Renewing our Monetary Vows: Open Letters to the Governor of the Bank of England

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National Institute of Economic and Social Research Occasional Papers 58.

National Institute of Economic and Social Research
2 Dean Trench St
London SW1P 3HE
T: +44 (0)20 7222 7665
E: enquiries@niesr.ac.uk
W: niesr.ac.uk
Registered charity no. 306083

ISBN: 978-1-9162584-0-2

THE NATIONAL INSTITUTE OF
ECONOMIC AND SOCIAL RESEARCH

Occasional Papers

LVIII

Renewing our Monetary Vows: Open Letters to the Governor of the Bank of England

Edited by Richard Barwell and Jagjit S. Chadha

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About the authors

Richard Barwell is the Head of Macro Research at BNP Paribas Asset Management. Previously, Richard spent almost a decade at the Bank of England working in both the Monetary Analysis and Financial Stability directorates. He holds a PhD from the London School of Economics, has written three books on the conduct of economic policy and has a particular interest in the communication of monetary policy and the design of macroprudential policy.

Jagjit S. Chadha is Director of the National Institute of Economic and Social Research. He has been Chair of the Money Macro Finance Group and was Mercers' Memorial Professor of Commerce at Gresham College from 2014 to 2018. As well as having worked at the Bank of England and BNP Paribas, he has held academic posts at the universities of Cambridge and Kent.

Chris Giles has been the Economics Editor of the *Financial Times* since 2004, reporting on the UK and global economy. Previously, he worked at Ofcom, the BBC and the Institute for Fiscal Studies. He writes a column at the *FT* on the UK economy.

Charlotta Groth is Global Macroeconomist at Zurich Insurance Group. Prior to this, she worked as a Senior Economist at the Bank of England. She holds a PhD from Stockholm University.

Michael Grady is Head of Investment Strategy and Chief Economist at Aviva Investors. Before joining Aviva Investors, he was Senior Economist at COMAC Capital, a global macro hedge fund. Prior to this, he spent a decade at the Bank of England in a variety of senior roles, latterly as a Senior Manager in the Markets Directorate. He began his career at the Australian Treasury.

Arnaud Marès is Citi's Chief European Economist. Prior to joining Citi, he was Special Adviser to the President of the ECB, Mario Draghi. He also spent an earlier part of his career at the ECB, as well as serving three years as Head of Policy of the UK Debt Management Office. Prior to returning to the ECB in 2012, he was an Economist and Managing Director at Morgan Stanley.

Paul Mizen is the Professor of Monetary Economics at the University of Nottingham, Chairman of the Money Macroeconomic and Finance Society, Fellow of the Office for National Statistics and a consultant to the Bank of England. His research focuses on the interaction between monetary policy, corporate finance, real activity and productivity using panel data from financial accounts and surveys. He is Principal Investigator in work with the Bank of England on the Decision Maker Panel and with the Office for National Statistics on the Management and Expectations Survey.

Ben Nelson is Senior Economist at Rokos Capital Management in London. Previously he was Senior Economist at the Bank of England, where he worked in a variety of policy and research roles. He holds a DPhil in Economics from Nuffield College, Oxford.

Huw Pill is a Senior Lecturer at Harvard Business School. Previously he worked at Goldman Sachs, the ECB and the Bank of England, as well as serving as Associate Professor at Harvard. Huw is a graduate of Stanford and Oxford universities.

Rebecca Riley is Director of the Economic Statistics Centre of Excellence. Previously, she was head of the productivity group and the UK economy forecast at NIESR. She has been an advisor to UK Trade & Investment, the Department for Work and Pensions and the Office for National Statistics, and is affiliated with the Centre for Macroeconomics and the Centre for Learning and Life Chances, UCL Institute of Education.

Paul Tucker is a Research Fellow at the Harvard Kennedy School, Chair of the Systemic Risk Council, President of NIESR and a former central banker. His book, *Unelected Power*, was published in 2018.

Tony Yates is an independent economist and former Professor of Economics at Birmingham University. Before that, he was a staffer at the Bank of England for 20 years. He is an adviser to Fathom Consulting and a Research Associate at the Resolution Foundation.

Karen Ward worked for HSBC's investment bank for ten years in a number of roles including Chief European Economist. In 2016 she joined Philip Hammond, the Chancellor of the Exchequer, as his economic adviser. She is now Chief Market Strategist at JPMorgan Asset Management.

Foreword

Paul Tucker[1]

For central banks, being the only game in town has turned out to be politically, even constitutionally, awkward. Among those interested in how power is distributed in our societies, there is concern that the monetary authorities are insufficiently harnessed to the public good. Depending on where critics stand on the political spectrum, the proposed remedies range from retreating to a more modest role to, very differently, contributing to a wider range of policy goals. Meanwhile, mainstream economists are preoccupied by less profound but nonetheless basic issues, fretting whether central banks will be able to maintain monetary stability when the next recession or crisis comes.

On the whole, those debates have been less engaged in Britain than in other advanced economies, which makes this book especially welcome.

While it concentrates on the objectives, instruments and accountability of monetary policymakers, those issues cannot be wholly detached from whether central bank independence is sustainable. On that, I hope we do not lose sight of the deep constitutional value – the separation of powers – served by independence. The state's monetary levers are latently instruments of taxation, and so should not be held by the elected executive. Over the long 19th century, the Westminster parliament achieved the necessary separation through the gold standard. That proved unsustainable after the move from a property-based assembly to full-franchise democracy, because it entailed too much volatility in jobs and economic output. After a long search, involving the executive branch experimenting with a series of ultimately unsuccessful regimes, the separation was restored by Bank of England independence in 1997.

1 President of the National Institute of Economic and Social Research and Research Fellow at Harvard Kennedy School.

That way of looking at monetary regimes highlights the absolute necessity of central banks' delegated powers being subject to carefully designed statutory constraints. If most of the chapters of this book are about technical design, lurking in the background are questions about the regime's comprehensibility, the need to ensure power within the central bank is fragmented, and hence the public accountability of its individual policy makers.

I hope the book will generate demand for a follow-up volume, maybe again catalysed by NIESR. One of the biggest lessons of the financial crisis was that since the central bank is unavoidably the lender of last resort, it cannot sanely or safely be shut out of the prudential regimes for maintaining a safe and sound banking system. In the UK, that imperative was addressed through a major overhaul of the regulatory architecture, giving the Bank of England a more complete mandate for preserving *monetary system* stability. With its powers greatly increased, similar issues arise concerning design, transparency, and individual accountability.

Finally, I cannot say how glad I am that so many former Bank officials and advisors have contributed to this book. After independence, we hoped that turnover in the staff would, over time, create a community of concerned but deeply knowledgeable critics. It has, and alongside scrutiny from press and parliament, that in itself might help to sustain the principled insulation from day-to-day politics that is the very purpose of an independent Bank of England.

Introduction

Jagjit S. Chadha[1]

In many respects, monetary and financial policy resembles the roof, plumbing and foundations of a house. From day to day the householder does not particularly pay much attention to these key structural aspects of her home. The wind may blow, the rain may fall and, if we are lucky, the sun may shine but she will look to her home as the place where life can be arranged and enjoyed whatever the conditions outside. But should any or all of these aspects fail, disaster awaits and immediate attention will be paid to repair. In that sense, we ask the central bank to look after the structure of the economy. Monetary and financial policy both should protect the economy from shocks and allow firms and families to plan their lives with limited disruptions.

The Bank of England has accordingly been charged with pursuing a democratically determined objective for price and then also financial stability. The pre-financial crisis settlement involved a separation of monetary from financial, with a microscopic focus on price stability. Following the financial crisis, there has been a large shift towards constraining the activities of financial sector intermediaries to limit the scale of their risk-taking and any contingent claim on fiscal authorities. This reform of the monetary-financial constitution has been welcome, but a number of aspects of the consensus will need to be addressed during the term of the next Governor of the Bank of England.

This is because the progress that has been made in the science of monetary policy is under threat from a new era of economic populism. There is a clear danger that in the absence of an open and deep debate about the fundamental objectives of the central bank, the political system will try to offload its obligations onto the central bank balance sheet and/or seek to unwind achievable objectives by arguing that those were the problems of the past, or worse still that those old objectives were the root cause of the

1 Director of the National Institute of Economic and Social Research. We thank the ESRC for support of this project.

problems we now face. To be clear, they were not. Monetary and financial stability does not cause economic strife, but its absence surely will.

So, with the considerable help of Richard Barwell at BNP Paribas, I commissioned a number of expert UK-based economists, from academia and the markets, to survey the monetary landscape. I determined a move to the next generation and asked a younger set of senior economists to outline their views. These views are offered on a personal basis and do not necessarily represent those of any of the institutions for which they work or the National Institute of Economic and Social Research. Indeed, I do not find myself agreeing with everything that has been written.

The first question concerns price stability itself. Does low and stable still imply inflation of 2% or so? **Richard Barwell** and **Tony Yates** explain why they think that the inflation target should be raised. The same thought process that might have delivered a 2% target in 1992 or 2003 would now deliver a higher number; four is the new two, they argue. **Karen Ward** argues that an average inflation targeting framework, essentially serving as a price level target, would be more robust than the Bank of England's current forward-looking framework. She feels that a system where the central bank has to account for past inflation misses would represent a deeper commitment and thus be less prone to de-anchoring. Not satisfied with only one or two changes, and even though he is pleased with many aspects of monetary and financial performance, **Huw Pill** calls for a wholesale strategic review of the monetary framework to allow for a new settlement of the boundaries of independence.

Arnaud Marès, with **Richard Barwell**, says that so-called unconventional tools will become the norm and the Bank of England will find it more difficult to control its stance entirely independently. In order to deliver the policy stance of its Monetary Policy Committee (MPC), the Bank may need to enter into more formal coordination with other authorities (the Debt Management Office or the Prudential Regulation Authority, for example). So if we want to maintain the post-1997 central bank independence and monetary dominance at the level of policy formulation, we need to revisit some of the separation that has taken place then and since then at the level of policy implementation.

Michael Grady wonders whether the Bank can lower the effective lower bound below zero by breaking the exchange rate between cash and deposits, and how a term funding scheme might help offset the impact on commercial bank balance sheets. **I** argue that balance sheet policies will remain on the monetary landscape and that there needs to be careful examination of the ad hoc accommodation made with fiscal policies so far. **Charlotta Groth** goes on to make the case that more can be done before the zero lower bound is breached and more forward guidance and quantitative easing (QE) might be sufficient. She makes a strong case for more forward-looking policy, which may have to rely on better data and models.

At a time when much of the constitution is being questioned and we have had a number of indicative votes in the House of Commons (see Aidt et al., 2019), **Richard Barwell** asks why MPC votes suggest little practical dissent. He argues for more variety in interest rate increments, paths and models. Indeed, he argues for a more contrary set of external MPC members. **Ben Nelson** places communication at least on a par with actual changes in policy rates. He argues that communication and the explanation of conditional forecasts are incredibly important ways of expressing the risks inherent in any examination of the future. **Chris Giles** reminds us of the need for MPC members to be accountable for their actions in a democracy, but also questions the practice so far. He suggests a number of ways in which the MPC might be made more accountable to the government, Parliament, other experts, the media and the public.

We conclude with two important chapters on measurement. **Paul Mizen** makes a strong case for the importance of supplementing digital data with survey data on expectations and uncertainty, while **Rebecca Riley** argues that the increasing granularity of data is ultimately replacing the once standard use of aggregate macro data and that the central bank can do much to promote the measurement of the new economy. I would also like to thank Anil Shamdasani and Fran Robinson for their careful production support for this volume.

In light of the search for the new Governor of the Bank of England, I recently lamented the lack of a national debate on objectives, instruments, communication and measurement, and hope that NIESR can create an ongoing dialogue. Whilst many of the issues I raise are common to advanced economies, the historic importance

of the Bank of England means that we have a chance to lead the international debate and also support the continuation of excellence in the financial sector, whatever vicissitudes may result from the final settlement we agree with the European Union.

Westminster
September 2019

Reference

Aidt, T., J.S. Chadha and H. Sabourian (2019), "Breaking the Brexit Impasse: Achieving a Fair, Legitimate and Democratic Outcome", *National Institute Economic Review* 247(1): F4–F11.

Part 1: Objectives

CHAPTER 1

Four is the new two: The case for raising the inflation target

Richard Barwell and Tony Yates[1]

After experimenting unsuccessfully with a number of alternative nominal anchors for the economy – from targets for growth in broad and then narrow money aggregates, to informal and then formal targets for the exchange rate – the United Kingdom adopted an inflation target in October 1992. Chancellor Norman Lamont proposed to "set ourselves the objective of keeping underlying inflation [defined as the change in retail prices excluding mortgage interest payments] within a range of 1–4 per cent, and we believe by the end of the Parliament we need to be in the lower part of the range", and further that "we need to aim at a rate of inflation in the long term of 2 per cent or less".

The precise calibration of the UK target has changed a little since then, but over a quarter of a century later the nominal anchor of the economy is still essentially in the same place. On one level, the fact that the inflation target has been more or less unchanged has been a virtue: in stark contrast to the preceding 25 years, inflation has been low and stable since the early 1990s. Price stability has been delivered. However, the fact that the target has not even been seriously reviewed in over a decade and a half – an eventful period in monetary history by many measures – could also be considered a vice.

The calibration of the inflation target should reflect the particular structure of the economy and following a profound economic crisis, an extended period of unconventional monetary activism

1 Richard Barwell is Head of Macro Research at BNP Paribas Asset Management. Tony Yates is a former Professor of Economics at Birmingham and Bank of England staffer; he is currently a Research Associate at Resolution Foundation and Senior Advisor to Fathom Consulting. This publication reflects the personal views of the authors and not necessarily those of BNP Paribas Asset Management, Resolution Foundation of Fathom Consulting.

and ongoing structural change in the global economy, it is high time that policymakers and the profession assess whether the current inflation target is still fit for purpose. That is the main recommendation of this chapter: that the UK government should commission a review of the appropriate level of the inflation target.

In the rest of the chapter we explain why the outcome of that review ought to be near-certain to reach the conclusion that the inflation target should be raised. The same thought process that might have delivered a 2% target in 1992 or 2003 would now deliver a higher number. Four is the new two.

The issue of the appropriate index for the inflation target is also an important one, and far more complex than the well-rehearsed debate about how to incorporate the cost of owner-occupied housing. The literature advocates a fundamental departure from the indices currently produced by the national statisticians towards theoretical constructs, through the inclusion of asset prices to capture the future cost of consumption, or the re-calibration of the weights according to how sticky prices are at the item level. Framing the price stability mandate in terms of these indices can deliver good macroeconomic outcomes but with a not insignificant loss on the accountability front, since these theoretical constructs are largely unobservable to the market. These issues are beyond the scope of this chapter but certainly worthy of further investigation.

Two was the magic number

Inflation targeting has become the solution for providing a nominal anchor. Explicit inflation targets were introduced by a number of advanced economies around the same time that the UK made the change, and then with a lag many emerging economies also adopted inflation targets. The precise choice of price index or the precise form of words used to describe the symmetric nature of the target may vary from place to place, but most of the world's major central banks are working with a target that is in the ballpark of 2%.

It would be nice to be able to claim that this consensus on the number two emerged as the result of a careful calibration exercise, based on the conclusions of a mature literature. However, it would probably be more accurate to say that central bankers were nimble in supplying a coherent ex post justification of how that number might have emerged from a rigorous cost benefit analysis of the

optimal inflation rate. Nonetheless, it is still useful to present that framework and those arguments to illustrate why the answer is likely to have changed.

Basic economics suggests that the optimal inflation rate may be below zero. The marginal cost of producing money is close to zero. It follows that the social planner should seek an equilibrium in which there is a sufficient amount of money in circulation in order that the marginal benefit to society of an additional unit – in terms of facilitating transactions – is also close to zero. But it seems unlikely that households and companies would be willing to collectively hold that socially optimal stock money, since each agent will face an obvious financial penalty for holding cash for transactional purposes. Cash pays a zero nominal return and is therefore dominated as a store of value by a host of other substitute assets. We should therefore expect households and companies to be willing to pay the 'shoe leather' costs involved in managing their affairs whilst holding as little cash as possible. It is only when other substitutes for cash offer the same near-zero nominal return that cash offers that households and companies will be willing to collectively hold that socially optimal money stock. Milton Friedman observed that this condition will hold when prices are expected to fall at the same rate as the return on real assets (Friedman, 1969). According to Friedman's rule, then, the central bank should be set a deflation target that offsets the prevailing real interest rate to deliver a zero nominal return on cash and real assets. Two points are worth noting here: first, few practical economists advocate a deflation target; and second, if the real interest rate declines, then Friedman's rule would advocate a higher (less negative) target.

This 'shoe leather' argument is typically presented in the form of a hyperinflation parable and the extreme lengths to which households and companies are forced to resort in order to synchronise their receipt and expenditure of cash and thereby minimise their holdings of cash, and the erosion of real disposable income and financial wealth. Hyperinflations are thankfully rare, but older generations are still intimately familiar with the idea of regular visits to the ATM to withdraw cash – although that was primarily driven by concerns about security, and not inflation. Indeed, it is unclear how relevant these shoe leather costs are in an increasingly cashless economy – with households and companies making use of digital

transactions through traditional debit cards, online or via mobile devices – although there are still costs involved in reallocating your wealth into and out of liquid, non-interest-bearing accounts.

The traditional response to the Friedman rule is seigniorage. Inflation can be thought of as a tax on real money balances, with the state printing new money that can finance new expenditure that indirectly leads to higher prices, which in turn reduces the real value of the cash held elsewhere in the system. Governments do not have the luxury of financing spending on procurement, employing workers, making transfer payments and servicing debt with lump sum taxes. The taxes they rely upon in the real world distort behaviour. As Phelps (1973) observed, it is not clear why the rational social planner would forswear taxes on real money balances and the inefficiency this creates and instead focus entirely on other revenue streams. In other words, a modest distortion to the demand for cash is likely to be considered a price worth paying to reduce distortions to labour supply or saving. Moreover, the inflation tax has the advantage that it can reach parts of the economy that are beyond the scope of conventional taxes. Cash plays a prominent role in lubricating the informal economy, so the inflation tax might prove a useful way to tax activity in this sector.

These arguments suggest that the optimal inflation rate is unlikely to involve prices falling at the real interest rate, but there is nothing here which guarantees that stable prices – a zero inflation target – would be optimal. Fortunately, there are a number of powerful arguments which suggest either a stable price level or at the very least avoiding high and volatile inflation:

- **Menu costs**. Any agent who posts prices is obliged to pay a menu cost that covers the time and money that is spent collecting and processing information in order to calculate the new optimal price and then finally the costs of posting the new price. The rise of the digital economy is likely to have reduced the final aspect of the menu cost, but the other two elements remain. The price mechanism demands that these menu costs are paid to ensure an efficient reallocation of resources in response to all relevant news that is reflected in updated prices. But by delivering a stable price level – or a zero inflation target – the social planner can eliminate inefficient menu costs that are paid periodically by all companies as they reset their price in line with the rising (or falling) price level.

- **Noise in the relative price mechanism**. The efficiency of the market as an allocation mechanism rests on relative prices conveying accurate information about the value of resources consumed in producing a particular good or service, to which consumers can then respond. The higher and the more uncertain inflation is, the harder it becomes to identify the meaningful changes in relative prices, that serve a critical role in a market economy, from the background noise of the inevitably desynchronised and staggered moves in all prices that occur when the price level drifts higher, which can then trigger an inefficient misallocation of resources.
- **Hedging**. The higher and the more uncertain inflation is, the more resources households and companies are likely to devote to insulating themselves from the impact of unanticipated movements in the price level.
- **Fiscal drag**. High and volatile inflation creates a multiplicity of distortions within a complex and less than perfectly indexed tax and benefit system – for example, discouraging labour supply when effective tax rates on workers rise because income tax thresholds fail to keep pace with inflation and discouraging savings because investors are taxed on nominal rather than real returns. Conventional debt contracts have the feature that nominal interest rate is fixed over the lifetime of the loan, and so in periods of high inflation the real burden of servicing the debt will tend to fall over the lifetime of the loan as income rises but debt servicing payments do not.
- **Easing credit constraints.** As mentioned above, conventional debt contracts have the feature that the nominal interest rate is fixed and will reflect expectations of the rate of inflation over the lifetime of the loan. In contrast, the (nominal) resources available to debtors will increase over the lifetime of the loan. Therefore, the higher the level of inflation is, the more the real burden of servicing long-term debt is concentrated in the early years of the contract. It follows that as inflation increases, the capacity of households and companies to service debt at the outset of the loan starts to constrain the amount they can borrow. This front-loading problem can inefficiently constrain investment.

- **Preserving the 'other' role of money.** High and volatile inflation also undermines one of the basic functions of money – namely, its ability to serve as a unit of account. It is much harder to make comparisons about the value of two transactions through time based on prices with high and volatile inflation.

If we want to motivate a strictly positive inflation target, we need additional arguments. The standard response is that inflation greases the wheels of the labour market. At any moment in time, employers will be 'on their labour demand curve' if the wage they pay is the appropriate mark down on the marginal revenue product of the worker, which reflects the productivity of the worker and the value of their output. The labour market is constantly buffeted by cyclical, sectoral and job-specific shifts in labour demand, and for those on the losing end that can imply an inward shift in marginal revenue product from the perspective of their employer. Where those shocks are sufficiently large as to swamp any improvement in productivity, then there will be pressure for wages to fall unless the employer is willing and able to absorb the shock in a lower profit margin. But if there are significant downward nominal wage rigidities – if it is expensive or difficult to cut nominal wages – then companies may be forced to reduce employment to boost productivity and bring marginal revenue productivity back into alignment with an unchanged nominal wage.

Research on microdata covering the 1980s and 1990s suggests that both real and nominal wage rigidities are prevalent in the data and moreover that workers who are more likely to be protected from wage cuts are also more likely to lose their jobs (Barwell and Schweitzer, 2007). However, there is also clear evidence that wage rigidities were in decline during this period – although interestingly, that decline does not appear to be directly related to obvious institutional changes in the labour market such as the decline in the influence of trade unions – so this justification for a positive inflation target may be less persuasive now than at the time when the 2% target was set. Further work is required here to identify how the incidence of downward wage rigidities has evolved over the past couple of decades.

Another standard argument for a positive inflation target is mismeasurement. For a variety of reasons – notably, improvements in the quality of goods at an unchanged price, the arrival of new products and the tendency for consumers to substitute away from

expensive towards cheaper items – the measured rate of inflation is likely to overstate the true rate of change in the price level. It follows that if the social planner believes that a stable price level is optimal, then she should set a positive inflation target equal to her estimate of the upward bias in the inflation data. In other words, aim positive to get zero. The Boskin Commission famously estimated that this bias was of the order of one percentage point in the United States in the mid-1990s (Boskin Commission, 1996). Of course, the consumption basket has moved on since then, as has the retail sector, and it is becoming increasingly uncomfortable to justify the calibration of a positive inflation target on Boskin. Moreover, if there are obvious flaws in the consumer prices data, then it probably makes sense to try and fix them. As the Johnson Review of Consumer Price Statistics recently highlighted (Johnson 2015), there are steps that could be taken to improve the quality of the data and reduce any potential bias. Finally, it is worth keeping in mind that the literature has challenged this classic justification for a positive inflation target. If (as seems likely) the stickiness is located in the quality-unadjusted prices of goods that companies post, then the theory suggests that the nominal anchor should be designed to keep those prices stable through time, which requires a zero not positive inflation target (Schmitt-Grohé and Uribe, 2012).

The final argument for a positive inflation target – the so-called zero lower bound (ZLB) problem – was thought to be little more than a theoretical curiosity at the time the UK inflation target was first calibrated, although it now turns out to be central.

The nominal return on cash is fixed at zero, and therefore it was assumed that the return on the other form of central bank money (reserves) was bound from below at zero too. Any attempt to take the rate on central bank reserves into negative territory would surely lead the banks to liquidate those reserves and run to physical currency that paid a higher rate. Macroeconomists were so convinced of this argument that they talked repeatedly of a zero lower bound on the policy rate. It was understood that the conduct of monetary policy might become severely constrained once the policy rate had fallen to this zero bound. If the central bank cannot cut the policy rate further, then it loses traction on real interest rates which drive the monetary transmission mechanism and there is at least a risk that inflation expectations start to decline, leading real interest rates to rise and pushing the economy into a deflationary spiral.

Fortunately, policymakers had some control over the probability of that risk crystallising by influencing the point around which the policy rate is likely to oscillate through the cycle. After all, the higher the policy rate is on the cusp of a recession, the more room there is to cut rates before you reach the zero bound. In equilibrium, the Fisher relation tells us that the policy rate should be roughly equal to the sum of the short-term real interest rate and the expected rate of inflation. Inflation expectations should be anchored on the target and therefore raising the inflation target is the obvious lever to raise inflation expectations and hence the equilibrium policy rate, creating more space to cut rates in a downturn.

Essentially, this is an argument for paying a flow cost associated with inflation each period in order to reduce the risk of the economy reaching the lower bound in the future. The question for those calibrating the inflation target was the appropriate level of insurance to take out against ZLB risk – that is, what rate of inflation, and hence how much policy space above the ZLB, is a price worth paying to avoid monetary policy becoming ineffective in a future recession?

When the UK adopted its inflation target, 2% inflation seemed ample insurance against ZLB risk. Given the prevailing level of real interest rates, the Bank of England should have had four to five percentage points of room to cut interest rates in a downturn with a 2% target. This would remain the position throughout the pre-crisis period. A survey conducted in 2002 concluded that targeting inflation of 2% or higher implied a small risk of hitting the zero bound, with the policy rate likely to be at zero for between 1% and 5% of the time, which in turn implied "very small risks" of the economy entering a deflationary spiral (Yates, 2004).

Interestingly, one advanced economy, Japan, became marooned at the lower bound during this period, in the wake of a financial crisis. However, the majority of macroeconomists remained convinced that the prevailing calibration of inflation targets was not only still valid, but also sufficient to justify a reactive strategy to evidence that financial imbalances were on the rise. Rather than pre-emptively raising rates in an attempt to burst the bubble, central banks should instead wait for the bubble to burst and then 'mop up' any collateral damage on the economy. That view was informed in no small part by US experience during the DotCom boom and bust. As Blinder and Reis (2005) observed, "if the mopping up strategy worked this

well after the mega-bubble burst in 2000, shouldn't we assume that it will also work well after other, presumably smaller, bubbles burst in the future?".

Five lessons and two conclusions

The case for raising the inflation target rests on a reappraisal of this final argument – the calculation of the appropriate level of insurance against the central bank becoming constrained – because it turns out that the consensus view of almost every input to that calculation has fundamentally changed since the 2% inflation target was set. We highlight five key lessons learned.

The first lesson learned, courtesy of the global financial crisis, was that very large shocks which demand very large policy responses can occur more often than was assumed. Many central banks – the Bank of England included – soon found themselves in a position where the conduct of interest rate policy was constrained. The insurance provided by a 2% inflation target proved woefully insufficient given the state of the pre-crisis regulatory regime. However, that regime has been the subject of root-and-branch reform with the objective of significantly reducing the risk of a recurrence of this episode. If financial crises are the event most likely to trigger an extended period of ultra-low interest rates, and therefore an extended period at the lower bound, then those reforms in the financial sphere may have significantly reduced the risk of hitting the lower bound. But whilst it may be hoped that the pre-crisis monetary stability framework will make more sense in conjunction with the post-crisis financial stability framework, it might be rash to take that for granted given that the new system has yet to be tested.

The second lesson learned is that whilst central bankers can depend on the automatic fiscal stabilisers and reasonably anticipate discretionary fiscal stimulus in a crisis to provide some support to spending, they cannot necessarily rely on a persistent and powerful fiscal policy response. This is in part a problem of willingness, with finance ministers seemingly happy for central banks to shoulder the burden of supporting the economy since it avoids them having to spend political capital justifying higher borrowing, and in part a problem of perceived constraints, with finance ministers fearful of losing the confidence of the bond market and their ability to issue debt at low cost in the current or future downturns, which then

leads them to prioritise consolidation in the aftermath of a crisis. Once again, the less that central banks can rely on fiscal policy, the more monetary space is required in response to large shocks.

The third lesson learned was that central banks were not entirely impotent when interest rates approached zero. Other tools were used to stimulate demand, including forward guidance on the future path of the policy rate and asset purchases. Those tools are discussed in more detail elsewhere in this book. We simply note here that if those tools are a perfect substitute for further rate cuts, then the focus on the lower bound and this justification for a positive inflation target is a distraction. If, on the other hand, these tools are considered imperfect substitutes, perhaps because they involve undesirable side effects or because they too are subject to constraint in use, then the lower bound problem remains. If, for example, central banks enter the next crisis without having had the opportunity to unwind their existing asset portfolios, then there may be practical constraints on the scope of additional purchases.

The fourth lesson learned was that the lower bound on the policy rate was not zero after all. A number of central banks have taken the policy rate into negative territory without the sky falling in. The determinants of and the likely location of the true lower bound in the UK are discussed elsewhere in this book. For our purposes here we simply note the basic takeaway that the further below zero the lower bound lies, the more policy space there is for a given inflation target. Unfortunately, it seems that even if the Bank of England's assessment is too pessimistic and rates can be taken sub-zero, it is likely the case that the true lower bound is not that far below zero. This is true without fundamental reform to our monetary system, either to eliminate cash or to find a means to tax it, which seem both undesirably risky and also likely to be met with insuperable political resistance.

The fifth lesson is that the fundamental anchor of this entire debate has shifted. The social planner chooses a desired level for the equilibrium policy rate and hence the desired policy space above the zero bound. This in turn is pinned down by the prevailing level of the equilibrium real interest rate, which is largely beyond her control, and the level of inflation expectations, which should be anchored on the target. It follows that persistent shifts in the equilibrium real rate will fundamentally change the amount of insurance or policy space that a given inflation target provides. If,

as appears to have been the case, the equilibrium real rate has fallen significantly, then so too will the equilibrium setting of the policy rate and the amount of policy space a 2% inflation target provides.

Indeed, a simple rule of thumb here is that every basis point decline in the equilibrium real rate needs to be matched by a basis point increase in the inflation target to preserve the desired amount of policy space above the lower bound. This is something of a simplification because the cost of acquiring that insurance (the given percentage points of policy space above the lower bound) will have increased because higher inflation carries higher social costs. Moreover, if we assume that there are costs involved in changing the target, then the social planner is likely to be conservative in her calibration of the required increase in the inflation target given that changes in equilibrium real interest rates are hard to estimate in real-time and even harder to forecast. Nonetheless, the basic point holds: so long as we are confident that equilibrium real interest rates have fallen materially and are likely to stay low for some time – in other words, that there is at least something to the secular stagnation hypothesis – then the inflation target must be raised if we wish to regain the policy space we thought we had in the early 1990s.

These five lessons suggest two clear conclusions in our minds.

First, the combination of the apparent scale of the decline in the equilibrium real interest rate, the inherent uncertainty about the effectiveness of unconventional monetary stimulus and the willingness of finance ministers to deploy a sustained fiscal stimulus suggests that the inflation target should be raised to restore policy space above a lower bound that is likely not far below zero.[2] Estimates vary, but according to analysis by the Bank of England, the equilibrium real rate has fallen by more than two percentage points since the UK adopted an inflation target. A two percentage point increase in the inflation target therefore seems roughly right. In other words, four is the new two.

Second, the calibration of the inflation target should not take place in a vacuum, but rather the key aspects of the three policy frameworks should be jointly determined. In particular, for so long as the public debt burden remains high (which seems a reasonable

2 See Summers (2013). For a discussion of the forces bearing down on the equilibrium real rate, see Vlieghe (2016) and Rachel and Summers (2019).

assumption given looming demographics trends) and there is limited appetite for sustained fiscal stimulus, then monetary policy will have to shoulder the burden of stabilisation policy in future downturns. If there is no appetite to raise the inflation target to create more space in response to high severity tail risks, then the financial stability policy regime must be set in such a way as to make the probability of a key subset of those risks crystallising vanishingly small. Likewise, if the target is not raised and the financial stability regime is not set in such a way as to make the system bulletproof, then the fiscal authority must prepare now to be in a position to shoulder the burden of stabilisation in a future economic crisis because relatively little support should be expected from monetary policy.

Of course, raising the target is not a free lunch. We have already encountered a number of arguments for low or even no inflation. Raising the target implies imposing additional costs on society each period. The key calibration question is whether those costs increase proportionately or more than proportionately with inflation. We believe that over the interval in question – moving from 2% to 4% – the costs of inflation should not increase prohibitively.

Practical prevention is better than theoretical cure

Raising the inflation target is not the only way to solve the lower bound problem. Many within the policy community appear to have a preference for an alternative solution, known as price level path targeting, in preference over raising the inflation target. We disagree.

Macroeconomists and policymakers have become increasingly persuaded of the case for a *robust* approach to the conduct of economic policy given the pervasive uncertainty about the structure of the economy. There is a preference for decisions which perform reasonably well across a range of different modelling assumptions as opposed to those where outcomes hinge on the accuracy of particular assumptions or mechanisms. Our preference for a higher inflation target is a case in point: the alternative places too much faith in the behaviour of expectations.

Price level path targeting is discussed in detail elsewhere in this book, but we need to offer a brief review here in order to explain why we believe raising the inflation target is the better solution.

Price level path targeting has the fundamental feature that policy becomes explicitly history dependent. With a conventional inflation target, the objective that policymakers are trying to achieve in the future does not depend on their success in achieving that objective in the past. That is, central banks are required to deliver a particular rate of change of prices in the future irrespective of whether inflation has been too high or too low in the past. That having being said, the conduct of policy might still depend on history in the presence of significant hysteresis or path-dependence effects. If the central bank was unable to insulate the economy from large shocks in the past, then inflation expectations might have de-anchored and potential supply might have been eroded, which will influence the stance of monetary policy.

With a price level path target, the objective of monetary policy clearly depends on past performance – bygones are no longer bygones. If inflation was too low in the past, then the central bank is obliged to ensure that it will be too high in the future in order that there is no long-run impact on the price level. There are a number of ways in which this basic idea can be implemented that fall under the umbrella of price level path targeting:

- a temporary state-contingent suspension of the inflation target when the policy rate reaches the lower bound, with the central bank adopting a price level path target (typically but not necessarily consistent with 2% inflation) such that the central bank is then obliged to compensate for any undershoot of the target whilst the effectiveness of monetary policy is impaired by delaying the timing and trajectory of exit from the lower bound;
- a permanent switch to a price level path target – again, typically but not necessarily consistent with 2% inflation – such that the central bank is obliged to compensate for any undershoot or overshoot of inflation around the now hypothetical target by adjusting the stance of policy to deliver an offsetting move; or
- a switch to average inflation targeting, which is an approximation to a permanent switch to a price level target, in that the period over which average performance is evaluated spans the past as well as the future and therefore the inflation objective in the near future is calibrated to compensate for past performance. However, performance is typically calculated over a finite window so policy could be said to depend on recent history.

> If the central bank is unable to compensate for deviations of inflation in a timely fashion, then that history of under- or overshoots will sooner or later drop out of the window used to calculate the inflation objective over the future and the price level can drift away from the intended path.

All of these proposals offer the same basic solution to the lower bound problem: the central bank promises too much inflation later relative to a 2% inflation target, which then obliges the policymaker to set policy in a different way (to keep the stance looser for longer) than she would otherwise have done with a 2% target. Expectations of a looser stance in the future should depress long rates today, and that should boost demand.

All of these proposals have the virtue of quantifying precisely the overshoot in inflation that central banks are required to deliver, which should reduce the risk that a problem of inflation expectations potentially de-anchoring to the downside does not morph into the opposite concern.

All of these proposals also have the advantage that this commitment is hard-wired into the framework, and therefore the commitment is more credible than would be the case if the Monetary Policy Committee (MPC) provided so-called Odyssean forward guidance at the lower bound that it now intended to set policy in such a way as to mimic outcomes under these history dependent strategies. After all, members of the MPC can always change their minds, and in any case serve finite terms.

However, the other thing these proposals have in common is that they offer solutions for how to escape the lower bound once the economy has arrived at that point; they do relatively little to reduce the risk that the economy runs up against the lower bound in the first place. Indeed, it could be argued that a permanent price level path target and average inflation targeting increase the risk that the economy will periodically arrive at the lower bound because the framework will oblige central banks to periodically disinflate the economy when the price level has risen too far, even though inflation is stable at the target. It is inevitable that policymakers will sometimes miscalibrate the execution of that disinflation strategy, triggering an excessively sharp slowdown in demand that will ultimately have to be corrected with a much looser monetary stance.

Moreover, it is not entirely clear how effective the cure is. In a workhorse macroeconomic model with sophisticated forward-looking agents, the implications of a price level path target are clear. Agents use the true model of the economy, including the monetary policy reaction function, to form expectations about the future path of interest rates and inflation. With the switch to price level path targets, agents now believe rates will be lower for even longer and inflation will therefore be higher in the future. And if short-term rates are expected to be lower in the potentially far future, then long-term interest rates will fall today. If spending is sensitive to long-term real interest rates, then a price level path target can stimulate spending when the short rate hits the lower bound via these expectations channels.

The price level target may work reasonably well in the textbook, but it is far from clear whether it will work in practice.

The mechanism described above relies on features of the model (descriptions of behaviour) which may not be realistic. In the real world, agents may not even have well-defined expectations of the policy rate and inflation far in the future, whilst others may use simple rules of thumb. Indeed, most of the population may remain blissfully unaware that the central bank has communicated *anything* about the delayed timing of lift-off from the lower bound. Only a small subset of the population may understand the implications of the new monetary policy framework and revise their expectations accordingly in line with the prediction of the model. Moreover, the transmission from long-term interest rates to spending may be relatively weak. In the real world, promises about the far future may have a limited impact on outcomes today.

In fact, the performance of price level path targets at the lower bound is debatable even within the confines of the textbook model. The effectiveness of the cure hinges on the framework being perfectly credible. If agents suspect that the central bank could renege in the future – if they believe that the central bank will choose not to deliver the above-target inflation in the future that is required to reach the price level path, and instead raise rates sooner and by more – then the framework will have little traction on expectations and hence the economy.

In contrast, raising the inflation target reduces the probability that the economy will arrive at the lower bound in the first place precisely because the gap between the policy rate and the lower

bound increases roughly one for one with the change in the target, creating more policy space. The more policymakers are concerned about the welfare loss when the economy is marooned at the lower bound, the more inclined they should be to favour raising the inflation target than adopting price level path targets. Practical prevention is better than a theoretical cure.

Practical considerations: Fine tuning inflation expectations

It is one thing to announce an increase in the inflation target; it is another to credibly convince agents that you can deliver that higher target and no more. The proposal to raise the inflation target is essentially an experiment in fine tuning inflation expectations.

It is all too easy to imagine the announcement underwhelming agents, in which case inertial expectations will likely prove a formidable constraint on achieving the higher target. The UK is something of an outlier in that there is not the same recent history of under-shooting the target that has been experienced in the euro area, the United States and Japan. However, those idiosyncratic inflation outcomes do appear to have been largely a function of a sequence of price-level shocks, given the behaviour of the exchange rate or government policy (an increase in VAT and tuition fees). It is therefore perfectly plausible that a promise to raise CPI inflation to 4% and hold it there might be met with some scepticism.

If inflation expectations do not move in response to the announced change in the target, then it would likely be harder still to reach the harder target. The MPC would presumably have to generate an extremely large imbalance in the real economy (i.e., a positive output gap) to have a realistic chance of raising inflation to 4% if the Phillips curve is flat (i.e., inflation is relatively insensitive to those real imbalances) and expectations remain anchored on the old 2% target. There is every chance that the MPC would be unable to drive inflation up to the new target. This would be an unsatisfactory outcome: little is to be gained from announcing an increase in the inflation target that cannot be achieved.

There are a number of solutions here. One is to allow inflation to crawl to the new inflation target, effectively committing to a price level path that increases at a gradually increasing rate. However, what is gained in the elegance of the transition is lost in the complexity of the framework: the nominal anchor might not

be transparent and clear to the general public. An alternative is to attempt an opportunistic reflation – that is, to wait for favourable circumstances to announce the change when the Chancellor could be confident that inflation was likely to overshoot the target (for example, if there was a large decline in the exchange rate). Finally, the Chancellor could use fiscal levers to help the Bank of England to achieve a higher target, with perhaps a major relaxation in the stance through higher spending and cuts in direct taxation allied to an increase in indirect taxes.

The ideal outcome, as suggested by former MPC member Adam Posen, would be for governments to coordinate on a common increase in inflation targets and a fiscal stimulus calibrated to deliver it. In this way, there is probably more hope that the motivation for the change is not misunderstood and the objective is achieved. However, we see little prospect of such a coordinated move and instead propose unilateral action.

Equally, it is all too easy to imagine that agents could misunderstand the change in the target as a signal of a fundamental loss of fiscal discipline and the first step in an inflationary escape from a high debt burden, in which case inflation expectations could de-anchor and rise far above the new target. Indeed, the latter argument appears to be the root cause of the paralysis within official institutions on this question – the fear that any attempt to move the target will inevitably be misinterpreted, leading to an inflationary surge that, even given a higher target, would then demand a costly disinflation.

We do not discount this risk of losing control of expectations and inflation altogether. Indeed, we believe it would be a mistake to rule out any future change in the inflation target precisely because we are open to the possibility that circumstances will continue to change and being open about that fact could play into the hands of the conspiracy theorists. Nonetheless, there are steps that can be taken to mitigate the risks. For one thing, the process should be conducted in a transparent fashion. All the analysis that is produced as part of the formal review should be published, whether it supports the ultimate conclusion or not. More importantly, the government could also send a signal about its commitment to price stability by pledging to increase the share of index-linked debt in new issuance, thereby reducing whatever incentive might currently exist to inflate away debt.

References

Barwell, R. and M. Schweitzer (2007), "The incidence of nominal and real wage rigidities in Great Britain: 1978-1998", *Economic Journal* 117(11): F553-F569.

Blinder, A. and R. Reis (2005), "Understanding the Greenspan standard", *Proceedings of the Economic Policy Symposium at Jackson Hole*, pp. 11-96.

Boskin Commission (1996), *Toward a More Accurate Measure of the Cost of Living*, Final Report to the Senate Finance Committee.

Friedman, M. (1969), *The Optimal Quantity of Money and Other Essays*, Aldine.

Johnson, P. (2015), *UK Consumer Price Statistics: A Review*, UK Statistics Authority.

Phelps, E.S. (1973), "Inflation in the Theory of Public Finance", *Scandinavian Journal of Economics* 75: 67-82.

Rachel, L. and L.H. Summers (2019), "On falling neutral real interest rates, fiscal policy and the risk of secular stagnation", *Brookings Papers on Economic Activity*, Spring.

Schmitt-Grohé, S. and M. Uribe (2012), "On quality bias and inflation targets", *Journal of Monetary Economics* 59(4): 393-400.

Summers, L. (2013), "Why stagnation might prove to be the new normal", *Financial Times*, 15 December.

Vlieghe, G. (2016), "Umbrellas don't cause rain", speech at Sheffield University, 28 November.

Yates, A. (2004), "Monetary Policy and the Zero Bound to Interest Rates: A Review", *Journal of Economic Surveys* 18(3): 427-481.

CHAPTER 2

Flexible inflation targeting

Karen Ward[1]

Flexibility against the risk of de-anchoring

While the economic community's framework for understanding inflation has not changed much in recent decades, a wealth of research suggests that the relevant importance of the influencing variables has.

The framework remains that inflation in any one time period will be a function of a) inflation expectations – the rate of inflation expected in 'normal' times, and b) a deviation dependent on the prevailing pressures of demand on supply.

In my view it is clear that the former is becoming more important than the latter. Inflation appears almost impervious to changes in the degree of slack in the economy. The relationship between slack and inflation, known when depicted graphically as the Phillips curve, appears to have flattened considerably (Ball and Mazumber, 2011; IMF, 2013).

It is the role of inflation expectations in the price-setting process that now appears paramount (Yellen, 2017).

For central banks this can be a blessing. But it can also be a curse.

A central bank that manages to anchor inflation expectations at a desired level has a relatively easy life. Shocks to the economy will lead to very limited deviations in inflation from target, which the central bank can comfortably accommodate safe in the knowledge that inflation will gravitate back to target. The central bank will not have to lean too heavily against the wind of an output gap, and as a result volatility of both output and inflation is minimised.

1 Chief Market Strategist at JPMorgan Asset Management. This publication reflects the personal view of the author and not necessarily that of JPMorgan Asset Management.

Conversely, if a central bank fails to anchor the system at a rate of inflation it deems as desirable, then the policy response has to elicit a far greater deviation in demand to reach a target inflation level.

Emerging markets, such as Argentina, demonstrate the problem of a system in which inflation expectations are anchored at a level that is undesirably high. For much of the developed world, including the UK, the other extreme is perhaps more relevant. Japan has shown for over two decades how inflation expectations can get stuck at a level that is undesirably low. It is proving extremely difficult for the Bank of Japan to convince businesses to adapt to a higher rate of price inflation.

If inflation expectations get stuck at too low a level, the central bank is more likely to be troubled by the zero lower bound for interest rates. I am entirely unconvinced that any of the new monetary tools developed since the global financial crisis – asset purchases or negative interest rates – represent a perfect substitute for traditional monetary policy. Though there is insufficient scope to elaborate in this chapter, resulting distortions to financial markets and capital allocation may have longer-term ramifications, in my view.

To avoid the problems of the zero lower bound, it is necessary to anchor inflation expectations at a desired positive rate. Unfortunately, our understanding of how inflation expectations are formed is poor, though there is some evidence that past outturns of inflation play a role in households' and businesses' expectations of inflation in the future (Gaspar et al., 2010).

At face value, this suggests central banks should be less flexible – that they should not tolerate deviations of inflation from target. However, a small open economy like the UK will be hit by shocks which have implications for activity and the short-run price level. For example, a depreciation of the exchange rate would boost import prices. A central bank could attempt to fully counter the passthrough of these costs and prevent the one-off increase in the price level and temporary increase in the inflation rate. But such an approach would most likely prompt firms to cut costs elsewhere, including via employment potentially.

In short, central banks face a major challenge. A dogged focus on keeping inflation at target at all times may increase the volatility of output, but tolerance of persistent deviations from the target increases the risk of de-anchoring inflation expectations.

It could be argued that central banks could accommodate a deviation from target unless and until there is evidence that inflation expectations are becoming de-anchored. This might be true if we had adequate ways to monitor inflation expectations in real time. However, the market and survey measures we have available do not obviously provide such a reliable compass. In the early 1990s, Japan experienced years of deflation before closely tracked measures of 'inflation expectations' from economic or market forecasters suggested the system had become dislodged (Maruyama and Suganuma, 2019). It would be wrong to suggest that central banks can assume their inflation target is credible until the current suite of indicators of inflation expectations suggest otherwise.

The Bank of England should move to an average inflation targeting framework

The optimal inflation targeting framework is one which has the deepest commitment to the target and has the best chance of enduringly anchoring inflation expectations. This in turn would afford the central bank some degree of flexibility and minimise output volatility.

In the context of anchoring inflation expectations, the Bank of England's point target of 2% is clear and simple and far superior to the original specification of a target range for inflation.

However, what is suboptimal about the current framework is that it is entirely forward-looking; the Bank of England has no need to make up for past errors regardless of how sizeable or prolonged.

A more optimal framework is one in which the central bank can allow inflation to deviate from target but must compensate for any past misses in the future.

This amounts to a price level target whereby the central bank provides households and firms with an expected path for prices over the long term and a commitment that any deviation from that path would have to be compensated for so that the level of prices returns to the prescribed path.

In practice, this means that a period of past inflation overshoot must be compensated for in the future by a corresponding period of undershoot, and vice versa, in order to return the price level to the desired path.

A generally more robust framework

An average inflation targeting framework has in my view a better chance of anchoring inflation expectations than a purely forward-looking, 'bygones are bygones' framework.

I believe that it also more adequately meets the government's broad objective of providing an economic framework that will foster economic prosperity. A commitment to a path for prices over the medium to long term allows households to plan – how much to save, spend, invest and borrow.

Suppose, for example, that a firm invests in a plant and range of machinery based on a projection of output and prices, and thus an expected income stream. If, however, some years later aggregate price gains and the price of the entrepreneur's product have grown at a much more moderate rate, the entrepreneur's income stream may well have ended up well below the level that they had anticipated. If the plant and machinery were bought with a loan from the bank, then repaying the loan will not be as straightforward as expected ex ante. For this entrepreneur, bygones are far from bygones. She would react by scaling back future investment and/ or reducing staff to realign net outflows to the new lower trajectory of expected profits.

Similarly, if a period of low inflation coincides with a period of weak wage growth, then a household may not see their income growing in the way anticipated when taking on a mortgage or loan. They might feel the need to cut back on spending to try and realign their cash flow to this lower trajectory of wages.

The paradox of thrift dictates that when households and businesses react to negative news in a similar manner, whilst individually rational, it generates a significant adverse feedback loop for the macroeconomy. If inflation has been persistently below target because aggregate demand is suboptimal and proving less responsive to monetary stimulus than expected, such a reaction by companies and households will make it even harder for the central bank to lift demand and inflation.

The scenario described above is often described as a balance sheet recession. Following a downturn, economic players focus on repaying debt. But the resulting downturn in demand creates a vicious cycle in which the burden of debt keeps growing. Prolonged periods of weakness in turn result in much greater hysteresis effects

as firms remain reluctant to invest and hire, having been deeply scarred by the past. This can be amplified by the response of banks and other financial institutions.

Table 2.1 shows that in the past five years, many major developed world economies have had inflation persistently below target. This has accumulated into a sizeable price *level* shortfall, most evident in the euro area and Japan.

Table 2.1 Inflation outturns in the past five years and price level shortfalls

	Average inflation in the last five years	Per cent deviation from price level that would have prevailed had target* been met
UK	1.5	-2.2%
US	1.3	-3.4%
Euro area	0.9	-4.3%
Japan	0.9	-7.7%

Notes: Inflation indices are the personal consumption expenditure deflator for the US, the Harmonised Index of Consumer Prices (HICP) for the euro area, and the Consumer Price Index (CPI) for the UK and Japan. *Targets taken as 2% for US, UK and Japan and "close to but below 2%" is assumed to equate to 1.9% for the euro area.

While safeguarding against a period of low inflation appears most relevant in the current conjuncture, the framework should be symmetric, with a period of inflation overshooting followed by a period of undershooting.

The reason is that a prolonged period of inflation above target can also be damaging. Indebted firms and households may well be comfortable if their debts have fallen in real terms, but it is less pleasant for those on fixed incomes, such as many pensioners, who experience a real decline in incomes when inflation overshoots the target. Aiming for a subsequent period of more moderate inflation would reassure such individuals that this is not a permanent loss to real incomes.

Given the distributional consequences of inflation across different population cohorts (Bullard et al., 2012) – debtors and savers, young and old – a system in which past errors have to be compensated for in the future would be more equitable. It also insulates the central

bank from the political consequences of pandering to a particular section of the electorate, in turn strengthening the independence of the institution.

Again, this is very relevant to the current policy debate. The Bank of Japan is sometimes criticised for purposely missing its inflation target so as to better serve its rapidly ageing population, which has a preference for low inflation. The institution risks falling out of favour with the younger sections of society who might have a preference for a higher rate of inflation.

A bedrock for forward guidance

Average inflation targeting would also provide a clear framework to underpin forward guidance, which has become a key component of policy in recent years as other tools have been exhausted. In setting out clearly the medium-term objective in relation to errors in the past, the central bank can identify the future path of policy required to meet its objectives.

In general, good communication will be essential under an average inflation targeting framework. In part, this is to overcome issues of time-inconsistency (Woodford, 2010). Put simply, households and firms might not trust the central bank to run the economy 'hotter' to generate a period of above-target inflation following a period of undershoot. They might suspect that when inflation returns to target, policy might immediately return to a neutral setting.

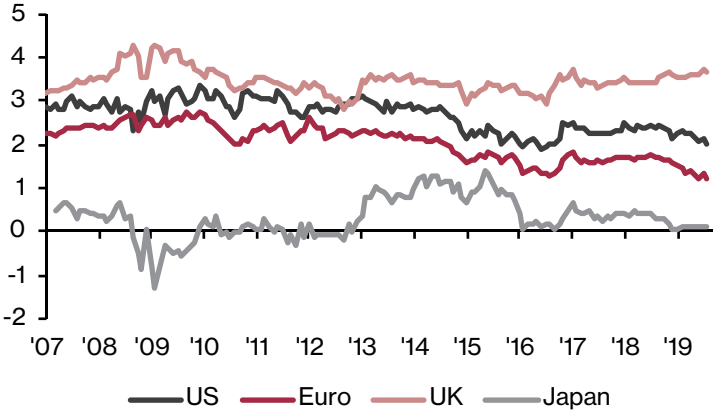
Guiding expectations on the exact scale of overshoot is also important, reducing the risk that economic players extrapolate a desired temporary deviation of higher inflation for a permanent tolerance for a new level of inflation.

Relevance to the Bank of England?

Some might argue there is no need to change the Bank of England's mandate when there is little sign that inflation expectations are becoming de-anchored in the UK (see Figure 2.1, which shows inflation expectations according to five-year, five-year forward swap rates). Aside from the caveat that these measures of inflation expectations have in the past proved to be unreliable indicators, I would argue this is exactly the time to ensure an optimal structure

is in place. Once inflation expectations start to slip, the policy and output response required to shift inflation expectations could become sizeable.

Figure 2.1 Inflation expectations according to five-year, five-year swap rates



Note: The reference rate for the five-year, five-year swap rates are the CPI for the US and Japan, the HICP excluding tobacco for the euro area and the Retail Price Index (RPI) for the UK. The UK RPI is consistently higher than the CPI by around one percentage point.[2]

Practical considerations

The target horizon

Over what time horizon should the central bank seek to reach the target on average? Economic cycles provide an appealing target horizon, but such an approach would be difficult to implement in practice since it is hard to define when a business cycle begins and ends. Deliberation over the definition of the cycle may distract from the broad objective of compensating for a period of below-target inflation with one in which inflation is subsequently above target, and vice versa, to get the price level broadly back on track.

2 For a detailed explanation for the wedge between the RPI and CPI, see Office for Budget Responsibility (2015).

A simple rules-based framework would be preferable to such a subjective, discretion-based approach. The central bank could be required to aim for a point target based on the estimate of inflation over a ten-year period. In other words, the bank would take into account the rate of inflation experienced over the past five years and set policy to deliver a rate of inflation over the coming five years so that the average over the ten-year period would be 2%.

The fan charts

The Bank of England's *Inflation Report* framework and fan charts would need to be modified, but provide an ideal vehicle for effectively communicating an average inflation targeting framework. Here, I suggest one alteration and one supplement.

The fan chart would need to be extended forwards to five years to show any degree of desired over/undershoot under the framework. This should be supplemented by a corresponding price level chart. This would make clear that the overall objective is to have prices rising on a steady trajectory over time. At the end of the five-year forecast period shown in the fan chart, prices would be expected to reach their desired level if the policy on which the fan charts are conditioned is deemed appropriate.

The mandate

Such a change to the framework would have to be at the request of the UK government. Key paragraphs of the Bank of England's current remit are reproduced below.

> *The Bank of England Act states that in relation to monetary policy, the objectives of the Bank of England shall be:*
>
> *a) To maintain price stability*
>
> *b) Subject to that, to support the economic policy of Her Majesty's Government, including its objectives for growth and employment.*
>
> *The operational target for monetary policy remains an inflation rate of 2 per cent, measured by the 12-month increase in consumer prices. The inflation target of 2 per cent applies at all times. …*
>
> *The framework is based on a recognition that the actual inflation rate will on occasion depart from its target as a result of shocks and disturbances. Such factors will typically move inflation away from target temporarily. Attempts to keep inflation at the inflation target*

> *in these circumstances may cause undesirable volatility in output due to the short-term trade-offs involved, and the Monetary Policy Committee may therefore wish to allow inflation to deviate from the target temporarily.*
> …
> *In exceptional circumstances, shocks to the economy may be particularly large or the effects of the shocks may persist over an extended period, or both. In such circumstances the MPC is likely to be faced with more significant trade-offs between the speed with which it aims to bring inflation back to the target and the consideration that should be placed on the variability of output.*

The Bank is clearly afforded a considerable degree of flexibility under this mandate. In particular, the Monetary Policy Committee (MPC) is entrusted with the judgement of how long it should take for inflation to return to target in order to be in accordance with the government's other economic objectives.

But the remit is explicitly forward-looking. There is no reference to making up for past shortfalls, so it would have to be rewritten accordingly.

The remit also dictates that if inflation moves away from target by more than one percentage point in either direction, the governor of the Bank of England must write to the Chancellor of the Exchequer to explain the circumstance and strategy for returning inflation to target. I would advocate a change to the current system of letters such that a divergence from the inflation target of more than 1% that persists for a period of more than six months requires a letter providing the government with an explanation for the undershoot, any action that is intended to be taken, and a commitment to compensate with future inflation.

Conclusion

The economic merits of inflation targeting come from providing households and firms with a clear and stable trajectory for prices, and in turn real income, on which to plan. Safe in the knowledge that prices will rise in a slow and steady fashion over the long term, they can decide how much to save, spend, invest and borrow.

The current inflation framework does not adequately provide such a commitment to a steady upward trajectory. The Bank of England is merely required to try its best to reach a 2% target in the future,

regardless of what has happened in the past. Past errors are locked in. Households and firms can find themselves having to adjust to a level of real income that might deviate considerably from what they had anticipated ex ante.

An inflation undershoot may permanently raise the burden of debt. This in turn increases the risk of a balance sheet recession as the paradox of thrift takes hold. The increase in autonomous saving by firms and households leads to a downturn in aggregate demand. This makes it even harder for the central bank to meet its inflation objectives.

Conversely, a considerable period of inflation overshoot will permanently reduce the purchasing power of those on fixed incomes, often pensioners.

A framework whereby the Bank of England must account for past errors would be superior to the current forward-looking framework. Operationally, the 2% target should be achieved on average over a period of ten years. This average would reflect inflation outturns over the past five years and an estimate of inflation over the coming five years. The horizon of the Bank of England's inflation fan charts would be extended, and a corresponding price-level chart could demonstrate the underlying price-level objective.

An average inflation targeting framework would be more robust with greater credibility over the long term. It would be less prone to de-anchoring of inflation expectations, and less vulnerable to adverse feedback loops and the consequent risk of a balance sheet recession and associated hysteresis. By being more clearly equitable across different population cohorts, it would also lessen the risk of political interference.

It would be misguided to assume that this advice is only relevant for the Bank of Japan, or other central banks who have struggled recently with persistently weak inflation. The experience of Japan, and increasingly the euro area, shows that once inflation expectations have de-anchored it is extremely difficult to right the course. Fixing the roof is much easier when the sun is shining. The Bank of England should shift now before there are obvious signs that inflation expectations have slipped.

References

Ball, L. and S. Mazumder (2011), "Inflation dynamics and the Great Recession", NBER Working Paper No. 17044.

Bullard, J., C. Garriga and C Waller (2012) "Demographics, Redistribution and Optimal Inflation", *Federal Reserve Bank of St Louis Review* 94(6).

Gaspar, V., F. Smets and D. Vestin (2010), "Inflation expectations, adaptive learning and optimal monetary policy", Handbook of Monetary Economics, Vol. 3.

IMF (2013) "The dog that didn't bark: has inflation been muzzled or was it just sleeping?", Chapter 3 in *Hopes, Realities, and Risks*, *World Economic Outlook*, April.

Maruyama, T. and K. Suganuma (2019), "Inflation expectations curve in Japan", Bank of Japan Working Paper Series No 19-E-6.

Office for Budget Responsibility (OBR) (2015), "Revised assumption for the long-run wedge between RPI and CPI inflation", Economic and Fiscal Outlook, March.

Woodford, M. (2010), "Optimal Monetary Stabilisation Policy", NBER Working Paper No. 16095.

Yellen, J. (2017), "Inflation, Uncertainty and Monetary Policy", speech at the 59th Annual Meeting of the National Association for Business Economists, Cleveland, OH.

CHAPTER 3

Monetary policy: "Whatever it takes, within our (*new?*) mandate"

Huw Pill[1]

Ahead of the global financial crisis, a broad consensus emerged regarding the conduct of monetary policy in advanced economies. Independent central banks steered short-term interest rates in pursuit of the goal of price stability, understood as a low and stable rate of consumer price inflation. In the UK, implementing this consensus took institutional form in the inflation targeting regime established as the Bank of England achieved operational independence in 1997.

For a sustained period, this framework not only offered admirable clarity of purpose and a certain intellectual elegance; it also delivered results. At the turn of the century, economists lauded the 'Great Moderation', which saw low and steady inflation rates delivered in a context of wider macroeconomic stability (Stock and Watson, 2002). Former Bank of England governor, Mervyn King, identified a "NICE decade" in the UK – a sustained period of **N**on-**I**nflationary **C**onsistent economic **E**xpansion (King, 2003). The improved design of monetary policy was widely seen as central to the achievement of these outcomes.

Why review the inflation targeting mandate?

The global financial crisis has challenged this comfortable view.

At a minimum, it has rendered the conduct of monetary policy more complex. The macroeconomic environment has become more challenging for conventional monetary policy – output has fallen, trend growth is weakening, supply-side developments are

1 Senior Lecturer at Harvard Business School.

less favourable and the natural real rate of interest has declined. All this has brought central bank policy rates closer to their (perceived) lower bound. Policy transmission has been disrupted by dislocations to financial institutions and markets. As a result, central banks have been forced to adopt new instruments (such as quantitative and credit easing), while innovating along other dimensions of policy (such as liquidity operations and communication) (Pill, 2010). By nature, these innovations beg novel questions for the monetary policy mandate: how should new measures interact with one other, with the conventional interest rate instrument and with other non-monetary policy tools?

Moreover, during the crisis, central banks (with varying degrees of enthusiasm) assumed or extended responsibilities beyond their traditional monetary domain, into bank supervision, macro-prudential policy and quasi-fiscal support for credit provision. Rules are needed to govern how these responsibilities interact with monetary policy, as well as among themselves (Pill and Reichlin, 2017).

More profoundly for the monetary policy mandate – albeit less fully explored thus far – the financial crisis should raise doubts about the adequacy of the pre-crisis monetary policy consensus. Conveniently for monetary policymakers, responsibility for the crisis has largely been assigned elsewhere – to avaricious bankers, to misguided financial innovations, to incompetent bank supervisors and to regulatory weaknesses in the financial sector. This assignment may be convenient. That does not mean it is correct – at least not in entirety.

Through a variety of channels, monetary policy may also have played a role in creating and propagating the crisis.

First, inflation targeting encouraged policymakers to focus on shorter-term inflation dynamics. In its formulation, the Bank's two-year ahead inflation forecast became the central vehicle for the discussion, signalling and communication of monetary policy. In a jurisdiction with a poor inflation history, refocusing public attention on the impact of monetary policy on price developments was certainly desirable. But the focus on inflation two years ahead came at the expense of neglecting lower frequency dynamics in the economy, which threatened price, financial and macroeconomic stability at longer horizons.

In particular, and with the (considerable) benefit of hindsight, monetary policymakers gave too little weight to the accumulation of macroeconomic and financial imbalances during the 'NICE' decades. Self-sustaining but ultimately unsustainable developments in credit markets lay at the heart of this process. With the onset of the crisis, the sharp unwinding of these imbalances had profound implications for price and economic developments that had not been captured in conventional macroeconomic projections, including the Bank's famous inflation fan charts (Gennaioli and Shleifer, 2018).

Second, beyond encouraging neglect of them, the conduct of monetary policy under inflation targeting may have actively contributed to the accumulation of these underlying imbalances. In particular, the steepening of the money market yield curve associated with the well-signalled, gradual normalisation of the monetary policy stance in the mid-2000s created incentives for carry trades in the money market and a resulting build-up of excessive intra-financial sector leverage. This leverage proved to be an important propagator and amplifier of the financial crisis, if not its source.

These characterisations of monetary policy's role in the crisis are certainly not uncontroversial. But neither can they be dismissed lightly. Entertaining such arguments implies a need to review the UK's inflation targeting framework. Yet, a dozen years after the onset of the global financial crisis, monetary policy continues to operate in essentially the same institutional framework, as if nothing can be learnt from the trauma of the past decade.

This partly reflects the undeniable policy successes achieved within the current framework. Broad macroeconomic stability has been restored. The financial system has largely stabilised. UK inflation has hovered around target over recent years, albeit exhibiting somewhat greater volatility than during the NICE decades. Understandably, discussions about revising the Bank's mandate start from the premise "if it's not broken, don't fix it".

Yet the lack of a strategic review also reflects the character of the crisis itself. Monetary policy innovations after 2008 represent exceptional actions to address exceptional times – and were initially

styled as such.[2] By nature, such measures are temporary and will be reversed once the crisis abates. They do not bring the underlying strategic framework and mandate of monetary policy into question; rather, they are the exceptions that prove the rule. In that context, the policy debate focused on questions of exit – how to re-establish the pre-crisis regime once the ephemeral crisis requiring exceptional action had passed.

But, as other chapters in this book discuss, both circumstances and the passage of time imply that many crisis-spawned monetary policy innovations are here to stay. Central bank balance sheets will be larger and show more varied composition on both the asset and liability sides than before the crisis, with the range, riskiness and maturity of monetary policy operations having expanded considerably. Rather than questions of exit, this situation demands a reform and modernisation of monetary policy's governance, setting out the procedures and limits to manage these new tools and the relationship among them. That is a mandate issue.

New policy responsibilities and novel policy instruments have shifted monetary policy and central bank activities much closer to the heart of political debate. With the advent of quantitative easing (QE) and other non-standard measures, the distinction between monetary and fiscal policy has blurred. Credit easing has subsidised financing for some sectors relative to others. Monetary policy choices are thus both more economically invasive and have more obvious distributional intent and impact than in the past. By nature, this exposes them to greater political scrutiny.

The pre-crisis 'social contract' between the Bank of England's monetary technocrats and the wider society they serve was founded on a willingness of the latter to give significant autonomy to the former in pursuit of a narrow and widely agreed objective (inflation at target two years hence) with a narrow and broadly neutral policy instrument (short-term nominal interest rates). The legitimacy of the approach rested on the complementary narrowness of both the means and the ends. As the nature of monetary policy evolves, means become more diverse and ends become more subject to question. These changing circumstances dictate that the pre-crisis central banking social contract is now under threat.

2 See Lenza et al. (2010), who discuss the policies introduced around the failure of Lehman Brothers in this way.

One approach to revising that contract would be simply to establish the price stability objective and leave central banks to design and use tools to achieve it as they see fit — in other words, to do "whatever it takes" (to coin a phrase)[3] to attain the inflation target. In essence, this entails minimising discretion over the ends of policy (at least in principle), but maximising discretion over the means used to achieve them. In the midst of crisis, the flexibility accorded policymakers by such an approach may be appropriate.[4] But there are several reasons why, as the crisis recedes, constraining discretion over policy actions, not just over policy objectives, may improve effectiveness and sustainability over time.

First, placing fully unconstrained discretion in the hands of unelected central bank technocrats is not consistent with liberal democratic principles.[5] Aggressive innovation in monetary policy on the grounds that "the ends justify the means" may undermine the legitimacy of such policies and the broader policy framework (including central bank independence and the primacy of the price stability objective). This is particularly the case if policy innovation has significant distributional impact and/or creates conflict with other policy domains. Better to do "whatever it takes, *within our mandate*" (emphasis added). Then, by implication, the mandate needs to be defined. And when novel tools are introduced, the mandate needs to be refined and extended to accommodate and manage them.

Second (and more subtly), in some circumstances open-ended policies may prove less effective as the private sector is always left 'waiting for more'. Imposing limits may enhance policy impact. And should circumstances dictate (say, in the face of another financial crisis) that further policy innovation is required, an abrogation of existing explicit limits may amplify the impact of a policy over what could be achieved by an incrementalist approach.

3 Draghi's (2012) intervention focused on preserving the integrity of the euro and the euro area, but has been used by others to address the price stability mandate.

4 Even if other objectives – notably around financial stability – enter monetary policy decisions at that point.

5 Tucker (2018) offers a rich discussion of these issues, in both central bank and other contexts.

Third, failure to review the strategic framework for monetary policy can also damage central bank communication, which is increasingly seen as an important channel of policy transmission. Monetary policy strategies fulfil two roles: (i) organising the flow and analysis of data internally in order to support monetary policy decision making; and (ii) offering a framework for the presentation of those decisions and their rationale to external constituencies, notably the public and financial market participants. To the extent that the internal decision-making process incorporates lessons from the financial crisis whereas the external presentation of decisions remains unchanged, the transparency, clarity, credibility and ultimately the effectiveness of monetary policy will be threatened. The danger exists that being forced to shoe-horn the presentation of policy decisions into a framework that has not evolved to reflect new realities will distort the policy message. Worse, by a process of backwards induction, policy decisions may be taken so as to be communicable within the existing framework, leading to poorer policy choices – the communication 'tail' wags the policymaking 'dog'. Some of the recent communication challenges faced by the Bank of England can be seen in this light.

All in all, more than ten years on from the onset of the global financial crisis, the time has come to review the Bank's mandate and assess whether it remains fit for purpose. Wholesale change is unnecessary; the existing framework has avoided the calamity that threatened in 2007-08. What is required is an update and refinement, which captures the main lessons drawn from confronting the crisis since 2008, while not endangering the considerable advances made within the inflation targeting framework over the preceding decades.

In what follows, I seek to complement specific policy proposals analysed elsewhere in this volume with some more general considerations on how the Bank of England's mandate may need to evolve. The discussion is organised around two themes.

First, without prejudice to the overall goal of price stability over longer horizons, greater flexibility in managing the unavoidable shorter-term trade-offs facing monetary policy may be needed than was recognised in the past. Explicitly recognising this shorter-term flexibility and the complexity that surrounds it is preferable to shoe-horning policy decisions into the existing narrower framework that generates excessive focus on short-term inflation developments.

Second, as a quid pro quo for offering greater flexibility in managing short-term economic trade-offs, discretion over the use of novel or non-standard policy instruments – which, by nature, was very high when they were first introduced in response to the crisis – should be limited in some ways.

Such limits serve the interests of two constituencies. For advocates of such policy innovations, accommodating them within the explicit central bank mandate improves the legitimacy, communicability and, ultimately, the effectiveness of such tools. For sceptics of such policy initiatives, the proposed limits stem the advance along the 'slippery slope' towards undesirable outcomes that the prohibition or avoidance of such measures in the past was designed to avoid.

Refining the definition of ends…

The neutrality of monetary policy over the longer term has not been fundamentally challenged by the recent financial crisis. As a result, identifying price stability as the ultimate objective of monetary policy remains uncontroversial.

Other chapters in this book discuss at length issues surrounding the quantification and operationalisation of the relevant notion of price stability. In particular, that analysis entertains a number of possible refinements to current arrangements: (i) raising the Bank of England's inflation target in order to reduce the frequency at which policy rates are constrained by the perceived lower bound; (ii) redefining the Bank's target in terms of the price level (or multi-year moving averages of inflation rates), so as to strengthen self-stabilising expectational mechanisms in the economy via real interest rates; and (iii) lengthening the horizon at which the price stability target (however defined) is to be achieved.[6]

I will not repeat the arguments surrounding these issues. Suffice to say that each proposal comes with pros and cons, raising issues of operational practicality and communication. But a common thread across proposals to refine the Bank's price-level objective is that they create greater flexibility for policymakers in the short term. In other words, the set of immediate monetary policy decisions that can be validated as compatible with the achievement of the Bank's target is broadened rather than narrowed by the refinements to the

6 These issues and proposals are discussed in Pill and Smets (2013), for example.

target under consideration. This begs the question of how central bank policymakers should choose from among the enlarged set of policy actions consistent with achieving their target.

Of course, this is not a new issue. The transmission of monetary policy to price developments famously operates with long, variable and (crucially) not fully predictable lags. As long as the economy is subject to shocks that influence inflation more quickly than a monetary policy response can offset them, central banks will not be able to stabilise inflation at target. And, if the magnitude and timing of policy transmission is uncertain, there will always be a residual uncertainty about the future evolution of inflation, again implying that full inflation stabilisation is impossible. Empirically, these two conditions are certainly met.

A central banker that seeks to minimise deviations of inflation from its target on a high frequency basis notwithstanding these practical constraints has been labelled an 'inflation nutter'. Although such an approach in principle minimises inflation deviations from target, it has been seen as a poor guide for monetary policy. The volatility imparted to other macroeconomic variables as a consequence of this narrow-minded minimisation of inflation deviations from target comes with significant welfare costs. As a result – and as reflected in the Bank of England's existing mandate and conduct of monetary policy – central banks have pursued a *flexible* inflation targeting strategy, whereby volatility of inflation around its target is traded off against the volatility of other macro aggregates, such as the output or employment gaps.

At least conceptually, this framework suggests a very simple approach to governing how the flexibility accorded monetary policymakers should be used: while remaining committed to achieving the price stability objective, any remaining flexibility with policy decisions should be used to maximise 'social welfare'. Implementation of such an approach requires social welfare to be defined, entailing a large number of difficult value judgements as well as a very sophisticated understanding of the mechanics of the economy and the preferences of households within it. Attempts in the academic literature are, by nature, highly model-specific and, as such, hard to make operational. Nonetheless, this thinking has been influential in thinking about how to govern monetary policy decisions.

Famously, standard New Keynesian models, which represented the workhorse model for monetary policy analysis a decade ago, exhibit no trade-off between the stabilisation of inflation and the stabilisation of the (welfare-relevant) output gap (i.e., the gap between actual output and efficient output). This result was labelled the 'divine coincidence' and foretold a comfortable existence for central bankers, as there was no tension between their pursuit of an inflation target and stabilising output at its efficient level.

Unsurprisingly to monetary policymakers, practice has unfortunately proved more complex. Even in the abstract modelling world, the 'divine coincidence' disappears with only modest departures from the benchmark model (notably when real economic frictions – such as those arising when wages, as well as prices, are 'sticky' and thus real wages exhibit some inflexibility – are entertained). In the simplest version of these refined frameworks, central banks then face a trade-off between inflation volatility and output gap volatility in the shorter run as they seek to maintain price stability over the medium term.

For a welfare-optimising monetary policymaker, the relative weight of inflation and output gap volatility in the loss function it seeks to minimise (typically labelled lambda) is determined by the parameters of the model. Somewhat more sophisticated versions of these models which incorporate other features that help mimic the observed inertia in economic aggregates complicate the situation,[7] but the essential intuition carries over.

The Bank of England has embraced this framework in the articulation of its monetary policy. Leading Bank officials often characterise their policy dilemmas in the form of exploring the trade-off between deviations of inflation from target and output from potential under various calibrations of lambda, seeking to signal robust policy conclusions that are not dependent on any specific model or value of lambda. In terms of simplicity and clarity, this approach has obvious attractions: it is embedded in a well-established and deeply researched academic framework, yet it frames policy decisions in a communicable way.

7 For example, changes in the output gap and not just its level may also enter the social welfare or loss function.

Unfortunately, recent experience has not been kind to the models that underlie this framework. In particular, these models neglect the financial sector, which by nature came to the fore during the financial crisis, disrupting monetary policy transmission and driving macroeconomic dynamics in a manner that the models did not anticipate. Incorporating financial effects is a rich and dynamic part of the current macroeconomic research agenda, but insufficient progress has been made thus far for the results of research to be fully operational from a policymaking perspective. Nonetheless, recognising that the accumulation of financial and macroeconomic imbalances can play a role in medium-term inflation developments that is not reflected in the baseline model is an important preliminary conclusion of such work. This suggests a need to move beyond framing the governance of monetary policy around a 'choice of lambda' given prospective shorter-term inflation developments and a preferred estimate of the output gap.

The practical challenge of how to conduct monetary policy given this need remains an open question. One traditional response is to adopt an intermediate target, whereby policy seeks to stabilise a macro variable (such as money, the exchange rate or nominal GDP) that has a stable relationship with the price level over the medium term. Such an approach is seen as both (i) reliably delivering price stability (the stable relationship implies that the intermediate variable acts as a 'nominal anchor' for the economy, since its stability through time delivers price stability through time); and (ii) giving a clear and transparent guide to the conduct of monetary policy to govern the flexibility available to policymakers in the pursuit of price stability.

Experience with an intermediate target, perhaps especially in the UK, has been poor. First, the professed stability between the intermediate variable and the price level has often proved unreliable, breaking down just as policymakers sought to exploit it. The archetypal example is intermediate monetary targeting in the 1980s, where even repeated redefinitions of the target monetary aggregate proved insufficient to underpin a sufficiently reliable relationship with price developments over the longer run. Moreover, for a small, open economy like the UK, nominal exchange rate flexibility can be an important adjustment and stabilising mechanism. As experience

with the Exchange Rate Mechanism (ERM) in the early 1990s demonstrated, foregoing that flexibility can come at a high cost in terms of employment and growth.[8]

Nominal GDP targeting has more advocates of late.[9] Drawing on the discussion above, it can be viewed as a simple, communicable and neutral way of pinning down the lambda governing the inflation/output gap trade-off. That is attractive. But it suffers from many of the same shortcomings of that framework, notably, neglecting the financial channels of transmission and propagation in the economy and the potential for an accumulation of financial and macroeconomic imbalances over time.

I am therefore sceptical of an intermediate targeting approach. But that is not to suggest that policymakers should be blind to developments in the variables offered as intermediate targets. On the contrary, nominal GDP (and its components) and the exchange rate are variables central to the evolution of the economy. And the neglect of financial variables implicit in that would in part be addressed by close monitoring of developments in monetary and credit aggregates, as well as a wider assessment of the financial flows, interest rates and asset prices that determine wider financing conditions in the economy. But rather than attempting to stabilise nominal GDP growth, the exchange rate or a monetary aggregate around an intermediate target, central banks should seek to analyse and understand developments in these variables, extract the signals relevant for price and wider macro developments and use these as important inputs in coming to the overall assessment underpinning monetary policy decisions.

An alternative framework for governing the conduct of monetary policy in pursuit of price stability would be to adopt a Fed-style 'dual mandate', which explicitly recognises that monetary policy should seek to stabilise output or employment as well as inflation (with a similar weight on each) even as it seeks to ensure price stability is maintained in steady state. As with nominal exchange

8 In grappling with the impact of and uncertainties surrounding Brexit (which have implications for the appropriate UK real exchange rate), the Bank has proved adept at exploiting nominal exchange rate flexibility to manage that adjustment. Giving up that flexibility may therefore be especially unwise at present.

9 See Sheedy (2014) and Bean (2013) for discussions from a theoretical and policy-oriented perspective.

rate targeting, this approach can be seen as a communicable way of determining the 'lambda' in a loss function-based characterisation of the policy trade-off.

This approach is subject to two critiques. First, as with nominal GDP targeting, such a framework focuses attention on shorter-term developments in inflation and neglects lower frequency economic dynamics associated with financial and macroeconomic imbalances.[10] Second (and more profoundly), adopting a dual mandate dilutes (at least rhetorically) the prioritisation assigned to ensuring price stability in steady state. The dual mandate starts from the premise that steady-state inflation is credibly pinned down and emphasises the trade-offs faced at higher frequencies. In a jurisdiction with a poor inflation track record within living memory (such as the UK), taking this credible establishment of price stability in the medium term as a given may prove complacent. Better to emphasise the primacy of that requirement for monetary policy, while recognising that it is both possible and desirable for central banks to adopt a flexible approach to conducting monetary policy at cyclical horizons. This approach is embedded in the mandates of many central banks (including the Bank of England), which establish a clear hierarchy of objectives. Only with price stability over the medium term ensured can managing cyclical trade-offs be entertained. Now is not the moment for innovation on this dimension.

… constraining the use of means

A well-designed mandate will not only establish objectives for policy; it will also establish limits to the conduct of policy in pursuit of that objective. Given space constraints, I focus here on how this applies in the case to QE.

During the crisis, QE was motivated by two considerations. Initially, when faced with a seizing up of financial markets in the autumn of 2008, central banks engaged in massive liquidity injections to support market functioning and prevent the collapse of the banking

10 Interestingly, the Fed's mandate also includes a requirement that the flow of credit to the economy be maintained. One interpretation of this additional element beyond the well-known inflation/employment dichotomy is as a recognition that steering lower frequency monetary dynamics as well as underwriting effective transmission of monetary policy through the financial sector are also important guideposts for central bank conduct.

sector. In many cases (including the UK), a substantial part of this liquidity injection was implemented via QE. These were one-off emergency actions to contain specific financial stability threats.[11]

Latterly, as scope for easing via conventional interest rate cuts was exhausted by the approach of the lower bound, the motivation for QE shifted. By buying longer-maturity instruments using money created for the purpose, central banks absorbed duration from the market, squeezed term premia and lowered longer-term yields, thereby easing overall financing conditions and supporting the economy.[12]

These policy initiatives were no doubt well-intended and likely necessary. But implementing large-scale asset purchases came with side effects. In particular, QE inevitably blurred the distinction between monetary and fiscal policies.

Given the depth of market required for the magnitude of purchases and the understandable reluctance of central banks to assume private credit risk, central banks bought sovereign debt. Whatever the motivation for such actions, they had a fiscal impact. Of course, monetary policy has always influenced fiscal outcomes — interest rate changes influence sovereign financing costs. But, with QE, the character of the relationship has changed. Two channels can be distinguished.

First, central bank purchases of sovereign debt create space on heavily indebted government balance sheets, allowing the Treasury to ease fiscal policy even in the face of market reluctance to finance fiscal expansion. The government's intertemporal solvency is not brought into question; so-called monetary dominance is maintained over the price level. The central bank simply exploits its privileged status to resist market-dictated pro-cyclicality in fiscal policy when financial markets are unwilling or unable to finance government borrowing. In this, the central bank supports the government in using fiscal policy to sustain aggregate demand (a

11 For example, the Federal Reserve controversially appealed to "unusual and exigent circumstances" to justify some interventions during the crisis that were seen (even in its own eyes) as at the margins of its established mandate.

12 Admittedly, the implied flattening of the yield curve weighed on returns to maturity transformation, the profitability of banks and thus potentially credit creation and loan supply. Nonetheless, monetary policymakers judged that, on balance, the stimulative impact of lower long rates would be the dominant effect.

natural complement to the central bank's own monetary efforts in this direction, and a potential channel of transmission even when monetary policy options have been exhausted).

Contrast this with a second potential fiscal channel of QE transmission. In this, the central bank stands ready to finance a programme of fiscal easing that undermines the government's intertemporal solvency and establishes a regime of so-called fiscal dominance over the price level. It has been argued that such an approach may be the only way to revive inflation were the scope for stimulative monetary policy to be exhausted.

These two approaches are observationally equivalent at the outset. How the economy and price developments react to QE will depend largely on the market's expectations over whether policymakers are engaging the first or second transmission channel. The mandate of the central banks – and specifically the limitations placed on central bank financing of government deficits indirectly through purchases of sovereign debt in the secondary market – will be an important (if not the determining) factor shaping these expectations.

How these expectations are shaped has potentially profound implications for the inflation outlook and monetary policy. To take one example for the purposes of illustration: it is often said that, once constrained by the lower bound on policy rates, monetary policymakers should err on the side of aggression in implementing QE since the error of under-stimulus may be difficult to reverse if inflation expectations ratchet downwards, whereas the tools to contain any inflation overshoot are well-understood (raise policy rates to choke off excess demand). This logic holds in the first scenario, where monetary dominance over the price level is maintained. But if expectations of fiscal dominance take hold, higher interest rates may exacerbate rather than contain inflationary pressures as the present value of sovereign debt – the extent of government intertemporal insolvency – rises. When managing private expectations of the limits surrounding the implementation of QE, the stakes for monetary policymakers are therefore high.

Prior to the crisis, the institutional mechanism for managing these expectations was the prohibition of monetary financing. This implied very strict limits on the ability of central banks to finance fiscal activities: it aimed to shut down both of the potential channels of QE transmission described above on the grounds that (i) the implied rigid separation of fiscal and monetary affairs was

desirable from an institutional accountability perspective; and (ii) the conventional interest rate instrument would provide sufficient leverage for monetary policy to achieve its objective. But in the face of the crisis, this very strict prohibition proved unworkable. With conventional easing via interest rates exhausted, other tools of monetary stimulus were needed. And (perhaps more controversially from the Bank of England's perspective), the need for central banks to support fiscal activities – in the UK, largely in the form of quasi-fiscal subsidies supplied to the banking sector through liquidity operations – became apparent. In that context, the strict prohibition of monetary financing became unenforceable in practice.

In reviewing the central bank mandate after the crisis, the challenge is to find a new framework for steering private expectations of the fiscal/monetary nexus. At present, central bankers remain rhetorically (and legally) constrained by the pre-crisis regime, even as they implement actions at the very margin of it, if not beyond. That is neither healthy nor transparent, and may lead to suboptimal policy choices that can be defended more easily in court, in front of Parliament or to the public, rather than what is efficient and effective in policy terms.

While no taboo should be left unchallenged by the financial crisis and its aftermath, a starting point for framing revisions to the mandate governing monetary/fiscal interactions would be to permit and institutionalise monetary policy support to fiscal activities via the first channel of QE transmission (while subjecting them to appropriate scrutiny and accountability), while proscribing exploitation of the second channel described above (which, by establishing fiscal dominance over the price level, begs a further, deeper set of issues about the allocation of policy responsibilities and objectives across various arms of government).

Efforts in that direction would not only offer institutional tidiness; they would also improve the effectiveness of policy actions. To the extent that private actors are concerned that QE is being employed to permit fiscal policies that undermine intertemporal government solvency, the stimulative impact of fiscal easing under the first transmission channel is likely to be weakened (on Ricardian grounds). By the same token, if a central bank really wished to 'cross the Rubicon' and embrace fiscal dominance on the basis that, with monetary tools exhausted across the board, this was the only way to revive inflation, then the expectational leverage associated with

a very visible decision to alter the limits imposed by the central bank mandate on monetary/fiscal interactions would offer powerful communication leverage.

Conclusion: Some modest proposals

Summing up, this discussion leads to relatively modest innovation in the monetary policy mandate. Three points can be emphasised.

First, maintaining the primacy of the price stability objective is essential. For good reasons, monetary policy has been assigned responsibility for anchoring price developments.

Second, the mandate should recognise that achieving price stability at a meaningful horizon accords monetary policymakers considerable discretion in managing shorter-term cyclical trade-offs among macro variables. In governing how monetary policymakers employ that discretion, a number of innovations are desirable: (i) distinguishing more clearly between features of the mandate itself and how the Bank of England thus far has chosen to operationalise its approach (via inflation forecast targeting); (ii) by implication, de-emphasising the Bank's inflation forecast at a specific two-year horizon in favour of a more 'timeless' perspective on the outlook for price developments; in order to (iii) give greater weight to the lower frequency price and economic dynamics associated with slower moving accumulations of financial and macro imbalances; which in turn requires (iv) more prominent monitoring of developments in the financial sector and asset prices, including monetary and credit aggregates and the exchange rate, where the origins and drivers of such imbalances are most visible; while recognising that (v) monitoring of financial developments should not be understood as targeting monetary growth rates, the exchange rate or asset price levels either in their own right and/or as intermediate targets, but rather as instrumental in the pursuit of mandate itself.

Fortunately, on my reading, many if not most of these elements have been incorporated into central bank practice, especially in the aftermath of the financial crisis. Modernising central bank mandates to reflect such innovations is needed. Absent this, practice and presentation of policy actions will diverge, to the detriment of the transparency, accountability and ultimately the credibility of policy. But this is an evolutionary rather than revolutionary process.

Third, recognising and legitimising the flexibility available to central banks in the management of cyclical macro/financial trade-offs should be complemented by (re-)introducing explicit limits on the use of new or non-standard policy instruments.

Of late, circumstances have dictated that central banks adopt innovative policies. In the face of the financial crisis, such policies were both necessary and desirable. But, by their non-standard nature, the limitations to such policies were not fully established in pre-crisis central bank mandates. There is thus a need for mandates to 'catch up' with practice, particularly insofar as they relate to the interactions between monetary and fiscal affairs.

As central bankers become more concerned that conventional channels of monetary policy transmission are exhausted, advocacy of non-standard measures that blur the distinction between monetary and fiscal policy are inevitably being entertained.[13] This is understandable and inevitable, but not without its risks — after all, the motivation for imposing limits on central bank financing of government deficits has not disappeared. Defensible limits for the new, post-crisis world are preferable to no limits at all.

References

Bartsch, E., J. Boivin, S. Fischer, P. Hildebrand and S. Wang (2019), "Dealing with the next downturn: From unconventional monetary policy to unprecedented policy coordination", BlackRock Investment Institute.

Bean, C. (2013), "Nominal income targets – An old wine in a new bottle", speech at the Institute for Economic Affairs Conference on the State of the Economy, London, 27 February.

Draghi, M. (2012), Speech at the Global Investment Conference, London, 26 July.

Durré, A., C. Manea, A. Paul and H. Pill (2015), "Strategic challenges for UK monetary policy: Addressing fiscal-isation", presentation at the UK monetary policy forum, 25 September.

13 Bartsch et al. (2019) represents a good example of prominent former central bankers advocating such an approach. Durré et al. (2015) offer a more sceptical view.

Gennaioli, N. and A. Shleifer (2018), *A Crisis of Beliefs: Investor Psychology and Financial Fragility*, Princeton University Press.

King, M.A. (2003), Speech given by the Governor of the Bank of England, East Midlands Development Agency, Leicester, 14 October.

Lenza, M., H. Pill and L. Reichlin (2010), "Monetary policy in exceptional times", *Economic Policy* 62: 295-339.

Pill, H. (2010), "Monetary policy in a low interest rate environment: A checklist", *International seminar on Macroeconomics* 6: 335-345.

Pill, H. and F. Smets (2013), "Monetary policy frameworks after the great financial crisis", in J. Braude, Z. Eckstein, S. Fischer and K. Flug (eds), *The Great Recession: Lessons for Central Bankers*, MIT Press, pp. 21-50.

Pill, H. and L. Reichlin (2017), "Non-standard monetary policy measures and financial stability: Developing an appropriate macro financial policy mix", in R. Tunaru and J. Vilmunen (eds), *Preparing for the Next Financial Crisis: Policies, Tools, Models,* Cambridge University Press, pp. 8-25.

Sheedy, K.D. (2014), "Debt and incomplete financial markets: A case for nominal GDP targeting", *Brookings Papers on Economic Activity*, Spring: 301-361.

Stock, J. and M. Watson (2002), "Has the business cycle changed and why?", *NBER Macroeconomics Annual* 17: 159–218.

Tucker, P. (2018), *Unelected Power: The Quest for Legitimacy in Central Banking and the Regulatory State*, Princeton University Press.

Part 2: Instruments

CHAPTER 4

Some coordination problems inherent to central bank independence

Richard Barwell and Arnaud Marès[1]

Any discussion of the operational framework of central banks and the means by which it can be improved includes a substantial measure of subjectivity. As Claudio Borio once put it, "just as there are a hundred ways to skin a cat, so there are a hundred ways to implement monetary policy" (Borio, 1999). The central bank operational framework is more often than not the outcome of an accumulation of precedents, conventions and habit. There are, however, a number of circumstances that require a more thorough review of whether the *modus operandi* of the central bank is truly suitable to the achievement of its objective.

In this chapter we consider both aspects of the implementation debate, with a recommendation for a change in the convention for implementing conventional monetary policy to banish socially useless volatility in short-term money markets and a recommendation to retreat from the 'one independent policymaker per instrument' *über-Tinbergian* consensus towards coordination over the implementation of unconventional monetary policy.

Implementing conventional monetary policy

The conduct of monetary policy rests upon the central bank's privileged position as the monopoly supplier of base money. Basic economics teaches us that a monopolist can control the price or quantity that prevails in the market, but not both because she faces a demand schedule, and so it goes for the Old Lady.

1 Richard Barwell is Head of Macro Research at BNP Paribas Asset Management. Arnaud Marès is Chief European Economist at Citibank. This publication reflects the personal views of the authors and not necessarily those of BNP Paribas Asset Management or Citibank.

There is a monetary myth that once upon a time the Bank of England used to adjust the quantity of money in circulation in order to engineer the right price, given a good working knowledge of the location of that demand schedule. Fifteen years ago, when he was busy presenting the "biggest shake-up in how we implement monetary policy for at least a quarter of a century", the then Executive Director for Markets, Paul Tucker, was keen to disabuse central bank watchers of that notion: "neither in the past nor in the current review have we even briefly entertained the notion that this is realistic" (Tucker, 2004). The alternative, of course, is for the monopolist to set the price and the market to determine the quantity, and that is what the Bank does.

The shake-up that Paul Tucker was referring to certainly paid dividends, but there is still unfinished business. There was a sequence of structural breaks in the volatility of overnight rates during this period, as a review of the way the Bank implemented monetary policy was announced and then the actual reforms were implemented. The calm would soon be disturbed by the financial crisis, as banks discovered that the task of forecasting liquidity was increasingly complex and they became increasingly wary about the stigma that might be associated with making use of the standing liquidity facilities. But tranquillity was soon restored once we moved beyond the seismic tremors of the crisis and entered the era of quantitative easing and the associated massive expansion in the stock of base money remunerated at Bank Rate. The Bank was, and still is, operating a floor system and volatility has been vanquished. But at some point quantitative tightening will begin and the stock of excess reserves will start to dwindle, and eventually the floor system will no longer satisfactorily anchor market rates.

The Bank of England is conscious that it will have to prepare for the decline of excess reserves. The current plan is to stand ready to lend reserves against high quality collateral through regular open market operations. That is an eminently sensible strategy, but the plan falls short of a more radical approach to implementation that has been in circulation for at least a decade (for an excellent exposition, see Wiseman, 2007).

The Monetary Policy Committee (MPC) votes on the appropriate level of Bank Rate. It is then the task of Bank officials to implement that decision in the market. Stepping back, it is not clear why the Bank's framework is not designed to do precisely that – to set the price.

In the new steady state, the Bank could implement an active (near) zero corridor system (Barwell, 2016). This scheme has two key elements:

- the Bank would remunerate reserves up to some generous limit at the bank rate, and then stand ready to remunerate excess reserves beyond that limit and potentially in unlimited size at a rate epsilon below Bank Rate; and
- it would stand ready to lend reserves to individual banks in unlimited size at any moment in time at a rate epsilon above Bank Rate, secured against good collateral.

In short, what is proposed here is the creation of an on-demand, fixed-rate full-allotment regime for individual institutions as opposed to periodic open market operations to inject liquidity. The (near) zero corridor scheme should permanently crush the volatility in overnight rates.

Before engaging with the substance of this proposal, it is worth dealing with a common misunderstanding. The (near) zero corridor scheme would not discourage banks from self-insuring against a funding stress by turning the central bank into a generous lender of first resort. For a start, a robust system of liquidity regulation has now been put in place to force banks to make adequate provision irrespective of what is done here. Second, banks need good collateral to access funds at epsilon above Bank Rate, so the fundamental constraint remains: if you want to be able to tap the lender of first resort, then you need to be confident of having good quality collateral; and to be frank, if you have an ample supply of good quality unencumbered collateral, then you are unlikely to face a funding squeeze.

The rationale for this proposal is clear: there is nothing of value to be gained from price discovery in the overnight market because the MPC has already determined the socially optimal price. In contrast, it appears that the Bank is still willing to accept some residual volatility around that price in the future. It is unclear why.

The question is whether anything is lost in moving to the (near) zero corridor regime. There are three arguments here, and none is compelling.

First, it is argued that the Bank of England would lose the valuable information it can extract about the liquidity management of banks from their usage of the standing facilities, which in turn would leave the Bank less able to gauge the risk of a full-blown liquidity crisis. This argument surely does not apply in the post-crisis era, since the Bank of England has resumed responsibility for the micro-prudential supervision of banks. It now has access to far more reliable information on the state of banks' balance sheets than it could possibly glean from usage of the standing facilities.

Second, it is argued that the Bank would lose control over the size of its balance sheet if it stood ready to lend in unlimited size at a rate epsilon above Bank Rate. This is a valid observation but, to be blunt, so what? The question of control has long since been conceded: the monopolist cannot set price and quantity. The Bank stands ready to accommodate an increase in demand for reserves. The active (near) zero corridor regime simply eliminates the ambiguity.

Third, it is argued that the regime would undercut the overnight money market. Again, this much is true – the short-term money markets will all but disappear – but what of it? If this market serves no social purpose, then the Bank would allow valuable resources to be released to more productive purposes elsewhere in the economy by implementing the (near) zero corridor regime.

The question is what becomes of the operational standing facilities in the (near) zero corridor regime. The facility for deposits would obviously become redundant, but there could still be a role for the operational lending facilities in which institutions could access funding at a less attractive rate with lower quality collateral.

The (near) zero regime deals with the market for money at a very short horizon. The Bank cannot be in the business of fixing the price of money beyond the horizon of the next policy meeting – at least, not without clear instruction from the Committee (see below). However, there is scope for reform to purge these markets of unnecessary volatility.

The Bank has established a framework for lending money over a longer horizon: the Indexed Long-Term Repos (ILTRs), in which banks can bid for six-month money once each month; and in the background sits the more flexible backstop arrangement, the Contingent Term Repo Facility (CTRF). These are sensible additions to the Bank's toolkit.

The design of the ILTRs as a mechanism for maximising consumer and producer surplus is undoubtedly elegant. But the construction of the supply schedule and the concept of the cost to the Bank of providing electronic cash against certain collateral is at least debatable.

There are strong grounds for extending the scope of and design of the ILTRs in the same direction as the recommendation above. The Bank could stand ready to provide funds to institutions at multiple horizons and a more predictable price and with full allotment rather than via auctions.

The purpose of these operations would not be to crowd out the market for money at these time horizons, but rather to provide clarity via an upper bound over the cost of secured funding at these horizons. This facility would effectively provide an asymmetric form of yield curve control in money markets, suppressing spikes in term-secured funding rates. To be clear, these facilities should typically provide funds on significantly less attractive terms than banks can access in the market. Moreover, the cost of these on-demand, fixed-rate full-allotment term facilities should vary according to a number of factors:

- the **term** of the secured loan;
- the **size** of the secured loan, likely expressed relative to the size of the firm; or
- the **quality** of the collateral that banks deploy.

It would be prudent to embed a macroprudential override into the calibration of the scheme, which should be under the control of the Financial Policy Committee (FPC). The FPC could then adjust the cost of accessing the scheme through time, and in particular during moments of stress, to discourage banks from pursuing socially irrational but privately rational defensive actions, such as

deleveraging their balance sheets, if funding costs surge. In other words, the FPC could vary the asymmetric yield curve control over the financial cycle.

The key calibration question is how the cost of funding should vary according to the term of the loan. The answer should reflect two considerations: a prudential policy consideration about the appropriate fee (disincentive) for access to liquidity insurance at that particular horizon (which is likely increasing in the term and perhaps more than proportionately); and a monetary policy consideration about the appropriate level of the risk-free nominal rate at that horizon, and hence the path of Bank Rate between now and then. The latter is worthy of further comment.

The Bank could simply anchor this cost schedule on the path implicit in market pricing, but that is to delegate control over a key aspect of the framework to the market. Another option is to anchor the cost to the current level of Bank Rate. But if – as is discussed elsewhere in this book – the MPC were willing to provide forward guidance about the likely path of Bank Rate over, say, a three-year horizon, then the Bank would have an obvious anchor for this aspect of the cost of term funding out to three years. Moreover, by embedding the guidance within this mechanism, the Bank would be 'putting its money where its mouth is', adding credibility to the communication.

Implementing unconventional monetary policy

We are entering a period in which the Bank of England will be forced to review its implementation of unconventional monetary policy, because the macroeconomic and financial environment within which the Bank operates will likely (continue to) force it to operate in markets over which it has only imperfect control. Perhaps counter-intuitively, our main conclusion is not that the Bank should alter its operational framework in a particularly meaningful way. Rather, our main conclusion is that there should take place a reflection on whether the full institutional separation of responsibilities and decision-making powers between the Bank and other government agencies is still entirely optimal and appropriate.

Changes to the operational framework of the central bank are required under a variety of circumstances. The first and most obvious would be a situation where the objective changes. That is

probably not a situation that deserves much discussion now, as we assume here that for the foreseeable future, and in compliance with the Bank of England Act 1998, the objective of the Bank in relation to monetary policy will remain "*(a) to maintain price stability and (b) subject to that, to support the economic policy of Her Majesty's Government, including its objectives for growth and employment*".

An alternative situation where a discussion of the means to implement policy is required is one where the objective does not change but the intermediary target of policy changes, for instance if it shifts from steering the level of short-term interest rates to controlling the supply of money, or vice versa.

A third situation in which the operational framework would require reform is one where the markets in which the central bank operates are undergoing changes, which in turn requires operations to move to other markets, or take a different form, to achieve the same result.

In the case of the UK, two developments are currently taking place that may (in the case of one) or likely will (in the case of the other) create a challenge for central bank operations.

The first is Brexit, but as we can make very little in the way of a useful or informed statement about what form it may take, we will not discuss its implications here at all.

The second is the very low nominal rates that have prevailed over the past decade in the UK, as in much of the developed world, and that are likely to become a permanent feature of the Bank of England's environment.

What we like to refer to as 'unconventional' instruments of monetary policy were in fact not so much 'unconventional' as unusual. They were not unconventional because, fundamentally, they were mostly an extension of what monetary policy has always aimed at doing in the modern fiat money era, namely, altering the matrix of interest rates across the economy to influence investment and consumption decisions and thereby steer aggregate demand. They were unusual, however, because they had not been used before.

Looking forward, it is probably a fair assumption to say that these instruments will come to be regarded as neither unconventional nor unusual. The primary reason is that the control of short-term interest rates alone is unlikely to be sufficient to allow the Bank of England to alter its monetary policy stance as appropriate.

Over the past ten years, Bank Rate has fluctuated in a range of just 50 basis points (between 0.25% and 0.75%). In fact, it has been stable at 0.50% for the vast majority of that time. As that decade has evidently been one that witnessed a very wide range of cyclical situations, clearly the mere steering of short-term interest rates cannot be said to have been the primary instrument of the central bank, in direct contrast to preceding decades.

This situation is hardly peculiar to the Bank of England. Central banks in a few developed economies changed interest rates a bit more than the Bank of England did, but on the whole not by much. The US Federal Reserve System is the only major central bank to have recovered some meaningful policy space with respect to short-term interest rates, and even then only for a fraction of the fluctuation range of rates in previous economic cycles.

The experience of Japan, where the policy rate has been near zero for over 20 years, ought now to be seen realistically more as the norm than the exception. It is possible that we will return to an environment of higher inflation and – more importantly – a lesser overhang of savings globally that will allow a general increase in the level of policy- and market-determined interest rates around the world. It is probably fair to say that even if that does happen, it will not allow the Bank of England to return to the exclusive use of Bank Rate as a policy tool in the foreseeable future. Independently of what happens with Brexit (and putting the consequences of Brexit aside is a very odd thing to do here), the economic cycle in advanced economies is maturing to the point where the likelihood is that over the (short) horizon of visibility of economists and the (equally short) horizon of visibility of policymakers, the zero lower bound is likely to be binding again.

There are two responses for this, and both point to the same overall conclusion in terms of the institutional set-up of the central bank.

A first response – favoured by many economists, though perhaps more attractive in theory than in practice – is to overcome the zero lower bound by making negative interest rates a standard feature of the central bank toolkit.

A second response is to accept that the main instrument whereby the central bank determines its stance will likely not be the level of short-term interest rates but the array of other tools which the

Bank of England (and other central banks) has deployed, including (but not limited to) forward guidance on policy rates, term funding with or without conditionality and asset purchases.

In either case, the degree of control that the Bank of England would have over its intermediary target is likely to be less than in the previous world of positive nominal and real interest rates, and it will be more vulnerable to interference with the policies of other government agencies. To deliver the same degree of control over monetary policy stance, a greater degree of coordination between government agencies will therefore be desirable.

To explain that point, it is worth exploring in more detail the particular case of asset purchases.

Asset purchases are intended to put upward pressure on inflation dynamics through multiple channels. Perhaps the most relevant of these is the portfolio rebalancing channel, whereby central bank purchases exert downward pressure on the term premium and liquidity premium for the assets it purchases and displaces investments towards other proximate asset classes, which in turn lowers credit risk premia and the equity risk premium (and indirectly exerts downward pressure on the exchange rate). In principle, this all contributes to easing financing conditions for firms and households, and to increasing investment and consumption.

So in a vastly oversimplified form, asset purchases aim at exercising some control over long-term interest rates, when that control cannot be achieved merely by altering short-term rates (because of the effective lower bound) or by forward guidance over the future evolution of short-term rates (because there is a limit to how long the market is willing to believe any policy commitment).

As an aside, the same sort of control could be achieved largely by means other than (and possibly complementary to) asset purchases, such as the use of interest rate swaps in monetary policy operations. Indeed, fundamentally there is only a minor difference between the central bank purchasing a long-dated bond and the central bank entering into an interest rate swap agreement. When the central bank buys a bond, it ‘receives’ the fixed long-term yield-to-maturity on that bond. And because it creates the cash with which it buys the bond, and that cash always eventually ends up on a deposit at the central bank, it ‘pays’ whichever floating rate applies to deposit holdings of banks.

The one difference between purchasing assets and using interest rate swaps is that in the former case, the central bank creates base money. To the extent that one believes that an expansion of base money will result in an increase in broad money, then this difference is meaningful and the label of 'quantitative easing' for central bank asset purchases is accurate. If one is (more realistically) sceptical about the stability of the relationship between base money and broad money, then that difference is largely irrelevant.

But more fundamentally, the issue with asset purchases is that the central bank cannot exercise the same degree of control over long-term rates as it does over short-term rates. In the case of short-term rates, the central bank can always (and easily) clear demand for reserves at any price it chooses. As underlined in the introduction, it can choose any of a variety of segments of the money market and any of a large number of instruments (outright operations, repos, marginal lending or borrowing facilities, etc.) to do so, but in the final analysis it has absolute control over the level at which it sets rates.

In the case of asset purchases this is not as straightforward, as the Bank of England (or any other central bank) does not fully control the net supply of government paper. Its influence on the market depends at least in part on what the government itself issues.

This can be illustrated by thinking of the balance sheet of the government as a whole, that is, aggregating the balance sheet of the government with that of the Bank of England. We are fully aware of all the institutional and conventional reasons why this may seem anathema to many readers, but from a policy perspective it remains exactly the right way to think about asset purchases. One should not lose sight of the fact that the profits and losses of the central bank always eventually accrue to the government, and that for all practical purposes the central bank is always and everywhere an agency of government.

In aggregate, what happens when the central bank purchases government bonds is as follows. Initially, the government has liabilities that can be either gilts or Treasury bills. Then, the Bank of England buys gilts and funds those purchases by issuing bank reserves. So in aggregate, where the 'whole of government' had bonds and bills as liabilities, it now has bank reserves and bills. In effect, asset purchases are a large-duration swap that result in

shortening the duration of aggregate government liabilities. And that is why central bankers are often quoted as saying that an intention of asset purchases is to 'extract duration' from the market.

For that to be true, however, the reaction function of the government to a shortening of its aggregate net liabilities is important. If the government were to respond to central bank purchases by lengthening the duration of its gross debt (i.e., issuing longer gilts), this would run contrary to the objective of the central bank. It would reduce the degree of control the central bank has over its stance.

At this point, one ought to caveat this conclusion: if the government were to respond to the lower yield environment by increasing its net issuance and seize the opportunity of the expanded fiscal space opened up by monetary policy to increase net spending, then that would not run contrary to the objective of the central bank. It would arguably be exactly what the central bank seeks to achieve (increased consumption and investment, independently of whether it originates from the private or public sector).

This does not change our conclusion because:

- first, the level of funding costs rarely ever has any bearing on fiscal policy in the UK or elsewhere, barring extreme circumstances (of the sort that happened in Greece in 2009/10); and
- second, the composition of gross issuance by the UK Debt Management Office (DMO) is largely independent from the amount of net issuance it has to conduct.

Our point here is that by engaging in asset purchases, the Bank of England, like other central banks which conduct similar operations, becomes more vulnerable to interference between its own operations and the actions in the same market of other government agencies (in this case, the UK DMO).

This ought at least to induce a reflection about the degree of institutional separation between different agencies of government.

When the Bank of England was granted independence in 1997, government debt management was removed from the Bank and entrusted to an executive agency, the DMO, that emanates not from the Bank but from the Treasury. The two agencies have operated independently from each other – and successfully so – because they operated essentially in different markets (and when

the DMO operated in the money market, as it necessarily does, this had no bearing on the monetary stance since the central bank has absolute control over short-term interest rates).

As the Bank started to intervene in segments of the market where the issuance policy of the DMO can interfere more with its objectives, this calls at least for a reflection on whether there should be more coordination between the two agencies than was necessary up to this point. The agreement between the Bank and the DMO on gilt lending (whereby the Bank makes a substantial amount of its gilt holdings available to the DMO for on-lending to the market) is useful and important, but not the main policy issue.

We underline here that our argument is prospective, not retrospective. We do not mean to imply that DMO issuance policy has diminished in any way – either by omission or commission – the effect of the Bank's asset purchases. In fact, at a time when the Bank was introducing quantitative easing, the DMO was withdrawing the skew towards long and ultra-long gilt issuance that had prevailed in previous years. So, if anything, it supported rather than hindered the objectives of the Bank. We doubt that was its purpose, though.

Rather, our point is broader and forward-looking. Over the past 30 years or so, the trend across many advanced economies has been towards the proliferation of independent or autonomous executive agencies, each assigned one government objective under the implicit assumption that they could deliver their objective independently with the limited set of tools at their disposal and with minimal interference with other government policy areas. This reflected in some way a bold extrapolation of the Tinbergen principle according to which policymakers need to control at least as many instruments as they have targets. Under this implicit über-Tinbergian consensus, it became possible to assign one target to each individual instrument.

What we have described through the narrow lens of the shift of monetary policy operations from one market (the money market) to another (the gilt market) under the influence of a change in circumstances (a persistently low-rate environment) is but one example of how the über-Tinbergian principle is challenged. It is not, however, a challenge to the Tinbergen principle itself. It may simply be the case that to reach their multiple objectives,

policymakers need to rely less on separation of instruments and more on internally consistent combinations of the available instruments.

Many of the new instruments that central banks have developed, and that the Bank of England has often pioneered, provide additional illustrations of this. Interference between macro-driven monetary policy (which in a downturn aims at raising demand for credit) and micro-driven supervisory policy (which in the same situation may unwittingly act to constrain the supply of credit) cannot simply be ignored when the central bank is more likely to have to resort to policy tools directly aiming at facilitating the supply of loans to businesses and households, as the term funding and funding for lending schemes did. It has to be managed.

The fact that the Bank of England had to seek and obtain an indemnity from HM Treasury to engage in new types of operation shows that 'unconventional' monetary policy operations do blur the boundaries between monetary and fiscal policy, and in several ways: directly, because they may cause a financial gain or loss for the government; and indirectly, because their (microeconomic) distributive and allocative effects are more pronounced than was the case with the sole use of Bank Rate as a policy tool. That is not a problem so long as it is accepted and managed.

With this in mind, what we believe to be a worthwhile proposition to investigate for the Bank of England and its stakeholders is this:

The fundamental contribution of the 1997 reform of the institutional status of the Bank of England was not independence per se, and it was certainly not isolation. It was the affirmation of the principle of monetary dominance, at a strategic level but also therefore at an operational level. Monetary dominance does not assume that the Bank of England, or any other central bank, may always be able to achieve its objectives (operational or otherwise) on its own. It does imply, however, that government should accept to consider altering other policies or operations to avoid hindering the effectiveness of the Bank's own operations or the achievement of its objective.

In a context where the effective conduct of operations and the successful achievement of the objectives of monetary policy will likely require more mutual awareness, consistency and sometimes even coordination between the actions of various executive agencies, it is worthwhile exploring whether the 30-year trend

towards the creation of independent agencies should be reversed, or at least what coordinating mechanism needs to be put in place to ensure that Bank of England's operations maximise its control over aggregate demand while minimising any unintended side-effects.

References

Barwell, R. (2016), *Macroeconomic Policy After the Crash*, Palgrave Macmillan.

Borio, C. (1999), "A hundred ways to skin a cat: comparing monetary policy procedures in the United States, Japan and the euro area", Bank for International Settlements.

Tucker, P. (2004), "Managing the Central Bank's Balance Sheet: Where Monetary Policy Meets Financial Stability", lecture, 28 July.

Wiseman, J. (2007), "The pretend market for money", *Central Banking* XVIII: 27–36.

CHAPTER 5

Can the effective lower bound be reduced? The case for negative policy rates

Michael Grady[1]

A cautious beginning

The global financial crisis of 2008 led central banks around the world to reduce policy rates to historically low levels. In the initial phase, policy rates were lowered to levels moderately above zero. In the case of the Federal Reserve, a range of 0-0.25% was chosen, while at the Bank of England the policy rate was lowered to 0.5%. Why did most central banks stop there? In the case of the Bank of England, the prevailing wisdom was that the zero lower bound (ZLB) was a binding constraint (something that was subsequently found not to be the case in other jurisdictions). If negative policy rates were fully passed through to bank liabilities, including retail deposits, that could result in large-scale cash withdrawals for the purpose of hoarding.[2]

Indeed, it was judged that the effective lower bound (ELB) was actually somewhat above zero. That reflected two main concerns: first the expected negative impact on bank and building society profitability at a time when the banking sector was already extremely vulnerable; and second, the concern about the functioning of the sterling money market.[3]

1 Head of Investment Strategy and Chief Economist at Aviva Investors. This publication reflects the personal view of the author and not necessarily that of Aviva Investors.

2 Cash obviously attracts a zero nominal interest rate. The cost of storage is not zero, suggesting deposit rates may be able to go modestly negative before they outweighed the cost of storage and security requirements to hold cash balances.

3 For example, see paragraph 27 of the minutes from the Monetary Policy Committee March 2009 meeting, when Bank Rate was reduced to 0.5%.

While the concern over bank and building society profitability was broad-based, it was the building societies – a major segment of the household and small business savings and loan market that were primarily retail-deposit funded, with limited ability to access wholesale funding – that were particularly vulnerable to a squeeze in net interest margins. There was an expectation (and in some cases, a legal requirement) that deposit rates would not fall below zero, while at the same time mortgage lending rates were tied directly to the policy rate. Therefore, a reduction in policy rates to zero would have been likely to lead to ongoing operational losses for the sector, something which was not considered acceptable in the prevailing environment of a broader UK banking system that was near collapse.

The concept of a 'reversal rate' – the policy rate below which lenders would no longer pass through rate cuts and might actually start to raise borrowing costs in order to protect their margins or reduce lending – has become part of the ELB literature in recent years, but was not part of the lexicon of that time. However, it was undoubtedly there in the thinking about the transmission mechanism through the broader banking system.

In addition to the existential threat to bank and building society profitability, there was also concern that the functioning of sterling money markets may become permanently impaired following a period of zero interest rates. The incentive for interbank activity – which had largely disappeared during the depths of the crisis – to resume seemed even more remote if rates were not positive. This concern was largely based around the experience in Japan, where a long period of near-zero policy rates had led commercial banks to effectively close their money market desks.

A (very) modest reassessment

It was not until August 2016, soon after the UK's referendum on leaving the European Union, that the Bank of England revised its guidance on the ELB down to positive but close to zero. That followed a reduction in Bank Rate of 25 basis points (to 0.25%) and was accompanied by the introduction of the Term Funding Scheme, reflecting an ongoing concern about the impact on bank and building society margins as Bank Rate approached zero. Indeed, the Bank in its August *Inflation Report* (Bank of England, 2016) noted that:

> *"When Bank Rate is close to zero, however, it may be harder for banks to lower deposit rates and they may then face a choice between reducing pass-through of lower official rates to those they charge on loans — in particular rates on new loans — or a period of lower profitability, which, were it to persist, could reduce the supply of lending…Analysis by staff across the Bank suggests that cuts in Bank Rate towards zero from 0.5% could, by themselves, lower banks' net interest margins a little, which could in turn lead to upward pressure on margins on new lending. In such circumstances, the transmission of monetary policy would be less effective than usual. To avoid the risk that reductions in Bank Rate do not feed through fully to the rates faced by households and businesses, the MPC is launching a Term Funding Scheme (TFS)… That will provide funding for banks at interest rates close to Bank Rate and has been calibrated so that any reduction in Bank Rate has a broadly neutral impact on building societies' and banks' margins in aggregate."*

As at the time of writing, the Bank's guidance remains that the ELB for Bank Rate is close to, but a little above, zero. That is despite the experience of several other major central banks (such as the European Central Bank, the Bank of Japan, the Swiss National Bank and the Riksbank), who have lowered policy rates into negative territory, ranging from -0.1% to -0.75%. So why has the Bank of England remained so reluctant to look through the ZLB and reduce the ELB to a value below zero? The Bank's Chief Economist, Andy Haldane, addressed the question in a speech in 2015 (Haldane, 2015). In his speech, he briefly examined three proposals in the literature for reducing the ELB: a tax on banknotes; the abolition of banknotes entirely; and the creation of a wedge between the value of banknotes and electronic money (or deposit) via the creation of a central bank electronic currency (alongside existing central bank reserves). Since that speech there has been little more said by either Bank officials or research staff on the question of the ELB.

Is it worth trying to reduce the ELB?

One reason why we may not have seen much more on the topic from the Bank or England is that lowering the ELB may not be seen as bringing much benefit to policymakers. There remain a range of other tools at their disposal to ease policy at the ELB, including quantitative easing (QE), bank funding schemes, forward guidance on policy rates and more explicit yield curve control. The Bank has

engaged in all but the last of these in the past, and could argue that it has sufficient confidence in the ability of these measures to boost aggregate demand and ensure that inflation returns to target over an appropriate horizon.

In which case, why try to pursue an even less well understood policy path of negative Bank Rate? One argument might be that those policies may be less effective in certain risk environments. Academic studies of the effectiveness of QE in a range of economies since 2009 tend to show that the initial programmes had more impact than later ones.[4] The implication of this is that a more stressed market environment, with severe liquidity constraints, was well-suited to large-scale asset purchases to stabilise financial markets and the banking system, but in more 'normal' recessions, without the same degree of liquidity or balance sheet stress, asset purchases may be less effective.

Moreover, evidence from those jurisdictions that have moved policy rates into negative territory is that when they signalled that to the market, the distribution of possible outcomes for the market-implied path for future policy rates moved to re-price forward curves to include some probability of negative rates in the future. By pricing this possibility, the spot and forward prices (the mean of all possible future outcomes) moved lower, re-establishing the link between policy rates and the forward curve that had been lost when the market assumed that the policy rate was at the ELB (e.g., Grisse et al., 2016; Lemke and Vladu, 2016).

A 2017 IMF policy paper found that those central banks that had adopted negative interest rates saw full pass-through into money market rates, generally weaker exchange rates, increased credit availability and no signs of cash hoarding (IMF, 2017). Overall, the assessment concluded that negative interest rate policies (NIRPs) had generated positive, albeit likely small, effects on monetary conditions. It did, however, identify some decrease in banks' net interest margins. The relatively modest positive impact may have been due to the caution shown by those central banks in just how negative they were prepared to take policy rates.

4 For example, see Diez de los Rios and Shamloo (2017) for a review of the impact of QE on the yield curve across different periods and countries.

What options should be explored to reduce the ELB in the UK?

If one is prepared to accept that there are benefits to being able to reduce Bank Rate below zero (perhaps even further below zero than other central banks have tried thus far), then two key constraints on the transmission mechanism need to be addressed: first, the risk of people and companies hoarding cash; and second, the impact on bank profitability.

The most thorough examination of the multitude of questions thrown up by the ELB debate is in the recent paper by Agarwal and Kimball (2019). Much of what follows in this section draws on that work in addressing these two issues.[5]

How to prevent hoarding: Price versus quantity

Agarwal and Kimball neatly divide the potential solutions to the cash hoarding problem into policy responses that work through either prices or quantities. In much of the literature on hoarding, the solutions have focused on the latter. In modern times, these have ranged from eliminating large denomination bills to increasing the costs of storage (Rogoff, 2017), to legal prohibition of cash storage (an idea they propose, but do not advocate due to its heavy-handedness), to abolishing cash altogether (Buiter, 2009; Rogoff, 2015). However, each of these quantitative policy measures would require such fundamental changes in the way in which the vast majority of society engages in daily transactions that their practical implementation seems unrealistic. Perhaps more realistic quantitative policy options are those that worked through the banking system itself, such as imposing limits on cash withdrawals (Goodfriend, 2016) or limits on cash deposits by individual banks with the central bank (Agarwal and Kimball, 2019). But as Agarwal and Kimball argue, these are likely to result in large swings in the value of cash relative to deposits, creating confusion and inconvenience for the public.

Rather than focusing on quantitative restrictions on cash, the more palatable policy options are likely to relate to the way the relative price of cash and deposits (electronic money) could be influenced.

5 Their paper addresses many other issues in addition to these, but the focus here is on these two critical elements.

Again, there is a long literature on potential approaches along these lines. As far back as Eisler (1932), there were suggestions to eliminate the lower bound by decoupling the fixed exchange rate between currency and bank deposits. Buiter (2009) took this approach further by suggesting that cash currency could be taxed. Alternatively, he suggested abolishing 'old' issues of banknotes and replacing them with new ones, while at the same time mandating that all non-cash transactions continue to take place in the 'old' currency. The government could then determine the exchange rate between the old and new currencies (with the latter only in cash form). Other approaches include Goodfriend (2000), who suggested that the time in which banknotes had been in circulation could be monitored and taxed through barcodes or magnetic strips. This could then facilitate in a modern way Gesell's (1916) suggestion to tax paper currency by affixing stamps to banknotes as they aged. Mankiw (2009) suggested another approach that would use the serial numbers on banknotes to facilitate a random withdrawal of notes (again, implicitly imposing a tax on holding cash). But perhaps the most appealing are the price system policies that work through the banking system suggested by Agarwal and Kimball.

The authors suggest two approaches: one that would *explicitly* break the fixed exchange rate between cash and electronic money; and a second that would *implicitly* break that exchange rate. Both would raise the cost of hoarding cash relative to holding electronic balances.

The first they refer to as the 'clean approach'. The novel feature of this approach compared to others in the literature is the use of the central bank 'cash window' to break the par exchange rate between cash and electronic money (reserves). As the central bank is the monopoly supplier of paper currency, and that supply is made possible through member banks exchanging reserves for paper currency (all such requests are always satisfied on demand), it is theoretically possible for the central bank to impose a rate of interest on those cash demands. In other words, rather than exchanging £100 worth of reserves for £100 in cash, the bank would only receive, say, £99. The interest rate charged could vary through time and would be cumulative, effectively creating a crawling peg exchange rate between cash and reserves.

The commercial banks would then supply that cash to the economy at that prevailing exchange rate, and retailers would need to adjust their pricing to explicitly differentiate between the price of goods in electronic money (which would become the numeraire in such a system) and cash.[6] Such an approach has the attraction of clearly delivering a potentially large cost to hoarding cash, and therefore could materially reduce the ELB. However, as the authors note, there are clearly implementation challenges. First, there would need to be legal clarity for the central bank to make such a change to the cash window. Second, and likely much more significant, is the leap of understanding required by the general public regarding in particular the use of electronic money as the numeraire for retail transactions, which may be too much for a central bank to contemplate. Third, it may also result in increased menu costs, as retailers begin quoting prices in both the cash currency and deposit currency.

For those reasons, the most practical suggestion is what they call the 'rental fee approach'. This would maintain the exchange rate between cash and reserves at par, but would charge a fee for the exchange of reserves into cash. This is a subtle but important difference in shifting from an explicit to an implicit breaking of the par exchange rate. Under this approach, the central bank could impose an ongoing fee on banks to exchange reserves into cash. This fee could be imposed on all such transactions from a particular point in time, or it could be more narrowly focused on the marginal withdrawal over a pre-defined ceiling.[7] Such a fee-based system is already in effect in some central banks that have negative policy rates. For example, the Swiss National Bank charges a fee equivalent to the negative policy rate (currently -0.75%) on

6 In practice, for practical reasons and to reduce customer complaints, they may try to average the two to create a single price. However, the concept of imposing a cost to holding cash in the 'clean approach' does not rely on the likely changes to retail transactions to be effective, but rather on the impact it would have on the incentive to hoard cash.

7 This ceiling could be calculated based on the demand for cash at the time the policy was implemented and increased in line with average historical increases in the demand for cash. Or it could be based on a certain amount per adult and increased in line with nominal GDP. Either way, the objective being to charge only for "excess" withdrawals.

increases in cash demanded by a bank in a given reference period.[8] While the fee does not have to be aligned with the policy rate (sight deposits up to 20 times the required reserve level attract no fee), there are clearly benefits in terms of the simplicity and clarity of policy communications.

The appeal of this approach is that it does not require any great leap for the central bank, commercial banks or the general public in trying to understand what may seem like a radically new monetary system implied by other approaches. However, it does have its own implementation challenges. First, commercial banks would need to think carefully how they pass on the fee to their customers. It may be difficult to charge an ongoing fee if customers simply made a large withdrawal and then cut off all ties with the bank. If, as suggested above, it targeted only 'excess' withdrawals of cash from the central bank, then commercial banks might similarly just apply a (perhaps quite large) fee to large cash withdrawals. That is something that would require a review of existing banking contracts to ensure such a fee was able to be charged. If it were, that would heavily penalise those wishing to withdraw to hoard. Alternatively, banks may say to customers that they have a monthly limit on how much could be withdrawn without a fee, and above that limit a fee would be imposed (similar to the way the central bank might treat the commercial bank at the cash window). In the context of the UK, this could be seen as a move away from the (somewhat unusual) 'free' banking model that has emerged, whereby deposit and liquidity services attract no direct charge. In this case, anything above the usual rate of cash requirements for a retail customer would attract a fee.

I recommend the Bank of England investigate the potential for something along lines of the 'rental fee approach', in particular focusing on the legal right to charge a fee to commercial banks exchanging reserves for cash, the precise implementation of such a fee and the contractual ability for commercial banks to pass it on to customers. It should be investigated well before such a policy would need to be implemented.

8 The term sheet for this policy can be found at https://www.snb.ch/en/mmr/reference/repo_mb27/source/repo_mb27.en.pdf (accessed 23 September 2019).

Furthermore, the greater the adoption of the use of electronic money for transactions, the less likely there is to be public outcry in response any changes to the cost of using cash. Indeed, in the decades ahead, it may be that close to universal use of electronic money will remove any possibility for hoarding (at least in terms of the fiat currency). As such, I recommend the Bank of England and the Treasury look at ways to further incentivise banks to make electronic payments more widespread. Alongside that review, there should also be consideration of the potential benefits to ensuring all parts of society have access to banking, as those who do not are likely to be disadvantaged.

How to mitigate the impact on bank profitability: Lowering the 'reversal rate'

While addressing the issue of hoarding is central to being able to reduce the ELB to more deeply negative rates, it is a necessary, but not sufficient, condition for the potential use of such a policy. Much of the concern raised both when policy rates were initially cut close to zero in 2009 and even as recently as this year, with the ECB looking to potentially move the policy rate further into negative territory, related to the impact on bank profitability. A recent paper by Brunnermeier and Koby (2019) defines the reversal rate as the rate at which interest rate cuts become contractionary for lending (ignoring other channels through which interest rate cuts could stimulate the economy). This results from the contraction in net interest margins that follows from low or negative policy rates, in the face of retail deposit rates remaining sticky at zero. The contractionary forces become dominant when these effects outweigh the positive balance sheet effects of lower rates.

Moreover, much of the Basel III regulatory reform agenda focused on improving the liquidity profile of banks. In particular, the liquidity coverage ratio (LCR) and net stable funding ratio (NSFR) were designed to disincentivise short-term wholesale bank funding. However, by tilting funding in favour of retail deposits, those policies have also arguably made the transmission of a negative policy rate more difficult (due to the perceived inability to reduce retail deposit rates below zero). In order to provide better pass-through of negative policy rates into bank funding, it may be that the optimal bank funding mix should include a higher proportion of wholesale funds. Of course, those funds do not need to be as short

maturity as was the case prior to the financial crisis. I recommend the Bank of England look again at the optimal funding mix for banks in order to ensure the transmission mechanism is effective, while not compromising on the financial stability objectives of the Basel III liquidity rules.

There are also policy options open to central banks through their balance sheets to mitigate the effects of negative rates on bank profitability. The Bank has previously implemented one such policy when it launched the Term Funding Scheme, which allowed commercial banks to access funding for net new lending at the prevailing policy rate (with penalties for those who access the scheme but fail to increase net new lending). The scheme reduced the impact on net interest margins, as those new loans were not (ultimately) funded through retail deposits. The scheme closed to new drawdowns in February 2018, and I recommend that it be codified into the Banks' Sterling Monetary Framework 'Red Book' (Bank of England 2015) to make clear it is available as a future policy tool if needed.

In addition to central bank funding schemes, another approach that has been adopted by some central banks that have negative policy rates, such as the Swiss National Bank and Bank of Japan, is to apply a tiering system to the (negative) interest rate charged on reserve balances. Reserves held at the central bank usually attract a zero or positive rate of interest – in the case of the Bank of England, all reserves are remunerated at Bank Rate. As such, a negative policy rate would become a cost to banks that have no choice but to hold these reserves. This is particularly important when negative rate policy is combined with QE, and therefore large excess reserve balances. The Bank of Japan implemented a three-tier policy that uses a small positive rate, zero and the policy rate on balances, giving it the ability to dial up or down the marginal amount of reserves attracting the policy rate needed to ensure it is passed through into money markets, but that it does not weigh so heavily on bank profitability.

I recommend the Bank of England look at the feasibility of implementing a tiered system on reserves to reduce the impact on bank profitability of negative policy rates. Some may consider such policies to be quasi-fiscal, as they might equate to a subsidy to the banking system. However, I do not see it that way. In pursuing low or negative policy rates, particularly if done alongside QE, the

central bank is effectively placing a tax on the banking system if it does not act to mitigate the direct cost of those policies on banks. So long as commercial banks remain the primary transmission channel through which monetary policy operates on the economy, they need to be viable through the economic cycle.[9] If that viability is questioned through the policy actions of the central bank, then without some mitigating factor, the logical conclusion is the far more radical choice of disintermediating the commercial banks entirely and moving to a state-owned utility banking system (or even more radically, simply giving everyone an account at the central bank).

Effective communications

Finally, communicating conventional monetary policy is challenging enough. But moving further into the realm of unconventional policy, such as negative interest rates, requires even more careful communication. Without effective communication, both with financial markets and the general public, the transmission mechanism and ultimately the success of such policies will be compromised.

I recommend the Bank of England undertake a communications review to consider more deeply a plan on how to ensure that negative interest rate policies are understood and, if appropriate, to communicate that the ELB is well below zero. Moreover, it would need to be clear that the Bank was prepared to utilise that policy space. As part of that communications strategy, it would also need to be made clear that additional policy tools would be put in place to ensure that the transmission mechanism to households and businesses is effective, but that mitigating policies would also be put in place to ensure that unwanted side-effects do not weaken the policy.

9 This is not a question of viability in terms of safety and soundness related to capital requirements (as uncovered by the financial crisis of 2008, but rather one of sufficient profitability over time to ensure continued effective banking services such as maturity transformation, liquidity, risk transfer and intermediation.

References

Agarwal, R. and M. Kimball (2019), "Enabling Deep Negative Rates to Fight Recessions: A Guide", IMF Working Paper No. 19/84).

Bank of England (2015), *The Bank of England's Sterling Monetary Framework*.

Bank of England (2016), *Inflation Report*, August 2016.

Brunnermeier, M.K. and Y. Koby (2019), "The Reversal Interest Rate", unpublished paper, Princeton University.

Buiter, W.H. (2009), "Negative Nominal Interest Rates: Three Ways to Overcome the Zero Lower Bound", *The North American Journal of Economics and Finance* 20(3): 213-238.

Diez de los Rios, A. and M. Shamloo (2017), "Quantitative Easing and Long-term Yields in Small Open Economies", IMF Working Paper No. 17/212.

Eisler, R. (1932), *Stable Money, the Remedy for the Economic World Crisis: A Programme of Financial Reconstruction for the International Conference, 1933*, The Search Pub. Co.

Gesell, S. (1916), *Die Natuerliche Wirtschaftsordnung*, Rudolf Zitzman Verlag (available in English as *The Natural Economic Order*, Peter Owen Ltd, 1958).

Goodfriend, M. (2000), "Overcoming the Zero Bound on Interest Rate Policy", *Journal of Money, Credit, and Banking* 32(4): 1007-1035.

Goodfriend, M. (2016), "The Case for Unencumbering Interest Rate Policy as the Zero Lower Bound", speech at the Jackson Hole Conference, 25-27 August.

Grisse, C., S. Krogstrup and S. Schumacher (2016), "Lower Bound beliefs and Long-Term Interest Rates", IMF Working Paper No. 17/62.

Haldane, A. (2015), "How low can you go?", speech at the Portadown Chamber of Commerce, Northern Ireland, 18 September.

IMF (2017), "Negative Interest Rate Policies – Initial experiences and assessments", IMF Policy Paper.

Lemke, W. and A.L. Vladu (2016), "Below the Zero Lower Bound: A Shadow-Rate Term Structure Model for the Euro Area", Deutsche Bundesbank Discussion Paper No. 32/2016.

Mankiw, N.G. (2009), "It May Be Time for the Fed to Go Negative", *New York Times*, 18 April.

Rogoff, K. (2015), "Costs and Benefits to Phasing Out Paper Currency", *NBER Macroeconomics Annual* 29(1): 445-456.

Rogoff, K.S. (2017), *The Curse of Cash: How Large-Denomination Bills Aid Crime and Tax Evasion and Constrain Monetary Policy*, Princeton University Press.

CHAPTER 6

The Asset Purchase Facility and monetary policy: A permanent structure on the landscape?

Jagjit S. Chadha[1]

The modern history of monetary policymaking in the UK can be seen as having unfolded over three key events: exit from the European Exchange Rate Mechanism in September 1992, the election of 'New Labour' in 1997 with Gordon Brown as Chancellor, and the global financial crisis of 2007-8. The first led directly to the adoption of an explicit inflation target for monetary policy in October 1992; the second led to the adoption of operational independence for the Bank of England's Monetary Policy Committee (MPC) in pursuit of that target; and the third exposed the limitations of single-minded inflation targeting pursued solely via manipulations in Bank Rate. In this chapter I shall consider the limitations of Bank Rate policy, why balance sheet operations were adopted by the Bank of England and how the balance sheet might evolve as we return to more 'normal' times.

Why quantitative easing was adopted

Prior to the financial crisis, the MPC operated on Bank Rate to alter the path of effective demand so that it stabilised around its notion of supply or capacity at or near the inflation target. To varying degrees, the level of Bank Rate, its expected path and the long-run level to which it will converge would each impact on the path of effective demand. In the years leading up to the crisis, it was widely thought that controlling the level and path to the long-run, or 'neutral', rate would be sufficient to offset most shocks. There are two great unknowns here. The first is the relative level of aggregate demand to aggregate supply, which may not be discernible in real

1 Director of the National Institute of Economic and Social Research.

time or, worse still, may not be unique – in the sense that there may be many possible demand and supply configurations flowing from any given interest rate path. The second unknown is the numerical level of the long-run or 'neutral' rate, what Wicksell originally termed as the natural rate that equates planned savings with planned investment. The extent of the uncertainties over these two key magnitudes means we were probably rather lucky to enjoy the long period of growth and price stability that we did in the 'Long Expansion' from 1992 to 2007. Having observed these uncertainties repeatedly, we cannot really ignore them in the design of future monetary policy, and so new instruments that can give the policymaker more degrees of freedom seem likely to become a permanent structure on the landscape.

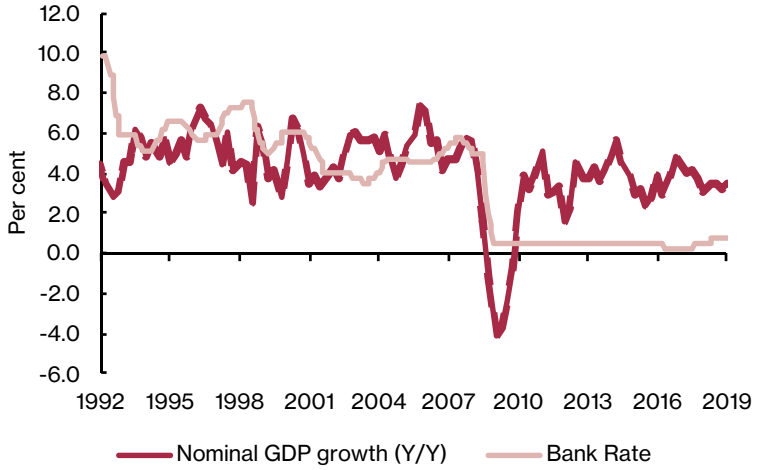
In its conception, Bank Rate influences the demand for money because households equate the marginal benefits of holding money, in terms of its liquidity service, to the cost, which is the interest rate forgone from not holding bonds. A cut in rates therefore induces a greater demand for money balances and should, through a variety of mechanisms, induce higher levels of expenditure. In response to changes in demand, the central bank typically alters the net supply of central bank money in an elastic manner at the given level of Bank Rate, by purchasing government securities or selling the securities it holds on its balance sheet. The purchase of government securities would release central bank money into the banking system, while the sale of securities would contract the narrow money supply. Providing the range of shocks and the scale of uncertainty in our knowledge about the economy did not act to amplify those shocks, it seemed that this system of interest rate control and monetary action could stabilise the economy on a path consistent with price stability.

The academic literature, however, has long identified a problem: in the presence of a large negative shock, it might not be possible to lower Bank Rate sufficiently to offset the impact of that shock. This is because once Bank Rate hits or approaches zero, households will become indifferent between holding cash, which does not pay an interest rate, or bonds, which pay a rate heavily influenced by Bank Rate. If bonds and money converge to basically the same thing in terms of their financial returns, then changes in their relative holdings will not have any economic effect on the wealth of

households. Swapping pears for oranges might matter if you have sated your demand for pears, but offering to exchange some pears for some other pears may hardly seem to matter much at all.

This so-called zero lower bound problem, or liquidity trap, has mostly been thought of as an arcane issue. The then Chief Economist of the Bank of England, Charlie Bean, wrote in 2002 that it seemed that the bound would only constrain policy for around 2% of the time.[2] Of the 17 years since, it has occupied policymakers for ten. This is because with rates falling from 5% to 0.5% in the five months following the collapse of Lehman Brothers in September 2008, the zero bound problem landed. To illustrate the break between then and now, Figure 6.1 compares the progression of Bank Rate and nominal GDP growth pre- and post-crisis.

Figure 6.1 Bank rate versus nominal year-on-year growth, 1992-19



Source: NIESR, Bank of England

At the lower zero bound it was thought that there were broadly two types of response. First, at the point that Bank Rate is constrained by the zero lower bound, policymakers could concentrate on making statements or signalling about the duration of Bank Rate at this low level. They could additionally be clear about the lower neutral level of Bank Rate. Arithmetically, it is possible to show that

2 Bean (2003) assessed that the probability of being constrained at the ZLB would be less than 5% of the time.

there might have been quite large effects on long-term interest rates of statements that were able to convince market participants that rates would not rise very quickly and, even if they did, not by very much. It is not at all clear that the MPC adopted clear or effective guidance in this manner, and accordingly financial markets did not significantly lower their expectations about the speed at which Bank Rate would return to 'normal' or the level to which it would return in response to so-called open mouth operations.

Indeed, the extension of these ideas to provide signals about Bank Rate into forward guidance, which was adopted in two stages over 2013 and 2014 and was concerned with either the duration (time-dependent) or conditions (state-dependent) under which Bank Rate would return to normal, is not thought to have been very successful either and has to all intents and purposes been dropped. A significantly more effective way of signalling the path of Bank Rate would be allow MPC members to provide their own individual judgements on the economy by providing a personal view of Bank Rate, drawing on their own interpretation of a Bank Staff forecast rather than a common MPC forecast. This could be combined with specific analysis of likely responses to various scenarios.

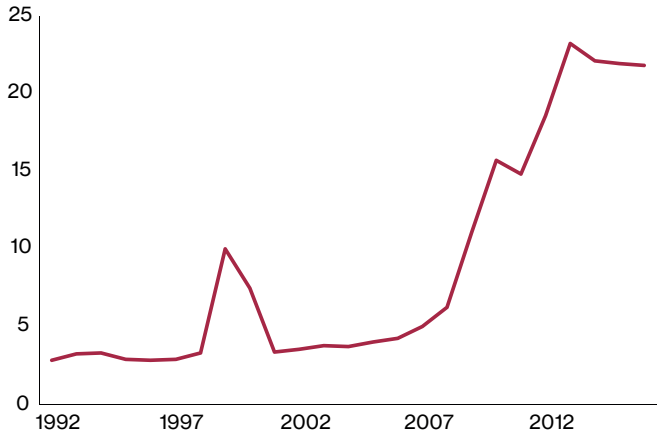
Second, rather than short-run operations that buy or sell government securities to influence the very short end of the maturity spectrum, the MPC could also choose to purchase and hold government and commercial assets to affect longer-term interest rates. These purchases could be funded by the issuance of central bank money, which would raise the quantity of narrow money in the economy directly and the supply of credit indirectly. Accordingly, at its February 2009 meeting, "the [Monetary Policy] Committee unanimously agreed that the Governor should write on its behalf to the Chancellor to seek authority to conduct purchases of government and other securities, financed by the creation of central bank money using the APF [Asset Purchase Facility]".

For such operations to have any economic impact, they must be able to raise bond prices over the level that they would otherwise reach, thereby easing monetary and financial conditions by reducing the net supply of bonds that the private sector is being asked to hold. If such operations are to meet this objective, then the demand for bonds cannot simply be perfectly elastic at the price that equals the set of state-contingent payoffs, otherwise changes in net supply would not impact on bond prices and hence long-term

interest rates. The argument runs that at some point, the increase in debt issuance (net supply) which typically accompanies a recession and/or financial crisis may reach the inelastic part of the market demand curve, with prices having to fall for the market to clear. These lower prices may represent compensation – a discount to the risk-neutral price – to debt holders for either or both of liquidity and default risks.

By the time of the following month's MPC meeting, the case had been further clarified: "By increasing the supply of money in the economy, these operations should, over time, cause nominal spending to rise. Sellers of assets to the Bank would find that their portfolios were now more heavily weighted towards highly liquid, low-yielding assets. To rebalance their portfolios, they would be likely to spend some or all of the proceeds buying other types of asset. This would tend to increase the relative prices of those assets, and hence wealth, and would, by stimulating the demand for corporate credit instruments, improve the supply of funds to the corporate sector. The purchases would also mean that the banking system would be holding a higher level of reserves in aggregate, which might cause it to increase its lending to companies and households. There could also be positive impacts on expectations and confidence from these operations to increase the money supply, as businesses and individuals became more confident about an eventual recovery". In a series of operations starting in 2009 – with the most recent operation being in 2016 after the EU referendum, which had delivered a 'surprise' result – the Bank of England Asset Purchase Facility Fund Limited (BEAPFF) bought some £425 billion of assets, which account for around 25% of outstanding government bonds and £10 billion of corporate bonds. These operations were designed to encourage nominal expenditures, alleviate risk and liquidity premia, signal that rates would remain low for some time and, via portfolio effects, encourage financial intermediaries to hold riskier assets and extend loans. If these operations were indeed able to nudge the economy in all these ways, the new instrument would appear to be like 'economic penicillin'. To illustrate the extent of this abrupt and quantitatively important change in operating procedures, Figure 6.2 shows the size of the Bank balance sheet pre- and post-crisis relative to GDP.

Figure 6.2 Bank of England balance sheet/GDP



The fiscal impact of the operations

It is normal to think of monetary policy as setting Bank Rate to help stabilise output over the business cycle in a manner consistent with some notion of price stability, and for fiscal policy to deal with any deleterious consequences on the income and wealth distribution – from both economic shocks and monetary policy responses – by choosing appropriate tax and spending plans. I shall return to this point below. But this suggested dichotomy has never been quite perfect, as fiscal policy usually has built-in automatic stabilisers which typically also support output stabilisation, and monetary policy choices have always altered the government's financing costs. Indeed, this traditionally porous separation, or assignment, between monetary and fiscal policies has been pretty much dismantled by the financial crisis. The two have become conjoined at the zero lower bound, with fiscal policy arguably more effective in terms of output stabilisation and monetary policy acting to mop up excess bonds with reserves issuance and providing revenues to the Exchequer.

To start from first principles, consider the extent to which QE has directly relaxed the fiscal budget constraint by setting up the possibility of a fiscal dividend to the Exchequer and, more traditionally, may also have reduced government borrowing costs at a critical time. The reduction in debt service costs may be even

higher over the life of these operations. It also turns out that the APF is likely to deliver a fiscal dividend of some £35 billion on the exit from QE,[3] which gives HM Treasury considerable room to offset distributional effects at nearly 2% of GDP in revenues. In this sense, the main redistributive implication of QE may have been a payment from bondholders to taxpayers. There is, however, a serious point of political economy that is often missed in discussions of QE. Whilst it might be seen as a long-term arbitrage opportunity that will, on exit, yield a positive return to the Exchequer, it is concerning that the profits have been remitted on a quarterly basis since 2012. This arrangement stores up future tensions. Should the costs of funding the APF at some future point exceed the coupon payments, the APF will have to ask for losses to be remitted back from the Treasury, which may raise questions over monetary independence. Indeed, it might undermine the credibility of the regime if there were any sense that the monetary authorities were reluctant to raise Bank Rate because of the direct impact on the profitability of their balance sheet.

The Bank of England's APF borrowed reserves at Bank Rate, and with those reserves bought just under £325 billion of government bonds from the non-bank financial sector. The non-bank financial sector thus receives a more liquid asset and does not have to hold quite so much government debt on its books. At the end of these operations, commercial banks end up holding more liquid assets in the form of reserves. The reserves pay interest, and so are very much like a Treasury Bill. In effect, the central bank has issued short-term debt instruments in exchange for longer-term government liabilities. These operations have helped bring down longer-term interest rates by reducing the net supply of government debt, may have induced some portfolio rebalancing by a non-bank financial sector which is flush with liquidity, and also provided signals about the duration of Bank Rate at or near the zero lower bound.

The overall impact of these operations has been a lowering of long-term interest rates in the order of 100-150 basis points across the sets of QE operations. We do not really know whether these interest rate effects are due to changes in net supply, signalling, the offset of a liquidity or a default premium, or a combination of these factors.

3 See the estimates in House of Commons Treasury Committee (2013).

Whatever the cause, lower longer-term interest rates will tend to support other asset prices and nominal income at higher levels than would otherwise be the case.

Additionally, the APF may be able to deliver a fiscal profit to the government in the order of £35 billion. This profit may represent the value of liquidity to the private sector in a crisis.

Finally, the reduction of government borrowing costs has meant that debt issued or re-financed since 2009 has been substantially cheaper for the government, saving on immediate funding costs and also on coupon payments (although these are already factored into fiscal plans).

As a guiding principle, fiscal policy involves questions about resource allocation, and monetary policy involves questions about total nominal expenditure in the economy. To that extent, monetary policy instruments and operations are directed at supporting the path of nominal expenditure, while fiscal policy ought to concentrate on economic structure, income and wealth shares, and planning revenue and expenditure priorities. The direct revenue consequences of some operations are a by-product rather than an aim of monetary policy. The incoming governor will need to ensure that the Bank concentrates on maintaining and developing the required instruments, operational expertise and institutional demarcation to ensure nominal stability, and that it resists taking on new obligations which are essentially under the remit of the Treasury and Whitehall, such as those related to climate change or productivity.

Money creation

Is money created by QE and is it inflationary? There is a conceit, or a suspension of disbelief, at the centre of the management of the central bank balance sheet in that it is treated as separate from that of HM Treasury but in reality it is not, as it forms part of the consolidated public sector balance sheet. Prior to these operations, HMT issued bond liabilities backed by future taxes. These are typically bought by non-bank financial intermediaries, representing savers, at a price that represents no more than the present value of those future tax receipts. When the Bank of England, through the APF, buys those bonds from non-bank financial intermediaries, it creates central bank money in the form of electronic reserves and

so expands its balance sheet. In effect, some of the bonds issued have ended up at the Bank of England, paid for by reserves issued by the Bank. The large part of these purchases by the Bank of England have not been sterilised – that is, offset by further sales of government debt such as T-Bills to absorb the reserves – and so have added to the stock of narrow money. If the money represented a permanent expansion of the money supply that was not met by an increase in demand, it would tend to raise the price level in direct proportion to its issuance and thus would bring about a temporary inflation.

But even if these operations turned out to result in a permanent increase in the supply of money, they would only lead to a temporary inflation with a one-off adjustment in the price level. To the extent that the increase in the stock of central bank money is met by an increase in its demand at near zero interest rates, there is no excess supply driving up prices. And ultimately there is no long-run effect, as when the purchases are reversed or, as now seems more likely, the stock of bonds held by the APF runs down as bonds mature, this will lead to the reserves that were created and borrowed being paid back to the Bank of England and the central bank money that was created being destroyed.

Contracting central bank balance sheets

The startling expansion of the central bank balance sheet has so far not presented any great conflict between the provision of extra liquidity to meet bank demand (as well as new regulatory requirements) and continued influence over long-term interest rates at the zero lower bound. At some point during any future contraction of the balance sheet, however, there is a danger that there will be insufficient liquidity, and that may present policymakers with a trade-off between macroeconomic and liquidity objectives. It is difficult to know what the equilibrium demand for central bank reserves is either over the business cycle or in steady state, so a gradual reduction to a higher level of central bank reserves than prior to the crisis seems appropriate. Having some traction to alter Bank Rate in the face of any trade-offs between market liquidity and bond rates will be critical.

One question is whether Bank Rate is set as a floor or within a corridor (see Farmer, 2017 on this point). I have previously argued for the maintenance of the floor system as we exit from extraordinary monetary policies, but also for the maintenance of a larger central bank balance sheet alongside a change in the risk composition of that balance sheet. In an early paper examining liquidity in a dynamic stochastic general equilibrium (DSGE) model, Luisa Corrado and I explored the extent to which bank choices of reserve might complement the interest rate strategy (Chadha and Corrado, 2012). We found that paying interest on reserves stimulated demand for pro-cyclical reserves, which meant that in a contraction, reserves would tend to fall to worrying levels unless the steady-state targets were considerably higher than under recent practice.

The demand curve for central bank reserves in normal times is quite hard to model and may be a complicated function of regulation and individual commercial bank and market balance sheets. Furthermore, the current levels of reserves held by banks are not an equilibrium phenomenon, as they are holding levels in excess of what they would voluntarily target. The levels are currently determined by the stock of asset purchases by the Asset Purchase Facility for macroeconomic stabilisation rather than for liquidity per se. In effect, the Bank has 'flooded' the money market with liquidity. Such an operation may yet be socially useful in the sense of the Friedman optimum even if in excess, and certainly compared to the case of a 'shortage'. That said, either because of hoarding, which is related to the break-down of the inter-bank market, or because of prudential regulations, banks are likely to wish to hold more reserves at any given Bank Rate than prior to the financial crisis. This begs the questions of whether we have observed from the money market data any resumption of inter-bank lending flows of reserves, and how banks are approaching their liquidity coverage ratio targets – are they, for example, overshooting with large pools of liquidity?

During a normalisation in interest rates and central bank balance sheets, banks can adjust the asset side of their balance sheets along two dimensions: the first is adjusting to a lower level of central bank reserves directly, the second is increasing lending so that the level of reserves can be justified. So far, the second avenue of adjustment has not seemed very important, but that may change during a more sustained economic expansion. There may be some heterogeneity in

the desired demand for reserves from different types of participants in the money market, as well as network effects, that mean the overall level of systemic need may be more than each firm would choose individually. Given we are likely to be above the required levels of liquidity but the steady-state target is unknown, it makes considerable sense to withdraw liquidity gradually and monitor the market for any heightened volatilities in money market rates that would reflect shortages in desired reserves, and to evaluate whether these result from a shortage of aggregate liquidity or the continued malfunctioning of the inter-bank market.

People's QE and modern monetary theory

There are increasingly widespread challenges to the basic financial arithmetic of running primary surpluses that underpins the pursuit of 'sound money'. The first is that the growth rate of the economy may not only tend to be higher than the real payments on debt, which would allow debt-to-GDP to grow more rapidly, but if it were permanently higher then there would be no constraint on debt, as nominal GDP growth will always tend to reduce the ratio of debt to GDP. The second is that at the zero lower bound, monetary and fiscal policy are essentially the same and so we must think about them as conjoined actors in stabilisation policy and use fiscal policy to return to robust growth. Finally, modern monetary theorists would have us believe that the lack of inflation means that there are considerable spare resources in the economy such that the central bank can simply issue free passes for households to use.

There are two separate objections to these ideas. The first is that the overall socially appropriate objective for the central bank remains the maintenance of price and financial stability. There is a primacy for the social imperative, and importance, of planning with a functioning price system that underpins trade in a capitalist economy. This ultimate objective means that as long as we continue to believe that the money stock pins down the price level, the central bank's primary objective is to ensure money does not grow much out of line with its demand. This imperative leaves fiscal authorities free to issue as much debt as can be financed at world interest rates without jeopardising their ability to respond to future economic shocks (and any structural developments) that might require further debt issuance.

The second objection is that debt is a claim on the future income of the issuer, and public debt is a claim on future generations. We cannot simply make speculative claims on those generations on their behalf, and it is the role of the central bank to lengthen the planning horizon so the preferences of those future generations are given appropriate weight. A sharp bringing forward of public expenditure has rarely ended well.

Policy conclusions

The recent expansion of the Bank of England balance sheet relative to the size of the economy has been unprecedented in peacetime Britain. Rather than supplying cash in response to the demands of the economy at Bank Rate, the Bank has become embroiled in asset purchases, funded by the expansion of reserves. These operations have obviously helped the economy avoid a prolonged depression, although we have not avoided a repeat of the doldrums of the early 1920s. Given the impact, many economists have argued for a further expansion of these policies by extending the scale and range of assets bought with central bank reserves, or for the expansion of the balance sheet itself to be put at the disposal of the government. The former policy would potentially undermine the capital of the Bank of England, as it would place a lot more market risk with the central bank. Sadly, the latter policy, which used to be known as monetary financing of the deficit, has regularly been shown to lead not only to chronic inflation but also, more critically, to a collapse in financial intermediation.

The questions facing the Bank of England are what the appropriate exit strategy is from such a large-scale holding of public debt, what structural impact do those extensive holdings have on debt markets that now see central bank purchases as a market norm, what the demand for reserves from the banking sector is, and, given that reserves are now remunerated, how Bank Rate should respond on the path to normality.

My recommendations for the Bank of England would be:

- outline the exit path from balance sheet operations and indicate the likely size of the balance sheet in normal times;
- make the case for ruling out objectives for monetary policy other than those concerned with nominal expenditure;
- re-ignite the case for price stability;
- re-energise the reform of inter-bank markets;
- look to move Bank Rate to normal levels as soon as practicable.

References

Bean, C. (2003), "Asset Prices, Financial Imbalances and Monetary Policy: Are Inflation Targets Enough?", in *Asset Prices and Monetary Policy*, proceedings of a Reserve Bank of Australia conference.

Chadha, J. and L. Corrado (2012), "Macro-prudential policy on liquidity: What does a DSGE model tell us?", *Journal of Economics and Business* 64(1): 37-62.

Farmer, R.E.A. (2017), "Unwinding: A Tale of Corridors and Floors", *National Institute Economic Review* 241(1): R70–R73 (https://doi.org/10.1177/002795011724100116).

House of Commons Treasury Committee (2013), "Quantitative Easing: Written Evidence" (available at https://publications.parliament.uk/pa/cm201213/cmselect/cmtreasy/writev/qe/qe.pdf).

CHAPTER 7

Working with multiple instruments

Charlotta Groth[1]

Central banks have broken new ground since the global financial crisis and are now working with a wide range of conventional and unconventional monetary policy instruments. Policy rates are unlikely to rise materially before the end of this economic cycle and these instruments will almost certainly stay in place over the coming decade as well, becoming a part of the normal. Questions around the choice and sequencing of different instruments and the role of forward guidance will need to be considered.

In this chapter, I argue that in today's low interest rate environment, central banks need to try hard to avoid the lower bound on interest rates. This involves loosening policy aggressively when the economy is slowing, working with a range of policy instruments to maximise policy impact, and only cautiously removing stimulus when the economy is recovering. Forward guidance should be used and central banks need to be brave when making this guidance. The policy decision is inherently more complex when multiple instruments are used, and this complexity needs to be reduced as far as possible. I argue that the Bank of England is still constrained by the lower bound, so these policy recommendations apply even if current inflation is close to target.

I also discuss some of the underlying structural reasons for low interest rates and the use of multiple instruments, including weak productivity growth, slowing demographics, excess savings, technological changes and a high level of debt. Although they fall outside of the usual remit for monetary policy, these are areas where central banks need to focus their attention over the coming years.

1 Global macroeconomist at Zurich Insurance Group. This chapter reflects the personal views of the author and not necessarily those of Zurich Insurance Group.

The role of the lower bound on interest rates

It is useful to make a distinction between conventional interest rate policy – where the central bank influences financial conditions by setting the short-term interest rate and giving forward guidance on the future interest rate path – and balance sheet policy – where it uses its balance sheet to influence broader financial conditions. The short-term interest rate – Bank Rate in the UK – is likely to remain the primary instrument of central banks. This reflects its advantages relative to less conventional balance sheet policies: it is under the sole control of the central bank, it does not impact on the central bank's or the government's consolidated balance sheet and its effects on the economy are broad based and relatively well understood, with less distributional consequences than most unconventional balance sheet tools.

The use of multiple instruments is intrinsically linked to the lower bound on the short-term interest rate. The root cause is the issuance of paper currency by the government, which effectively offers a zero nominal interest rate and therefore acts as an interest rate floor.[2]

Most central banks in developed economies are constrained by a lower bound. In the UK, the lower bound is perceived to be close to, but a little above, 0% (Carney, 2019) and the policy rate is still below 1%. This does not leave a large enough buffer for rate cuts, should the economy slow. In the last seven rate-cutting cycles, the Bank of England lowered Bank Rate by over 400 basis points, on average.

The lower bound introduces asymmetries that need to be taken into account when setting policy. When interest rates are low, there is limited space to inject more stimulus should it be required as rates cannot be cut further, and unconventional instruments are likely to be imperfect substitutes for the policy rate.

If policy is ineffective in stimulating aggregate demand when interest rates are close to the lower bound, the public's expectations of future economic conditions and inflation will adjust downwards (Mertens and Williams, 2019). When households and businesses expect lower levels of inflation to persist, this acts as an anchoring

2 In practice, the floor is below zero due to costs associated with holding cash in paper currency (such as storage and insurance costs) and the inconvenience of holding it.

point in wage and price negotiations. This puts additional downward pressure on inflation, which pushes up real interest rates and makes the challenge of stabilising the economy and returning inflation to its target even more pertinent. This could also increase the risk of a downward deflationary spiral. By contrast, there is plenty of room to tighten policy, should it be needed.

As policy becomes more uncertain around the lower bound, central banks should be keen to avoid it, a point that was already made clear by Orphanides and Wieland (2000). Because of this, policy should turn expansionary sooner and more aggressively than would be the case in the absence of the lower bound. The UK's economic environment is fundamentally uncertain and the Monetary Policy Committee (MPC) may be misjudging the underlying strength in the economy and the tendency of inflation to return to target. If the economy is stronger than expected, the policy rate can be raised and stimulus be removed. If the economy is weaker than anticipated, it may be difficult to inject further stimulus.

To sum up, the lower bound is the key reason why central banks now work with multiple instruments, and they should try hard to avoid it.

A risk management approach to monetary policy

Standard monetary policy models which take into account uncertainty often find that it is optimal to intervene less and to do so more gradually compared to when uncertainty is not considered (so-called Brainard-type policy uncertainty). However, once the lower bound is taken into account the standard Brainard result is reversed – central banks that operate in a low interest rate environment should respond more aggressively to economic conditions in order to reduce the risk associated with the lower bound (Evans et al., 2015).

This result relies on unconventional balance sheet tools being imperfect substitutes for the traditional policy rate. If they were perfect substitutes, it would not matter whether stimulus was injected through further rate cuts or through additional balance sheet expansion.

There is by now a large empirical literature that quantifies the impact of balance sheet policies on financial markets and the economy (see Weale and Wieladek, 2016 and Haldane et al., 2016

for the UK; and surveys by Borio and Zabai, 2016 and Bhattarai and Neely, 2016). These policies have supported asset prices and reduced long-term interest rates, particularly during crisis periods. But there is still large uncertainty around their effectiveness in boosting aggregate demand and supporting the broader economy during less extreme conditions. This partly reflects the difficulty of disentangling empirically the effects of different policy measures. However, it is not only an empirical question. Most central banks have not yet fully exited from unconventional policies, so this is an ongoing experiment and the final impact is yet to be seen.

Balance sheet policies also present disadvantages and costs that constrain the size and type of easing measures that a central bank is able and willing to take. They increase the size of, and the risk in, the central bank's balance sheet, which raises the possibility of incurring financial losses and undermining independence. Large-scale asset purchases can also lead to excessive risk taking in financial markets and a misallocation of capital. Some also argue that the creation of excessive reserves in the banking system will eventually unleash inflation, though there is little support for this.

The Bank of England is currently not constrained by its balance sheet, with total assets amounting to just above 20% of GDP (compared to 40% for the European Central Bank and over 100% for the Bank of Japan and the Swiss National Bank). The new capital and income framework for the Bank also means that capital is provided to ensure that the Bank can undertake asset purchases to support conventional monetary policy implementation without needing to ask for an indemnity from the Treasury (HM Treasury, 2018). This is an institutional adaptation which will make the Bank more capable of setting policy adequately during a period of stress.

The size of the government bond market is not infinite and there is an upper limit to the amount of assets that the central bank can purchase. Large-scale asset purchase (quantitative easing, or QE) programmes create distortions in financial markets, reduce liquidity and effectively remove long-duration assets, to the detriment of pension funds and insurance companies that need to hold these to match their long-duration liabilities. While the Bank of England

holds a limited share of UK government debt (around one fifth), these types of crowding-out effects are important at a global level – with over one third of global tradable debt now negative yielding.[3]

Don't be fooled by higher inflation

It is easy to see the advantages with a risk management approach when inflation is low and the risk of deflation is high. This is currently not the case for the UK. Consumer Price Index (CPI) inflation has on average been above the 2% target during the last decade and market-implied inflation expectations are above their historical averages. This is partly a reflection of Brexit and a weak currency, but labour markets are also tight and wage inflation is not insignificant. With this in mind, it is reasonable to ask whether the Bank needs to adopt a risk management approach. One could argue that a more relevant risk for the UK is rising inflation fuelled by a weaker currency, rather than a deflationary spiral.

The Bank should, however, be prepared to look through an episode of higher inflation and focus on the underlying dynamics in the economy. Uncertainty about future conditions is high, growth is slowing and leaving the EU will have long-lasting effects on the economy. Looser monetary conditions will be needed at some point. We saw that large cuts to the policy rate have been required in past economic downturns. This is why the constraint of the lower bound needs to be taken seriously, and equally so when inflation is close to target.

A broad approach to monetary policy

As the policy rate approaches the lower bound, central banks need to decide at what stage they should engage balance sheet policies, what types of measures to deploy, and their sequencing.

Williams (2013) shows that the optimal strategy is to rely on the instrument that is associated with the least uncertainty to the fullest before using more uncertain alternative instruments. In other words, unconventional policy should only be used as a last resort.

3 As a percent of the Bloomberg Barclays Global Aggregate Bond Index, which includes investment grade government and credit debt securities.

In practise, things are not as clear cut. The lower bound is unknown and there is large uncertainty around the precise point at which further rate cuts become counterproductive. A variety of factors will determine this, including the degree of pass-through to deposit rates, the tightness of capital constraints and banks' holdings of fixed income assets (Brunnermeier and Koby, 2018). There is also broader uncertainty around the transmission mechanism of monetary policy and the relative effects of different instruments. As an example, Miles (2015) suggests that when households are financially constrained, cash flow effects that arise primarily from changes to mortgage rates may dominate conventional substitution effects. This could be an argument for engaging unconventional policy instruments well before the policy rate reaches the lower bound.

The point is that in a more realistic setting where there is uncertainty around all policy instruments as well as the lower bound, there is a rationale for central banks to do more and use different tools in parallel as the policy rate approaches the lower bound.

Exiting from the lower bound and unconventional monetary policy

This asymmetry is also present when central banks exit from unconventional policies and begin to hike rates. Evans et al. (2015) show why this motivates a risk management approach – accommodation should only be cautiously removed. Uncertain policy instruments should be removed first and the policy rate should be left in place for longer.

This is a useful approach for thinking about lift-off. There are still questions around exactly what this will look like.

One thing to consider is that the sequencing of exit should depend on whether the stock or the flow theory of asset purchases is appropriate. If the stimulus effect of QE mainly comes from the outstanding stock of QE, policy tightening requires the stock to fall – net purchases to stop and reinvestment to be tapered. If, on the other hand, the flow of purchases is what matters, a tightening of policy only requires net purchases to be tapered while reinvestment can continue. In this case, the central bank could start hiking rates but at the same time continue reinvesting its asset portfolio.

Empirical studies provide support for both stock and flow effects (Borio and Zabai, 2016; Cœuré, 2018).

As long as the flow effect is not zero, this argues for the central bank only gradually reducing net purchases before hiking rates, and only later actively reducing asset holdings.

Clarity on the lower bound

What is clear from the discussion above is that central banks which work with multiple instruments face a far more complex policy decision.

The central bank's reaction function, which in normal times relates the policy rate to economic conditions, now also needs to account for the sequencing of and interlinkages between policy tools. This complexity makes the policy decision more difficult to communicate and could make monetary policy decisions less effective, precisely when central banks are most reliant on expectations formation.

One area in which a central bank can reduce complexity is around the lower bound. The lower bound is unknown, differs between countries and is time-varying. However, the central bank can simplify the reaction function by making an assessment of where the lower bound is likely to be given the structure of the economy and the banking sector and then treat it as given in the policy decision. Additional rate cuts when the policy rate is already at a very low level are unlikely anyway to provide material support to the economy, or could even be counter-productive. As such any losses incurred through not experimenting with further rate cuts should be limited.

By contrast, clearly communicating the lower bound simplifies the central bank's reaction function and should help to anchor expectations. This is in line with recent research by the Bank of England which shows that it pays for central banks to make their communication as clear as possible (Bholat et al., 2018).

The Bank has been very clear about the lower bound, which it perceives to be a positive number. This appears to have reduced complexity and anchored expectations. In the next rate-cutting cycle, this assumption is likely to be challenged. It will, however, be equally important to maintain clarity and a common view on this crucial input to the policy decision.

Forward guidance as a policy tool

Forward guidance has become more important as a monetary policy tool as interest rates have reached the lower bound. By providing guidance on the future interest rate path, central banks seek to influence not only the short-term but also long-term interest rates.

To avoid confusion due to the different types of forward guidance, it is useful to distinguish between Delphic and Odyssean forward guidance (following Campbell, 2013). Delphic guidance is when the central bank communicates the forecast and the risk scenarios to the broader public, in an attempt to align their expectations with the expected policy path. Like the oracle in Delphi, the bank forecasts but does not promise. Odyssean forward guidance is a promise to behave in a certain way in the future, even when tempted to do what seems best at the moment. Like Odysseus, the central bank ties itself to the mast to avoid temptation.

When the lower bound is a constraint, central banks can use forward guidance to influence expectations and reduce the likelihood of a more severe outcome. In this case, the central bank can promise to keep policy in place for a longer period than it would normally do. This will help to anchor expectations and increase policy effectiveness (Evans et al., 2015). The problem is that once conditions improve, the central bank will be tempted to break past promises and tighten policy in order to prevent inflation from becoming a problem. This makes it difficult to deliver effective forward guidance in practise.

What can central banks do to provide credible guidance?

Central banks have used various approaches to make Odyssean forward guidance credible. Guidance has been made time-dependent ("the policy rate will be left unchanged at least until the middle of next year") and state-dependent ("the policy rate will be left unchanged at least until unemployment falls to 7%"), and state-dependent forward guidance has been expressed both in terms of the central bank's target variable ("the policy rate will be left unchanged until inflation rises sustainably") and some intermediate variable such as unemployment.[4]

4 See Ehrmann et al. (2019) and Carney (2019) for evidence of the impact of forward guidance.

This illustrates how involved forward guidance can easily become, with a range of options to choose from. Given the importance of providing clear communication, a guiding principle ought to be to keep forward guidance as simple as possible. If a central bank targets inflation, forward guidance that refers directly to inflation (or a core measure of inflation) will help to anchor inflation expectations as long as there is a commitment device in place. By not expressing forward guidance for an intermediate variable, such as the unemployment rate, the central bank avoids having to change its forward guidance in case assumed relationships break down. And by not linking guidance to calendar time, the central bank reduces the risk that policy is set on auto pilot.

For the Bank of England, there is an additional challenge in providing forward guidance. The committee structure makes it difficult to formulate forward guidance that a majority of both current and future MPC members will agree to. The risk is that forward guidance is watered down to ensure that it is accepted by a majority and that it therefore fails to shift expectations and make a difference. This would limit its usefulness.

Asset purchases as forward guidance

Asset purchases could, by themselves, potentially be considered a form of forward guidance on the future rates path. When interest rates rise, bond prices fall (as they are inversely related to interest rates) so a central bank with fixed income assets (purchased as part of QE) makes a loss. A large stock of QE could therefore act as a commitment to keeping rates low for longer, as doing the opposite would threaten the balance sheet.

The balance sheet is, however, not the primary focus of central banks and is therefore unlikely to be a credible commitment device, especially when appropriate institutional arrangements are in place for the government to recapitalise the central bank should losses materialise, which is the case for the Bank of England.

Another way to use the central bank's balance to provide forward guidance is to build in inertia in the sequencing of different instruments. The way this has been done is to condition one policy instrument (the policy rate) on another (asset purchases), emphasising the sequencing of the two with a time lag built into the withdrawal of policy stimulus.

This approach has been effective in managing policy expectations and avoiding sharp and disruptive adjustments to interest rates and financial markets. However, it is not a mechanism for providing Odyssean forward guidance – it can delay the process, but not the initial decision to start scaling back stimulus. The drawback is also that policy tightening is set on autopilot, with the pre-defined process – rather than current economic conditions – determining its pace.

This shows how difficult it is in practice to provide credible Odyssean forward guidance. This is why it is so difficult for forward guidance to replace policy actions – yet another reason for avoiding the lower bound.

A final word on the use of forward guidance and the lower bound

Forward guidance can be a powerful way to anchor expectations in a low interest environment. But for forward guidance to be effective it has to be ambitious – promising more than would be provided in its absence. Once conditions improve, however, the central bank will be tempted to break past promises and tighten policy in order to prevent inflation from becoming a problem.

Recent central bank actions illustrate this point nicely. Over the past decade central banks have engaged in forward guidance in various forms. To begin with this was relatively easy to do, as unemployment was above potential while inflation was benign and below target. In 2017-2018, economic conditions improved materially. Global growth rose above trend, investment strengthened, labour markets began to tighten more materially, wage inflation recovered and inflation expectations rose. As a result, central banks started – or accelerated in the case of the Federal Reserve – the process of tightening policy.

Underlying growth was considered strong and this motivated a gradual removal of stimulus. However, inflation was well below target in most regions and inflation expectations were falling short of a level that would be consistent with the 2% target. Since then, global growth has slowed, inflation expectations have plummeted and central banks have cut interest rates and restarted QE.

For an outsider, it appears that precisely at the point in time when a commitment device was needed – when central banks themselves wanted to remove stimulus – there was no mechanism in place that prevented them from doing so. Central banks did not wait for inflation expectations to fully normalise and inflation to rise more sustainably. They were arguably not sufficiently cautious and are now forced to loosen policy again.

This observation shows the importance of a risk management approach (wait for longer until removing stimulus) and a commitment mechanism to limit temptation and execution risk. The conclusion is that central banks have to be prepared to overshoot the inflation target when they operate close to the lower bound. Inflation is a friend not a foe in this situation!

Central banks are needed outside their narrow remit

In this chapter I have argued that central banks should loosen policy aggressively as the policy rate approaches the lower bound, work with a range of policy instruments to maximise the policy impact and only very cautiously remove stimulus when the economy starts to normalise. Forward guidance should be used and central banks should be brave when issuing this guidance and ensure they constrain their future actions.

One must, however, recognise that there are limits to how far interest rates can be reduced and how much more long-term yields and risk spreads can be compressed. Central banks will almost inevitably need to make further changes to their asset purchase programmes – for example, by including more risk assets – and the way they provide forward guidance – such as targeting the yield curve or moving to an average inflation target – and also possibly redefine the way fiscal and monetary policy interact.

It is useful to pause at this point and consider why central banks have ended up in this situation. Global interest rates are exceptionally low, and this reflects a combination of weak productivity growth, demographic challenges, excess savings, technological changes and a high level of debt. Many of these are structural issues that monetary policy alone cannot resolve. However, they are the reason why central banks are so tangled up with the lower bound and have to work with multiple instruments.

The Bank of England and other central banks have the necessary expertise to propose solutions to some of these issues. On the one hand, the support mechanism needs to broaden out beyond monetary policy to ensure that there is sufficient policy support in a downturn regardless of the lower bound – just tweaking QE or improving forward guidance is unlikely to provide a long-term solution. On the other hand, measures to improve long-term growth potential are needed. These include reforms to enhance productivity and broaden economic participation alongside investment in infrastructure and education. Climate change mitigation and adaptation should also be added to the list.

Although they fall outside of the usual remit for monetary policy, these are areas were central banks will need to focus their attention over the coming years.

References

Bhattarai, S. and C. Neely (2016), "A survey of the empirical literature on US Unconventional Monetary Policy", Federal Reserve Bank of St Louis Working Paper No. 2016-021A, October.

Bholat, D., N. Broughton, J.T. Meer and E. Walczak (2018), "Simply is best: enhancing trust and understanding of central banks through better communication", Bank Underground, 22 November.

Borio, C. and A. Zabai (2016), "Unconventional monetary policies: a re-appraisal", BIS Working Paper No. 570.

Brunnermeier, M.K. and Y. Koby (2018), "The reversal interest rate", NBER Working Paper No. 25406.

Campbell, J. (2013) "Odyssean forward guidance in monetary policy: A primer", *Economic Perspectives*, Federal Reserve Bank of Chicago.

Carney, M. (2019), "Remarks to Open Policy Panel", speech at the ECB Forum on Central Banking, June.

Cœuré, B. (2018), "The persistence and signalling power of central bank asset purchases", speech at the ECB, February.

Ehrmann, M., G. Gaballo, P. Hoffmann and G. Strasseret (2019), "Can more public information raise uncertainty? The international evidence on forward guidance", ECB Working Paper No. 2263, April.

Evans, C., J. Fisher, F. Gourio and S. Krane (2015), "Risk Management for Monetary Policy Near the Zero Lower Bound", *Brookings Papers on Economic Activity*, Spring.

Haldane, A., M. Roberts-Sklar, T. Wieladek and C. Young (2016), "QE: the story so far", Bank of England Staff Working Paper No. 624.

HM Treasury (2018), "Financial relationship between HM Treasury and the Bank of England: memorandum of understanding".

Mertens, T. and J.C. Williams (2019), "Monetary frameworks and the effective lower bound on interest rates", Federal Reserve Bank of New York Staff Report No. 988, July.

Miles, D. (2015), "What can Monetary policy do?", speech at the Bank of England, January.

Orphanides, A. and V. Wieland (2000), "Efficient Monetary Policy Design Near Price Stability", *Journal of Japanese and International Economics* 14(4): 327-365.

Weale, M. and T. Wieladek (2016), "What are the macroeconomic effects of asset purchases", *Journal of Monetary Economics* 79: 81-93.

Williams, J. (2013), "A defense of moderation in monetary policy", *Journal of Macroeconomics* 38(PB): 137-150.

Part 3: Communications

CHAPTER 8

Inertial Groupvote: Reforming the decision-making process

Richard Barwell[1]

A robust policy process is one that exposes those taking decisions to a range of arguments and modelling assumptions, that challenges their priors, that encourages serious discussion of the range of possible outcomes and not just the base case. This approach may not be efficient – it is not designed to reach consensus in the least possible time and with the fewest possible meetings. But is the best possible defence against making major policy errors.

The published views of Bank of England's Monetary Policy Committee (MPC) members suggest that the policy debate is in rude health. But views don't count for much. It's votes that matter, and the votes suggest something quite different. At any given moment in time, MPC members are in near complete agreement with each other on the actual stance of policy with only token gestures of dissent, and those votes change very slowly through time.

The cross-sectional and time-series properties of the votes are arguably symptoms of deep-seated flaws in the institutional process for setting interest rates that then lead to systematic deviations of the actual stance of monetary policy from the optimal setting. In this chapter I introduce these curious features of the voting record before turning to diagnose the root cause of the problem and then suggest potential remedies.

1 Head of Macro Research at BNP Paribas Asset Management. This publication reflects the personal view of the author and not necessarily that of BNP Paribas Asset Management.

Token dissent and the interest rate multiplier

I begin with a discussion of what distinguishes meaningful differences in views on the level of official interest rates from what we dub token dissent. The answer should be framed in terms of the variable which policymakers are obliged to control – inflation – and the perceived welfare loss associated with deviations of inflation around the target, which we typically assume to be symmetric and quadratic. In other words, a meaningful difference in view on the path of interest rates should correspond to a sufficiently large difference in view on the implied path for inflation which translates into a material difference in the estimated welfare loss.

To make progress we therefore need a reliable estimate of the interest rate multiplier, which translates views on interest rates into quantitative impacts on inflation, and in a perfect world we would like to use the interest rate multiplier that Committee members have in their minds when casting votes. We therefore use the official estimate of the multiplier that was published by the MPC a couple of decades ago in which the Committee estimated that raising Bank Rate by 1 percentage point *and holding it there for a year* would likely lower inflation by 20-40 basis points around two years later (MPC, 1999). By extension, a difference in view on Bank Rate of the order of 25 basis points is worth around 5-10 basis points on inflation. To be clear, these numbers describe the consequences of a persistent difference in view on rates rather than, say, a disagreement over the timing of a change in rates of a matter of a few months.

The size of the interest rate multiplier reflects the underlying structure of the economy. Many, if not most, macroeconomists and central bankers appear to have concluded that one of the key determinants of the multiplier has changed over recent decades. It is widely believed that the slope of the Phillips curve has flattened over time, with inflation dynamics becoming gradually less sensitive to deviations of demand around potential supply. If true, that would imply that the interest rate multiplier is likely smaller than the 1999 estimates suggest. Perhaps 25 basis points for a year is now only worth at most 5 basis points on inflation.

The Committee has never published an updated estimate of the interest rate multiplier. This is somewhat surprising given the central importance of the multiplier to the conduct of monetary

policy and the profound changes in the structure of the economy and the huge volume of relevant research that has been published in the interim.

Committee members have no doubt thought about these issues, but there is a difference between reflecting on aspects of the interest rate multiplier and engaging in a root and branch review of the effectiveness of the interest rate lever.

The Committee should remedy this situation as a matter of urgency. Indeed, a review of the multipliers for unconventional tools is also in order – not least since at least one MPC member has challenged one of the key transmission channels of quantitative easing (QE) (Vlieghe, 2018).

This work agenda could prompt two reforms which might have an important impact on the conduct of policy. First, if the interest rate multiplier has changed then there is a prima facie case for revisiting the rule of thumb that interest rates are changed in at least 25 basis point increments. For example, if the multiplier has been cut in half, then Committee members should start thinking about 50 basis points as the new norm. The same point applies to the £25 billion increment for QE decisions. Second, the Bank would have a fresh body of evidence to recalibrate its models, improving the accuracy of the analysis that supports policy decisions. There is a risk that an outdated estimate of the multiplier is still reflected in the Bank's current set of models because in successive recalibration exercises – both working within a stable modelling framework and moving between them – Bank staff have chosen to preserve key model properties such as the interest rate multiplier.

We do not know the exact point at which differences in the path of inflation – and the implied social loss – start to become meaningful for MPC members. But we can appeal to some reasonable yardsticks to assess the economic significance of differences in view of inflation. The first is the precision with which the inflation data are published – the national statisticians report the annual percentage change in prices to one decimal place. The second is the width of the fan charts that the MPC publishes. For example, the August 2019 *Inflation Report* suggested that there was only a one in four chance that inflation would sit in an interval 100 basis points wide centred on the target three years into the future.

A 25 basis point disagreement on the appropriate stance of Bank Rate for a year therefore translates into differences of view on the path for inflation that the statisticians would consider to be close to a rounding error in the data and that the Bank's own forecasts suggest are dwarfed by the uncertainty around inflation. It is according to these yardsticks that such behaviour can be classified as economically insignificant.

If the majority publish a view on the policy path – as opposed to just the current level of rates (or stock of asset purchases) – then those in the minority have the option to signal their view by publishing an alternative divergent path that begins with token dissent but ultimately builds to material dissent. This is the approach articulated by Svensson (2016):

> *"[I]t would not have been appropriate to take a surprising and large step towards an unknown optimal rate and path. Instead I advocated this stepwise procedure towards a rate and path that would eventually make the corresponding forecasts for inflation and unemployment look good."*

The use of the word "eventually" is noteworthy. I will return later in this chapter to the question of the constraints which force a dissenting policymaker to adopt this 'many small steps' approach towards the optimal stance in preference to one giant leap. For my purposes here, I should acknowledge that dissent which begins with a disagreement of 25 basis points but gradually builds to, say, 100 basis points 18 months in the future would amount to more than 5 to 10 basis points on inflation at the two-year horizon. However, once we allow for a flattening of the Phillips curve, we may still be on the cusp of tokenism.

Priors on voting behaviour

Before I turn to review the pattern of behaviour we observe in the voting record, it is important to establish what we should expect to find given our understanding of how the policy process works and an appreciation of the interest multiplier.

Winston Churchill once remarked that "if you put two economists in a room, you get two opinions, unless one of them is Lord Keynes, in which case you get three opinions". That aphorism is certainly thought to apply to the MPC: put nine policymakers in a room and you get nine opinions on interest rates. However,

MPC members are not simply 'put in a room'. They sit in a room where they receive the same briefing on the structure and state of the economy and then exchange views on the appropriate policy response. Even if they enter the room with nine different opinions, one might reasonably expect that this process would encourage the nine to consistently converge on a consensus view. There is nothing necessarily wrong with this; the exchange of information, analysis and views seems a healthy state of affairs. Indeed, the Bank's own experimental research suggests that one of the virtues of decision by committee is that it allows individuals to pool judgement and information (Lombardelli et al., 2005). However, as I will go on to discuss, the experts in group behaviour (psychologists, not economists) worry about whether committees necessarily deliver optimal outcomes.

A review of the speeches and interviews given by MPC members suggests that convergence on consensus does not always occur. MPC members often articulate fundamentally different descriptions of the key aspects of the policy debate at a particular moment in time (Barwell, 2016). Indeed, former governor Mervyn King wore that dissent as a badge of pride, drawing a distinction between the process at the Bank and what takes place elsewhere (Giles and Daneshkhu, 2007):

> *"Some of the other central banks have a token dissent, or one odd ball, but … this is genuinely a committee in which people feel under great pressure to say what they really think and that's the principal part of how the committee operates. That you get better decisions if you ask the nine people to say what they really think, instead of asking them to sit round and try and come to a consensus."*

If it is indeed the case that meaningful differences of view – on the economic outlook, the structure of the economic or even the precise loss function that describes the objectives of policy – remain intact at the end of the policy debate, then those meaningful differences ought to translate into much more than a 25 basis point difference of view on the path of Bank Rate given the Committee's estimate of the interest rate multiplier.

Views inevitably change. MPC members will receive a constant flow of information about the state and structure of the economy. Sometimes the economy will evolve in line with their expectations. But sometimes the information will contain 'news' and that should

prompt a change of view. Once again, any material revision to a macro view should translate into a meaningful change in view on policy, given the size of the interest rate multiplier.

Economics suggests an additional constraint on voting behaviour. A rational policymaker should incorporate all available information into their vote – and that implies something about how votes should evolve through time. As Charles Goodhart once observed, a rational policymaker would appear to set policy in an approximately random fashion, because they should be responding to the arrival of new information that should be unpredictable. In contrast, when votes move in persistent cycles, that is consistent with policymakers only gradually responding to news or irrational behaviour.

The stylised facts of the voting record

The voting record does not match these priors. Five stylised facts present themselves (for more details, see Barwell, 2016):

1. **Crawling votes**: The votes of individual members – and hence the majority too – rarely jump, and instead move by at most 25 basis points from one meeting to the next.
2. **Reversal aversion**: U-turns on policy – cuts followed by hikes, and vice versa – are extremely rare for the majority and reasonably unusual for dissenters.
3. **Token dissent**: MPC members very rarely dissent from the majority by more than 25 basis points.
4. **Agenda-setting incumbents**: When new members join the Committee, they immediately converge upon the consensus chosen by the incumbents.
5. **Relative dissent**: When the majority change their mind, dissenting members will sometimes adjust their vote in the same direction at the same time to preserve a constant level of dissent.

The first two facts are well understood: interest rates do indeed appear to move in persistent cycles, which seems to violate the core assumption of rational behaviour. The literature has suggested plausible arguments for the intrinsic persistence we observe the policy process: to manage the uncertainty over the effectiveness of policy tools; to avoid the reputational damage that might be

involved in appearing to behave randomly; to gain traction on long rates by making future moves in short rates predictable; and to avoid financial stability issues when large interest moves cause large losses for financial institutions.

Nonetheless, concerns remain that policymakers – including MPC members – are either crawling towards where they believe policy ought to be today, which would imply persistent deviations from the optimal stance, or, even worse, failing to rigorously assess whether the current level of rates is optimal, a process which should lead to periodic jumps in the policy rate when that review prompts a significant change of view.

The voting record is arguably more consistent with an internal policy debate that is framed in terms of "changes" rather than the "levels" – that is, one in which the Committee processes the news since the last meeting to assess whether (and in what direction) interest rates should move *on the assumption that the correct level of interest rates was chosen at the previous meeting*.

The final three stylised facts are less well known and indeed largely ignored by the literature on the voting record, which searches for valuable information in the *incidence* of dissent in the voting record whilst failing to acknowledge the trivial *extent* of dissent.

According to Governor King, "each person is meant to say what they really think, so you don't have token voting". Most central bank watchers appear to have taken him at his word. But once you translate the votes into views on the path of inflation, then token dissent is precisely what is happening. Twenty-five basis points of dissent is not really dissent at all. *Groupthink* is not quite the right term, because it is clear from the comments of MPC members that they do think differently; *Groupvote* is probably more accurate.

Combining these cross-sectional and time series facts, we arrive at our stylised representation of the voting record: *inertial Groupvote*.

To be clear, these stylised facts are not definitive evidence of a fundamental flaw in the conduct of monetary policy. To confidently make that claim, we need to identify the underlying forces that give rise to these outcomes and understand the consequences.

A compelling explanation for our stylised facts can probably only be found in the creation of an oral history of the MPC. The collection of this valuable information is an urgent priority. The

recollections of former MPC members could shed light on many interesting research questions far beyond the scope of this chapter, but it would be of interest to know whether former policymakers felt there was too much focus on calibrating the central case and reaching a consensus on the appropriate change in rates and whether they voted their view.

In the absence of that oral history, I shall review three key aspects of the institutional set-up which may collectively contribute to the behaviour we observe: the *people* that are appointed to set interest rates and the structure of the Committee; the *process* through which they digest and debate information, analysis and forecasts to reach conclusions; and the *pressure* that those individuals might perceive to self-censor dissenting views and search for consensus.

People

There are a number of obvious qualities that we should look for in every prospective member of the Monetary Policy Committee: an excellent economist, a keen interest in the conduct of monetary policy, and a detailed understanding of the particular features of the UK economy. Subject to these constraints, it would be better if MPC members complemented each other in terms of their specific areas of expertise. As I will go on to discuss, the more external members there are on the Committee, the more scope there is to inject competing perspectives from the different disciplines and traditions within the broad church of macroeconomics into the policy debate.

Those concerned by evidence of inertial *Groupvote* are likely to argue that additional qualities should be emphasised in the selection of new MPC members. It is striking that when new individuals join the Committee, they immediately gravitate to the same fundamental view on the monetary stance – give or take token dissent – as the incumbents, despite the fact that they have not sat through the discussions that led the incumbents to reach that conclusion at an earlier date. The premium on selecting individuals who have a track record of clearly articulating coherent contrarian views is surely high. To be clear, vocal dissent for its own sake is of little value. What is required is people who think original and interesting thoughts and who are brave enough to robustly defend them and ultimately vote that view when others, including the

governor, take a different view. If you want a template for what that looks like, then you would probably look no further than Adam Posen.

If there is a concern about the gravitational pull of *Groupthink* within the Bank, then it makes sense to limit the externals to serving a single – but slightly longer – term (of, say, five years). This change is likely to increase turnover, injecting new thinking into the debate. Critically, with no prospect of reappointment there can be no misunderstanding about the potential rewards for 'not rocking the boat'. In passing, the Chancellor should probably avoid falling into the habit of appointing external MPC members to senior positions within the Bank.

It is also worth reviewing whether it makes sense for the external members to be based at Threadneedle Street. It is no doubt easier for the externals to participate in the intellectual debate within the Bank if they are present within the building most of the time. But proximity may speed the process of integration and adoption of group norms and beliefs. Distance may extend the half-life of intellectual independence.

Even if there is a fundamental shift in the selection criteria for external members and their subsequent behaviour on the Committee, the externals will remain in the minority. This is not ideal.

It would be a mistake to make the Committee the exclusive domain of academic outsiders. There must always be a place for the seasoned central bankers – people like Eddie George and Paul Tucker – who bring a wealth of relevant expertise, experience and insight to the table. Some of the people who have served as internal members were also highly respected academic economists in their own right. But there is no guarantee that the roles of governor and deputy governors will always be filled by individuals who would qualify as MPC members on the basis of their talent alone, as opposed to relying on their job title. Moreover, these individuals can only devote a fraction of their day to thinking about monetary policy issues. It makes sense to shift the balance of power towards the external experts.

The simplest approach here is to expand the size of the Committee by appointing at least two more external members. Of course, there has to come a point where the Committee becomes too

big. Buiter (2014) argues that we should be concerned about the lack of incentives for policymakers to give their best and that this problem becomes more acute the larger the Committee becomes, with members having an incentive to free-ride on the labours of others. Sibert (2006) highlights the risk that the search for consensus in large committees can lead to alternative strategies being disregarded and concludes that policy committees should not include many more than five members. The root cause of the concern with size is the lack of individual accountability. If that concern can be addressed (see below) then there is an alternative argument: the more experts there are in the room, the more chance there is that at least one person will entertain the proposition that the consensus is in entirely the wrong place rather than just epsilon away from precisely the right place. Otherwise, everything depends on the staff.

The alternative, and inferior, solution is to leave the number of externals unchanged but reduce the number of votes cast by internal members.

Disenfranchising the governor is surely a step too far. The governor could still act as a spokesperson for the Committee even if he or she did not vote, but the governor's capacity to steer and stabilise markets would surely be diminished in these circumstances. The chief economist should retain his or her vote on the condition that the person who fills this role must be a recognised expert in monetary policy and should be best placed to represent the collective view of the staff within the Committee's discussions. That leaves the three deputy governors. It would be a mistake to exclude these individuals from the policy process altogether or to inadvertently encourage them to treat the Bank's price stability remit as peripheral to their day job. The deputy governors should be at the table when policy is discussed. However, they don't necessarily need to vote – especially since in practice they vote at most token dissent from the governor.

The right for a single deputy governor (DG) to vote could be rotated between the three individuals from one meeting to the next. The end result would be a Committee with seven voting members at any given meeting: three internal and four externals. Or a compromise option might involve appointing one additional external member, re-enfranchising the DG for Monetary Policy and then rotating a single vote between the DG for Financial Stability and the DG for Markets and Banking to create a committee with four internals

and five externals. Either way, rotating votes has been introduced within the Governing Council of the ECB with the minimum of fuss. If it's good enough for the president of the Bundesbank and the governor of the Banque de France, then the Bank of England's DGs can surely cope.

Process

The current process looks like an efficient consensus-building machine and the voting record appears to confirm that claim.

The Committee shares the same analytical information on the current state and structure of the economy and the same set of macroeconomic forecasts. The Committee then debates the issues, exchanging views on the economy, the outlook and ultimately the policy decision. It is not a surprise, and not necessarily a bad thing, that this process tends to lead to a convergence of views.

The costs from preventing an exchange of information would surely dominate any benefit. And nothing can stop MPC members from converging on the emerging consensus once they become aware of their colleagues' views, if that is what they are determined to do.

The real issue is not with the fact that MPC members almost always converge on the consensus, give or take token dissent. The question is whether that consensus is in the right place. The fact that the consensus crawls and dissent is never meaningful gives cause for concern. It is critically important that the process constantly forces the Committee to evaluate alternative treatments of the data and modelling approaches, which might imply a radically different strategy. It is only when the Committee is forced to consider how the current strategy performs under these alternative perspectives that the process can be described as robust. The responsibility here falls on Committee members and the staff.

MPC members should be asked to produce a preliminary assessment of the macro outlook and the policy path at the start of each policy round. MPC members should be free to change their minds and revise their policy path during the process. But both the preliminary and final view should be published. This recommendation enhances accountability and aligns incentives, but requires resources and safeguards.

If policymakers know that the preliminary view will be published, then they will have every incentive to invest time and effort into the exercise. Policymakers who repeatedly radically revise their view towards the consensus will be held accountable.

For this exercise to be productive, MPC members must have access to sufficient resources to enable them to interrogate the data themselves, arrive at the key judgements on the structure of the economy and the evolution of the shocks, and produce coherent macro forecasts and ultimately a decision on the policy stance. In particular, a dissenting member must be in a position to articulate a credible 'giant leap' away from the prevailing stance. After all, Svensson (2016) argues that it was the "technical limitations of Riksbank analysis" that prevented one of the most respected academics in the world from advocating a policy position that immediately and significantly diverged from the majority view. Given the recommended change in the composition of the Committee, it might make sense to house this resource within the External Unit that supports external MPC members.

This recommendation could dovetail with any changes to the Committee's communication strategy. It would be much easier to discuss and publish an optimal policy path that best reflects the shared view of the Committee if individual members have already deliberated over their preferred path. Moreover, the paths preferred by individual members would help illustrate the uncertainty around that central path. Obviously, these preliminary policy views would be market sensitive so great care would need to be taken to keep them secure.

The Bank of England staff have an important role to play in dismantling the *Groupvote* phenomenon, particularly during the quarterly forecast round. The staff produce the analysis and forecasts that inform the policy decision. If the Committee is presented with a single interpretation of the data, a single description of how the economy behaves and a single forecast of the future given a particular set of assumptions and judgements, then it would not be surprising if the nine members of the Committee voted for more or less the same interest rate setting.

The more the Committee is presented with a range of plausible explanations for the economic outcomes we observe, a range of alternative descriptions of how the economy behaves and a range of plausible forecasts of the future which are then translated into

interest rate paths given a range of plausible interpretations of the loss function, the more likely it is that Committee members might arrive at different conclusions on policy. Establishing a rule of thumb among the staff that all analysis is presented in the form of ranges rather than point estimates might be a productive nudge.

Even those who are not at all persuaded that there is a problem with *Groupvote* should see merit in this recommendation, because illustrating the true nature of the uncertainty should give MPC members a more comprehensive understanding of the balance of risks, which is an essential ingredient in any robust policy discussion. If policymakers only probe alternative scenarios in the vicinity of what they believe to be the central case, they can leave themselves and the economy exposed. It is imperative that they interrogate the possible but improbable tail risks on the horizon.

The staff can do still more. At any moment in time there will likely be a consensus within the Committee either on key inputs or the output of the policy discussion. There is a natural tendency for the staff in any institution to look for evidence which validates the views of their superiors. It would therefore make sense for the Bank to ensure that senior members of staff are required to present the most compelling arguments that challenge that consensus. That is the best internal defence against *Groupthink* and *Groupvote*.

Moreover, the staff must prevent the Committee's focus becoming too narrow or short-term. The classic example here is the threat posed by the gradual accumulation of financial imbalances. The evolution of credit flows, debt stocks and asset prices may seem of peripheral importance to the outlook for inflation two years hence. But the evolution of financial imbalances can prove critical to the pursuit of price stability in the medium term.

Clearly, this defence is only as good as the quality of the analysis that the staff brings. The Bank must recruit, train and retain genuine experts and then incentivise them to remain in analytical roles in their particular area of expertise.

The enlightened governor appreciates that those members of staff who are ready, willing and able to provide awkward evidence that the Committee has got it wrong are far more valuable than those who only provide comforting evidence that the Committee has got it right. That enlightened governor might then reflect on the career paths of members of staff who have fallen into the categories of

'awkward squad' and 'comforters'. Who has tended to leave and who has tended to prosper? There must be incentives to challenge. But incentives may not be enough. The process must be organised so that Bank staff are obliged to be the bearers of bad news – to search for the counter-arguments to the Committee's view.

There is one critical element in the process which is in urgent need of attention: the analysis of the information content in financial market data and the use of asset price conditioning assumptions to construct forecasts. The transmission mechanism of monetary policy operates primarily through asset prices. At the same time, asset prices also contain useful information which policymakers would like to extract, including an expectation of the state of the economy and how the central bank will respond. Those expectations of market participants will rarely align perfectly with the views of MPC members and on occasion they may diverge quite markedly.

In these circumstances, the convention of constructing forecasts that are conditioned on the prevailing constellation of asset prices is problematic because a fundamental inconsistency is introduced into the forecast. The forecast will reflect a set of judgements on the state and structure of the economy made by the MPC. But by conditioning the forecast on the current constellation of asset prices, the MPC imports a conflicting set of judgements into the forecast. It is implicitly assumed that the Committee gets all the big calls right and investors get them all wrong along the path described by the Bank's forecasts. In that scenario, market beliefs and market prices should adjust. However, conditioning the forecast on market prices implicitly assumes that investors observe their mistake but learn no lessons and prices do not adjust. This is not a sensible perspective on which to base policy discussions.

Unconditional forecasts which allow for the possibility that investors' beliefs – and therefore asset prices – adjust as news arrives over the forecast seem infinitely preferable to the current approach. Moving over to unconditional forecasts would then allow a coherent discussion of alternative policy paths – and in particular, 'giant leaps' in the stance which may be radically different to what is assumed in asset prices and the conditioning assumptions. Of course, moving over to producing unconditional forecasts forces the Committee to take a stand in public on the optimal policy path.

In this chapter I have already argued that there is considerable merit to asking each Committee member to take a stand in private (and then eventually in public) on their own personal view on the rate path at the start and end of each policy round. There is a strong case for publishing this information alongside the settled view of the Committee on the rate path (for more detail, see elsewhere in this book and Barwell and Chadha, 2013). Of course, significant resources must be made available to facilitate this discussion and the production of these unconditional forecasts. Even once the optimal policy path has been identified there is the small matter of divining how asset prices will react to the publication of the path and news on the economy over the forecast horizon.

The final point to emphasise about the process is that it is essential that the MPC periodically grapples with the range of issues that influence the timeless conduct of monetary policy – many of which are discussed in this book. This is likely best done in regular monetary strategy meetings outside the forecast round, which would then allow the Committee to explore a particular issue in more depth without having the pressure of needing to reach a decision on rates. The Committee would then be in a better place to implement the conclusions from these strategy meetings the next time the particular issue cropped up in the policy debate.

For example, most central bankers agree that under certain circumstances it can make sense to pursue a risk management approach where policy is set so that inflation overshoots the target on the modal forecast. This argument is particularly powerful when there are high-impact negative tail risks looming on the horizon and the policymaker has relatively little (easy) scope to ease policy further. These arguments seemed to apply in the summer of 2018, when Bank Rate was still close to the (perceived) lower bound and the governor was highlighting that the risks of the UK leaving the EU without a deal were rising. However, it transpires that not a single MPC member was persuaded of the risk management case for leaving rates on hold – not even those members who are seemingly sceptical about the effectiveness of further rounds of asset purchases. It could be that there was a detailed debate of these issues and everybody was persuaded of the governor's argument that "we can't be handicapped or tied by the range of Brexit possibilities" and, implicitly, that the Committee could always cut

rates later if it needed to. Or it could be that there was just not enough time to explore these issues in sufficient depth to properly tease out the implications for policy.

Pressure

In our search for explanations for *inertial Groupvote*, it is also worth considering the constraints that MPC members may perceive to vote in this way.

One possible explanation for the Groupvote phenomenon is that MPC members are concerned about their reputations – about being judged harshly by posterity and perhaps the harm to their future career prospects. Individuals may conclude that there is safety in numbers – that there is little personal cost attached to voting the wrong way, so long as everyone voted the wrong way. It is unclear why the same argument applies to expressing contrarian views on the economy.

It might instead be the case that MPC members are concerned about the reputational damage to the Bank rather than to themselves. There will be a lot of commentary, and not all of it flattering, the first time that there is major dissent in the votes or a sudden reversal in the policy stance or perhaps even a major change. However, familiarity is likely to breed contentment rather than contempt; the furore is likely to fade through time. Commentators should eventually come around to the view that material dissent, giant leaps and U-turns are reassuring signal of a mature policy committee and a robust policy debate.

Alternatively, the Groupvote we observe may reflect the fact that dissenting members believe that they are more likely to persuade the majority to change their vote by advocating a small step towards a different policy stance rather than advocating a 'giant leap'. This explanation sounds plausible but has a sting or two in the tail. The very idea that MPC members would be spooked by the idea of a 100 basis point move in rates implies both that policymakers are not regularly considering rate moves on this scale (which suggests a process fixated on processing the news and tweaking the central case) and that policymakers do not have a firm handle on the interest rate multiplier (because 100 basis points is not that big a deal).

Finally, MPC members may have reached an implicit agreement to only offer token dissent because they believe that major dissent in the votes would reduce the ability of the majority to steer market expectations of the future path of rates. However, by definition, the dissenting member should be uncomfortable with the signal that the majority is sending at any given moment. Moreover, revealing the scale of the disagreement – preferably with an explanation of the reasons for the divergence – should provide valuable information about the policy debate and hence the outlook for rates which should not be suppressed.

The recommendations here are clear: the Chancellor must appoint courageous contrarians, and should make crystal clear in the job description that MPC members are expected to vote their view and the Treasury Select Committee should hold members to account for discrepancies between votes and views. Reforms to the MPC's communication strategy – publishing paths that reflect the views of the Committee and individual members – might also relax the perceived constraints and allow genuine dissent to flourish.

Endnote: Call in the experts

When it comes to the institutional design of monetary policy, macroeconomists are fond of citing the experimental result that groups make better decisions on average than individuals. However, the social psychology literature is more equivocal. There is a long-standing concern about 'group polarisation' – that taking decisions and even holding discussions within a group can shift outcomes (Myers and Lamm, 1976).

The Bank's chief economist once argued that "the evolution of central bank policy frameworks over recent years can be seen as an attempt to make them robust to psychological biases" (Haldane, 2014). Perhaps someone should ask the experts whether they agree.

The Chancellor should commission an eminent psychologist to review the institutions and process for setting monetary policy that could draw upon insights from the academic literature and behind closed doors exposure to how the Committee functions in practice. That review could shed light on questions such as the optimal size of the Committee, the balance between internals and externals and the optimal location of the external members.

Conclusions

The voting record is a cause for concern. There is almost always near complete agreement on the stance, with only token dissent, and the consensus view evolves gradually through time with very few jumps or reversals. This inertial Groupvote raises awkward questions about the true nature of the policy debate. A series of reforms should be considered to improve outcomes.

The Chancellor should:

- prioritise the appointment of courageous, coherent contrarians as external members who will be ready, willing and able to effectively challenge the status quo;
- appoint external members for a single five-year term and discourage external members from being almost ever-present at Threadneedle Street;
- tilt the balance of power within the Committee towards the externals, preferably by expanding the size of the Committee and the number of external members;
- instruct policymakers to vote their view and thereby improve the quality of the internal policy debate and enrich the Committee's communication; and
- commission an eminent psychologist to review the institutions and process for setting policy and suggest possible reforms.

The Committee should:

- conduct a review of the policy multipliers, publish the results and adjust the default setting for changes in policy instruments accordingly;
- focus on unconditional forecasts in the policy debate, which then enables a coherent discussion of alternative policy paths, rather than forecasts conditioned on asset prices which will tend to be internally inconsistent; and
- participate in regular strategy meetings outside the forecast round to discuss medium-term issues that get crowded out in the policy round.

Individual Committee members should:

- produce a preliminary view on the economy and the optimal policy path at the start of each policy round, which will then be published alongside their revised view; and
- consistently challenge the appropriate level of the current stance, as opposed to the appropriate change in the level in light of the news.

The Bank should:

- fund the creation of – but not produce itself – an oral history of the MPC, with independent researchers collecting the views and recommendations of former MPC members;
- recruit, retain and motivate staff capable of challenging policymakers and incentivise them to remain in analytical posts and develop expertise in one area so that collectively the staff can add the most value; and
- change the internal policy process so that the staff are obliged to challenge the prevailing consensus within the Committee.

The Bank staff should:

- provide MPC members with the necessary analytical support to produce coherent alternative policy recommendations; and
- provide robust analysis by presenting analysis and forecasts under different modelling assumptions, as opposed to point estimates based on a particular analytical framework.

References

Barwell, R. (2016), "Nine votes, one view and the never-ending consensus on the MPC during the great stability", in J. Chadha, A. Chrystal, J. Pearlman, P. Smith and S. Wright (eds), *The UK Economy in the Long Expansion and its Aftermath*, Cambridge.

Barwell, R. and J. Chadha(2013), "Complete forward guidance", in W. den Haan, W (ed.), *Forward Guidance: Perspectives from Central Bankers, Scholars and Market Participants*, a VoxEU eBook.

Buiter, W. (2014), "Central banks: powerful, political and unaccountable?", *Journal of the British Academy* 2: 269-303.

Giles, C. and S. Daneshkhu (2007), "Mervyn King interview transcript", *Financial Times*, 3 May.

Haldane, A. (2014), "Central bank psychology", speech at Royal College of Medicine conference on "Leadership: stress and hubris", 17 November.

Lombardelli, C., J. Proudman and J. Talbot (2005), "Committees versus individuals: an experimental analysis of monetary policy decision-making", *International Journal of Central Banking* 1(1): 181-205.

Monetary Policy Committee (1999), "The transmission mechanism of monetary policy", *Bank of England Quarterly Bulletin*, May, pp. 161-170.

Myers, D. and H. Lamm (1976), "The Group Polarization Phenomenon", *Psychological Bulletin* 83(4): 602-627.

Sibert, A. (2006), "Central Banking by Committee", *International Finance* 9(2): 145–68.

Svensson, L. (2016), "Two serious mistakes in the Goodfriend and King review of Riksbank monetary policy", Blog post, 22 January.

Vlieghe, J. (2018), "The yield curve and QE", speech at Imperial College Business School, London, 25 September.

CHAPTER 9

Words and deeds

Ben Nelson[1]

On 13th September 2017, the Bank of England's Monetary Policy Committee (MPC) voted to maintain Bank Rate at 0.25% and the stock of assets purchased under its programme of quantitative easing. To a casual observer the monetary policy stance had been left unchanged, but this would in one important respect be wrong. In the two days that followed, three-year interest rates rose by 0.17 percentage points and the sterling exchange rate strengthened by around 3% against the US dollar. If sustained, these changes would usually lower projected GDP by 0.3% after three years and inflation by a similar amount after two. By this measure, monetary conditions had in fact tightened notably.

This is not because of something the MPC did, but because of something it said. In its accompanying statement, the Committee noted that "some withdrawal of monetary stimulus is likely to be appropriate over the coming months" – a strong form of forward guidance to which financial markets paid evident attention.

Markets were right to react. At its subsequent meeting, the MPC increased Bank Rate by 0.25 percentage points, following through on its tightening guidance. Only that on the occasion where Bank Rate was raised, market conditions eased in response: three-year interest rates fell and the currency weakened by around 1.5%. Ostensibly, this was a reaction to the Committee's view that "[there remain considerable risks to the outlook".

Ben Bernanke has said that monetary policy is "98 percent talk and only 2 percent action", and these two modest episodes in recent MPC history illustrate the much broader point.[2] The financial

1 Senior Economist at Rokos Capital Management and member of the Centre for Macroeconomics. This publication reflects the personal view of the author and not necessarily that of Rokos Capital Management.

2 The so-called 'taper tantrum' of 2013 involving the Fed was a much more dramatic event, for example (see Bernanke, 2015).

markets that transmit monetary policy to the wider economy are extraordinarily sensitive to the utterances of central banks. To a significant extent, communication is not just part of monetary policy, it *is* monetary policy.

The mechanisms: Forward-looking behaviour of the economy

The monetary policy textbook shows why. What emerged from the synthesis of classical and Keynesian economics was a workhorse model for monetary policy – the so-called New Keynesian model. This combines a theory of the 'real' side of the economy with important features of the nominal economy, especially rigidities in prices and wages. The two give rise to a theory of short-run inflation determination which says that inflation tends to rise when output is above its natural level, and tends to fall when output is below its natural level.

A key feature of this model is that it assumes that people making decisions in the actual economy are not naively looking in the rear-view mirror when they act.[3] Instead, they plan for the future, trying to form expectations about the economic variables that have a bearing on their best course of action over time.

An important corollary is that a central bank able to influence the expected path for the real interest rate – and so the incentives for households to spend, save or invest – can control inflation by stabilising the overall level of output around its potential level. Forward-looking behaviour implies the expectational effect is powerful. As Michael Woodford put it, "not only do expectations about [monetary] policy matter, but, at least under current conditions, very little else matters" (Woodford, 2005).

That describes a model, whereas the real world is doubtless different in important ways. Around one-third of UK households have mortgages on their homes, for example. And around one-fifth of those mortgages have interest rates that track Bank Rate directly. In these instances, Bank Rate per se – rather than expectations of it – has a direct effect on at least some households' monthly cash flows, and this is not an effect the workhorse model considers.

3 At least not all of the time. The baseline New Keynesian model also allows for rule of thumb, habits, price and wage indexation, and other forms of rigidity that affect the inflation process.

That being said, the model contains an important kernel of truth because, for many other actors in the economy, the expectational effect is directly relevant. For people seeking new fixed-rate mortgages, market expectations for future interest rates are a key determinant of what they can afford to borrow and for how long. For firms with international trading activities, the path for the currency is a crucial factor in their pricing decisions – and this path is significantly affected by interest rate expectations. And for the government making taxation, spending and borrowing decisions, the expected path for interest rates is a relevant factor in determining its fiscal policy plans, given the need to service the outstanding stock of public debt.

It is not necessary to believe the textbook model to agree that managing expectations is important. If anything, features of the real world imply this matters more, not less. Information is far from perfect and highly asymmetric. So statements about the economy's *state*, its *structure*, or the central bank's *monetary strategy* are highly significant and mean communication is as much of a monetary policy tool as the overnight interest rate itself:

- Both the central bank and the private sector are learning about the *state* of the economy. In other words, where do we start from? Are we in a state of excess demand or excess supply? Is monetary policy currently pushing up on demand or down on it? What, therefore, are the initial conditions for inflation pressure? The central bank spends a lot of time and resources in assessing these questions. And therefore any statement it makes about them contains information that other players in the economy need to internalise.
- Both the central bank and the private sector are also learning about the *structure* of the economy. The central bank also spends a lot of time thinking about this. Has the relationship between interest rates and demand intensified or abated? Has the influence of demand on prices waxed or waned? The answers to these questions inform the central bank's assessment of the economy's laws of motion, and therefore the urgency with which it is likely to act to achieve its stabilisation objectives.
- Finally, an operationally independent central bank has a monopoly over *monetary policy strategy*. In the Bank of England's case, a combination of statute – which determines the Bank's monetary policy objectives – and remit letter –

> which describes the MPC's operational target – sets out what the Bank is to achieve. The Bank's MPC has to formulate, communicate and implement a strategy to do so. If the central bank is formulating its policy systematically and rationally, then that is useful for people in the economy to understand because it will help them to anticipate how the central bank is likely to react to changing economic circumstances. That understanding itself is stabilising.

In sum, forward-looking economic behaviour means that by communicating about the economy's state, structure and its own monetary policy strategy, the central bank gains an important tool to achieve its objectives. Moreover, via its communication strategy, the central bank has an important role to play in promoting the informational efficiency of the market economy.[4] What means are there to achieve this?

The means: Action now, guidance about the future

In setting monetary policy, Alan Greenspan said he had "learned to mumble with great incoherence". Indeed, there was a period where secrecy – and the related ability to surprise the market – was thought to make monetary policy more effective. Although today there is a lingering sense among market participants that central banks 'don't want to disappoint the market', central banking has come a long way from Montagu Norman's "never explain, never excuse" (Warsh, 2014).

The Federal Reserve only started announcing its policy decisions in 1994.[5] Prior to that, actors in the economy were left guessing. Today, the private sector can form expectations regarding the path for monetary policy from what the central bank does in its immediate policy decisions. This provides one channel through which people in the economy can learn about what the monetary authority is

4 See, for example, Hayek (1945), who wrote: "..in a system where knowledge of the relevant facts is dispersed, prices can act to coordinate.....The most significant fact about the system is the economy of knowledge with which it operates, how little the individual participants need to know in order to be able to take the right action".

5 Blinder et al. (2008) provide a review.

likely to do. Having observed the central bank's responses to events in the past, the private sector can begin to anticipate how it is likely to react in the future.

But there are limits. The first is that the composition of policy committees changes over time, which can mean changes in strategy or approach about which past behaviour is not informative. The second is that the structure of the economy can change over time, or the shocks to which it is subject may shift in unpredictable ways.[6] The third is that at or in close proximity to the effective lower bound on the policy rate, there may be long periods for which the policy rate is left unchanged. This removes the scope for the private sector to learn about the MPC's intentions from its choices regarding Bank Rate. Prior to the financial crisis, for example, there was a relatively stable empirical relationship between survey measures of activity and the MPC's choice for Bank Rate – a revealed, relatively stable 'reaction function'. This broke down following the global financial crisis, when Bank Rate was cut to the effective lower bound and stayed there for nearly a decade.

This last point will have significant and lasting implications for monetary policy communication for as long as equilibrium interest rates remain subdued globally (Rachel and Smith, 2017). When the effective lower bound is binding or in close proximity, the MPC's scope to influence monetary conditions by revealing its reaction function with Bank Rate per se is severely limited, if not negligible. In this case, the forward path for Bank Rate will take on a lasting role as the main instrument for monetary policy. It follows from this that the use of forward guidance in monetary policy communications should grow, not shrink, for as long as these conditions persist.

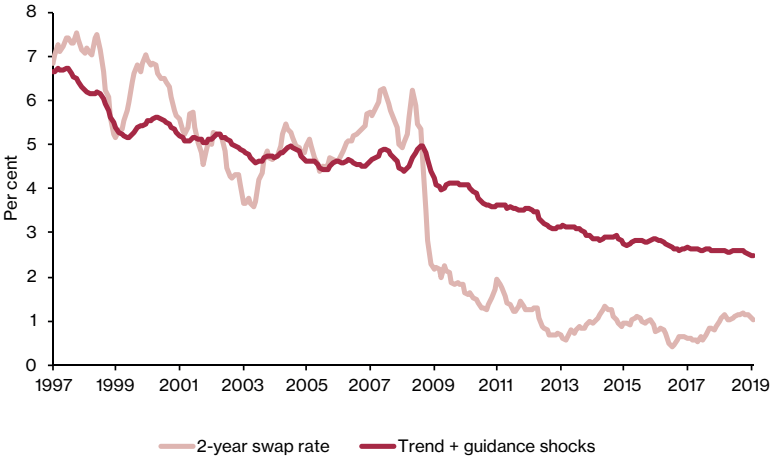
Forward guidance is not new, and nor was it invented recently. As a monetary policy tool, guidance has been deployed frequently during the inflation-targeting period, including since the MPC became operationally independent in June 1997. In August 1997, for example, having delivered three rate rises over the preceding three months, the MPC "concluded that monetary policy has now

6 For example, if 'supply' shocks become more prevalent than in the past, the behaviour of growth per se will be a less powerful indicator of future inflation pressure (see Broadbent, 2013).

reached a position at which it should be possible to pause in order to assess the direction in which the risks are likely to materialise". That was guidance.

To illustrate this further, Figure 9.1 shows a time series estimate of the effects of past guidance on two-year sterling interest rates. To construct these, I estimated a macro model similar to the Bank of England's COMPASS model,[7] using monthly UK data over the period for which the MPC set monetary policy. The model is a medium-scale small open economy New Keynesian DSGE model with sticky prices and wages. I model unemployment in a similar way to Gali et al. (2012), as for the UK in Nelson (forthcoming). Monetary policy is characterised by a Taylor rule, relating the short-term interest rate to inflation and the output gap. Estimation is performed using Bayesian methods, as in An and Shorfheide (2007).

Figure 9.1 Forward guidance explains some of the variation in two-year swap rates since 1997

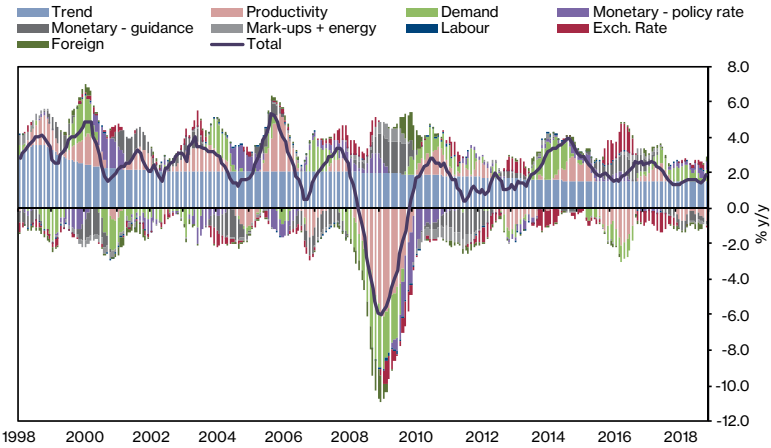


Notes: The chart shows the 2-year sterling swap rate and the component of this rate explained by the trend in these rates plus a forward guidance shock. The forward guidance shock is estimated from a New Keynesian model by including an anticipated monetary policy shock in the Taylor rule.

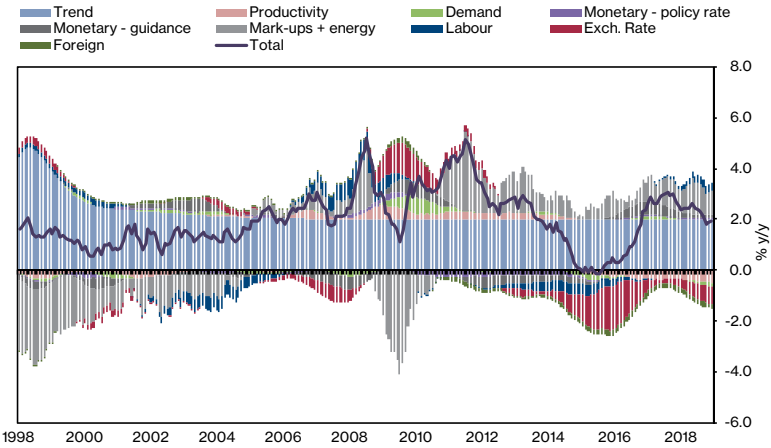
7 See Burgess et al. (2013) for the details of the Bank's model.

Figure 9.2 Forward guidance shocks are estimated to have supported GDP growth (panel a) and CPI inflation (panel b) during the crisis and in the aftermath of the EU referendum

a) GDP growth



b) CPI inflation



Notes: See notes to Figure 9.1 and the text for further details.

To identify 'forward guidance' shocks, I include an additional, *anticipated* monetary policy shock in the Taylor rule, as in Harrison (2015). This anticipated shock takes the form of a 'news shock' – so that agents in the model learn today that at some point in the future, the policy rate will diverge from the usual Taylor-rule-implied path by some known amount. I allowed the news shock to affect the policy rate twelve months forward, although I also experimented with allowing multiple monetary policy news shocks at horizons of six, twelve and eighteen months forward, with similar results.

Figure 9.2 shows the impact of these estimated guidance shocks on GDP growth (panel a) and inflation (panel b). These estimates suggest forward guidance has been a significant feature of the monetary policy landscape in the UK for some time. This form of monetary policy is estimated to have supported output growth and employment during the global financial crisis, for example, and in the aftermath of the Brexit referendum. In the former episode, around 100 basis points of the 400 basis point decline in two-year swap rates around the crisis is estimated to have been due to guidance shocks, boosting growth by around 1¾% and CPI inflation by around ½%. Around the Brexit referendum, guidance shocks are estimated to have lowered two-year rates by around ¼%, raising growth by around 1% and inflation by ½%.

Guidance in practice

Thus central banks go far beyond simply stating their immediate policy actions. Today, the Bank of England does so in its Monetary Policy Summary – a digestible one-page description of what the MPC has decided and why. Following the Warsh review (Warsh, 2014), the Bank also moved to publishing the minutes of the MPC's deliberations alongside this short statement, which give greater colour to the MPC's assessment of the state of the economy and the reasons behind its immediate policy decision.

Better still, however, is if there can be a forecast which details the central bank's assessment of not only the state of the economy, but its structure and therefore how it expects it to evolve.

Forecasts will be 'wrong' in a trivial sense in that there will be 'forecast errors'. We cannot expect otherwise. Instead, what is required is that a forecast is unbiased – it has no tendency to make systematic errors – and that it is efficient – it makes use of

all available information, so as to achieve its minimal variance. In other words, the central bank should not be systematically over- or under-optimistic for a sustained period, and it should not ignore something it shouldn't have. The Bank's Independent Evaluation Office gave a broadly favourable review of its forecast performance in 2015, while making some recommendations for improvement (Bank of England, 2015).

Finally, the situation is better still if that forecast can be linked to monetary policy strategy. There are some important choices to be made here. The central bank can make a conditional forecast – that is, a forecast for its objectives conditional on some list of known events happening. In practice, a forecast is likely always to be conditional on some things, like prevailing oil prices or fiscal policy plans, unless the central bank can convince itself it is better at forecasting these things than the market or the fiscal authority respectively. It can also condition its forecast on other important asset prices, including the short-term policy rate itself. The MPC currently produces forecasts that are conditioned on a path for the policy rate extracted from market prices, and also provides a forecast conditional on Bank Rate being held constant over the forecast period. Either way, the forecast is the central vehicle for the MPC's communication strategy.

What does the forecast represent?

Insofar as forecasts help the central bank to communicate about its strategy, *conditional* forecasts such as those produced by the MPC have some advantages and some disadvantages.[8]

Among the advantages are that the conditioning assumptions are clear and, at least in the case of asset prices, should be mutually consistent. For example, the market-implied path for short-term interest rates is in principle consistent with longer-term interest rates, equity prices, exchange rates and commodity prices, all of which are important determinants of inflation.

8 Vlieghe (2019) provides a more detailed review of the arguments and comes down on the side of publishing greater detail about the MPC's preferred policy path.

In addition, long-term market interest rates should reflect expectations over both the path for the short-term interest rate and the yield curve impact of any unconventional monetary policy measures – namely quantitative or credit easing – and the path for fiscal policy together with other relevant variables affecting term premia. It is not easy to extract policy expectations for either the overnight rate or unconventional monetary policy from market asset prices, but at least in principle a structural interpretation of asset price dynamics is not necessarily required in order to make good forecasts. Indeed, 'all' that is required is that the right set of conditioning variables – the right 'information set' – and the right economic model are used.

A cost is that conditional forecasts (if x happens, then y) are likely to be dominated by unconditional ones (given all possibilities, z is the expected outcome). In addition, the forecasts currently produced by the MPC conditional on market rates are an exercise in gauging the appropriateness of current market pricing – or at least in trying to work out why, on occasion, given common knowledge of the objectives and a broadly similar set of economic data, the market might think a given path for the policy rate is up to the task of achieving the MPC's objectives, while the MPC does not. In a sense, this reflects the MPC's forecast process, which is an exercise in testing and possibly refuting the idea that the market path for interest rates is more likely than not to deliver the Committee's objectives.

Where the MPC's forecasts do not appear to be consistent with its objectives, people must infer from what the MPC says about its preferred outcomes for growth and inflation what it intends to do with the policy rate and its asset purchases to deliver them. This leaves room for ambiguity because the guidance the Committee gives is usually qualitative in nature.[9] The MPC could instead produce a forecast conditioned on 'optimal' monetary policy, or some other 'preferred' path for the policy rate.

9 For example, in February 2018, the Committee said: "The Committee judges that, were the economy to evolve broadly in line with the February Inflation Report projections, monetary policy would need to be tightened somewhat earlier and by a somewhat greater extent over the forecast period than anticipated at the time of the November Report, in order to return inflation sustainably to the target". This was somewhat unusual in the sense in which the February forecast was evaluated with reference to the preceding (November) conditioning assumption for Bank Rate.

Begin with the former. One definition of optimal policy is that the available policy tools are set in a way that minimises a series of projected deviations in the Committee's target variables from their equilibrium levels.[10]

We know what those target variables are and what the policy objective should look like from the MPC's remit:

- The current remit says that the inflation target is symmetric and "applies at all times", and subject to its achievement, the Committee should avoid undue volatility in output.
- The remit letter also recognises that "actual inflation rate will on occasion depart from its target as a result of shocks and disturbances", and in these circumstances the MPC may allow inflation to deviate from target to alleviate any short run trade-offs that arise.
- It also allows the MPC to allow inflation to deviate from target temporarily if financial stability risks arise, accounting for the Financial Policy Committee being the 'first line of defence' against such risks.
- And when larger shocks occur, the MPC is required to "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".

Bringing this together, a quantitative description of the policy objective should contain the deviation of inflation from the target, a measure of the volatility of output, and some consideration for those financial stability risks for which there are no substitute tools available to the Financial Policy Committee. The optimal policy plan seeks to meet these objectives subject to the MPC's understanding of where the economy starts from – its state – and how the economy works – its structure.

10 Within this, there are choices. Is the optimal policy path computed assuming commitment – that the Committee commits to a stable reaction function across time? Or does it instead assume the Committee re-optimises at each meeting?

A quantitative example of what this exercise might look like is shown in Figure 9.3. Here, I again use a macro model similar to the Bank's COMPASS model to perform the following exercise.[11] Suppose the UK economy is subject to a large negative demand shock, which causes a negative output gap and risks below-target inflation. Figure 9.3 shows how this could be expected to work through the economy, abstracting from the effective lower bound on the policy rate and from other unconventional policy tools, beginning with above-equilibrium unemployment (panel d) and a below-trend output gap (panel a). The disinflationary drag pulls down wage growth (panel e) which feeds slowly through to lower inflation (panel b). Over time, the economy rebalances as the output gap closes and inflation gradually returns towards the target.

To deliver these outcomes, Bank Rate is eased aggressively (panel c), depreciating the real exchange rate (panel f).[12] These paths are generated by assuming monetary policy responds following a Taylor rule whose parameters are estimated over the inflation targeting period. The fan charts are generated from stochastic simulations of the model which assume the future distribution of shocks is the same at that estimated over the past.

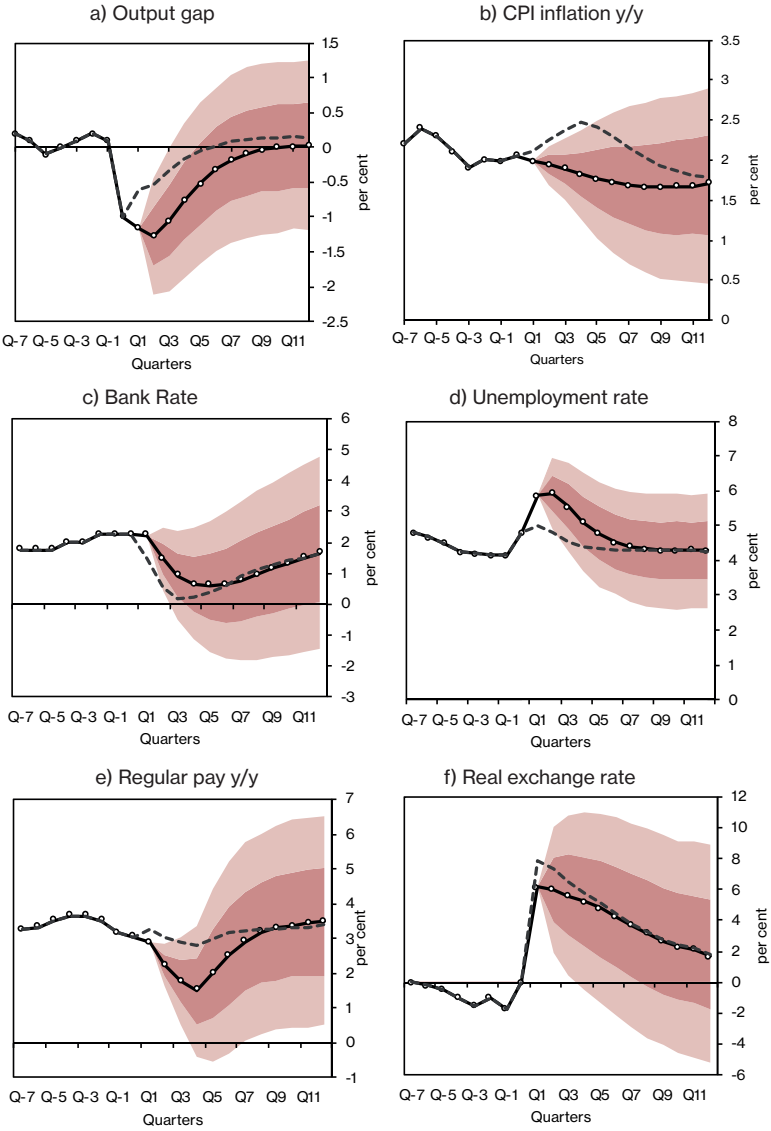
The path for Bank Rate shown in panel (c) need not be the MPC's optimal path, however (e.g., Broadbent, 2015). One can generate alternative paths for the economy by imagining how the MPC would respond if, instead of following a Taylor rule, it responded by balancing the objectives stated for it in its remit. The dotted lines in Figure 9.3 are generated under the alternative assumption that the MPC's policy is the result of a simple optimisation problem that minimises deviation of inflation and output from their target levels, while avoiding sharp changes in Bank Rate from quarter to quarter (as a proxy for financial stability concerns).[13]

11 Like the model used in the forward guidance estimates, this is a small open economy New Keynesian DSGE model. The difference this time is that I estimate the model on quarterly rather than monthly data, and I omit the forward guidance shocks from the model.

12 The exchange rate is defined as the domestic price of foreign currency, so an increase in the real exchange rate equates to a depreciation.

13 Specifically, for the purposes of this simulation, I assume the fictional policymaker delivers inflation deviations half as large as output gap deviations for a given policy rate change, and half as large as policy rate changes for a given output gap, so the resulting inflation deviation is an average of the output gap and interest rate changes.

Figure 9.3 Fan chart projections with an endogenous policy rate



Notes: The light-shaded areas denote the 15th-85th percentiles of the simulated distribution; the dark-shaded areas denote the 30th-70th percentiles of the simulated distribution.

There is an important (normative) question about how those preferences should be calibrated.[14] The remit speaks on this matter to some extent, but despite the primacy of the inflation target it leaves some room for policymaker discretion over precisely how the inflation-output trade-off should be balanced when disturbances to the economy are large. Obviously, this discretion must be quantified in some way in order to formulate quantitative optimal policy projections, and the quantification I use here is arbitrary.

Regardless, a characteristic property of such paths is that inflation and the output gap converge back to their target levels with opposite signs. The decline in output and rise in unemployment is much mitigated with aggressive easing in the early stages of the simulation, and although the economy is subject to negative demand headwinds, inflation optimally rises, rather than falling. In fact, the MPC allows a modest inflation overshoot in order to deliver a smaller loss of output and employment. Part of this easing is delivered via a greater depreciation of the real exchange rate.

One other property of this optimal policy exercise is that the target variables typically lie away from their equilibrium levels for some time – in this case, for the duration of the simulation. In the early period of the shock, output is below target and inflation is above; while further out, a positive output gap is balanced by below-target inflation. The reason is that the lag structure of the economy imposes not just contemporaneous trade-offs between inflation and output, but also dynamic ones: the effect of Bank Rate on demand is gradual, as is the effect of demand on inflation. So although inflation returns to the target at a conventional two-year horizon after the start of the forecast, it subsequently undershoots the target for a period thereafter. Given the constraints imposed by the economy, this is the best this fictional MPC could deliver. Generally, the clean 'divine coincidence' implied by the simplest monetary models is substantially muddied by the empirical realities of an inertial economy.[15]

14 There is also a technical question about how policymaker preferences should be aggregated. In some circumstances, aggregating preferences can be challenging, and would involve violating otherwise desirable properties of a voting system, such as non-dictatorship (see Arrow, 1950).

15 See, for example, Blanchard and Gali (2007).

An important point is that what is powerful about such optimal policy exercises is not the policy path per se, but that fact that it is generated by a well-posed policy problem giving rise to a 'reaction function' encoding how the policy would react to different circumstances. To be effective, this reaction function must be well understood. This is trivial in a model but less so in the real world. It follows from this that the forecast should be used in such a way as to shed light on the reaction function.

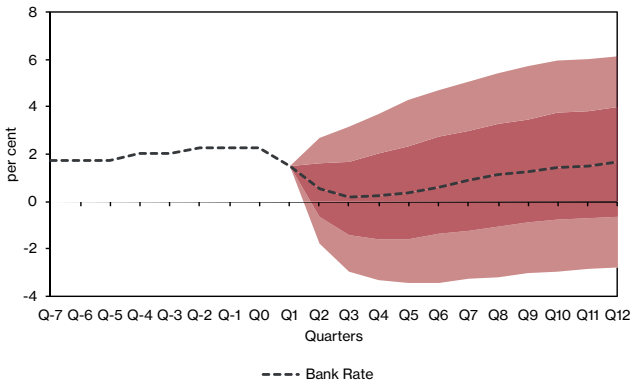
An alternative to formal optimal policy projections would be a 'preferred path' formulation. Rather than relying on a quantitative framework to generate and communicate policy plans, a more judgemental approach may be followed. In this case, one approach would be to formulate a baseline forecast conditional on market asset prices, as is done currently. The next step would be for the Committee to discuss the stabilisation properties of this path, and where if at all it is likely to be deficient. The Committee would then discuss variants of the forecast assuming alternative, judgemental policy rate paths, forming a best collective judgement view about what path is likely to be optimal. Formal optimal policy projections could be an input into these discussions, but need not be the final product. The MPC is ultimately answerable for its judgements in light of the outcomes for its target variables, and so a judgement-based variant of optimal policy paths – published 'preferred' paths – may be a more comfortable resting place.

As shown above, forecasts produced assuming some kind of optimal policy would serve the purpose of de-mystifying the reaction function to some extent. They would illustrate, for example, the paths for the MPC's target variables it would like to deliver consistent with its remit; and given its assessment of the natural interest rate, the path for Bank Rate that would deliver those outcomes, in its view. Although as shown above, model-based optimal policy paths would also be likely to highlight the very real trade-offs the MPC faces when stabilising a dynamic economy. Moreover, I have abstracted from the question of how to include unconventional policy tools within the optimal policy analysis.

Perhaps more importantly, we can safely assume that forecast errors – in other words, shocks – will occur, and that these shocks will make revisions to the MPC's desired paths for its target variables necessary over time. No MPC will have perfect foresight. And it may well be that the uncertainty implied by these disturbances

makes any fan chart for the policy rate or asset purchases rather wide. Figure 9.4, for example, shows a hypothetical fan chart for the 'optimal' policy path shown previously, in Figure 9.3. The 30th to 70th percentiles of the simulated distribution span a range for Bank Rate of around 4 percentage points. This may be an artefact of a model estimated over a sample including the financial crisis, although the published rate path fan charts for Sweden's and Norway's central banks also show substantial rate path uncertainty as an inevitable feature of monetary policy making.[16]

Figure 9.4 Fan chart for an optimal policy path



Although useful, in the limit, uncertainty about the shocks likely to hit the economy may limit the signal people can take from the MPC's optimal policy fan chart, which provides a snapshot of the preferred path given today's initial conditions.

Communicating strategically

Key judgements as scenarios

The MPC currently highlights these uncertainties in qualitative, narrative form via the 'key [forecast] judgements' it publishes alongside its forecasts in the regular *Inflation Report*. These

16 The range of uncertainty shown in the central 75% of outcomes in the Riksbank's published repo rate path in July 2019 was 5.14% at three years; the range of uncertainty shown in the central 70% of outcomes in the Norges Bank's published policy rate path in June 2019 was 3.4%.

describe the essential judgements that underpin the MPC's central projections and therefore how, in principle, the central projection could be moved off track. Although the implications of these variants for growth and inflation are usually discussed, the implications for policy – what they would mean for policy in light of the Committee's reaction function – are not.

The key forecast judgements open up a potentially useful addition to the MPC's central (conditional) forecast, or a useful complement to an optimal policy projection, in that they inform in principle a type of scenario analysis. Scenarios can be used to make monetary policy more predictable *conditionally*, not unconditionally, by saying more about the macroeconomic outcomes that could alter the MPC's optimal or preferred policy path.[17]

Logically, the scenarios should entail economic situations that are mutually exclusive and collectively exhaustive. Mutually exclusive in that they are associated with different structural shocks (like 'demand' and 'supply'). And collectively exhaustive in that they span the possible co-movements of the MPC's target variables (requiring positive and negative draws of the relevant shocks). This is closely related to the econometric concept of identification. In practice, the set of key forecast judgements naturally provides a significantly more parsimonious but arguably more salient set of scenarios than this, scenarios that could be used to illustrate what the best collective judgement policy response would be likely to be if the judgements underpinning the central projection did not come to pass.

Just as for publishing a preferred policy path, Committee members may feel overly constrained by any scenarios or forecast variants they publish, of course.[18] It is a natural instinct to resist constraints on policy discretion. At the same time, by illustrating the fact that policy is formulated systematically and will be influenced by changes in economic conditions, this reinforces the statement that any policy guidance is 'a forecast not a promise'.

17 Either the optimal path, under optimal policy projections, or the market path, under a conditional forecast.

18 This may be one reason why the Riksbank, which published scenario analysis (including an endogenous monetary policy response) for a period up until early 2016, has since largely ceased doing so.

What are the benefits? One is that, as mentioned, an unconditional forecast may contain so much uncertainty as to give little practical guidance about how policy will be set if circumstances change in plausible ways. Scenario analysis may help the Committee go beyond the truism that policy will always be set to achieve the 2% inflation target in the medium term by illustrating magnitudes and contingencies that are of particular relevance. It would constitute a form of conditional guidance that makes policy more predictable.

One other potential benefit is that it puts flesh on the bones of the idea of 'data dependence'.[19] Central banks naturally emphasise that policy is data-dependent in the sense that the policy instruments are not held fixed, or moved arbitrarily, irrespective of the state of the economy. The policy instruments must be moved in a stabilising manner, which means responding to developments in the economy. But the direction and magnitude of the appropriate response is not always obvious in a world of imperfect information where knowledge of the reaction function is incomplete.

There are likely to be occasions where a better public understanding of data dependence is particularly valuable. For example, from time to time, the public's understanding of the MPC's reaction function can become particularly clouded by overarching uncertainties. Consider the view that 'Bank Rate is on hold until the Brexit process is complete'. To some extent, such a view lay behind the relative unresponsiveness of financial markets to improving UK data over the course of 2017.[20]

This is the episode that was noted in the introduction – and ultimately it was resolved by the Committee making a somewhat direct statement to the effect that a Bank Rate rise was coming at the next meeting. Suppose instead key forecast judgements made earlier in the year had been used to discuss the policy implications of a stronger path for demand over the subsequent period. It is possible that an 'upside demand' scenario could have provided some anchor for what was likely to happen to policy if the economy

19 See, for example, Clarida (2018). He distinguishes two forms of data dependence: (i) incoming data as revealing the state of the economy, relative to the central bank's objectives, naturally being an important input into the policy decision in a situation in which the parameters of the economy are known; (ii) data as shedding light on where the economy's equilibrium variables – particularly u^* and r^* – are likely to be, and therefore 'where the economy is heading'.

20 See, for example, Haldane (2017).

strengthened by more than in the baseline projection. In this case, market pricing may have been more efficient in the run up to the rise in Bank Rate that had instead to be telegraphed directly – 'jolting' markets out of their complacency – at the end of the year. Had this been the case, it is possible there would have been less need for direct commentary from the MPC, which itself could lead to a kind of perverse dependency of market efficiency on the time-based guidance of the central bank. By saying more about monetary policy conditionally, the MPC may end up having to say less unconditionally.

Monetary strategy in the minutes

Presently, the minutes summarise the incoming data, before turning to 'the immediate policy decision'. The range of views behind the immediate policy decision are set out, before the decision itself is given, together with the votes.

Within these paragraphs, the immediate policy decision is usually situated with reference to the Committee's policy strategy. Currently, and paraphrasing, this is to return inflation to the 2% target at a conventional horizon – the implication being that the Committee sees no particular trade-off between achieving the target and stabilising output at present. On other occasions, the Committee has said that it intended to return inflation to target over a somewhat longer horizon than usual, balancing the speed with which 2% inflation is achieved against support for jobs and activity.

These are legitimate but important judgements, fully in line with the remit. The public's understanding of them could be enhanced with a further strategy discussion section in the minutes, summarising:

- the Committee's broad assessment of the state of the economy, stepping away somewhat from the latest data volatility;
- the current stance of monetary policy relative to its equilibrium short-term setting ('short-term r*');
- how it expects the real side of the economy to evolve, and therefore the likely path for the equilibrium interest rate;

- in light of that, the desired path for inflation, including the intended period over which inflation is to be returned to target, and why (this differs from current practice to the extent that the market curve does not deliver the Committee's desired paths for inflation and output); and
- finally, risks to the strategy should be considered, dovetailing with the key judgements described above. The immediate policy decision would then logically follow from the preceding assessment of the incoming data and in the light of the overall strategy discussion.

Concluding remarks

In a low interest rate environment, policy guidance will become more important not less. In the limit, at the effective lower bound, the forward path for the policy rate becomes the main mechanism for monetary policymakers to affect financial conditions. Because the forward path can be influenced by the central bank's communication strategy, communication per se becomes an essential monetary policy tool. Coherent macroeconomic projections provide a convenient vehicle for communication about the future path for monetary policy. When conditional forecasts – that is, projections made on the basis of prevailing asset prices – do not meet the objectives of the central bank, it makes sense to say more about which alternative policy paths would.

There are questions to be resolved about the basis for specifying policy paths – whether, for example, they are formulated as optimal policy projections, or something more judgemental. In any case, preferred paths would never eliminate the uncertainty inherent in monetary policy dynamics, and the stabilising role of monetary policy derives not just from what people expect the central bank to do for given initial conditions, but also what they expect the central bank to do when things change.

Monetary policy must always be data dependent, and by specifying scenarios under which the MPC's central projection might go off track, its key forecast judgements provide a natural way to put flesh on the bones of this core idea. Together with a more prominent discussion for monetary policy strategy, monetary policy's effectiveness could be maximised in a period when conventional policy space is low.

References

An, S. and F. Schorfheide (2007), "Bayesian Analysis of DSGE Models", *Econometric Reviews* 26(2-4): 113-172.

Arrow, K.J. (1950), "A Difficulty in the Concept of Social Welfare", *Journal of Political Economy* 58: 328-328.

Bank of England (2015), "Evaluating forecast performance", November (https://www.bankofengland.co.uk/-/media/boe/files/independent-evaluation-office/2015/evaluating-forecast-performance-november-2015).

Bernanke, B. (2015), "Inaugurating a new blog", Brookings, 30 March (https://www.brookings.edu/blog/ben-bernanke/2015/03/30/inaugurating-a-new-blog/).

Blanchard, O. and J. Galí (2007), "Real Wage Rigidities and the New Keynesian Model", *Journal of Money, Credit and Banking* 39(S1): 35-65.

Blinder, A.S., M. Ehrmann, Marcel Fratzscher, J. De Haan and D.-J. Jansen (2008), "Central Bank Communication and Monetary Policy: A Survey of Theory and Evidence", *Journal of Economic Literature* 46(4): 910-945.

Broadbent, B. (2013), "Conditional guidance as a response to supply uncertainty", speech at London Business School, 23 September (https://www.bankofengland.co.uk/-/media/boe/files/speech/2013/conditional-guidance-as-a-response-to-supply-uncertainty).

Broadbent, B. (2015), "The MPC's forecasts and the yield curve: predictions versus promises", speech at Reuters, 18 November (https://www.bankofengland.co.uk/-/media/boe/files/speech/2015/the-mpcs-forecast-and-the-yield-curve-predictions-versus-promises).

Burgess, S., E. Fernandez-Corugedo, C. Groth, R. Harrison, F. Monti, K. Theodoridis and M. Waldron (2013), "The Bank of England's forecasting platform: COMPASS, MAPS, EASE and the suite of models", Bank of England Working Paper No. 471.

Clarida, R. (2018), "Data dependence and US monetary policy", speech at the Clearing House and the Bank Policy Institute Annual Conference, New York, 27 November (https://www.federalreserve.gov/newsevents/speech/clarida20181127a.htm).

Galí, J., F. Smets and R. Wouters (2012), "Unemployment in an Estimated New Keynesian Model", *NBER Macroeconomics Annual* 26(1): 329-360.

Haldane, A.G. (2017), "Work, wages and monetary policy", speech at the National Science and Media museum, Bradford, 20 June (https://www.bankofengland.co.uk/-/media/boe/files/speech/2017/work-wages-and-monetary-policy).

Harrison, R. (2015), "Estimating the effects of forward guidance in rational expectations models", European Economic Review 79(C): 196-213.

Hayek, F.A. (1945), "The use of knowledge in society", *American Economic Review* 35(4).

Nelson, B.D. (forthcoming), "Understanding the UK's wageless recovery", *International Journal of Central Banking*.

Rachel, L. and T.D. Smith (2017), "Are Low Real Interest Rates Here to Stay?", International Journal of Central Banking, *International Journal of Central Banking* 13(3): 1-42.

Vlieghe, G. (2019), "Continuous improvements in communicating monetary policy", speech at Thomson Reuters London, 12 July (https://www.bankofengland.co.uk/-/media/boe/files/speech/2019/continuous-improvements-in-communicating-monetary-policy-speech-by-gertjan-vlieghe.pdf).

Warsh, K. (2014), "Transparency and the Bank of England's monetary policy committee", December (https://www.hoover.org/sites/default/files/transparency_and_the_bank_of_englands_monetary_policy_committee.pdf).

Woodford, M. (2005), "Central bank communication and policy effectiveness", *Proceedings – Economic Policy Symposium – Jackson Hole*, Federal Reserve Bank of Kansas City, August, pp. 399-474.

CHAPTER 10

The oversight and accountability of monetary policy

Chris Giles[1]

Once the Bank of England's Monetary Policy Committee (MPC) has set monetary policy and communicated its decisions to the world, policymakers need to be accountable for their actions. In a democracy few officials have as much power over people's lives as the nine members of the MPC.

Their collective choice determines whether people have jobs, whether prices will rise or fall out of control, and can influence the long-term living standards of the population. Arguably, it is only senior judges, with the power to deprive people of their liberty, who hold a greater sway over people's lives.

If the MPC is cavalier in its use of this power, it will call into question the legitimacy of independence to set monetary policy and raise questions over the legitimacy of what Paul Tucker, former deputy governor of the Bank of England, calls the "unelected state" (*Financial Times*, 2018).

To meet the Bank's mission to serve the good of the people of the UK, MPC members must demonstrate they are accountable both individually and collectively. But although everyone in the Bank accepts the importance of accountability, in my experience, the institution does not always live up to its best intentions. The current monetary framework is only as strong as the accountability mechanisms that operate.

Accountability is therefore an existential question for the operational independence of monetary policy.

In this chapter I will look at the accountability of the Bank of England from a personal perspective, having covered the central bank for the past 15 years. I will examine areas of monetary policy

1 Economics Editor of the *Financial Times*.

where the Bank should be held accountable for its decisions, the mechanisms of accountability and the people to whom the Bank should be directly accountable. I will examine the issues from a deliberately practical rather than theoretical perspective.

For what should the Bank of England be accountable?

Meeting the inflation target

With a monetary policy remit to achieve price stability, currently defined as hitting "the inflation target [of] 2 per cent as measured by the 12-month increase in the Consumer Prices Index", the most important element of accountability is ensuring this is achieved.[2]

But price stability, even with a precise definition, is a slippery concept. Celebrating ten years of MPC operational independence in May 2007 (Meyer, 2000), the then governor, Mervyn King, boasted how "the average deviation of inflation from target has been just minus 0.08 percentage points", a statistic that was irrelevant to the eventual record of macroeconomic stabilisation of the previous decade. The global financial crisis started three months later, puncturing the then governor's hubris.

The financial crisis was far from the Bank of England's fault, but it was complicit in errors in believing that stable inflation generated a stable economy, and the Bank did not acknowledge its error in what was a fundamental mistake of economic analysis before the crisis.

The difficulty in using inflation performance as an accountability device does not end there.

When inflation is on target (as it was in the decade before 2007), central bankers take credit for their actions. When it is well away from target, they say they are "looking through" an "idiosyncratic shock" to prices and aiming to bring inflation back to target "over the appropriate time horizon". It is not straightforward to distinguish between honest central bankers, grappling with difficult circumstances, and incompetent ones cavalier about their mandate.

2 See the letter from MT Treasury to Governor Mark Carney, 29 October 2018 (https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/752077/PU2207_MPC_remit_web.pdf).

In short, there is a fundamental difficulty in holding a central bank to account for price stability outcomes. We know if it has gone horribly wrong, such as in the financial crisis, but cannot easily determine success without a clear statement in advance of the bank's own criteria of success.

The policy tools

While accountability for inflation performance is crucial, but far from proof of successful monetary policymaking, central banks also need to be accountable for the policy process. This can range from the forecasting models to the communications used to anchor price expectations and, in recent years, the guidance over future monetary policy.

To highlight how difficult accountability can be, take the example of the Bank of England's first foray into forward guidance, introduced shortly after Mark Carney became governor in 2013. The MPC pledged not to consider raising interest rates until unemployment fell below 7%. The rate was 7.8% when Mr Carney took over.

The guidance was controversial at the time because everyone knew that the previous link between inflation and unemployment had broken down. When concerns about the new guidance were proved true within six months as unemployment fell rapidly, making the trigger redundant, the Bank ditched the policy. It had failed as a tool of monetary policy.

But that is not the history that governor Mark Carney tells (Carney, 2019). Rather than admitting a policy error, turmoil inside the bank and much scurrying around in late 2013 to find a dignified way to U-turn, he attributes the change in guidance to have resulted from "another structural development: the sharp fall in the equilibrium real interest". The lack of any material change in the equilibrium interest rate between June 2013 and January 2014 of sufficient size to drop a policy adopted six months earlier does not inhibit this rewriting of history.

Side effects of monetary policy action

Unfortunately, monetary policy does not only affect the general price level. By altering the price of money and incentives to borrow and save, it powerfully redistributes between different groups in society. Cuts

in interest rates boost asset prices and help borrowers, for example. Redistribution is a fundamental part of democratic decision making and an awkward area for monetary policymakers, who should be accountable for the distributional effects of their actions and transparent about them. Then, politicians can decide whether they want to offset them with targeted tax or social security changes.

The Bank of England has regularly sought to fudge this genuinely difficult issue. In 2012 it said that although the effect of quantitative easing (QE) on asset prices had not been shared equally across the population, the loosening of monetary policy had benefited everyone, even those with money in interest-bearing accounts (Bank of England, 2012). In 2018, Chief Economist Andy Haldane gave a speech after the Bank re-estimated its equations and again found that the MPC's actions had raised living standards by avoiding a deeper slump and that these gains "have been shared right across the distribution of income and wealth, age and region, though the precise scale and nature of these benefits does differ across cohorts" (Haldane, 2018).

The widely reported speech was an exercise in the Bank seeking to show it was accountable for its actions. Less reported was the working paper that accompanied the speech (Bunn et al., 2018), which showed that by raising house prices and including the future cost of housing, the Bank estimated monetary policy had hurt the living standards of those in their 20s. Equally, the restraints on lending in macroprudential policy in 2014 reduced the welfare of many households by limiting their access to credit, something that did not show up in the distributional analysis. For those who follow the Bank of England closely, it was a classic example of the Bank wanting to be seen accountable for successes but never failures.

Important economic subjects, tangential to monetary policy

There are genuinely difficult questions regarding when the Bank of England should speak about matters of economic importance and when it should keep quiet. Almost any issue can be seen to be relevant to monetary policy or financial stability, so it is easy to justify speaking up about fiscal policy (as Mervyn King, former governor, did in 2009), Scottish independence (as Mark Carney did in 2014), Brexit (Carney again from 2016 onwards) or climate change (Carney again from 2015 onwards).

But getting the line right between speaking about issues as they apply to policies relevant to the central bank and using the power of the institution to promote a policy not that important to monetary policy requires scrutiny. The governor of the Bank, in particular, needs to be accountable for where he or she draws that line.

How is the Bank of England accountable for its decisions?

There is a single word answer to this question: "transparency". The more the Bank and the MPC allow government, Parliament and the public to see all the evidence on the reasons for monetary decisions taken on their behalf and the effects of those decisions, the more accountable it will be.

This is not to deny there is an important trade-off in setting monetary policy. Policymakers need a safe space to deliberate their decisions, clarify thinking and make mistakes, but once the decisions are taken, the trade-off disappears. There is no simple formula for the right level of transparency of decision making – history demands a record is kept – but the Bank should seek to be at least as transparent as other leading central banks, which it now is.

The more transparent an institution is about its thinking, the more accountable it will be for its decisions and the more legitimacy those decisions will have.

From many years of reporting on the Bank of England, I am convinced that transparency is both the greatest weapon outsiders have to hold officials to account and also the greatest weapon at the disposal of officials to demonstrate they are acting in the public interest. I have therefore struggled to understand why the Bank was traditionally so secretive and why some policymakers appear so keen to mask their detailed thoughts on monetary policy.

Go back ten years and the central bank routinely refused to give people the parameters of a chart they had published in documents so it could be replicated elsewhere. It insisted on a blanket exemption to freedom of information requests for monetary policy, something that barely existed even for much more sensitive parts of government. It refused to make transcripts of MPC meetings available even for archives to be published for historians 50 years hence. It is no wonder people were suspicious and then justifiably

angry when the wheels came off the economy in 2008. Secrecy and obfuscation did not aid policy formation in the good times and added to pressure when challenges arose.

Improvements in transparency has been one of the defining features of the governorship of Mark Carney. Many of the changes stemmed from the 2014 Warsh review on transparency and accountability, commissioned by the Bank (Warsh, 2014). Contrary to the warnings of his predecessor, the sky did not fall in when the Bank opened up its monetary policy process to greater transparency and scrutiny. The fears regularly articulated by Mervyn King that greater transparency would result in systematic misrepresentation of the Bank by the media have been shown to be false. With the quarterly *Inflation Reports*, the public now has access to:

- the decision on interest rates at the same time as the inflation report;
- reasons given for interest rate changes each time there is an MPC meeting, with minutes of the meeting and a summary;
- detailed parameters of the Bank's forecast;
- guidance over the key judgments of the Committee to give a nuanced guide to their reaction function;
- a transcript of the press conference and opening statement; and
- transcripts of the MPC meetings themselves, held private for eight years to allow freedom of discussion.

In addition, the media has access to a good briefing on the *Inflation Report* by the head of monetary analysis ahead of its publication, in a secure room with no outside communication, to aid the accuracy of initial reporting. A select group of City economists also receive a briefing after the press conference, although few report it to be of high value. A restricted list of media outlets also gets embargoed access to important monetary policy speeches, sometimes also distributed in a secure room with no telecommunications access to the outside world to prevent leaks.

Transparency is not yet perfect. The freedom of information exemption still stands for little purpose other than allowing the Bank to avoid engaging in a discussion over whether the release of information is in the public interest.

MPC members often avoid a detailed discussion of their vote in speeches or of their personal view of the economic outlook or the likely future path of monetary policy. As Gertjan Vlieghe, the external MPC member who takes transparency much more seriously than the rest, has shown, it is perfectly possible to be transparent about his own views, in the context of the MPC's agreed "limited and gradual" guidance, without any negative consequences.

His example demonstrates the remaining gaps in transparency and accountability which apply to the other MPC members. They should follow suit and, if they choose not to, should face lengthy grilling by MPs and the public on why they are shirking individual accountability for their thinking and votes on monetary policy.

To whom does the MPC need to be accountable?

The government

From the accounts I have heard, this works well. A government representative from the Treasury – either the permanent secretary or chief economist – attends MPC meetings, allowing the deliberations to be communicated to economic decision makers in government. The governor has regular meetings with the chancellor and prime minister.

These are private, and appropriately so to allow a safe space for discussion and policy deliberation. Papers are archived and will be produced for historical purposes by the national archives, generally after 20 years.

To Parliament

Giving evidence to the Treasury Committee of the House of Commons is the bedrock of the MPC's collective accountability for operational independence of monetary policy and the individual accountability of MPC members. They recognise its importance and concur with the views of Lord King in his last hearing in 2013 that the importance stems from "demonstrating to the people of this country that the Bank of England is held to account".[3]

3 https://publications.parliament.uk/pa/cm201314/cmselect/cmtreasy/458/130625.htm.

As a long-standing observer of the hearings, there have been instances where Bank officials have genuinely been held to account for their actions at Treasury Committee hearings. Experience suggests the Committee can be sufficiently expert, has enough time and can be adequately briefed, if MPs are interested.

But the most effective scrutiny has nearly all been on procedural matters and areas of governance of the Bank rather than monetary policy. Where conflicts of interest have arisen, such as in the appointment hearings of Gertjan Vlieghe[4] or Charlotte Hogg,[5] the accountability of the Bank for errors in the financial crisis or examination of former deputy governor, Paul Tucker,[6] on his interaction with commercial banks in the crisis.

The quality of discussion and the degree to which MPC members are held accountable for their monetary policy decisions otherwise is poor. Even though it was a better hearing than many, the latest Inflation Report hearing held on 24 June 20197 gives an indication of the lack of scrutiny in these hearings.

- The governor answers nearly all the questions – he answered almost as many as the other three witnesses combined.
- There was little probing of detailed views on monetary policy or differences between committee members. The main issue should have been why was the Committee sticking to a conditioning assumption for monetary policy of a flat market path for interest rates which was inconsistent with its view of the "limited and gradual" rate rises that were necessary. This was the first question, but there were no follow ups to examine whether the governor's answer that there was a "natural tension" that existed was a sufficient response. The obvious repost from the Treasury Committee would be to ask each MPC member for their personal view of the outlook on a conditioning path that was consistent with their view, and if

4 https://www.ft.com/content/d8b68ece-71b5-11e5-9b9e-690fdae72044

5 https://www.ft.com/content/3b35ab5c-08a0-11e7-ac5a-903b21361b43

6 https://www.ft.com/content/c73016ab-8f1f-3b29-9a93-eef6625e7120

7 http://data.parliament.uk/writtenevidence/committeeevidence.svc/evidencedocument/treasury-committee/bank-of-england-inflation-reports/oral/103340.html

they could not supply it, to demand the MPC members did better and supplied it in writing. This would have been an effective use of Committee time and a news story.

- As ever, many of the questions MPs asked were read out from a script provided by the Treasury Committee clerks. These questions are generally good, but the MPs need to be able to ask relevant follow-up questions.
- As ever, there was a good deal of party political grandstanding. One of the more successful elements was a Labour MP's effort to cause some mischief in the Conservative Party leadership debate by encouraging the governor to say that Boris Johnson was wrong in his interpretation of Article 24 of the treaties underpinning global trading rules. Mr Carney obliged.

To expert opinion

There is limited dissemination to experts, many of whom feel that the MPC is remote and unwilling to respond to challenging questions. MPC speeches are rarely to specialist audiences and few City economists prize their quarterly briefings. Greater challenge from experts in a controlled environment would help ensure the MPC was accountable, not just to Parliament but also to expert opinion they might not have heard sufficiently.

To the public intermediated through the press

There have been many improvements to the information flow in the quarterly Inflation Report, which is now released to a better-informed set of specialist journalists who have also been briefed privately by staff in a secure location in the Bank before the press conference. The governor does not always stick to the tone of the report. Mr Carney was, for example, more hawkish in his warnings on inflation in the press conference for the most recent (May 2019) report than the report itself. This inconsistency complicates accurate reporting.

A more troubling phenomenon of the press conference is its one-hour format of one question each with no follow-ups allowed and sometimes cut short, as was the case in August 2019, much to the legitimate irritation of some journalists such as Philip Aldrick of

The Times.[8] This permits the governor or other Bank staff to avoid the question. Economics journalists are ill-disciplined in behaving as a pack and asking the same question many times, much to my frustration and that of others among us. There is an unfortunate tendency to want to be seen to be asking a complicated question to make the journalist look smart rather than to hold the Bank to account.

MPC speeches are seen in the Bank as an effective way for members to demonstrate individual accountability for their views on monetary policy. At some times and for some members, this is true, but MPC speeches have a tendency to major on an obscure academic point with a small section on their view shoehorned in at the end. I often wonder who the intended audience is for these speeches. They could be much better vehicles for individual accountability than they are.

MPC members also give occasional press interviews. Many are given to local press on regional visits. I am not aware of anything said of any significance in any of these interviews. I would expect them to have very limited readership.

Otherwise, interviews are handed out to news organisations as gifts for good behaviour by the Bank's press office. Good behaviour is defined as being helpful to the Bank rather than providing effective scrutiny. This is never a way for effective media management except on a very short-term basis. These are not generally effective vehicles for accountability unless the MPC member has thought in advance about the message he or she would like to deliver and wants to use the interview to express dissent from the majority view on the MPC. Then, interviews are very effective.

The *Financial Times* will now ask what the MPC member wants to say before agreeing to an interview. There is nothing worse than the cold fear of sitting in an interview with the news desk expecting a good story only for the interviewee to have nothing of note to say. This form of accountability does not work well.

8 https://twitter.com/PhilAldrick/status/1156911631441506310?s=20

Direct accountability to the public, not intermediated through the press

The Bank has a noble aim of seeking to gain greater direct accountability to the public though a "layered" communications strategy (Bank of England, 2019). There is greater interaction with the public on Twitter, more graphical information published and attempts made for simple summaries. The Bank has celebrated a rise in hits on its website for the visual summaries.

I am sceptical about these efforts. The Bank praised its rising "interactions" from users of the website, but the numbers are still objectively tiny. It received 500,000 "interactions" for all of the Inflation Report and Financial Stability Report content (Bank of England, 2019). I am a heavy supplier of interactions to the Bank and if I am any guide, the rise in hits does not prove greater accountability or better information. The information is now stored in such a difficult way on the website that you need to click many more times to find what you are looking for. My increased interactions reflect greater frustration, not greater accountability. I will not comment on the infographics the Bank produces, except to say it would be difficult to hold anyone to account for them since they generally provide zero information.

Recommendations

The Bank of England has made strides in transparency over the past seven years, but still prefers to be accountable for its policy successes and to airbrush its failure. So, more can still be done to improve transparency and accountability.

- The MPC should set out a loss function and clear criteria of success so that outsiders can judge whether it has succeeded.
- The MPC should take individual accountability more seriously. MPC members should seek to demonstrate where their views differ from the Committee and talk about it in plain English. This should be done in more frequent meaningful interviews, more probing questions at the Treasury Committee and in an individual section in the minutes or the inflation report.
- MPC members should demonstrate their accountability and their own views with individual rate forecasts or an indication of where their views differ from the collective inflation rate forecast.

- MPC members should always seek to answer questions rather than find clever ways to deflect them. They are not politicians. This requires a change in attitude.
- MPC members should expose themselves more willingly to challenge from expert and dissenting opinion. They should decide whether this should be in private seminars or a more formal and open format.
- The Bank should seek to present its reports and views more clearly on its website. The organisation of material has taken a large step backwards since the Bank moved to a new platform. It must remember that better communication does not mean infantile infographics that contain no information.
- The Bank should periodically update and improve its analysis on the peripheral effects of monetary policy on aspects such as the distribution of income. This need not happen more than once every two years.
- MPs should be more interested in scrutiny of policy, not in point scoring on the Treasury Committee. Reading prepared questions at hearings is a terrible look, especially when there is no effective follow-up.
- The quarterly *Inflation Report* press conference should be scheduled for two hours with follow-up questions allowed for clarifications.
- In the meantime, the media should stick to one or two topics in questioning the governor at press conferences. Questioning should be focussed rather than scatter-gun. This will generate better scrutiny of public officials on the main story of the day. Deference to the governor must be a thing of the past.

References

Bank of England (2012), "The Distributional Effects of Asset Purchases", 12 July (https://www.bankofengland.co.uk/-/media/boe/files/news/2012/july/the-distributional-effects-of-asset-purchases-paper).

Bank of England (2019), *Annual Report and Accounts, 1 March 2018 to 28 February 2019* (https://www.bankofengland.co.uk/-/media/boe/files/annual-report/2019/boe-2019.pdf).

Bunn, P. A. Pugh and C. Yeates (2018), "The distributional impact of monetary policy easing in the UK between 2008 and 2014", Bank of England Staff Working Paper No. 720 (https://www.bankofengland.co.uk/-/media/boe/files/working-paper/2018/the-distributional-impact-of-monetary-policy-easing-in-the-uk-between-2008-and-2014.pdf).

Carney, M. (2019), "Remarks to Open Policy Panel", remarks at the ECB Forum on Central Banking – 20 Years of European Economic and Monetary Union, Sintra, 18 June (https://www.bankofengland.co.uk/-/media/boe/files/speech/2019/remarks-to-open-policy-panel-by-mark-carney).

Financial Times (2018), "Sir Paul Tucker on the legitimacy of the central bank", *Financial Times* Alphachat podcast, 18 May (https://www.ft.com/content/1132a693-bfe8-4ed4-9435-16232e8b596d).

Haldane, A. (2018), "How Monetary Policy Affects Your GDP", speech at the University of Melbourne, 10 April (https://www.bankofengland.co.uk/-/media/boe/files/speech/2018/how-monetary-policy-affects-your-gdp-speech-by-andy-haldane).

Meyer, L.H. (2000), "The politics of monetary policy – balancing independence and accountability", remarks at the University of Wisconsin, 24 October (https://www.bis.org/review/r001027a.pdf).

Warsh, K. (2014), *Transparency and the Bank of England's Monetary Policy Committee*, December (https://www.hoover.org/sites/default/files/transparency_and_the_bank_of_englands_monetary_policy_committee.pdf).

Part 4: Measurement

CHAPTER 11

Measuring the economy and gaining better insights for policy

Paul Mizen[1]

Why we need to measure the economy more accurately

Gathering data is absolutely central to making the best monetary and financial policy decisions. Policymaking committees in the central banks rely on huge volumes of economic and financial data that inform the current policy decision. These data are used by officials to show trends and cycles in key variables, and to highlight new developments that have arisen since the previous policy decision or that are observable with greater clarity with the addition of new data points. Where there is a well-defined remit for policy, it is often possible for policymakers to make better-informed judgements if they have access to the most current data.

In theory, the vast array of official data should prove ample to support this task. But official data typically come with a lag due to the time taken in sampling households or firms and then balancing the responses using accepted international standards for the construction of national statistics.[2] Data are often released in vintages that are revised as survey results are updated with further information.[3] For this reason, first-release data can differ from later releases if additional survey data arrive with characteristics that modify the original release. While revisions may be necessary, they introduce policymakers to the complexities of using data in 'real

1 Professor of Monetary Economics, University of Nottingham. I would like to thank Richard Barwell, Jagjit Chadha, Michael Clements, Tony Garratt, Kevin Lee, Rebecca Riley, Pawel Smietanka and Martin Weale for comments.

2 This is not a criticism of national statistics or the bodies that compile the data, it is just a reflection of reality that official data take time to gather and process before dissemination.

3 Revision histories differ by country, being slightly shorter in the US and longer in the UK.

time' – before the official data are fully revised – a difficulty that has long been recognised (Croushore, 2011). For example, Orphanides and van Norden (2002) show that the standard measures of the output gap – a key input to the monetary policy process – are highly uncertain because ex post revisions of the gap in the US are of the same order of magnitude as the estimated gap itself. Dealing with revisions in data is a process that requires careful consideration and can complicate the policymaking process (Garratt et al., 2008). Therefore, official data are often supplemented with information from surveys, examples of which include credit conditions surveys (which revealed the need for the Funding for Lending Scheme) or Agents' Reports (which identified the impact of migration from A8 countries to the UK on the labour market). Use is also made of 'nowcasts' that employ a wide range of current indicators, such as retail sales or Purchasing Managers' Indexes (PMIs), to provide a real time reading of economic conditions. These data are used to check understanding of current conditions, to calibrate models and to inform judgements.

Furthermore, official data are collected by national statistical agencies through surveys that use a standardised format every month and therefore cannot easily be altered to deal with short-term changes in the information that is needed by policymakers without some piloting of new questions. Official data are therefore relatively inflexible, although this allows comparison of data collected and processed in exactly the same way at different times.

New data sources are emerging, often from digital and administrative sources, which offer considerable scope for more efficient and timely collection of data with greater granularity and more flexibility in their construction. This will support better policymaking.

In this chapter, I consider the importance of supplementing digital data with survey data on expectations and uncertainty. There are data that policymakers require that do not have a digital footprint because they are yet to happen. Nevertheless, firms or households may have formed expectations about these future variables (sales, for example) and there may be a distribution of expectations that indicates the degree of uncertainty about their central expectation.[4]

4 The dispersion of expectations for individual respondents signals their uncertainty (Bachmann et al., 2013), but this must be distinguished from the distribution across respondents, for example, disagreement between forecasters (Dovern et al., 2012).

Policymakers will benefit from these data indicating the state of mind of key decision makers in the economy, and they may provide critical insights into current decisions over investment and employment that necessarily take into account future expected demand and the prospective return, and will at times benefit a pause for more information to be revealed.

Surveys take many forms and can shed light on these forward-looking decisions. In this chapter I argue that policymakers increasingly benefit from better-devised surveys that will elicit clearer information about expectations and uncertainty. In circumstances where there are distinct scenarios that firms or households need to prepare for, these surveys can provide illumination to reveal the planning, preparedness and likely direction that will be taken under different future paths.

New data sources

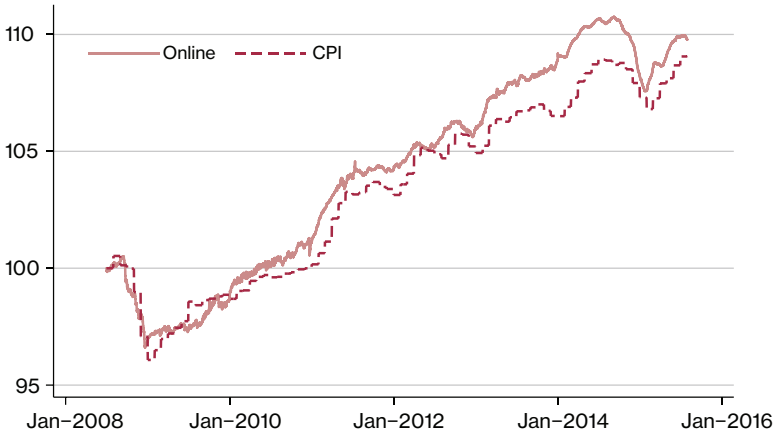
There has been a significant growth in the sources of additional data, driven to an extent by the Digital Economy Act (2017) and the application of data science to official statistics. There are also many other sources of digital data besides those from official providers. Data on prices and volumes can be sourced digitally from web-scraping price lists on wholesaler and retailer websites, from online sales data for large retailers, from private sector records such as transactions by the leading credit card companies, and from financial transactions that are recorded in the banking system. These data are often recorded at much higher frequency than traditional data sources that rely on monthly or quarterly surveys and take time to construct. In some cases, they record all the transactions that take place, and provide a breakdown of the volume and price data to the product level.

Alberto Cavallo at Harvard University has documented the power of digital data collection through the Billion Prices Project (Cavallo and Rigobon, 2016), a joint Harvard-MIT project which won the 2018 Economics in Central Banking Award for impact on central bank policymaking. His use of technology and online web services to web-scrape prices data, collected from hundreds of online retailers around the world, provides higher-frequency and

more granular data that can be compared to official measures such as the Consumer Price Index (CPI) (see the US data reported in Figure 11.1).[5]

These data are obviously more timely and give greater granularity than official data. There is very little lag between gathering the data and presenting them for use by the public or policymakers. They indicate the stickiness of pricing behaviour, they allow comparisons between online and physical prices (Cavallo, 2017) and they show competition and behavioural responses in pricing by retailers that traditional survey methods may find hard to measure. Unsurprisingly, central banks have begun to take notice (Cavallo, 2018a).

Figure 11.1 Billion Prices Price Index Versus US CPI

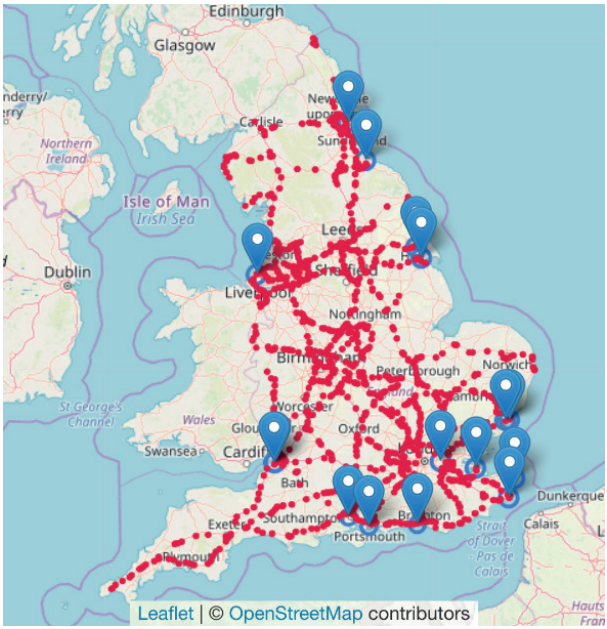


Source: Billion Prices Project, Harvard-MIT (www.thebillionpricesproject.com/)

5 These include daily price indices for the US and monthly and annual inflation rates for Argentina, Brazil, China, Germany, Japan, South Africa, the UK and the US. The project also records daily prices for all goods sold by seven large retailers in Latin America and the US and every product price listed on APPLE, IKEA, ZARA, and H&M from 2008 to 2013 in 85 countries.

As discussed by Rebecca Riley in her chapter in this book, official statistics are also getting in on the act and increasingly rely on digital data sources. Blue Book revisions by the Office for National Statistics are being rolled out in 2019 and 2020; new sources of data for measuring the CPI are scheduled for 2021; and the Data Science Campus has used faster indicators to provide a real-time measure of activity based on information in traffic flows, shipping data and administrative data such as sales taxes (see Figures 11.2 and 11.3).[6] Although in their infancy, these data potentially provide useful real-time indicators of activity that will improve with further refinement. With the growth in digital data sources, it seems that policymakers should be able to gather more information where needed from these unofficial sources.

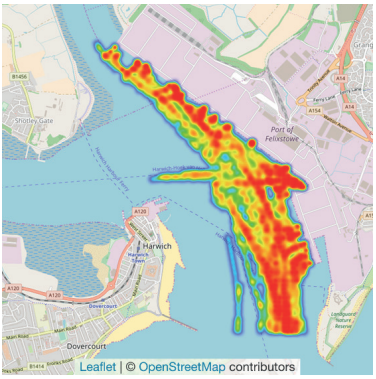
Figure 11.2 Road traffic data



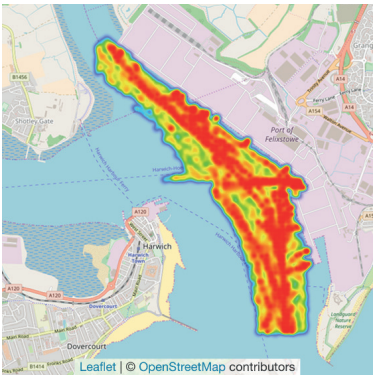
Source: ONS, Data Science Campus and Highways England.

6 See https://datasciencecampus.ons.gov.uk/faster-indicators-of-uk-economic-activity/ and https://www.ons.gov.uk/economy/economicoutputandproductivity/output/articles/economicactivityfasterindicatorsuk/previousReleases.

Figure 11.3 Shipping data

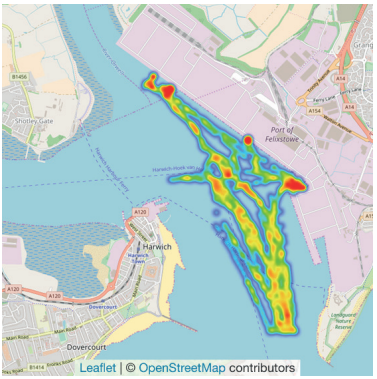


Monday, 12 December 2016



Monday, 19 December 2016

Sunday, 25 December 2016



Sunday, 1 January 2017

Source: ONS, Data Science Campus and Maritime & Coastguard Agency.

But there are some types of data that are harder to gather through digital means, such as expectations data or measures of uncertainty about the future. Events about which expectations are formed have not happened yet, so there are no digital footprints of the transactions to observe. The expectations themselves can take a range of different values even for an individual firm or household, so they are often best described as a distribution of possibilities with a central value (the mean) and some dispersion around it (the variance or standard deviation).

These descriptive data are informative in themselves as indicators of the state of mind of key decision makers in the economy. For example, a lower value for the mean sales revenue for businesses could indicate a lower expectation regarding future demand, and may signal an inclination to cut back on investment spending. A wider dispersion of expectations, resulting in a higher standard deviation, might signal greater uncertainty about the future and might also indicate an inclination to cut back on investment spending. The ability to measure first- and second-moment shocks (means and variances) can help policymakers anticipate future changes in the economy, provided the expectations distributions are accurate and representative of businesses (in this example) or households.

Traditional survey indicators

Traditional surveys such as the British Chambers of Commerce survey, the Confederation of British Industry (CBI) surveys, Purchasing Managers Indices, and so on have attempted to gather this information. Many surveys, such as the CBI industrial Intentions Survey, have been running for a very long time and therefore provide a valuable source of information about expectations and uncertainty over many business cycles. However, there are some significant drawbacks to traditional surveys and the way their information is conveyed.

Many surveys are based on samples that are not representative of all the businesses or lenders/borrowers in the economy. This bias in the sampling frame can arise because firms 'select' to participate, or they are participants by virtue of being members of a business organisation or lobby group. They may be chosen in a way that does not ensure a representative sample if, for example, they are all financial firms or large firms. Unrepresentative surveys will not accurately record the expectations or uncertainty in the economy because they are selective about the data they collect and then report. Weighting the data responses may help if a survey covers a wide enough range of businesses but out of proportion to the population.

Another drawback arises from the types of questions that surveys ask. Some surveys ask questions that are essentially based on three bins: 'better', 'worse' or 'the same' outcomes compared to a previous period, or for expectations over a future period.

These Likert scale questions do not provide accurate quantitative measures of expectations or uncertainty, because the surveys require one answer and there is no nuancing of the response for individual firms. A firm would reveal more information if asked to give a range of expected values and probabilities rather than a single response (increase/same/decrease), but three-bin Likert-type questions do not offer much opportunity in this regard.

There are ways to extract quantitative information from the qualitative answers in the sample as a whole (Carlson and Parkin, 1975; Pesaran, 1987) but these require additional modelling based on potentially contentious assumptions. In practice, when reporting the results of these traditional surveys the information is often presented as a simple balance statistic (e.g., the net percentage of firms reporting an increase versus a decrease) or a composite index. A good example of this is the Purchasing Managers' Indices, which are often used to give an indication of current business conditions. The surveys compiled by IHS Markit Group gather information from about 400 purchasing managers in manufacturing, services, construction and the whole economy on new orders, factory output, employment, suppliers' delivery times and stocks of purchases. The responses are given weights and then multiplied by 1.0 for improvement, 0.5 for no change, and 0 for deterioration. The responses from different firms within a sector are weighted by contribution to GDP of each sector, so all respondents – whether large or small firms – hold the same weight within each sector. By far the most prominent PMI is the composite number calculated for all firms reported as a 'snapshot of the health of the economy'. A reading above 50.0 for the index suggests an improvement in conditions, while a reading below 50.0 suggests a deterioration. Despite their popularity and simplicity, composite PMI indicators that combine the responses to five questions measuring different units do not properly exploit, and can even misrepresent, the information the surveys contain. Sub-sector PMIs and responses to surveys on key economic drivers such as inflation, exports, employment and inventories do exist, but receive much less attention.

Does this mean that survey data should be treated with caution? I argue not, although some should. Survey data of this type has been labelled 'soft' data that can at best provide an indictor before the harder official data are released, but new surveys are posing more sophisticated questions that can provide 'hard' numerical

information on expectations and probabilities. It is a mistake to label all survey data 'soft', because they may be shown to be very reliable and consistent with official data that are themselves collected using surveys. The key questions to ask are whether the survey information is derived from a reliable, representative, large-scale sampling frame, and whether the questions that are asked are sufficiently clear to elicit information that is relevant to monetary policymaking.

Surveys of professional forecasters

A number of countries provide data from professional forecasters. The Survey of Professional Forecasters (SPF) in the United States is one such example, the Survey of External Forecasters in the United Kingdom is another. Professional forecasters are typically asked to provide probabilities for the growth of a key economic variable – for example, GDP over a reasonable horizon (three months or a year) – which fall into pre-specified bins (i.e., ranges of values for growth). A vast literature has emerged around this source of survey data (for a good review, see Pesaran and Weale, 2006). Professional forecasts can reveal information about key macroeconomic indicators which is useful for establishing whether inflation expectations are firmly anchored, although such forecasts typically receive less attention from markets and policymakers than traditional surveys.

Professional forecast data have been used to make a number of improvements. For example, there has been growing emphasis on the use of professional forecasts in combination with traditional surveys to form 'nowcasts' of current conditions before official data are released. Garratt et al. (2008) show how real-time data can be used to mitigate the impact of data revisions. Jacobs and van Norden (2011) explain how policymakers, who must base their decisions on preliminary or partially revised data of varying reliability, can model the dynamics of data revisions to improve their decision making in real time. This improves first-moment prediction, but the implications of data revisions for second moments (forecast uncertainty or prediction intervals) are shown by Clements (2017) to be 'too wide' if revisions 'add news', or else 'too narrow' if noise is removed by the revision process.

Garratt et al. (2018) use professional forecasts surveys to measure expected outputs. These reflect beliefs about output movements, including optimism/pessimism over future economic prospects, and

the role of the uncertainty surrounding these (i.e., disagreement between forecasters). Aristidou et al. (2019) propose a modelling framework and evaluation procedure to judge the usefulness of real-time datasets incorporating past data vintages and survey expectations in forecasting. They show that both can be useful in forecasting growth and recessionary events. And an evaluation of 20 years of the ECB Survey of Professional forecasters (SPF) (ECB, 2019) shows how data are used to revise medium-term forecasts in the light of changes to the Phillips curve and Okun's law revealed by forecaster surveys. For example, five-year rolling window regressions using ECB SPF data imply the slope of the Phillips curve has flattened, while the relationship between unemployment rate and real output growth has steepened.

Despite all these advantages, professional forecasts focus on macro information – expectations and uncertainty around the evolution of macroeconomic variables. They allow an insight into expectations formation (Coibion and Gorodnichenko 2012; 2015) from a professional forecaster's perspective, although these may be no better than unconditional forecasts (Clements, 2018). Yet there is an absence of information about firm- or household-level expectations or uncertainty in these professional forecasts that leaves the process of decision making behind the macroeconomic outcomes something of a black box. Certainly, there is scope for better-devised surveys and/or surveys with more directed questions to provide more precisely focused information about expectations and uncertainty.

New business surveys

Fortunately, many new business surveys have emerged that improve on traditional surveys and professional forecasts by focusing on expectations of, and uncertainty among, senior executives. These surveys provide micro-data at the firm level that can be aggregated into indicators at the industry, region or country level as desired. A pioneering example is the Survey of Business Uncertainty (SBU) run in the US by the Atlanta Fed (Altig et al., 2018). These surveys report expected values for different variables such as sales revenue growth, investment or employment growth, and also the dispersion around the mean. It is possible to gauge subjective uncertainty by observing the standard deviation of these distributions (individually

or in aggregate). The CBI surveys ask questions about factors hindering investment, and include uncertainty about the future among several options.

The benefit of using survey data of this kind is that it can open the black box of decision making and reveal heterogeneities between types of firms. The data can indicate the industry or regional differences that occur mostly due to the differences of composition across sectors and geographies. They may indicate whether there are distinct sectoral responses or behavioural differences in firms that differ on other criteria (for example, how productive they are or whether or not they are internationally focused). This gives the policymaker the opportunity to understand the forward-looking behaviour of investors and employers in much greater detail. It is possible to recognise nuances in the data (from distributions rather than mean values) that would not have been observed from other sources, such as balance statistics.

With this additional information, policymakers are able to gauge the likelihood of certain scenarios emerging or the degrees of response to policy actions due to the greater granularity in the data. This gives them the ability to gauge distributional and inequality effects from their actions by considering which firms (or households) are likely to be affected by their actions.

The Decision Maker Panel

The Decision Maker Panel (DMP) project surveys thousands of firms to elicit information on their expectations and their uncertainties (Bloom et al., 2018; 2019a). This provides up-to-date information within a week of collection that can be filtered into the policymaking process.

The Bank of England, together with Stanford University and the University of Nottingham, launched the Decision Maker Panel in August 2016. The large online survey is designed to be representative of the UK business population, covering large, medium and small firms from across the economy. The size of the panel has grown rapidly since its inception, reaching 8,000 firms that employ 26% of the labour force by July 2019. The monthly response rate has averaged 54% since the survey was launched. DMP members are asked regular questions about developments, and the probabilities that they ascribe to a range of possible future

outcomes, in the following areas: investment, employment, and sales and prices. A key innovation is the five-bin expectations question that asks firms to report 'highest', 'high', 'middle', 'low' and 'lowest' values for each variable. The survey then asks firms to assign a probability to each outcome. An example of this kind of approach is given in Figure 11.4 using sales revenue growth as an illustration. Our validation processes have shown that the firm-level responses closely match accounting data recorded by Companies House. When we aggregate the data weighted by employment, they also correspond with official statistics reported by the Office for National Statistics. Figure 11.5 shows that measures of sales revenue growth closely match the growth in total final expenditure from the ONS, picking up the same cyclical response and turning points. The difference is that the survey data are released monthly and appear one week after the survey closes, and can be broken down by sector without delay (unlike many official statistics) (see Figure 11.6).

Figure 11.4 Decision Maker Panel Questionnaire Examples

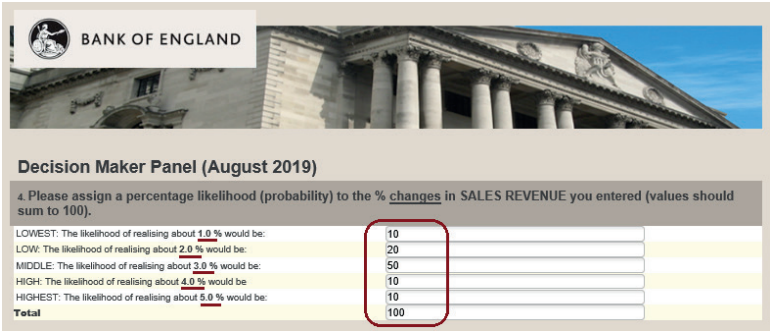
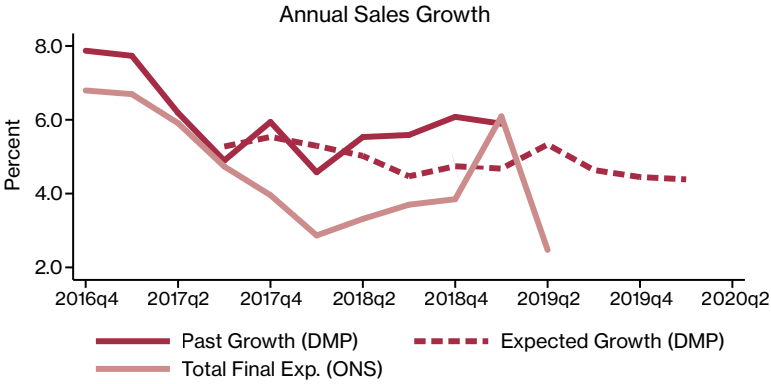


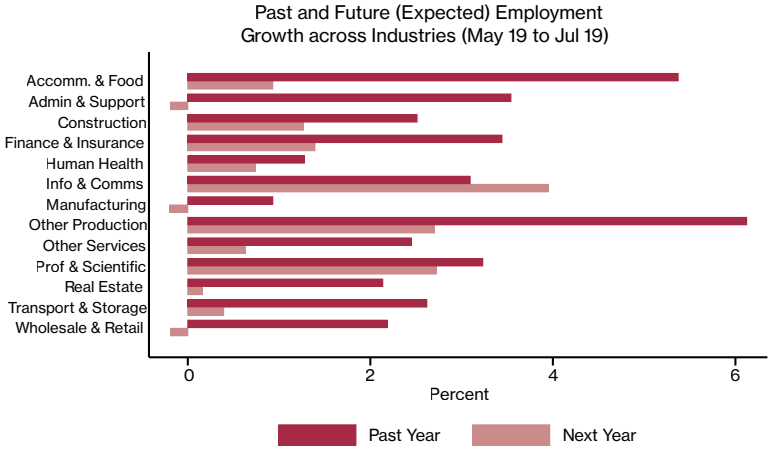
Figure 11.5 Actual and expected sales revenue growth versus ONS total final expenditure



Notes: This graph is constructed from responses of three questions on sales and revenue: "Looking back over the past year from the first quarter of 2019 (January – March), by what % amount has your SALES REVENUE changed since the same quarter a year ago (January – March 2018)" and "Looking a year ahead from the first quarter (January – March 2019), by what % amount do you expect your SALES REVENUE to have changed in each of the following scenarios?" with five scenarios provided; i) lowest, ii) low, iii) middle, iv) high, v) highest and "Please assign a percentage likelihood (probability) to the % changes in SALES REVENUE you entered (values should sum to 100%)". Data for Total Final Expenditures (ONS) is taken from ONS website.

Source: Decision Maker Panel.

Figure 11.6 Actual and expected sales revenue growth breakdown by industry



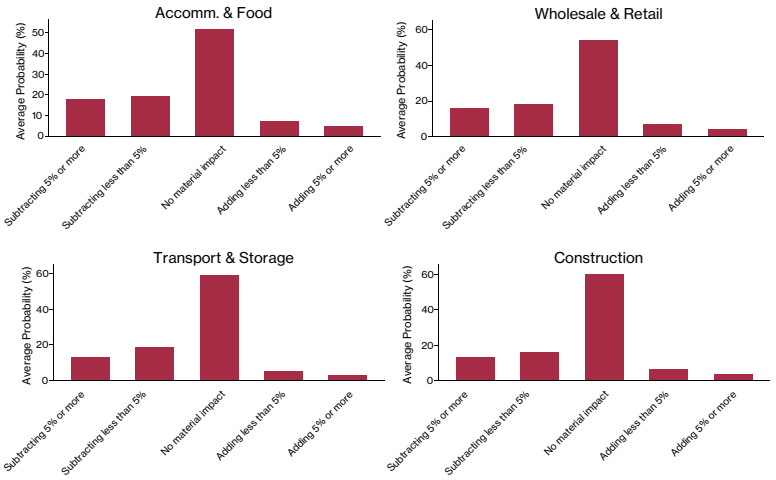
Notes: This graph is constructed from responses to three questions about employment; "Looking back 12 months ago how many Employees did your business have then?" "Looking ahead, 12 months from now, how many EMPLOYEES would your business have in each of the following scenarios?" (with five scenarios provided: i) lowest, ii) low, iii) middle, iv) high, v) highest) and "Please assign a percentage likelihood (probability) to the NUMBER OF EMPLOYEES you entered".

Source: Decision Maker Panel.

From these survey questions we can also generate a distribution of expectations about future sales growth. Because the Decision Maker Panel has a large sample size it can be split by region, industry or firm size. Examples of the breakdown of sales revenue growth by industry and size are provided in Figures 11.7 and 11.8. These data are available on the Decision Maker Panel website (www.decisionmakerpanel.co.uk) and on the Bank of England website. The data indicate to policymakers the range of different expectations held by firms and the degree of uncertainty (based on the standard deviation of the distribution). It is evident that this information is far richer than that coming from traditional surveys that report a balance statistic.

Data on individual firms that report their response each month can be tracked in a panel. We have approximately 36,000 observations per year for firms that respond to the Decision Maker Panel. Using these micro-data, we can model investment, employment and production decisions controlling for industrial sector and year.

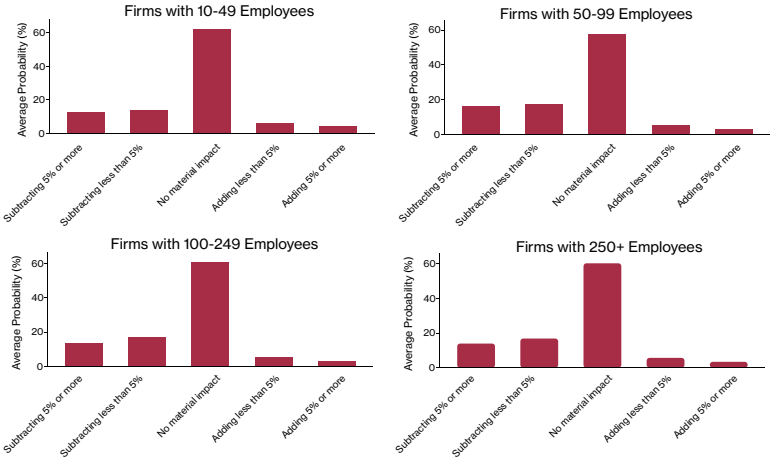
Figure 11.7 Example of impact of Brexit on investment by selected industries



Note: Graphs constructed based on responses to the following question; Could you say how the UK's decision to vote 'leave' in the EU referendum is likely to influence your CAPITAL EXPENDITURE over the next year? Assign a percentage likelihood with 5 scenarios provided; i) large positive, adding 5% or more, ii) minor positive, adding less than 5%, iii) no material; impact, iv) minor negative, subtracting less than 5%, v) large negative, subtracting 5% or more.

Source: Decision Maker Panel.

Figure 11.8 Example of impact of Brexit on investment by size



Notes: See Figure 11.7.

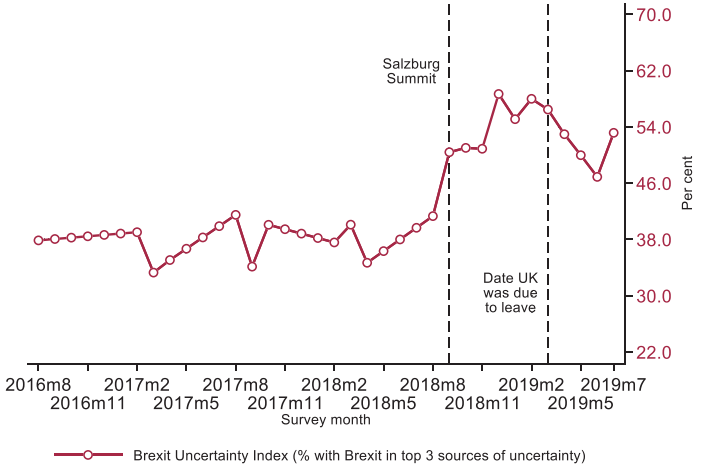
Source: Decision Maker Panel.

A further advantage of this new survey is that it can capture the expectations and uncertainty around scenarios such as a future recession or an anticipated event. The example we use to illustrate this is the Brexit uncertainty effect. Our survey contains data on several different aspects of Brexit uncertainty, such as views about the importance of Brexit as a source of uncertainty to each business, information on uncertainty around the eventual impact on the sales and other aspects of individual businesses, and data on uncertainty about year-ahead sales growth. It has included questions about the predicted timing of Brexit and uncertainty surrounding firms' predictions.

We have also recently created a Brexit Uncertainty Index. To construct this index, members of the DMP are asked about the importance of Brexit as a source of uncertainty to their business on a number of occasions. The responses are split into four categories: 'not at all important', 'one of many sources of uncertainty', 'in the top two or three sources of uncertainty' and 'the most important source of uncertainty'. The proportion of firms citing Brexit as their top source of uncertainty is used to construct the Brexit Uncertainty Index. Figure 11.9 shows that since late 2016, about 35% of firms regards Brexit uncertainty as one of the top three

sources of uncertainty, and following the Salzburg summit that figure rose to between 50-60%. The share has fallen a little since the extension to Article 50 but still remains very high.

Figure 11.9 Brexit Uncertainty Index



Source: Decision Maker Panel.

This information has been provided to MPC members individually and through written summaries of evidence prior to rate-setting meetings. It has established reliability versus official data and is more timely, and has transformed insight for the Bank's Monetary Policy Committee, who have requested information from the DMP on uncertainty, employment, investment and productivity for policy meetings and for providing evidence to Parliament. It has facilitated the communication of emerging policy challenges (i.e., Brexit) through speeches by Governor Mark Carney (in July 2017 and July 2019), Deputy Governor Ben Broadbent (October 2017 and May 2019) Deputy Governor Dave Ramsden (November 2017 and June 2018) and Chief Economist Andy Haldane (November 2017). It has explained policy decisions in press conferences and official publications, such as Inflation Reports, and Agents' Briefings.

By 2018-19, the Bank of England felt able to refer extensively to the Decision Maker Panel in verbal and written evidence to the Parliamentary Inquiry into the Brexit Withdrawal Agreement in December 2018, quantifying the likely effects of Brexit uncertainty using DMP data, as did Deputy Governor Ben Broadbent in 2019.

DMP evidence also persuaded the Chancellor of the Exchequer, Philip Hammond, to increase the Annual Investment Allowance five-fold to £1 million in his 2018 Budget to offset Brexit uncertainty.[7]

The economic effects of Brexit uncertainty have been documented in Bloom et al. (2019b). The decision to leave the EU has triggered a large and persistent increase in uncertainty. Unlike previous events that led to spikes in uncertainty, Brexit caused an uncertainty shock that preceded the actual event. Even if the actual Brexit shock is still yet to happen, the withdrawal process has already had a real impact on businesses based in the UK. Investment fell by about 11% in the three years following the referendum as a consequence of the uncertainty caused by Brexit. Over the same period, the anticipation of Brexit reduced the level of UK productivity by between 2% and 5%. One of the reasons behind the drop in productivity has been firms shifting substantial resources from productive activities to preparations for Brexit. Businesses with links to mainland Europe have been more affected by the rising level of uncertainty. Since global businesses tend to be more productive than firms without international links, this helps explain low productivity following the referendum. We find that, as a consequence of uncertainties surrounding Brexit, businesses that were more productive in the run up to the referendum have been shrinking faster after the vote than companies that were less productive. Consequently, aggregate UK productivity growth, which has been sluggish for a decade, is now even lower than it would have been otherwise.

Conclusions and recommendations

Gathering the best available data is absolutely central to making the correct monetary and financial policy decisions. Policy committees already receive vast amounts of official and unofficial data prior to making their decisions. There has been a considerable improvement in official data and unofficial data as new digital data sources have enabled providers to give more detailed information in a more timely fashion. Despite this, lags remain in the system and gaps exist that need to be filled, especially regarding expectations and uncertainty.

7 https://www.gov.uk/government/news/budget-2018-24-things-you-need-to-know.

Data quality and quantity are improving all the time. Technology has enabled the recording and gathering of information digitally, which has speeded up the process. There are many more sources of data to allow the cross-checking of new information as it arrives. Surveys are also moving forward. Far from being a 'soft' source of data that provide an indication of trends until harder evidence is available, new surveys now provide 'firm' insights into expectations and uncertainties about events that are yet to happen. There are likely to be substantial gains from making the micro-data as well as the summary information available to researchers, who can match the data to other sources. These insights often enable policymakers to see the implications of changing expectations and uncertainty, as well as other subjects such as business conditions, credit conditions, labour market trends, and so on. In this respect, monetary and financial policymakers need to make use of surveys to fill in gaps where there are no digital records and where traditional surveys are weak.

When monetary policymakers are weighing up the options for rate decisions, it is invaluable to gain some insights into the likelihood of different outcomes based on the responses of senior executives in businesses who themselves make decisions based on their expectations and adjust their actions according their degree of uncertainty. Surveys that are large enough to be split into reporting groups by industry, region and firm size offer considerable additional information. The new surveys provide distributions of data points for individual responding units that reveal heterogeneities between firms, regional differences, varied sectoral responses, and behavioural differences among firms that differ in other criteria, such as how productive they are, how internationally focused their activities are, or how exposed they are to certain types of shocks. To an extent, it is possible to judge the likely differences in business responses that arise from implementing alternative policy options.

The best policy results from judicious use of the best available data. Therefore, there are a number of recommendations for senior executives at the Bank of England (and other central banks) to promote the collection and use of high-quality data.

- First, they should undertake a thorough overhaul of their existing surveys to ensure that they have a suitable sample frame, with sufficiently large samples of respondents who are representative of their class, and take steps to improve the

sampling methods employed where they are deficient. They should move from questions that ask for Likert responses ('up', 'down' or 'the same') and report balance statistics towards quantitative questions with a range of numerical responses, including, where appropriate, probabilities attached to the outcomes. They should rely much less on poorly devised surveys and relatively uninformative summary information (e.g., balance statistics received from external sources). They should focus on qualitative information that can usefully supplement insights into numerical survey responses. For example, credit conditions are partly about volumes and prices, but also about access to credit or terms of credit (e.g., covenants).

- Second, they should make the microdata available to qualified accredited researchers to ensure that the data are fully analysed for economic information using state-of-the-art methods. The condition for sharing the data could be an obligation to share the results and the code for reproducing the results with the Bank.
- Third, they should pioneer administrative and legal protocols that allow data to be shared with other organisations such as the ONS, HMRC and UK Government on a reciprocal basis, to permit matching of datasets. Matching data with other records – for example, the Business Register, trade information from Customs and Excise, R&D from BERD, labour market information from PAYE, or transactions involving VAT – is often the key that unlocks new insights. But progress is slow in building trust between organisations, despite recent changes to UK legislation such as the Digital Economy Act (2017). The Research Code, which implements Chapter 5 of Part 5 of the Act, is designed to "facilitate the linking and sharing of datasets held by public authorities for research purposes" and "broaden the capacity of research to deliver a number of direct and indirect public benefits, including the production of valuable new research insights about UK society and the economy".

Taking these three steps would improve the measurement of the economy and facilitate more comprehensive use of the data we collect to gain better insights for policymakers.

References

Altig, D., J.M. Barrero, N. Bloom, S.J. Davis, B.H. Meyer and N. Parker (2018), "Surveying Business Uncertainty", Becker Friedman Institute for Economics Working Paper No. 2019-85, University of Chicago (http://dx.doi.org/10.2139/ssrn.3401842).

Aristidou C., K. Lee and K. Shields (2019), "Evaluating the Use of Real-Time Data in Forecasting Output Levels and Recessionary Events in the US", *Journal of the Royal Statistical Society* (Series A) 182(1): 131-163.

Bachmann, R., S. Elstner and E.R. Sims (2013), "Uncertainty and Economic Activity: Evidence from Business Survey Data", *American Economic Journal: Macroeconomics* 5: 217-249.

Bloom, N., P. Bunn, S. Chen, P. Mizen, P. Smietanka, G. Thwaites and G. Young (2018), "Brexit and Uncertainty: Insights from the Decision Maker Panel", *Fiscal Studies* 39(4): 555-580.

Bloom, N., P. Bunn, S. Chen, P. Mizen, P. Smietanka and G. Thwaites (2019a), "Brexit Is Already Affecting UK Businesses — Here's How", *Harvard Business Review*, March.

Bloom, N., P. Bunn, S. Chen, P. Mizen, P. Smietanka and G. Thwaites (2019b), "The Impact of Brexit on UK Firms", NBER Working Paper No. 26218.

Carlson, J.A. and M. Parkin (1975), "Inflation Expectations", *Economica* 42: 123–138.

Cavallo, A. (2017), "Are Online and Offline Prices Similar? Evidence from Large Multi-Channel Retailers", *American Economic Review* 107(1): 283–303.

Cavallo, A. (2018), "More Amazon Effects: Online Competition and Pricing Behaviors", in *Jackson Hole Economic Symposium Conference Proceedings*, Federal Reserve Bank of Kansas City.

Cavallo, A. and R. Rigobon (2016), "The Billion Prices Project: Using Online Prices for Measurement and Research", *Journal of Economic Perspectives* 30(2): 151-178.

Clements, M.P. (2017), "Assessing Macro Uncertainty in Real-Time When Data are Subject to Revision", *Journal of Business and Economic Statistics* 35(3): 420-433.

Clements, M.P. (2018), "Are Macroeconomic Density Forecasts Informative?", *International Journal of Forecasting* 34: 181–198.

Coibion, O. and Y. Gorodnichenko (2012), "What Can Survey Forecasts Tell Us About Information Rigidities?", *Journal of Political Economy* 120: 116–159.

Coibion, O. and Y. Gorodnichenko (2015), "Information Rigidity and the Expectations Formation Process: A Simple Framework and New Facts", *American Economic Review* 105: 2644–2678.

Croushore, D. (2011), "Frontiers of Real-Time Data Analysis", *Journal of Economic Literature* 49: 72-100.

Dovern, J., U. Fritsche and J. Slacalek (2012, "Disagreement Among Forecasters in G7 Countries", *Review of Economics and Statistics* 94: 1081-1096.

ECB (2019), "Twenty years of the ECB Survey of Professional Forecasters", *ECB Economic Bulletin* 1/2019.

Garratt, A., K. Lee, E. Mise and K. Shields (2008), "Real Time Representations of the Output Gap", *Review of Economics and Statistics* 90(4): 792-804.

Garratt, A., K. Lee and K. Shields (2018), "The Role of Uncertainty, Sentiment and Cross-Country Interactions in G7 Output Dynamics", *Canadian Journal of Economics* 51: 391-418.

Jacobs, J. and S. van Norden (2011), "Modeling Data Revisions: Measurement Error and Dynamics of 'True' Values", *Journal of Econometrics* 161(2): 101-109.

Orphanides, A. and S. van Norden (2002), "The Unreliability of Output-Gap Estimates in Real Time", *The Review of Economics and Statistics* 84(4): 569-583.

Pesaran, H. (1987), *The Limits to Rational Expectations*, Basil Blackwell.

Pesaran, M.H. and M.R. Weale (2006), "Survey Expectations", in G. Elliott, C.W.J. Granger and A. Timmermann (eds), *Handbook of Economic Forecasting*, Vol. 1, North-Holland, pp. 715–776.

CHAPTER 12

Harnessing the value of data

Rebecca Riley[1]

It is sometimes suggested that we live in an age of 'omni-measurement' (Curzon Price, 2019), where data are abundant and generated from all our activities, be these our transactions as consumers of goods and services (financial or otherwise), our interactions as individuals and businesses with the customs, tax and social security systems or with a multitude of registration systems, our navigation and postings online (for example, through social media or on business websites), or location information revealed by our use of any number of gadgets. This explosion in the scale and scope of micro- or granular data that might be used for analysis has focused the attention of many businesses and non-commercial organisations on the possibilities for data to enhance the value of their enterprise. Such is the increasing prominence of data to economic activity that there are now concerted efforts to begin to measure the value of data and data flows (OECD, 2019; Nguyen and Paczos, 2019).

How might this increasing data abundance support the undertakings of central banks and influence the agenda of the Governor of the Bank of England in the years ahead? Great strides have been made in recent years in improving aggregate data,[2] the bread and butter of macroeconomic analysis at the Bank of England, and in developing new surveys[3] to fill data gaps. The next stage is to further harness the value of 'big data'. A 2015 survey of central bankers carried out by the Irving Fisher Committee on Central Bank Statistics (IFC) of the Bank for International Settlements (BIS) aimed to gauge

1 Director of the Economic Statistics Centre of Excellence and Fellow of NIESR. I would like to thank Richard Barwell, David Bholat, Jagjit Chadha, Sarah Henry, Paul Mizen, Sally Srinivasan, Misa Tanaka and Garry Young for comments.

2 For example, the introduction of official monthly GDP (ONS, 2018) and access to historical datasets.

3 For example, the Decision Maker Panel survey.

whether big data related to financial and economic topics could help central banks to better monitor the economic conjuncture, enhance the effectiveness of their policy measures and assess the impact of these within the financial system and the broader economy (BIS, 2015). The resulting report concluded that a majority of central banks had a strong interest in big data, which were seen as potentially effective in supporting macroeconomic and financial stability analysis. However, comparatively few central banks were regularly using such data in 2015, although many expected to see growing use of big data sources for economic forecasting, business cycle analysis, financial stability analysis including the construction of risk indicators, and for enhancing the quality of conventional statistics. The Bank of England established the Advanced Analytics Division in 2014 and has increasingly made use of big data in its research to inform policy (Haldane, 2018; Robinson, 2019).

The global financial crisis of 2007-2008 has encouraged some of this interest in large granular data collections amongst central banks, not least for the purposes of providing continuous and up-to-date assessments of current economic conditions. The G20 Data Gaps Initiative, established in the wake of the global financial crisis and led by the Financial Stability Board (FSB) and the International Monetary Fund (IMF), has led to a series of recommendations endorsed by G20 finance ministers and central bank governors to improve monitoring of financial sector risk and understanding of the vulnerabilities and interconnectedness of economic entities within and between national borders. This work has explicitly recognised the limitations of aggregated data alone, which may obscure the drivers and effects of changing economic patterns, and has resulted in increased efforts to cooperate and exchange experiences around the use of granular data across central banks (INEXDA, 2018). Much of this work is supported by national statistics institutes (NSIs), which have recognised for some time the potential value, as well as challenges, of administrative data and other new secondary data sources for measuring and understanding the economy (UNECE, 2011).

Despite the wide recognition amongst central banks, and amongst economists and statisticians elsewhere, of the promise brought by this flood of large-scale microdata sources for economic analysis and hence for effective policymaking, a number of barriers hamper progress in bringing this promise to fruition. These include legal and practical issues around data sharing and data linking,

organisational habits and the need for new skills and resources and multidisciplinary teams (UNECE, 2011;Witt and Blaschke, 2019), as well as technical issues around the analysis and validation of new data sources (e.g., Bank of England, 2018; Hammer et al., 2017).

In this chapter, I consider how large-scale microdata sources might generate value for monetary policy through secondary analysis, and some of the impediments to this, drawing in particular on the work of the Economic Statistics Centre of Excellence (ESCoE) and its partners. I focus on three areas where these data can assist monetary policy decision making:

- First, the demand for speed and accuracy, i.e. the importance for monetary policy setting of being able to monitor in real time and predict the state and direction of the economy.
- Second, the demand for granularity. This demand for microdata is multifaceted and may be independent of the need for timeliness. Granular data are generally needed for the purposes of understanding underlying economic patterns that determine macroeconomic outcomes (i.e., for understanding how the economy works), but are also explicitly useful for evaluating the nature of the monetary policy transmission mechanism and financial stability issues.
- Third, the demand for better measures of key economic concepts relevant to monetary policy in an ever-evolving economy, for example, of labour market slack in a gig-driven economy reliant on international migration, and of inflation itself in a rapidly changing and services-oriented economy.

I conclude by highlighting some of the main roadblocks ahead and offer some recommendations for new infrastructures to fully harness the value of data for central banks.

Large-scale microdata

There are several definitions of big data and the terminology is fluid. In this chapter, I refer to large-scale microdata and use this interchangeably with big data. The key defining feature or commonality of the data sources I consider is that they are generated at scale, contain highly granular information, and have potential value for a purpose that is secondary and quite likely unrelated to the original purpose for which they were collected

or otherwise created. Large-scale survey responses collected for a particular purpose, but which have additional value for a secondary purpose, also share these features. For example, detailed responses to surveys collected by NSIs to generate price indices and national accounts totals might have uses beyond measuring macroeconomic aggregates.

Many of these data are not necessarily new in the sense that the systems through which they are generated have been around for a long time, but their potential remains far from realised. In the UK, for example, for the last many decades, Revenue and Customs bodies have collected income taxes through Pay As You Earn (PAYE) and consumption taxes through Value-Added Tax (VAT) directly from employers and businesses. However, even if these data have been around for some time, it is only through successive advances in digital technologies, including storage capabilities and security arrangements, that they have become increasingly accessible, linkable and malleable for secondary analysis. Data-sharing agreements and access portals, such as the UK Data Service, the HMRC Datalab and the ONS Secure Research Service and its predecessors, have meant that researchers and analysts in universities, central banks, NSIs and other public bodies are progressively more able to use a range of microdata to address policy and broader economic questions.

Other data are genuinely new – for example, internet search data, geolocation data generated by mobile phones and the variety of text data that can be harvested from digital repositories and the web. These less conventional data are directly related to the advent of new digital technologies and have led to exponential growth in the variety and quantity of raw granular data available. These data are often available in real time.

(Faster than) real time

It is fundamental to the effective conduct of monetary policy to have an up-to-date picture of economic activity and any emerging inflationary pressures, hence the continual pursuit of early warning indicators and additional information gathering – for example, through the Bank of England's regional agencies – to complement information from aggregate statistics and surveys. In achieving this up-to-date picture there is typically a trade-off between accuracy and timeliness, with the true picture often becoming clear with

significant hindsight. New large-scale data sources have the potential to shift that trade-off outwards, allowing the same degree of accuracy to be achieved more quickly with clear benefits for monetary policymaking. This requires data-sharing mechanisms that facilitate timely use of these data, as well as overcoming significant technical and analytical hurdles in terms of converting the data mass into meaningful indicators of economic activity.

The potential benefits of achieving an accurate picture of economic conditions in a timely manner are well known and illustrated by Kara and Lennard (2019). Using a simple Taylor rule, they estimate a monetary policy response to economic statistics that were available at the time of the global financial crisis and, separately, to the revised version of these same economic statistics that followed as more data became available to feed into these statistics. The differences between the preliminary and revised GDP series suggest that early estimates of GDP were slow to show the economic slowdown at the time of the financial crisis in 2008. Hence, the Taylor rule produces a faster loosening of monetary policy in 2008 in response to the revised GDP series than in response to the preliminary GDP series. Using NiGEM, a macroeconomic model of the global economy, the authors illustrate the path of the economy under these two different policy settings. The faster policy response in reaction to the revised GDP estimates stabilises the economy more quickly and pre-empts some job losses in comparison to the slower policy response in reaction to the preliminary GDP estimates.

This simple example around one key economic statistic provides some indication of the potential for more timely and accurate economic statistics to assist central banks in effective decision making. In theory, large-scale live administrative data such as companies' VAT and PAYE records held by HM Revenue and Customs (HMRC) provide a fantastic opportunity for enhancing the speed and accuracy of early GDP estimates. The administrative data can be fed into estimates of GDP more quickly than survey data, taking us to a 'final' estimate of GDP more quickly than was possible before.[4] While the process of incorporating such data sources into the compilation of GDP estimates has begun, and

4 Administrative data can also be used to generate early indicators, for example: https://datasciencecampus.ons.gov.uk/faster-indicators-of-uk-economic-activity/

setting aside issues around data access, it requires highly developed skillsets to operationalise and the technical issues that need to be resolved should not be underestimated.

One issue that arises with VAT returns is that they may cover intervals of varying and overlapping lengths of time. In order to make use of these rolling data in GDP estimation, it is therefore necessary to first produce estimates of monthly VAT. Labonne and Weale (2018) develop a state space approach for filtering, cleaning and temporally disaggregating the VAT figures. But there are many other issues to address before these data can be fully implemented in regular economic statistics production processes. For example, how can best use be made of the subsets of returns that are filed early and contain information about the current period in combination with later returns as these accrue, and how should differences to aggregated results from surveys be interpreted. Another question is whether the picture of economic activity that could be generated by PAYE data matches the picture derived by VAT data. The former might further improve the proxy of a 'final' estimate of GDP in real time, providing information from the income side in addition to the VAT information from the output side of the economy.

The inclusion of data sourced from less conventional big data sources may also improve 'nowcasts' of economic activity. Incorporating these data into estimates of activity present a number of different challenges, such as how to identify potentially useful sources and, given the largely unstructured nature of much of this data, how best to exploit the information present in these new datasets, which typically do not lend themselves to the use of standard econometric methods. Kapetanios and Papailias (2018) provide an overview of the literature and suggest that both nowcasts and forecasts of economic activity can be improved when standard macroeconomic and financial indicators are supplemented by big data. They suggest a process by which big unstructured data, unsuitable for time series analysis, can be translated into structured data that can then be used in standard econometric models to produce nowcasts and forecasts. In an example using a basic selection of keywords in Google Trends, they are able to improve nowcasts of key UK macroeconomic variables. They conjecture that if a simple experiment using a relatively limited set of big data can improve nowcasts, then nowcasts that employ the 'high-quality' big data available in central banks, statistics agencies and government departments should further improve the accuracy of

real-time measures of economic activity. In a relatively data-driven approach to assessing the state of the economy and its direction, the methods illustrated by Kapetanios and Papailias (2018) can be used to evaluate the suitability of any number of early indicators developed from big data for achieving more accurate measures of key macroeconomic variables in real time and in forecasts. Perhaps of particular relevance to central banks are the opportunities to improve short-term inflation forecasting through online prices data (Hull et al., 2017).

Micro to macro (to micro)

Data-driven approaches can be complemented by more theory-driven approaches to harnessing big data for the purposes of assessing the economic outlook. More generally, the granularity of economic information facilitated by large-scale microdata provides ample opportunity for economic analysis to improve our understanding of how the macroeconomy works. There are real and significant gains to be made in terms of understanding. While this is not new, the opportunities have increased. Long gone are the days when macroeconomic time series alone provided the staple data underpinning empirical macroeconomic knowledge.

In principle it is possible to use big data to develop economic information at numerous levels of detail, including the level of the agent, product or transaction. This yields incredible variation from which to glean economic relationships. Microdata can also be grouped into higher levels, including ex ante undefined groups. For example, new sources of text data make it possible to define new economically meaningful entities, as in Djumalieva and Sleeman (2018), who use the texts available in job adverts to characterise employer skill demands, providing a starting point for new ways of assessing skills shortages and inflationary pressures stemming from the labour market. The granularity and vast coverage of many administrative datasets also make these suitable for improving existing survey measures – for example, enabling improvements in adjustments for non-response, which has been rising, and better distributional measures. Fixler et al. (2019) use tax records to recalibrate the higher end of the income distribution in the US which includes observations that are often missed in traditional surveys, with implications for our understanding of inequality as well as responses to aggregate demand shocks.

It is easy to see that many of the economic insights that might be gained from analysis of large-scale microdata will be of interest to central bankers, to other policymakers and to the wider economics profession alike. But there are also specific applications that are relevant to central banks in particular, for example, those pertaining primarily to the monetary transmission mechanism and to macro- and microprudential policy.

Bank of England researchers examined large databases of individual price quotes in the UK to better understand price-setting behaviours that underlie nominal price rigidities. Analysing the microdata underlying the Consumer Prices Index (CPI) and a database of supermarket prices, Bunn and Ellis (2012) found considerable heterogeneity in the data, which they suggested was at odds with the representative agent models that formed the basis of much policy thinking. Petrella et al. (2019) also use the microdata underlying the CPI to develop a measure of aggregate price flexibility. Their sample covers the period February 1996 to August 2017, resulting in approximately 27.5 million price observations. They condense information on individual price changes into a measure of aggregate price flexibility, an estimate of the response of the aggregate price level to monetary shocks, and find this varies significantly over time. Accounting for this state dependence when forecasting CPI inflation, the authors are able to significantly improve medium-term forecasts of inflation and recommend measures of price flexibility are incorporated into policymakers' forecasting routines.

Large business surveys carried out by the Office for National Statistics (ONS) for the purposes of developing relatively aggregate economic statistics also have value beyond the purpose for which they were originally designed. For example, Bank of England researchers and researchers elsewhere have used ONS Annual Business Surveys and business register databases to understand firm-level dynamics underpinning macroeconomic trends with a view to understanding longer term supply-side constraints and how these might interact with financial conditions (e.g., Barnett et al., 2014; Riley et al., 2015). Large company accounts databases provide another tool for central banks to understand these issues. Anderson et al. (2019) use information on companies' accounts in combination with details of their lending relationships with UK banks to study the effects of credit conditions and banking stress on business failure and the productivity distribution of companies

operating in the UK. Their results suggest that banks with weaker balance sheets continued to provide support to low-productivity 'zombie' firms to avoid crystalising losses following the financial crisis, distorting the typical cleansing process that accompanies recessions and with potential implications for the monetary transmission mechanism.

Large-scale microdata are often at their most powerful when linked across multiple sources. In an excellent application, Bahaj et al. (2017) combine data on company accounts, the residential address of company directors, and land registry data on house prices. This allows them to estimate the residential collateral of company directors and to study the impacts of changes in house prices on the investment behaviour of companies. Their results suggest that directors' housing wealth significantly influences investment in small and medium-sized enterprises, with large impacts in aggregate. Thus, they find that house prices can have a significant impact on aggregate supply, complicating how central banks should set policy in relation to house prices and macroprudential risk.

Another relatively new literature emphasises the importance of networks between different economic agents, in particular production networks, in amplifying idiosyncratic shocks (Carvalho, 2014) and in propagating the effects of monetary policy on the real economy (Ozdagli and Weber, 2017). These production networks are not very well detailed in the UK data. Information scraped from company websites provide a potential resource for measuring networks between firms, for example via concepts describing a company's activities, web-links to other institutions and geographical information (Bernini et al., 2017). Large-scale transactions data may also be helpful for these purposes, including detailed information on the international purchases of firms held by HMRC linked to accounts data or other business registers (see, for example, the applications in Mion, 2018 and Wales et al., 2018).

Micro-financial data held by central banks or accessible to central banks also provide a rich source for developing deep understanding of financial markets and macro- and microprudential policy; I mention but a few examples here. For instance, Pérez and Huerga (2016) outline the uses of the Centralised Securities Database, which contains reference, price and ratings data for millions of active debt securities, equity shares and investment fund units issued worldwide, for financial stability purposes. Gurrola-Perez

et al. (2019) use detailed data on gilt and equity transactions to study the network characteristics of settlement fails in the UK equities and gilt markets. Petropoulos et al. (2019) show how machine learning techniques applied to large loan-level datasets can pinpoint and forecast credit risk more accurately than traditional methods. Chakraborty et al. (2017) use the Financial Conduct Authority's Product Sales Database (PSD), which provides a census of UK mortgages including lender and borrower characteristics, to estimate the current period stock of UK mortgages. Their results suggest there were more vulnerable borrowers in the UK than household surveys would suggest 2012-2015. See Cloyne et al. (2019) for a related use of the PSD.

Mismeasurement arising

So far, I have highlighted some of the ways that big data can inform the policy decision making of central banks by yielding more timely and accurate aggregate economic indicators and/or by yielding a level of granularity and range that enables more in-depth economic analysis and understanding of the likely impacts of central bank policies. Big data can also add value to central bank decision-making by improving measures of key economic concepts relevant to their policies. As the economy changes, it is only natural that some economic variables will become more important to monetary policymakers than they were before, and others may become of less interest. For example, as international migration stocks and flows to advanced economies have increased over the last two decades, monetary policymakers and others have required better data on international migration patterns to understand wage pressures and labour market supply (e.g., King, 2005; House of Lords Select Committee on Economic Affairs, 2008). Increased scrutiny of the data that accompanied that requirement has long raised questions about the reliability of key surveys underlying official migration statistics (Portes, 2018). So, what can big data do to help? Potentially quite a lot. Indeed, enabled by the data-sharing powers stipulated in the Digital Economy Act 2017, administrative data are central to plans of the ONS for transforming official population and migration statistics (ONS, 2019a).

As the economy changes, it is not just a matter of existing economic variables going in and out of fashion and becoming more or less important to understanding the economic outlook. Economic

change has always brought with it new economic phenomena and concepts or, at the very least, re-interpretations of old ones. For example, the globalisation of production which led to very complex ownership structures of large multinational enterprises can have significant implications for GDP, the classic example being that of the 26% increase in Irish GDP in 2015. Events such as this have led to the adoption of additional metrics to measure economic growth, such as the 'modified gross national income' in Ireland.[5] Many of the issues surrounding economic measurement of a modern economy were highlighted in Bean (2016) and have led to new research, at ESCoE and elsewhere.

Big data can help in this context. For example, Cribb et al. (2019) use the universe of business owners' administrative tax records provided by HMRC to learn more about business owners and their businesses than has previously been possible using survey data, elucidating amongst other things some of the implications of the rise in the 'gig' economy. Mion (2018) and Lemmers and Wong (2019) use detailed administrative information on international trade transactions at the level of the company and product to shed light on the implications of complex trading relationships through global production chains for the interpretation of international trade statistics, quantifying trade in value-added (TiVA) for detailed UK manufacturing industries and the implications of re-exporting for the trade balance between the Netherlands and other countries.

One issue perhaps of particular interest to central banks is the measurement of price change in a rapidly changing and increasingly digital economy. The increased digitisation of the economy at a time of historically low productivity growth has raised questions about the extent of quality adjustment applied in deriving measures of inflation. For example, Abdirahman et al. (2017) suggest the quality adjustment of telecommunications outputs used in constructing producer prices might have been significantly underestimated in recent years. Others have questioned international comparability in quality adjustment of new technology goods in consumer price indices (Byrne, 2019).

These issues raise questions about the target measure of monetary policy and hence the monetary policy stance. For example, has inflation been lower than measured in recent years because of

5 https://www.cso.ie/en/releasesandpublications/ep/p-nie/nie2017/mgni/

rapidly improving digital goods, and does that mean that the monetary policy stance has been too tight? Cavallo and Rigobon (2016) suggest that with better underlying data, online price indices can approximate the results of more sophisticated, and often impractical, hedonic-regression methods. The reason being that they can offer a large number of uncensored price spells for all models of a given good on sale at any point in time. Scanner data may also help in this regard, by facilitating faster onboarding of new products in price indices, as well as leading to other improvements in price indices (e.g., Eurostat, 2017). The ONS plans to bring both web-scraped price information and scanner data into the compilation of its price indices by 2023 (ONS, 2019b).

New and necessary infrastructures

The potential benefits of new large-scale microdata sources to central banks would appear to be manifold. I have outlined some of these above. Central banks recognise this potential, particularly at senior levels (BIS, 2015). There are of course sizeable technical analytical challenges to realising many of these benefits, not least in terms of understanding the quality and limitations of these data sources (e.g., Cielinska et al., 2017) and in developing appropriate techniques for their effective use. These challenges can be addressed over time through research and by investing in the right combinations of skills. There are other and possibly bigger challenges, including data access and usage restrictions, costs of commercially provided data, and the need to further develop productive and mutually beneficial data-sharing arrangements. These challenges might be addressed by strengthening coordination between stakeholders in the UK and internationally, as discussed below. The Bank of England plays a key role in this.

Difficulties with access and restrictions around usage, including data-linking, present one of the most significant challenges to realising the potential of new large-scale microdata or big data, not least in the UK. The Digital Economy Act 2017 has paved the way for enhanced sharing of administrative data between public authorities and with the ONS and, ultimately, with a wider research community for public good use. This legislation is a major step towards realising the potential of administrative data in the UK and is evident in some of the recent innovations at ONS. We now need a coordinated push to see through the intentions of the Act, ensuring

that data sharing for research and statistical purposes becomes default practice. Prominent beneficiaries of large-scale microdata and ONS products, such as the Bank of England, should continue to champion this open data approach, helping to consolidate departmental willingness to share data and to overcome barriers to implementation of the Act.

Other access issues occur with the commercialisation of publicly collected data. To take one example, in many countries companies are obliged to file annual accounts with an official body. In the UK, companies are obliged to file annual accounts with Companies House. Bureau van Dijk (BvD) has for many years collated this information and resold these accounts data on an electronic platform. Products include a database for UK companies only (FAME) as well as a global equivalent (ORBIS). These data products are primarily designed for business users, but are also widely used for research purposes by academic and public sector users to inform public policy, including the Bank of England through the years. Whilst it is important to recognise the intellectual property associated with the collation of these data, the fact that the main input to the final data product is essentially a publicly collected administrative product does raise questions about the costs of and legal restrictions on use through commercial providers. Large annual fees are levied by commercial data providers from many public bodies in the UK and internationally.

A survey of central bankers in 2016 by the IFC of the BIS, which focused on the sharing of microdata among central banks and the wider range of national and international bodies, suggests there may be an appetite for re-evaluating issues like this (BIS, 2016). A third of respondents to the survey registered "a strong or very strong need to ease the legal constraints imposed by commercial agreements that restrict the sharing among public authorities of microdata provided by private vendors". Suggestions that have been voiced by some central banks include allowing public authorities to have access to microdata collected by the private sector as a general rule, and pooling the purchasing of commercial data between different user entities to provide more clout in negotiations. Coordination between stakeholders may yield more efficient ways of accessing data.

Of course, central banks themselves hold and have access to much large-scale microdata as a result of their operational functions, such as trade repository data. One of the ways these might be further leveraged for monetary, macroeconomic and financial stability purposes is through wider and more eclectic use for research. This could involve new infrastructures and sharing arrangements, building on existing initiatives, and might follow examples such as the ONS Secure Research Service or the HMRC Datalab, tailored to the specific needs of the Bank and compliant with legal requirements. And, perhaps with time and as the Digital Economy Act becomes entrenched, we might hope to see secure access for research purposes to anonymised datasets held by many parties in a single environment. As a condition of use, researchers might be obliged to contribute to data development – for example, making available their code for manipulating the data, following some finite period of exclusivity for intellectual property protection, and contributing to a live user manual to codify knowledge that is acquired through use of the data. This might also encourage coordinated and better dialogue between users and producers of data and statistics. A 'national repository' of this kind could ultimately save analytical resources by minimising effort duplication and promoting informed uses of the data.

References

Abdirahman, M., D. Coyle, R. Heys and W. Stewart (2017), "A Comparison of Approaches to Deflating Telecoms Services Output", ESCoE Discussion Paper 2017-04.

Anderson, G., R. Riley and G. Young (2019), "Distressed Banks: Distorted Decisions?", CFM Discussion Paper No. 2019-08.

Bahaj, S., A. Foulis and G. Pinter (2017), "Home values and firm behaviour", Bank of England Staff Working Paper No. 679.

Bank of England (2018), "Modelling with Big Data and Machine Learning", Centre for Central Banking Studies Workshop, Bank of England, 26–27 November.

Bank for International Settlements (BIS) (2015), *Central banks' use of and interest in "big data"*, Irving Fisher Committee Report, October.

Bank for International Settlements (BIS) (2016), *The sharing of microdata – a central bank perspective*, Irving Fisher Committee Report, December.

Barnett, A., B. Broadbent, A. Chiu, J. Franklin and H. Miller (2014), "Impaired Capital Reallocation and Productivity", *National Institute Economic Review* 228: R35-R48.

Bean, C. (2016), *Independent Review of UK Economic Statistics*, Cabinet Office, March.

Bernini, M., R. Riley, A. Rincon-Aznar, M. Barbera, A. Bratus, N. Sambin, S. Adderley, R. Mulhall, P. and Ramirez (2017), "Industrial Clusters in England", BEIS Research Paper No. 4, September.

Bunn, P. and C. Ellis (2012), "Examining the Behaviour of Individual UK Consumer Prices", *Economic Journal* 122: 35–55.

Byrne, D. (2019), "The mysterious cross-country dispersion in mobile phone price trends", *National Institute Economic Review* 249: R39-R46.

Carvalho, V. (2014), "From Micro to Macro via Production Networks", *Journal of Economic Perspectives* 28(4): 23-48.

Cavallo, A. and R. Rigobon (2016), "The Billion Prices Project: Using Online Prices for Measurement and Research", *Journal of Economic Perspectives* 30(2): 151-178.

Chakraborty, C., M. Gimpelewicz and A. Uluc (2017), "A tiger by the tail: estimating the UK mortgage market vulnerabilities from loan-level data", Bank of England Staff Working Paper No. 703.

Cielinska, O., A. Joseph, U. Shreyas, J. Tanner and M. Vasios (2017), "Gauging market dynamics using trade repository data: the case of the Swiss franc de-pegging", Bank of England Financial Stability Paper No. 41.

Cloyne, J., K. Huber, E. Ilzetzki and H. Kleven (2019), "The Effect of House Prices on Household Borrowing: A New Approach", *American Economic Review* 109(6): 2104–2136.

Cribb, J., H. Miller and T. Pope (2019), "Who are business owners and what are they doing?", ESCoE Discussion Paper 2019-12.

Curzon Price, T. (2019) "Is there a newly urgent Trust/Accuracy trade-off for national economic statistics?", in E. Humpherson (Ed.), *That's your bloody post-truth*, ESCoE Occasional Paper No. 01, September.

Djumalieva, J. and C. Sleeman (2018), "An Open and Data-driven Taxonomy of Skills Extracted from Online Job Adverts", ESCoE Discussion Paper 2018-13.

Eurostat (2017), *Harmonised Index of Consumer Prices: Practical Guide for Processing Supermarket Scanner Data*, European Commission, September.

Fixler, D., M. Gindelsky and D. Johnson (2019), "Improving the Measure of the Distribution of Personal Income", ESCoE Discussion Paper 2019-14.

Gurrola-Perez, P., J. He and G. Harper (2019), "Securities settlement fails network and buy-in strategies", Bank of England Staff Working Paper No. 821.

Haldane, A. (2018), "Will Big Data Keep Its Promise?", speech given at Data Analytics for Finance and Macro Research Centre, King's Business School, 19 April.

Hammer, C., D. Kostroch and G. Quirós (2017), "Big Data: Potential, Challenges, and Statistical Implications", IMF Staff Discussion Note, SDN/17/06, September.

House of Lords Select Committee on Economic Affairs (2008), *The Economic Impact of Immigration: Volume 1*, HL Paper 82-I, London: The Stationery Office Ltd.

Hull, I., M. Löf and M. Tibblin (2017) "Price information collected online and short-term inflation forecasts", in Big Data, IFC Bulletin 44, Bank for International Settlements.

International Network for Exchanging Experience on Statistical Handling of Granular Data (INEXDA) (2018), "INEXDA – the Granular Data Network", Irving Fisher Committee Working Paper No 18, Bank for International Settlements, October.

Kapetanios, G. and F. Papailias (2018), "Big Data & Macroeconomic Nowcasting: Methodological Review", ESCoE Discussion Paper 2018-12.

Kara, A. and J. Lennard (2019) "Valuing Economic Statistics: A Case Study", ESCoE, forthcoming.

King, M. (2005) "Mervyn King: Jackson Hole Conference – remarks to the Central Bank Governors' Panel", remarks, at a symposium sponsored by the Federal Reserve Bank of Kansas City, Jackson Hole, 27 August.

Labonne, P. and M. Weale (2018), "Temporal disaggregation of overlapping noisy quarterly data using state space models: Estimation of monthly business sector output from Value Added Tax data in the UK", ESCoE Discussion Paper 2018-18.

Lemmers, O. and K. Wong (2019), "Distinguishing between imports for domestic use and for re-exports: a novel method illustrated for the Netherlands", *National Institute Economic Review* 249: R59-R67.

Mion, G. (2018), "Constructing estimates for exports, imports and the value-added from exports of the car industry and other manufacturing industries in the UK", ESCoE Technical Report No. 2.

Nguyen, D. and Paczos, M. (2019), "Measuring the economic value of data and data flows", presentation at OECD Working Party on Measurement and Analysis of the Digital Economy, Paris, 7 May.

Office for National Statistics (ONS) (2018), "Introducing a new publication model for GDP", 27 April.

Office for National Statistics (ONS) (2019a), "Transformation of the population and migration statistics system: overview", 22 August.

Office for National Statistics (ONS) (2019b), "New data sources in consumer price statistics: July 2019", in *ONS Economic Review*, July.

Organisation for Economic Co-operation and Development (OECD) (2019), *Measuring the Digital Transformation: A Roadmap for the Future*, March.

Ozdagli, A. and M. Weber (2017), "Monetary Policy through Production Networks: Evidence from the Stock Market", NBER Working Paper No. 23424.

Pérez, A.C. and J. Huerga (2016), "The Centralised Securities Database (CSDB) – Standardised micro data for financial stability purposes", in *Combining micro and macro statistical data for financial stability analysis*, IFC Bulletin 41, Bank for International Settlements.

Petrella, I., E. Santoro and L. Simonsen (2019), "Time-varying Price Flexibility and Inflation Dynamics", ESCoE Discussion Paper, forthcoming.

Petropoulos, A., V. Siakoulis, E. Stavroulakis and A. Klamargias (2019), "A robust machine learning approach for credit risk analysis of large loan-level datasets using deep learning and extreme gradient boosting", in *Are post-crisis statistical initiatives completed?*, IFC Bulletin 49, Bank for International Settlements.

Portes, J. (2018), "Population Estimates and Migration Statistics Compared", ESCoE Blogpost, 22 June.

Riley, R., C. Rosazza-Bondibene and G. Young (2015), "The UK Productivity Puzzle 2008-2013: Evidence from British Businesses", Bank of England Working Paper No. 531.

Robinson, P. (2019), "Big data: new insights for economic policy – The Bank of England experience", in *The use of big data analytics and artificial intelligence in central banking*, IFC Bulletin 50, Bank for International Settlements.

United Nations Economic Commission for Europe (UNECE) (2011), *Using Administrative and Secondary Sources for Official Statistics: A Handbook of Principles and Practices*, United Nations.

Wales, P., R. Black, T. Dolby and G. Awano (2018), "UK trade in goods and productivity: New findings", ESCoE Discussion Paper 2018-09.

Witt, E. and J. Blaschke (2019), "ECB data for analysis and decision-making: data governance and technology", in *Are post-crisis statistical initiatives completed?*, IFC Bulletin 49, Bank for International Settlements.

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