THE BERNANKE REVIEW

RESPONSES FROM BANK OF ENGLAND WATCHERS

KING'S College LONDON

KING'S BUSINESS SCHOOL

QATAR CENTRE FOR GLOBAL BANKING & FINANCE

THE BERNANKE REVIEW: RESPONSES FROM BANK OF ENGLAND WATCHERS

Edited by David Aikman and Richard Barwell

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CONTENTS

INTRODUCTION 5
David Aikman, King's Business School, and Richard Barwell, BNP Paribas Asset Management

SOME REACTIONS TO THE BERNANKE REVIEW 10
David Aikman, King's Business School

THE BERNANKE REVIEW – REPLACING THE FAN CHARTS 13
Dame Kate Barker, Independent Economist

FOUR ISSUES RAISED BY THE BERNANKE REVIEW 15
Richard Barwell, BNP Paribas Asset Management

TAKING STOCK OF BERNANKE: THE ORIGINAL SIN OF FORECASTING 20
Jagjit S. Chadha, National Institute of Economic and Social Research

A COMMENT ON THE BERNANKE REVIEW 23
Laura Coroneo, University of York

BERNANKE REVIEW – REFLECTIONS 26
Richard Davies, London School of Economics

FEW CHEERS FOR BERNANKE....30
Shamik Dhar, BNY Mellon Investment Management*

WORSE THAN A MISSED OPPORTUNITY....32
Chris Giles, Financial Times

THE GRASS IS ALWAYS GREENER: FAREWELL FAN CHARTS, WELCOME SCENARIOS 35
Charles Goodhart, London School of Economics

THE BERNANKE REVIEW: AN OPPORTUNITY TO GO FURTHER....38
Michael Grady, Aviva Investors

A REVIEW OF THE BERNANKE REPORT ON ECONOMIC FORECASTING AT THE BANK OF ENGLAND......42
David F Hendry and John NJ Muellbauer, Nuffield College, Oxford University

REFLECTIONS ON THE BERNANKE REVIEW 47
Dame DeAnne Julius (DCMG, CBE), Chatham House

THE BERNANKE REVIEW RISKS BEING A 'ONCE IN A GENERATION OPPORTUNITY' MISSED 50
Jens Larsen, Eurasia Group

BEST COLLECTIVE JUDGEMENT: GIVE IT TO THE STAFF 53
Jack Meaning, Barclays

TIME TO DISENTANGLE THE STAFF'S FORECAST AND THE MPC'S FORECAST? 56
Francesca Monti, UCLouvain

POLICY STRATEGY AND SCENARIOS: FIXING ONE BEFORE YOU CAN DO THE OTHER 59
Ben Nabarro, Citi

RESPONSE TO THE BERNANKE REVIEW 62
Katharine Neiss, PGIM Fixed Income

ON THE BERNANKE REVIEW 66
Ben Nelson

SOME THOUGHTS ABOUT THE BERNANKE REPORT 72
Adrian Pagan, University of Sydney

BERNANKE REVIEW: WHAT NEXT? PRACTICAL STEPS IN SETTING A PATH FORWARD 75
Sanjay Raja, Deutsche Bank

BOE REVIEW: UNCOMFORTABLE GUIDANCE 78
Philip Rush, Heteronomics

EIGHT PRESS CONFERENCES AND NINE DOTS 82
Jumana Saleheen, Vanguard

GO BIG OR GO HOME: IMPLEMENTED IN FULL, THE BERNANKE REVIEW IS A POTENTIAL GAME CHANGER FOR BANK OF ENGLAND TRANSPARENCY 86
James Smith, Resolution Foundation

THE BERNANKE REVIEW: FOOTNOTE 34 89
Helen Thomas, Blonde Money

THE BERNANKE REVIEW: A MISSED OPPORTUNITY? 92
Sushil Wadhwani

COULD DO BETTER…BUT IT'S NOT EASY! 96
Peter Westaway, Independent Economist

SCENARIO BASED BANK RATE GUIDANCE MAY RAISE UK RISK PREMIA 100
Tomasz Wieladek, T. Rowe Price

THE BERNANKE REVIEW WAS A HUGE MISSED OPPORTUNITY 104
Robert Wood, Pantheon Macroeconomics

INTRODUCTION

David Aikman, King's Business School, and Richard Barwell, BNP Paribas Asset Management

On Friday 12 April 2024, Dr Ben Bernanke, Nobel Laureate and former Chair of the Federal Reserve Board, published his landmark review into "Forecasting for monetary policy making and communication at the Bank of England". The remit for this report was 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…". The Bank has said that it will consider the recommendations in depth and will provide an update on proposed changes by the end of the year.

This book is a compendium of individual reactions to the Bernanke Review from a large set of prominent UK macroeconomists. It includes opinion pieces from both academics and economists working in financial markets and business; many are former MPC members or former Bank staff economists with experience in the forecast and model development process. Each author had complete discretion over which aspect of the Review to focus on; the pieces reflect the views of individual authors only and should not be taken to represent those of other contributors or the institutions they work for.

The Bernanke Review's recommendations

The Bernanke Review makes 12 recommendations covering: (a) the infrastructure the Bank uses for forecasting and analysis; (b) the use of the forecast in the MPC's decision-making process; and (c) the communication of the MPC's outlook and policy rationale to the public. The recommendations are as follows:[1]

R1. The ongoing updating and modernisation of software to manage and manipulate data should be continued with high priority and as rapidly as feasible.

R2. 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.

R3. 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 Bank's existing macroeconomic model].

[1] For conciseness, we repeat only the bolded text from the Bernanke Report's recommendations – except for recommendation 4, which we repeat in full.

R4. 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 (e.g., one-year) and longer-term (e.g., 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.

R5. 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.

R6. 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.

R7. 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.

R8. 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.

R9. 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.

R10. 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.

R11. 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. 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.

R12. 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.

Some themes in this compendium

You will find a range of views on all the key issues that the Bernanke Review touches upon in the contributions that follow. Sometimes our contributors differ in their degree of concern, or on some nuanced point of detail, but sometimes there are fundamentally different points of view. We think that this compendium is all the better for it.

We have no intention of providing a detailed review of what follows, for fear that it would distract attention from the individual contributions. The contributions are short and speak for themselves. However, we thought it would be helpful to flag five themes that repeatedly crop up across contributions.

First are the feelings of surprise and regret that we ended up in this situation. As Chris Giles puts it: “how on earth did the BoE’s management and governance arrangements allow its modelling to get into such a mess?”, or as David Hendry and John Muellbauer ask: “What was the Bank thinking (and doing) that such basic advice on data management and model development is needed?”. Jens Larsen asks how a process can “prove so change resistant, despite clear short-comings”. Rob Wood is not alone in concluding that more regimented and detailed parliamentary scrutiny of the Bank will be required going forward “to ensure the central bank does not get into this position again”.

Second is the qualified support for Bernanke’s recommendation to place more emphasis on scenarios. Tomasz Wieladek argues that “scenario analysis could be a very effective

addition to the Bank of England's forecasting framework and communication". Several contributors highlight the importance of considering and communicating the monetary policy response implicit in these scenarios. Ben Nelson concludes that "the most coherent package of changes would probably therefore be to deploy scenarios under endogenous policy". However, Peter Westaway reminds us that the market path is the "path which economic agents will be basing their current and future decisions on, and which will be embodied in asset prices" and hence "as soon as a different interest rate path is postulated, so the starting point in the forecast for asset prices today would 'jump'". Finally, Ben Nabarro worries about the impact on the internal policy debate: "discussions based on a range of economic scenarios could also make it easier for MPC members to 'duck' core strategic questions".

Third, are the mixed feelings around the demise of the fan chart at the expense of scenarios. Francesca Monti concedes that "it is undeniable, though, that the fan charts could be improved" and Kate Barker observes that the "the fan charts as constructed have probably outlived their time". However, Barker goes on to write that "scenarios, while useful, will be less readily adaptable to convey uncertainty about how known shocks feed through" and Charles Goodhart observes: "the number of potential scenarios is huge, and the choice of which scenario to adopt is, surely, even more ad hoc than the fan chart". Michael Grady is among several contributors who worry that "the removal of the fancharts and the quantification of the balance of risks seems a retrograde step" and "the Bank would do better to ensure it is explaining the forecast in the context of the fancharts and balance of risks, rather than eliminating them altogether".

Fourth, is the broad support for the principle of a staff forecast. Several contributors highlight the inherent tension in a forecast that serves multiple purposes and masters. For example, Helen Thomas argues "The central forecast simply cannot be both input and joint product. Bernanke would do better to demand the Bank pick one." Jack Meaning argues that the forecast is "caught between two objectives and not acting optimally as an input into the MPC's decision-making or as a communication device" and "the cleanest way to solve these issues would be to give staff ownership of the forecast, as happens at other central banks". DeAnne Julius concludes that "adopting this procedure would free up Committee members' time, make better use of their links to the outside world, provide more real-time input, promote a broader debate within the MPC meetings and thereby improve the decision outcomes, especially in times of major external shocks".

Fifth, is the sense of regret that the Bernanke Review did not make a formal recommendation concerning publishing rate paths. Jagjit Chadha observes: "the Bernanke review oddly stops short of asking for the publication of interest rate paths or fed-style dot plots, which would provide much more clarity on the management of risks". To be clear: there is not universal support for this idea across our contributors. Adrian Pagan cautions that "As we have seen in Australia, it is easily the case that, when the monetary authority

suggests a likely interest rate path, it starts being treated as what will happen, and decisions are made on that". However, many of our contributors are supportive of publishing a path of a dot plot. Laura Coroneo argues that "disclosing the MPC's expected path of future policy rates guarantees transparency and effective communication" and Jumana Saleheen notes "there is merit in the MPC members revealing their individual short and longer-run forecasts for inflation, growth and policy rates. That is part of the MPC's individual accountability to both the UK Parliament and the Public".

Finally, the following point struck us as particularly significant. It was made by a distinguished economist who was unable to contribute to this book but was happy to share the observation "The recent inflation jump was not the result of the way forecasts were presented. Rather it reflected economic judgements about the state of the economy and the impact of QE. Whether forecasts were discussed in terms of fan charts, scenarios or any other way, those judgements would have driven policy decisions".

We hope that you enjoy reading the contributions in this compendium. We look forward to discussing the issues discussed here in more detail at the annual ***Bank of England Watchers Conference***, to be held in London in late November, where there will be a session dedicated to the Review and how to take forward Dr Bernanke's recommendations. One interesting point made by Sushil Wadhwani that we should probably all reflect upon is that many of Bernanke's suggestions "will only be noticed by a tiny fraction of the British population who actually read the Bank's publications. It is a pity that the benefits of what Dr Bernanke recommends will only be experienced by this tiny cult rather than the broader population that we need to win back ". We hope to see you there.

SOME REACTIONS TO THE BERNANKE REVIEW

David Aikman, King's Business School

Ben Bernanke's long-awaited report into the forecast process at the Bank of England must have made for uncomfortable reading – and no doubt some embarrassment – for senior officials and staffers in Threadneedle Street. While the report falls short of recommending truly radical change, Dr Bernanke doesn't pull his punches when it comes to calling out serious shortcomings in the key infrastructure the Bank uses to construct its forecasts.

There is lots of food for thought for the Bank and Parliament in Dr Bernanke's lengthy report. The key suggested change is to abandon the Bank's forecast "fan charts", which attempt to describe the probability distribution of different outturns, and instead to augment the central forecast with alternative scenarios. The term "scenario" suggests fully articulated "what if" alternative outlooks for the economy, such as an AI-driven speed-up in trend growth. But what Dr Bernanke seems to have in mind instead is sensitivity analysis: projections designed to highlight the impact of varying key conditioning assumptions and highlighting parameter values that have material effects on the forecast profiles.

While the fan chart technology was clearly in need of a refresh, we should bear in mind that this device has long been a key part of a framework that has delivered exceptional performance for decades.[1] Fan charts are a particularly efficient way of communicating the central outlook, the degree of uncertainty, and the balance of risks. It will be interesting to see whether the use of scenarios improves the communication of these things.

The implementation challenges for the BoE and its staff of putting scenarios centre stage will be considerable. Let me highlight a few:

- Most obviously, can the Bank's models be relied upon to provide an accurate gauge of the behaviour of macroeconomic variables under the assumed scenario? Recall that the Bank doesn't use its macroeconomic model at all at present to generate the existing fan charts – they instead reflect a combination of past forecast errors and MPC judgement – suggesting it has some doubts about the reliability of its toolkit for conducting such exercises.
- How should the Bank choose the scenarios is decides to publish? Should they be purely ad hoc, chosen at the discretion of MPC members each round? Or should

[1] The Bank has been publishing the fan chart in its current form since February 1996. See Britton et al. (1998) for discussion.

they be the result of some process – e.g., model simulations designed to uncover the shocks that would create the most difficulty for the MPC?

- What should the MPC be aiming to achieve in communicating the scenarios it considers? Should the intention be to reassure the public that, even under a range of plausible alternative economic circumstances, the MPC has the tools it needs to meet the inflation target? Or should it attempt to convey the genuine uncertainty that exists, and the potential for volatility outside the MPC's control?
- How should the MPC be held to account ex post for its choice of scenarios? With fan charts, one could at least ask (as the Bank routinely used to do) whether over long periods of time inflation outturns are consistent with the various probability bands of the forecast. It's not at all clear how this can be done with scenarios.

The second question I'd like to discuss is what should be done to hold the Bank to account for maintaining the quality of its forecast infrastructure. It feels uncomfortable even to write this question down. This has obviously been a period of exceptional turbulence for the Bank to deal with, and with "all hands to the deck" it's understandable that investment in the forecast models and databases has been put on the backburner. But given the "serious deficiencies" Dr Bernanke describes in his published report, it's an absolute priority that those charged with holding the Bank to account get to the bottom of why this was allowed to occur. Something clearly needs to change.

One observation is that while there is a significant amount of scrutiny over the outputs of the forecast process – the accuracy of the inflation and GDP growth projections and the quality of the narrative provided by the Bank's senior officials in explaining the forecast – there is next to no interrogation of the machinery used to produce these outputs. The BoE has effectively been operating in a "trust us" environment.

It is strongly in the Bank's interest to foster greater external scrutiny over, and input into, its forecast process. One suggestion to support this would be for the Treasury Select Committee to appoint an independent advisory technical committee, comprised of external experts, whose role it would be to scrutinise the forecast policy infrastructure (i.e., the inputs into the forecast process – not the forecast itself) in detail at regular frequency. This advisory committee could be given the powers to request that certain scenarios are run, and to request that the results are published. It could also interrogate the way the Bank has chosen to recalibrate the model to incorporate MPC judgements and to address puzzles that arise in explaining the data.

My third point is the need to evolve the forecast process in a way that recognises the resources the Bank can devote to it – not just over the next year, where extra resources will clearly be brought in, but over the next decade. There is no point building state-of-the-art shiny new tools if the Bank lacks the resources to maintain such a kit.

One issue is how to evolve the modelling framework. Whatever the model, it's inevitable that some shock will occur that is not well captured, which the Bank's staff will need to find a way of incorporating at short order. In this respect, my view is that Dynamic General Equilibrium models like COMPASS and its predecessor BEQM are inherently more difficult to maintain and develop than models with looser micro-foundations. Their tight internal consistency is also their weakness. Models with looser micro-foundations – sometimes called "semi-structural" models – have a distinct advantage in that the modeller is not forced to provide a micro-founded description of the force in question, which by necessity will have to sweep away various real-world complications that may turn out to be important but impossible to capture in a tractable way. The Fed's FRB/US model is a good example of such a semi-structural model.[2] There's an important lesson to learn from the fact this model has been in use for around 30 years – updated and refined rather than replaced.

A second issue is the human resource capacity needed to maintain and develop the new framework. It's hardly a secret that the Bank's remuneration package is not at all competitive; as a result, it finds it incredibly difficult to recruit and retain the best and brightest.[3] While this has long been a problem for the Bank, it's become a much more binding constraint in recent years given the considerable increase in the house-price-to-income ratio in London. As an aside, Dr Bernanke's recommendations seem to implicitly suggest that the Bank should move towards a Fed-style recruitment model of economists with doctoral degrees. This has never been the model at the Bank and it's not clear a priori that such a route is preferable per se to recruiting the cream of the population of newly minted graduates. The most impressive colleagues I had during my time at the Bank were typically in the latter category. Either way, if there's no intention of changing the remuneration package for Bank economists, the Fed's staffing model is entirely out of reach. Should we not therefore scale back our ambitions for what the Bank can deliver?

ABOUT THE AUTHOR

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[2] See https://www.federalreserve.gov/econres/us-models-about.htm for details.
[3] The Bank offers a starting salary of c. £60k for an economist with a doctoral degree in economics; the comparable salary for an economist at the Fed is c. $200k.

THE BERNANKE REVIEW – REPLACING THE FAN CHARTS

Dame Kate Barker, Independent Economist

The tone of the Bernanke review is perhaps surprisingly critical given that it contains the key sentence, with regard to forecast accuracy: 'There appears therefore to be little basis for singling out the Bank from its peers for criticism.' However, clearly Bernanke believes all central banks should have done better through the successive shocks of Covid-19 and Russia's invasion of Ukraine. And there is much to welcome in the review, especially around the critique of conditioning paths.

The review covers forecasting and communication – my comments here will focus on Recommendation 11, which proposes the elimination of the fan charts, and by implication Recommendation 8 which proposes publishing scenarios.

Uncertainty is obviously inevitable in forecasts. But communicating it is uncomfortable. A key question is: 'what are you uncertain about?' It may be about whether the known shocks (large or small) which have just hit the economy will play out as expected. Or it may be uncertainty about the outcome of known future events – such as an election. And it may be uncertainty about future unknown shocks (with apologies to Donald Rumsfeld) – it is this third factor which makes the comment "this is a particularly uncertain time for forecasting" so empty.

Through the MPC's existence, the fan charts have been based, more or less, on the forecast errors of the past ten years. In the early 2000s the inflation fan charts were criticised by Ken Wallis for both bias and for showing too wide a range.[1] However the financial crisis demonstrated that outturns could indeed move in ways the charts had suggested were relatively improbable.

As a member of the MPC during much of the GFC, I participated in a decision to widen the fan charts. We judged it to be a period of greater than usual uncertainty in the first sense defined above – how would the shocks to the financial system play out through the wider economy. One problem was that at least while I was on the Committee it never seemed appropriate to say we were less uncertain. Looking back this may reflect the weakness that the way in which the basic chart was constructed did not really consider how the shocks of the past might relate (or not) to the shocks of the future.

[1] Wallis, K (2003) *Chi-squared tests of interval and density forecasts, and the Bank of England's fan charts* International Journal of Economics Vol 19, Issue 2.

How successful was this fan chart presentation at communicating uncertainty? The combination of the modal and mean paths receive a great deal of attention and are well-understood by financial market commentators and participants – both in terms of how the conditioning assumptions work and what any upward or downward 'skew' represents. Whether adjustments to the width of the fan chart conveys much useful information seems less clear. In addition, when the fan charts are very wide they can readily convey to the less informed the impression that the Bank does not know what it is doing.

On the whole, I agree that the fan charts as constructed have probably outlived their time. However, scenarios, while useful, will be less readily adaptable to convey uncertainty about how known shocks feed through – which could be quite well communicated through a fan chart, though not ones determined as at present. It is also never going to be easy to wean commentators away from the central path – and for that reason this should remain the focus of the MPC's work, and perhaps that path should still have a fan chart designed to consider how shocks feed through.

There will also be issues with the proposal as it is put forward for the scenarios. They will have one benefit, which is the ability to distinguish different uncertainties – in a way the fan charts unhelpfully tend to mash all the uncertainties together. But adopting different paths for fiscal policy, though occasionally desirable, would present very evident difficulties (is the Bank recommending this path? Does the Bank have inside information?). And regularly changing the scenarios would lead to questions about why a previous one had been dropped.

This final comment is an obvious one and applies to the whole review, and not just the discussion of fan charts. It was a surprise to me to read that some of the problems existing when I left the MPC in 2010, around the unwieldy nature of the forecast process and the pressures on staff, had not been resolved. But even when these issues are resolved, and communication is improved, the basic problem of an unknown future will remain. The Bank's correctly cautious response to this review will not and cannot solve this problem.

ABOUT THE AUTHOR

Dame Kate Barker is presently chair of the trustee board at the Universities Superannuation Scheme. She is also chair of the Jersey Fiscal Policy Panel, and of the Governing Council of the Productivity Institute. Since 2023 she has been a Church Commissioner for the Church of England. She has held roles as an NED at Taylor Wimpey plc, Man Group plc and the Yorkshire Building Society. She was a member of the Bank of England's Monetary Policy Committee from 2001-2010.

FOUR ISSUES RAISED BY THE BERNANKE REVIEW

Richard Barwell, BNP Paribas Asset Management

This note considers the arguments around: publishing rate paths; eliminating the fan charts and the mean forecast; launching another model development project; and, revisiting Committee judgements and the contribution of a staff forecast.

Publishing rate paths

Before turning to the substance, it is worth rehearsing the arguments for publishing an optimal rate path. An optimal path would embed significant unpublished information – about the Committee's assessment of the economy and the appropriate reaction function – and therefore its publication has the potential to move market expectations. Publishing a path is a more disciplined and effective way to move those expectations (and anchor financial conditions in the 'right' place) than the current approach of hints and qualitative signals. A commitment to publish a path would focus the internal discussion on what really matters (monetary strategy) improving the quality of the internal debate. The risk that the path is interpreted as a commitment could be contained by publishing it within a fan chart.

Bernanke stops short of making a formal recommendation that the Committee should publish an optimal rate path. The idea is "left for future discussion", presumably reflecting significant opposition to the idea within the Bank. But Bernanke is not in favour of the status quo. He recommends that less emphasis should be placed on forecasts conditioned on market expectations, because they can prove misleading. Conditioning on an arbitrary path (e.g., constant rates) wouldn't address that concern. Bernanke seems in favour of using scenarios which could embed "different monetary policy paths" – but the formal recommendation on scenarios doesn't insist on this point.

It is very hard to imagine a world where the Bank is simultaneously publishing interest rate paths for scenarios that the Committee believes are unlikely to happen but refusing to publish a rate path for the scenario that the Committee believes is the most likely to happen. Harder still to imagine a situation where one of those alternative scenarios becomes the new baseline and the Bank switches from the optimal path to the market path as a conditioning assumption.

It would certainly improve transparency – and perhaps the quality of the internal debate too – if the Bank published each member's assessment of the outlook and the optimal policy path. After all, the ultra-marginal ±25bp dissenting votes on Bank Rate only communicate

the direction, not the extent, of any disagreement. Unlike the FOMC model, these 'dots' should be attributed to individuals. Bernanke does not recommend an 'MPC dot plot', but he does suggest that alternative scenarios with different rate paths could illustrate points of disagreement. Once again, it is hard to imagine a world where dissenting members informally put their names to rate paths, but the majority does not.

Two outcomes seem plausible: either the Bank is going to start publishing the majority view on the 'optimal path' – perhaps alongside other paths – or it will not publish any rate paths. The latter seems more likely unless the incoming Deputy Governor for Monetary Policy shifts the internal view on this issue.

Eliminating the mean and the fan charts

Monetary policy should be based on the probability-weighted sum of all possible scenarios (the mean) and not the single most likely outcome (the mode). Policymakers need to think about the entire distribution of outcomes (unless the risks around the mode are conveniently perfectly balanced). The current process respects that orthodoxy by publishing a mean forecast alongside the mode and a fan chart to illustrate the range of possibilities.

Bernanke recommends important changes here: the fan charts should be "eliminated", and the mean forecast should be dropped.

Bernanke no doubt has legitimate concerns that "mean forecasts as currently constructed do not provide additional useful information", "the construction of the fan charts is uncomfortably ad hoc", "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 the fan charts' "communication value" is "low". Nonetheless, Bernanke could have recommended that more time and resources are spent locating the mean, calibrating the fan chart, and communicating what it means. The mean and the other fan chart parameters are undoubtedly extremely hard to pin down. The point is to have a process that forces you to think about what matters.

Bernanke recommends "more qualitative descriptions of risks and uncertainty surrounding the outlook" – i.e., the MPC should describe whether the mean is above or below the mode, but not quantify how far. The Committee will know, and BoE-watchers will understand, that policy should be set so that the mode is below (above) the target if the risks are skewed to the upside (downside) around that mode, but it will be unclear by how much.

Scenarios can help illustrate the risks around the mode, but they cannot help you locate the mean. Indeed, whilst scenarios will add value, they are no panacea. The probability of any specific scenario (including the mode) crystallising is very low. The calibration of any specific scenario is somewhat arbitrary – arguably more so the further we deviate from the mode. Moreover, the value in these scenarios will be limited if we don't know what is happening to monetary policy in each scenario. The differences in the paths for output and

inflation are very hard to interpret if you don't know the underlying differences in interest rates and asset prices (e.g., the exchange rate).

Bernanke's recommendations might be pragmatic, but they feel like a retreat from orthodoxy on optimal policy. The ramifications are likely to be particularly significant in atypical circumstances when a central bank switches into risk management mode. At that point, policymakers should be reweighting the probabilities that are attached to different outcomes that are implicit in the mean and explicit in the fan chart when they calibrate policy to reflect the perceived costs of different outcomes. But there will be no mean or fan chart on which to base that discussion under the new process.

A(nother) model development project

Another key recommendation is to undertake a major review of the forecast framework, and that "given the shortcomings" of the current forecasting model (COMPASS), a new central model "will likely be needed". Bernanke recommends a non-trivial set of features that the revamped framework should have, including: an institutionally realistic treatment of the transmission mechanism; modelling short- and long-term inflation expectations and allowing for the latter to de-anchor; detailed models of key sectors of the economy; and, greater attention to the supply side.

The decision over what type of model to build cannot be delegated to the staff. Bank leadership will need to reflect on what type of forecast process they want before the model development project begins in earnest. Indeed, the conclusions here should be a key element of the formal Bank response to Bernanke. No doubt the Bank will want to consult colleagues in other central banks, to tease out the pros and cons of different approaches, to clarify what will work best for the Bank. This is not the first time that the Bank has engaged in a major model development exercise during the MPC era – there was the BEQM project around two decades ago and the COMPASS project around a decade ago – so the current leadership of the Bank will surely want to consult their predecessors to learn valuable lessons about how to manage these projects.

Simplifying somewhat, the more that the Committee wants a forecast process that mirrors the debate in the academic literature and is rooted in micro-founded discussions about the true nature of the shocks and the deep structural parameters of the economy, the more compelling the argument for building a(nother) complex DSGE model (like BEQM). Alternatively, the more that the Committee prioritises working with a model that has a rich coverage of the economy (which becomes increasingly complex with the DSGE approach) and is comfortable making top-down judgements to forecast profiles without a specific structural interpretation, or to have discussions that can roam across various competing paradigms, the more it might make sense to build the forecast within a semi-structural model (like the MTMM) and carry out policy analysis in satellite models.

There are costs and benefits to each approach. Semi-structural models are certainly more tractable and can better explain the data. The Fed appears to manage perfectly well with FRB/US. But there were reasons why the Bank switched from the MTMM to BEQM – to obtain a well-defined steady state, stock-flow and flow-flow consistency and model-consistent rational expectations for all variables (not just inflation) to name but three. Christiano, Eichenbaum and Trabandt once quipped: "We'd rather have Stanley Fischer than a DSGE model, but we'd rather have Stanley Fischer with a DSGE model than without one." If the Bank opts for MTMM 2.0, then MPC members will need to think like Stanley Fischer and do more of the general equilibrium economics in their heads.

Meanwhile, the current model certainly comes in for criticism. COMPASS has "significant shortcomings", "its role in constructing the forecast has diminished considerably". It is disconcerting to learn of an "inability to capture fully some key channels of monetary transmission", that COMPASS "is no longer used to predict the effects of changes in interest rates or asset prices on the economy" and "the shape of the forecast is not significantly constrained by the a priori theoretical properties of this model". COMPASS appears to be primarily "a framework for aggregating the output of other models and human judgements and to ensure that key accounting relationships among variables are maintained".

The replacement for COMPASS will not be ready for many years. Meanwhile, the MPC will have to persevere with a framework that has been exposed to painful public scrutiny by a Nobel Laureate. The forecast should be the anchor on the policy debate. The MPC may need to be mindful about the risk of cross-contamination, to prevent the credibility of the policy process being impacted by the hit to the credibility of the forecast process.

Revisiting judgements

Bernanke warns about the risks of incrementalism: "the practice of basing new forecasts on previous forecasts, with marginal adjustments" and argues that "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". This recommendation is interesting because it goes against the grain of the staff's traditional input into the Bank's forecast process.

The primary role of the staff used to be to mechanically update the forecast that the Committee published at the end of the last forecast round with a neutral treatment of the news on economic data and asset prices. The forecast traditionally belonged to the Committee although Bernanke's description suggests more of a partnership: "staff and MPC members work together to put together the final product, which is approved by the MPC".

Bernanke recommends that the staff should routinely meet with the Committee to review whether "structural change, misspecification of models, or faulty judgements warrant

discrete changes to the key assumptions or modeling approaches”. If the Bank wants those discussions to be fruitful then it should consider the case for a ‘staff forecast’.

The discussion that Bernanke proposes would likely be more productive if both sides have skin in the game – i.e., if the staff maintains its own calibration of the main forecast model and accompanying forecast. A staff forecast should clarify what the staff really believes and the range and extent of disagreements with the MPC – information which could be news to the Committee if there is not a culture of ‘radical transparency’ at the Bank.

That staff forecast only has value if it is truly independent and the staff are ready, willing and able to defend it. The former may require both clear rules of engagement for internal MPC members (to whom the staff report) and perhaps delayed publication of the staff forecast. The latter may require progress on Bernanke’s recommendations around personnel policies: “fewer but more experienced and technically sophisticated staff members involved in modelling and forecasting”.

ABOUT THE AUTHOR

Richard Barwell is the Head of Macro Research and Investment Strategy at BNP Paribas Asset Management. Prior to joining BNPP AM in 2015 he worked as an economist an investment bank and before that for around a decade at the Bank of England, in various roles within the Monetary Analysis and Financial Stability Directorates. Alongside Professor Aikman, Richard is one of the organisers of the Bank of England Watchers Conference and editors of the Macroprudential Matters website, which publishes opinion pieces on all aspects of financial stability policy. Richard holds a PhD in Economics from the LSE.

TAKING STOCK OF BERNANKE: THE ORIGINAL SIN OF FORECASTING

Jagjit S. Chadha, National Institute of Economic and Social Research

The Bernanke Review of forecasting should be the start of a more profound discussion at the Bank of England.

While the Bernanke Review of forecasting at the Bank of England provides a welcome moment for us to assess the mistakes that have resulted from the current practices of the monetary policy committee (MPC), it should not be the final word. The original sin of economic forecasters is that they will always be wrong. Any honest producer of forecasts will make this point clear, as I have at every forecast release at the National Institute of Economic and Social Research since my appointment in May 2016.

Every consumer is therefore subject to caveat emptor, particularly if the forecast is the primary source of information for the deployment of Bank Rate. The MPC's job is thus less to produce a perfect forecast, as one does not exist, but to articulate and manage the risks to price stability. A fundamental problem at the Bank of England is that the MPC is both producer and consumer of the forecast. And in my view, a fundamental guiding principle that should underpin reforms of the forecast process at the Bank is that we must break that link decisively, as it sets up an unnecessarily defensive mindset, promotes groupthink and denies bank staff agency. Let us hand the production and ownership of the forecast to a better resourced and empowered Bank staff, who work more closely with the macro community in the UK, and then allow the MPC to be careful consumers who may wish to stress risks and responses in accordance with their own analysis.

What exactly were the errors in monetary policy setting as we emerged from covid? The Bank failed to understand that monetary and fiscal policy were continuing to inject demand into the economy, even while it was recovering from Covid. The Bank's own forecast in early 2021 expected strong growth in domestic demand and yet this did not lead to a change in monetary conditions until December. Furthermore, that stance of monetary policy, with ultra-low policy rates and a continuing expansion in QE, amplified emergent inflationary pressures. These would also be further amplified by the crimped supply side, already suffering from Brexit and the resulting compression in trade and investment. Although the Bank has finally decisively revised down its estimate of supply side potential, it remained worrying quiet on this question in the key 2021–22 period.

Given the gamut of uncertainties in modelling and understanding changing economic structure, it would be a mistake to try and push all risks such as these into some new

monolithic model. Indeed, focusing on that reform would excuse the MPC from any responsibility for previous policy errors and judgements, as it could argue that it did not have the right tools. Basically, it did. It would be far better to have been clear about risks in its communication and to have deployed scenario analysis that would provide much more clarity on the path of Bank Rate.

While scenarios look to be firmly on the agenda, the Bernanke review oddly stops short of asking for the publication of interest rate paths or fed-style dot plots, which would provide much more clarity on the management of risks. And while it looks as though we may be about to scrap the fan charts, if used properly these can convey the balances and magnitude of risks that face policy makers and can actually act to complement scenario analyses, which by and large will sit inside the fan charts. To me at least it is not a case of either or, as both can work side by side.

There are two observations I would like to make that the Bank and its watchers may wish to consider. During the interest rate normalisation cycle there were large and persistent errors in money market expectations of Bank Rate. This threw up two problems. It first suggested that the MPC were not communicating well the risks to price stability and the probable responses in Bank Rate. This started with the infamous misdirection of November 2021.

The second problem is that if the Bank conditions its forecast on mistaken market expectations, the forecast will itself be biased. We have to think carefully through what interest rate conditioning assumption we use – the current practice of market rates and a constant interest rate assumption further guarantees a forecast that will be wrong. Bank staff could easily generate paths for Bank Rate from their own modelling of the economy that correspond to different preferences on inflation or output without prejudice to the final choice made by the MPC. To some extent we have seen some of that with speeches that showed what would have happened to employment and output had Bank Rate sought to bring inflation back down to target quickly. Such a practice would be a more useful benchmark for the MPC.

At the same time, we can also note that the path of Bank Rate followed very closely that of the US federal funds rate. While it might be the case that the shocks and economic structures in the UK implied the same path as the Federal Reserve, it seems at face value unlikely. And this questions whether the MPC was willing to use its independence to the full extent, possibly feeling that it had to stay close to some notion of international norms and not stand out from the central bank crowd. It is tempting to ask what is the point of an independent central bank with its own floating currency if we are determined to shadow an external policy rate? Note that these two points are not especially model dependent; they are arguing for more explanation of Bank thought and openness about dissent, which reflects genuine uncertainty about the likely future path of the economy and the courage to

act. A model is at best a guide, but we still need to be wary of what direction it is sending us.

The Bank has a history of commissioning reviews every few years and then committing to implementing the recommendations. But this time should be different. The near loss of price stability and monetary policy credibility has been a risk too far for the UK economy – the price level is now some 14% above the level we might have anticipated in the middle of 2021 had the inflation target been met consistently over this period. That is a huge deviation and has shocked households and firms. And so, this review should be the start of a more profound discussion about how the Bank needs to reform its internal practices, encourage more internal and external debate, and interact more openly to respond to the failings we have observed. It should not be the end but a start.

ABOUT THE AUTHOR

Jagjit s. Chadha is Director of the National Institute of Economic and Social Research. He is the author of *Money Minders - the parables, trade-offs and lags of central banking*, published by Cambridge University Press.

A COMMENT ON THE BERNANKE REVIEW

Laura Coroneo, University of York

In the wake of the largest inflation surge witnessed by major developed countries in over two decades, the role of central banks in managing economic expectations has never been more scrutinized. The recent Bernanke review offers a fresh lens on the Bank of England's forecasting practices, providing a set of recommendations on how economic forecasts should be approached and utilized. My commentary focuses on three important themes highlighted in the review that warrant a deeper consideration, and that could reshape our understanding of the role of economic forecasting in monetary policy.

The imperfect science of economic forecasting

Firstly, it's crucial to acknowledge a fundamental truth that the Bernanke review underscores – economic forecasts are inherently flawed. The primary purpose of economic forecasts is to assist in decision-making; they are not and cannot be infallible. Indeed, as detailed in the review, all forecasters, both within and outside central banks, failed to predict the severe economic consequences of the shocks after 2019 in a timely manner. Still, 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. This perspective is vital in an era where the media and the public often criticize central banks for their "poor" forecasts, missing the broader value these forecasts provide. By emphasizing that forecasts are tools rather than objectives, the review calls for a shift in how we view economic forecasting. This perspective is crucial in understanding that the MPC's role is managing inflation risks, rather than producing accurate forecasts.

The imperative for routine forecast evaluation

Another important point raised in the review is the need for routine forecast evaluation in order to improve model specifications and forecasting methods. The review acknowledges that 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. However, it recommends learning from past forecast errors, especially those not stemming from unanticipated shocks. In particular, the review suggests that 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. The review's recommendation that these evaluations should involve both internal and external experts to improve the robustness of forecasting models looks promising. However, it is also crucial to acknowledge that this process must be rigorous and transparent in order to enhance public trust and monetary policy effectiveness.

Decoupling forecasts from market expectations

One of the review's most crucial points is the critique of the use of market expectations of future policy rates as conditioning information for the forecasts. Using market expectations of future policy rates is convenient, as it does not require the MPC to take a public stance on future policy. Yet, this approach has the potential to distort the Bank's economic forecasts, as market expectations may not accurately represent the views of the MPC, and indeed financial markets have often failed to predict central banks' actions.

However, while the review identifies the problem with current rate assumption practices, it stops short of providing an alternative. It notes the potential for adopting practices similar to those of peer central banks. Notably, replacing market-based rate paths with forecasts generated internally by the MPC, based on collective judgment or individual assessments, for example as the “dot-plot” used by the Federal Reserve System. This approach would provide clarity about the Bank's views of the path of policy rates reducing policy uncertainty. However, the review considers such changes as "highly consequential" and it recommends that decisions on this matter be reserved for future deliberations.

The review, therefore, only suggests some adjustments to the current practice, such as de-emphasising the central forecast based on the market rate path in the MPC communications and using alternative scenarios to provide additional information about the effects of alternative policy options. The suggestion of alternative scenarios seems promising, but this approach raises the issue of how these alternative policy options should be selected. Ideally, they should represent the views of the MPC, but then we are back to the issue of using rate paths internally generated by the MPC.

Disclosing the MPC’s expected path of future policy rates guarantees transparency and effective communication. However, if the Bank indeed views this option as too consequential, it should consider the alternative of Bank staff taking charge of the Bank's economic forecasts, freeing up the MPC to focus on managing inflation risks. This shift would allow using model-consistent paths for policy rates that do not necessarily reflect the MPC's views and foster a more open discussion about forecast evaluation among Bank staff. Overall, this simple but important change has the potential to enhance the accuracy of the Bank's economic forecasts and strengthen the overall effectiveness of its monetary policy communications.

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BERNANKE REVIEW – REFLECTIONS

Richard Davies, London School of Economics

As the money market fires of 2007 spread to engulf the banking system in 2008 many working on the policy response looked to America's 1929 crash and ensuing depression for lessons. For its analysis, Ben Bernanke's academic work stood out. But for the human stories—to glimpse the culture of the period—JK Galbraith's *The 1929 Crash* was the essential read. In reflecting on Dr Bernanke's review of forecast performance at the Bank of England, an old Galbraith book is helpful once again. There is a reason for errors and disagreement in economics:

"[Economists face] the problem of change. The ultimate subject matter of the physical sciences is fixed. That of economics, in contrast, is always in the process of change – the corporation, the labor force, the behaviour of the consumer, the role of government, are always in transition. This means that economics, if it is to avoid obsolescence, must adapt in two ways. It must change as new information is added or interpretation is improved. And it must change as basic institutions change." J.K. Galbraith, *Almost Everyone's Guide to Economics*, (1978), p17.

Economic views will and should differ, Galbraith says. He bemoaned perfectionist visions of the subject, emphasising the need for open minds: economists should embrace sociology, demography and geography, he thought. When it comes to the ideal culture in economics Galbraith's prescription is clear: flexibility, humility, and receptiveness to challenge are what is needed.

Infrastructure – moving to a cutting-edge system that provides public goods

Dr Bernanke's main concern was clearly the underlying plumbing at the Bank. He describes an accrual of ad-hoc software, underlining the need for 'data control'. These problems are cumulative – so the Bank should act promptly. Thankfully, good things appear on the horizon: the Bank now has dedicated oversight of this area from an Executive Director, a three-year strategy will be published this summer, and a new 'cloud' platform that will manage the Bank's data is in the works. This all welcome, but several steps are needed to lift the Bank to the position it should occupy, as frontier player, not a laggard, in these areas:

- **Automated data.** Models are only as good as the data that is fed into them. Dr Bernanke suggests this step should be automated leaving the caveat "to the extent possible". In terms of macroeconomic time-series there is no feasibility or cost constraint here: this step could be fast, simple and cheap. A new API—a piece of software that acts as a secure tunnel delivering data direct from source to the Bank's modelling teams is

needed. Models that start with an API call ensure comparable data is being used, save time, remove errors, and add transparency. Over time, the Bank should move to ensure that all of its analysis (charts, tables) related to the forecast are run from live APIs.

The Bank would be a natural home or lead partner in a publicly available UK macroeconomics API. There is a strong precedent for this: the Federal Reserve and Bundesbank both operate APIs, for example. (Another option, as used in Canada, is for the statistical agency to take the lead, with the support of the Central Bank). Such a tool could be built cheaply and quickly as the Economics Observatory's "Data Hub" project—which can deliver most of the macro variables used in COMPASS live to any user—has shown.[1][1]

- **Microdata – anonymisation and access**. Dr Bernanke states that the Bank's core model needs updating. The appropriate toolkit will be a matter of huge debate. From his longlist it is clear that the roles of (a) finance, and in particular micro-level (household and firm) conditions, and (b) and heterogeneity (both firm and household) will be most important [*Recommendation 4(d)*]. These classes of model use more complex statistics (often distributions) to 'discipline' the model; this, in turn, relies on microdata. But this data is (necessarily) held in secure-access databases (e.g. the ONS SRS) which are time consuming to access and difficult to extract data from. My concern is that this reduces the number of people that can engage with (run, comment on, fact check) the Bank's models.

  A *microdata API* should be developed. This tool would be more complex that its macro cousin, and take more time, but would be a huge win for the Bank, and UK in general, as it would draw in researchers from across the world. Such an API would feed out the needed statistics (often points on distributions) *without* the user ever seeing the raw data. Alternatively, it could use new techniques that create a synthetic version of the data—with the same properties, but none of the sensitivities—to be shared. Here, cross-institution work will be vital: in addition to its own microdata (on mortgages, its daily data on financial trades) there are essential datasets (from HMRC and DWP, for example) that the Bank needs. Given recent difficulties with the Integrated Data Service (a related attempt to share data between institutions) and with the UK's labour market data it will be necessary for the Bank to play a leading role here.

- **Computing power**. It seems likely that new generation of models will be computationally intensive. Taking heterogeneity seriously often means a larger 'state space', a more laborious optimisation problem and simulation exercises. It is worth noting that outside economics, the power of computers used has increased substantially.

[1] The ECO API is: https://api.economicsobservatory.com/{COUNTRY}/{SERIES}. For example, to retrieve ONS inflation data the user simply uses the following URL: https://api.economicsobservatory.com/gbr/infl.

In weather forecasting, for example, the UK's supercomputer contains 460,000 cores. If, as seems likely, new modelling approaches do require a step change in compute, this should (as in weather) take the form of a shared tool that the wider UK macroeconomic community can use. This would be a public good.

- **External input and funding**. Several of the infrastructure steps the Bank needs to take include outside parties. It would make sense to create formal vehicles for external input here, as part of the Bank's forthcoming plan. In particular, an external panel could help draw in experience from microdata users on how the Bank can best *access* (e.g. HMRC, DWP data) and *share* its own (anonymised) microdata. Just as with monetary stability in general the Bank would be providing public goods with these activities. So, a joint funding model, which could include Civil Service departments and research councils, should be considered.

Openness – a system that enhances challenge, both internal and external

The importance of fresh thinking—challenge, alternative forecasts, allowing big changes rather than incremental ones—came through as the unifying theme of Dr Bernanke's non-infrastructure advice [*Recommendations 5 to 11*].

- **The value of standardisation.** The Bank's has a unique mandate and will naturally tailor its tools to achieve that mandate. Likewise, the OBR. But are all the idiosyncrasies of UK forecasting bodies necessary, and could more be done to aid comparison, while protecting diversity of views? Consider what varies between institutions: the data used, the model, the frequency and dates on which the forecasts take place, the forecast horizon. Understanding exactly drives differences can be extremely hard when direct comparison is so difficult. [*Recommendation 5*].

  Outside economics standardisation is an important norm: in medical labs, in industrial manufacturing. One idea would be for the Bank (and OBR, and others) to *add* a new output in the background—a kind of 'UK Standard' forecast which they could share privately. This would not replace the main policy forecasts. But by running (different) models on the same vintage of data, over the same horizons and in their 'raw' (minimal judgment added) state would clarify precisely what drives differences, misses, and errors. This is not done at all in the UK, to my knowledge. As the role of microdata and AI increase, so the 'black box' nature of models will rise. Steps to make model comparison more scientific—one of these being running in a standardised 'environment'—may become vital.

- **Tools for power users.** The number of people who truly understand how models work in the UK is small and will likely shrink as a side product of the unavoidable (and necessary) evolution set out above. The practical truth is that even staff with relevant PhDs cannot always use the latest models and it is generally not possible for those taking policy decisions to adapt or edit models themselves in a meaningful way. Most

academics and specialist journalists are in the same position. The complexity of models has collapsed the number of people that truly understand them.

But there is a missing middle here. The Bank would benefit by building tools to establish a new kind of power user—a kind of 'modeller light'. Again, there are clear parallels from other areas: this is how computer science works, for example.[2] Such tools would allow academics working in adjacent fields (say, a demographer) and specialised journalists (the UK Economics Editors, for example) to 'play' with the models. They would not be writing the base code or equations, but could change assumptions, play with parameters and toggle channels off and on. In reality, this may have to be done with a "toy" or simplified version of the Bank's model, but developing such tools would increase engagement.

Conclusion

Galbraith said that economics "pre-empts the headlines, bears on everyone's life, anxieties and, if more rarely, satisfactions". In Britain, a good chunk of this bearing is the Bank of England. It is good that such a frank review of the Bank's forecast has taken place. In responding the Bank has an opportunity to build the cutting-edge data infrastructure befitting of it. If done properly this will create public goods and stimulate a new ecosystem of modellers in the UK.

ABOUT THE AUTHOR

Richard Davies is a Professor in Practice at the LSE's School of Public Policy and is director of the Economics Observatory and the Harvard-LSE Growth Co-Lab. He currently serves as an independent member of the Fiscal Policy Panel of the States of Jersey. In previous roles, Richard has been Chair of the Council of Economic Advisers at HM Treasury, an economist at the Bank of England, and economics editor of The Economist. At the University of Chicago, he was Executive Director of the department's new Economics for Everyone initiative. He holds a Chair in the Public Understanding of Economics at Bristol University and is director of the Festival of Economics, held in Bristol each year. He was a founding director and trustee of CORE, a charity which provides open-access resources for economics teachers and students in universities across the world. He holds degrees in economics from Oxford (BA), the London School of Economics (MSc) and New York University (PhD). He has taught economics at Oxford, Bristol, Chicago, and the LSE.

[2] The world's most important coding language, by far, is JavaScript. Yet huge numbers of coders do not use it directly, instead using libraries that sit on top of it allowing for simpler interaction with the language, e.g. React.

FEW CHEERS FOR BERNANKE

Shamik Dhar, BNY Mellon Investment Management*

The Bernanke Review is punchy but disappointing. Some of the recommendations – e.g. improving the forecasting infrastructure and involving PhD staff more closely in the forecast – make sense, but were issues when I was running the forecast process at the Bank 30 years ago! Maybe there is something more fundamentally institutional about the Bank's approach to forecasting that needs addressing.

My main concerns centre on the recommendations about the use of scenarios and the abandonment of fan charts. I'm a huge advocate of scenarios and think this is the most important recommendation of the Review. I use them to generate probabilistic forecasts here at BNYM, but they work best when thought of as internally-consistent 'stories' that are distinct from one another. Bernanke's definition of a 'scenario' sounds slightly different: variations on the central forecast based on different conditioning assumptions or parameter values. To me, a useful scenario incorporates different assumptions about the fundamental shocks hitting the economy, the nature of the transmission mechanism and the structural features of the economy.

For instance, in our latest quarterly forecast 'Vantage Point', we have an odds-against, but significant probability scenario called 'Second Wave', where inflation starts to pick up again and expectations of interest rate cuts this year are disappointed. In order to construct this scenario, we assumed the US economy was faced with a large and persistent aggregate demand shock, more confident households prepared to borrow or use accumulated savings to smooth consumption, loose financial conditions (as measured by a broad range of asset prices), all mediated through a labour market characterised by greater real wage resistance. A good scenario reduces the dimensionality of uncertainty by combining a number of factors to produce a plausible narrative that is very different from the central forecast.

Each of our scenarios generates forecast paths for key economic variables that are themselves the mean of a normal distribution of outcomes. We then probability-weight these distributions to generate normal mixture distributions that are typically highly non-normal. The variance of these distributions depends on the variance of the means (how far apart the scenarios are) and the means of the variances (how much uncertainty we incorporate into each scenario). These distributions are presented as fan charts for inflation, growth and asset prices that are consistent with one another, but also tell portfolio managers a lot about what the most likely outcomes are (how to position), how large the uncertainty is (what level of portfolio risk to run) and what the balance of risks is (how to hedge).

Of course, the issues are different for policy makers and I'm not advocating this approach – merely pointing out that it's perfectly possible to combine scenarios with informative probabilistic forecasts in a way that Bernanke doesn't seem to have considered. My own suggestion would be that the Bank forms scenario 'red teams', each of which is tasked with coming up with a plausible forecast scenario, using whatever technology they like, and that these scenarios are presented to the MPC at an early stage, who then decide which are the most interesting, credible and likely. The MPC-chosen scenarios should then be refined in further discussions with the committee and ultimately presented in whatever way the Bank thinks most effective. I'm sure the fine, creative minds there will come up with something as novel and powerful as the fan charts were.

I'm a 'fan' of the fan charts, and not just because I thought my good friend Erik Britton did a great job dreaming them up. Used well, they contain lots of information that should be useful to policy makers and, indeed, portfolio managers, which is why I use them here. The problem is, they haven't been used well, particularly in the past decade and, to quote Erik, 'if you design a hammer, but your successors choose to use it as a screwdriver, that's hardly the hammer's fault'.

* These are the personal views of the author and should not be thought of as representing the official position of BNY Mellon Investment Management or affiliated institutions.

ABOUT THE AUTHOR

Shamik Dhar is the Chief Economist of BNY Mellon Investment Management. Starting in H.M. Treasury as an economic assistant in the mid-1980s, he moved to Oxford Economic Forecasting and then spent most of the 1990s as a senior economist in the Bank of England, where he worked on the UK economic forecast in the early days of inflation targeting. He moved to Aviva Investors in 2000, ending up as a Head of Investment Strategy. In 2014, he became Chief Economist at the Foreign and Commonwealth Office. Shamik joined BNY Mellon as Global Chief Economist in October 2018. Shamik has a degree in PPE from Oxford University and a Masters in Economics from Queen Mary College, University of London.

WORSE THAN A MISSED OPPORTUNITY

Chris Giles, Financial Times

Ben Bernanke's report into forecasting and communication at the Bank of England called for a revamp of the central bank's main economic model. I was disappointed by its content and the suggested response from the bank.

This was a Nobel Prize-winning former Federal Reserve chair donning the mantle of a management consultant, recommending changes that executives already wanted to make, not asking searching questions and avoiding controversial recommendations that Bernanke clearly believed were necessary.

The first four of 12 recommendations relate to internal plumbing at the BoE as a response to "significant shortcomings" in its economic modelling. There is nothing objectionable about them and they will help improve the storage of data and quality of economic modelling.

The key unaddressed question here was how on earth did the BoE's management and governance arrangements allow its modelling to get into such a mess? This is something that Parliament should probe further to prevent it happening again, since the BoE court of directors clearly did not deploy its governance function adequately. Over to you, Treasury select committee and Lords economic affairs committee.

The fifth recommendation is extraordinary. It calls for the BoE to examine forecast errors carefully, "particularly errors that are not due to unanticipated shocks to the standard conditioning variables". The problem is that it expects all this should be done behind closed doors. It is not difficult to do it in public. The Office for Budget Responsibility does as do the better economic forecasters.

The BoE has again suggested that this is not something that the institution should look at in public. Governor Andrew Bailey hates to "do hindsight", as he said again on Friday when the report was published. This makes him look shifty. I don't think he is, but unless you undertake full forecast evaluation in public and show you have learnt lessons, people will not accept your partial account that forecast errors were due to Russia's invasion of Ukraine or data revisions.

Recommendation number six related to the deployment of staff in the modelling areas of the BoE and again demonstrated the dysfunction of the institution. It highlighted that around 35 per cent of the staff the BoE employs in the core area of modelling held PhD. Fantastic, you might think because the forecasting area of the Bank has access to those with the

highest qualifications. The problem is that the majority of PhD researchers in these areas were found to spend little or no time on the core function of the central bank.

This raised the question how the governance of the BoE had not noticed that it is employing expensive economists who seem to be using the Bank as a vehicle for academic research without the hassle of teaching students? Again, something for Parliament to pick up.

The remaining recommendations were public-facing and essentially called on the BoE to disown its own central forecast, insert some ad hoc scenarios and not much more.

Bernanke clearly wanted the BoE to address the key problem that the forecast is predicated on assumptions that the Monetary Policy Committee does not believe and therefore can give strange results that are impossible to explain publicly. "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," he wrote.

But Bernanke instead dodged the issue, saying a "change would be highly consequential and this report recommends leaving decisions on this issue to future deliberations".

By Bernanke's own reasoning, this makes his report inconsequential. I agree.

The solution of disowning the current central forecast and adding in some scenarios will lead journalists to ask: "What is the scenario for interest rates that would stabilise inflation at your target of 2 per cent?" It is a good question and needs to be asked repeatedly. My sense is that the BoE will dodge the question.

From the Bank's response, we have learnt that any action following Bernanke's report will be slow and likely to be small. There will be a further report by the end of the year outlining implementation plans. This is highly unlikely to address the conditioning path assumption and the need to give those outside the Bank a better sense of the reaction function of the BoE.

What people need to know is how is the BoE likely to respond to news and events. The evidence in the report shows that other countries that are more explicit about publishing optimal interest rate paths do not face severe problems. The public and financial markets do not see such information as a promise that binds the Monetary Policy Committee to a particular path of interest rates.

That MPC members keep saying they would feel bound to a previous published rate path shows they are not serious in assessing the evidence and suggests that their key motivation is to cover their backs when forecasts inevitably go wrong.

Following the review, the indications, therefore are that the MPC wants to disown the central forecast and provide some scenarios around it which are not conditioned on an alternative path for interest rates. This would be a step backwards for the transparency and legitimacy of the BoE in its forecasting.

If that is the outcome from the Bernanke review, it appears to stem from a misguided view in the BoE that the reputation of an economic institution is enhanced when people outside have less information on which to judge its performance and, hence, criticism will be more muted.

That misreads the modern world of communication. Criticism will come if performance is bad. If an institution is opaque and does not explain its thinking in public, the criticism will grow. That is the reason the BoE has faced difficulties in the past few years with its public reputation.

The solution lies in full transparency and showing all your working in public so you can explain why your views were reasonable at the time and what has changed. The Bernanke review appears to have been a missed opportunity to bring consistency and transparency into the BoE's modelling. If I am right, it will add to the reputational challenges for the Bank.

I hope I am wrong.

ABOUT THE AUTHOR

Chris Giles is the FT's economics commentator. He writes a fortnightly column and the weekly newsletter, Chris Giles on Central Banks. Previously, he was economics editor and served as a leader writer. He is an Honorary Professor of Practice at the UCL Policy Lab. Before joining the FT, he worked for the BBC, Ofcom and the Institute for Fiscal Studies.

THE GRASS IS ALWAYS GREENER: FAREWELL FAN CHARTS, WELCOME SCENARIOS

Charles Goodhart, London School of Economics

The first half of Bernanke's report, Recommendations 1 to 6, relate to the technical process of forecasting and back testing the cause of previous errors, on which I am not competent to comment. That said, I welcome the main revisions to the forecasting framework suggested in Recommendation 4. These being better models of the financial sector and the transmission mechanism, more realistic inflation expectations, causation from prices to wages as well as from wages to prices, and greater attention to supply-side elements. In order to achieve all this, Bernanke suggests the provision of additional staff and resources, see Recommendation 2. Central Banks are already employing a significant proportion of those really well skilled in macro-economics and macro-econometrics. I sometimes wonder what the longer-term implications may be of having so much research and forecasting ability concentrated in Central Banks.

But the main immediate proposal for the forecast is to drop using fan charts altogether, (Recommendation 11), and to replace them with alternative scenarios, (Recommendations 7 and 8). The critique of fan charts is slightly unfair, for several reasons. First, the Bank at times itself downgraded their use. For example, during Governor Carney's regime, the fan chart for inflation two years hence was kept at a constant width and zero asymmetry, i.e. no skew.

Second, as Bernanke correctly reports, page 77, "The charts receive little attention from the public and are rarely shown in media reports", but that is as much a failing of the public and the media as it is of the approach. Bernanke does not appreciate that public, politicians and media are looking to the forecasts to give them more guidance and certainty about what will happen, i.e. the central forecast, and are less concerned about possible risks and uncertainty. If they base their own positions on that central forecast, and anything goes wrong, they can blame the Bank!

So, if forecasting was to shift onto a central forecast with symmetric scenarios showing more, or less, inflation, then the scenarios would just be disregarded by public and media, as was the fan, concentrating on the middle, central projection. I shall return to this further below.

Then, again, Bernanke dismisses "the construction of the fan charts as uncomfortably ad hoc", page 76. But, in turn, the number of potential scenarios is huge, and the choice of which scenario to adopt is, surely, even more ad hoc than the fan chart.

A further problem with fan charts, which Bernanke notes, is that any sizeable deviation of inflation, or employment, from objective, would surely bring about a policy response, e.g. via interest rates, so the width of the fan chart, given unchanged interest rates, is exaggerated. Yes, but using scenarios, involving an endogenous change in interest rates, does not solve that problem. In particular, when developments in conditioning variables go astray, how soon should one assume that the central bank reacts? How far should one assume that the Central Bank has correct knowledge of the new, revised future path of that conditional assumption? Assuming that the Central Bank had an exact appreciation of the likely revised path of the conditioning assumption would imply far less deviations than would be likely in practice. Incoming data are often volatile and frequently revised; paths are bumpy. So Central Banks tend to be slow in responding to deviations both in assumptions and in model structure. But how slow should one assume the Central Bank reaction?

As already noted, there is a danger that any forecast with symmetric risk scenarios and a central projection in between, would find recipients concentrating solely on the central path, just as happened with fan charts. I have sometimes considered a forecast procedure omitting a central projection altogether, and just have two, or four, or any even number, of scenarios, with the Central Bank either suggesting what it thought the probability of these scenarios, or even leaving it to recipients to use their own judgment about that, leaving recipients, politicians and the press, to have to think for themselves about outcomes, and they would not like this. There would be such a howl of rage at the abandonment of a central projection, that it would not be politically feasible. So, how would Bernanke reduce excessive focus on the central projection? His suggestion, Recommendation 10, is "To put less emphasis on the central forecast and to.... cut back the detailed quantitative discussion of economic conditions in the Monetary Policy Summary in favour of a shorter and more qualitative description." One way to de-emphasise the central forecast is to call it a Market Reference Scenario, i.e. market, not official, projections. In some ways this feels like a retreat from transparency, perhaps reflecting that recipients are not sufficiently capable of appreciating the uncertainty surrounding any central forecast.

Another problem that Bernanke does touch on is that many of the practical risk scenarios are political in nature. For example, an obvious risk to world economic conditions is what might happen dependent on the outcome of the future US Presidential Election. But even if the Bank of England was to consider this internally, could it give two risk scenarios with a Biden or a Trump victory? Again, as Bernanke notes, the Bank has to use fiscal policy conditioning assumptions, usually based on the projections of the OBR, (page 69). Again, the Bank might consider what might happen if either the fiscal conditions were such as to

cause investors to lose confidence in debt sustainability, or alternatively, perhaps in order to forestall that, if the fiscal authorities tightened sufficiently to reduce such dangers. But could the Bank publish alternative fiscal scenarios?

The likelihood of recipients focusing unduly on the central projection would only be exacerbated if that were based on a proposed MPC-agreed future path of interest rates, rather than on the market rate curve. Both because of that, and the potential complexity of getting the MPC to agree a future path, (page 70), Bernanke suggests deferring such a change until after the new scenario-based forecast had been reasonably successfully introduced, and the central projection de-emphasised. In my view, such caution is entirely justified.

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Charles Goodhart is Professor Emeritus, Systemic Risk Centre, London School of Economics. Charles Goodhart's career has alternated between academia (Cambridge, 1963-65; LSE, 1967/68; again 1985-date), and work in the official sector, mostly in the Bank of England (Department of Economic Affairs, 1965/66; Bank of England, 1968-85; Monetary Policy Committee, 1997-2000). He has been a specialist monetary economist, focussing on policy issues and on financial regulation, and has written more books and articles on these subjects than any sane person would want to read.

THE BERNANKE REVIEW: AN OPPORTUNITY TO GO FURTHER

Michael Grady, Aviva Investors

The review of forecasting at the Bank of England represents a unique opportunity to more than just evaluate the Bank's approach to forecasting, but to consider what the best approach might look like when considering the broader context for the role of forecasting in monetary policy – both in terms of informing policy decisions and communicating those decisions. The Bernanke Review delivers twelve recommendations to improve the current process. Much of what is contained in those recommendations might be thought of as 'business as usual' activities – e.g. ensuring the Bank staff has access to data and systems to undertake the right analysis in a timely way; forecast model maintenance; regular review of model choice etc. All important and laudable recommendations, but ones that the Bank ought to always have under review. The more substantive recommendations relate to the two key considerations highlighted above – i) how the forecast is used in policymaking; and ii) how it is used for communications. This article therefore focuses on these two areas, where despite the somewhat timid recommendations, there is an opportunity for the Bank to go further.

A unique aspect of the MPC is the collective ownership of the forecast. This elevates the significance of it in the policy process in a way that cannot easily be achieved at larger institutions such as the Federal Reserve or the ECB. Indeed, in both of those institutions, the forecast is purely a staff exercise to be presented to the policy makers, with little feedback mechanism. As the Report notes, the long and variable lags in monetary policy make inflation targeting akin to inflation forecast targeting (Svensson, 1997). Putting the inflation forecast at the centre of the policy process is compelling. That might be done on an individual basis (and published as in the case of the Fed), but a collectively agreed forecast should be a more powerful basis for the policy decision and communication. But how can that be achieved when the production of the forecast lies not with the MPC, but with the staff (overseen by the Chief Economist and ultimately the Governor)? As the Report notes, the consequence is incrementalism and layers of MPC judgements built up over time. This is not a bug (as suggested in the Report), but a feature of the approach. If that is an undesirable feature – which if maintained and managed effectively it may not be – then a more significant change is likely required in the process of producing the forecast.

Model assumptions, parameterisation and/or shortcomings in the specification can be addressed through ongoing research and development. Certainly, as a minimum, the primary forecasting model needs to reflect the theoretical foundations that are broadly

accepted by the MPC, alongside the empirical reality of the historical data. It cannot be perceived as a 'black box' that almost defies practical understanding or interpretation.

But anyone who has produced economic forecasts knows that many judgements must be made in the process, many or most of which will be known only to the forecaster responsible. Simply undoing these every time a new forecast is produced would only result in another set of judgements having to be imposed on the model due to its imperfect representation of the world. At the end of the day, the model is best at providing structure and internal consistency, it does not in itself produce the forecast. So how could the forecast process evolve to deliver a better role in the policy debate and ultimately ownership by the MPC?

I have four recommendations relating to the internal forecast process. First, the Benchmark forecast presented to the MPC should be based on the Staff view of the appropriate judgements applied to the model given the latest available data. It would be the Staffs' preferred forecast. This goes further than the recommendation to be less incremental. It has its challenges, as it potentially puts the Staff in conflict with the MPC at the outset of each forecast round. But the resolution of that conflict should result in a better forecast and therefore a better policy discussion.

This might mean undoing past judgements, including those explicitly made by the MPC. These would need to be carefully explained but should reflect the fact that new information may have made past judgements no longer valid or reflect limitations in the model to a new development or shock.

Second, the Benchmark forecast should be just one of a number of alternative forecasts produced, each reflecting a different set of judgements regarding the propagation of the shocks or the assumed structure of the economy. The Staff ought to give consideration to the probability they attach to the Benchmark and alternative scenarios and explain those probabilities to the MPC. These probabilities ought to give some insight into the overall balance of risks to the forecast. Given time constraints, this could only be achieved if there was a de-emphasis on the detailed and often subjective accounting of news since the previous forecast (another feature of the incrementalist approach).

Third, the forecasts should be produced and shared with the MPC, both with and without the incorporation of a monetary policy rule in operation (using market-determined path in the case of the latter). This ought to be critical to the MPC's use of the forecast in the policy decision process. Of course, no simple model-based rule can capture the complexities of the policy decision now or in the future, but it can provide a baseline for those discussions. It can also form the baseline of a preferred policy path from the MPC to be imposed as a conditioning assumption for the forecast.

Fourth, the MPC should agree which scenarios they consider to be the most likely and how to weight those together to agree a central projection. I do not underestimate the practical

challenges created by this approach. It would likely require greater resources than the Bank currently utilises in the forecast process. It would also likely require more time for the MPC to both independently and collectively evaluate the forecast. But going back to the unique position of the MPC compared to other monetary policy makers, it has the potential to improve the policy outcomes in a way that others simply do not have the scope to attempt.

The second key element of the Review relates to the role of the forecast in the MPC's communication of the policy decision. Here the Review makes three substantive recommendations: i) the publishing of forecasts of alternative scenarios; ii) ceasing to publish the fancharts; and iii) ceasing to publish a quantification of the balance of risks via a mean and mode forecast. These recommendations seem somewhat in conflict. Publishing a number of alternative scenarios can indeed be helpful in articulating the uncertainty and the balance of risks. As noted in the Report, the Bank has done this on occasion in the past, and it is common practice amongst other central banks. It would add to the richness of the policy debate and should help with communications. It should therefore be supported. However, the removal of the fancharts and the quantification of the balance of risks seems a retrograde step. They are, after all, designed to represent the probability distribution of the full range of possible scenarios (of which the alternatives presented are just a sub-sample) and the MPC's views on the balance of risks – often a key factor in the policy decision. The Bank would do better to ensure it is explaining the forecast in the context of the fancharts and balance of risks, rather than eliminating them altogether.

Perhaps the most important potential change raised in the Report that did not result in a recommendation relates to the use and publication of a preferred policy rate projection. The Report dismisses it as too 'consequential' at this time. Here the Bank clearly has an opportunity to go further. The case for incorporating an MPC policy path into the forecast and communications has been put forward over many years in the academic literature, by other central banks and even from within the Bank itself (Vlieghe, 2019). I will not go through all the arguments again here, other than to note that the main objection in the past appears to have been concern that the public would interpret the path as a promise, which if reneged on could damage credibility. It is a concern that should be taken seriously, but is perhaps no less problematic than the current situation of interpretation of the market-based rates assumption (often reported as the Bank's forecast) and the implicit policy implications of an inflation forecast that does not return to target on a sustainable basis. The strongest arguments in favour of an MPC rate path are both to improve the internal policy debate (including on monetary strategy, which goes beyond the immediate policy decision) and to improve communications by providing a clearer description of how the immediate and likely future policy decisions would bring inflation back to target.

Another recommendation I would make is for the Bank to publish a detailed description of the main forecasting model, including the key modelling assumptions contained within it and the multipliers / impulse responses to a variety of real, nominal and policy shocks. The

model code and data should also be made available to allow for external analysis. The Report says that there are urgent changes needed to the main model (COMPASS) and how it is used with the broader suite of models. The development of a more effective main model gives the Bank the opportunity to be more transparent with those outside the Bank.

The Bernanke Review should be an opportunity for the Bank to make a break from the past. The forecast is not an end in itself. But it should play an important role. It should not be judged on its accuracy, but instead for the role it plays in delivering better policy outcomes. The Bank should go further in some areas, and less far in others, when considering the Review's recommendations. Ultimately, it should evolve the forecast process to deliver a better policy discussion, to improve the communication of the policy decision and deliver better policy outcomes.

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A REVIEW OF THE BERNANKE REPORT ON ECONOMIC FORECASTING AT THE BANK OF ENGLAND

David F Hendry and John NJ Muellbauer, Nuffield College, Oxford University

We welcome the 80-page report on modelling and forecasting at the Bank of England by Ben Bernanke, which should mark a major change of course by the Bank. The language of the report is diplomatic, but does expose some deep-seated failings, to which we will add a few more. The report had 12 recommendations with the aims:

"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 (Monetary Policy Committee) 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."

The report highlights some worrying issues that the Bank must correct, about its software, data facilities, econometric models, forecasting framework and policy communications. We consider the recommendations in order: see the introduction for their contents.

R1 and R2: What was the Bank thinking (and doing) that such basic advice on data management and model development is needed? It is in charge of monetary policy, requiring up-to-date information that can be rapidly incorporated into its forecasts. When recently challenged to test the Bank's model on the 1970s data, it threw up a smokescreen of `that is not relevant': really, a period with war, an energy crisis, a fuel price explosion followed by high inflation was not relevant? We thought that was to avoid the embarrassment of seeing the model fall apart, but maybe it also reflected a lack of modelling capacity and constraints on data access.

R3: COMPASS was developed when the Bank of England Quarterly Economic Model (BEQM, a dynamic stochastic general equilibrium—DSGE—system) failed badly in the 2008 Financial Crisis (and did not bend like Beckham). It was claimed at the time that BEQM was too cumbersome and that COMPASS, introduced in 2011, would be easier to use. However, the key problem was that the New Keynesian DSGE formulation on which COMPASS was also based, is fundamentally flawed. A plethora of new thinking about micro-foundations of macroeconomics in the context of heterogeneous agents and

evidence-based research, see Muellbauer (2022) p.237--238 for a brief birds-eye view, has fatally undermined the credibility of the New Keynesian DSGE. Moreover, research at the Bank already in 2015 revealed that COMPASS was pointing in the wrong direction, and like BEQM, performed badly over the financial crisis. Nor was that a surprise to us. In Hendry and Mizon (2014), we demonstrated the invalidity of the mathematical basis central to DSGEs, namely conditional expectations are not minimum mean-squared error predictors (as taught in elementary statistical textbooks) and the law of iterated expectations used to derive its equations requires the absence of shifts in the variables. When the means of variables change, the equations of DSGEs will shift, so the previous formulation will suffer systematic forecast failure until appropriately revised. This serious problem was summarised less technically in Why DSGEs crash during crises, and reiterated in our 2018 `Macro theory and models at the Bank of England' which also highlights a number of more detailed flaws in COMPASS. Key among these is the misleading account it gives of how monetary transmission works, omitting the credit channel, the cash-flow channel and the asset price channel. Muellbauer (2022) explains the relevance of these channels, how they differ across economies, and why they would be especially important in the UK.

The Bank has been adept at ducking aspects of reports it does not like: the Pagan report recommendation of developing an automatically selected small macro model was ignored, while those about DSGEs were adopted. In the meantime, the author of that report, Adrian Pagan advised the RBA 2018 to adapt their (non-DSGE) 'suite of models' into the common framework of a semi-structural econometric policy model that satisfies the various national accounting and sectoral adding up constraints of the data. The Bank of England is now in a small minority of central banks without such a model, a model type that has become widely adopted, especially since the financial crisis.

R4: The detailed recommendations on a revamped forecasting framework (a), (d) and (e) are all important, but why are they needed? Surely all Central Banks need a "rich and institutionally realistic representations of the monetary transmission mechanism, allowing for alternative channels of transmission". (b) is no surprise given Ben Bernanke's own recent publication; but (c) again reflects the Bank's unwillingness to adapt its models as a wage-price spiral was rigorously established in Castle and Hendry (2009) with a less technical summary, and shown to really matter for the persistence of inflation in Castle, Hendry and Martinez 2023.

R5: We welcome the comments on the need for regular re-evaluation of models and considering how structural change and model mis-specification may have contributed to forecast failure, including consideration of discrete changes to key assumptions and modelling approaches. Like the next recommendation, R6 on staff deployment, we worry that such advice is needed. However, several crucial aspects were not discussed which we follow up below under 'missing issues'.

R7: It was probably implicit that this recommendation regarding the use of scenarios would only follow a fundamental revamping of the Bank's modelling framework. Hendry & Pretis (2022) discuss what can go wrong in scenarios and what is required to validate scenarios. A scenario based on a bad model that would shift when the scenario change is implemented is often worse than useless. It is crucial (and relatively easy) to test the invariance of the relevant equations of the model on past data to changes in the policy variable. Most scenarios must be wrong, as at best one will reflect the resulting reality, hence it is hard to see how, with a bad model, that will help communicate the policy rationale. A single (or at least a very small number of) properly tested scenario(s) where the model in use is invariant to the change that the Bank intends to implement, published alongside a viable forecast (discussed below) might help illustrate the uncertainty and the likely impacts of a policy change. As the report indicates, *ideally* the selection of scenarios "would help the public better understand the reasons for the policy choice, including risk management considerations". Including simulations of the monetary policy response in each scenario would help markets understand the MPC's monetary policy reaction function.

R8: The comments on R7 regarding publication of scenarios apply: whether or not this would help depends on the invariance of the model to the relevant policy changes.

R9: The central forecast should indeed reflect the MPC's views of likely policies. Much of the discussion behind recommendations 7, 8 and 9 regarding the conditioning path of future interest rates is clearly relevant to the validity of the resulting scenarios.

R10: Replacing the market-based path for the policy rate with the MPC's own forecasts of Bank Rate seems sensible and avoids contradictions when there is a policy change. Adopting qualitative explanations in the policy statement (i.e., foredictions) would not preclude evaluating them.

R11: Fan charts can have a viable basis and can communicate the range of forecast uncertainty if the model is robust and has accurate variance estimates. The record of past forecast errors may do little to improve trust in the Bank, and would ideally need to distinguish between the impacts of large unexpected events (e.g., pandemics, wars etc.) which cannot be forecast, badly mis-measured initial flash data (as occurred during 2008), and flaws in the models or judgemental mistakes from MPC interventions.

Such a separation could provide a measure of the fundamental uncertainty faced by decision makers.

R12: Indeed. The recommendations can be summarised as, more data, better models with more flexibility (and an improved financial sector), more scenario analyses so a semi-structural model is going to be the way forward. Balancing theory and empirical evidence with theory as the null hypothesis can be undertaken easily in robust software while also testing for outliers and shifts that would otherwise distort parameter estimates.

Nevertheless, seven important issues are missing from the report: equilibrium-correction mechanisms (EqCMs) and their pernicious role in forecasting after shifts; the derivation of DSGEs (discussed above); robust forecasts; testing the invariance of models; the usefulness of the modelling framework for developing macro-prudential policy; and climate change.

EqCMs involving dynamic adjustment around an invariant long-run solution can be disastrous when forecasting after shifts as they revert back to the previous equilibrium mean. A startling example is the decade long seriously wrong forecasts for U.K. productivity by the Office for Budget Responsibility (OBR). This problem with EqCMs was highlighted by the forecast-error taxonomies in Clements and Hendry (1998), and Hendry and Mizon (2012) for open-models.

However, since a given model can be used in different ways to produce forecasts, transforms that are robust after location or trend shifts can avoid the resulting systematic forecast failure. Dramatic reductions are possible: e.g., using a smoothed robust version of the OBR model reduces the root mean-squared error by 75% in the decade after 2010Q1.

The lack of emphasis on the need for policy models and their forecasts or scenarios to be invariant to policy changes is a major omission, though we welcome the discussion behind R5 on model re-evaluation. Implicitly, this is a serious criticism of the failure, in recent decades, of Bank models to be tested and modified if necessary, which the report strongly recommends.

After the financial crisis, all central banks have focused far more than before on financial stability and have invested heavily in the appropriate governance and design of macro-prudential policy. Stress tests of the financial system and the design of interventions such as the 2014 decisions by the Financial Policy Committee to impose flow limits on high loan-to-income mortgages and an affordability test need to be simulated in a system-wide context. A policy model without a banking sector and a credit channel and transmission of policy through the housing market is not useful for this purpose.

Finally, although checking for the impact of extreme events is discussed, the need for the Bank to be prepared for those deriving from climate change is not. With UK commercial banks having made huge loans to fossil fuel industries, sudden legislation to offset the worst impacts of climate change could precipitate another financial crisis.

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REFLECTIONS ON THE BERNANKE REVIEW

Dame DeAnne Julius (DCMG, CBE), Chatham House

The Bernanke Review is a disappointment. It entailed a massive input of time and expertise and produced a substantial 75-page output. Many of its recommendations are sensible, but they are unlikely to have much impact on monetary policy making in the UK. In fact, they may have the unintended consequence of reinforcing 'group think' by further constraining the time and ability of external MPC members to bring outside perspectives into the process. And clear communication with the general public will become even more challenging with multiple scenarios. An alternative approach is outlined below.

Half of the Review's 12 recommendations are about updating and improving the Bank's use of data and its forecasting model. This is undoubtedly a good idea, but will it improve forecasting accuracy? Many specific shortcomings of the COMPASS model are identified. Yet the Review notes that the Bank's forecast performance is in the 'middle of the pack' and 'not significantly better or worse than those of others in the comparison group." Presumably some of the other central banks had more up-to-date calibration or models of a different genre and yet were also unable to accurately forecast the impact of external shocks (like the Pandemic or the Russian invasion) on domestic inflation. This is essentially because short-run econometric models, calibrated on past data, are unable to endogenously predict the impact of novel supply-side shocks. Judgemental overlays are required, however sophisticated the model.

Recommendations 7 and 8 make the case for developing and publishing alternative scenarios along with the central forecast to illustrate key risks (instead of using fan charts). The Review recognises that such scenarios would likely be misinterpreted if they did not include the MPC's policy response to a given shock. But this would represent a strong form of forward guidance that the Committee would find difficult to agree even if it were so minded to provide (which I doubt). It is no accident that monetary policy decisions become more data-dependent, and less forecast-dependent, when major shocks occur.

Scenarios in the form of simple sensitivity analyses around one or two variables in the forecast model may be helpful. Indeed, the Bank did publish such sensitivity analyses for energy prices and inflation persistence in previous years. To go beyond these and produce robust scenarios which trace the impact of a foreseeable shock through the many different channels of the forecast and with feedback from interest rate responses would require major time and effort by both staff and the MPC. It would also add to the communications

problem if the media understandably chose to focus on the more eye-catching scenarios rather than the central forecast.

Recommendation 9 highlights the problem of using forward market interest rates in the Bank's inflation forecast, but it does not propose any alternative. Better, or frequently repeated, explanations of the implications of both market and constant interest rates may help. But the constant rate forecast is more intuitive for many people – and easier to explain – because it shows in which direction rates are likely to move (all else equal). Few in the general public have any understanding or exposure to the market's yield curve, so using it as a conditioning assumption merely confuses most of the lay audience, including many journalists.

Recommendations 10 and 11 concern the Bank's communication strategy. It makes sense to cut back the quantitative aspects of presentations and to omit fan charts. This will certainly be necessary if alternative scenarios become a standard part of presentations. However, I believe that a more radical – yet simple - change in the monetary policy process and its public communications has been missed in the Bernanke Review. This is to shift ownership of the inflation forecast from the MPC to the staff of the Bank.

At present the published inflation forecast is endorsed by the MPC. It has been developed in consultation with the MPC members and it represents 'the best collective judgment' of the Committee. This is indeed the case as MPC members spend much of their time together in meetings that focus on the forecast. If additional scenarios are to be developed with the MPC, this will consume even more Committee time. Much of the discussion around the forecast is technocratic in nature, based on econometric tests of equations and relationships. Some external MPC members find this fascinating; others not so much. The economic experience and real-world contacts they bring to the process lie elsewhere and are often broader in nature. Time that could be otherwise devoted to external contacts and sources of information is squeezed by the demands of forecast preparation and 'quiet periods' around meetings. In this way, over time, the repeat game of negotiating a 'best collective judgment' every quarter adds to the problems of incrementalism and 'group think'.

To ameliorate these problems, the responsibility for the (new, improved) model and its forecast should be left with the highly capable staff of the Bank. This is the case at the ECB and the US Fed where the forecasts are produced by the staff "with little or no policymaker input". The policy making committee uses the staff forecast as input to their discussion and decision, but they do not spend prodigious time and effort debating the technicalities that go into it. They do not endorse the forecast as their own, nor does it play a major role in the communication of their interest rate decision. The rationale for the decision is made in qualitative terms, both in the written statement and in the subsequent press conference. Adopting this procedure would free up Committee members' time, make better use of their links to the outside world, provide more real-time input, promote a broader debate within

the MPC meetings and thereby improve the decision outcomes, especially in times of major external shocks.

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THE BERNANKE REVIEW RISKS BEING A ‘ONCE IN A GENERATION OPPORTUNITY’ MISSED

Jens Larsen, Eurasia Group

The Bernanke review is a substantial and thorough analysis of the Bank of England’s forecast and associated policy processes that, in places, provides critical, hard-hitting insights and clear recommendations. The recommendation that greater emphasis should be placed on scenario analysis will make a significant difference to the conduct of UK monetary policy, in particular when it comes to communication. That said, the review falls short of providing recommendations that will fundamentally alter the MPC’s forecast processes. In responding to the review, the Bank will have to go beyond the recommendations if the flaws are to be addressed.

The Bernanke review identifies critical shortcomings, including in the Bank’s IT and model infrastructure and in the way Bank staff are deployed to support the MPC and the forecast process. It demonstrates serious issues in the way that the MPC and staff handle forecast uncertainty, particularly in times of heightened fundamental uncertainty and structural change. And finally, it highlights that the MPC communication needs are poorly served by the current approach. In particular, the review identifies the emphasis on central projections, the fan charts as an expression of uncertainty, and the conditioning assumptions for interest rates and fiscal policy underlying the forecast as highly problematic. The review recommends that the MPC should consider using scenarios more extensively, whether with different conditioning assumptions including different interest rate paths, or with more fundamental forms of uncertainty including about the transmission mechanism of monetary policy.

The MPC’s inflation forecasts were not materially worse than peers. Despite all these identified shortcomings, the review concludes that the MPC’s forecasts were not materially worse than that of peers or of external forecasters. The issue is that the forecast process is not fit for the purpose of supporting the MPC’s policy decision or its communications with the public and with markets, not that the MPC or the Bank’s staff are particularly bad at forecasting. This is an important message that runs counter to the media narrative about the review.

Long standing issues identified. For a long-term Bank observer and a former member of staff, the review makes for occasional frustrating reading. Many of the issues—whether on the infrastructure side, staff deployment, MPC interactions, or with the communication of risks and uncertainty—are almost evergreens which could have been addressed long ago.

This particularly applies to Bernanke's observations on the role of the central projection, the communication of uncertainty and the use of market paths for interest rates as a conditioning assumption. How can a process that involves so many highly qualified, hard-working, and well-intentioned staff and policymakers prove so change resistant, despite clear short-comings, extensive debate and with peer central banks taking different approaches?

Marginal vs more fundamental process changes. The Bernanke review will hopefully strengthen the impetus for change, giving incoming Deputy Governor Clare Lombardelli a platform for making the necessary changes. That said, for all the identified shortcomings and all the recommendations, the review shies away from pushing the analysis to its conclusion, suggesting that the Bank should move gradually and leaving out suggested changes to the way the MPC interacts with the forecast. That runs the risk that the momentum for change will be lost, and that the Bank ends up implementing only marginal changes.

The MPC will need to make a Bank Rate forecast. Most obviously, the review does not recommend that MPC should replace the market-based path for Bank Rate with its own forecast, though it suggests moving gradually in that direction. It is not clear whether the reluctance to push for change is driven by the infrastructure inadequacies or by MPC resistance to embrace such a change. Either way, it is an opportunity lost: the argument in favour of this change has long been settled, and the review should have made such a recommendation.

The review does not express a view on whether the MPC role in the forecast process should be fundamentally changed. Compared to peers, the MPC is highly unusual in being so closely involved in the process and in "owning" the forecast; that ownership combined with the strong emphasis on MPC member's individual accountability invariably strains the process of agreeing a forecast. The forecast process has to accommodate both the need for internal coherence and Committee members' different views. That was never an easy task, and with multiple scenarios, each with different policy paths, that process will become even more complicated. Even with less clunky infrastructure, it will eat staff time and attention; and the MPC will continue to spend time managing a forecast process at the expense of discussing policy and communication.

Tension between individual and Committee accountability. The central issue remains that there is a strong tension between individual accountability on the one hand and conducting policy through a highly centralised forecast process on the other; arguably that tension between individual and committee accountability extends to the MPC's communications. This combined with the fear that an interest rate forecast is interpreted as a commitment by the press and the public is the underlying issue that makes the MPC's forecast process and communication challenging. Something may have to give.

Given Ben Bernanke extensive review of the experience in the US and elsewhere, his opinion on other ways of addressing this tension would have been valuable. As it stands, the risk is that the MPC will not consider changing these processes and stick to the review's recommendations; if they do, the changes may not go far enough.

Are there lessons for other central banks in this review? In some ways, the peculiarities of the Bank of England setup means that many of the conclusions are specific to the Bank, and the insights for other central banks and their forecasting processes may be limited; that said, some insights will carry weight elsewhere. In particular, the idea of de-emphasising central projections and using scenarios would seem to good practice that applies not just to central bank forecasts; so is the insight that a robust policy is one that performs well under several plausible scenarios, rather than "optimally" in the sense of precisely hitting the policy target under the central/modal projection.

Lessons for UK fiscal policy. The insights would have bearing on the UK's fiscal forecasts where the Office for Budget Responsibility (OBR) has experimented with scenarios, a practice that the review provides strong support for. That said, the OBR's central projections for fiscal deficit and debt five years hence, both massively uncertain, and the associated fan charts clearly play an outsized role in UK policy making, because of the way the fiscal framework is formulated: on the basis of the central forecast plus a fan chart calibrated on historic forecast errors, the OBR judges whether fiscal policy has a more than 50% probability of meeting the government's self-imposed fiscal rules; that assessment in turn defines the fiscal space available to a government. Bernanke's conclusions highlight the absurdity of using projections in this way, and an incoming government should consider a more robust approach.

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BEST COLLECTIVE JUDGEMENT: GIVE IT TO THE STAFF

Jack Meaning, Barclays*

There was plenty in the Bernanke Review that was commendable and should certainly be taken on by the Bank of England. Recommendations around updating and monitoring the forecast process and infrastructure to ensure best practice make sense to the point of being obvious; recommendations to allow staff to develop deeper, more specialist skills, rather than incentivising them to switch roles too often will work wonders for the human capital of the Bank; and the acceptance that the information encapsulated in the fan charts is more accurately and honestly characterised in a few written sentences is long overdue.

However, the terms of reference for the Review gave scope to go beyond purely the process and look at *'the role of the forecast in the MPC's decision making and communications'*, and it is here that it may have missed an important trick.

The Review correctly identifies that the forecast currently plays (at least) two distinct roles: as an input into the MPC's assessment of the economy and decision making, and as an output, to communicate the policy stance and reaction function. As all macroeconomists brought up on the work of Tinbergen will know though, a single instrument is only capable of effectively pursuing a single objective. As they stand, Dr Bernanke's recommendations do not help with that trade-off or force a choice.

In the current forecast process, staff bring a baseline to the MPC which is then adjusted and amended through layers of judgement determined by discussion with, and between, the committee. Importantly, the convention is that the MPC has ultimate ownership of the forecast and that it amounts to their 'best collective judgement'.

This is unlike other central banks. At the ECB, the forecast that is published alongside the policy decision each quarter is owned by the staff, not the committee. And at the Federal Reserve, the staff produce a forecast that is not published alongside the decision but is an input to the discussion, while individual FOMC members essentially publish their own forecasts quarterly.

This difference is counterintuitive, especially given that the MPC is one of the few central bank policy committees that has a decision-making process with individual accountability and publicly announced individual votes. The forecast is best collective judgement, but the decisions are individual.

This ambiguous dual objective and the convention of a best collective judgement forecast owned by the MPC drives a number of practical issues.

First and foremost, it creates a forecast that no single MPC member believes in. In fact, the old Inflation Report (now the Monetary Policy Report) had on its front page an explicit acceptance of this, saying: *"Not every MPC member will agree with every assumption".* More recently, a number of MPC members have publicly stated that their view on aspects of the economic outlook is fundamentally different to forecasts they have seemingly put their name to as part of best collective judgement just a matter of days earlier. This limits the extent to which the forecast can be a useful way of communicating the reaction functions of policymakers. Put another way, there is not one single MPC reaction function. By design, the MPC is made of 9 individually accountable members, each with their own reaction function and, as one would hope and expect of a diverse committee free of group think, these reaction functions may differ significantly. For market participants, it is these individual reaction functions that contain the most value and a lot of important information is lost in the averaging that arrives at a best collective judgement. The interesting bits are in the differences, and so the process needs to be designed to bring those differences out and explain them.

More than this, the process of arriving at a best collective judgement forecast can lead to internal inconsistencies in what results. The natural process of deliberation, negotiation and horse-trading among committee members – *I'll concede that we revise up wage growth if you concede that our forecast for equilibrium unemployment is too high* – runs a significant risk of turning 9 internally consistent views of the world into one that has assumptions that contradict one another, especially over time. These inconsistencies can mean that the value of the forecast as an input to the decision-making process is diminished. They also create confusion in markets which are trying to interpret the forecast as a whole and can ultimately damage the credibility of the MPC.

So, if the forecast as it stands is caught between two objectives and not acting optimally as an input into the MPC's decision-making or as a communication device, what can be done about it? Perhaps the cleanest way to solve these issues would be to give staff ownership of the forecast, as happens at other central banks, and pick a side, focussing on the value of the forecast as an input for the MPC.

From a decision-making point of view this would allow MPC members to focus on why they disagree or deviate from the staff's view, using the forecast as a neutral, internally consistent base to launch discussion from, without the complication of needing to see one's own view reflected. These differences, once uncovered, could be explored and expressed through scenarios, which Dr Bernanke's review rightly championed, without the need to taint the forecast itself.

From a communication point of view, staff-ownership would free the forecast from the secondary burden of trying to communicate the 'collective' policy reaction function. This role could be picked up by scenarios much more effectively. Each individual reaction function could be outlined in relation to the staff view, which would act as a neutral fixed point against which each MPC member differentiates themselves – *I think inflation will be higher than the staff view because of X* – for instance. These scenarios could be delivered as part of the quarterly policy report or, maybe more effectively, through speeches. These channels already exist and some MPC members have used scenarios in this way to good effect already. The difficulty has always been that to do so they must speak against a forecast for which they have taken collective responsibility. A staff-owned forecast would liberate them to use scenarios and explain their personal view much more freely.

Winston Churchill once famously said that if you put two economists in a room you would end up with two opinions.[1] The current forecast framework at the Bank of England denies this with the fiction that you can put nine economists in a room and come up with one forecast. This exacerbates the problem that the MPC's forecast is currently stuck between two objectives. Bringing in increased use of scenario analysis, as recommended by the Bernanke Review, is surely part of the solution. But to fully free the forecast, and help the MPC members to formulate and communicate policy effectively, a staff forecast is a crucial further step.

*This article is based on published Barclays research and evidence given to the Treasury Select Committee.

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[1] "... unless one of them is Lord Keynes, in which case you would have three opinions."

TIME TO DISENTANGLE THE STAFF'S FORECAST AND THE MPC'S FORECAST?

Francesca Monti, UCLouvain

The forecasting performance of the Bank of England and of other central banks around the world has taken a hit in recent years: this is hardly surprising, though, given the challenges faced by world's economies following the COVID-19 pandemic and the war in Ukraine. The Bernanke Review's focus on how forecasting can best support decision making and communication in "times of high uncertainty and structural change" is therefore spot on.

The Bank of England, like most comparable institutions, uses a suite of models to produce the forecast, and rightfully so. Models, like maps, serve different purposes depending on their design. As we might use a road map to navigate through the city and a cadastral map to document the boundaries of land ownership, similarly we need different types of models for nowcasting, forecasting, thinking about policy, stress-testing, etc.... The Bank's suite of models features COMPASS, a Dynamic Stochastic General Equilibrium (DSGE) model, as its "central organising model." Many were expecting a call to move to a semi-structural model, which facilitates the introduction of MPC judgement in the forecasts. Instead, the Bernanke Review very rightly put a lot more emphasis on the role of staff – explicitly in Recommendations 2 and 6, and implicitly in Recommendations 1 and 3 – rather than on the specifics of the models (Recommendation 4). I am delighted with this choice: I have always been convinced that what really makes the forecasting process resilient is to have skilled staff, who are able to update and develop the most appropriate models and techniques required to answer the most pressing questions arising from the economic conjuncture.

The Bank of England's staffing model differs quite strikingly from other major central banks, like the ECB and the Fed. Both the Fed and the ECB have a much higher number of research economists, who naturally have more experience using and building models. Second, research is more incentivised and rewarded at the ECB and the Fed. This means that, when a new issue appears on the horizon, it is much easier for the Fed or the ECB to find someone that has already done some thinking about the issue at stake and has truly useful insights. Bernanke's review is adamant about the need to reward expertise and research, so I was rather disappointed to see that staff composition and incentives feature in a rather muted way in the Bank's response to the review.

Another aspect that the Bernanke Review is bang on about is the rigidity of the current forecast process and in particular what is called “incrementalism” in Recommendation 5 – i.e. the practice of starting the forecast from the previous round’s forecast and only making marginal adjustments to it. The shared responsibility over the forecast, which is MPC-owned but staff-led, makes moving away from this type of rigid forecast process quite complex. The forecast, despite being produced by the staff, needs to reflect the MPC’s collective views, and there is no clear demarcation between model outputs and MPC judgments. The attempt to achieve consistency between forecasts of different rounds, which aids the communication between staff and MPC, actually limits greatly the way models are used in the forecast.

Starting each forecast round with a blank slate would allow for a more natural use of the models to analyse new incoming data, even if it might mean that the interpretation changes somewhat from one round to the next. It could help spot structural change in a more timely fashion, and it might even push the MPC to question in a constructive way their storytelling and their judgments.

Many commentators were expecting a recommendation to change the conditioning path for rates, possibly proposing a move towards something similar to the dot plot – a figure that shows the FOMC members’ individual projections for rates in the long run. The review points to the need to “de-emphasise the central forecast based on the market rate path,” but it does not, unfortunately, go as far as proposing an alternative. It only loosely points to the fact that other central banks publish either “endogenously generated forecasts of the policy rate” or devices like the dot plot. The institutional structure of the Bank of England’s forecast – which represents the MPC’s collective view, but produced by the staff merging models and judgement – makes it difficult to implement either of these alternatives.

A move towards a system in which the staff own and produce the forecasts and the MPC use it as an input for their policy decisions along with their judgment would achieve many of the recommendations in the Bernanke review, as well as many other benefits. It would create a clearer distinction between model outputs and judgments, which would help in monitoring their respective performance. It would also usher a more natural use of “endogenously generated forecasts of the policy rate” and dot plots. It would be a quite radical shift, though, which certainly goes over and above the recommendations of the Bernanke review, and is unlikely to be considered by the Bank.

The only point of the Bernanke review that finds me in strong disagreement is the recommendation to drop the fan charts, because quantifying the uncertainty around the forecast is important in helping the market understand the policy decision. It is undeniable, though, that the fan charts could be improved. At the moment they are judgmentally produced around the MPC’s forecast using a conditioning path (the market path for rates) that in not necessarily the one that nor the MPC nor the staff think is most likely. An

increased separation between staff and MPC forecasts would help with making the fan charts more informative as well.

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POLICY STRATEGY AND SCENARIOS: FIXING ONE BEFORE YOU CAN DO THE OTHER

Ben Nabarro, Citi

While individual MPC members are accountable for their votes, sound monetary policy depends on the formulation of a genuine 'best collective judgement.' This is more than the aggregated views of nine autonomous members. Instead, this means genuine deliberation, and the development of a common monetary policy strategy. In our view, the latter is becoming more difficult to formulate in light of supply shocks, but is also more important to ensure the best possible economic outcomes. While the Bernanke review's suggestion of scenarios may make it easier to communicate a given strategy, if substantively the key elements are not in place, the whole project is unlikely to succeed. And, at worst, could even enable further obfuscation.

Monetary policy, when working well, is based on a common view of what 'should' be done in a certain set of circumstances. This then provides a framing that can be internalised across the economy, improving the efficacy of monetary policy overall. In our view, such an 'ideal' is becoming both more difficult to achieve, and also more important. As has now been widely noted, the kernel of economic volatility is shifting from the 'demand-side' to 'supply-side' of the economy. In contrast to demand shocks, the policy playbook in such circumstances is more subjective. Policymakers face a trade-off between price stability and welfare maximising output.[1] 'Optimal' policy depends on state judgements – most notably the shape and stability of the Philips curve - but also a values-based judgement around the time over which price or output stability should be achieved.[2] Consistency is therefore harder to achieve. However, an economy-wide understanding of that same 'mapping' from conditions into policy also becomes more important. The sudden nature of many of these shocks means that any capacity for financial markets to pre-empt monetary policy in the event of these shocks is especially valuable.

In the face of a series of growing supply shocks in recent years, we think a consistent policy playbook remains difficult to decipher in the UK. Since Covid, we have struggled to understand 1) how the MPC thought about the economic impact of higher rates and 2) how

[1] Blanchard and Gali (2007): Real Wage Rigidities and the New Keynesian Model.
[2] Carney (2017): Lambda.

higher rates would subsequently generate better outcomes, given the sequence of supply shocks. Instead, 'strategic' considerations have been largely absent the MPC's public discussion – notwithstanding some notable exceptions.[3] And looking further back, we have seen supply shocks first treated passively – for example in the aftermath of the Brexit referendum. And then, in more recent history, suddenly very actively. While the latter is easily rationalised – for example if one assumes that the risk to inflation expectations is likely increasing geometrically with the level of inflation itself[4] – this case has never been properly substantiated. And if a supply shock were to strike again, we are unsure what criteria would determine the MPC's response.

The 'Bernanke Review' was set up in part to begin the process of filling this vacuum. The terms of reference note focus on 'the analytical framework for taking account of significant shocks and shifts on the supply as well as the demand side of the economy' – including, we assume, strategic policy considerations. However, while we think the report does rather a lot to address issues surrounding the technical underpinning of the forecast, and challenges around policy communication, on the substantive development of a cogent strategy, the report feels somewhat lighter.

Two specific points are worth picking out:

Firstly, alongside the issues above, the report suggests the basis of a strategy is further behind than even we might have hoped. The most notable deficiency here is the absence of a robust view of policy transmission. A clear mapping of economic conditions onto monetary policy depends first on the question of how monetary policy impacts the economy – especially inflation. However, recommendation four of the report includes reference to the need to develop a 'rich and institutionally realistic representation of the monetary transmission mechanism' – suggesting current work on the first element remains some way short.

While there is room for limited disagreement surrounding this question, the fact there is not a robust committee-wide view is a fundamental deficiency. At times, we think this has left space for some unhelpful 'improvisation' over recent years - with appeals made to mechanisms such as a direct link from policy to inflation expectations,[5] for which there is little evidence[6] in the UK's case. And, more fundamentally, the MPC has struggled to

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[3] See, for example, Pill (2021): Crossing the river by feeling the stones; Pill (2022): Monetary policy with a steady hand; Ramsden (2022): That was the year that was; Mann (2023): Turning Points and Monetary Policy Strategy (amongst others).
[4] This view has been set out by Beaudry et al (2023): The Central Bank's Dilemma: Look Through Supply Shocks or Control Inflation Expectations?, NBER Working paper.
[5] Mann (2022): Inflation expectations, inflation persistence, and monetary policy strategy.
[6] Mangiante and Masolo (2022) point to a link in firm expectations, although the sample period is too short to be substantive. Longer household expectations series generally show little statistically significant effect. Mangiante, G and R Masolo (2022). 'Do Firm Expectations Respond to Monetary Policy?', Bank of England Staff Working Paper.

articulate how precisely hiking policy would impact the inflationary risk. Instead, several different – perfectly cogent – views are identifiable. But this has felt some way from settled.

Secondly, and in response to several communicative challenges, the Bernanke review recommends the use of scenarios in policy communication. Here we think that until more progress has been made on the substance of the MPC's strategy, scenarios risk confounding as much as they inform. Here the report refers to the work of Lars Svensson[7] who noted that using scenarios – including both alternative policy paths as well as different structural assumptions – could deliver more robust policy making, including by evaluating different policy strategies in a variety of contexts. It is hard to disagree. However, the subsequent discussion of the report seems to emphasise the role of the scenarios primarily in evaluating alternative structural economic or conditioning assumptions. The issue of different policy approaches receives less emphasis.

Without a settled policy strategy, even if scenarios are accompanied by policy paths, the principle-based takeaway will be different to decipher. But more substantively, discussions based on a range of economic scenarios could also make it easier for MPC members to 'duck' core strategic questions, with differences instead masked by differing emphasis on alternative economic scenarios. While the fan-charts have their – now well flagged – drawbacks, they do at least force the MPC to come to a common view around economic uncertainty, and the skew of risks. The movement towards a scenario-based framework risks taking us further away from a common strategic discussion.

In a context of more frequent supply shocks, the development of a 'settled' policy mapping from economic conditions to policy is both more difficult, and more important. In recent years even the most basic questions of monetary policy strategy seem to have been left unaddressed, and this has made it difficult to rationalise and explain the MPC's policy approach. Employing scenarios, without first ensuring a more developed monetary policy strategy, may prove somewhat self-defeating, at least as a means to improve communication. And at worse, this could inhibit effective policy discussion.

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[7] Svensson, Lars E.O. (1997), Inflation Forecast Targeting: Implementing and Monitoring Inflation Targets, European Economic Review.

RESPONSE TO THE BERNANKE REVIEW

Katharine Neiss, PGIM Fixed Income*

In order to maximise the impact of the recommendations contained in the Bernanke Review, these should be implemented alongside a wider set of complementary and much-needed reforms. Set out below are measures that both the Bank of England and HM Treasury (HMT) should consider alongside the recommendations contained in the Review. These would serve to modernise the Bank and bring it into line with the US Federal Reserve and the European Central Bank (ECB). The collective of these suggested changes would deliver both immediate visible change, as well as a more long lasting evolution to the setting of monetary policy. In sum, they would offer a reset of the Bank's reputation, which is urgently needed.

My take on the Review

The Bernanke Review did not surprise with radical change. In keeping with the Terms of Reference, it is primarily focussed on technical aspects of the forecast and monetary policy setting processes. The most significant change relates to the analysis and communication of the Monetary Policy Committee's (MPC) uncertainty around its forecast.

As expected, the review recommends retiring the fan chart and adopting scenario analysis. This approach has been adopted at other peer central banks. More radical changes, such as moving to a staff forecast or adopting or an MPC rate forecast, were left for another day.

Given the more technical nature of the recommendations, the Report acknowledges that these will take time to be implemented. For example, investments are needed in software modernisation, data management tools, economic modelling, and staff development.

Limitations of the Review

To the outside observer, there is likely to be relatively little that will look and feel different to how the Bank works or sets policy as a consequence of this review, at least over the near term. Unlike previous such reviews (e.g. Stockton 2012), the Bernanke Review was motivated by the fact that the Bank of England had come under mounting criticism for the sharp pickup in inflation. The level of criticism was unusual, as the Bank has generally been well regarded both at home and abroad. Since then, inflation has fallen back, but the damage to the Bank's reputation remains. Indeed, media coverage on the publication of the Bernanke Review frequently focused on criticisms of the Bank contained within the report.

Given that backdrop, the slow-burn nature of the recommended changes on their own may not be enough to repair the public's perception of the Bank. As the review notes, 'monetary policy affects the lives of almost everyone'. Lack of confidence in the Bank impairs the ability of households and firms to plan for the future, acting as a drag on potential growth. In a low credibility environment, investors will require a premium to hold UK government debt. In light of the tight fiscal situation the UK finds itself in - combined with urgently needed public investments in the form of social care, sustainability and security - it is vital to restore the Bank's reputation as soon as possible.

Enhancing the Review

Below are a set of changes that the Bank of England could implement on its own initiative to enhance and amplify the recommendations contained in the review. Others fall under the purview of the HMT. Suggestions include 'quick wins' alongside longer-term investments such as those recommended in the Bernanke Review. As a collective, these could meaningfully shift the dial and help repair the constituency for an independent, inflation targeting Bank of England.

Changes for the Bank of England to consider

1. With immediate effect, the Bank should **hold a press conference after every policy meeting**. This was a recent change introduced by the Federal Reserve, announced in late 2018 and implemented at the start of 2019. The change helped underscore for markets that every Fed meeting was now 'live'. Holding a press conference after every policy meeting could help the UK for similar reasons. Indeed, Governor Bailey said in a recent interview that all meetings were now live, but markets continue to price a higher probability of rate cuts in forecast round meetings.

More generally, such a change would foster the view that the Bank is timely in its decision making process and responsive to incoming data. In other words, that the MPC will 'change its mind [on the setting of policy] when the facts change'. This is important because a key criticism has been that the MPC was too slow to act.

Finally, regular press conferences would support improved communications around changes to the forecast, as discussed in recommendations 8 and 9 of the report.

2. With immediate effect, the Bank should **commit to carry out regular, calendar-based internal framework reviews** (e.g. once every five years) of its forecasting and policy framework. This would mitigate the risk the Bank finds itself in a similar situation down the line. Regular, calendar-based reviews would help ensure the framework keeps pace with likely structural changes to the UK economy as, for example, its trading relationship with the European Union continues to evolve. This suggestion is in keeping with recommendation 4 of the report.

3. With immediate effect, the Bank should restart the important work it has done in the past on **including owner-occupied housing (OOH) in an appropriate measure of the inflation target**. Housing is the single largest monthly expenditure for most UK households. Its partial omission when it comes to owner-occupiers in the headline measure of inflation that the Bank targets risks undermining public trust in the overall framework. Previous Governors[1] have emphasised the importance of including OOH, however data availability has been the limiting factor. Now that the Office for National Statistics measure of CPIH[2] has obtained National Statistic status, discussions about bringing this measure formally into the inflation targeting should be seriously considered.

4. With immediate effect, the Bank should look to **elevate the work of the regional agents** as 'the eyes and ears of the MPC'. This would have multiple benefits. First, real time intelligence from agents around the country would help overcome the lagged nature of official data (see page 14 of the report). Second, more impactful use of the Bank's regional agents to explain MPC decision-making would enhance communication. Finally, through community outreach, regional agents can enhance openness and accountability such that the people of the UK have an opportunity to input and engage with the process.

Changes for UK government to consider

Having written on this topic previously[3], this section will be brief.

1. Grant the Bank of England **goal independence**. Building on the decision taken in 1997 to grant the Bank independence in policy making decisions, the government could consider giving the Bank freedom to decide on how it defines price stability. This would bring the Bank into line with both the Federal Reserve and the ECB. For example, subject to its findings on the inclusion of owner-occupied housing in inflation as discussed above, the Bank could decide to use the CPIH as a more appropriate inflation targeting measure.

2. Improve the **financial independence** of the Bank to underpin policy independence. Consider seriously the recommendation of the recent Treasury Select Committee inquiry into Quantitative Tightening to revisit accounting for profits and losses, for example in a way that is analogous to the deferred asset approach as deployed in the US.[4]

3. Reduce the risk of groupthink by **limiting external MPC members to a single term**. In recognition of the substantial start-up costs for new joiners to the Committee, the term

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[1] See for example *The rush to include housing in the UK inflation target*, Financial Times, May 2010.
[2] Consumer Price Index including owner occupied housing costs.
[3] See Portfolio Advisor (January 2024), *Giving the BOE its Mojo Back*. page 11. https://markallen.mydigitalpublication.co.uk/publication/?m=53027&i=813340&p=10&ver=html5.
[4] See House of Commons Treasury Committee Report on Quantitative Tightening, January 2024 https://committees.parliament.uk/committee/158/treasury-committee/news/199797/bank-of-england-has-taken-a-leap-in-the-dark-on-quantitative-tightening-treasury-committee-concludes/.

could be extended from the current three years, with the option to renew, to a single five-year term.

* The views are based on those of the author and are accurate at the time of writing, the views may not reflect the formal views of PGIM Fixed Income and are subject to change.

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ON THE BERNANKE REVIEW

Ben Nelson

Dr Bernanke has produced a thorough Review of the forecast and communication processes around the MPC's monetary policy that is both timely and credible. Its conclusions ring true, though many of the recommendations that follow also leave the route forward relatively open.

Assessing the record

The first important takeaway from the Review is that **the Bank's recent forecast performance should be taken in context**. Dr Bernanke debunks the idea that the Bank and its Monetary Policy Committee erred uniquely, relative to central bank peers and private sector expectations, in failing foresee the great inflation of 2021-23. Given the Review's subsequent and somewhat damning assessment of the Bank's apparently creaking forecast infrastructure, this could be seen as a towering achievement!

It is obviously not accurate to point to the UK's bout of price instability as evidence of the Bank's or the MPC's distinctive failings. The inflation experienced globally over the past three years was largely the consequence of a sequence of large, unanticipated – and almost wholly unforecastable – disturbances to global supply chains, global energy markets, and global food markets.[1] Seen in that context, the Review shows clearly that the MPC's inflation forecast errors were, in direction and scale, similar to peer central banks.[2]

What is more surprising is that in these exceptional circumstances, there has not been more Committee-wide discussion and communication of the appropriate monetary policy strategy to deal with such shocks, as envisaged in the Committee's remit. Even with perfect foresight, it is not at all obvious that a policy of absolute price stability would have been optimal over the recent period. But then again, the preferred strategy to meeting the inflation target, including at what horizon and with what trade-off, has not really been articulated publicly by the Committee as a whole either.[3]

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[1] See Bernanke and Blanchard (2023). See also Haskel (2023) for an application to the UK.
[2] Bernanke writes: "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 … they were similar to those of the other banks during the most recent period."
[3] The Remit states: "In exceptional circumstances, shocks to the economy may be particularly large or the effects of shocks may persist over an extended period, or both. … In forming and communicating its judgements the Committee should promote understanding of the trade-offs inherent in setting monetary policy to meet a forward-looking inflation target while giving due consideration to output volatility." Some MPC

Improving the forecast platform

The second takeaway pertains to the Bank staff's forecasting platform itself. The staff's central organising model – "Compass" – and its associated software, cops a fair amount of criticism from Dr Bernanke.

The overwhelming sense here is that investment in its maintenance and development has failed to keep pace with economists' understanding of how the UK economy works, practitioners' experience with the model's use, and with the evolving nature of the shocks that have hit the UK in the recent period. It should now be a high priority that significant investment in addressing these issues is undertaken, with complementary changes made to internal policies and procedures around staffing with a view to building and retaining greater technical depth and domain-specific knowledge.

It seems that integrated workstreams will be needed each for both: (a) model refurbishment, along with ongoing research and development; and (b) investment in the supporting data and processing infrastructure.

Model refurbishment, research and development

All models are 'wrong', but some are useful. In that sense, retaining a central organising model remains important because it is impossible to think about monetary policy and the economy in anything other than a dynamic, stochastic and general equilibrium environment. I mean this in a general sense: such an environment can contain many different economic features and mechanisms and it is an empirical question as to which need to be included. Dr Bernanke points to a key few of these that are absent from the current vintage of Compass.

In filling the gaps, however, it will be important to assess which additions would yield fundamental improvements in performance. 'Performance' here is multidimensional – it includes not just forecast properties vis-à-vis competitor models, but also the plausibility its causal mechanisms that allow policymakers to construct a central narrative from the observed co-movement in the data (including forecast errors), together with its comparative static properties, most obviously and importantly its characterisation of the monetary policy transmission mechanism.[4]

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members have sought to promote a greater understanding of the appropriate trade-off than aggregate MPC communication arguably has, e.g. Broadbent B (2021), Tenreyro (2022).

[4] Broadly speaking, the profession embarked on the DSGE route in the light of econometric studies claiming that the forecast performance of DSGE models was comparable to those produced by purely statistical approaches, the leading examples of which were Bayesian Vector Autoregressions. Yet DGSE models were also able broadly to replicate the dynamics of the monetary transmission mechanism and, while retaining their 'structural' foundations, could also be tools with which policy counterfactuals could be studied.

It should also be remembered that bigger, more elaborate models do not always produce better results, and it is very likely that the model refurbishment process will face trade-offs among competing objectives. Structural models can in principle be used to generate narrative interpretations of forecasts produced by purely statistical models, so some design trade-offs could be mitigated. In addition, parsimony and tractability are also attractive design principles.

That said, many of the 'blocks' of the existing Compass model that Dr Bernanke identifies as needing to be updated have well-studied and road-tested elements that can, with some investment, be brought into the extant framework in a relatively timely fashion if desired. This includes examples of work done in these areas by current and former Bank staff alongside academic contributions to the study of labour market disequilibrium,[5]housing market frictions,[6] financial frictions,[7] energy markets,[8] and inflation expectations formation.[9]

Beyond these, Dr Bernanke's Review points to a number of additional areas of improvement, importantly including the treatment of the supply side. Regarding both this and the preceding topics, it has to be emphasised that while there may be some low-hanging fruit, not all the answers exist 'off the shelf'. This speaks to the need retain a close connectivity between research in Monetary Analysis (MA) and the Bank's broader research agenda with any frontier work being done in these areas among peer central banks, academia and the private sector.

Investment in the supporting data and processing infrastructure

Within this workstream, it is obviously important to leverage the Bank's ongoing renewal of data and analytics strategy while better integrating MA's suite of models with each other and with a refurbished Compass. This must crucially anticipate a dynamic environment where new models will need to be developed, tested and deployed over time. In addition, a

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[5] The details of labour market disequilibrium have been incorporated into Compass-like policy models, with many references including Corbo and Strid (2020), building on Adolfson et al (2013), Gertler and Trigari (2009), Thomas (2008), Blanchard & Gali (2010), Gali, Smets & Wouters (2011), including applications of various of these approaches to UK data in Faccini et al (2011) and Nelson (2019).
[6] Housing market frictions, including long-lived mortgage contracts and associated regulatory policies have been examined in Garriga, Kydland & Sustek (2021) and Bluwstein et al (2018).
[7] Financial frictions and the role of banks as credit providers have been studied extensively including following Gertler & Kiyotaki (2010), Gertler & Karadi (2011), Gerali et al (2010), and in a UK context by Villa & Yang (2012), including with respect to QE in Harrison (2024).
[8] Energy markets and the role of commodity inputs into production have been examined by Blanchard and Gali (2007) and Gagliardone and Gertler (2023), and in the UK context by Harrison et al (2011).
[9] Further work on thinking about the expectation formation process remains an exciting and important analytical priority, with a research agenda needed to better understand and apply the insights of Reis (2023), Carvalho et al (2023), and others. Notably, it is already possible to capture non-rational expectations in the Bank's "Maps" framework, as originally envisaged in Burgess et al (2013).

revamped platform should aim for a high degree of inter-operability between models to enhance the efficiency of the process.

It is notable that largely open-source object-oriented languages have grown in popularity in recent years, likely reflecting a combination of computational robustness, an existing and growing library of open-source functionality, and the tantalising use of AI co-pilots to facilitate code and model development. A more seamless flow of data, model development and model outputs would broaden and deepen analytical expertise across the staff, in turn enhancing its ability to inform and challenge the MPC, making for better policy decisions over time.

However, it is absolutely crucial to anticipate and budget for ongoing expenses related to infrastructure maintenance. A one-off upgrade would leave the system vulnerable to falling behind the frontier once again in the future. Evidently a dynamic platform was originally envisaged when Compass and its infrastructure was rolled out (see Burgess et al 2013); what seems to have fallen short is ongoing investment over the subsequent period.

Scenarios and communication

The third lesson pertains to communication, including the recommendations that the fan charts should be discontinued and, alongside that, the MPC should make greater use of scenario analysis.

There are a few ways to think about scenarios and what they could be used to achieve, and their precise use is left somewhat open by the Review. One can think of:

1. Scenarios as illustrators of uncertainty;
2. Scenarios as illustrators of key mechanisms operative in the modal forecast, laying down markers for subsequent forecast error evaluation;
3. Scenarios as illustrative of alternative monetary policy strategies given a modal forecast;
4. Scenarios as indicative of what ‘off equilibrium’ outcomes would mean for monetary policy

If fan charts are to be dropped, it might be tempting to deploy scenarios in their place as a way to communicate about uncertainty, as per (1). Of course, fan charts themselves were originally developed with this communication purpose in mind. It is not obvious that scenarios used for this purpose would be an improvement. A scenario is presumably intended to be more than just a random but specific draw from a distribution of possible outcomes. Scenarios would not seem best thought of as particular instances of the more general fact revealed by the fan charts that ‘stuff happens’. Fan charts are better illustrators of that truth.

Instead, scenarios seem better conceptualised as either specific sequences of shocks, or alternative economic mechanisms (as encoded in alternative laws of motion for the economy), with a concrete narrative attached. To take an example of the former: what if we

had a sequence of easing in credit conditions similar to that seen in the run up to the GFC? To take an example of the latter: to what extent do wage dynamics reflect endogenous persistence arising from labour market tightness or inherited effects given the path for headline inflation? This suggests scenarios could be used to speak to (2).

In this setting, the Committee would have to agree on the key mechanisms it wants to study and quantify in its risk scenarios. However, a candidate list of these is already formulated during the forecast process in the so-called Key Judgements (also summarised in the Monetary Policy Report). One possibility then is to use scenarios to illustrate and, importantly, quantify the economic significance of these Judgements, putting quantitative markers down for how the Committee intends to assess whether the Judgements it has made are tracking or not. In this world the use of scenarios to track Key Judgements provides an ex ante framework within which quantitatively to interpret forecast errors ex post. Scenarios thus could be deployed as a way to reinforce information extraction and learning from the deviation of outturns from the Committee's modal projections.

A third alternative, under (3), is to hold the shocks and mechanisms generating the modal forecast fixed and allow instead monetary policy strategy to vary. In practice this would mean taking the baseline (conditional) forecast and replacing the conditioning path for monetary policy with some other description of the policy problem. For example, given the Committee's baseline projection, what would a scenario entailing greater monetary policy gradualism look like? What would a scenario with a more aggressive approach to returning inflation to target look like?

It is not clear that the Review intends scenarios to be understood quite in this sense, because this gets close to a 'preferred path' formulation for monetary policy in the forecast, on which the Review is equivocal. Hence (3) is related to the debate about the merits of this alternative 'preferred path' approach to the forecast. The degree of uncertainty around any projection for interest rates is likely to be very high, so although varieties of 'endogenous policy' assumptions would add a greater degree of coherence to the forecast and communication, the information content conveyed might not be particularly large, it being revealed mainly by revisions to the projected path for rates in response to news over subsequent forecast rounds.[10]

A final deployment of scenario analysis would be to combine (2) and (3) in illustrating the key risks to the forecast, as assessed and tracked via the Key Judgements, and showing the likely consequences for the path for short-term interest rates in response, as proposed in (4).

[10] Other asset prices, which would respond to alternative assumptions about risk-free rates, would presumably also have to be endogenised too, to the extent that the path for risk-free rates were not a sufficient statistic for the stance of monetary policy. It is not obvious that our modelling of risk premia in asset markets can currently capture all these relevant channels, particularly in foreign exchange markets, but also in long rates.

In other words, if a risk scenario materialises or a Key Judgement fails, the Committee would illustrate how it thinks about its preferred response.

Because monetary policy attains its stabilisation power via its systematic responses to inflation prospects, using scenarios to promote a greater understanding of the Committee's reaction function in this way could enhance the effectiveness of policy. The mechanism via which this would operate would be by encouraging a more efficient response of market pricing to unexpected developments. This could have been useful on some previous occasions.[11]

At the same time, if monetary policy is assumed to respond optimally to 'off equilibrium' risk scenarios, why is it not also assumed to go the whole way in optimising vis-à-vis both the 'off equilibrium' shocks and those that are used to generate the baseline modal forecast too?

The most coherent package of changes would probably therefore be to deploy scenarios under endogenous policy as in (4), around a baseline modal projection also featuring endogenous monetary policy. This would also be the most analytically challenging change to implement.

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[11] Including those around the Brexit negotiation period when short-term market rates appeared to become relatively insensitive to data developments, which the MPC eventually had to correct in a fairly direct manner.

SOME THOUGHTS ABOUT THE BERNANKE REPORT

Adrian Pagan, University of Sydney

We seem to be in an age of endless reports. Many of these are done to respond to some criticisms of business or government which are either getting increasing attention in the media or creating concern among the populace. So, a first question I always have about them is why there is one? Applying that question to this report one could ask (as it does) whether the MPC have failed badly in their central task of implementing monetary policies for the UK economy. The report appears to conclude that the MPC performance is comparable to five other central banks. Moreover, they are probably better than the UK private sector forecasters.

I did have some questions about the first comparison as one would think it would be necessary to relate the RMSE of forecast errors to the volatility of inflation and growth, rather than just the former, as the chosen countries seem to be subject to different type of shocks. But my guess is that such a correction would not change the conclusion much.

So, if the MPC is doing as well as it might, what are the concerns of the Bernanke Report (BR). These are revealed by recommendations which broadly relate to the process of forming the projection and the role of the staff who need to assist the MPC in formulating it. Modernization of systems, "group think" issues, proper deployment of staff, clearer criteria for promotion are all well discussed. To comment effectively on them one needs knowledge of the Bank of England structures today and not from two decades ago when I did my review, Pagan(2002). So I turn to comment on those items that relate more to the projection, its connection to policy decisions, and explanation of the forecast.

Generally, the BR takes the position that the MPC can communicate and arrive at their projections in a more informative way than they presently do. This is to be done with greater use of scenarios, de-emphasis on a central forecast – particularly that with market rate futures – replacement of fan charts with more narrative devices, dealing with any concerns arising from the MPC being uncomfortable with the conditioning information like future fiscal policy used by the staff in forming the projection, determining why forecast errors were made, and making clear in the MPR what the contribution of judgement by both staff and the MPC is to the published projection.

I must admit that I had a feeling of déjà vu as all of these difficulties have been around for a long time. The forecast failures of the 1970s led to the development of methods which aimed to find out what equation or equations were the source of the failure in the

projection. This is not easy to do in a system, often requiring a switch of the status of endogenous variables to exogenous. The bigger the model the harder this is to deal with. When one allowed for future expectations it was even more complex and took up an inordinate amount of time. One can see some of this complexity in the discussion of the model COMPASS. I have to say that I thought that the investigations rarely came up with much of use for specific equations. Mostly prediction failures were attributed to bigger picture themes of "inadequate supply side", identities not being respected, and "expectations are important".

As David Hendry has often said, when one looks at single equation prediction errors, intercept shifts were the main cause of forecast failure. Intercepts often absorb many quantities such as r*, the potential rate of growth, the NAIRU (or an equivalent) etc and so shifts in those might be the issue. Making models smaller and more tightly specified does help to check the source of prediction errors, but then it is much harder to capture the institutional detail that the BR feels is needed in any central model. I have no doubt that one should study forecast failure, but not too frequently. I think experience has been that the cost/benefit ratio is high for smaller central banks in respect to this.

Scenarios play a big role in the BR. A first reference was to a paper by Bordo/Levy. Scenarios here seem to be about what I would call "scary" shocks like pandemics, global meltdowns of financial markets, wars, and terrorist attacks. In those instances, one has little idea of how any projection might go wrong, so looking at some extreme outcomes makes sense. One would expect some commentary of this situation in an MPR. But later the BR seems to be more concerned about "fuzzy" shocks. The likely path of fiscal shocks in the covid pandemic is cited. Dealing with future and even very near fiscal policy has always been an issue. Even estimates made of expenditures and taxes can be quite incorrect. Perhaps it is worse today and more needs to be provided in an MPR about what the assumptions made about it are for the projection. An old response was to have a fiscal rule as the conditioning assumption that the projection is based on and to add judgement to that to capture likely any suspected deviations.

I think central banks have always done such scenarios in order to gauge the risks around a forecast. I do recall in the early 2000s that the process in place for deciding on the final projection asked the MPC what they saw as the three big risks to it and the staff then needed to investigate the sensitivity of the projection to them. One of the issues around that was how 9/11 would affect costs and that meant outside information needed to be found.

I feel that one of the central issues that does need to be addressed is the role of future expectations. This relates to the basic model(s) used for the baseline projection. COMPASS was to do that, but I learned from the BR that it seems to have been partially replaced with sectoral models of the type set out in the 2015 Working Paper by Cloyne et al. These models don't seem to have expectations but simply long-run relations connecting variables.

For some years I have been looking at the BoE web page to find what model is being currently used in the projection. The only reference I could find was to the COMPASS paper of 2013. It would be good if the BoE web page was more informative about the base model for projection than it has been. I therefore concur with the recommendation that the relationship between the 2013 and 2015 models needs to be "sorted" (to use an oft repeated word in parts of the UK). This may demand investment in a new model but perhaps not. If the MPC feels the current reconciliation works, it may just require tightening of the links.

The BR does not like the baseline to work off market expectations of interest rates but seems to feel it should be the forecasts of the MPC for interest rates. I think one has to be careful with that replacement. It is said in the BR that three of the central banks who use this (or something like it) had said that the results were just treated as "forecasts" and not promises. As we have seen in Australia, it is easily the case that, when the monetary authority suggests a likely interest rate path, it starts being treated as what will happen, and decisions are made on that. Unless the MPC feel that the market expectation for future rates is very different from their own vision, I see no reason not to continue to use it. Perhaps the MPC could set out what they consider the path would be and that could be used as a scenario but without a precise description of the path. Scenarios have always been useful devices, but one has to exercise some caution with them.

There is much more I would like to say about BR. I am sceptical of what big data brings to monetary policy analysis. It may be advantageous for nowcasting. In practice current automated modelling via AI seems to me too much of a black box. There needs to be more information about what the final model means and exactly what is capturing. I feel we have spent many years learning about the need to impose some discipline on modelling and this seems to go against that.

Perhaps the main advantage of reviews like BR is not that they are done because of any performance failures but that they bring up issues that need debate, either due to changed environments or because there was no real resolution of them in the past. Hence one might re-think old or try new approaches. From this perspective the BR was very instructive and welcome. "Let a thousand flowers bloom" seems the appropriate way to respond to it.

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Adrian Pagan is Emeritus Professor, University of Sydney. He has numerous publications in the areas of econometrics and cycles. He has held professorships at a number of universities including the Australian National University and the Universities of Sydney, Oxford and Rochester. He has been elected a Fellow of a number of societies and journals including the Econometric Society, the International Association of Applied Econometrics, the Economic Society of Australia Association the Academy of Social Sciences. In addition, he has been awarded the Order of Australia and the Centennial Medal.

BERNANKE REVIEW: WHAT NEXT? PRACTICAL STEPS IN SETTING A PATH FORWARD

Sanjay Raja, Deutsche Bank

On 12 April 2024, Dr Bernanke delivered what many have referred to as a 'once in a generation' review of the Bank of England's (BoE) forecasting infrastructure and communication. In short, more work will be needed to get the Bank of England operating at the frontier of macroeconomic forecasting. And no doubt, the Monetary Policy Committee (MPC) will have its hands full in grappling with many of the recommendations presented by Dr Bernanke.

What next? This piece isn't meant to rehash the findings of the Bernanke Review. The conclusions speak for themselves. But, in light of the review, we ask the question: what is the art of the doable coming out of the Bernanke review, and what would tangibly improve monetary policy in light of the several recommendations put forth over the coming months and quarters?

Forecasting - connecting with other forecasters could strengthen the MPC's forecasts, analysis, and strengthen its pulse of financial markets. Dr Bernanke's criticism of the Bank's models was clear: the BoE's forecasting infrastructure is antiquated and in need of a thorough revamp. Building and maintaining state of the art forecasting models will be the first key task for Bank staff - something that inevitably will take some time to deliver.

There is a bigger question here, however. How can the Bank of England leverage the private sector to improve its forecasting? Here, increasing engagement with the private sector and the academic community could be useful. Bank Agents already do this to some extent. And Bank staff discuss projections and the broader Monetary Policy Report with external forecasters throughout the year.

What more can be done? Two things. First, put external forecasters directly into the MPC briefing sessions - ahead of a forecast round. This would allow for a more open dialogue on growth and the labour market, whilst also allowing for a wider range of inflation views. With some accusing the MPC of 'group think', exposure to external analysts could help introduce new or alternative viewpoints to the MPC. This would take the Bank's engagement with market participants above and beyond its quarterly collection of external forecasts alongside its Market Participants Survey. Second, to the scale that it currently exists, we would recommend building on the Bank's networks with both the academic

community as well as the forecasting community to create state of the art forecasting models. With budget constraints, working with individuals and institutions at the forefront of cutting-edge statistical techniques could allow Bank staff (and subsequently the MPC) to better engage on forecasting issues from model combination to joint probability distributions of various risk factors that could ultimately be mutually beneficial.

Scenarios: different strokes for different folks. One of the more important recommendations, we think, that could have an immediate impact on policy communication and decision making is the use of scenario analyses to augment the Bank's central projections. To be sure, Dr Bernanke's recommendation is not novel. Indeed, Dr Stockton proposed this more than a decade ago when conducting a review of the BoE's forecasting capabilities. Why could the use of scenarios be more effective? For one, it allows for diverse views on the MPC to be highlighted at every forecast round. Introducing risk scenarios that reflect the various leanings on the MPC gives market participants, including the public, more transparency on the varying paths for growth, unemployment and inflation. This would clearly highlight the varying views on the MPC (as opposed to some MPC members immediately downplaying the central path following the publication of a monetary policy report). These risk paths allow MPC members to be held more accountable when voting for any particular policy path. Moreover, in an uncertain world where supply shocks are increasingly more likely, the use of scenario analyses would also force the Bank of England to evaluate policy options outside of the central case scenario. In our minds, this would allow for more robust policy making that could lead to a more optimal policy outcome, particularly if the MPC's central projections prove to be wrong.

To chart a rate path or not? We acknowledge that there are both merits and demerits in the MPC setting out a central interest rate path in conditioning its baseline projections. Relying on a set of endogenous rate expectations would avoid a 'tail wagging the dog' scenario when it comes to using market rates in guiding the Bank's growth, unemployment and inflation projections. This is particularly true in a world where volatility in rate expectations is elevated – as we have seen in recent weeks. But doing so may also create an unhealthy over-reliance on MPC rate expectations that could be construed as a promise rather than a conditional path for policy. Ultimately, this will be up to the MPC and its individual members to decide.

But regardless of what the MPC's decision may be on using a central rate path, we think there is more that MPC members can do individually in improving transparency and accountability, particularly if they disagree with the BoE's central projections. Here, whether through speeches or through supplementary material provided within a Monetary Policy Report (this could also be published separately and after the publication of the MPR), individual members can set out their own expectations for inflation (as well as growth and unemployment). This can even be done through speeches which clearly highlight any upside or downside risks quantitatively. And while we do not subscribe to the

idea of 'excess forward guidance', we would strongly encourage policy makers to consider increasing communication about the medium-term policy path, providing greater transparency around the overarching policy direction (something we think could improve institutional credibility) rather than creating undue focus on the near-term path for policy.

Not once in a generation, but a continuous path for progress. Dr Bernanke's review comes at an opportune time. Changes are a good thing. And the published review presents a timely opportunity for the Bank of England to reset, revamp, and rebuild. But as others have rightly suggested, a review of the Bank of England's forecasting and communication should not be a generational event. Instead, monetary policy should always be assessed, and light should always be shed on how optimal policy outcomes could be delivered for the economy. Conducting (and publishing) an annual or biennial assessment of the Bank's forecasting performance and policy outcomes would improve transparency and allow the BoE to engage more openly about its forecast errors – akin to what the Office for Budget Responsibility does on an annual basis. This, in our view, could not only help improve the Bank's credibility but also shed light on what the MPC got wrong and what it got right.

In setting out the Bank of England's next steps, we strongly encourage the MPC to take a staged approach. Fixing the Bank's forecasting infrastructure will inevitably take time. But engagement with the academic and forecasting community on how best to restructure and rebuild could start early, with the BoE highlighting various milestones through its journey. Moreover, implementing some of the changes around engagement with the private sector (including think-tanks) could happen as early as in the second half of this year, with a formalised structure in place following the summer.

It is imperative that monetary policy remains transparent and policy makers held accountable in delivering price stability. Indeed, when interest rates are set, they should be set for the good of the entire country. And while policy makers will never always get it right, we should always strive for better.

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BOE REVIEW: UNCOMFORTABLE GUIDANCE

Philip Rush, Heteronomics

Ben Bernanke's review of forecasting at the Bank of England raised many suggestions. We hope the BoE doesn't dodge two aspects critical to improving its guidance. Inflation expectations are poorly captured in forecasts, contributing to misguided market views and leaving MPC members open to attack when critiquing surging wages. MPC rate expectations would best replace the conditioning rate path. Absent that, market rates are better than alternatives so that path should not be de-emphasised.

Ben Bernanke was commissioned to lead a review into forecasting at the Bank of England partly in response to popular dissatisfaction with the institution's performance. The results were published almost nine months later, on 12 April 2024, along with the BoE's response.

Many of the points and recommendations were reasonable, including the contextual recognition that the BoE's forecasts were not worse than others. We naturally welcome aims to fix these flaws. However, we are also mindful that dissatisfaction with the BoE arises from how it communicates the implications of its forecast rather than just the forecast itself. The institutional framework would ideally be robust to variations in the quality of the communicators leading the Bank.

Among Bernanke's numerous interesting insights are two that we believe are more problematic than the rest yet critical to institutionally raising the standard of guidance. Unfortunately, the BoE's current "Next Steps" leave space to brush them under the carpet. We hope the BoE isn't discouraged by the relative discomfort in addressing its assumptions for inflation expectations and the conditioning rate path.

Inflation expectations

Recommendation 4 from Bernanke's review proposed elements to include in the revamped framework, noting that not all are necessarily missing from the current approach. Among these was empirical modelling of inflation expectations, "and without the assumption that longer-term inflation expectations are always well-anchored". This is uncomfortable ground for the MPC, but it is a source of forecast error and misguidance that remains topical.

It is an uncomfortable area for policymakers because it strikes at the heart of their credibility. If the MPC is believed to be committed to achieving its inflation target and capable of achieving it, expectations should be firmly anchored at 2%. Anything else suggests doubt in the commitment or ability. Publicising perceived divergences risks

reinforcing wayward expectations, which could make success more difficult. The BOJ arguably struggled to end deflation partly for this reason.

Ignoring the issue also doesn't help. To its credit, the Bank has published forecast breakdowns incorporating excessive contributions from current inflation expectations. However, the MPC's belief in its credibility, as embedded in the model's forecast convergence, has seemingly understated the issue. Success is unconditional on action consistent with achieving it.

Rather than fully incorporate the risk of persistently excessive inflation expectations in the modal path, the MPC has often treated them as a critical risk. That muddied the usefulness of the projections as a communication tool as many other economists erroneously saw low medium-term inflation forecasts as a dovish signal during the post-pandemic hiking cycle. In practice, that lowness was conditional on breaking the excesses embedded in wages. Evidence of strength contradicted that required condition, necessitating a series of surprise tightenings.

Neither improving the modelling of long-term inflation expectations nor the wage growth feedback would necessarily solve this problem of misleading forecasts. Forecasts can still be wrong. However, incorporating the relevant channels into a more flexible modelling infrastructure would allow the MPC to simulate this critical assumption. It would stop being an off-model risk and become a tangible judgment that others could consider.

Moreover, inflation expectations could be considered quantitatively, demonstrating the impact of wage growth inconsistent with the target. Without that, reasonable warnings from MPC members have been unfairly attacked as though they were making mean value judgements. Pretending problems don't exist by not talking about them doesn't make them go away. It merely harms the forecast's performance and its ability to guide expectations for the policy outlook.

Conditioning rate path

Hopefully, divergent inflation expectations will only be a topical issue in the short term. However, it is a fundamental feature of the forecast worth preparing to consider at any stage in either direction. Meanwhile, there will be conditioning assumptions in all projections, including scenarios. The current convention takes financial market prices for assets, currencies, and the monetary policy outlook, which form a consistent set for the most prominent forecast path.

Bernanke's ninth recommendation is to de-emphasise this central forecast conditional on the market rate path because it does not necessarily reflect the MPC's view and "does not provide a clear rationale for policy decisions". In practice, the fact that the MPC might have a different view is communicated through the forecast deviating from the target at policy-relevant horizons, which provides an impetus to change market pricing.

Small changes in uncertain 2-3yr inflation projections aren't the cleanest way for a central bank to send a message to the market. However, it's the best in the BoE's current regular communication toolkit. BoE watchers must learn to read the tea leaves from target deviations at different horizons on this and the path conditional on unchanged policy, but it's hardly the most challenging task.

The MPC has seemingly been de-emphasising the forecast to get around issues, including those with inflation expectations mentioned above. Something else must compensate for the lost emphasis to avoid weakening the policy guidance. Unfortunately, that hasn't occurred so far, which leaves MPC members struggling to communicate their intent without established tools from the institutional framework. Comments are inherently more nuanced and prone to misinterpretation, feeding dissatisfaction with the BoE's performance.

Proposals within this recommendation are no panacea. Alternative scenarios could illustrate the envisaged reaction function to specific shocks but are less helpful in massaging modal expectations. Emphasising the conditionality is effectively the current approach with the risk of sounding even more uncertain. Modifying assumptions can create inconsistencies between them, and judgemental adjustments to the results are the worst of all worlds as they mask the appropriateness of an assumption to the outlook.

To paraphrase Winston Churchill, conditioning on market rates is the worst form of guidance except for all the others. The extent of the issue and the need to change partly depends on the primary purpose of the forecast. The current approach is acceptable if the aim is to guide market participants to the MPC's expected collective reaction function, adjusted for differential economic views. However, if the objective is to produce the best economic forecast, then MPC members should use their knowledge of their reaction function to condition the outlook on that alternative path.

Bernanke appears to be assuming it is the latter, hence his desire to de-emphasise the forecast conditional on market rates. Unfortunately, his alternative suggestions sacrifice signalling power without maximising forecast performance. Views may differ on the trade-off, but it looks like an undesirable compromise.

Perhaps paradoxically, the answer is in the review, just not in a formal recommendation. It involves replacing the market rate path with the MPC's collective judgement or aggregation of individual member views. It wasn't formally recommended because "that change would be highly consequential and this report recommends leaving decisions on this issue to future deliberations". We agree that the change would be highly consequential. It would maximise the forecast's policy guidance and performance.

It would improve the quality of policy guidance by providing a complete path of expected policy changes. That cuts through uncertainties about which path the MPC considers optimal when multiple options are available – e.g. wait longer then act more aggressively or act sooner but more cautiously. It also helps reveal features like terminal rate assumptions

and, if aggregating individual views, the breadth of opinion across the path, aiding understanding of the outlook and its uncertainty.

Forecast performance should also be better because it uses the MPC's proprietary information on their reaction function. If the MPC expects to behave differently within the outlook it forecasts, it can capture the impact of its alternative response. The rare occasions where the BoE forecasts implausible outlooks to accompany disagreeable market pricing would cease.

Improving the quality of policy guidance and forecasting performance are desirable results. These consequences should be welcomed, not kicked into the long grass. We hope the BoE adopts and publishes a policy rate path conditional on MPC expectations without delay. If it doesn't do that, it should resist the urge to de-emphasise the path conditional on market rates. Even if it's not the best option, it's the best quantitative signal in the current toolkit, so the effectiveness of policy guidance would suffer from its loss.

ABOUT THE AUTHOR

Philip Rush is the Founder and Chief Economist of Heteronomics, which independently provides macroeconomic research services to institutional investors. Until launching in November 2016, he was Nomura's Senior European Economist and was the Chief UK Economist there since 2010. Before that, he was the UK Economist at Barclays Wealth, where he also developed strategic asset allocation models for their market return portfolios. Philip started his career at Lehman Brothers covering the UK, Scandinavian and Swiss economies. Palgrave Macmillan published his fundamental framework as Real Market Economics.

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EIGHT PRESS CONFERENCES AND NINE DOTS

Jumana Saleheen, Vanguard

I am fortunate to have seen the Bank of England forecasts from both inside and out. Currently, as an economist on the trading floor I observe how MPC forecast communication affects financial markets. Prior to working in the private sector, I spent 20 years at the Bank of England, including as a member of the forecast team producing those fan charts.

Here I focus on the following two points from the Bernanke terms of reference.

- the appropriate conditioning assumptions in projections, including the interest rate path on which the forecast is based;
- material provided to the MPC to assist the discussion and communication of the outlook and the risks around that.

I welcome Bernanke's recommendations. To translate them into actions, I propose three changes: holding eight press conferences a year, communicating the path of future policy through nine dots, producing a staff forecast of the economy and individual MPC forecasts.

The Bank should hold eight press conferences a year. This Bank should hold a press conference after every policy meeting in line with the standards of public accountability set by the ECB and the Fed. Plenty of research shows that oral communication tends to be more simple than written communication. And that simple communication gives rise to lower asset price volatility.

The Bank should adopt a Fed-style dot plot. The Bank currently provides medium term forecast for inflation and growth which are conditioned on assumed paths for interest rates. Two changes would be welcome. First, replace the interest rate conditioning assumptions with forecasts of the policy interest rate. Second, expand the forecasts to include longer-run forecasts for inflation, growth, and interest rates, which would improve the transparency of the Bank's view on potential output, the neutral rate and long-term inflation. These forecasts should be packaged in a simple way – such as the Fed's dot plot – so that it is easily understood by the public.

The Bank should produce a staff forecast and individual MPC members forecasts of inflation, growth, and rates. The outcome of previous forecast reviews has been building a new model. I hope this time will be different. The Bank needs to revamp its framework for forecast production and communication. The Bank should publish a staff forecast of the

economy. In addition, each MPC member should also produce their own individual forecasts. This would ameliorate forecast incrementalism and ad hoc adjustments.

Eight press conferences – one for every policy meeting

Bernanke's review did not really talk much about the cadence of external monetary policy communication and public accountability of the Bank of England. This is a clear miss.

Currently oral communication from the Bank of England in the form of the Monetary Policy Report Press Conference - is held only once a quarter. This is below the standards set by the ECB and the Fed – who hold a Press Conference after each of their 8 policy meetings. Academic research shows that oral communication tends to be more simple than written communication. And that simple communication gives rise to lower asset price volatility (Mumtaz, Saleheen and Spitznagel, 2023).

Regular verbal communication of the policy decision – at every policy meeting – would improve the transparency about trends in the economy, and the challenges around policy setting. Having four press conferences outside of the quarterly Monetary Policy Report will also force the Bank to communicate its policy views independently of forecasts. Eight press conference also promotes public accountability.

The challenges around the interest rate conditioning path

The Bank's convention of conditioning the macro projections on the constant and market interest rate paths is well documented in Bernanke's review, so I will not repeat them here. The main problem with the interest rate conditioning paths is that it gives rise to muddled communication from the Bank of England about the likely path of future policy. Not great for central bank transparency.

To illustrate this, consider the following example. If inflation is at 2% at the 2-year horizon on the constant interest rate inflation projection, the implication (absent new shocks and new information) is that interest rates do not need to change for the Bank to deliver its inflation target. Alternatively, if the market implied path for interest rates is pricing in a 25bps rate cut, and the inflation projection based on market rate interest rate expectations delivers inflation of 2% at the 2-year horizon, then one can also assume that the MPC will likely cut rates by 25bps. Between these two extremes, there are numerous cases in which neither the constant rate nor the market rate inflation project returns inflation to 2% in 2-years' time. In all these instances, when asked about the future direction of policy at the press conference, the Governor and Deputy Governors struggle to provide clarity.

Clunky communication arises from two weak spots

Weak spot one is the Bank's traditional aversion to talk about future rate setting, or forward guidance. The Bank's aversion to forward guidance is natural given the classic time inconsistency problem (Kydland and Prescott, 1977). Since its independence the Bank's

policy has been to reveal information about its monetary policy meeting by meeting, and never in advance. This is an outdated style. Following the 2008-09 Global Financial Crisis, other major central banks have become more comfortable with forward guidance. The Bank needs to move in this direction. The Bank can always adjust its guidance in light of new shocks – market participants will be understanding on this.

Weak spot two is that the Bank does not have an internally agreed upon framework on how to translate the constant and market rate inflation projections into a policy path. The Bank's forecasting framework was designed during the Great Moderation. Inflation hardly moved, and the difference between the constant and market rate projections was small. The policy decision, cut today or stay on hold, almost fell out of the difference between the two projections – whichever projection was closer to 2%. But such a framework fails in times of high and volatile inflation. Economic volatility gets mimicked in bond markets too. That means the market implied rate path also moves around dramatically from month to month, as we have seen over the past two years. In these volatile times, the MPC needs to look somewhere else for stability.

To stay on the frontier, the Bank and MPC should set up a forecast advisory board with academics and practitioners. The Federal Reserve has an academic advisory board. The ECB regularly engages with academics and practitioners. Such dialogue promotes debate and awareness of forecasting best practice.

Markets love the Fed dot plot

In 2012 the Fed introduced a dot plot to communicate its forecast for inflation, growth and interest rates. These forecasts are for the current year, next year and about the longer run. They show the Fed's views on the neutral rate of interest, potential growth of the economy, and inflation. All in one chart. Easy to communicate, easy to read the forecast numbers (unlike the fan charts), easy to see the range of views, and changes to the dots over time.

Initially, there were fears in the central bank community about the dot plot. Concerns that each dot (which captures the view of an FOMC member) would represent a different type of model, a different set of judgements, and different levels of rigor. For example, the growth dot for one FOMC member could indeed come from a different model to their inflation and interest rate dot. And the dots for some FOMC members may underpinned by a model, while for another FOMC member, it might be more 'finger in the air.' But the reality is the marginal value of a perfect world (all dots from one member are internally consistent; and all dots come from models with equally good forecasting record) may be small.

Nine dots is the way to go

The Fed dot plot has 19 dots. Bernanke did not recommend the dot plot. Some argue 9 dots is too few, making it easy to infer which dot belonged to which MPC member. I disagree. The number of dots is not the deal breaker. The bigger point, and in line with MPC's

individual accountability to Parliament, there is merit in the MPC members revealing their individual short and longer-run forecasts for inflation, growth and policy rates. That is part of the MPC's individual accountability to both the UK Parliament and the Public.

A staff forecast and individual MPC forecasts

The Bank has long defended the forecast as the MPC's forecast and not a staff forecast. That has strengths. Producing an MPC owned forecast involves boardroom style meetings in which the staff run the model (technical) and present it to the MPC. But the staff are obliged to take on the MPC judgments that alter the final inflation projection. I have witnessed meetings in which the discussion has deteriorated to that of line drawing – the MPC may have a strong view on the path of inflation that has no relation to the model output. This creates a disconnect between the model and the published projections. And in my view, it is one source of the forecast incrementalism and ad hoc judgments that Bernanke talks about. To close the disconnect the staff should own their forecast, so that the process of judgment and modelling are brought closer. On top of this I argue that it would be better for individual MPC members to produce their own forecast.

Bold changes are needed

The Bank must be congratulated for conducting this review. The staff who have inputted into the process deserve credit for their candidness. Bernanke did well to translate what he heard into recommendations. I have argued for more simple communication from the Bank in the form of eight policy press conferences a year. I believe the introduction of a staff forecast, and a Fed-style dot plot, with individual MPC forecasts, would be beneficial the monetary policy setting in the UK.

Putting recommendations into action is no mean feat. The path ahead will be set by the senior leadership of the Bank of England. It may require a reallocation of resources across teams. Great leaders can set a bold vision and forge ahead. I look forward to it.

ABOUT THE AUTHOR

Jumana Saleheen (PhD) is head of the Investment Strategy Group, Europe, and chief European economist. She leads a team in London that conducts research on economics, capital markets, and related investment topics. Her areas of expertise include monetary policy, international macroeconomics, and macroeconomics forecasting. Before joining Vanguard in 2022, Jumana was chief economist at commodity consulting firm CRU Group. She also held several senior roles at the Bank of England, where most of her career was in the Monetary Stability Directorate and she later was head of division in the Financial Stability Directorate.

GO BIG OR GO HOME: IMPLEMENTED IN FULL, THE BERNANKE REVIEW IS A POTENTIAL GAME CHANGER FOR BANK OF ENGLAND TRANSPARENCY

James Smith, Resolution Foundation

Open Ben Bernanke's Review of Bank of England forecasting and the first thing that strikes you is how technocratic it is. With expectations set for a 'once-in-a-generation' change in the Bank's forecasting and communications, it is noticeable that the Review dives straight into the weeds of forecast infrastructure and software!

This approach is perhaps not surprising given that Bernanke – as a Nobel Laureate and all-round central-banking legend – is hardly lacking expertise. But anyone expecting him to rake over the Bank's recent struggles with forecasting and communicating during the cost-of-living crisis will be disappointed.

But disappointment would be the wrong reaction. Dig a little deeper and it's clear that Bernanke is nudging the Bank of England to move itself towards the forefront of transparent monetary policy making.

The key recommendation in the Review is for the Monetary Policy Committee (MPC) to make more use of alternative scenarios in its policy making and communications. This recommendation could just mean adding a few more lines to a chart that few people look at.

But it *could* also prompt a much bigger change in how the MPC makes and communicates policy. Here, Bernanke is not prescriptive about how the Bank should go about using scenarios more – he leaves that up to the Bank.

To understand why this could lead to a bigger change, you need to understand why the Bank of England is different in its use of forecasts.

Unlike some other major central banks, the MPC produces its own consensus – or 'best-collective judgement' – forecast. Other central banks, most obviously the Federal Reserve and the ECB, rely more on staff forecasts, which are part of the policy process but which rate-setters can actively disown in their communications.

My view is that having such a central role for the forecast is a strength of the Bank of England's process. This seems to be a view that Bernanke has some sympathy with: as the Review makes clear, producing such a forecast is onerous (just look at Figure 2 in the

Review, which sets out the whole process), involving around six long meetings for the MPC to agree what it is going to publish, but Bernanke notes that the forecast process '*appears to shape the policy decision in several ways*'. That said, it's noticeable that Bernanke falls short of comparing the Bank of England's forecast process favourably to that at other central banks.

All this means that policy decisions and forecasts are very closely aligned at the Bank of England in a way that they are not elsewhere. That's important because setting monetary policy is inherently forward-looking – in the jargon, many central banks in practice end up implementing a form of what Lars Svensson has dubbed 'inflation forecast targeting'. Such an approach can boil down to a simple decision to raise the policy rate when the medium-term inflation forecast is above target. But the key point here is that, if you're going to set rates with reference to your forecast, it makes sense to make the forecast process central to your policy process.

A big problem with taking such an approach is that can lead to an over emphasis on the central projection, and doesn't make clear the risks to the path of future interest rates. Fan charts, the Bank of England's primary way of communicating its forecast at the moment, and which are comprehensively demolished by Bernanke in the Review, don't deal with that problem: they just show one specific form of forecast uncertainty – that arising from past forecast errors. Other attempts by the Bank to deemphasise the central projection – such as the Key Judgements section of its Monetary Policy Report – did not do enough to make the risks clear during the cost-of-living crisis.

How can scenarios help? Here, implementation is key. *If* producing scenarios means putting alternative projections at the heart of a revamped forecast round, with meaningful discussion of the accompanying policy response, then this would indeed be a big change. Communicating the outcome of such discussions would make it clear not only how the world might end up different from the central project, but also what that would mean for interest rates.

Would this have changed anything during the cost-of-living crisis period? Arguably, yes. In 2022, for example, the MPC could have signalled that much higher inflation would have been accompanied by much higher rates. Doing so would have forced MPC to discuss that scenario in depth as part of its forecasting round, and to have communicated the implications explicitly to markets and the public.

One particular form of this – which the Review describes as a "more aggressive approach" to implementing scenarios – would be to use them to compare "the likely effects of alternative policy paths on the outlook". Put another way, MPC could use this approach to signal exactly how it expects to set policy, and set out how that might change if the outlook changes. This could even pave the way for a 'dot plot' of MPC members' preferred paths for interest rates. Such an approach is already taken by the Federal Reserve and the Bank of Japan, and would put the Bank of England at the frontier of transparent policymaking –

some other central banks publish policy paths, some do scenarios, but none does both. So this would be a big change.

But, crucially, the Review leaves the issue of exactly how scenarios might be used up to the Bank of England. In its response, the Bank says it will come back to us by the end of the year and tell us how it will change things.

In doing so, and in order to realise the full benefits of Bernanke's recommendations, the Bank should resist the temptation to implement a minimal version of Bernanke's proposals by clinging on to the status quo. By 'going big', the Bank can seize the opportunity for a truly 'once-in-a-generation' change in how it makes and communicates policy.

ABOUT THE AUTHOR

James Smith is Research Director at the Resolution Foundation, a role he took up in October 2018. Prior to this, he worked in a range of roles at the Bank of England and in the civil service, leading analysis of macroeconomic issues for policy. His work focuses on wealth, debt and housing as well as leading the Foundation's work on macro policy.

THE BERNANKE REVIEW: FOOTNOTE 34

Helen Thomas, Blonde Money

There is one key character in the Bernanke Review. It's not Ben himself, nor past or present luminaries of the MPC. It's not even the staff of the Bank, who receive a welcome and justifiable pat on the back for their hard work. It is an almost mythical entity: the central forecast. It is upon this head of a pin that the MPC dance and therefore around which Bernanke focuses his review.

His recommendations are split into three broad elements: infrastructure, process and communication. Yet all of them feed into the central forecast.

Infrastructure – he wants better software and data collection to feed into the forecast

Process – he wants structural change to replace incrementalism for the creation of the forecast

Communication – he wants alternative scenarios explained qualitatively to de-emphasise the forecast

All of which must lead to the conclusion that it is the forecast itself which is causing such consternation.

A clue is revealed in Footnote 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).'*

This is a key question, one that deserves much more than relegation to a footnote. It gets to the heart of the reason for the review in the first place which is, if we look at the Terms of Reference, to *'develop and strengthen the Bank's processes in support of the Monetary Policy Committee's forward-looking approach to the formulation of monetary policy, especially in times of high uncertainty'*.

If the core of the process is something that is potentially both input and output, Schrodinger style, then that must be ironed out before drawing any further conclusions.

Suppose Bernanke determined that the central forecast must purely be an input. Then each MPC member could explain their own policy reaction function based on elements of the

forecast with which they agreed or disagreed based on the release of various pieces of data. They could have a dot on a plot.

Meanwhile the staff of the BoE could devote more energy to improving the model itself so that it better reflects the way the economy actually works – Bernanke provides the example of *'Notably, analyses of inflation should consider supply-side factors as well as the state of aggregate demand'*.

He goes on to argue that the current patching up of the model using short term fixes leads to incrementalism that avoids drilling into the heart of the structure of the economy:

'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'.

Rather than conclude that the central forecast must be changed to reflect these structural changes, he instead offers his own incremental solution – that the Bank should provide alternate scenarios to the forecast. However, the barrier to the latter, Bernanke is told, is that it is *'a drain on the time [the staff] have available to develop the central forecast and engage with the MPC'*.

But why must they spend so much time worrying about engaging with the MPC? Because the central forecast isn't just a model. It runs through several iterations in the five-week process before it is signed off, where each MPC member can challenge and tweak assumptions. Bernanke explains:

'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'.

Once the judgement has been incorporated this leaves a hybrid forecast, man plus machine, around which each MPC member then weaves their own tale of whether it is in line with all of their assumptions or only some, or indeed none. This then creates a communication challenge for informing the public and market participants about the MPC's policy reaction function. If it turns out the second round effects of inflation on wage growth are even more persistent than the forecast, then what does that mean for interest rates? More restrictive perhaps, but for how long? And under what circumstances or following which data would change the path of policy?

And so the central forecast must in some way rationalise the policy decision taken at the time. It is both input and output. This creates a pernicious risk: that the central forecast itself drives groupthink within the MPC. It is the end result that justifies the decision. Rather than each MPC member seeing staff forecasts, conducting their own analysis on

their outlook for the economy, and then signalling their opinion on interest rates through their own speeches and (unattributed) in the Minutes of the meeting – they instead start from the consensus outlook and work back from there.

No wonder this has become confusing. We recently had a three way split vote on the MPC between higher rates, lower, and unchanged. The hawks and doves had set out their stall and are of course entitled to their opinions. But if the central forecast is omnipotent and omniscient, it cannot possibly include the same outlook for inflation and unemployment for someone who sees much lower rates ahead and someone who sees them going higher.

It is particularly problematic when the range of possible future outcomes is more uncertain than usual due to a series of shocks. There is a fair economic debate about whether the pandemic and the energy price shocks will lead to aggregate demand outpacing aggregate supply, thus requiring higher rates, or vice versa. But if the central forecast suggests inflation on balance is going to return to target within two years then it constrains the ability of individual MPC members to communicate credibly about their own assumptions.

You end up with a 'joint product' that doesn't contain any information about a distribution of future outcomes. This is where the fan charts come in. Or, used to, as we know Bernanke wants them gone. Fan charts include skew to incorporate the judgement of MPC members. They can signal, for example, that inflation risks after huge amounts of QE were skewed to the upside, even higher than the central forecast suggested.

Without them, Bernanke recommends that alternative scenarios be produced. But this adds complexity where the simpler fan charts brought simplicity. What if MPC member X agrees with the wage-price dynamics of scenario 1 but the labour market dynamics of scenario 2? And let's not get into the fact that he rather casually throws in 'There should be no presumption that the same scenarios will be published in each MPR', meaning each meeting could bring a new set of factors that might move policy in a different direction.

All of these contortions come from footnote 34. The central forecast simply cannot be both input and joint product. Bernanke would do better to demand the Bank pick one, rather than hint in a footnote that this might be the cause of the real vulnerability of the Bank.

ABOUT THE AUTHOR

Helen Thomas is the CEO and founder of BlondeMoney, a macro advisory firm that looks at the unpriced risks in financial markets. She founded the company six years ago and has almost twenty years of experience in banking, fund management and politics. She was an adviser to George Osborne, the former Chancellor of the Exchequer, during 2008 and ran the Financial Markets Reform Programme at Policy Exchange before going on to be a partner in a Global Macro hedge fund and Head of Currency Alpha at SSGA. She was a board member of CFA UK, is a Freeman of the City of London, and she has a degree in PPE from Christ Church, Oxford University.

THE BERNANKE REVIEW: A MISSED OPPORTUNITY?

Sushil Wadhwani*

It is important to recall that the backdrop to the commissioning of the Bernanke review was widespread criticism of the Bank of England from various quarters and surveys of public satisfaction with the BoE plumbing new lows. This is in sharp contrast to the time when I left the MPC in 2002. Back then, I was always overwhelmed and surprised by the degree of respect and deference accorded to MPC members.

A concrete way in which the way the BoE is perceived really matters is its likely impact on inflation expectations. Steve Nickell, who was on the MPC at the same time as me, always reminded us that as long as we appeared to look busy and were believed to be competent, then inflation would largely take care of itself. Indeed, I was struck by the fact that, on regional visits, most firms I met told me that the starting point for their wage negotiations was our inflation target (which, back then, was 2.5%) as they believed that any deviations in actual inflation from target would prove to be temporary. Of course, such beliefs, when widely held, can be self-fulfilling. Currently, the MPC worries about the possible persistence of inflation because wage settlements pay a lot more attention to recent price inflation outturns and much less to the inflation target. In that rather fundamental sense, we have seen that the inflation expectations of firms have de-anchored and this inevitably affects the price and wage decisions they make. This is why the BoE needs to be laser-focused on remedying its credibility deficit with the decision-makers in the British economy.

Obviously, the very large recent BoE forecast errors have contributed to the observed de-anchoring of expectations and it is therefore disappointing that Dr Bernanke appears to let the BOE off lightly by merely saying that other central banks performed just as poorly. He fails to note the fact that several economists (including some former MPC members) were pointing to upside risks to inflation as early as November 2020 while the BoE was still continuing with QE and extraordinarily low interest rates. Some of us who worried about higher inflation at the time were looking at the very high money supply growth and noting that the successful vaccine trials made it likely that velocity would normalize. The level of nominal GDP that was therefore implied was much higher than the existing BoE forecast. One did not have to believe in a stable econometric relationship between money supply growth and nominal GDP growth in order to heed this warning signal – only to note that there was an important inconsistency between the two approaches that needed further probing. Yet, even if all of Dr Bernanke's valuable recommendations has already been

implemented before 2020, it is not obvious to me that the BoE would have paid more attention to the need to cross-check their forecasts against the monetary data, as I would not expect the money supply to directly enter the new econometric model recommended by him. Instead, we need a cultural change on the MPC to be more willing to genuinely look at a variety of models and spend time cross-checking the implications of each of them. This might well require a more diverse membership.

A second factor that contributed to the BoE's poor forecasting performance was the fact that their model for wage formation only relied on the data over the last 30 years. The TSC was surely right to question the MPC on this. Some of us who were worrying about higher-than-expected inflation noticed that several survey-based measures of inflation expectations had become dislodged in early 2021 and so Dr Bernanke's recommendation that the BOE use a model that drops the assumption that long-run inflation expectations are anchored is to be welcomed. The fact that I find puzzling is that the MPC did not question this assumption for itself and once again makes me wonder whether we need a more diverse membership.

In terms of diversity, I am reminded of the well-known parable of "the blind men and the elephant". While welcome progress has been made in terms of gender balance on the MPC, I am not sure that we have done enough in terms of true diversity of experiences and approaches. For example, I have had the privilege of working with two people in the financial industry who, over the last thirty years, have demonstrated to me that they have a rather special skill in terms of being able to form an excellent judgement about where the economy is headed. Neither of them has a PhD in Economics and have never worked at the Treasury and so, even if they could be persuaded to jettison their lucrative careers to apply to the MPC, I doubt that they would ever be appointed as a result of our current recruitment process. One reason that I have heard offered to explain why such people could not be appointed is that they would not wholly understand the intricacies of an econometric forecasting process. My argument for a diverse membership necessarily requires us to move outside the narrow priesthood that are deemed to be appointable. To provide a different example, the person who I regard as having the greatest skill in interpreting monetary data amongst all economists in the world was not renewed to serve a second term on the MPC. Yet, he was in the forefront in terms of warning of high inflation in 2020.

The credibility of the BoE has also been undermined by poor communication and Dr Bernanke has made some useful recommendations in that regard. The diminution in respect for the BoE owes much to communication missteps over the years-for example, the forward guidance that inevitably proved to be inaccurate and that earned the then Governor the epithet of "unreliable boyfriend". More recently, the Bank did not help itself when, at a time when rates were 4%, it tried to tell everyone that the markets were wrong in expecting rates to rise to 5.25%. I know of decision-makers who acted on that BoE advice, only to find that rates did, after all, go to 5.25%! The Bank has also attracted broader criticism for its choice of language in some cases. Making the recurrence of such missteps much less

likely is vastly more important to improving the respect accorded to the Bank than some of Dr Bernanke's detailed recommendations to, for example, cut back on the detailed quantitative discussion of economic conditions or to drop fan charts. Many of his suggestions will only be noticed by a tiny fraction of the British population who actually read the Bank's publications. It is a pity that the benefits of what Dr Bernanke recommends will only be experienced by this tiny cult rather than the broader population that we need to win back.

Of course, Dr Bernanke is right when he talks about the dangers in terms of how the BoE is perceived by the broader British population when they publish forecasts based on conditioning assumptions that they do not believe in themselves. This has, in recent years, led to situations where the media highlight a "BoE forecast" that the majority of the MPC do not believe in. I am not wholly sure as to how the BoE ever allowed this to happen. When I was on the MPC, the late Governor George was rightly insistent that the forecast we publish be tightly linked to the decisions we made. Indeed, on one occasion, when the decision we had just made was out of line with a forecast we were due to publish, an ad hoc last-minute forecast meeting was convened in order to vary the assumptions embedded within the forecast to ensure the desired consistency with the MPC vote!

It is well-recognised that the recommendations of the Bernanke review will take a considerable amount of resource and time to implement. Some of his suggestions (e.g. improved software) are probably essential and uncontroversial. My fear, though, is that an exclusive focus on implementing this report might distract from the more important task of winning the trust of the British public. One compromise that we might wish to discuss and explore is therefore to downgrade the published BoE forecast to a staff forecast. After all, both the Federal Reserve and the ECB rely on a staff forecast. This would allow the MPC to spend more time on debating the issues of the day versus being bogged down by the detail relating to econometric modelling, especially if much committee time will now be expended on the new model. Moreover, if the MPC is no longer responsible for the forecast, then its membership could more easily be widened to include a more diverse set of experiences.

It is said that Prime Minster Truss contemplated sacking Governor Bailey. If we do wish to preserve Bank independence, it is imperative that we inspire greater confidence amongst a broader set of the population. As the Bank considers its response to the Bernanke review, I do hope that it chooses its priorities with that imperative in mind.

*These are the personal views of the author and should not be thought of as representing the official position of PGIM Wadhwani, where the author currently serves as Senior Adviser.

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COULD DO BETTER...BUT IT'S NOT EASY!

Peter Westaway, Independent Economist

The Bernanke review of the Bank of England's forecasting activities has attracted some lurid headlines about the devastating critique delivered by the former Fed chair, Ben Bernanke. My reading was slightly different. According to the popular press and some commentators, the Bank has been carrying out an especially poor job in its role of forecasting the UK economy and, as a result, is making errors in interest-rate setting. Implicit in this criticism is that others have been doing better. In fact, the report makes clear that the Bank has not performed particularly badly compared to other central banks or private sector forecasters in the face of a series of unexpected "exogenous shocks" (pandemic, war in Ukraine). For sure, twenty-twenty hindsight relating to those shocks would have helped monetary policy setting, but inflation still would have overshot its target considerably. So, Andrew Bailey and his team should feel vindicated in this respect at least.

Bernanke suggests that a systematic analysis of the Bank's forecast mistakes should usefully be made, now and going forward, decomposing the source into errors about "exogenous" shocks, conditioning assumptions, and modelling misspecification. We can now expect to see the Bank doing this more systematically and more publicly. In an ideal world, too, we would see that decomposition compared to other forecasters to help understand how different forecasters have gone wrong, though that was not carried out by Bernanke, and it is unlikely to happen in future.

Going beyond the narrow question of forecast accuracy, however, the Bank does have some significant questions to address about the way it runs its modelling and forecasting operations. Having myself overseen an earlier review of the Bank's modelling infrastructure in 1999, an exercise which led to the Bank's first public articulation of its "suite of models" philosophy (see Economic Models at the Bank of England), it has always been clear that such activities require continual ongoing investment. To be fair, there has been no lack of modelling innovation with the semi-structural medium-term macro-economic model (MTMM), developed in 1999, evolving into models with a basis in dynamic stochastic general equilibrium (DSGE) theory, with BEQM (Bank of England Quarterly model) followed by the current version, COMPASS. Whether the move towards greater theoretical rigour embodied in these later models improved matters in terms of accuracy of forecasts, ease of communication or better policies can be debated. But it seems clear from the report that the Bank has allowed the ongoing maintenance of the software to be deprioritised and this will need to change.

One particular feature of Bernanke's report was his between-the-lines recommendation to "do things the way we do it at the Fed". This came through in a few areas, for example in the discussion of how PhD-level economists were deployed. There has always been a question of how to motivate smart economists who want to do their own publishable research while still adding value to the policy process. In my time and since, Bank researchers jealously looked at how the Fed and ECB allowed their economists to follow their own projects so maybe this report will nudge the dial further in that direction.

Probably the most important Fed-like recommendation related to the greater use of alternative policy scenarios, potentially including the use of alternative interest rate scenarios. Bernanke stopped short, however, of recommending that individual MPC member forecasts of rate projections be published, or indeed that the Bank forecast should be conditioned on the MPC's subjective expected policy rate expectation. Of course, it is difficult to argue with the suggestion that forecasts offering alternative views of how the economy might evolve could help elucidate the policy outlook. Even so, when it comes to interest rates, my sense is that the Bernanke report pays insufficient attention to why conditioning on market rates is an informative way, perhaps the best way, to frame the policy decision.

To explain why, it is worth reminding ourselves that the expected path for policy rates embodied in financial market prices is unique. It is this very path which economic agents will be basing their current and future decisions on, and which will be embodied in asset prices like the exchange rate, equity prices and bond yields. Certainly, there are risk premia to calculate in deriving the exact rate path which is being expected (as the Bank of England economists attempt to do when deriving their conditioning path). And not everyone in the economy adopts purely forward-looking expectations. But these are details that can be captured in the forecasting and modelling process. The fact remains that a forecast based on the market-expected path for interest rates will indicate whether, given the assumptions in the rest of the Bank's forecast, inflation is set to reach its target at a medium-term horizon or whether it is too high or too low. This then allows the Bank to send a strong signal as to whether the implied monetary policy stance is too tight, too loose, or just right. This is why the Bank of England uses this conditioning assumption as its signalling device.

Of course, exactly how interest rates need to be adjusted to get inflation back on track is not provided by this approach. Nor is it possible to infer whether interest rates are on the right path if some assumption relating to the rest of the forecast is different (e.g. if relating to the oil price assumption or the assumed natural rate of unemployment). So, this is where alternative forecast scenarios might usefully be deployed by the Bank to help financial market participants, and indeed the general public, understand how interest rates might need to play out.

Bank staff could run these alternative scenarios in two separate ways, one more straightforward, the other quite complex.

In the simpler case where the Bank wants to illustrate the implication of a different assumption for some aspect of the forecast (e.g. higher equilibrium unemployment) then the thought experiment would be to re-run the forecast again under the same market rate conditioning assumption but now with a different unemployment assumption. The maintained hypothesis here is that this alternative assumption on unemployment is the alternative view held by market participants. So, this would deliver a new forecast for inflation, and as before, this would provide, just as in the "central case," a new signal as to whether the market view for rates was too tight, too loose or just right.

Now consider the more complex case where the Bank wants to illustrate the implications of alternative interest rate paths. The complication here is that, as soon as a different interest rate path is postulated, so the starting point in the forecast for asset prices today would "jump." For example, with a higher path for interest rates, under reasonable assumptions about how asset prices behave, today's exchange rate would immediately be higher, bond yields would immediately be higher and equity prices would fall. And all this would have knock-on consequences for the behaviour of firms and households in the economy. Of course, it would be unrealistic in the extreme to assume that this new alternative path for interest rates was immediately perceived and acted upon. As a result, in deriving the forecast, it would be necessary to model some form of learning where economic agents gradually came to believe the new path for interest rates. This is certainly possible to do but it is not a straightforward exercise and would require some additional assumptions to be built into the alternative scenarios being examined.

This complication when analysing alternative policy rate paths in a forecast context may seem esoteric. But it must be taken seriously. Technically it is at the heart of the difference between what economic modellers call a "model forecast" and a "model simulation." No doubt those central bank forecasters who already adopt a non-market-path conditioning assumption have developed their own ways of addressing this challenge. And an examination of how this is done would bear further scrutiny from the Bank before they undertake this exercise.

Let me conclude. Overall, the Bernanke report has provided a forensic examination of how the Bank's use of modelling and forecasting models can be better deployed to improve forecast accuracy, policy analysis and communication. I have tried to argue that forecasting and policy analysis is actually pretty difficult and that there are no easy panaceas for delivering consistently accurate forecasts. The press reaction to the Bernanke report has done little to reassure me that the report has helped to improve public understanding of why forecasters get things wrong. The suggested scrapping of the famous "rivers of blood" fan charts is an unnecessary step in my view. These charts were designed to illustrate, as former BoE governor Mervyn King used to say, that "the Bank's central forecast will always be wrong"! Perhaps they were an over-elaborate way of making the point that "predictions are

difficult, especially about the future[1]", but it is important that it is not lost in the revamped Bank of England process.

ABOUT THE AUTHOR

Peter Westaway is an independent economist who writes and speaks on issues relating to the economy and financial markets. He previously spent a career as an economist in the public, private and academic sectors for HM Treasury, the Bank of England, Nomura, Vanguard and the National Institute of Economic and Social Research. He has a PhD from the University of Cambridge.

[1] This expression is variously attributed to Yogi Berra, the baseball coach, and Niels Bohr, the physicist!

SCENARIO BASED BANK RATE GUIDANCE MAY RAISE UK RISK PREMIA

Tomasz Wieladek, T. Rowe Price

Former Federal Reserve Chairman and Nobel laureate Dr Ben Bernanke published his review of forecasting at the Bank of England. A major recommendation of the report is to adopt alternative forecast scenarios. In this article, I argue that this approach could raise financial market risk premia. But this unintended consequence can be avoided through careful implementation and communication of the new forecasting framework.

Scenario analysis will improve the Bank's ability to illustrate plausible alternative economic outcomes. This is currently implicit in the fan chart, but the exact scenarios which lead to a wider fan chart aren't specified. The review points out that financial market participants and the media pay little attention to the actual fan chart. Specifying scenarios and explaining them in terms of alternative point forecasts could therefore improve communication with financial markets and the public, especially in times of significant economic volatility.

Recent experience shows that scenarios can be an excellent communication tool when uncertainty is high and shocks are large. During the Pandemic, the OECD deviated from its usual forecasting practices and presented an alternative scenario for a second wave of global Covid-19 infections in its June 2020 forecast. It was one of the very few public sector organizations to do so. The fact that this alternative scenario turned out to be right helped to support the OECD's communications around forecasts. Importantly it raised the credibility of the forecasting process in the eyes of governments, the public and financial markets.

Forecast credibility is especially important for central banks. Public expectations that the central bank will return inflation to target serve as a long-term anchor for inflation. Inflation expectations management can help to bring inflation back to target faster, thereby supporting the transmission of monetary policy. These channels are more powerful when central bank forecasts have credibility with the public. By presenting alternative scenarios before they happen, the central bank can demonstrate that it understands the root causes of inflation in a particular state of the world. This will instil the public with confidence that the central bank will return inflation to target and support the anchoring of long-term inflation expectations at target.

The Bank of England had an excellent historical track record of keeping inflation at 2%. Inflation averaged 2% in the 25 years since the Bank received independence. This is a much better performance than the Euro Area after the Global Financial Crisis, where inflation was closer to 1% for a decade. But as the evidence shows, it takes time to gain inflation credibility, but it can be easily lost. In the Bank of England's case, public dissatisfaction has risen significantly. Long-term inflation expectations are now returning to levels that can be considered normal, but only after a steep Bank Rate hiking cycle. Without question, a high inflation forecast scenario due to a large energy price shock, published before it happened, would have helped to keep inflation expectations anchored. The MPC may not have had to hike Bank Rate as much as it did.

Many economic risks such as the energy price consequences of geopolitics do not enter the central projection, because they haven't happened yet. Similarly, shocks that are already on the MPC's radar at the time of the forecast could turn out to be much larger than expected. Scenario analysis is ideal to illustrate the inflation consequences of these shocks. This will help to support the Bank's forecasting credibility with the stakeholders it serves.

Given these significant advantages, scenario analysis could be a very effective addition to the Bank of England's forecasting framework and communication.

In terms of communication, the review suggests that the Bank of England should put less emphasis on the central forecast and more on scenarios. But such an approach could lead to unintended consequences in financial markets.

It is the role of financial markets to anticipate and price the future. If the MPC explicitly puts more weight on an alternative scenario, financial markets will take this into consideration when pricing the future path for Bank Rate. The threshold for financial markets to switch from pricing the central forecast to the alternative scenario would be lowered. Data outturns which are inconsistent with the central forecast could lead financial markets to price the alternative scenario instead. This could be intended. However, data often provide a muddy picture of economic reality. It is hard to disentangle which shocks hit the economy in real time. This means that financial markets could easily switch between the central and alternative scenario, based on only a couple of data points. Similarly, if data began to look more consistent with the central scenario, pricing could just as easily switch back.

Recent history shows how a couple of data points can change pricing significantly. In December 2023, there were seven Bank rate cuts priced for 2024 in the UK money markets curve and now there is two. This large move occurred as the narrative in financial markets changed based on only a few key data points. Clearly, US data has been in the driving seat and affected global markets. But UK data wage and CPI inflation upside surprises also led to a large adjustment of monetary policy pricing.

Such large fluctuations in monetary policy pricing are undesirable. If they persist, it is likely that investors will start to price in term premia in the Gilt yield curve to account for this volatility. If alternative scenarios provide anchor points between which markets can switch easily, because the MPC believes them to be plausible, then providing financial markets with alternative scenarios could lead to higher term premia in the Gilt yield curve and a risk premium in the Pound.

MPC members could use alternative scenarios to highlight their own policy preferences. The review highlights that this could be helpful to illustrate points of disagreement in the MPC's collective judgement. However, MPC members endorsing certain scenarios over others could reinforce or weaken a particular data-driven market narrative. Strong endorsement of certain scenarios by individual MPC members may therefore contribute to the volatility in rate pricing.

The review discusses Bank Rate forecasts as a useful tool to complement the scenario analysis and further improve communication with the public and financial markets. The review contrasts the costs and benefits of interest rate guidance very well, noting that such a step would be a significant deviation from current practice. As a result, there is no formal recommendation for the MPC to adopt Bank Rate forward guidance.

But if the MPC chooses to provide formal Bank Rate guidance in each scenario, the scope for large fluctuations in financial market pricing of the future rate path would be even greater. The path for Bank Rate in each scenario could become an anchoring point for financial markets. And differing data points over time would lead markets to switch from one plausible MPC Bank Rate forecast to another. This would further raise volatility in rates markets, together with all its adverse consequences.

Of course, fluctuations in monetary policy pricing will be much smaller if the alternative scenario is close to the central forecast. But there isn't much value in alternative scenarios that are close to the central forecast from a communication point of view.

There is a simple solution, which allows for a wide variety of scenarios, but with less risk of undesirable financial market volatility. Scenario analysis should be mainly used to highlight potential future risks. This will help the MPC to convince the public and financial markets that it is prepared to bring inflation back to target in a wide variety of scenarios. But the MPC should continue to put most of the emphasis on the central forecast, both in collective and individual communication. This will set a high bar for financial markets to switch from the central to an alternative scenario without a significant amount of evidence. Excessive financial market volatility is therefore much less of a risk with this approach.

The Bank of England has a once-in-a-generation opportunity to improve its forecasting framework and communication. Scenario analysis can raise the credibility of the Bank's forecasts, help to keep long-term inflation expectations anchored when risks materialize and make monetary policy more effective.

This article illustrates one of the many challenges of scenario analysis. There are likely many other equally effective solutions to the issues raised here. But this is precisely why the Bank of England may want to take its time in thinking through the ramifications of different variations of scenario analysis. Changes should be implemented in small evolutionary steps to help identify unintended consequences as they arise. A gradual implementation of the review is therefore likely the best way to help the Bank significantly improve its forecasting process, while avoiding the unintended consequences that could arise from the recommendations.

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THE BERNANKE REVIEW WAS A HUGE MISSED OPPORTUNITY

Robert Wood, Pantheon Macroeconomics

Judging by the problems it found, this review was sorely needed. Sadly, Dr Bernanke's recommendations risk making the problems worse. As a diagnosis of the Bank of England's forecasting problems, the review works, but as a way forward it does not.

Dr Bernanke's access to Bank of England staff revealed an astonishing situation. When it launched its new model, COMPASS, a decade ago the Bank of England argued the model was smaller and simpler than its predecessor, BEQM (Bank of England Quarterly Model). That made the model "easier to estimate and to use, enabling Bank staff to produce timely updates to the MPC's forecast". Now, the Bernanke Review reports that central model is not even used to figure out the effect of interest rate changes on the economy, and "the shape of the forecast is not significantly constrained by the a priori theoretical properties of this model". What's more, the supporting economic and statistical models are not adequately maintained, while the majority of the most technically able staff spend little or no time on the forecast.

The review also describes a problematic forecast process and less-than-ideal communications. Dr Bernanke says: "The quantitative links between the forecast and the subsequent policy decision... are not entirely clear". The review also seems puzzled how the MPC sets policy given that "choosing a policy from a set of qualitatively similar options requires comparison of the likely effects on the economy of the proposed alternatives".

To solve these problems, Dr Bernanke first recommends an automation effort to aggregate more efficiently the forecasts from the range of models the Bank uses instead of Compass. He suggests that a subsequent massive remodelling job will be needed to replace or overhaul the central model. Required are a realistic representation of the monetary transmission mechanism, modelling inflation expectations, as well as models of the financial, housing and energy sectors.

Developing better, realistic models and ensuring they cover the key areas will always be sensible. But that doesn't narrow down the task much. Such a wide-ranging model-building exercise will take years. Moreover, recommending the central bank develop "better" models will not necessarily result in them being used more effectively than the previous state-of-the-art infrastructure the Bank of England had at its disposal.

The central bank has now developed two major DSGE (dynamic stochastic general equilibrium) models, and neither have passed the test of time. This was not only an IT or a

modelling problem but an institutional issue. These models take expectations seriously, and their diagnosis of the economic outlook depends on structural economic parameters and reflects a micro-founded economic structure. That clashes with an MPC that wants to set policy "one meeting at a time", largely eschewing the question of interest rate expectations, and that seemingly wants to apply judgements based on a wide array of economic theories. For instance, the MPC often discusses whether inflation expectations are anchored, but has less to say on what policy path it would need to follow to keep them anchored: expectations often seem to be treated as more exogenous than endogenous.

Dr Bernanke recommends the Bank undertake another review of its modelling to determine the way forward. The MPC will need to consider whether to return to a semi-structural economic model—with which the Fed, for instance, manages well—or whether to develop another DSGE model. This review should ask searching questions of what the MPC wants from the forecast process. Does it wish to be constrained by the theoretical foundations inherent in a DSGE model, with the advantage of its internal consistency and treatment of expectations, or is it happy for a more ad hoc approach? It may want both.

While the central bank chews over that issue, it will have to defend forecasts created with a heavily criticised modelling framework. There are serious issues here. To this point, external commentators would have relied on the Compass model multipliers the Bank has published to think through how the MPC would react to data news. Now that outsiders know the MPC does not use those model multipliers, the question must be: what does the MPC think? The Bank must at the least describe its 'reaction function'. As ex-Governor Mervyn King put it in 2000, "A transparent monetary policy reaction function means that the news should be in developments of the economy not in the announcements of decisions by the central bank...transparency should lead to policy being predictable". An urgent project, not suggested by Dr Bernanke, would be to provide an update on what the Bank thinks about these key inputs into its policy decision.

Defending a broken forecast process is not the review's problem, but the recommendations risk an even less coherent outcome. Dr Bernanke argues the MPC should downplay the central forecast because it is based on market expectations of interest rates with which the MPC does not necessarily agree. Scenarios should be used to show risks around that central case, but those scenarios do not have to show a policy path the MPC does agree with. What's more, the fan charts that encode the Committee's assessment of the balance of risks should be binned, because they "appear to have little or no explicit grounding in data or quantitative analysis". It would be hard for outsiders to decode the quantitative implications of a series of scenarios based on different—not necessarily published—policy paths with which the MPC may or may not agree, a central forecast the Bank argues doesn't represent it views because it is conditioned on the market path, and a non-quantified balance of risks.

In fairness, buried in the review Dr Bernanke is clear on what he should recommend. That is a central forecast based on an MPC-chosen policy path and scenarios that show how

policy should react to risks. That would indeed be a revolution and result in a coherent forecast process and communication. But puzzlingly Dr Bernanke stops short of recommending this. It's a major flaw of the review. The result could be the BoE providing less useful information than now. The Bank's brief response to the review does not provide strong grounds for optimism on this front.

Finally, the area of the review that would likely be impossible to implement without bigger institutional changes is a recommendation that the staff spend more time with the MPC to review forecast errors and modelling choices. This is a worthy aim, but it seems unlikely all the MPC members have the spare time to do this. In any case, it's not clear how nine MPC members could agree on an explanation of forecast errors, unless they are working within the same theoretical framework. Arguably, the Bank's modelling infrastructure has withered because the MPC has not had time to prioritise its development and potentially because rate setters resisted the constraints imposed by the model. Ex-Chief Economist Andy Haldane, for instance, recounted in an FT article how he saw in the early years of inflation-targeting that the Bank's forecasts were "hand-drawn in pencil by the then governor."

The question is how this review could be used to deliver a coherent improvement. Aside from a thorough review of what the MPC want from their model the Treasury Select Committee has a key role to play. It should question how the Bank executive will devote more time to the forecast. The TSC could ask whether the forecast would be better led by the staff—as at the Fed—with the MPC focusing on scenarios, if rate-setters lack the time for modelling due diligence. This is easier if the central projection is downplayed and would also allow the Bank to consider alternative conditioning assumptions in sensitive areas like fiscal policy. The MPC must let go of some time-consuming tasks if it is to take on others.

There are bigger questions that were outside the terms of this review but which should also be asked. The size and shape of the MPC has been unchanged since 1997, but it may make sense to at least debate the balance between internal and external MPC members, for instance. External MPC members likely have more time available to engage in modelling choices, can be at the forefront of academic practice, and can be figureheads for challenge.

Finally, there is the question of how to ensure the central bank does not get into this position again. The TSC should now commission regular—say five-yearly—reviews of the BoE's modelling and communications, with the same access to bank staff Dr Bernanke had. The Riksbank, for instance, is subject to scrutiny of this kind. Regular reviews could help guard against the risk that the type of problems Dr Bernanke discovered are left to fester for years again.

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