale for the policy decision, eg, a forecast that inflation will remain too high justifies a tighter policy than average, all else equal. In general, the relationship between the central bank's economic outlook and the policy strategy it chooses is called the **policy reaction function**. Analysis of the responses of policy to monetary policy makers' outlook over time helps identify the bank's reaction function and improves the ability of outsiders to anticipate how policymakers will respond to various contingencies.

Better understanding of the reaction function by the public and financial market participants in turn helps to align private economic decisions and general financial conditions more broadly with the central bank's view, which can make policy more effective in moving the economy in the desired direction. Policy is also made more effective if communications, together with the central bank's policymaking record, help to tie down ('anchor') longer-run inflation expectations. If the public are confident that the central bank is committed to achieving its inflation target in the medium term, the risks of a self-fulfilling, expectations-driven wage-price spiral are much reduced.

Although publication of a forecast along with the policy decision can help the public learn about the policy reaction function over time, once again scenario analyses can make the process more precise and effective. For example, if (along with the central forecast) the central bank publishes alternative scenarios that indicate how policy would likely be set if the economy were to evolve in a manner different than expected, the public will be able to draw sharper inferences about the reaction function and thus better anticipate future policy actions. In addition, the publication of alternative scenarios in which the expected future path of interest rates is allowed to vary could provide useful information to the public about how policymakers expect monetary actions to affect the economy (the **monetary transmission mechanism**), providing further insight into why policymakers made the decisions they did.

In sum, publishing a forecast can be an important tool for making the central bank more transparent and accountable. Monetary policy affects the lives of almost everyone, and policymakers owe the public clarity about the factors driving their decisions. Published forecasts force policymakers to explain (1) the analysis underlying the forecast, including the factors that

policymakers see as most important for the outlook; (2) the reasons for significant changes over time in the outlook, and how policymakers are responding to those changes; (3) retrospectively, the factors responsible for significant past forecast errors and how policymakers are adjusting to and learning from those errors; and (4) the consistency of the policy plan with policymakers' mandated objectives. Again, publication of alternative scenarios along with the main forecast can potentially provide even greater transparency, in that those scenarios may reveal information about the factors that policymakers considered in their decision-making and illustrate risks about which policymakers are particularly concerned.

Finally, the publication of forecasts invites two-way communication with the public. For example, sufficiently detailed explanations of the central bank's outlook should make it possible for outside analysts to think along with policymakers, probing the forecast's underlying assumptions and providing commentary and feedback that conceivably could improve policy decisions.

## The construction of economic forecasts

Even inaccurate forecasts, if constructed by consistent methods using the best available information, can help improve the coherence and predictability of policy. But of course, all else equal, better forecasts imply better policymaking and communication. The construction of economic forecasts, at most central banks, is done primarily by professional staff, in many cases with some input from policymakers. Effective forecasting makes use of many kinds of information besides official economic data and remains as much an art as a science.

For forecasting and economic analysis, most central banks make use of econometrically estimated **macroeconomic models**, which are sets of equations that provide quantitative representations of key behavioural relationships (such as the responsiveness of aggregate consumption to changes in labour income or asset values, for example), while ensuring that necessary relationships (such as national income accounting identities) are respected in the forecast. When simulated on a computer, and conditional on underlying assumptions about the behaviour of variables outside the model (**exogenous variables**), macroeconomic models produce forecasts of key economic series, such as inflation and unemployment. Economic quantities whose values are determined by the model are called **endogenous variables**.

Economists use several different types of macroeconomic models for forecasting, either alone or in combination. So-called **semi-structural models** are (typically quite large) economic models that loosely combine equations describing key sectors of the economy and that flexibly model expectations formation and economic dynamics. The Federal Reserve's FRBUS is an example of a semi-structural model. Another type of macroeconomic model, of which the Bank of England's COMPASS is an example, are **dynamic stochastic general equilibrium (DSGE) models**. DSGE models are built up from microeconomic representations of the behaviour of individual households and firms. These models are dynamic in that they focus on intertemporal choices, such as saving and investment decisions; stochastic, in that decision-makers are



assumed to consider randomness in the environment; and general equilibrium, in that the models require that all economic choices be determined simultaneously in a mutually consistent way. The roots of semi-structural models are the large Keynesian models first developed in the 1960s. DSGE models had their beginnings in the new classical revolution of the 1980s but, unlike the original new classical models, most DSGE models in use today include slow adjustment of wages and prices and other Keynesian features.

While a macroeconomic model may help the forecaster construct a baseline outlook for the economy, in almost all cases it will be supplemented by other types of models and sources of information. Supplementary models used by central banks include both so-called sectoral models and statistical models. **Sectoral models** come in different forms, but – as the name implies – they typically provide more detailed representations of a particular sector of interest, such as the energy sector, the housing sector, or the financial sector. The predictions of such models can be used to fill in areas where the coverage of the overarching macroeconomic model is thin. This extra detail can be especially important when unusual developments in a particular sector – say, problems in banking and credit markets – have the potential to influence the overall economy.

**Statistical models** use little or no economic theory but instead rely on ‘black box’ mathematical models that are estimated from the historically observed behaviour of certain variables or sets of variables. For example, vector autoregression models are built on estimates of the responses over time of a set of variables (say, inflation, output, and unemployment) to changes in the past values of the same variables. Because they are typically unconstrained by economic theory, the predictions of vector autoregressions and other statistical models provide useful checks on the forecasts of macroeconomic models, which incorporate many (possibly incorrect) assumptions about economic behaviour.

Importantly, notwithstanding the role of formal models, no central bank relies entirely on models for its forecast. **Human judgement** remains a critical, sometimes even dominant, element of most real-world forecasts. People (including both staff and policymakers) can identify and correct for factors not adequately captured by econometric or statistical models, including possible structural changes to the economy or historically unusual developments. The people overseeing the forecast can do this in part because they have access to sources of information not available to the models, such as business and community contacts, journalistic accounts, and personal experience in the private sector, government, or academia. People who work extensively with particular models or methods also become sensitive to the ‘blind spots’ of the models – factors excluded from the models that can be important at times – and they can adjust model output, formally or informally, to compensate for systematic undershoots or overshoots in previous forecasts. In short, the predictions of formal econometric models are only one of several inputs, and not necessarily the most important one, to the forecasting process.

Finally, traditional forecasting methods are increasingly being supplemented by methods based


on new technologies or data sources. Many central banks already make use of large data sets ('big data'), such as (anonymised) credit card or mortgage records, to get more timely and granular information about the state of the economy. During the pandemic, many central bank staffers (including at the Bank of England) consulted closely with epidemiologists and other public health professionals to better understand Covid-19's economic consequences. Artificial intelligence tools, which can extract information from immense bodies of qualitative and quantitative data, seem certain to be increasingly important for monitoring the economy and forecasting in the future.<sup>[3]</sup> Central banks are already preparing for that eventuality.

## Part II: The construction and use of economic forecasts at the Bank of England

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### Background

By statute (the Bank of England Act of 1998), monetary policy at the Bank of England is the responsibility of the Monetary Policy Committee, or MPC. Except when there is a vacancy, the MPC has nine members. A non-voting representative of the Treasury also attends policy meetings. The five internal (to the Bank) members of the MPC include the Governor, three Deputy Governors (with special responsibilities for, respectively, monetary policy, financial stability, and markets and banking) and the Bank's Chief Economist. Four external members are appointed by the Chancellor of the Exchequer for renewable three-year terms. External members are chosen through an open application process and need not be (and often are not) UK citizens. The rationale for including external members is to promote greater diversity of thought and to bring skills and experience to monetary policy making that may differ from those of the internal members.

The Committee is responsible for maintaining price stability, which is defined in an annual remit letter from the Chancellor. Currently the MPC is charged with keeping the CPI measure of inflation close to a 2% target and, subject to that, supporting the Government's economic policy, including its objectives for growth and employment. Each member has one vote on policy, and is responsible for that vote (for example, individual members are called to testify before Parliamentary oversight committees). Following a recommendation made by Kevin Warsh in his review of the Bank's communication practices ([Warsh \(2014\)](#) ) , policy meetings are now held eight times per year instead of monthly as in the past.

The Bank of England Act also requires the MPC to produce a quarterly report that contains:

- (a) a review of the monetary policy decisions published by the Bank in the period to which the report relates,
- (b) an assessment of the developments in inflation in the economy of the United Kingdom in the period to which the report relates, and
- (c) an indication of the expected approach to meeting the Bank's objectives of price stability and, subject to that, supporting the Government's economic policies for growth and employment.

Although the Act does not explicitly specify production of an economic forecast, the MPC, like policymakers at most central banks, regularly include forecasts in their reports, in greatest detail

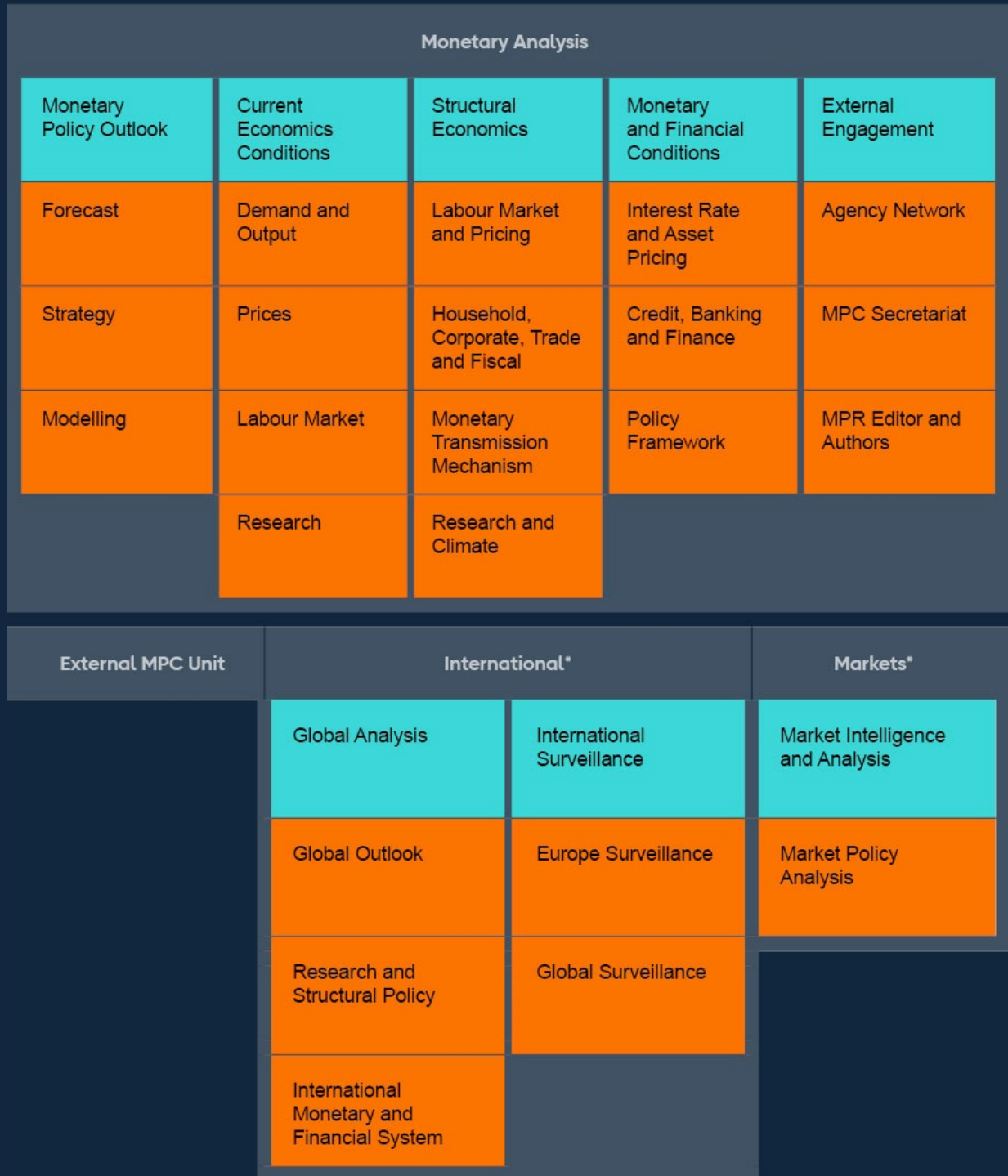
in the quarterly Monetary Policy Report (MPR, formerly the Inflation Report). Among the key variables forecast are consumer price inflation (CPI), the growth rate of real gross domestic product (GDP), the unemployment rate, and the excess or shortfall of aggregate demand relative to aggregate supply, which is intended to indicate the degree of pressure on prices. Forecasts are made for the subsequent three-year period. The forecasts are **modal**, meaning that they predict the most likely outcomes of the forecasted variables, although, as we will discuss, attention is also given to the subjective distribution of less likely outcomes around the modal forecast. The MPC's forecasts are typically described as the **best collective judgement** of the Committee, a phrase that is undefined but suggests that all MPC members (or perhaps a majority) are comfortable with the forecast, or at least its broad outlines.

## Staffing the forecast

The Bank staff involved in the forecast process are mostly members of the Monetary Analysis (MA), International and Markets Directorates (Figure 1). A little over half of these staff have master's-level qualifications, and around a third have doctorates. Of the staff with doctorates, many combine work on modelling, current economic analysis, and forecasting with a broader, typically more academic research agenda. Within MA, staff are divided into groups that specialise in the analysis of current economic conditions and short-term developments; the medium-term outlook; model development and monetary strategy; longer-term or structural changes in the economy; money, credit, and financial market developments; MPC communications; and the Agency network. Staff across two Divisions in the International Directorate provide projections and analysis of the rest of the world. And MA staff co-ordinate with staff outside the Directorate working on financial markets and financial stability issues.

In addition, each external MPC member is supported by two Bank staffers, who in turn can connect the external member with other staff as needed. The external members (past and present) that we interviewed expressed strong satisfaction with their staff support. External members in some cases can call on additional research support from associates in their home institutions, subject to appropriate insulation from sensitive materials.

Figure 1: Organogram of the areas that are involved in the forecast process



Directorate/Unit / Division / Team

\*Only includes those divisions that input directly into the regular forecast process.

## The Bank's modelling and forecasting tools

The Bank's forecasts incorporate diverse information. The staff use a suite of models, both economic and purely statistical, to analyse different aspects of the economy and the outlook. However, the staff and the MPC do not mechanically use the outputs of these models to produce the forecast but instead combine their outputs with considerable judgement and diverse information from outside sources.

As at most central banks, a benchmark macroeconomic model is used to provide a baseline forecast to help organise and interpret input from other models and human judgements. Currently, the Bank's benchmark model is a DSGE model called COMPASS, which in turn replaced earlier benchmark models.<sup>[4]</sup> COMPASS is a medium-sized macroeconomic model, including 18 observable variables.<sup>[5]</sup> It reflects both new classical and new Keynesian influences. Following the new classical approach, it assumes optimising behaviour and rational expectations by households and firms.<sup>[6]</sup> In the new Keynesian tradition, the model includes the assumption that wages and prices adjust only slowly; absent this assumption or a similar one, monetary policy would not affect the real economy in model simulations. COMPASS also contains the assumption that long-run inflation expectations are fixed at 2% ('well anchored' expectations), which creates a presumption that, in simulations of the model, inflation will eventually return to target.<sup>[7]</sup>

Although COMPASS retains its official status as the Bank's benchmark model, its role in constructing the forecast has diminished considerably in recent years. This has reflected both various shortcomings of the model that have become apparent and a lack of investment in supplementary models intended to fill in missing details of the (relatively small) COMPASS model (eg, COMPASS itself does not include detailed representations of the financial sector or the energy sector). Other identified shortcomings include COMPASS's inability to capture fully some key channels of monetary transmission and its tendency to predict over-rapid returns of the economy to its steady-state equilibrium (including to 2% inflation). Reflecting the de-emphasis of COMPASS, the model is no longer used to predict the effects of changes in interest rates or asset prices on the economy, a fundamental element of the forecast. More generally, the shape of the forecast is not significantly constrained by the a priori theoretical properties of this model. At this point, perhaps the most important role of COMPASS is to provide a framework for aggregating the output of other models and human judgements and to ensure that key accounting relationships among variables are maintained.

As reliance on COMPASS has diminished, Bank staff have increasingly depended on a suite of sectoral and purely statistical models, modified by human judgements, for constructing the baseline forecast. For example, a disaggregated semi-structural model is used to assess the domestic economic effects of changes in interest rates, asset prices and credit spreads.<sup>[8]</sup> This model predicts the responses of households, corporations, and banks to changes in asset prices and yields, allowing for a more disaggregated and granular analysis than could be done using COMPASS alone. This supplementary sectoral model can be used for analysing the effects of

unconventional monetary policies (such as asset purchases) as well as of more standard policies.

Although incorporating diverse sources of information and analysis should in principle improve forecast accuracy, the process of putting the various inputs to the forecast together has become increasingly complex and consumes a high fraction of staff energy and attention. Steps that ideally would be executed automatically are instead done manually. The high priority assigned to producing the current forecast in time for the next policy meeting reduces the staff time available for longer-term projects, including improving the data and software infrastructure and the maintenance and development of forecasting models and methods.

## Conditioning assumptions

Importantly, the MPC's forecast does not necessarily represent the Committee's best guess of **what will actually happen** to the economy. It is instead a conditional forecast, as defined in Part I: the MPC's outlook **conditional** on a set of variables following exogenously given paths (not necessarily the paths that the Committee thinks most likely). The key conditioning variables in MPC forecasts, which are regularly set out and explained in the MPR, are: (i) the future path of short-term interest rates (as implied by the market curve, or, in an alternative simulation, by the assumption that short-term interest rates will remain constant at the current level); (ii) government spending, taxation, and other fiscal policies as announced in the most recent official statements; (iii) the exchange rate between the pound and other currencies (weighted by their shares of trade with the UK), which is assumed to follow a path halfway between that implied by international interest rate differentials and the current exchange rate; and (iv) energy prices, as implied by futures prices of oil and natural gas.<sup>[9]</sup> Some consequences of using externally determined conditioning assumptions rather than assumptions freely chosen by the MPC are discussed in Part IV.

Besides the forecasts of headline variables (inflation, growth, unemployment), the MPR also provides three-year forecasts for a list of subsidiary variables, including variables treated as exogenous to the UK forecast (such as world GDP) and endogenous variables of interest derived as part of the forecast (such as average weekly earnings and consumer spending). In practice, in its communications with the public the MPC focus on the headline variables, although other variables (eg, wages) also receive attention.

## The quarterly forecast process

The forecasts of the Bank of England are often described as MPC-owned but staff-led. The professional staff do most of the preparatory work, in formal and informal consultation with MPC members, and they are responsible for drafting the descriptions of the economic situation and the outlook that appear in the MPR. MPC members provide feedback, add their own judgements, and, when they are satisfied, approve the forecast and the staff's description of it in the MPR. As

the forecast is supposed to represent the best collective judgement of the Committee, its approval involves discussion and negotiation among MPC members. In practice, MPC members may differ from the collective forecast at least to some degree, but members appreciate that differences of view are normal and even desirable. In any case, there is no formal mechanism for dissent from the forecast *per se*.<sup>[10]</sup> Members with differing outlooks have ample opportunity to present their views in public fora including speeches and testimony at the Treasury Select Committee.

Broadly speaking, the development of the quarterly forecast follows a regular sequence (see Figure 2 for the sequence from the November 2023 round). Although informal discussions among staff and between staff and MPC members occur on an ongoing basis, the release of the Quarterly National Accounts data by the Office for National Statistics, approximately five to six weeks before the Bank's policy meeting and the subsequent publication of the forecast, marks the official beginning of the new forecast round. The staff begin the process by updating the previous forecast to reflect new information, primarily economic and financial data that have become available over the previous quarter, including changes in the paths of the conditioning variables. Information derived by periodic staff 'stock-takes', for example about productivity and the supply side of the economy, may also be incorporated at this stage.



Figure 2: Timeline for the November 2023 forecast round

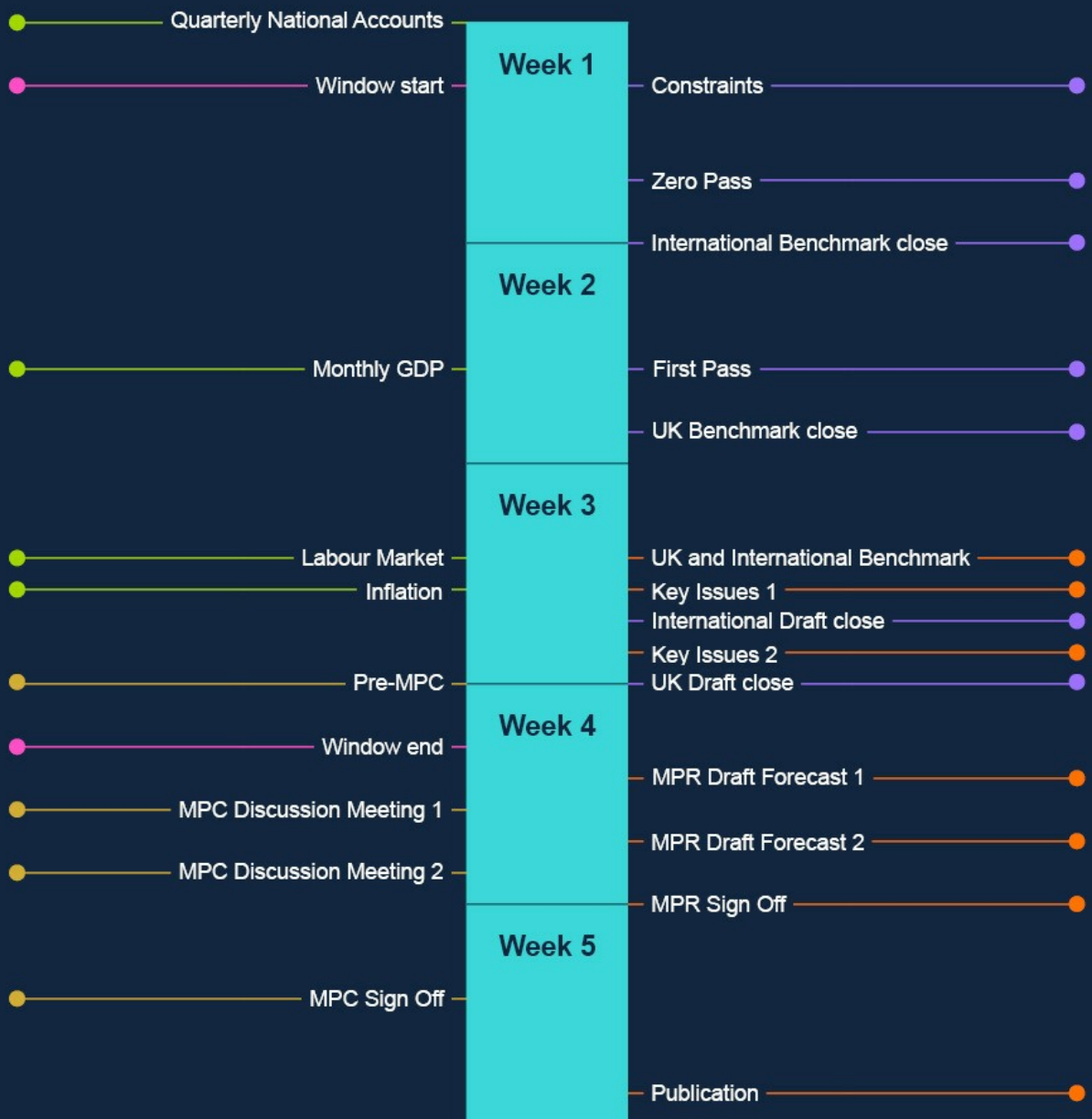
**MPC forecast meetings/milestones**

**Staff forecast meetings/milestones**

**Policy meetings**

**ONS data releases**

**15-day asset pricing**



About five weeks before publication, staff convene for the 'constraints meeting'. At this meeting the staff discuss updates to the forecast in progress. Much of the discussion at this meeting concerns the likely outcomes for the current (not yet completed) quarter and the following quarter. Staff estimate the values of key variables for those quarters using, for the most part, either data already in hand (including data that are preliminary and/or 'high-frequency', eg, released daily, weekly, or monthly) or short-term forecasts, combined with judgement. For example, the near-term inflation rate is constructed by aggregating individual forecasts for the prices of various goods and services, taking into account additional information about wages and input costs based on current official and survey data. The current and subsequent quarter are called the 'constraint quarters' (hence the name of the meeting) because the final forecast is constrained to match the output of the short-term forecasting exercise for those quarters.

The UK is a small open economy which is sensitive to developments abroad. Accordingly, forecasts for economic activity and inflation in the global economy and in major economic regions (the euro area, the United States, China, other emerging markets) are important inputs to the UK forecast. The forecasts for foreign activity and inflation are consequently constructed early in the process (with updates as needed) by a separate staff group (the International Directorate) responsible for monitoring international developments. The regional forecasts draw from a range of sources, including official economic and financial data, information and forecasts provided by international agencies such as the International Monetary Fund, small economic models, and the judgements of staff, which include specialists in the economies of each major region. The outputs of this process most relevant to the UK forecast are the expected global demand for UK exports, world GDP weighted by UK trade, and a measure of world export prices.

The constraints meeting is followed by staff meetings at which a provisional medium-term forecast is fleshed out and possible changes to staff and MPC judgements that might be incorporated into the forecast are discussed. Staff characterised this process to us as being top-down, that is, new information about medium-term developments is layered incrementally on top of the forecast produced in the prior iteration. In the second or third week of the process (three to four weeks before the policy meeting), members of the MPC join the staff for a Benchmark Meeting, during which the staff present the provisional forecast, discuss key assumptions incorporated in the forecast, and suggest issues that may deserve further discussion. The meeting includes a presentation by the staff responsible for the international forecast. MPC members provide feedback, which may result in supplementary analyses and/or tweaks to the forecast by the staff.

Again, judgemental modifications to model outputs are important throughout the forecast process. Staff make judgements when constructing the benchmark forecast, discussing those that are more controversial or consequential with the MPC. MPC members add their own judgements, which have played an important role in forecasts in recent years. For example, based on their observation of the economy and analysis of previous forecast errors, MPC

members have come to believe that the second-round effects of inflation on wage growth are currently larger and more persistent than those captured by the models, and they have accordingly modified the forecasted profiles for inflation and nominal wage growth. Judgements are cumulative, that is, quantitative judgements made in each round are typically added to judgements from earlier rounds. Staff keep records of judgements made or modified from round to round, and they may suggest modifications or additions to MPC judgements based on their own analyses.

The MPC's judgemental adjustments to forecasts are related to but not identical to so-called Key Judgements. Key Judgements are assessments made collectively by MPC members, with staff input, that lay out the Committee's preferred narratives or interpretations of the outlook and are thus potentially useful as communications devices. Qualitative descriptions of the MPC's Key Judgements are featured prominently in the MPR.

Following the Benchmark Meeting, the forecast is refined in a series of meetings between staff and MPC members, known as Key Issues Meetings. The joint MPC-staff meetings include presentations and discussions of staff analyses of issues bearing on the forecast, including discussions of monetary policy strategy. The forecast must also be updated to reflect changes in the conditioning assumptions (eg, changes in the market path of short-term rates, from which the forecast's assumptions about the course of the policy rate are derived). By the fifth week of the forecast round, about one week before the policy meeting, the MPC and staff are ready to hold official draft meetings, at which staff present and MPC members discuss the near-final forecast. During the week prior to the policy decision the MPC signs off on the forecast and on the accompanying text of the MPR.

Although most of the meeting time running up to the policy decision is devoted to the central forecast and supporting analyses, the staff and MPC also work together to develop **fan charts**, which supplement the main forecast in the MPR (see Box 1). The purpose of the fan charts is to provide the public with information about the range of uncertainty around the forecasts of inflation, GDP growth, and unemployment over the next three years. A separate fan chart is constructed for each of these variables.

Except when the schedule is affected by international meetings and the like, the formal policy decision is deliberated in MPC meetings on a Friday and the following Tuesday, with the official vote on policy taken on Wednesday. On Thursday the decision and the MPR (including the forecast) are released, along with a statement and the minutes of the policy meeting. The Governor and the Deputy Governors for Monetary Policy and Markets and Banking hold a press conference and sit for additional media interviews to provide additional information and context to the decision.

## Box 1: Constructing fan charts

The MPR contains fan charts that summarise the uncertainty surrounding the forecasts of inflation, GDP growth, and unemployment. The fanlike shape of these charts reflects the fact that the range of uncertainty inherent in the forecasts broadens with the forecast horizon. The modal forecast for each variable lies in a band roughly in the centre of the respective fan chart. Coloured regions around the central line show the range of possible outcomes and the subjective probabilities that the actual outcomes will fall within each range. For example, a relatively narrow band around the modal forecast is expected to include the realised path of the forecasted variable, in the judgement of the staff and MPC, about 30% of the time. A band corresponding to the full width of the fan chart is expected to include the realised path of the forecasted variable 90 out of 100 times.

The empirical basis for the fan charts, in the first instance, is the historical record of the Bank's forecast errors (since 2004, with 2020 errors downweighted) for each variable. A wider fan chart corresponds to a history of larger forecast errors on average and, accordingly, a presumption that the future course of the variable is more uncertain.

As with the central forecast, the MPC is given the opportunity to add judgements to the fan charts. (MPC members may decline to add judgements to the charts or may simply retain judgements made in earlier forecast rounds.) These possible judgements are of two types. First, MPC members may feel that the current level of uncertainty about the outlook is greater or less than implied by historical forecast errors, leading them to broaden or narrow one or more fan charts accordingly. This type of adjustment appears to occur only rarely. Second, more frequently, members may feel that the probability of a particular variable being (for example) higher than the modal forecast is greater than the probability of its being lower than forecast. That is, there is 'upside risk' to that particular variable. To capture unbalanced risks, the MPC may (in this example) judgementally reshape the distribution to add more weight above the modal path and subtract weight from below the modal path. Technically, the MPC adds **skew** to the distribution of outcomes represented by the fan. In general, a large skew (a significantly 'lopsided' fan chart) suggests that the Committee puts considerable weight on the possibility that the realised path of the forecasted variable will be above (rightward skew) or below (leftward skew) the modal forecast.

For each of the variables with associated fan charts, the assumed skew permits the calculation of mean (average or expected) forecast values, defined as the sum of possible outcomes weighted by the probability of their occurrence.<sup>[11]</sup> For a variable with (say) upside risks, and thus a rightward skew, the mean forecast exceeds the modal forecast, and vice versa. The MPR and its supplementary materials currently include both estimated mean and modal forecasts for inflation, growth, and unemployment.

## The forecast and public communications

The day after the policy decision during a monetary policy round where a Monetary Policy Report is published has become known as ‘super Thursday’, because of the volume of materials released to the public along with the announcement of the policy decision.<sup>[12]</sup> The key materials released on super Thursday include the Monetary Policy Summary, the Monetary Policy Report, and the minutes of the policy meeting. The MPC’s economic forecast typically plays a central role in all of these materials, as well as in the press conference, interviews, and media coverage that follow the announcement.

### Monetary Policy Summary

The Monetary Policy Summary has evolved somewhat over time, but in its current form it begins by reporting the decision, the vote, and the policy preferences (eg, for a rate increase instead of no change) of the members who voted against the Committee action. It notes that the updated economic projections are published in the MPR and states the conditioning assumptions underlying the forecast.

Following this brief introduction comes a review of recent developments in the UK economy, typically including the evolution of GDP, labour markets, pay growth, and, of course, the Bank’s target, CPI inflation. Some quantitative and qualitative discussion of the outlook comes next. The modal forecast for inflation is given, as is the rough date at which inflation is expected to return to target. The statement summarises the MPC’s views of the risks to the outlook and may provide a mean inflation forecast (which, as discussed in Box 1, is greater than the modal inflation forecast when the risks to inflation are to the upside, and vice versa). The statement may also note how the forecast changes in the alternative scenario in which Bank Rate is assumed to remain constant instead of following the path implied by market prices.

Qualitative forward guidance about future policy, if any, is given at the end of the policy summary. For example, the summary of the November 2023 meeting, which I attended, ends by noting that ‘policy is likely to need to be restrictive for an extended period of time’ and that ‘[f]urther tightening in monetary policy would be required if there were evidence of more persistent inflationary pressures.’ The goal of this guidance is presumably to shape market expectations for the policy rate over the next few quarters in a way that minimises market volatility and aligns market pricing and financial conditions more generally with the achievement of the MPC’s economic objectives.

In issuing a summary statement after its policy decision, the Bank is following standard practice for monetary policy makers. However, the Bank’s Monetary Policy Summary offers significantly more, and more quantitative, detail than those of most other central banks on both recent economic developments and the economic forecast. This additional detail results in a policy

statement that is longer and denser than those of peer central banks. For example, the Bank's Monetary Policy Summary for the November 2023 meeting and the three previous meetings in which summaries were released had an average word count of 920, which is about double that of the other central banks we considered.<sup>[13]</sup>

## Monetary Policy Report

Of the Bank's communication vehicles, the quarterly Monetary Policy Report (MPR) provides the most comprehensive overview of the state of the economy. The MPR is similar to publications released by most but not all of the peer central banks, which are typically also published on a quarterly schedule.<sup>[14]</sup> The MPR begins by reprinting the Monetary Policy Summary, discussed above. Following the Summary, the two principal sections of the Report provide further information on (1) the outlook for the UK economy and the risks to that outlook; and (2) current economic conditions.

The section on the outlook displays a table (Table 1.A) showing the MPC's economic forecasts for the next quarter and subsequent three years of GDP, inflation (both modal and mean values), the unemployment rate, and the degree of excess supply or excess demand (that is, the aggregate output gap). The forecast's conditioning assumptions, including the market-implied path for Bank Rate, the policy rate, are again clearly stated, discussed, and summarised in a table (Table 1.B). Forecasts for subsidiary economic variables (eg, household consumption, business investment, and housing investment), prepared by the staff to be consistent with the forecasts for the headline variables, are also presented in a table and discussed in the text. The alternative forecast conditional on the assumption that the policy rate will remain constant is also presented. Supplementary tables that include detailed forecasts for a longer list of variables and other quantitative information are available for download.

The outlook section of the Report includes qualitative discussions of the MPC's Key Judgements, which, as discussed earlier, are narratives that help shape the Committee's outlook and the official forecast. To illustrate the degree of risk and uncertainty, the fan charts for GDP, unemployment, and inflation are displayed. The risks to each major variable are also described qualitatively and discussed.

The second major section of the MPR reviews current economic conditions, although it also contains some forward-looking material (eg, the implications of wage growth or current rates of producer price inflation for consumer price inflation in the next few quarters). This section begins with an overview of the global economy and financial markets, reflecting their important influence on the UK economy. Developments in market interest rates and credit conditions and the impact of interest rates on activity are also discussed. The coverage of inflation includes, among other factors, an update on measures of inflation expectations. Central bankers generally agree that keeping medium-term inflation expectations near target, which tends to moderate the aggressiveness of firms' pricing and workers' wage demands, is important for gaining control of

realised inflation.

Boxes and annexes, either within or following the two main sections, contain other information and analyses. Regular features of the MPR include a review of monetary policy developments since the last meeting, an update of the reports of the Bank's Agents on business conditions, and a summary of the outlooks of external forecasters drawn from a regular survey. About once a year the MPR also includes an annex on how the economy has evolved recently relative to the MPC's projections. The discussion of recent forecast misses is supplemented by figures comparing earlier projections of key variables with the outturns. Usefully, it typically distinguishes recent forecast errors caused by unexpected movements in conditioning variables from errors arising from other factors, eg, a misreading by the MPC of the links between unemployment and wage growth.

The Report also routinely includes chapters and boxes on special topics. 'In focus' chapters take a deeper look at aspects of current economic developments or the outlook, eg, the outlook for inflation (May 2023), factors affecting aggregate supply (February 2023), developments in the labour market (August 2022), and the effects on the economy of the rise in energy prices (May 2022). Other, occasional boxes provide short reviews of particular issues of interest, eg, quantitative tightening (August 2023), the cash flow channel of monetary policy (May 2023), and international comparisons of the behaviour of inflation (August 2022).

## Minutes

Following another recommendation of [Warsh \(2014\)](#), the minutes of the policy meeting are published together with the Monetary Policy Summary and the MPR (in relevant months) on the day of the policy announcement. Most central banks publish minutes only with some weeks' delay. The Bank appears to have accepted the argument that the logistical difficulties of producing minutes within a day after the multi-day meeting concludes are compensated for by avoiding an additional market-moving announcement some weeks after the policy decision, and perhaps by eliminating the risk of leaks in the interim period. Quick publication of the minutes also provides useful context for the Governor's press conference.

The minutes usually begin with a summary of the MPC's discussion of current developments and the outlook, including the global economic outlook, financial market developments, and the outlook for UK growth, unemployment, and inflation. The minutes also typically report both the future rate path implied by market pricing and that given by the median respondent in the Bank's Market Participants Survey.

This is followed by a further review of economic developments and the outlook. In the spirit of risk management, the minutes report the discussion of the risks to the outlook, and the mean (as opposed to modal) projections for inflation may be repeated. Much of the material to this point (except possibly the results of the Market Participants Survey) repeats or summarises material

available in other documents.

The minutes then delve into the debate around the policy decision. The MPC, where it is not uncommon for several members to cast public votes against the Committee's policy action, is less consensus-oriented than policy committees at, say, the Federal Reserve or the European Central Bank. MPC members who vote in the minority are asked to state the action they would have preferred, and a precis of the majority and minority rationales for their preferences regarding the policy decision (without specific attribution to individuals) is presented.

Both the summary of the debate and a subsequent paragraph reflecting the views of the MPC as a whole may contain forward-looking views or guidance about the future evolution of policy, guidance that is typically repeated in the Monetary Policy Summary and at the post-meeting press conference. In contrast to the Monetary Policy Summary, supporters and opponents of the policy action are named, along with the preferred policy action (but not the individual rationales) of opponents, reflecting the requirement of individual responsibility. Interviewees from the media and financial markets told us that laying out the pros and cons of the action and providing forward-looking guidance were highly useful.

A section of the minutes on 'operational considerations' has in recent years included information about changes in the total stock of assets held by the Bank for monetary purposes (quantitative easing or tightening).



## Box 2: Comparisons to forecasting procedures at peer central banks

To gain perspective on forecasting at the Bank of England, we compared forecasting processes at the Bank with those of six other central banks, selected because of their global importance (the Federal Reserve, the European Central Bank) or because, like the Bank of England, they are inflation-targeting central banks making policy for advanced but comparatively small open economies: the Swedish Riksbank, the Norwegian Norges Bank, the Bank of Canada, and the Reserve Bank of New Zealand. (We excluded the Bank of Japan because both the recent experience and the institutional structure of the Japanese economy are quite different from the other central banks we consider.) Our comparisons are based on interviews with staff at the various banks and on our reading of public documents.<sup>[15]</sup>

Forecasting procedures at the peer banks share many features with those of the Bank of England. Most forecast headline economic variables, such as growth, inflation, and labour market indicators, and many forecast global economic developments as well. Notably, however, published forecasts by peer banks are typically much less detailed and are less prominently featured in public communication than those made by the Bank.

At the majority of the peer banks, including the Riksbank, the Norges Bank, the Reserve Bank of Canada, and the Reserve Bank of New Zealand, policymakers formally sign off on the forecast and provide input to staff on its development. However, our sense from interviews was that, at these banks, the involvement of policymakers in forecast construction is generally less extensive than at the Bank of England. For example, at the Bank of Canada the staff present a complete forecast to the Governing Council; based on the staff forecast (which is not published) and additional information received prior to the meeting, the Council publishes its own consensus forecast in its Monetary Policy Report. Forecasts at the peer central banks also differ in the conditioning assumptions used (see Box 3 below). In particular, several central banks publish their own forecasts of the policy rate, rather than taking market-based forecasts of rates as a conditioning assumption.

At the European Central Bank and the US Federal Reserve, the staff produce forecasts with little or no policymaker input. Probably this practice at the ECB and the Fed is accounted for by the fact that the policy committees at both of these central banks are large and geographically dispersed, making meaningful policymaker involvement in forecast development difficult. The ECB publishes its staff forecast, and it is an important part of the bank's communication; however, ECB policymakers do not formally sign off on the forecast and make their own risk assessments. The Fed does not publish the staff forecast (except when policy meeting transcripts are released, with a five-year lag), using it only internally in policy deliberations.<sup>[16]</sup> Instead, the Fed releases the (anonymous)

individual projections of key macroeconomic variables by participants of the Federal Open Market Committee (FOMC) in a quarterly publication called the Summary of Economic Projections. These projections do not reflect the official views of the FOMC as a whole, a fact that is sometimes a source of public confusion, but the policymaker projections are typically strongly influenced by the staff forecast (circulated in advance of the policy meeting) and the work of staff economists at the regional Federal Reserve Banks.

Like the Bank of England, in their forecast development all of the six peer central banks combine formal modelling techniques, including economic models and statistical tools, with substantial judgement.<sup>[17]</sup> Some peer banks use semi-structural models, like the Federal Reserve's FRBUS or the Bank of Canada's LENS model, as their benchmark models. However, the Norges Bank and the Reserve Bank of New Zealand use DSGE models, analogous to the Bank's COMPASS model, as their central models, and other banks use DSGE models to cross-check the forecasts of their central models and, in some cases, for policy analysis. Most peer banks also use a suite of supplementary or sectoral models, as well as purely statistical models, in constructing their forecasts. Most also use atheoretical techniques, based on currently available data, to 'nowcast' current and near-term conditions.

Most of the peer banks do not produce fan charts. The European Central Bank's staff forecast includes fan charts for GDP growth and inflation (both headline and core). The ECB's fan charts are symmetrical and are based on past projection errors. The Norges Bank has recently used a statistical method to estimate the uncertainty around projections of output, inflation, and house prices. The FOMC's survey of participants asks them for directional assessments of the risks to headline macro variables, as well as of general uncertainty, but the resulting charts do not purport to show the distribution of outcomes of those variables. The Riksbank, the Bank of Canada, and the Reserve Bank of New Zealand do not currently publish fan charts. However, all central banks discuss risk and uncertainty in qualitative terms, often in their post-meeting monetary policy statements.

## Part III: Comparisons of forecast accuracy

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As we have seen, the forecasting process at central banks has many purposes: if well done, it can help policymakers make good decisions by providing an opportunity for systematic review of economic developments and issues and for assessing the likely impacts of alternative policy choices. The forecast can likewise be a useful tool for clarifying policymakers' current views of the economy and explaining them to the public. Even inaccurate forecasts, if they reflect the best available economic information and are thoughtfully adjusted when new information arrives, can help increase the coherence and predictability of policy. Nevertheless, accurate forecasts are obviously important, both as a guide to policy and because forecast accuracy can be an indicator of how well staff and policymakers understand developments in the economy.

This review is prospective, aimed at strengthening the Bank of England's forecasting process and its use of forecasts going forward. Nevertheless, a look at the historical record is useful. In that spirit, this section briefly compares the Bank's forecast accuracy since 2015 with that of the other six central banks in our comparison set (the Bank of Canada, the US Federal Reserve, Norway's Norges Bank, the Reserve Bank of New Zealand, the Swedish Riksbank, and the European Central Bank) as well as with that of external forecasters.<sup>[18]</sup> We focus primarily on one year ahead forecasts of inflation, GDP growth, and unemployment. We also consider what we call here 'one quarter ahead' forecasts, which are estimates covering the year extending from three quarters prior to the date of the forecast to one quarter beyond, and thus should perhaps be more properly called 'nowcasts'. We end this part with a brief examination of the responses of monetary policy at the seven central banks to the recent inflation.

To anticipate the results, we confirm that the forecasting performance of all the central banks in our study, as well as that of external forecasters, deteriorated significantly with the onset of the pandemic and the subsequent inflation. The Bank of England suffered the common deterioration in forecast accuracy, but we find that, overall, its record is generally in the middle of the pack, and its policy response to recent developments, as indicated by changes in its policy rate, was also qualitatively similar to that of the other central banks. There appears therefore to be little basis for singling out the Bank from its peers for criticism.<sup>[19]</sup> At the same time, the marked decline in forecasting performance by all central banks (and other forecasters) provides strong motivation for reviewing the forecasting processes and the use of forecasts at all these entities, including the Bank.

Before proceeding, we should acknowledge that an entirely objective comparison of central banks' forecasting records since 2020 or so is probably not possible. As already noted, in recent years the global economy has faced a series of large shocks. The pandemic shut down businesses and schools for extended periods, even in the absence of government-ordered

lockdowns. Supply chains were disrupted during and following the pandemic, as indicated by a 4.3 standard deviation increase (relative to the pre-pandemic average) in the New York Fed's index of global supply-chain pressures. Oil and natural gas prices rose sharply, especially following Russia's invasion of Ukraine, with global oil prices rising by about 150% between the start of 2021 and June 2022, and UK gas prices rising by 520% between the beginning of 2021 and August 2022. Food prices also spiked along with the prices of grain and other critical commodities.

Importantly for our purposes, these shocks had different effects on different economies (eg, increases in natural gas prices had more severe effects on the UK and the euro area than on the US), and individual economies faced idiosyncratic shocks (and different government responses) as well. Differences in the mix and size of shocks hitting each economy would have affected the difficulty of making accurate forecasts for that economy and consequently the validity of international comparisons. Moreover, national definitions of the key forecasted variables differ in important details (eg unlike the Fed's measure, the ECB's inflation measure does not include the imputed rents of owner-occupied housing).

Another consideration in making comparisons is that the conventions governing the timing of central bank forecasts are also not uniform. In particular, the timing conventions at the ECB and the central banks of Norway, Sweden, and New Zealand are broadly consistent with the Bank of England's approach of providing quarterly forecasts for the three-year period following the date of the forecast. We can thus compare the forecasts of these central banks to those of the Bank without additional adjustment for timing differences. In contrast, the Bank of Canada and the Federal Reserve publish quarterly forecasts for growth and inflation (measured from the fourth quarter of one year to the fourth quarter of the next year) for both the current year and the next two **calendar** years (eg, Fed forecasts made in March, June, September, and December 2020 all apply to the years ending in 2020 Q4, 2021 Q4, and 2022 Q4).

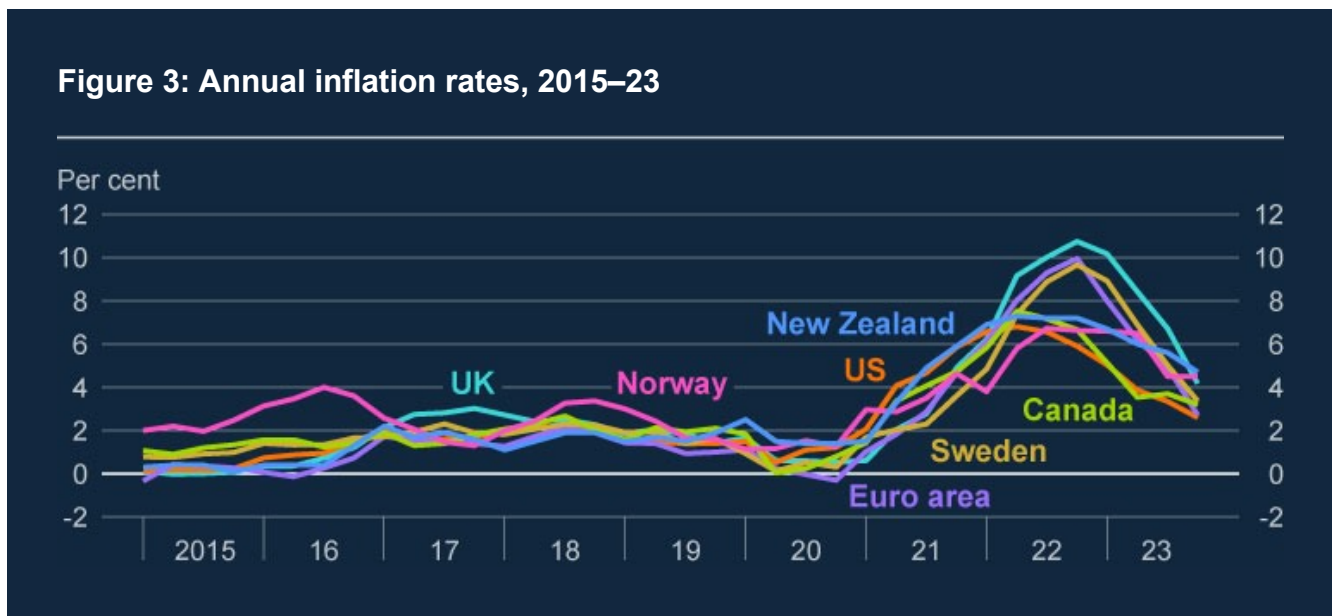
The Bank of Canada kindly provided us one year ahead forecasts for inflation that use a timing convention similar to that of the Bank of England, and we use that data in the relevant figure and table below.<sup>[20]</sup> Otherwise, to roughly align timing between the Bank of England's medium-term forecasts and those of the Federal Reserve and the Bank of Canada, we used year ahead forecasts for Q4 published in December (for the Federal Reserve) and January (for the Bank of Canada). Application of this procedure produces a roughly apples to apples comparison but allows for only one forecast comparison per year, not enough to draw strong conclusions. In what follows, we include forecast series for which we have only partial data in the relevant figures but exclude them from the statistical comparisons. As the Federal Reserve does not publish one quarter ahead forecasts, we also exclude the Fed from all comparisons of one quarter ahead forecast accuracy.

For each of the central banks in our comparison set, and with considerable help from their respective staffs, we gathered each bank's real-time forecasts and the corresponding outturns for

the three headline variables noted above: inflation, real GDP growth, and the unemployment rate (where available).[21] Revisions of the data as of 23 January 2024 were used where applicable. We chose the inflation rate corresponding to the official target rate of each central bank. A more complete description of the data and their sources can be found in Annex B.

## Inflation

After years of relative stability, inflation around the world began what would prove to be a sustained rise in 2021, peaking in mid-2022. Figure 3 below shows actual inflation rates since 2015 faced by the seven central banks in our comparison set. As is clear from the figure, the recent inflation experience was broadly similar across countries. The UK suffered the highest peak inflation (with Sweden and the euro area not far behind), but, like the other economies, has seen rapid disinflation since mid-2022.



To what extent was the surge in global inflation anticipated? Figure 4 shows one year ahead inflation forecast errors for all seven central banks through 2023 Q3. The figure is followed by a table showing, for various subperiods, the root mean squared forecast errors (RMSEs) for the Bank of England and the four other central banks that share the Bank's forecast timing conventions, plus the Bank of Canada (which provided comparable data). A higher RMSE corresponds to larger errors and less accurate forecasts. Available (annual) observations from the Federal Reserve are included in Figure 4, but because of the differences in forecast timing conventions noted earlier, the Fed is excluded from the RMSE table.

Figure 4: Inflation, one year ahead forecast errors, 2015–23

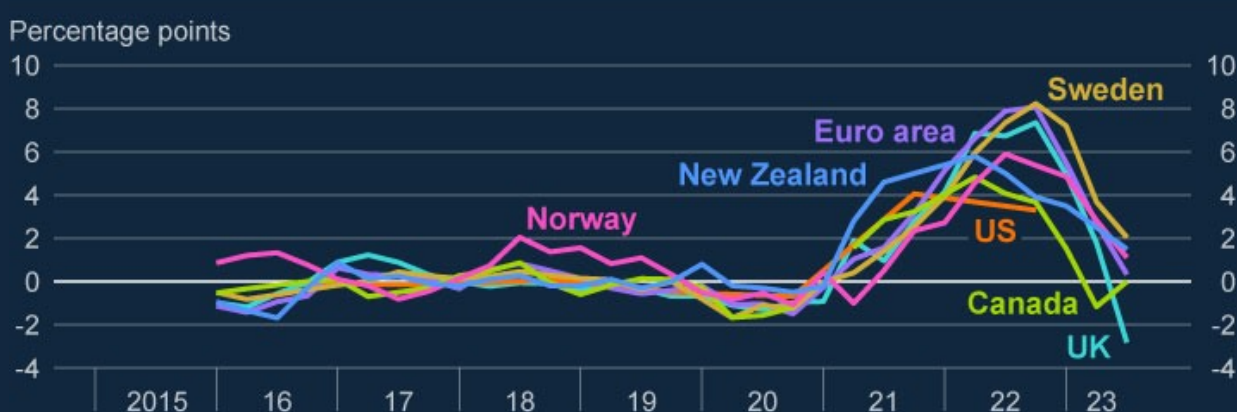
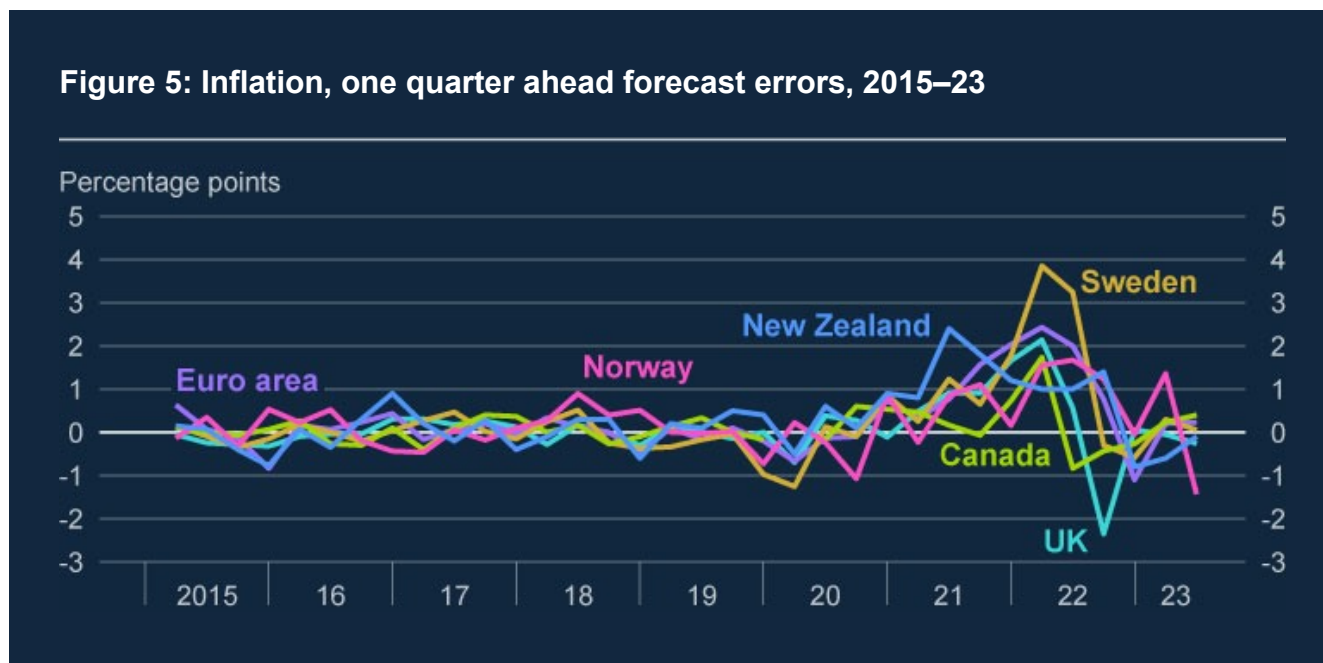


Table 1: RMSEs, one year ahead inflation forecasts

Period	BOE CPI inflation	ECB HICP inflation	Riksbank CPIF inflation	Bank of Canada CPI inflation	Norges Bank CPI inflation	RBNZ CPI inflation
2015–19	0.64	0.67	0.38	0.41	1.02	0.65
2020 Q1–2021 Q1	1.02	0.96	1.12	1.30	0.71	0.46
2021 Q2–2023 Q3	4.60	4.99	5.01	3.07	3.63	4.22

Figure 4 and Table 1 both show that all the central banks whose records we were able to compare did reasonably well in forecasting one year ahead inflation in 2015 through 2019, a period of relatively stable inflation, and even during 2020, the first year of the pandemic. However, the surge in inflation that began in mid-2021 was largely, though not entirely, unanticipated by all the central banks. Based on RMSEs, the Bank of England's inflation forecasts were neither the worst nor the best of the central banks shown in Table 1. During the critical 2021 Q2–2023 Q3 period, when inflation was most extreme, the Bank's inflation forecasts, as quantified by the RMSE metric and with the caveats given earlier, were better than those of the ECB and the Riksbank but worse than those of the Bank of Canada, the Norges Bank, and the Reserve Bank of New Zealand.[22]

Figure 5 shows one quarter ahead inflation forecast errors (forecasts are for annual, not quarterly inflation) for the comparison group of central banks (excluding the Federal Reserve), and Table 2 below shows the corresponding RMSEs.



**Table 2: RMSEs, one quarter ahead inflation forecasts**

Period	BOE CPI inflation	ECB HICP inflation	Riksbank CPIF inflation	Bank of Canada CPI inflation	Norges Bank CPI inflation	RBNZ CPI inflation
2015–19	0.20	0.31	0.25	0.23	0.37	0.40
2020 Q1–2021 Q1	0.38	0.46	0.81	0.42	0.71	0.56
2021 Q2–2023 Q3	1.23	1.38	1.76	0.70	1.12	1.27

Recall that at the Bank of England, as at most central banks, very short-term forecasts are constructed mostly by extrapolation of available data and various statistical models, to which the longer-term forecast is forced to conform. Due to their backward-looking component, these forecasts also require anticipation of revisions to past data. One quarter ahead forecasts are thus not particularly representative of central banks' forecasting processes in general. That said, by the RMSE criterion the Bank's one quarter ahead inflation forecasts were the most accurate of

the six central banks in 2015–19 and in 2020 Q1–2021 Q1, and, despite the large inflation miss in 2022 Q4 (see Figure 5), they were similar to those of the other banks during the most recent period.[23]

## GDP growth

Like inflation, GDP growth became much more variable during the pandemic period. Figure 6 shows the wide swings in output since 2020 in all the represented economies, with the fluctuations in the UK being especially large. Figure 7 depicts the one year ahead forecast errors of the seven central banks in our comparison set, and Table 3 shows the comparative accuracy of five banks (excluding the Fed and the Bank of Canada, for whom we do not have complete data) by the RMSE criterion.

Figure 6: Four-quarter GDP growth rates, 2015–23





Figure 7: Four-quarter GDP growth, one year ahead forecast errors, 2015–23



Table 3: RMSEs, one year ahead forecasts of GDP growth

Period	BOE GDP	ECB GDP	Riksbank GDP	Norges Bank GDP	RBNZ GDP
2015–19	0.85	1.68	1.01	0.76	0.82
2020 Q1–2021 Q1	12.95	7.23	4.44	5.25	5.74
2021 Q2–2023 Q3	3.75	4.99	1.96	0.99	4.05

We do not present a figure showing one quarter ahead forecast errors for GDP, but Table 4 presents the relevant statistical comparison. The Bank of Canada is now included.

**Table 4: RMSEs, one quarter ahead forecasts of GDP growth**

Period	BOE	ECB	Riksbank	Bank of Canada	Norges Bank	RBNZ
	GDP	GDP	GDP	GDP	GDP	GDP
2015–19	0.66	1.67	1.28	0.75	0.53	1.14
2020 Q1–2021 Q1	10.97	9.11	6.18	2.91	3.89	7.18
2021 Q2–2023 Q3	2.76	4.84	1.92	0.99	0.82	1.93

At both the one-year and one-quarter horizons, the Bank unsurprisingly failed to forecast the extraordinary decline in activity in early 2020, following the arrival of the pandemic. The large miss elevated the Bank's RMSE during 2020. Before and after 2020, however, the Bank's one year ahead GDP forecasts are again in the middle of the pack (third of five in both periods), by the RMSE criterion. At the quarterly horizon, the Bank's comparative record was second best of six in 2015–19 but fifth of six in the most recent period. In November 2022, the Bank forecast a mild but extended recession that did not in fact occur, a miss due in part to the forecast's externally given conditioning assumptions (see Part IV).

## Unemployment

Unemployment forecasts may be the most difficult to compare across countries as labour market institutions, government policies, and the methods of defining unemployment and collecting the relevant data are not uniform.<sup>[24]</sup> Differences in policies were particularly stark during the pandemic. For example, the UK responded to the possibility of mass layoffs by instituting a furlough scheme, while the US mostly supported workers directly, through unemployment insurance and stimulus checks. The Swedish government largely avoided lockdowns although it provided labour market subsidies. With those caveats, Figure 8, which shows one year ahead forecasting errors, and the two accompanying tables below describe the performance of our comparison set of central banks in forecasting unemployment (the ECB and the Bank of Canada do not publish forecasts of unemployment).

Figure 8: Unemployment, one year ahead forecast errors, 2015–23

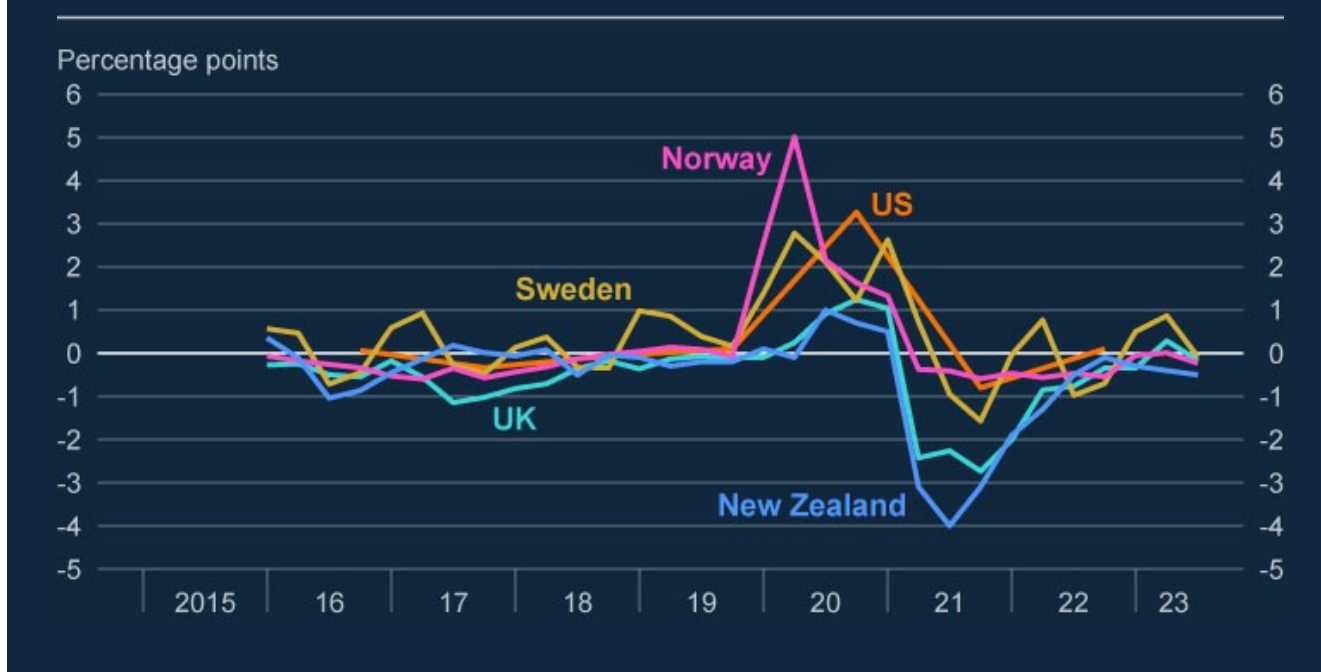


Table 5: RMSEs, one year ahead forecasts of unemployment

Period	BOE Unemployment	Riksbank Unemployment	Norges Bank Unemployment	RBNZ Unemployment
2015–19	0.55	0.56	0.32	0.41
2020 Q1–2021 Q1	0.84	2.12	2.85	0.59
2021 Q2–2023 Q3	1.55 (a)	0.83	0.42	2.03

(a) Due to problems with the ONS labour market data noted in footnote 24, Labour Force Survey (LFS) data were not available beyond 2023 Q2. We have taken the Bank of England's internal estimate of the Labour Force Survey for 2023 Q3, as available as of 23 January 2024.

**Table 6: RMSEs, one quarter ahead forecasts of unemployment**

Period	BOE Unemployment	Riksbank Unemployment	Norges Bank Unemployment	RBNZ Unemployment
2015–19	0.24	0.61	0.10	0.39
2020 Q1–2021 Q1	2.49	1.32	2.52	2.33
2021 Q2–2023 Q3	1.05 (a)	0.68	0.28	0.64

(a) See Table 5, footnote (a).

Based on RMSEs, the forecast accuracy of the Bank again does not look significantly worse than that of its peer central banks, despite the large miss in 2021 Q2. As we elaborate in Part IV, once again some of that miss can be laid to a conditioning assumption – in this case, the conditioning assumption that, by convention, excluded the widely expected renewal of the UK Government’s furlough scheme. Renewal of the scheme was in fact announced shortly after the Bank’s February 2021 forecast was made, with the result that measured unemployment came in lower than the Bank had forecast.

## Comparisons with external forecasters


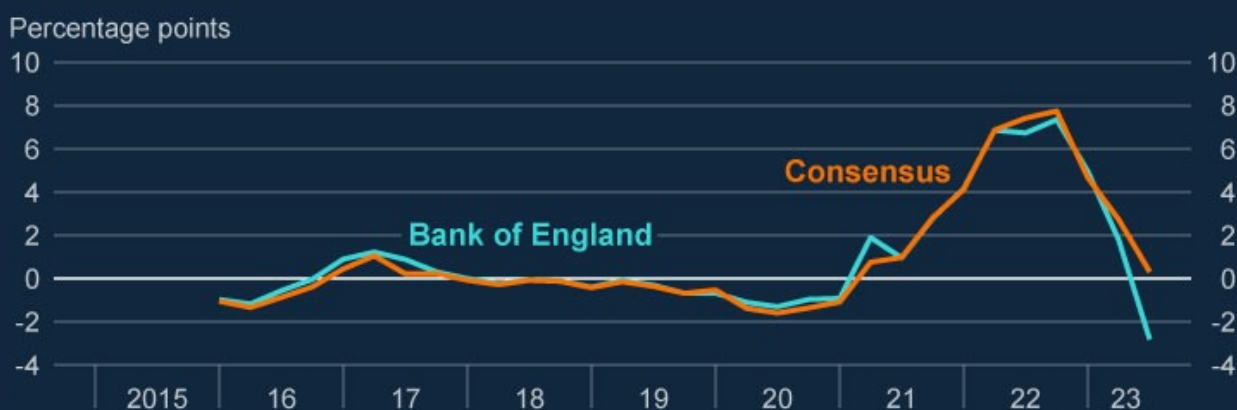
The Bank routinely publishes comparisons of its own forecast errors with those of outside forecasters. This comparison is arguably a fairer one than the comparison with other central banks, in that the external forecasters are projecting precisely the same economic variables and with roughly the same timing as the Bank forecasters. Consensus external forecasts for inflation and GDP growth at the one-year and one-quarter horizons are provided to the Bank by [Consensus Economics](#) , a London-based firm that compiles monthly forecasts for economies and markets around the world. The Consensus forecasts reflect the average opinion of a large panel of forecasters and, historically, individual forecasters have had great difficulty systematically beating the consensus.

Figure 9 below compares the one year ahead UK inflation forecasts of the Bank of England and the corresponding Consensus forecasts. Table 7 reports the RMSEs for the Bank and the Consensus forecasts at the one-year and one-quarter horizons.

For inflation, the forecast errors made by the Bank and those made by external forecasters are barely distinguishable. At the one-year horizon, the correlation of errors between the two forecasts is 0.97. As Table 7 shows, for inflation forecasts the RMSEs of the Bank’s forecasts and those of external forecasters are virtually identical at both the one-quarter and one-year horizon. In particular, external forecasters failed to predict the post-pandemic surge in inflation,

much as central banks did.

**Figure 9: UK CPI inflation rate, one year ahead forecast errors, 2015–23**



**Table 7: RMSEs, forecasts of UK inflation**

Period	BOE	BOE	Consensus	Consensus
	One quarter ahead	One year ahead	One quarter ahead	One year ahead
2015–19	0.20	0.64	0.24	0.62
2020 Q1–2021 Q1	0.38	1.02	0.38	1.25
2021 Q2–2023 Q3	1.23	4.60	1.01	4.67

The comparison of forecast accuracy with external forecasters for the case of GDP growth is shown in Figure 10 and Table 8. The figure illustrates that Bank forecasters and external forecasters do not always move in lockstep. The two sets of one year ahead forecast errors diverge notably in 2021 (reflecting forecasts made in 2020), with the MPC overestimating growth and external forecasters underestimating it. Evidently, the two sets of forecasters had different views about the timing and economic impact of the country's emergence from the pandemic, the resulting dialing-down of palliative government policies, and the reopening of the UK and global economies. Despite this difference in view, in terms of RMSEs the gap between the Bank and external forecasters is small, at both the one-quarter and one-year horizons.

Figure 10: UK four-quarter GDP growth, one year ahead forecast errors, 2015–23



Table 8: RMSEs, forecasts of UK GDP growth

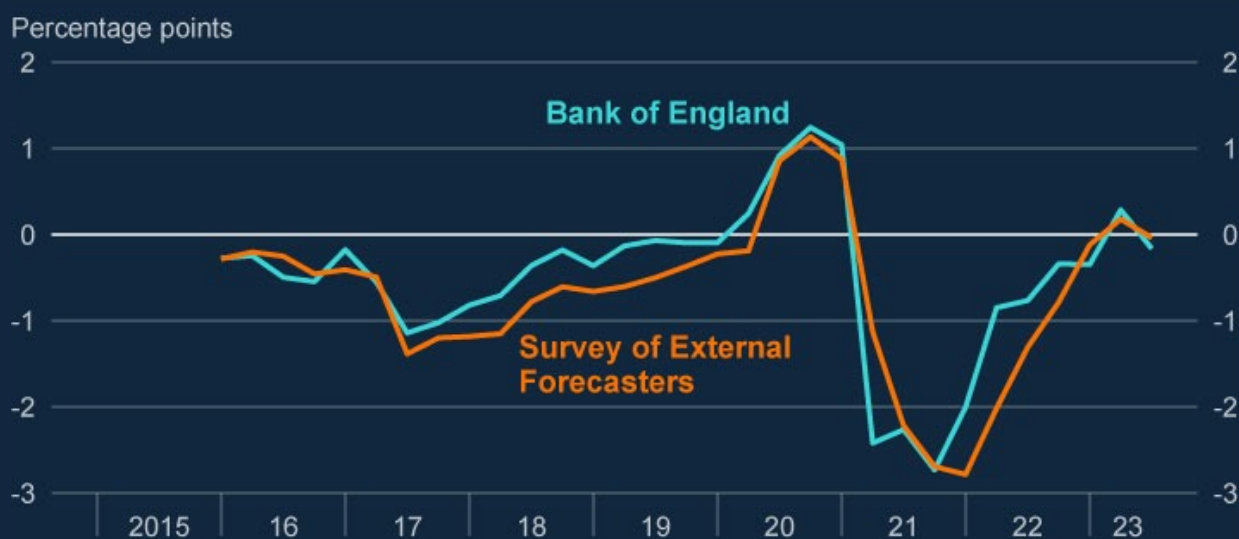
Period	BOE	BOE	Consensus	Consensus
	One quarter ahead	One year ahead	One quarter ahead	One year ahead
2015–19	0.66	0.85	0.70	0.84
2020 Q1–2021 Q1	10.97	12.95	10.28	12.85
2021 Q2–2023 Q4	2.76	3.75	3.01	3.90

Consensus Economics does not provide forecasts of UK unemployment. However, the Bank conducts a quarterly Survey of External Forecasters (SEF) – in financial markets, academia, and the private sector – about their projections for inflation, GDP growth, unemployment, and other variables, up to three years in the future. The results are published in an annex to the MPR.<sup>[25]</sup> We compared the MPC’s unemployment forecasts to those of the SEF.

The results of this comparison are shown in Figure 11 and Table 9. As the survey does not report one quarter ahead forecasts, we show forecast errors at the two-year horizon as well as the one-year horizon. Once again, despite the different source for external forecasts, the similarity in forecast errors is marked (the correlation between the two sets of one year ahead forecast errors

is 0.90, with neither set of forecasts obviously superior in RMSE terms). As in previous cases, the biggest misses took place during the pandemic, likely due not only to uncertainty about the course of the pandemic but also uncertainty about government responses and how those responses would affect measured unemployment.[26]

**Figure 11: UK unemployment rate, one year ahead forecast errors, 2015–23**



**Table 9: RMSEs, forecasts of the unemployment rate**

Period	BOE	BOE	SEF	SEF
	One year ahead	Two years ahead	One year ahead	Two years ahead
2015–19	0.55	0.93	0.75	1.17
2020 Q1–2021 Q1	0.84	0.85	0.76	0.62
2021 Q2–2023 Q3	1.55	0.74	1.66	1.23

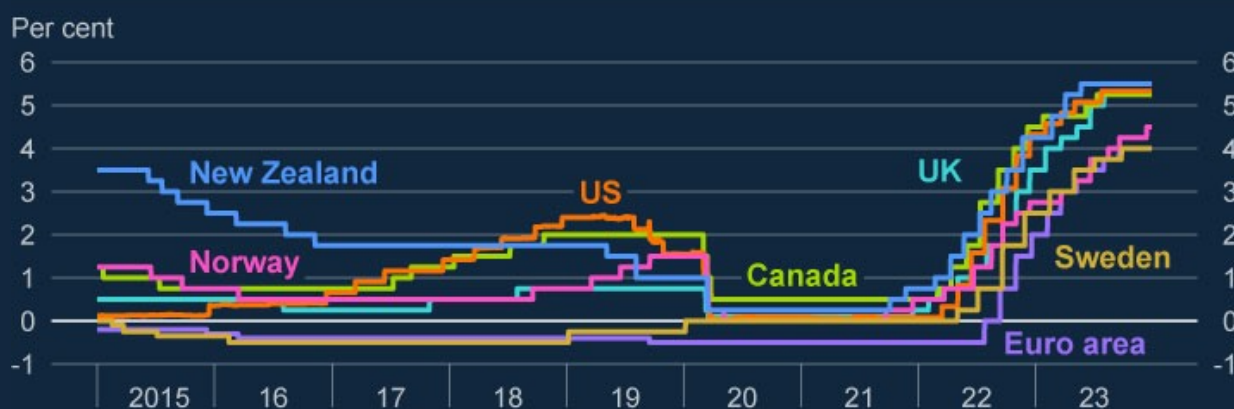
## Monetary policies

We close this Part with a brief comparison of the monetary policies that the central banks we are considering adopted in response to the recent inflation. As we have seen, by the RMSE metric, the Bank's forecasting performance, particularly regarding inflation, was broadly comparable to that of the other central banks we considered. On the other hand, considered quarter by quarter, the forecast errors of the Bank and the peer banks often diverged. Did these differences lead to

systematic differences in policy responses during the tumultuous period from 2020 on? In making this comparison, it is important to note that it takes no account of significant differences in the circumstances and institutions across countries and therefore should be treated as illustrative only, without normative implications.

A first cut at this question can be made by comparing the path of policy rates (Bank Rate, in the case of the Bank of England) across central banks. This comparison is shown in Figure 12. (Note that the comparison does not consider asset purchase programmes, which most major central banks also employed.) The figure confirms that, with the substantial benefit of hindsight, all the central banks in our comparison set were relatively slow in responding to the post-pandemic rise in inflation, beginning rate increases in late 2021 or early 2022. The Bank of England began its rate increases relatively early – slightly later than the central banks of New Zealand and Norway (although the Bank would ‘pass’ the Norges Bank by mid-2022), but earlier than the Bank of Canada, the Fed, the Riksbank, and the ECB. The Bank’s peak rate (as of this writing) of 5.25% is close to the maximum of any bank (the Reserve Bank of New Zealand’s policy rate is currently 5.5% and the Fed’s target range for its policy rate is 5.25% to 5.5%).

**Figure 12: Policy rates for seven central banks, 2015–23**



To summarise the findings of Part III. A comparison of forecasting performance shows that virtually all forecasters – both in central banks and outside – failed to anticipate in a timely way the dramatic economic consequences of the post-2019 shocks, including the pandemic, the non-monetary policy responses to the pandemic, spikes in global commodity prices, Russia’s war on Ukraine, supply-chain disruptions, and the effects of global reopening on consumer demand and labour markets. Without doubt, these large and difficult-to-anticipate shocks are an important reason that, globally, forecasting errors for key macroeconomic variables, in all the cases we studied, were much larger in recent years than before the pandemic. Although there are details worth investigating further, in general the Bank of England’s overall forecasting record of recent



years does not look significantly better or worse than those of others in the comparison group. Consistent with that, the Bank's policy response to the recent crisis, notably the inflation surge that occurred as the global economy reopened, likewise looks qualitatively similar to that of other major central banks.

Although the Bank's accuracy during and after the pandemic was not much different from that of other forecasters, the events of recent years nevertheless served as a stress test of forecasting at the Bank, including not only the routine construction of forecasts but also, importantly, the use of forecasts in policymaking and public communication. The final section of this report provides an assessment of the Bank's practices and makes recommendations for change.

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## Part IV: Assessment and recommendations

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This section evaluates the construction of the quarterly forecast at the Bank of England, including: the supporting infrastructure; the use of the forecast in supporting decision-making by the MPC; and the role of the forecast in public communication, followed in each case by recommendations. The Executive summary which begins this report provides an overview of the main findings and includes a complete list of the recommendations.

### Constructing the forecast

Strong staff work is essential to a successful forecasting process. In interviews, current and past members of the MPC uniformly praised the competence and dedication of the Bank staff. The quarterly forecasts must be constructed, discussed with the MPC, revised, and written up in time to meet strict deadlines. Substantive analyses addressing key issues must be produced on short notice. Despite the time pressure, the staff's work is of high quality and is completed in a timely way. The positive evaluations of the staff by MPC members are supported by my own limited observation. The staff presentations on the forecast and related issues that I saw were highly professional, and staff members were responsive to questions and comments of MPC members.

Our evaluation of the forecasting infrastructure – the software and models used to produce the forecast – is much less favourable. Some key software used in preparing the forecasts is out of date and lacks important functionality. Moreover, many of the economic and statistical models that support the forecast are not adequately maintained (updated, stress tested, periodically re-estimated). The models are also not smoothly integrated with each other, eg, model outputs do not always flow automatically to where they are needed for forecast construction but must often be transferred manually, a laborious and inefficient process. The incorporation of staff and MPC judgements into the forecast is likewise operationally complex. Makeshift fixes of these and other operational problems over the years have resulted in an unwieldy and inflexible system that limits the ability of the staff to undertake potentially useful analyses, including (for example) producing additional forecast scenarios, using information gleaned from forecast errors to improve model specifications, or considering alternative or supplementary modelling frameworks.

The deficiencies in infrastructure maintenance and development do not reflect insufficient commitment by the staff. The heavy demands of the quarterly forecast round severely limit the staff time available to address longer-term issues of software development and economic modelling. The weaknesses of the infrastructure in turn significantly increase the amount of staff time needed for the production of the current forecast.

## Data availability and access

Effective forecasting and economic analysis require easy access to a wide range of macroeconomic, sectoral, financial, and other relevant data. The Bank staff rely heavily on a large commercial database, which contains several million data series, and which is used to manage the flow of data among various models. The data appear to be comprehensive and are usually updated in a timely manner. However, the software for loading data to and accessing data from the database is seriously out of date and difficult to use. For example, what should be relatively straightforward operations such as searching for and extracting a particular data series or creating graphs or figures are often not well supported, instead requiring auxiliary programs and several additional steps. These deficiencies are frustrating to staff, complicate the forecast process, and limit the scope for supplementary analyses.

The good news is that a major effort is already under way to update and improve the software used by the staff to access and manipulate data, an effort recently formally endorsed by the Court. Recommendation 1 sets some goals for this update.

**Recommendation 1. The ongoing updating and modernisation of software to manage and manipulate data should be continued with high priority and as rapidly as feasible.** At completion, the modernisation project should ensure that:

- (i) the economic and financial data available to the staff are comprehensive, covering all key sectors at the relevant frequencies; clearly defined, with sources provided; updated in a timely way; and easily searchable;
- (ii) staff are able to export and transform data series as needed to construct figures, tables, and routine econometric analyses quickly and efficiently and with adequate source control;
- (iii) large data sets, both time series and cross-sectional, can be 'cleaned' and used efficiently in substantive analysis and research; and
- (iv) the inputting of data to the suite of economic and statistical models, especially for routine operations including forecasting and scenario analysis, is automated to the extent possible.

The Bank might consider whether adding a few data specialists to work with economists in accessing and working with data, especially larger and more complex data sets, would make the process work more smoothly.

## Model maintenance and development

As we have seen, Bank forecasts involve substantial judgement and the use of external information and are by no means the product of economic and statistical models alone. Nevertheless, formal models play an essential role in the forecast process, as well as in many supporting analyses, and should be adequately maintained and updated as needed. At a

minimum, the models on which staff place most reliance should be regularly evaluated, periodically re-estimated using newly available data, stress tested to examine the plausibility of the model outputs under alternative scenarios, and regularly modified as needed to reflect new knowledge or changes in the economy. Attention to model specification and estimation is particularly important in times of high uncertainty, when structural changes in the economy are more likely and potentially more consequential.

Necessary maintenance and development of the forecasting infrastructure will require a significant increase in dedicated staff time and other resources, including specialised software, at least until current deficits are remedied. Going forward, staff responsible for the infrastructure should prioritise that function, but they should also have frequent opportunities to interact with policymakers, to work directly with the 'front-line' staff who produce the quarterly forecast, and to exchange ideas with or receive help from external experts on software, economic modelling, and forecasting.

In addition, in light of the de-emphasis of COMPASS and the increasingly complex and ad hoc software patches needed to deal with emerging problems and inconsistencies in the forecasting process, over the longer term the Bank should perform a thorough review and re-evaluation of its forecasting framework. Besides improving the quality of forecasts, the objective of the review should be the development of a framework that co-ordinates model outputs and human judgement in a way that is internally consistent; is easier to use; and is flexible and transparent enough to be applied in a variety of exercises, including the construction of alternative scenarios and the quantitative assessment of the sources of past forecasting errors.

It is beyond the remit of this review to propose specific models or theoretical frameworks for use in forecasting; those are decisions that should be made by staff with MPC input. However, given the shortcomings of COMPASS, a new central model (or at a minimum a thorough revamping of COMPASS) will likely be needed. There are several directions in which the Bank could go. Many central banks use semi-structural models like the Federal Reserve's FRBUS, as the Bank did prior to the adoption of COMPASS, but others have successfully used frameworks based on DSGE models or have used those models as cross-checks or complements to larger semi-structural models. Wholesale replacement of the modelling infrastructure is unlikely to be needed; many of the large suite of models already in use at the Bank, after appropriate review and updating, could be retained and incorporated in a newly organised system.

However, in general, and drawing on the lessons of the recent experience, the developers of the revamped framework should ensure that the component models include (1) rich and institutionally realistic representations of the monetary transmission process; (2) specifications that endogenise public expectations of inflation and of other key variables (without the assumption that longer-term inflation expectations are always well-anchored); (3) empirically accurate descriptions of the setting of wages and prices and their interaction; (4) detailed models of the financial sector, the housing sector, the energy sector, and other key components of the UK

economy; and (5) regular incorporation of supply-side developments, such as changes in productivity growth, labour supply, and the efficiency of job-worker matching.

It should be emphasised that the above is a checklist of important components for a revamped forecasting framework; we do not mean to imply that all these components are necessarily absent from the current framework. For example, staff have traditionally done an annual 'stock-take' on supply-side developments. Issues raised by the pandemic necessitated more frequent and agile reviews of the supply side (eg, of supply chains and labour supply), a practice that should be continued (point (5) above).

Ease of use should be a particularly important criterion for a reorganised framework. The current system, which depends on timely input from many people and results from many distinct models, is hard pressed to produce the number and variety of analyses that policymakers need. In particular, once a baseline forecast is developed, an efficient system would allow alternative simulations (in which a small number of assumptions of the central forecast are modified but other elements are left unchanged) to be quickly calculated and displayed. An efficient system would also keep track of Committee and staff judgements made over time and be able to analyse retrospectively how judgements, changes in conditioning assumptions, and aspects of the underlying models have contributed to forecast misses.

**Recommendation 2. Model maintenance and development should be an ongoing priority, supported by a significant increase in dedicated staff time and adequate resources, including specialised software as needed.** To be most effective, the dedicated staff should have ample opportunities to interact with 'front-line' forecasting staff, MPC members, and external experts. The maintenance and development staff should ensure that forecasting models are regularly evaluated, re-estimated when new data become available, stress tested against alternative scenarios, and modified as needed to reflect new perspectives on the economy.

**Recommendation 3. Over the longer term, the Bank should undertake a thorough review and updating of its forecasting framework, including replacing or, at a minimum, thoroughly revamping COMPASS.** The specific framework and models to employ should be decided over a period of time by the staff with MPC input. However, so that staff can respond to policymakers' requests for new analyses in a timely way, flexibility, transparency, and ease of use (including automation of processes now carried out manually) should be important criteria for a restructured system.

**Recommendation 4. Based on the lessons of recent years, a revamped forecasting framework should include at least the following key elements:**

(a) rich and institutionally realistic representations of the monetary transmission mechanism, allowing for alternative channels of transmission;

- (b) empirically based modelling of inflation expectations, with a distinction between short-term (eg, one-year) and longer-term (eg, five to ten years) expectations, and without the assumption that longer-term inflation expectations are always well-anchored;
- (c) models of wage-price determination that allow gradual adjustment and causation from prices to wages as well as from wages to prices;
- (d) detailed models of the financial sector, the housing sector, the energy sector, and other key components of the UK economy; and
- (e) greater attention to, and ongoing review of, supply-side elements and their role in the determination of inflation and growth. Important supply-side factors include changes in productivity, labour supply, the efficiency of job-worker matching, supply-chain disruptions, and trade policy. Notably, analyses of inflation should consider supply-side factors as well as the state of aggregate demand.

### **Incrementalism and judgements**

The current forecasting process appears at times to suffer from excessive **incrementalism**, ie, a bias toward making only small sequential changes to the forecast or the underlying models.<sup>[27]</sup> For example, under current practice, and following MPC guidance, the starting point for the forecast made for each policy round is the forecast for the previous round, to which the staff make marginal adjustments to reflect incoming data or changes in the standard conditioning assumptions. Subsequent modifications of the forecast then build on that starting point. A forecast that adjusts gradually over time is sensible more often than not, but the risk remains that the incrementalist approach will prevent timely consideration of fundamental problems of modelling or analysis, or lead staff and policymakers to underweight the risk of important structural changes in the economy. This possibility is of course of particular concern in times of high uncertainty and economic instability, as we have experienced recently.

The issue of incrementalism interacts with the extensive use of human judgement in the forecast. Staff and policymaker judgements will inevitably remain central to the forecasting process, as they should. Judgements incorporate diverse information, and they compensate for the inevitable omission of important features of the economy from economic and statistical models, which prevents the models alone from adequately matching the data in all circumstances. However, by the same token, persistent reliance on particular judgements, especially judgements without compelling rationale and which are not periodically re-examined, may obscure problems with the underlying framework. A continuing need for ad hoc adjustments to model outputs may be a symptom of problems with the models or, more fundamentally, of deficiencies in the staff's and policymakers' views of the economy.

Reducing the risks of excessive incrementalism and over-reliance on stale judgements will

require a focused effort. In particular, staff (at times in conjunction with the MPC) should meet periodically to consider alternatives to key assumptions and modelling choices used in the forecasts, particularly those that retrospective analyses show to have contributed importantly to recent forecast misses.[28] In these meetings staff might explore the sources of forecast errors for significant variables, particularly in cases in which the errors are not due to unanticipated shocks to the conditioning assumptions. As discussed later, alternative scenarios can be used to decompose forecast errors into portions due to conditioning assumptions, models, and judgements. Models and individual equations that may have contributed to significant forecast misses or otherwise performed poorly should be noted and discussed, as well as variables whose forecasts are consistently dominated by extra-model judgements. In addition, the underlying economic rationales for staff and policymaker judgements should be periodically revisited and discussed to assess whether those judgements are obscuring systematic problems with the models.

These recommendations build on the discussion of forecast misses that (commendably) already appears regularly in the MPR. The innovation relative to the MPR discussion is to encourage more formal and systematic quantification of the sources of past forecast errors, including mis-specified models and faulty judgements, and to build on those analyses to routinely consider whether discrete changes to key assumptions or modelling choices are warranted.[29]

The analysis of forecast errors, judgements, and possible structural change relates to the issue of possible **groupthink** at the Bank – the concern that, for psychological or other reasons, staff and MPC members may pay insufficient attention to alternative or heterodox perspectives. The Bank has important institutional and practical safeguards against groupthink, including the inclusion of four external members on the MPC, the principle of individual responsibility (and attributed voting) of MPC members in policy decisions, the leeway given to Bank research staff to choose the topics they analyse and the outside experts with whom they work, visits by MPC members to various parts of the country to hear local views and see the state of the economy up close, and regular consultations of MPC members and staff with Agents, businesspeople, outside economists, other experts, and non-economists (as represented by the Citizens' Forums, for example). That said, the analysis of forecast errors and potential structural change provides another possible test of the groupthink hypothesis. If the Bank's forecast errors are largely unavoidable, eg, resulting from unpredictable moves in exogenous variables like global energy prices, then groupthink is probably not an issue. If, however, analyses of forecast errors show that those errors are the result of persistent failures to correct problems with the Bank's economic models, analytical tools, or human judgements, that could signal that more attention to alternative viewpoints is needed.

**Recommendation 5.** Incrementalism (the practice of basing new forecasts on previous forecasts, with marginal adjustments) and the use of ad hoc judgements may obscure deeper problems with the underlying forecasting framework or unrecognised changes in the structure of

the economy. **The staff should be charged with highlighting significant forecast errors and their sources, particularly errors that are not due to unanticipated shocks to the standard conditioning variables. Models and model components that may have contributed to forecast misses should be regularly evaluated and discussed, as well as the determinants of variables whose forecasts are consistently dominated by extra-model judgements. Staff should routinely meet with MPC members to consider whether structural change, misspecification of models, or faulty judgements warrant discrete changes to the key assumptions or modelling approaches used in forecasting.**

Willingness to modify existing frameworks and to consider new data or other information is particularly important during periods of high uncertainty. The Bank should also build on existing vehicles for external engagement to capture a broad range of views.

### **Policies regarding staff**

Bank staff are hardworking and committed but are often stretched thin by the demands placed on them. Bank leadership, who are keenly aware of the difficulty of attracting and retaining highly skilled staff in a very competitive labour market, do regular compensation surveys and reviews of hiring and promotion practices. Staff are informed about how their pay is linked to external pay benchmarks and annual performance reviews, and the Bank conducted a review of its 'talent strategy' in April 2023 that identified a number of issues, including a lack of clarity among the staff about criteria for promotions and raises. Efforts are under way to address these problems. Complementary to these efforts, based on our meetings with staff and the results of a small staff survey, we identified two specific areas in which changes in personnel policies and usage of existing staff might improve the Bank's forecasting process.

First, there is some evidence that the incentive structure at the Bank does not sufficiently reward staff who have accumulated experience and expertise in critical substantive areas, eg, labour economics or time series modelling. Staff members with extensive experience in a particular domain generally have deeper knowledge of their subject area and can engage policymakers with more confidence. At the Federal Reserve and other major central banks, it is not uncommon for forecast leaders and subject matter specialists to have decades of experience in their area. Our survey and feedback from staff suggested however that, at the Bank of England, many staff believe that the best path to promotion and increased pay is moving to a new job or a different division, taking on new responsibilities, rather than by demonstrating sustained excellence in a given role. For example, respondents to our survey from areas that feed into the forecast, who had been promoted at least once in their time at the Bank reported that they obtained promotion by applying to fill a posted vacancy in 45 cases, compared with in-role promotion in only 18 cases, with 22 respondents having had promotions through both channels. Reported average experience in role, of those responding to the survey from relevant areas, was about three years, which seems low. There are benefits to having well-rounded staff, but the trade-off between the benefits of experience in role and of broad exposure currently seem tilted too far toward the latter.

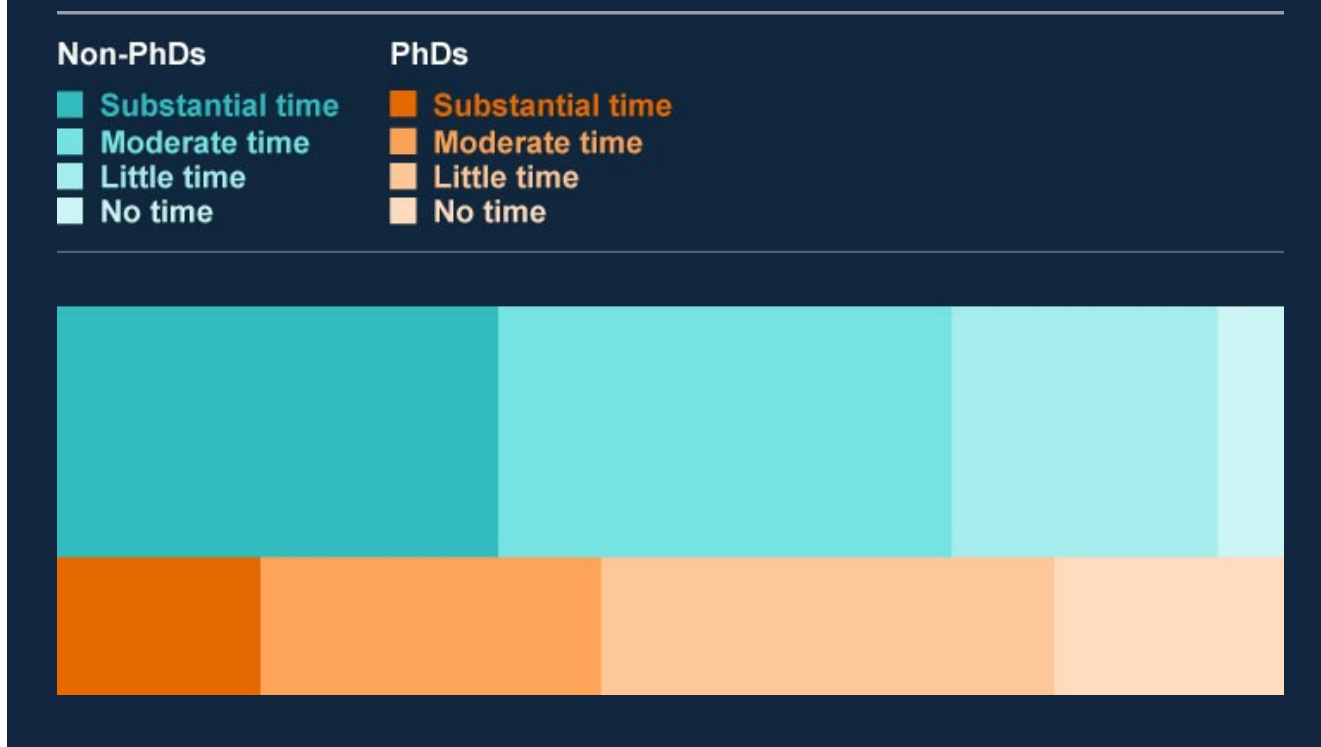


To increase experience and expertise in the staff, the Bank should consider making it easier – for example, by creating more in-role promotion opportunities and giving greater credit for the value of experience in annual performance reviews – for staff members to receive promotions and pay increases based solely on in-role performance, without necessarily changing area or specialty.[30]

The second area for possible improvement concerns staff with doctoral degrees, especially those with independent research agendas. Normally, PhD researchers are required to spend at least half their work time on tasks related to the forecast or current economic analysis, with their remaining time available for individual research. (This research is usually not specifically directed by line managers but is typically related to the goals of the Bank. Researchers in the Research Hub, a small research-only division in the Bank, are often allotted more time than this to focus on research projects.) The quality of the individual research agendas at the Bank is generally quite high – among the advantages of the Bank’s research program is increased engagement with outside academics and other experts – and the Bank should allow the very best researchers to continue to devote considerable time to their individual agendas throughout their careers.[31]

However, again based on meetings with staff and on our survey, our sense is that many PhD economists believe that their career advancement within the Bank depends on their independent research and peer-reviewed journal publications rather than on policy work; that the portion of their time devoted to policy work is not always well utilised; and, in particular, that researchers are not encouraged or incentivised to work on long-term projects directly related to forecasting and policy, such as model development and refinement. Some employees with doctorates complained that forecasting staff lacked the technical expertise to use PhD economists effectively; and some reported that, in practice, they did not engage very much with the forecasting process at all, or that the value of their engagement was reduced by the weakness of the infrastructure or bureaucratic constraints. Of the PhD staff who responded to our survey, and who work in areas that feed into the forecast, only 45% said they spent ‘substantial time’ or ‘moderate time’ each year on the forecast or related analysis, compared with 73% of non-PhD staff (see Figure 13).

Figure 13: Staff survey results (a)



(a) This chart comprises 120 respondents to the survey from the teams in Monetary Analysis, International Directorate and Markets Directorate that input directly into the regular forecast process. The shaded blue and orange areas represent the share of these respondents with and without PhDs (35% and 65% respectively), split by how much time they reported spending on the forecast or related analysis.

The utilisation in policy and forecasting work of researchers and other employees with doctoral degrees should at a minimum be reviewed. Again, it is important that staff with strong research skills have the opportunity to pursue their research agendas throughout their careers if they choose. However, during the portion of their time devoted to current forecasting and analysis, employees with more advanced degrees should be rewarded for taking leading roles in the forecast process, particularly in longer-term model maintenance and the development of new and existing models, an area in which many have experience and comparative advantages. While the forecast infrastructure should be prioritised, employees with doctorates can also contribute by undertaking more substantive analyses that bear directly on current issues. PhD economists should also be given the opportunity to lead in technical areas that make use of their training and research experience.

If the Bank were able to fix infrastructure problems and position itself to perform more sophisticated analyses, then questions would arise about the optimal long-run mix of staff (in terms of training, technical skills, and other backgrounds). Possibly, in the longer run the Bank should aim to have fewer but more experienced and technically sophisticated staff members involved in modelling and forecasting. As mentioned in Recommendation 1, adding a few data

scientists might smooth the forecasting process; people with that background could also help the Bank make better use of big data techniques, artificial intelligence, and other evolving methods to improve forecasting. The long-run mix of staff is however a strategic question for the Bank whose answer will depend on many factors.

**Recommendation 6. The Bank should review its personnel policies to determine if existing staff could be deployed in ways that improve the forecasting infrastructure and forecast quality.** In general, employees should be more strongly encouraged and incentivised to accumulate experience and expertise in specific substantive areas (eg, through in-role promotions), rather than being forced to change fields or responsibilities to get promotions and raises. Researchers with doctorates should continue to spend part of their time in undirected or loosely directed research, with the best researchers afforded the opportunity to continue working on their individual agendas throughout their careers. However, during the portion of their time devoted to current forecasting and analysis, employees with more advanced degrees should be rewarded for taking leading roles, especially in longer-term model maintenance and the development of new and existing models. PhD researchers can also contribute by undertaking substantive analyses directly related to current issues and, as appropriate, by being given the chance to lead in technical areas that make good use of their training and research experience.

## **The use of the forecast in policymaking and communication**

The Bank's forecast is a key component of both the policy process and public communications. On the policy side, the development of the forecast provides MPC members an extended opportunity to engage the staff and each other on issues shaping the outlook and the risks to the outlook. At a minimum, these discussions discipline policymakers by pushing them to link their policy choices to a plausible narrative about how the economy is likely to evolve.

For public communication, the importance the MPC attaches to the central forecast is illustrated by its prominence in all of the Bank's post-decision public releases, which together provide considerably more quantitative detail on the outlook than that given by most central banks. Indeed, at the Bank of England the forecast is arguably the primary vehicle on which the MPC relies to explain its view of the economy and the reasons for its policy decisions. The extensive reliance on the forecast in the Bank's communication is reflected, in turn, in the attention paid to it by media and the markets.


The Bank's commitments to transparency in communication and to detailed, quantitative analyses in both policymaking and communication are commendable. Those commitments should not change. However, recent experience suggests that some operational improvements in both areas may be possible. To foreshadow, many of the recommendations below regarding policymaking and communication involve supplementing the central forecast with alternative scenarios, which (as discussed in Part I) are conditional forecasts based on assumptions that differ from those underlying the central forecast. Thoughtfully applied, greater use of alternative

scenarios could improve the ability of the MPC to evaluate its policy options and assess risks to the outlook, while providing a valuable vehicle for communicating the resulting judgements and other pertinent information to the public.[32]

## Forecasts as an input to policy

As policy meetings are not open to the public, the role of the forecast in policy discussions and the policy decision is not entirely transparent.[33] However, based on meeting minutes and other public documents, interviews with MPC members, and my personal observation of one policy meeting, the forecast appears to shape the policy decision in several ways. First, as just noted, working with staff in developing the forecast provides opportunities for MPC members to analyse and discuss the economic outlook, the risks to the outlook, and salient economic issues in some detail. Several MPC members, past and present, told us in interviews that this part of the forecast process was quite useful in preparing them for the policy discussion. Second, the forecast process helps MPC members identify key differences in views, the discussion of which may facilitate agreement on the policy choice or, at least, provide clarity about the reasons for divergent policy preferences. Third, the process of constructing the forecast forces MPC members to think about their communications strategy in advance of the policy meeting. MPC members are quite aware of the large role that the forecast plays in their communication about the policy decision, and they try to ensure that the narrative inherent in the forecast and the risks to the forecast are reasonably consistent with the policy choice.[34]

Although the discussions and debates that the forecasting process generates among staff and MPC members are undoubtedly valuable, the quantitative links between the forecast and the subsequent policy decision, which in turn inform the forecast's use in communications, are not entirely clear. True, a forecast of (say) high inflation rationalises more restrictive monetary policy, all else equal. But how restrictive and for how long? And how should the MPC incorporate risks to the outlook into its decision? Logically, choosing a policy from a set of qualitatively similar options requires comparison of the likely effects on the economy of the proposed alternatives, information that cannot be provided by a single forecast alone.

The Swedish economist and policymaker Lars Svensson ([Svensson \(1997\)](#) ) has emphasised this point. For example, Svensson explains that inflation targeting, the framework that governs policy at the Bank of England, is better conceptualised as 'inflation forecast targeting', because of the lags between policy actions and their effects on the economy. He argues that, to make sensible policy choices, policymakers should construct alternative forecasts conditional on candidate policy strategies (that is, alternative scenarios), then pick the strategy that gives the preferred expected outcome (eg, returning inflation to target in a timely way without unduly increasing unemployment). Because they allow direct comparisons of the projected effects of various policies, alternative scenarios provide a more rigorous and quantitative approach to making monetary policy decisions, and, in particular, for assessing the likely effects on the

economy of policies 'close to' but different from the preferred strategy. Currently, the staff do provide the MPC with calculations of optimal policy given a particular loss function and economic model. The recommendation here is to go further, to investigate in more detail the implications for the outlook and the risks to the outlook of candidate policies, holding constant other assumptions driving the forecast.

Besides evaluating competing policy strategies, alternative scenarios have other potential uses in policy decisions (see also Part I).

First, alternative scenario analysis can help assess the costs of potential risks to the outlook arising from a shock to an exogenous variable, such as an unexpected and large increase in energy prices. In this example, the MPC could use an alternative scenario conditioned on the assumption of higher energy prices than in the baseline forecast to assess the likely effects and costs of this possible outcome, which could then be factored into a risk analysis. Note that, ideally, alternative scenarios of this type would include an endogenous response of monetary policy to the assumed changes in the outlook. These responses could be generated by the staff, in consultation with the MPC, based on the historical behaviour of the Committee, by policy rules such as a Taylor rule, or by optimal policy calculations. Simulations of risk scenarios that do not include a monetary policy response are still informative but overstate the costs of the scenario by omitting the palliative effect of the response.<sup>[35]</sup> Assessments of the consequences of key risk events (or possible combinations of risk events) facilitate better risk management in policymaking.

Second, scenario analyses can help the MPC evaluate a different but equally important type of risk to the outlook, the risk that one or more of the Committee's key assumptions about the structure of the economy (eg, the estimated sensitivity of economic activity and inflation to interest rates) are wrong. This would require re-running the computation of the forecast with modifications to the assumptions in question, holding constant other factors including staff and MPC judgements. If the forecast proves sensitive to parameters about which the Committee is uncertain, then both greater caution in policy choices and more intensive analysis of the underlying issue are warranted.

Third, scenario analyses could be used to stress test the judgements made by the MPC or staff in constructing the forecast, for example by showing quantitatively the influence of a particular judgement or set of judgements on key economic variables. This can be done through alternative scenarios that exclude the judgement or set of judgements in question and show how that exclusion would affect the forecast. Similarly, alternative scenarios that replace a past forecast's standard conditioning assumptions with the realised values of the conditioning variables, then compare the implied forecast errors with the actual errors of the past forecast, provide a rigorous method for decomposing forecast errors into the parts due to the conditioning assumptions and the parts due to other factors, including faulty judgements or model misspecification. Each of these exercises can help identify aspects of the forecasting framework that might be reviewed or

modified in periodic stock-takes (see Recommendation 5).

The MPC has made occasional use of alternative scenarios in the past for risk assessment, but not systematically. Alternative forecasts around the central projection were introduced briefly as part of the Bank's response to [Stockton \(2012\)](#) and published in the Inflation Report in February 2015 (lower oil prices) and May 2015 (higher labour supply growth). More recently, scenarios were published in the MPR in late 2021 and 2022 to illustrate key risks, notably around energy prices and inflation persistence. The endogenous path for the policy rate was not shown in any of these scenarios, although sometimes it has been described in qualitative terms. Without objecting to scenarios in principle, in our conversations some staff expressed concerns that producing these scenarios could be time-intensive and a drain on the time they have available to develop the central forecast and engage with the MPC. The improvements in the forecasting infrastructure recommended in this report should help address the time constraint. We conjecture that, with some experience in devising and analysing a few key alternative scenarios, the MPC would find the insights gained about policy options and the risks to the outlook to be well worth the time spent.

The MPC currently publishes the results of one alternative policy scenario, which assumes a constant policy rate rather than a market-based rate path. This scenario is most useful at times when a near-term flat profile for Bank Rate is within the range of plausible possibilities, since in that case it gives some insight on how the MPC views alternative policy strategies. In addition, by showing the differences in the behaviour of the economy under the constant rate forecast and the central forecast, the constant rate scenario provides information about the MPC's views on the monetary transmission mechanism. In situations in which a flat rate profile is not seen by markets as a plausible policy option, however, the constant rate scenario could usefully be replaced by other policy scenarios.

In short, the use of alternative scenarios in conjunction with the central forecast has the potential to provide additional useful information for policymakers about the effects of alternative policy options, the costs and policy consequences of specific risks to the outlook, and the sources of forecast errors, including judgements and conditioning assumptions. However, the forecast infrastructure is not currently adequate to produce a large number of alternative scenarios, so that, at least for the time being, it will be necessary to be selective. The MPC and the staff should meet at an early stage of each forecast round to determine which alternative scenarios will be most useful for the policy discussion. Experience will help clarify the types of scenarios that are most useful, but a reasonable set of initial choices might include at least one alternative policy scenario in addition to the standard forecast conditioned on market rates (this could be the constant rate scenario if it is judged most relevant); one and possibly two risk scenarios; and, in cases in which the Committee deems it potentially useful, a scenario that assesses the implications of one or more MPC judgements or key modelling assumptions.

**Recommendation 7. To improve the MPC’s policy discussion, the central forecast should be regularly augmented by alternative scenarios, with the specific scenarios ideally decided upon at an early stage of each forecast round by the MPC and staff.**

Among the types of scenarios that could be considered are those that: (1) allow for direct comparisons of the likely effects of alternative policy paths on the outlook; (2) help to assess the effects and costs of possible risks to the outlook arising from unexpected changes in exogenous variables; (3) can be used to evaluate the effects of the Committee’s policy choices on the economy if one or more of its key assumptions about the structure of the economy are wrong; and (4) can be used to decompose historical forecast errors into portions due to judgements, conditioning assumptions, and other factors.

## Forecasts and communication

The volume of material that the Bank releases to the public each quarter is testament to the importance that the Bank places on communication. Indeed, the Bank was a leader in the central bank transparency revolution of the 1990s, adopting a formal inflation target and greatly increasing the information about its outlook and policy strategy that it shared publicly. Good communication supports democratic accountability, which in turn helps legitimise the independence central banks need to pursue their mandates without being influenced by short-term political considerations. Communication can also assist monetary policy makers in achieving their policy goals, for example, by helping to anchor medium-term inflation expectations near the Bank’s target (which reduces the risk of a wage-price spiral) and by aligning pricing in financial markets more closely with the Bank’s objectives. External interviewees generally gave the Bank’s regular releases high marks, praising the thoroughness and detail of the MPR and citing the Monetary Policy Summary and the minutes as useful sources of policy guidance.

As we have seen, the forecast, or at least the portion released to the public, is central to the Bank’s communications effort. As presented in the MPR and other documents, the forecast gives the public considerable detail on the MPC’s collective view of the outlook, while simultaneously providing a useful jumping off point for individual members to express their own views in speeches, testimonies, and other public venues. The forecast also serves as a basis for feedback from external analysts.

While the central forecast is a useful and now-familiar communications device, which should continue to be constructed and published, it has drawbacks for communication that are parallel to those noted in the previous discussion of the use of the forecast in policy decisions. Notably, as a single central forecast does not provide all the information needed for the MPC to choose a policy, because it does not provide a comparison of the effects of alternative policies, it likewise does not give the public all the information necessary to understand the policy choice.<sup>[36]</sup> Nor does a single forecast give much insight into specific risks (including risks associated with the Committee’s uncertainty about the structure of the economy) that may be influencing the MPC’s

decision. Finally, the forecast alone does not provide information that would help more sophisticated Bank-watchers project future policies, including information bearing on the Bank's policy reaction function and the MPC's views of the monetary transmission mechanism.

The publication of selected scenario analyses in the MPR, together with the central forecast, could ameliorate these concerns.<sup>[37]</sup>

First, showing the outlook conditional on one or more alternative rate paths would both provide comparisons of the effects of alternative policies and reinforce verbal guidance by the Bank. At the same time, MPC members with different policy preferences could use these alternative scenarios in public remarks to illustrate potential points of disagreement with the Committee's collective judgement. Sophisticated observers could also use these scenarios, which would show the expected reaction of the economy to different monetary policy paths, to learn about the Bank's views concerning the monetary transmission mechanism.

Second, scenarios that illustrate the likely economic effects of specific risks coming to fruition would provide insight about the MPC's use of risk management in its policy choices. In addition, if the published risk scenario also showed an endogenous response of monetary policy to the realisation of the risk, it would help observers quantify the MPC's policy reaction function.<sup>[38]</sup>

Not all the alternative scenarios considered by the MPC in its deliberations need be published. Presenting too many scenarios could confuse the public and obscure the information that the MPC wishes to convey. In some cases, publication of a particular scenario might send a signal the Committee does not want to send or would risk being misleading for some other reason. The MPC should choose to publish scenarios of particular interest or relevance, or that do not repeat earlier analyses. There should be no presumption that the same set of scenarios will be published in each MPR. In particular, the constant interest rate scenario need not be published when, in the MPC's judgement, it does not provide useful information to the public. Ultimately, though, if the Committee is making more extensive use of alternative scenarios in its policy decisions, the transparent approach is to let the public see the most influential inputs into their decisions.

In making greater use of and selectively publishing alternative scenarios, the Bank would be following the practice of some though not all of the peer central banks reviewed for this report. Most of the peer banks we considered use scenario analyses internally for policy analysis, including comparison of alternative policy strategies, and for discussion of potential risks (both upside and downside) to the outlook. Publication policies regarding scenarios are more mixed. Alternative scenarios (other than qualitative discussions) are rarely or never published by several central banks, including the Fed and the Bank of Canada (although the Bank of Canada has made greater use of scenarios lately). Among central banks that publish scenarios, some (like the European Central Bank) do not publish the endogenous monetary policy response associated with the scenario, while others do, including the Riksbank and the Norges Bank (which publish relatively few scenarios, however). Because the Bank of England makes greater



use of an official forecast in its communications than most other central banks, the case for publishing selected scenarios that offer insights into that forecast and its sensitivity to alternative assumptions may be stronger in the UK than elsewhere.

**Recommendation 8. The publication of selected alternative scenarios in the MPR, along with the central forecast, would help the public better understand the reasons for the policy choice, including risk management considerations.** The publication of selected alternative scenarios could also provide the public with information about the Committee's policy reaction function and its views of the monetary transmission mechanism. The MPC should determine which scenarios are published, choosing those that members deem to be most informative about the policy decision at a particular time. There should be no presumption that the same scenarios will be published in each MPR.

### **Problems created by the standard forecast conditioning assumptions**

The forecast on which the MPC relies for policy and for communication obviously reflects a good deal of effort and economic expertise. However, we have discussed why the forecast alone, no matter how well done, does not necessarily convey all the information that the Bank might like the public to have. Alternative scenarios are one method of providing information missing from the central forecast.


There are two additional problems with heavy reliance on the central forecast alone for communication. First, the focus on the central forecast may lead the public to underestimate the enormous uncertainty surrounding any macroeconomic forecast, especially those extending more than a few quarters. To communicate this uncertainty, the Bank also publishes fan charts, which are intended to convey the range of possible outcomes for key variables around the modal forecast. However, the fan charts as currently constructed suffer from significant conceptual problems. I return to the fan charts below.

The second issue, addressed here, is the potentially perverse effects of the standard conditioning assumptions on which the central forecast is based. As noted earlier in this report, the MPC's central forecast is not a true (unconditional) forecast in that it does not necessarily represent the Committee's collective best guess of what will actually happen in the UK economy. It is instead a projection conditional on a set of assumptions about the likely future course of several key variables, assumptions that come fully or partly from the outside and may or may not accurately reflect MPC members' beliefs about those variables. The conditioning variables, described in Part II in more detail, are the future path of Bank Rate (derived from market prices, specifically, overnight index swap rates); government spending, tax, and other fiscal policies, as laid out in the most recent government announcement; the exchange rate, based in part on interest-rate differentials; and commodity (oil and natural gas) prices, based in part on futures prices.

From the policymakers' point of view, an advantage of using externally determined conditioning

assumptions is that the Committee does not have to take a public position on some potentially sensitive topics, including the likely future path of interest rates and the predicted economic effects of proposed fiscal policies. Standardised conditioning assumptions are also easy for the staff to implement without extensive consultation with the Committee. However, as we have emphasised here, the drawback of exogenous conditioning assumptions is that they need not correspond to the MPC's collective view, with the result that the central forecast, which is based on those assumptions, may not accurately capture the Committee's outlook for the economy. If incorrect conditioning assumptions lead to a forecast that is implausible or proves wrong, the Bank's reputation will suffer in the court of public opinion, notwithstanding the conditional nature of its forecast.

The two standard conditioning assumptions that are most problematic in practice are (1) the assumption that future policy rates will follow the market curve and (2) the requirement that the forecast be conditioned on the fiscal policies described in the Government's latest public statement. The commodity price and exchange rate assumptions are less of an issue because, although these assumptions are drawn to a significant extent from market prices, the staff and the MPC have some latitude to make adjustments to these less-sensitive assumptions when needed.

Although using the market rate curve has the benefit of not forcing the MPC to take a public position on future policy, it also has significant disadvantages as a proxy for the future course of the policy rate. First, if the MPC in fact has a different view than the market about the likely course of policy, then a forecast conditioned on the market curve may be misleading, as already noted.<sup>[39]</sup> Moreover, if the MPC policy action and communication cause the market curve to shift, as it likely will if the policy action deviates from market expectations, then the market-based conditioning assumption becomes immediately out of date ([Goodhart \(2009\)](#) ). Second, forward rates implied by the market curve are not pure forecasts of future rates, because forward rates may incorporate risk and liquidity premiums. Third, the staff derive the conditioning assumption about the future course of the policy rate based on market quotes averaged over the period beginning four weeks before the policy meeting and, in practice, ending one week before the meeting. Stale quotes do not necessarily reflect either the market's or the MPC's rate expectations as of the day of the policy decision. Fourth, in an efficient market, and excluding risk premiums, market rates predict mean or average values of Bank Rate, not the modal or most likely rate path; but it is the latter which is more consistent with a forecast cast in terms of the modal outlook.

The MPC has deployed some modest flexibility to vary the conditioning assumption for rates, notably by shortening the window over which the average rates are calculated, if it feels that more recent data on rate expectations give a better read on current conditions. However, this option has been exercised only twice in the MPC's history, in August 2007 (following a sharp move in asset prices) and in November 2022, in response to an episode of financial instability. Even when that adjustment is made, because of lags in constructing the forecast, stale market quotes must

be used in the forecast.

The fiscal policy conditioning assumption, usually described as announced government policy, is in practice based largely on the costings and projections of the Office for Budget Responsibility (OBR) for the most recent Budget or Fiscal Statement, with minor adjustments to account for the difference in the Office's macroeconomic forecast. On rare occasions Bank staff have incorporated information from fiscal announcements made by the Prime Minister or Chancellor, where these occurred without an associated OBR forecast. In November 2022, for example, the Chancellor announced continuation of current support to household energy bills to February 2023, and that some form of support would remain thereafter but did not specify its nature. The MPC therefore made a 'working assumption' about the nature of that support in its forecast ahead of details about the extent of support.<sup>[40]</sup> This was a highly unusual exception; interviewees told us that including in the forecast fiscal policies that have not yet been officially announced, even if they seemed likely to be implemented, could be seen as front-running what are appropriately government decisions. This restriction can, again, lead to central forecasts that deviate from the MPC's actual expectations.

To some extent, market participants can correct for these issues, as the MPC is quite clear about the conditioning assumption it employs. Indeed, the MPC traditionally used divergences between its conditional rate projections and its own rate expectations to provide a signal to the markets about future policy. For example, a forecast of inflation above 2% in the second or third year would suggest to market participants that the path of rates in the forecast consistent with market quotes was too low, relative to the MPC's expectations of the appropriate rate path. However, this device has become less useful in the past decade as the UK economy has experienced larger shocks, and the MPC has more often published inflation forecasts in which inflation approaches the target sufficiently slowly as to provide an ambiguous market signal.

For the media and broader public, however, the inflexibility of the interest rate and fiscal conditioning assumptions can be a barrier to clear communication about the MPC's outlook. These assumptions have on occasion led the MPC to issue forecasts that almost certainly were different from what members of the Committee would have considered the most reasonable. Recent examples where conditioning assumptions may have caused problems for the interpretation of the forecast include: (i) a projection of high unemployment made in February 2021, when the furlough scheme (whose renewal had not yet been announced) was assumed in the forecast to be ending, even though its continuation was widely expected; (ii) a forecast of high inflation together with a long recession in August 2022, resulting from the imposed assumption that, contrary to general expectation, the Government would take no action to reduce the burden on households of high energy prices; and (iii) a projection of a long recession in November 2022 that resulted in large part from a market curve that implied a period of higher interest rates than the MPC likely expected.<sup>[41]</sup> In addition, arguably the large forecast errors in 2021 were baked in by the standard conditioning assumptions of the time about future rates and energy prices,

although it is not clear in that case that policymakers disagreed with those conditioning assumptions. If forecast conditionality is not understood by the public, or if media reporting of the forecast ignores or insufficiently explains conditionality, episodes like these risk reducing public confidence in the Bank and its forecasts or creating unwarranted public optimism or pessimism that affects economic behaviour.

What should be done? Some of the Bank's peer central banks have found solutions to the problem of conditioning assumptions, including using (published or unpublished) forecasts of the policy rate in place of the market-based conditioning assumption (Box 3).

What are the Bank's options? Following the practice of some of its peers, the Bank might at some point consider replacing the market-determined rate path used in the economic forecast with a rate forecast by the Bank itself. There are several ways that could be done. For example, guided by staff projections, MPC members could develop a provisional consensus on future rates, similar to the practice to several of the peer central banks discussed in this report. Alternatively, to avoid the difficulties of achieving consensus, MPC members could individually project their expectations for Bank Rate, say, at one year and two years into the future, with the median (interpolated) rate entering the forecast. Individual member projections (which presumably would be attributed) are consistent with the principle of individual responsibility and have the advantage of not requiring agreement on the Committee. A drawback of the latter approach is that MPC members might feel unprepared to make projections until late in the forecast round, after they have heard staff presentations and had preliminary discussions. That in turn would make it more difficult for the staff to incorporate the projections into the central forecast (though eventually it should be doable).

Publishing an MPC-approved forecast of the policy rate, which admittedly would be a big change from current practice, would have advantages and disadvantages for the Bank's communications. On the plus side, the change would increase the transparency of policy, avoid the problems raised by using market-based rate projections, and provide powerful forward guidance. The strength of the forward guidance that MPC rate projections would provide is also a potential negative, however, since the median individual rate projection would not necessarily represent the collective view of the Committee, and because there are times when (due to unusually high uncertainty, for example) the MPC might prefer not to offer guidance about the future path of policy. For these reasons, this option is left for future discussion and is not a formal recommendation.<sup>[42]</sup>

For now, perhaps the most straightforward solution is to continue current practices, including the production and dissemination of a central forecast conditioned on market rates, but (1) to de-emphasise somewhat the prominence of the central forecast in regular Bank communications and (2) to take special care not to issue forecasts based on conditioning assumptions that do not reflect the MPC's views without adequate qualification. Several steps are worth considering:

First, the publication of alternative scenarios in the MPR, as suggested above, together with greater attention to those alternatives in the press conference and interviews, could reduce the emphasis on the central forecast, as would the willingness of MPC members to use the alternative scenarios as reference points when publicly describing their own views on the outlook and policy. Greater attention to alternative scenarios in communications would impress on the public that the MPC's outlook for the economy is not fully described by a point forecast but spans a range of possibilities, all of which bear on the policy decision. The MPC's choice of scenarios to publish would also likely signal risks to the outlook that most concern the Committee.

Second, although the Bank is already assiduous in stating the conditioning assumptions when reporting the forecast, perhaps the role of those assumptions could be emphasised even further in communications, especially with the media. Being especially clear about the conditionality of the forecast is particularly important when the MPC is concerned that its official forecast, because of the conditioning assumptions being made, does not fully reflect the Committee's unconditional outlook for the economy. For example, cautionary words about the forecast could be included in the Monetary Policy Summary and the Governor's statement opening the press conference.<sup>[43]</sup> The guiding principle should be that if a forecast that does not adequately represent the MPC's unconditional views of the outlook must be issued, it should be accompanied with extensive explanations and qualifiers sufficient to penetrate media coverage.

Third, when necessary, the MPC could be more forthcoming in using its limited discretion to modify the conditioning assumptions, as it has done in the past. For example, as we have seen, it can vary the time period over which forward rates are averaged or, as it has on at least one occasion, choose to incorporate fiscal information from Government sources other than OBR projections.

A fourth possibility is that the staff and MPC could use judgements to align the central forecast more closely with their own unconditional outlook. For example, if the MPC see aggregate demand as projected in the standard central forecast as growing more slowly than they actually expect, due to exogenous conditioning assumptions, they could consider modifying the judgemental component of the aggregate demand forecast. That approach would be consistent with the current active use of judgements in the forecast process. However, judgemental adjustments of this type would also have a significant drawback, namely, that they send an inaccurate signal to financial markets about the MPC's assessment of the rate path most consistent with the Committee's objectives. This option is thus the least attractive of the four.

A change that would serve several purposes would be to eliminate or at least cut back the quantitative discussion of economic developments and the outlook in the Monetary Policy Summary. This change would not be a reduction in transparency, since all the key information is contained in (or could be added to) other releases; and, as noted earlier, the Summary is considerably longer and more detailed than the analogous statements of most central banks. The proximity of the detailed economic discussion to the policy announcement and guidance

increases public attention to the central forecast and implicitly overstates its significance to the policy decision. The quantitative discussion in the Summary could be replaced in full or in part by more succinct, qualitative language about economic developments and the outlook, similar to the language used to describe the balance of risks and the broad direction of policy. This step would simplify the Bank's post-meeting statement, reduce the emphasis on the central forecast in communication, allow for a more qualitative discussion of the outlook and the risks to the outlook in the press conference and post-meeting interviews, and bring the statement more in line, in terms of style and length, with those of most other central banks.

**Recommendation 9. Because the standard conditioning assumptions do not necessarily reflect the MPC's views but can have potentially significant effects on the forecast, and because the central forecast by itself does not provide a clear rationale for policy decisions, the MPC should de-emphasise the central forecast based on the market rate path in its communications and be exceptionally clear in warning about situations in which it judges the standard conditioning assumptions to be inconsistent with its view of the outlook.** Methods for doing this include giving more attention to published alternative scenarios in discussions of the outlook and policy; emphasising to an even greater degree the conditionality of the forecast on exogenous assumptions not chosen by the MPC; and when appropriate, using the MPC's limited discretion to modify the standard conditioning assumptions. Judgemental adjustments might also be used to offset the effects on the forecast of conditioning assumptions with which the Committee disagrees, but that approach has the significant disadvantage of sending inaccurate signals to market participants about the MPC's assessment of the rate path consistent with the Committee's objectives.

**Recommendation 10. To put less emphasis on the central forecast, to simplify its policy statement, and to reduce repetitiveness in its communications, the MPC should replace or cut back the detailed quantitative discussion of economic conditions in the Monetary Policy Summary in favour of a shorter and more qualitative description, following the practice of most peer central banks.**

### Box 3: Conditioning assumptions at peer central banks

**The forward rate assumption.** The use of the market curve to derive the assumed policy path is not the only approach available. Like the Bank of England, the European Central Bank's staff forecast uses market rate futures to derive the policy rate path that underlies the forecast. However, other central banks use alternative means to avoid this assumption. For example, Bank of Canada staff construct an endogenous policy path (though not published) based on the historical behaviour of Canadian policymakers. The Norges Bank, the Riksbank, and the Reserve Bank of New Zealand publish endogenously generated forecasts of the policy rate which are approved or owned by policymakers, and in each case the forecasted policy rate is also used to construct the economic forecast released to the public. The forecasted rate paths of the latter three central banks clearly influence market policy expectations, unsurprisingly, but staff told us that the forecasted rates are (appropriately) viewed as forecasts rather than promises, and that markets sometimes exhibit disagreement with central bank rate projections.

At the Federal Reserve, participants in FOMC meetings (anonymously) project the policy rate for up to three years in the future, as well as the expected value of the rate in the long run. (The figure that shows the individual projections is colloquially known as the dot plot.) Unlike the other central banks that publish rate projections, the FOMC projections are calculated from individual submissions, are not official decisions of the Committee as a whole, and are not used in the Fed's staff-owned forecast, in which conditioning variables including interest rates are forecast using statistical methods and judgement. In addition, FOMC participants' projections reflect individual beliefs of what constitutes appropriate monetary policy, which is not necessarily the same as what each individual expects the Committee to do. However, to the extent that the median rate projection in the dot plot is close to the FOMC consensus view of the best policy path, it should also function as an unconditional forecast of the Fed's policy rate.

**Fiscal policy assumptions.** Most peer central banks appear less constrained than the Bank regarding the fiscal assumptions used in their forecasts, although they generally take on board government fiscal announcements and forecasts. Where political considerations are important, staff ownership of the forecast or a decision simply not to publish the fiscal assumptions provide the policy committee with some distance from any assumptions that are made. The Federal Reserve illustrates both approaches. At the Fed the Board forecast is both owned by the staff and not published. Since the fiscal assumptions are not made public, the Fed staff feel free to forecast fiscal developments using the best and most recent available information, without implicating the FOMC.

## Fan charts, risk, and uncertainty

The public, the media, and the markets typically pay the most attention to the MPC's modal (most likely) conditional forecast, which is a point forecast. But, of course, all forecasts are subject to considerable uncertainty. To help educate the public on this point, in 1992 the Bank innovated by beginning publication of fan charts, which show for each of the major forecasted variables the MPC's assessed probability that the outturn will fall within a specified range at various points in the future. The widths of the fan charts dramatically illustrate the high degree of uncertainty in economic forecasts, especially at longer horizons, an important message for the public to hear. Box 1 described the process of constructing fan charts.

The fan charts are also intended to convey information about the balance of risks around the modal forecast. If the primary risks to inflation are assessed to be to the upside, for example, the fan chart will be skewed in the direction of higher inflation outcomes. In such a case, the mean value of forecasted inflation is higher than its modal value. Because the mean inflation rate incorporates the balance of risks, the Bank, like many other central banks concerned with risk management, in principle takes mean as well as modal forecasts into account in its policy choices. For reasons discussed below, however, it is not clear that mean forecasts provide useful quantitative information over and above that contained in more qualitative descriptions of risks.

Despite fan charts' superficial appeal, in practice the construction of the fan charts is uncomfortably ad hoc.<sup>[44]</sup> The probabilities of possible outcomes shown in the fan charts is based in the first instance on the distribution of the Bank's historical forecast errors since 2004, with a reduced weight on errors made during 2020 (the onset of the pandemic). As noted earlier, the MPC can choose to increase or decrease the width of the fan chart to reflect its assessment of the level of economic uncertainty. The Committee also judgementally adjusts the skew of the fan chart to reflect its views on the balance of risks. In recent years the MPC has shown a considerable upside skew in its fan charts of inflation, for example. As with the central projection, the MPC's calibration of the fan chart is carried over between forecast rounds, so judgements can be persistent.

Using the distribution of historical forecast errors as a representation of forecast uncertainty is a defensible first step, though this procedure takes no account of possible changes in the forecasting process, in the structure of the economy, or in the distribution of economic shocks. However, based on my observation and interviews, the MPC's adjustments to both the width and the skew of the fan chart appear to have little or no explicit grounding in data or quantitative analysis and thus convey a false sense of precision. In addition, the MPC's adjustments do not systematically account for the fact that, in principle, the fan charts for different variables are not independent, eg, a change in the width or skew of the inflation fan chart should have implications for the shapes of the fan charts for unemployment and economic growth. Accurate measurement of these interactions and the construction of truly forecast-consistent fan charts would require many (hundreds) of forecast simulations assuming different combinations of economic shocks,



which is not practical. In short, it is highly questionable whether fan charts provide any information that is not already conveyed (with less intervening noise) by the historical distribution of forecast errors and by qualitative MPC statements (in the Summary or the MPR, for example) about the current degree of uncertainty and risks to the outlook.

The retention of the fan charts might be justified if they served a useful pedagogical purpose about the high uncertainty associated with forecasts. However, the majority of our interviewees from the media and financial markets agreed that the communication value of the fan charts, even as a purely pedagogical device, is low. The charts receive little attention from the public and are rarely shown in media reports. They do provide a graphical representation of the modal forecast (the central band in each fan) and they convey the point that forecast uncertainty is high, but, as discussed below, there are alternative ways to convey uncertainty and risks that are both more rigorous and more understandable.<sup>[45]</sup> Although the fan charts were innovative when introduced three decades ago, and were adopted by other central banks, over time they have become perceived as less useful, and some institutions have abandoned them.

On the other hand, communicating to the public about the MPC's perceptions of the level of uncertainty and the balance of risks remains essential. If the fan charts were eliminated, what would replace them? A suggested approach would be to have, in lieu of fan charts, a regularly appearing section or series of boxes in the MPR focused on uncertainty and the balance of risks in the outlook. Elements of this section, most of which are already constructed and published, could include a figure showing the actual distribution of historical forecast errors by the Bank, perhaps augmented by time series graphs and discussion; a periodic review of the sources of recent forecast errors, similar to material already presented in the MPR; a discussion, where appropriate, of any changes to the MPC's views on the economy flowing from the analysis of forecast errors; a discussion of key risks to the outlook, with references to alternative scenarios as appropriate; and the MPC's **qualitative** assessment of the degree of uncertainty surrounding the forecast and the balance of risks to key variables, information that should also be included in the Monetary Policy Summary and the minutes. Qualitative assessments of uncertainty and the balance of risks, as well as of economic conditions, would likely be useful elements of the Bank's policy guidance.

One casualty of eliminating the fan charts would be the estimated mean values of inflation and other headline variables, whose calculation depends on the width and skew of the fan charts. As the mean forecasts inherit the conceptual weaknesses of the fan charts, these quantitative measures add little to the MPC's qualitative characterisations of risk and uncertainty. Dropping mean forecasts might draw objections from a few observers, but unless new methods to calculate them can be found, retaining mean forecasts serves little practical purpose.<sup>[46]</sup> If MPC members believe that risk management considerations require a significant adjustment in the policy rate, the more transparent way forward is to be clear about the risks (the costs and subjective probabilities) that motivate their action, which can be described (as by most central banks) in

qualitative terms.

**Recommendation 11. Despite their distinguished history, the fan charts as published in the MPR have weak conceptual foundations, convey little useful information over and above what could be communicated in other, more direct ways, and receive little attention from the public. They should be eliminated.** However, it remains important to communicate the degree of forecast uncertainty and the balance of risks. A section in the MPR should be devoted to uncertainty and the balance of risks in the forecast. Beyond verbal discussion that describes uncertainty and risk in qualitative terms (terms that should be echoed in other Bank releases), this section could include the record of forecasting errors by the Bank, perhaps including new time series figures and discussion; an analysis of recent forecast errors, together with steps taken (if any) to correct the factors that contributed to those errors; and an overview of the risks to the outlook, possibly with reference to alternative scenarios published in the MPR. **Mean forecasts as currently constructed do not provide additional useful information and should also be dropped from publications in favour of more qualitative descriptions of risks and uncertainty surrounding the outlook.**

Finally, many of the proposals made here for improving policymaking and communication are dependent on extending the capabilities and flexibility of the forecasting infrastructure (see especially Recommendations 1–4). The needed improvements to the infrastructure cannot happen immediately and will likely require the deployment of additional resources, at least for a time. A phased approach to the recommended changes is thus likely to be necessary.

**Recommendation 12. A phased approach to implementing changes proposed in this report, focused first on improving the forecasting infrastructure, while moving cautiously in adopting changes to policymaking and communications, is likely to be necessary. To facilitate infrastructure improvements and address existing deficits, the commitment of additional resources will be required, at least for a time.**

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# Annexes

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## Annex A: Published terms of reference

In the years following the introduction of inflation targeting in the United Kingdom, the economy was largely subject to shocks that the monetary policy framework was well set up to manage. Over the following years, however, the shocks have been of a different nature, and their impact has been more uncertain. Most recently, the UK has faced a complex constellation of shocks – including a series of substantial supply shocks – that have led to a sharp rise in inflation.

At its May 2023 meeting, the Bank of England's Court of Directors commissioned a review into the Bank's forecasting and related processes during times of significant uncertainty.

The purpose of this review is to develop and strengthen the Bank's processes in support of the MPC's forward-looking approach to the formulation of monetary policy, especially in times of high uncertainty.

The focus of the review should also be forward looking – rather than an ex-post review of policy decisions – but that view can be informed by taking lessons from past experiences and from the experiences of other central banks.

As part of that, the review should consider the appropriate approach to forecasting and analysis in support of decision-making and communications in times of high uncertainty from big shocks and structural change focusing on:

- staff processes and analysis supporting the MPC's policy deliberations;
- the analytical framework for taking account of significant shocks and shifts on the supply as well as the demand side of the economy;
- the role of the forecast in the MPC's policy decisions and communications, including the roles of the MPC and the staff in the development of the official forecast;
- the appropriate conditioning assumptions in projections, including the interest rate path on which the forecast is based; and
- material provided to the MPC to assist the discussion and communication of the outlook and the risks around that.

## Annex B: Data definitions and sources for forecast comparisons

All data that was collected or provided by other central banks is accurate as of 23 January 2024. Subsequent revisions to the data have not been incorporated.

### Inflation

Country	Definition	Source of data outturns	Source of forecast	Sample periods
<b>Bank of Canada</b>	Annual rate of consumer price inflation up to 2017 Q4, then Q4-on-Q4 growth rate of CPI	Statistics Canada	Staff Economic Projections database up to 2017 Q4 and Monetary Policy Report projections provided by BoC staff thereafter	1QA: 2015 Q2–2023 Q3 1YA: 2016 Q1–2023 Q3
<b>Bank of England</b>	Annual rate of consumer price inflation	Series D7BT – Consumer Prices Index, Office for National Statistics (ONS)	Monetary Policy Reports	1QA: 2015 Q2–2023 Q3 1YA: 2016 Q1–2023 Q3
<b>European Central Bank</b>	Annual rate of HICP inflation	Eurostat	ECB Staff Macroeconomic Projections	1QA: 2015 Q2–2023 Q3 1YA: 2016 Q1–2023 Q3
<b>Federal Reserve Bank</b>	Q4-on-Q4 growth rate of PCE prices	US Bureau of Economic Analysis	Summary of Economic Projections	1YA: 2016 Q4–2022 Q4
<b>Norges Bank</b>	Annual rate of consumer price inflation	Statistics Norway	Norges Bank staff provided forecasts used in the Monetary Policy Report	1QA: 2015 Q2–2023 Q3 1YA: 2016 Q1–2023 Q3
<b>Reserve Bank of New Zealand</b>	Annual rate of consumer price inflation	Statistics New Zealand	RBNZ staff provided forecasts used in the Monetary Policy Report	1QA: 2015 Q2–2023 Q3 1YA: 2016 Q1–2023 Q3

<b>Riksbank</b>	Annual rate of consumer price inflation with a fixed interest rate	Statistics Sweden	Riksbank staff provided forecasts used in the Monetary Policy Report. (a)	1QA: 2015 Q2–2023 Q3 1YA: 2016 Q1–2023 Q3
			The comparative analysis used the following MPRs: <ul style="list-style-type: none"> <li>• 2015–19: February, April, September, December; and</li> <li>• 2020–2023 Q3: February, April, September, November.</li> </ul>	
			For inflation, the analysis takes the quarterly average of monthly projections.	
<b>External forecasters (UK)</b>	Annual rate of consumer price inflation	Series D7BT – Consumer Prices Index, ONS	Consensus Economics, Consensus Forecasts™ – G7 & Western Europe, UK series	1QA: 2015 Q2–2023 Q3 1YA: 2016 Q1–2023 Q3

(a) The Riksbank published MPRs with accompanying forecasts six times a year (February, April, July, September, October, December). from 2015–19. Since 2020 it has moved to publishing MPRs five times a year (February, April, June, September, November). The comparative analysis is based on forecasts from the MPRs published closest to the dates of Bank of England publications.

## GDP growth

Country	Definition	Source of data outturns	Source of forecast	Sample periods
<b>Bank of Canada</b>	Four-quarter growth rate of real GDP for one-quarter ahead forecasts; for one-year ahead four-quarter growth up to 2017 Q4, and Q4-on-Q4 growth thereafter	Statistics Canada	Staff Economic Projections database up to 2017 Q4 and projections published in the Monetary Policy Report (MPR) thereafter, with year-ahead forecasts based on the Q4 projection published in the January MPR	1QA: 2015 Q2–2023 Q3 1YA: 2016 Q1–2022 Q4
<b>Bank of England</b>	Four-quarter growth rate of real GDP	Series ABMI – Quarterly National Accounts, ONS	Monetary Policy Reports	1QA: 2015 Q2–2023 Q3 1YA: 2016 Q1–2023 Q3
<b>European Central Bank</b>	Four quarter growth rate of real GDP	Eurostat	ECB Staff Macroeconomic Projections	1QA: 2015 Q2–2023 Q3 1YA: 2016 Q1–2023 Q3
<b>Federal Reserve Bank</b>	Q4-on-Q4 growth rate of real GDP	US Bureau of Economic Analysis	Summary of Economic Projections	1YA: 2016 Q4–2022 Q4



<b>Norges Bank</b>	Four quarter growth rate of real Mainland GDP	Statistics Norway	<p>Norges Bank staff provided forecasts used in the Monetary Policy Report</p> <p>The comparative analysis used the following MPRs:</p> <ul style="list-style-type: none"> <li>• 2015–19: February, April, September, December; and</li> <li>• 2020–2023 Q3: February, April, September, November.</li> </ul>	<p>1QA: 2015 Q2–2023 Q3</p> <p>1YA: 2016 Q1–2023 Q3</p>
<b>Reserve Bank of New Zealand</b>	Four quarter growth rate of real GDP	Statistics New Zealand	<p>RBNZ staff provided forecasts used in the Monetary Policy Report</p>	<p>1QA: 2015 Q2–2023 Q3</p> <p>1YA: 2016 Q1–2023 Q3</p>
<b>Riksbank</b>	Four quarter growth rate of real GDP	Statistics Sweden	<p>Riksbank staff provided forecasts used in the Monetary Policy Report</p> <p>The comparative analysis used the following MPRs:</p> <ul style="list-style-type: none"> <li>• 2015–19: February, April, September, December; and</li> <li>• 2020–2023 Q3: February, April, September, November.</li> </ul>	<p>1QA: 2015 Q2–2023 Q3</p> <p>1YA: 2016 Q1–2023 Q3</p>
<b>External forecasters (UK)</b>	Four-quarter growth rate of real GDP	Series ABMI – Quarterly National Accounts, ONS	<p>Consensus Economics, Consensus Forecasts™ – G7 &amp; Western Europe, UK series</p>	<p>1QA: 2015 Q2–2023 Q3</p> <p>1YA: 2016 Q1–2023 Q3</p>






## Unemployment rate










Country	Definition	Source of data outturns	Source of forecast	Sample periods
<b>Bank of England</b>	Average rate of unemployment as measured by the ONS Labour Force Survey	Up to 2023 Q2, Series MGSX – Labour Force Survey, ONS. For 2023 Q3, Bank staff provided the internal estimate that was incorporated in the February 2024 MPR	Monetary Policy Reports	1QA: 2015 Q2–2023 Q3 1YA: 2016 Q1–2023 Q3 2YA: 2017 Q1–2023 Q3
<b>Federal Reserve Bank</b>	Average civilian unemployment rate in Q4	US Bureau of Labor Statistics	Summary of Economic Projections	1YA: 2016 Q4–2022 Q4
<b>Norges Bank</b>	Average rate of unemployment as measured by the Labour Force Survey	Statistics Norway	Norges Bank staff provided forecasts used in the Monetary Policy Report	1QA: 2015 Q2–2023 Q3 1YA: 2016 Q1–2023 Q3
<b>Reserve Bank of New Zealand</b>	Average rate of unemployment as measured by the Household Labour Force Survey	Statistics New Zealand	RBNZ staff provided forecasts used in the Monetary Policy Report	1QA: 2015 Q2–2023 Q3 1YA: 2016 Q1–2023 Q3

<b>Riksbank</b>	Average rate of unemployment as measured by the Labour Force Survey	Statistics Sweden	Riksbank staff provided forecasts used in the Monetary Policy Report	1QA: 2015 Q2–2023 Q3 1YA: 2016 Q1 – 2023 Q3
			The comparative analysis used the following MPRs: <ul style="list-style-type: none"> <li>• 2015–19: February, April, September, December; and</li> <li>• 2020–2023 Q3: February, April, September, November.</li> </ul>	
<b>External forecasters (UK)</b>	Annual rate of consumer price inflation	Up to 2023 Q2, Series MGSX – Labour Force Survey, ONS. For 2023 Q3, Bank staff provided the internal estimate that was incorporated in the February 2024 MPR	Bank of England’s Survey of External Forecasters (SEF)	1YA: 2016 Q1–2023 Q3 2YA: 2017 Q1–2023 Q3

1. Other contributors included: Giulia Mantoan and Jessica Verlander, who assisted on the comparative analysis of the Bank’s past forecasting performance; William Sayers, who provided research assistance; and Austin Royle and Peter Denton, who supported fact-checking the report.
2. Readers familiar with the general principles of central bank forecasting and the use of forecasts in policy and communication can skip Part I without loss of continuity.
3. For an example of the use of textual analysis in UK forecasting, see [Anesti et al \(2021\)](#).
4. The predecessor to COMPASS was the Bank of England Quarterly Model (BEQM), which in turn replaced a semi-structural model called the Medium-Term Macro Model (MTMM)
5. See [Burgess et al \(2013\)](#).
6. Rational expectations is the assumption that agents use all available information in forming expectations about the future, thereby avoiding forecastable errors.
7. More precisely, COMPASS features a monetary policy reaction function according to which the central bank adjusts the policy rate appropriately in response to inflation deviating from the 2% target (and in response to a measure of slack in the economy). Since it is assumed that the central bank is perfectly credible and committed to achieving its inflation

target, long-run inflation expectations by households and firms in the model are well-anchored at 2%. As a result, inflation will eventually return to target in simulations of the model.

8. See [Cloyne et al \(2015\)](#).
9. Between August 2019 and November 2022, the conditioning path was derived from the futures curves for the next six months, plus the assumption that prices remained flat thereafter.
10. [Stockton \(2012, recommendation 17\)](#)  suggested that the MPC vote on the forecast, but the recommendation was not adopted.
11. This statement is not quite correct, because the fan does not cover the entire distribution of possible outcomes; see [Mitchell and Weale \(2023\)](#) .
12. There are eight policy decisions in a year. A Monetary Policy Report, including an updated forecast, accompanies the decision only four times a year – in February, May, August and November.
13. Average word counts of the past four post-meeting statements as of November 2023 were as follows: European Central Bank 547; Federal Reserve 296; Riksbank 476; Norges Bank 338; Reserve Bank of New Zealand 332; Bank of Canada 532.
14. The Federal Reserve releases a report on monetary developments only twice each year, in conjunction with the statutorily required testimonies of the chair before the Fed's congressional oversight committees.
15. For a useful recent review of forecasting procedures and outcomes at the Bank of Canada, the Federal Reserve, and the European Central Bank, as well as the Bank of England, see [Binder and Sekkel \(2023\)](#) .
16. Lately there has been a greater tendency for the Fed to describe aspects of the staff forecast in the meeting minutes.
17. Staff of the European Central Bank face the unique problem of reconciling forecasts for the euro area as a whole with forecasts for individual member countries made by national central banks. As a partial compromise, forecasts in March and September are produced by ECB staff alone, while June and December forecasts combine the efforts of ECB staff and the staff of Eurosystem national central banks. The June and December forecasts include projections for individual countries as well as for the euro area as a whole.
18. Previous studies, including [IEO \(2015\)](#), have reviewed the Bank's forecasting record before 2015.
19. In a recent comparative study, [Håkanson and Laséen \(2024\)](#)  also found that recent forecasting performance was quite similar across central banks, with the UK not an outlier ('the ten central banks we study have been largely equally good or equally bad').
20. The Bank of Canada did not forecast inflation or other macroeconomic variables during the pandemic-affected quarter 2020 Q2. Our statistical comparison of forecasts below simply omits that quarter for Canada, which, given the volatility of the period, may lead to some overestimate of that central bank's accuracy in quarter-ahead GDP and inflation and year-ahead inflation forecasts.
21. We thank IEO staff for co-ordinating the collection of these data.
22. Two year ahead forecasts, although even noisier as expected, tell a similar story and are excluded here. Also, see footnote 20 regarding Canada.
23. The reasons for the Bank's miss in 2022 Q4, and for similar misses for growth and unemployment noted below, reflected in part problems with its forecast conditioning assumptions. See Part IV.
24. Low response rates in the unemployment survey led the UK Office for National Statistics (ONS) to temporarily suspend issuance of official unemployment data in the second half of 2023.
25. For more details on the methodology of the survey, see [Boero et al \(2008\)](#) .

26. The reference to 'measured' unemployment is important. As in most countries, unemployment statistics in the UK were subject to various ad hoc adjustments during the pandemic period.
27. [Stockton \(2012\)](#) , page 7, made this point in his earlier review.
28. We heard in a few interviews that in the past the staff organised 'forecast challenge' meetings to air alternative views. Meetings of this type, supported by systematic analysis, are what we have in mind.
29. Material in the 2015 transcripts, released in 2024 per the recommendation of [Warsh \(2014\)](#) , includes internal staff reports on forecast misses that are still more detailed and quantitative than the MPR summaries. These analyses could be a useful starting point for regular assessment of the sources of forecast errors.
30. [Stockton \(2012\)](#)  (recommendations 7 and 9) raised similar points.
31. Research by PhD staff typically appears first in the Bank's working paper series, accessible through the Bank's website. A public blog, [Bank Underground](#) , summarises selected research findings.
32. Alternative scenarios already play a large role in the Bank's financial stability functions (eg, in the construction of bank stress tests and in assessing tail risks to the financial system).
33. Following another recommendation of [Warsh \(2014\)](#) , transcripts of the meetings are released with an eight-year lag, with the first release having been in January 2024.
34. Using language that we heard several times in interviews and at the Bank, the MPC's focus on the forecast as a communication device raises the question of whether the forecast is an **input** to the policy decision or a **joint product** with the policy decision (meaning that the MPC sees the goal of the forecast to be as much rationalising as informing the policy decision).
35. More ambitiously, multiple simulations of the forecast using 'draws' from the historical distributions of the exogenous variables (a so-called Monte Carlo approach) could provide estimated distributions of the range of outcomes for the economy. However, such exercises are typically computationally challenging and are invalid if the underlying distributions of the shocks are not stable.
36. As discussed above, the possible exception is the situation in which the constant rate scenario provided by the Bank is a plausible policy strategy; but this exception, which interviewees told us was often useful, illustrates the benefits of communicating through alternative scenarios.
37. [Stockton \(2014, recommendation 12\)](#)  also recommended publishing alternative scenarios.
38. The monetary policy response to alternative scenarios could be calculated initially by the staff, using for example an estimated policy rule or an optimal policy calculation. A simpler though less informative alternative would be to report the effects of the alternative risk scenario without a monetary policy response. This exercise would help calibrate the risks around the forecast (even as it overstates them) but provides no insight regarding the monetary policy reaction function. [Goodhart \(2023\)](#)  recommends using alternative scenarios, with endogenous policy responses, in place of point forecasts. See also [Bordo et al \(2020\)](#) .
39. [Knüppel and Schultefrankenfeld \(2017\)](#)  find that the Bank's constant interest rate forecasts and its market-based forecasts had about the same accuracy in 2010 and earlier, from which they conclude that the choice of conditioning rate path is not important. However, the study is a bit dated; and, as the Bank does not use its own rate projections in forecasts, a direct comparison of that case with the other two cannot be made. In any case, the issue is not necessarily whether a given conditioning assumption results in the most accurate forecasts but whether the forecasts that are released represent the current views of policymakers, who base policy decisions on their own outlook at each point in time.
40. [Monetary Policy Report - November 2022](#).
41. In his November 2022 post-meeting press conference, the Governor highlighted the dependence of the forecast of a

long recession on the standard assumption about future rates, noting that in the constant interest rate scenario presented along with the central forecast, 'the depth of the recession is much shallower.' In response to a reporter's question, the Governor added, '...in a sense what we are saying is our best view of what the rate should be, given the circumstances and the evidence we have to date, is nearer to the constant rate curve than the market curve is to the constant rate curve currently.'

42. Yet another possibility, following the Fed, would be to have the staff prepare an unpublished forecast for use in policy discussions while MPC members make and release their own individual forecasts of rates and headline economic variables. However, this approach would have the substantial drawback of uprooting the longstanding collaboration of staff and MPC members in the development of a common Bank forecast, and for that and other reasons is not recommended.
43. An instructive example is the Governor's emphasis, in his November 2022 press conference, on the role of the standard conditioning assumption about policy rates in driving the MPC's forecast of a long recession. See footnote 41.
44. MPR footnotes to the fan charts explain how to read them but give no detail on how they are constructed. The most analytical discussion of fan charts appears to be [Britton et al \(1998\)](#), which describes the distributional assumptions underlying the fan charts. However, that article confirms that the width and skew of fan charts are primarily determined by MPC members' judgement, informed by discussion of potential risks and ideally (but not necessarily in practice) alternative scenarios.
45. Dropping the fan charts would eliminate the graphical depictions of the forecasted paths of the headline variables. However, the underlying data are available in a downloadable spreadsheet. We heard that these data are useful for some stakeholders, so it would be helpful if the Bank continued to provide this information in its supplementary materials.
46. A radical step to preserve mean forecasts would be to construct the whole forecast in terms of mean rather than modal quantities.