

TSC QUESTIONNAIRE FOR HUW PILL

A. PERSONAL / GENERAL

1. *Do you have any business or financial connections or other commitments that might give rise to a conflict of interest in carrying out your duties as Chief Economist and a member of the Monetary Policy Committee (MPC)?*

No.

As a result of my previous employment, I continue to hold shares in Goldman Sachs & Co., which are either unvested and/or restricted as a result of regulatory rules imposed by the PRA or additional restrictions imposed by GS. (I have already sold all my GS shareholdings that I was permitted to sell under these rules, i.e. those that were both vested and unrestricted.) I reported these holdings to the Bank's conflicts officer ahead of taking up my appointment at the Bank. The Bank and Goldman Sachs have been engaged in a process of agreeing how to unwind these shareholdings, such that I do not hold any equity exposure to a regulated financial institution. This will be implemented as soon as feasible given the relevant regulatory rules. My expectation is that the shares will be converted into cash or debt, and continue to be held in unvested / restricted form according to the original schedule. The bulk of this holding will become unrestricted in January 2022, and the unwind will be completed in January 2023.

2. *Do you intend to serve out the full term for which you have been appointed?*

Yes.

3. *Which of your publications or papers are of most relevance to your future work on the Monetary Policy Committee (MPC) and as Chief Economist and Executive Director for Monetary Analysis?*

Two streams of my published work serve to frame my approach to meeting MPC and Bank responsibilities.

In a series of academic papers with Ronald McKinnon,¹ I explored the implications of liberalising the capital account of the balance of payments in a reforming, small open economy. We sought to explain the 'over-borrowing' phenomenon identified in the open economy macroeconomics literature: episodes where emerging economies first enjoyed a surge in growth financed by substantial inflows of foreign capital, only to subsequently face a 'sudden stop' as those flows halted and then reversed, culminating in financial, economic and social crises.

These episodes represented a challenge to the prevailing macro orthodoxy. Paraphrasing the question posed in the introduction to one of our papers: How could countries that had embarked on apparently well-designed programmes of macroeconomic stabilisation and structural economic reform repeatedly fall prey to financial crisis? Our answer focused on a potentially unhealthy interaction between initial euphoria induced by stabilisation and longer-term vulnerabilities stemming from weak economic institutions, especially in the financial sector.

Three messages from this work are of particular relevance to my work at the Bank.

First, the framework suggests that – while necessary – stabilising inflation at low rates consistent with price stability is not, of itself, sufficient to ensure wider macroeconomic stability. The financial and fiscal context also matters. While our papers focused on exchange rate-based stabilisations, similar issues may arise within an inflation targeting regime. Arguably the success of central banks in achieving their inflation target and the wider context of perceived macro stability+ in the early years of this century bred complacency in the financial sector, encouraged excessive risk taking, and led to the neglect of accumulating macro imbalances

– notably the build-up of undue financial leverage – that eventually became manifest in the global financial crisis.² Recognising that an independent monetary policy delivering on its price stability objective operates within a wider policy and financial context, which it both shapes and is shaped by, is a relevant lesson for the current challenges facing the Bank and MPC.

Second (and drawing on the preceding argumentation), we identified financial regulation and supervision as key elements of the institutional infrastructure required to contain the accumulation of macro and financial imbalances. In particular, we argued for policies that internalised the systemic nature of the risks stemming from these imbalances: measures that are now labelled macro-prudential policy.

Beyond ensuring individual institutions were well-managed and respected regulation, measures were needed to contain the macroeconomic feedback from capital inflows and financial liberalisation to risk appetite and the relaxation of credit constraints. In particular, we argued for caution regarding the pace, timing and sequencing of market liberalisation and introduction of financial innovation, with a focus on the interaction between such macro-prudential concerns and other macro policies including monetary policy. This remains an important area of research for the Bank, about which I have also written in the aftermath of the financial crisis.³ Its relevance for the current work of the Bank and MPC is self-evident.

Third (and from a more methodological perspective), in order to explain the sharp changes in sentiment, market pricing and economic behaviour associated with the onset of crisis, these papers sought to relax some of the constraints imposed by the then prevailing dominant rational expectations paradigm in macroeconomics.

Households and firms within our framework developed a narrative (or ‘rational belief’) of how the economy worked. Once that narrative was established, it drove behaviour until the incoming data proved the narrative false. At that point, a re-assessment of the underlying structure of the economy took place, leading to the emergence of new – and potentially quite different – patterns of economic activity. In this way, self-sustaining but ultimately unsustainable ‘boom / bust’ cycles could emerge. An initially positive reaction to economic reform could lead to the emergence of euphoria if the benefits of reform were over-stated. In turn, that euphoria created financial and macro imbalances that eventually culminated in a crisis that undermined the stability on which the success of the reform rested.

Frameworks of this type have now become much more mainstream within macroeconomics. They have been used to account for the global financial crisis.⁴ The importance of popular narratives in shaping macroeconomic outcomes has received renewed attention:⁵ this certainly chimes with my experience of observing market dynamics while working in the private sector.

These themes are all central to the challenges facing the Bank and MPC at present. On the one hand, they serve to highlight risks. Financial ‘busts’ stemming from the slow but excessive accumulation of leverage and/or deviation of asset prices from fundamental values during ‘boom’ periods may recur. Yet, on the other hand, these themes also present opportunities for central banks. The importance of public narratives in shaping macroeconomic performance provides a rationale for central banks’ efforts to improve their communication across a broad set of audiences, with the objective of coordinating private behaviour on favourable outcomes.

A second stream of relevant publications focuses on the impact of (what were then deemed) non-standard monetary policy measures in the midst of the global financial crisis. Given my employment at that time, these papers focus on the euro area and were written in collaboration with my then colleagues at the European Central Bank. They have a more immediate and practical policy orientation, seeking to identify and explain the transmission channels of non-standard measures, offer a quantification of their impact on macroeconomic outcomes and address the distinctive challenges posed by the unique institutional structure of the euro area.

Three elements of this work are worth highlighting.

First, the papers seek to identify a ‘market functioning’ channel of transmission for non-standard policy measures. Upon their introduction of quantitative easing (QE), the Bank and Federal Reserve emphasised

transmission via portfolio balance channels, e.g. absorbing duration from the market would put downward pressure on term premia along the yield curve. By contrast, the ECB focused its interventions on specific financial market segments that were dysfunctional, e.g. the euro area bank funding market. More specifically, the ECB offered its own balance sheet as a venue for financial intermediation in a context where private markets has seized up.

These two channels of transmission are not at odds with one another. On the contrary, in general they are complements.⁶ But an understanding of their relative importance is needed to calibrate the size and character of policy interventions. In particular, variation in their relative importance can help explain the so-called state-dependence of QE's impact on the economy: QE is more potent when financial markets are stressed. This result has been identified in Bank research and emphasised in recent policy communication.

The relative importance of these two channels also has implications for the relationship between non-standard monetary policy measures and conventional interest rate actions. Transmission of non-standard policy through the portfolio balance channel represents a potential substitute for conventional monetary policy, as it continues to operate even after policy rates have been floored at their effective lower bound. By contrast, since the market functioning channel aims at supporting normal monetary policy transmission by ensuring interest rate decisions pass-through to the wider economy, they are natural complements to conventional policy: the two elements work together.⁷ As the Bank seeks to normalise monetary policy as the economy recovers from the Covid-19 pandemic, understanding the substitutability and complementarity between interest rate and balance sheet aspects of its policy stance will again come to the fore.

Second, a series of papers sought to quantify the impact of the ECB's interventions on macroeconomic variables.⁸ Given our focus on the market functioning channel of transmission, this involved comparing outcomes embodying the impact of policy interventions on market dislocations (measured as the reduction in interest rate spreads that the policy measures induced) with counterfactual model simulations where those dislocations persisted. While methodologically this approach had some shortcomings, it offered practical, pragmatic and policy-relevant guidance at a time when uncertainty was pervasive.

Third, we explored the impact of institutional weaknesses within the euro area on the transmission of monetary policy and the role of non-standard policy interventions. In particular, as the euro sovereign and banking crises intensified in 2011-12, the integrity of euro financial markets began to break down along national lines. Using bank balance sheet data, we documented both the resulting disruption to monetary policy transmission and pro-cyclical deterioration of credit conditions in some national jurisdictions, as well as the impact of policy interventions such as funding schemes that employed the ECB balance sheet to bridge the financial fissures that opened between national markets.⁹ Ultimately these corrosive centrifugal dynamics were arrested by President Draghi's 'whatever it takes' intervention.¹⁰

While much of this work has a euro area-specific element, it again emphasises the importance of the wider institutional context for the conduct and success of monetary policy, as well as the challenges of managing and calibrating the new tools that emerged in response to the financial crisis and its aftermath. These issues are of ongoing relevance for the Bank and MPC.

4. How has your experience to date prepared you for the role of Chief Economist and Executive Director for Monetary Analysis, including your role on the MPC?

I have spent the past thirty years working on macro and international economic issues, with a focus on monetary and financial questions and policies. My experience spans a variety of roles and jurisdictions. Taken together, these represent both a solid foundation and a rich background for both my role at the Bank and for serving on the Monetary Policy Committee.

In academia, I worked as a junior faculty member at Harvard Business School, having graduated with a PhD from the economics department at Stanford. My academic research explored the macro and monetary impact of capital account liberalisation at a time of increasing financial globalisation. Inspired by close observation of Britain's financial and monetary convulsions within the ERM while working at the Bank of

England, I developed a model of international ‘overborrowing’ in liberalising economies.¹¹ This work was published in leading economic journals and was widely employed to explore the emerging market crises of the 1990s in Asia and Mexico. At that time, it was influential in policy circles, triggering research visits and engagement with the IMF, MAS, Indonesian Finance Ministry and Banco de Mexico.

As regards policy institutions, I worked for a decade at the European Central Bank, in addition to my early spell as a junior economist at the Bank of England. At the ECB, I served as head of the Monetary Policy Stance Division during the first stage of the global financial crisis. Drawing on the resilience of the team I had built up over preceding years and relying on the ECB’s state-of-the-art framework for the implementation of monetary policy, we were able to meet the substantial challenges of steering the euro money market around the failure of Lehman. Moreover, we began to develop and assess the armoury of unconventional policy measures subsequently deployed by the ECB, including exploring the pros and cons of instruments such as negative interest rates, asset purchases and subsidised bank funding schemes.

In this role, I was also responsible for preparing the macroeconomic briefing material used at the ECB’s Governing Council as a basis for interest rate policy decisions. Albeit from a staff member rather than a policy maker perspective – with all the substantial differences that entails – these responsibilities mimic the analytical demands placed on an MPC member at the Bank of England. Through this work, I participated in a variety of inter-institutional committees and exercises, such as the Monetary Experts Group of the OECD, the G-3 central bank meetings of the ECB with the Federal Reserve and Bank of Japan and various Eurosystem / ESCB / BIS / IMF fora.

In 2009, I was promoted to the ECB’s senior management as Deputy Director of Research. This took me away from my previous close involvement in the month-to-month policy round, and refocused my efforts on strategic issues, the econometric and modelling foundations of the lower frequency macroeconomic forecasting exercises produced by Eurosystem staff, and analytical studies of the effectiveness of unconventional policy measures introduced during the crisis, many of which were subsequently published in academic and policy journals.¹² I led an effort to revamp the structure and management of the research department, which I saw as suffering from being too far removed from policy discussions to exert a useful influence over the direction of policy at a time when the innovation that good research could offer was at a premium.

More recently, I have worked as a sell-side economist in the financial sector, serving as chief European economist of Goldman Sachs. In this role, I developed a sensitivity to market dynamics and drivers, thereby deepening my understanding of monetary policy transmission and macro-financial issues. Prior to re-joining the Bank in September, I taught macro and international economics in the MBA programme at the Harvard Business School, while completing a number of research projects that started while I was working at GS.

To summarise, I have demonstrated a deep engagement in monetary policy and macroeconomics. I worked at the heart of one of the world’s most important central banks, taking a leadership role at several critical moments in the preparation of policy decisions along strategic, conjunctural and implementation dimensions. Moreover, the depth of this knowledge is complemented by a breadth of experience: not only have I shown expertise on the practical essence of monetary policy as a central banker, but in other roles I have taken a more dispassionate analytical view from academia, and faced the challenges of interpreting monetary policy actions and their implications in a sometimes febrile market context. It is the combination of these experiences that represents the value that I can bring to the MPC.

5. *What are your main priorities and ambitions for your tenure as Chief Economist and Executive Director for Monetary Analysis? What criteria do you suggest should be used to assess your record?*

From my still short recent experience of life in the Bank, it is apparent that many things are done well. For example, the analysis of the data and forecast construction underlying the preparation of monetary policy decisions is a well-oiled and efficient machine. The data are presented and discussed within a well-established framework that supports internal and external presentation of the analysis and its implications for policy decisions.

Yet the strength of this approach also creates some weaknesses. Not all issues fit neatly within it. The policy tools available to the Bank have multiplied as its remit has expanded and new instruments have been developed. More generally, the strength and success of the framework may make it difficult to challenge orthodoxy. Alternative views and approaches may be difficult to encompass within the existing machinery, or have to be shoe-horned into it.

As a result, I seek to introduce a number of innovations to strengthen the resilience and robustness of policy process, organised around two main priorities for my tenure as Chief Economist and Executive Director for Monetary Analysis. These could be labelled: doing different things; and doing things differently.

As regards the former, I plan to re-focus efforts towards deepening understanding of the policy tools and frameworks that have emerged from the financial crisis and its aftermath (including the impact of the pandemic and the policy response to it).

For much of the past decade and a half, improvisation has been required to stabilise the economy and financial system. Under the pressure of circumstances, central banks have introduced a web of new tools: quantitative easing, credit easing, funding schemes, forward guidance, negative interest rates. Inevitably, in real time their mechanics and the interactions among them were, at best, incompletely understood. Indeed, former Federal Reserve Chairman Ben Bernanke famously stated: “The problem with QE is it works in practice, but it doesn’t work in theory”.

Acting to contain a crisis is a practical rather than theoretical business. But as (we hope) the economy normalises, crises recede and policy decisions again become more finely balanced, developing a better understanding of these new instruments becomes central. It is time to take stock of the tools and assess how they would operate in a ‘new normal’, as well as consider the implication of such tools for the magnitude and composition of the Bank’s balance sheet.

A large part of this agenda is a research exercise (which I will address in my response to the next question). But it has concrete, practical implications. To illustrate, I take one example (and build on an earlier answer). Since QE can work through various channels, we should consider whether the design and governance of any QE programme should reflect the relative importance of those channels at the time it was implemented.

If QE is intended to ease financial conditions by lowering yields and squeezing term and credit risk premia via portfolio balance effects, then it is naturally governed by the decisions of the MPC. Presentation of QE would focus on the stock of purchases, to be implemented over a longer period according to a steady, pre-announced schedule. This was the template for asset purchases established at the inception of the QE programme back in 2009.

By contrast, if asset purchases are intended to support market functioning in a systemically pivotal market such as that for sovereign debt, then a more flexible and opportunistic approach focused on the flow of asset purchases may be more appropriate. Given the importance of financial stability considerations in assessing the effectiveness of such purchases, the FPC may wish or need to be involved in their governance (even if the monetary implications of the purchases continue to entail a prominent role for the MPC).

Arguably, QE announced in March 2020 in the face of the so-called ‘dash-for-cash’ at the outset of the Covid-19 pandemic was intended in large part to support market functioning. But in the absence of a thorough stock take of non-standard instruments, that intervention was framed under the established regime, designed at a different time for a different purpose. That did not undermine the effectiveness of the intervention: the gilt market was broadly normalised after a few days, supporting both financial stability and the MPC’s pursuit of its inflation target. But it did complicate the subsequent presentation and explanation of the measure. In short – and as this example illustrates – the design, governance and communication of policy measures would be enhanced by reviewing the recently expanded policy toolkit available to the Bank.

In judging the success of this agenda, a first criterion would be whether questions raised about the Bank’s extended policy armoury (e.g., in the recent report of the Bank’s own Internal Evaluation Office, by the

House of Lords Economic Affairs Committee, and by academic and market participants) can be satisfactorily and convincingly addressed. (Re-)establishing the Bank as a leader in this debate among its central bank peers would be another test in this vein. A second criterion would be whether clarification of the policy toolkit can improve understanding of Bank policy among the broad set of audiences it addresses: the general public, market participants, the media. Our accountability towards the TSC is a prime example. But the ultimate test will be whether the Bank has the right tools in the right place at the right time to deliver on its remit and mandate: maintaining monetary and financial stability.

Turning to the second ambition for my tenure – doing things differently – I intend to prioritise efforts to encourage greater diversity of approach within the policy preparation process, introducing more scope for challenges to the orthodoxies and assumptions embedded in the core framework. Any policy process needs to find a balance between, on the one hand, ‘keeping the wheels turning’ (i.e., ensuring that decisions can be made in a timely and internally consistent way) and, on the other hand, avoiding that blinkered ‘group think’ neglects or undervalues developments that are not accorded significance in the core framework (which, to a large extent, is a model representation of that group think).

Under the substantial challenges stemming from the global financial crisis, the Covid-19 pandemic, etc., my sense is that the Bank’s policy preparation has (understandably) prioritised the former over the latter. That is an experience shared across jurisdictions. As the economic environment (hopefully) normalises, some corrective is therefore required if the desired balance is to be re-established.

Part of the solution lies in exposing the Bank’s work to external critique and inviting those with valuable and constructive alternative views to offer their distinct perspective. The Bank has ongoing programmes in that realm. But ensuring that the Bank’s own staff are willing and able to challenge orthodoxy is at least as important. This entails reinforcing a safe and open internal environment, where individuals are confident that speaking their mind and criticising the established view does not come with adverse and unwarranted consequences. Even if challenges to orthodoxy ‘fail’, those making those challenges should not feel that they have (or be seen to have) ‘failed’. Such challenges improve the robustness of and refine the rationale for the final policy decision, often in ways that only become apparent with a long lag. Creating an environment where such challenges are possible entails significant investment in building an open and supportive culture.

There is considerable evidence that taking decisions within diverse groups helps improve the quality of the resulting decisions. That is one of the rationales for the committee structure of policymaking at the Bank. And diversity of approach and perspective is typically correlated with identity diversity along various dimensions, such as gender, nationality, ethnicity, etc. Making decision-making at the Bank more diverse therefore not only makes it an institution more representative of the society it serves, but it also improves the quality of the decisions it takes. As the Bank has recognised in its Diversity and Inclusion agenda, harnessing diversity of thought and perspective is therefore an important objective, to which I subscribe.

In judging performance in meeting this ambition, monitoring progress towards the Bank’s numerical scorecards (in the Monetary Analysis Directorate and more widely) is therefore an important benchmark against which I (and others) will be held to account. This is one measure of success. Beyond that, assessing progress on building a culture of openness and inclusion within the Monetary Analysis and Research areas that fosters openness and challenges to orthodoxy will be an important test, one that can be measured both directly and via its impact on the policy preparation process and research outputs. This encompasses but is broader than meeting diversity targets.

6. *What will your initial research priorities be as Chief Economist and Executive Director for Monetary Analysis?*

The research community at the Bank covers a wide range of topics. I will seek to foster and support efforts across the board. However, in the context of my response to the previous question, my initial research priorities centre on deepening understanding of the Bank’s policy tools and the interactions among them.

In part, establishing this priority entails exploring the effectiveness of non-standard tools over recent years. The Bank has already produced a substantial body of work in this vein, summarised in Andrew Bailey’s

recent Jackson Hole paper.¹³ Further work can be done, particularly in evaluating the impact of non-standard policy instruments beyond QE, such as the Bank's corporate bond purchases, various bank funding schemes, forward guidance, etc. But it is also important to be realistic about how much further can be learnt from torturing what is a small sample of QE episodes.

Making progress requires going further. To establish the ambition and encompassing nature of the agenda, I pose the following questions: who should have access to the Bank's balance sheet? On what terms? And for what purpose? Research that addresses this question would provide the basis for codifying the Bank's new policy toolkit, understanding the connections among various elements of that toolkit, and designing the 'steady-state' structure and size of the Bank's balance sheet.

Addressing these issues thoroughly also supports one other function that the cross-institutional, horizontally organised research activities serve at the Bank, namely serving as a catalyst to increase interaction among different policy areas.

At a higher level, my priorities for the Bank's research activities involve achieving three objectives across the range of topics and activities pursued: excellence (producing research of outstanding quality that meets the exacting standards of academic publication); independence (ensuring that researchers feel empowered to be innovative and creative in their work, challenging orthodoxy and convention as their findings imply); and relevance (producing research that serves the Bank's pursuit of its remit).

Good central bank research that serves these objectives is likely to exploit the advantages of being produced at a central bank: awareness of and sensitivity to the key policy questions and issues; engagement with policy and operational experts as colleagues; access to data that (for reasons of confidentiality) is only available within the central bank. These advantages can help to attract and retain high quality researchers. Their research output can engage academic researchers in issues of importance to the central bank, which otherwise not be part of their research agenda. A virtuous cycle can be created.

B. MONETARY AND ECONOMIC POLICY

7. *What do you regard as the major risks to the outlook for UK inflation, growth and employment?*

In the face of the Covid-19 pandemic, from March 2020 the MPC eased monetary policy significantly, in parallel with substantial fiscal and other policy support. The rationale for these decisions was to build a bridge to the post-COVID world, avoiding permanent damage to UK employment and activity. While the UK is still to achieve pre-pandemic levels of GDP and pandemic risks remain, the bridge to the post-pandemic world is now well established, and much progress has been made in traversing it.

Against this background, the onset of the pandemic and the multi-faceted policy response to it led to large and uncoordinated shifts in both aggregate demand and aggregate supply over the past eighteen months. In this context, the gap between demand and supply – understood as a measure of resource pressure relevant for short-term price developments – has proved both volatile and unpredictable.

Following the initial lockdown, the downturn in demand dominated, weighing on inflation last year. More recently as restrictions have been relaxed, demand has recovered but supply has been constrained by sectoral bottlenecks and mis-matches. The strength of demand relative to supply has boosted inflation over recent months. Taking the past eighteen months as a whole, inflation has proved volatile.

Within these evolutions of the aggregates, substantial variation has emerged in their composition. As regards demand, lockdown implied a shift in consumption from consumer-facing services (restaurants, in-store retail) to durable goods. That shift is now slowly unwinding. On the supply side, bottlenecks constrain production in some sectors (such as semi-conductors) more than others where the pandemic has had more limited impact.

These developments are global in character. With still strong demand for durable and intermediate goods but ongoing tensions in international supply chains owing to transport and production dislocations, goods prices have risen at the global level. Much of the recent rise in UK inflation stems from developments imported goods prices that reflect these dynamics, as well as rises in international commodity prices. As the pandemic recedes and the level and composition of global demand and supply normalise, these inflationary pressures should subside. But the magnitude and duration of the transient inflation spike is proving greater than expected.

While similar in overall character, pressures in the UK economy have reflected its specific context. Taking the August MPR as the benchmark, over recent months inflation has surprised to the upside, UK activity data have disappointed somewhat, while the labour market has tightened. This combination has all the hallmarks of an adverse supply shock, centred on mismatches in the labour market. Supply problems within the UK owe to the ‘pingdemic’ and shortages of specific skills (such as HGV drivers). Moreover, the rise in wholesale gas prices threatens to raise retail energy costs next year, sustaining CPI inflation rates above 4% into 2022 Q2.

At the time of writing, the end of the UK furlough scheme introduces another layer of uncertainty in assessing the outlook for UK activity and inflation. The number of jobs still furloughed as the end of the scheme approach is much higher than foreseen in the August MPR. But at the same time, the number of vacancies in the UK is at high levels, even as the unemployment rate has fallen slightly as demand has recovered. A key question is whether those supported in currently furloughed jobs will smoothly re-enter the labour market or whether they will become unemployed or inactive when the scheme ends. Should they become unemployed, it then remains to be seen whether they weigh on wage growth, contain inflationary pressure and slowly take up the vacancies available (many of which are in relatively low paid positions, which may not have been attractive for those on furlough). An alternative outcome would be their unemployed status is more structural in character, reflecting skill, sectoral or geographic mis-matches. That would imply less downward pressure on short-term inflationary pressures.

Framing these issues in a more general setting, the risks to inflation, growth and employment in coming quarters will reflect both the sustainability of the recovery in demand and the persistence and magnitude of supply constraints.

A benign view sees those supply constraints as temporary. Current inflationary pressures are part of an adjustment process, which will subside as bottlenecks are relieved. The end of the furlough scheme releases additional effective supply into the labour market. Monetary policy has a role in sustaining demand to create conditions amenable to adjustment and avoid that temporary supply constraints evolve into a permanent degradation of the supply side via hysteresis.

By contrast, a malign view sees mis-matches as persistent or even structural. The end of furlough does not add to effective labour supply, but simply adds to long-term unemployment. Monetary policy needs to constrain demand to recognise the lower potential of the economy, or otherwise risk that inflation and inflation expectations shift to a new higher equilibrium inconsistent with the MPC’s remit owing to self-sustaining second round effects in inflation associated with rising pricing power for firms and/or a wage/price spiral.

Reality will lie somewhere between these two polar characterisations of the risks. In considering policy decisions, it will be necessary judge the balance of risk between the two scenarios. In my view, that balance of risks is currently shifting towards great concerns about the inflation outlook, as the current strength of inflation looks set to prove more long lasting than originally anticipated.

More importantly (and reflecting the uncertainties faced), I would emphasise that risks to the economic and inflation outlook are again clearly becoming two-sided. This marks a significant change to the past eighteen months (and arguably the bulk of the period since the onset of the financial crisis, punctuated by Brexit and the pandemic). In the prior period, the weakness of the economy has skewed risks to activity, employment and inflation to the downside. Monetary policy has been accommodative as a result: there has been little

debate about its direction. But as the risks to the outlook become more two-sided, monetary policy decisions will become more finely balanced.

8. *Why in your view have the UK and other advanced economies suffered from stagnant productivity growth in recent years, and what do you see as the prospects for productivity growth in the coming years?*

Before the global financial crisis, UK productivity growth averaged over 2% per year. Since then, labour productivity has fallen considerably. Slowdowns in productivity growth have also been observed in other advanced economies, especially in Europe. The slowdown has been referred to as the “productivity puzzle”.

A number of explanations have been proposed. Some focus on structural changes in the labour market. For example, the rise in self-employment may have reduced the scale efficiencies in employment. Others explore the impact of restrictions to credit supply in the aftermath of the financial crisis, which may have restricted the supply of credit to higher productivity new businesses.

A small number of sectors appear to account for a large proportion of the slowdown in productivity growth in the UK since the financial crisis. Many of the sectors in question tended to display fast productivity growth ahead of the crisis. The most recent data suggest that much of the weakness relative to pre-crisis is concentrated in the manufacturing sector. Manufacturing output are typically highly tradable. Any stalling of globalisation (as reflected in less intensive exploitation of the economies offered by global value chains) since the crisis may have contributed to falling productivity.

Moreover, the latest data have re-stated the output of the financial sector, using a different methodology to that employed in the past. The new data imply lower financial output prior to the financial crisis, and thus a lower decline in sectoral productivity in its aftermath. This example is reflective of the broader data challenges and uncertainties that are faced in assessing productivity developments.

Another possible explanation is the heightened uncertainty over the past 14 years, which has contributed to lower investment growth and slowed efforts in innovation and research and development (R&D). The UK has experienced three major waves of uncertainty: the global financial crisis, the EU referendum and now the Covid-19 pandemic. This is likely to have made firms understandably cautious in their investment decisions.

It is likely that a combination of these factors, as well as others, has contributed to falling productivity growth. A major uncertainty is how productivity will evolve as the economy recovers from the pandemic. To take a positive perspective, the aftermath of the Covid-19 pandemic may have different implications for productivity than other recoveries, such as that from the financial crisis. Many firms have had to completely shut down their activities, giving them a chance to re-optimize and improve their processes as they restarted their activity, potentially improving productivity. There is also evidence that firm creation has rebounded strongly since lockdowns have been eased. These may bring innovative business models that prove more productive. Existing firms have also invested in technologies – such as those supporting automation or facilitating working from home – which could raise productivity in the longer term.

9. *MPC members have issued guidance that they do “not intend to tighten monetary policy at least until there is clear evidence that significant progress is being made in eliminating spare capacity and achieving the 2% inflation target sustainably.” Do you think these criteria have been met, and do you think that ‘forward guidance’ of this sort is an effective tool of monetary policy?*

On my reading, this question is now somewhat moot, as the MPC decided to drop the formal forward guidance (embodied in quotation contained in the question above) at its September meeting. This decision reflects a response to the emergence of two-sided risks to the inflation and economic outlook in recent months (discussed in response to a previous question), which made redundant forward guidance intended to signal that policy rates would not rise for some time. The retirement of this form of forward guidance has thus helped to clarify the MPC’s communication.

More broadly, my reading of experience across central banks is that formal forward guidance (embodying thresholds and knock-out criteria, etc.) tends to start well, but end in some confusion. To a large extent, that is part and parcel of attempting to make commitments that are not time consistent (i.e., commitments that you would not choose to keep as you move forward, which are therefore difficult to make credible). But it also reflects the difficulty of articulating a set of criteria that all policymakers can agree to at the outset and which remains clear and transparent as the economy evolves. The various interpretations of ‘spare capacity’ that emerged within the MPC in recent months are a case in point.

At the same time, effective monetary policy transmission entails more than simply setting the level of Bank rate. Transmission works via financial markets and asset prices. Households and firms taking consumption and investment decisions borrow at longer-term market rates – not the Bank rate. Influencing these market rates involves steering expectations of future levels of Bank rate, not just its spot level. In that more informal sense, forward guidance is – and always has been – a central and necessary part of designing monetary policy.

For what it is worth, I would have judged the necessary condition embedded in the MPC’s forward guidance to have been met at the August meeting. My focus would have been on the shorter-term supply concept, which is more relevant for inflation (and thus for assessing policy in the context of the MPC’s remit). At the same time (and as reflected in my answer to a previous question), I recognise that with activity still below pre-Covid levels, there is potential supply available in the economy over the medium-term. Without prejudicing its commitment to price stability, monetary policy should seek to support a level of activity that exploits that potential as fully as possible.

10. What consideration should be given to asset prices, including house prices, within the framework for inflation targeting?

The Bank has a clear remit for monetary policy: keeping inflation at its 2% target. That target is expressed in terms of CPI inflation. Asset prices – including house prices – are not incorporated into the CPI, which captures developments in consumer prices. Therefore there is no basis to target asset prices as part of the objective of monetary policy.

That said, asset prices do play an important role in the transmission of monetary policy to the real economy and ultimately to CPI inflation. By influencing the cost and availability of borrowing, they shape consumption and investment decisions. Higher asset prices may also exert wealth effects on spending decisions and boost the value of collateral, making access to finance easier for some borrowers. Among other channels, it is through these asset price effects that monetary policy pursues its inflation target.

Indeed, the non-standard monetary policy measures implemented over the past fifteen years – notably asset purchases and forward guidance – transmit to the economy largely through influencing asset prices. By absorbing safe, longer duration sovereign debt from the market, QE serves to squeeze term and credit risk premia, bringing down yields and reducing borrowing costs. By shaping expectations of future short-term policy rates, forward guidance also influences the level and slope of the risk-free yield curve, influencing wider asset price developments and the cost and availability of financing. If anything, asset prices have therefore become more integral to monetary policy transmission in recent years.

Moreover, the evolution of asset prices offers an important insight into market participants’ expectations of future economic developments, which can help inform policymakers’ assessment of the economy, cross-check the central banks’ own forecasts and give a sense of how specific policy actions will be received and interpreted. Examples include: extracting both short- and longer-term growth and inflation expectations from bond yields; assessing the magnitude of and appetite for risk by evaluating corporate credit spreads and equity prices; and exploring the size and skew in uncertainty using derivative prices. Asset prices are thus both a signal on the direction of the economy, and a yardstick to evaluate policy transmission.

For all these reasons, asset prices deserve to be closely monitored by central banks as part of their policy preparation and economic assessment, even though they do not form part of the target of monetary policy. (Of course, assessing risks to asset prices is central to the financial stability assessment.)

Within this overall framework, house prices deserve special mention. In many household balance sheets, housing and its financing via mortgages will represent the bulk of assets and liabilities respectively. Simply owing to their importance, they deserve extra attention. Beyond that, housing markets are subject to many other frictions, such as planning restrictions and taxes such as stamp duty. They cannot easily be interpreted using benchmark models from financial economics that, even if imperfect, likely represent a useful benchmark for the analysis and interpretation of financial asset prices. In particular, in the past housing markets have proved vulnerable to the ‘boom / bust’ dynamics discussed in another answer to this questionnaire, with important spillovers onto financial stability and monetary policy transmission.

Standard macroeconomic models that underlie the Bank’s core framework for the preparation of monetary policy decisions neglect the financial sector and embody an, at best, sketchy representation of the housing market. This gap became apparent during the financial crisis, where financial and housing developments disrupted monetary policy transmission in a manner that the standard models did not anticipate. Incorporating financial and housing effects is a rich and dynamic part of the current macroeconomic research agenda (including at the Bank), 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 reflected in asset prices 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. Including a more prominent role for the housing market is similarly important. While efforts to build these new models proceed, continuing to ensure that asset pricing, housing market developments, and the evolution of mortgage borrowing and its pricing are monitored closely and filtered into the overall assessment of the economic situation remains crucial.

11. The current MPC remit sets an inflation target of 2 per cent at all times, but it also allows the MPC to tolerate temporary deviations of unspecified length in order to avoid “undesirable volatility in output”. How do you interpret this mandate and the degree of flexibility it offers?

In answering this question, it is useful to set out four preliminaries.

First, monetary policy influences CPI inflation with a lag. If unanticipated disturbances to the economy affect CPI inflation more quickly than a monetary policy’s response can influence CPI inflation, then it is simply impossible for monetary policy to offset all shocks in a manner that literally leaves inflation at its 2% target ‘at all times’.

Second, what complicates the situation further is that the lags in monetary policy transmission are famously ‘long and variable’. Perhaps even more importantly, these lags are not fully predictable. So uncertainty surrounds when and how monetary policy actions will affect inflation, making the calibration of policy actions to offset the impact of shocks inevitably inexact. The adoption of non-standard monetary policy instruments in recent years is likely to have exacerbated this issue. Because of their novelty and character, transmission of monetary policy implemented via such non-standard measures is likely to entail longer, more variable and – crucially – less predictable lags than conventional policy implemented via Bank rate. (Indeed, this is an implication of recent Bank research.)

Taken together, these two points imply that there will be an irreducible level of short-term variation in the inflation rate around its 2% target. Monetary policy simply does not have the ability to fine-tune inflation at very high frequencies. Attempting to do so is likely to prove self-defeating, because the unavoidable errors in policy calibration themselves have the potential to become a source of inflation volatility. This is the basic argument for a medium-term orientation of monetary policy.

Third, in response to some economic disturbances, the policy that would best stabilise inflation is also the policy that would best stabilise output. An example would be a temporary increase in aggregate demand. This would raise both spending and, to the extent that higher spending created resource pressures, increase inflation. In this context, a monetary policy tightening serves to stabilise both inflation and activity – a result labelled the ‘divine coincidence’ in the economic literature. But in response to other types of disturbance,

a trade-off between output and inflation stabilisation may emerge. Consider a temporary negative supply shock. If spending and activity were to continue unchanged, resource pressures would build in the short term adding to inflationary pressure. A monetary policy tightening would help contain those inflationary pressures, but at the expense of driving down spending towards the reduced level of supply and thereby introducing some volatility into activity. This volatility of output is likely to weigh on the economy, say if there are adjustment costs.

This argumentation provides the rationale for the Bank's adoption of *flexible* inflation targeting. Flexible inflation targeting recognises that seeking to minimise inflation's volatility around its target may induce costly levels of volatility in output. Therefore, there is value in trading short-term volatility in inflation off against short-term volatility in output, as long as this does not prejudice the firm anchoring of inflation at its 2% target over the medium term.

Fourth, monetary policy actions do not affect inflation only at one horizon, and then dissipate immediately. Rather they affect inflation over time. As a result, focusing attention solely on a specific horizon – say two years – in setting the policy stance runs the risk that those actions can induce unnecessary volatility in inflation beyond that horizon. A well-designed policy framework would recognise this and internalise in its decision making the impact of policy decisions at all points in the future. (More subtly, this approach would also recognise that policy actions also influence inflation over time (and into the potentially distant future) by shaping private expectations of future policy actions.)

Against this background, my interpretation of the remit's requirement to meet the inflation target of 2 per cent *at all times* does not imply a likely self-defeating pursuit of 2% inflation on a month-to-month basis in the face of inevitable economic disturbances and uncertainties that create volatility. Rather I interpret the statement as requiring that policymakers should internalise the impact of any of their decisions on inflation at *all* horizons into the future, such that they credibly keep inflation at target over the medium term. In this light, inflation targeting does not entail focusing solely on a specific horizon for returning inflation to its 2% target, still less have policy decisions feedback mechanically from deviations of inflation forecasts from target at that horizon.

Turning to the remit's tolerance of temporary deviations of unspecified length in order to avoid "undesirable volatility in output", I interpret this as the embodiment of flexible inflation targeting. This not only recognises the impossibility of stabilising inflation at target on a month-to-month basis given the lags and uncertainties in transmission, but it also acknowledges the potentially significant welfare costs associated with volatility in other macroeconomic variables that would be created by attempting to keep inflation at target on a month-to-month basis.

Ideally, our modelling framework would quantify the welfare costs associated with inflation and output volatility, providing a consistent basis to manage the trade-off between them. Unfortunately, current models fall some way short in this regard. As a result, some judgement will inevitably be required in managing the trade-off between short-term inflation and output volatility, and in determining the horizon at which temporary deviations of inflation from target may start to prejudice the credibility of the Bank's commitment to maintaining inflation at 2% over the medium term.

12. *What is your assessment of monetary policy tools other than conventional interest rate setting, including quantitative easing and negative interest rates? What should be considered in preparation for the eventual unwinding of quantitative easing?*

Prior to the global financial crisis, monetary policy was implemented via changes in Bank rate. This was a clear and communicable characterisation of the policy stance, which dovetailed with the flexible inflation targeting strategy adopted by the Bank. The Bank was accorded significant autonomy by the government (and wider society) to pursue a narrow and widely agreed objective (inflation at target) with a narrow and broadly neutral policy instrument (short-term nominal interest rates). The legitimacy of the approach rested in part on the complementary narrowness of both the means and the ends.

For a sustained period, this framework not only offered admirable clarity of purpose; 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.

The financial crisis challenged this comfortable view. The emergence of non-standard tools was a reaction to the new and difficult problems that emerged in the face of the crisis, subsequently augmented by the challenges of Brexit and the Covid-19 pandemic. As the economy (hopefully) normalises, one might expect that the need for non-standard tools may also recede in parallel, permitting a return to the simpler and clearer pre-crisis monetary policy framework.

There are reasons to doubt this view.

First (and as discussed in another answer), the equilibrium or neutral level of policy interest rates (R-star in economics jargon) has declined over recent decades. This is unlikely to reverse soon. Relying on conventional policy measures shifting Bank rate around this neutral level increasingly runs the risk that the scope for policy easing is constrained by the existence of an effective lower bound on nominal rates (owing to the possibility of stockpiling zero interest banknotes). Alternative easing mechanisms may be required if monetary policy is to remain effective.

Second, the Bank’s capacity to implement non-standard policies is now well established. Even if these policies were to be withdrawn (say the Bank’s asset purchase facility were run down to zero), market participants are likely to anticipate the potential re-activation of such policies. Better to shape and manage expectations of what such tools may be used for in future than let the market form its own view without guidance from the Bank.

For both these reasons – and as discussed elsewhere in my response to the questionnaire – non-standard policy tools are here to stay: they have evolved to become part of the standard monetary policy armoury. Clarifying and codifying the framework governing the newly expanded set of policy tools, and understanding better how these tools work and interact with one another, are research and operational priorities. On this, I will not repeat issues discussed in previous answers. Here I focus on the institutional setting in which the expanded policy tool set would operate.

As regards asset purchases and term funding / lending facilities, a key question is the interaction between these measures and fiscal policy. 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. This complementarity between monetary and fiscal easing has been apparent in the policy response to the Covid-19 pandemic. Moreover, purchases of corporate debt and bank term funding facilities have at least the potential to assume a quasi-fiscal character: they entail providing de facto subsidies to specific institutions and/or activities.

Interactions between monetary and fiscal policy are longstanding and inevitable. Policy rate decisions affect the cost of government borrowing and many central banks have long held asset portfolios including government debt. But the magnitude, intensity and distributional impact of these monetary/fiscal interactions have multiplied as a result of the non-standard policy measures introduced in recent years. Understanding and managing these interactions is an important topic for further research.

Thanks to the efforts of Bank staff over the past year, negative interest rates are now a live instrument of monetary policy in the UK. Scepticism over their employment remains. I share the view that the scope for interest rates to fall into negative territory in the current institutional setting remains limited. In the end, the possibility of shifting into zero-interest rate bearing banknotes continues to imply a floor to Bank rate, even if it is below zero (implying a negative ‘effective lower bound’ rather than a ‘zero lower bound’). But continental European experience suggests that concerns about the impact of negative rates on bank profitability as retail interest margins are squeezed – a concern based on the potential for negative rates to prove counter-productive if they weaken bank capital and hinder the supply of loans – have been overstated. On my reading, those concerns under-appreciated the ‘general equilibrium’ benefits of negative rates in

boosting confidence, sustaining demand and improving credit quality. These factors have more than offset any negative impact on bank balance sheets coming from a squeezed on net interest margins.

Based on this assessment, I draw two conclusions. (1) Negative interest rates are both feasible and likely to ease monetary conditions. They are thus a helpful addition to the monetary policy toolkit, create additional policy room, and help to address concerns that central banks may be running out of ammunition to fight disinflationary pressures. But (2) negative interest rates are no panacea. In the current institutional setting, there are limits to how far they can fall: probably 50 or 100bp of additional reduction in the Bank rate is now possible. This is not negligible; but nor is it transformational. Moreover, the impact of negative rates is likely to depend on the state of the economy: the strength of bank balance sheets and wider confidence, demand and credit quality, which will determine the strength of the macroeconomic feedbacks. These feedbacks may be smaller in the UK than in the euro area (at least at the time negative rates were introduced there). More generally (and as illustrated by this comparison), uncertainty surrounding the impact of negative rates is greater than that which anyway surrounds the transmission of conventional Bank rate changes at positive levels. As with other new monetary policy tools, this points to caution in believing they can be used to ‘fine tune’ macroeconomic developments.

These conclusions assume we remain within the current institutional setting where traditional banknotes continue to exist. That is likely to be the case for the foreseeable future, and the Bank has explicitly signalled its intention to retain conventional banknotes. But at a time when analysis of the introduction of central bank digital currencies (CBDCs) is underway, envisaging an environment where banknotes are eliminated and CBDCs pay negative interest rates may create scope for much more negative interest rates. This is an interesting topic for further research, and demonstrates the importance of bringing monetary policy concerns to bear in analysis of CBDCs.

Turning to the question of unwinding quantitative easing, at what has the potential to prove an important inflexion point for monetary policy, there is a premium on simple and clear communication from the MPC. In its August MPR (and therefore prior to my participation in the committee’s discussion), a plan for unwinding the stock of asset purchases was announced, embodying clear criteria for the Bank to cease re-investment of maturing bonds in its QE portfolio and subsequently consider starting active sales of assets. This plan embodies the established principle that reducing the QE portfolio will be gradual and predictable, so as to minimise market disruption.

Being seen to deviate from a framework announced very recently is undesirable, especially when there are anyway underlying uncertainties about QE transmission. I would therefore view this plan as the best way forward at this stage.

Underlying the plan is the view that, at a time when financial markets appear to be functioning normally, a gradual and predictable reduction in the stock of asset purchases can be achieved without disrupting markets and/or creating an undesired abrupt tightening of financial and monetary conditions. As with any plan, if this assumption proves to be misplaced, the plan may need to be revised. The Federal Reserve’s experience with shrinking its balance sheet in 2019 suggests that money market reactions to the withdrawal of central bank liquidity are difficult to predict. And, more generally, we do not know what the future holds. A renewed bout of market tension may require the reactivation of asset purchases on market functioning grounds. Flexibility and pragmatism in the implementation of the August MPR plan would be required in these circumstances.

13. Since the financial crisis, interest rates have been at or near zero. Do you expect interest rates to remain low after the recovery from the pandemic, and what is the impact on the scope for monetary policy to stabilise output and inflation?

Relative to earlier decades, in recent years nominal interest rates have been low in large part because inflation has also been low. This is a sign of the success of the inflation targeting regime in keeping CPI inflation low and stable. But it is not just nominal rates that have fallen. Real interest rates (i.e. interest rates adjusted for inflation) have also fallen to low levels by the standards of earlier decades.

To frame my response to this question, it is important to recognise that the policy stimulus coming from interest rates does not stem from the absolute level of the (real) Bank rate. Rather it comes from the deviation of the real Bank rate from its ‘neutral’ level, often labelled R-star in the economics literature.

R-star is an elusive concept. Estimates of R-star are therefore surrounded by substantial uncertainty. But there is strong evidence that the level of the neutral real interest rate in the economy – the real rate at which savings and investment are balanced, resource pressures are muted and monetary policy does not contribute to inflationary or disinflationary pressures – has fallen over the past thirty years. This is true for the UK, for other large advanced economies and at a global level. Indeed, given the openness of its capital markets, the evolution of R-star in the UK is likely to be strongly influenced by global factors.

A number of candidate explanations have been offered for this secular decline. If we interpret R-star as the real interest rate that balances the supply of savings with the demand for investment – a definition that would fall out of many standard macroeconomic models – then a lower R-star owes to greater saving and/or less favourable investment prospects. As regards the former, demographic and distributional trends may have increased saving over recent decades. For the latter, investment prospects may have been dampened by uncertainties created by the financial crisis and its aftermath, by the prospect of weaker future demand as demographics shift in unfavourable directions, and by the lower capital-intensity of activity in a more digital world. While much controversy surrounds which of these explanations is most important, for the purposes of addressing the current question the key point is that all of these trends are likely to persist.

Crucially, the reasons for this likely persistence of R-star at a low level are largely independent of monetary policy. In other words, the generally low level of interest rates prevailing at present reflects longer-term structural developments in the economy rather than monetary policy choices. The MPC has to work within the environment created by those structural trends, steering Bank rate around a low level of R-star.

Given this conclusion, I do expect interest rates to remain at relatively low levels for the coming years, even as the impact of the Covid-19 pandemic recedes. As macroeconomic circumstances evolve, there may be need to tighten or loosen the stance of monetary policy relative to its current setting. But that adjustment will involve steering Bank rate around a low level of R-star that is likely to continue for some time.

As mentioned in previous answers to this questionnaire, the low level of R-star and interest rates more generally has created concern about whether there is sufficient room to ease monetary policy before policy rates are constrained by the effective lower bound. Were monetary policy to be constrained in this way, this would threaten to limit scope to stabilise output and inflation.

Recognising this threat, the Bank and its sister central banks have introduced new tools to ease monetary policy even when policy rates are at their effective lower bound. They have also sought to reduce the effective lower bound by opening up the possibility of negative rates. Previous answers to this questionnaire have discussed these initiatives and emphasised both the importance of codifying and clarifying the new tools within and the need to make analytical and operational preparations for expanding the toolkit further should the need arise. Central banks have not and will not run out of ammunition to fight deflationary pressures should they emerge, even if the tools needed to do so may be novel, work in uncertain ways and have side-effects that need to be recognised and managed.

Central banks are therefore not reliant on other actors should further easing be required. Nonetheless, fiscal and structural policies can help improve the environment in which monetary policy operates. Counter-cyclical fiscal support for demand can relieve the burden on monetary policy. By improving investment prospects, well-designed structural reforms will raise R-star and create further space for policy easing before the effective lower bound constrains monetary policy.

Notes

- ¹ e.g., McKinnon, R.I. and H. Pill (1997), “Credible economic liberalizations and overborrowing,” *American Economic Review* 87(2), pp. 189-193; McKinnon, R.I. and H. Pill (1996), “Credible liberalizations and international capital flows: The overborrowing syndrome,” in T. Ito and A.O. Krueger (eds.) Financial deregulation and integration in East Asia, pp. 7-42 (Chicago, IL: Chicago University Press); McKinnon, R.I. and H. Pill (1998), “International overborrowing: A decomposition of credit and currency risks,” *World Development* 26(6), pp. 1267-82.
- ² cf., Pill, H. (2019), “Whatever it takes within our (new?) mandate” in R. Barwell and J. Chadha (eds.) Renewing our monetary vows: Open letters to the Governor of the Bank of England, pp. 37–54 (London: National Institute of Economic and Social Research), especially p. 35.
- ³ e.g., Pill, H. and L. Reichlin (2017), “Non-standard monetary policy and financial stability: Developing an appropriate macro-financial policy mix,” in E. Jokivuolle and R. Tunaru (eds.) Preparing for the next financial crisis: Policies, tools and models, pp. 8-25 (Cambridge University Press); Giannone, D., M.Lenza, H. Pill and L. Reichlin (2011), “Monetary policy and financial stability,” in S. Claessens, D.D. Evanoff, G.G. Kaufman and L.E. Kodres (eds.) Macroprudential regulatory policies: The new road to financial stability? pp. 103-120 (World Scientific).
- ⁴ cf., Gennaioli, N. and A. Shleifer (2018), A crisis of beliefs: Investor psychology and financial fragility (Princeton University Press).
- ⁵ cf. Shiller, R.J. (2019), Narrative economics: How stories go viral and drive major economic events (Princeton University Press).
- ⁶ cf., Durré, A. and H. Pill (2012), “Central bank balance sheets as policy tools,” *BIS Papers* 66, pp. 193-213.
- ⁷ cf., Pill, H. (2010), “Monetary policy in a low interest rate environment: A checklist,” *International seminar on Macroeconomics* 6, pp. 335-45; Pill, H., and F. Smets (2012), “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, pp. 21-50 (MIT Press).
- ⁸ e.g., Giannone, D., M. Lenza, H. Pill and L. Reichlin (2012), “The ECB and the interbank market,” *Economic Journal* 122, pp. 467-86; Lenza, M., H. Pill and L. Reichlin (2010), “Monetary policy in exceptional times,” *Economic Policy* 62, pp. 295-339.
- ⁹ Colangelo, A., D. Giannone, M. Lenza, H. Pill and L. Reichlin (2017), “The national segmentation of euro area bank balance sheets during the financial crisis,” *Empirical Economics* 53(1), pp. 247-265.
- ¹⁰ cf., Pill, H. (2014), “Virtual unconventional policies: The euro area recovery and the role of ECB policy,” in J. Vallés (ed.) Monetary policy after the Great Recession, pp. 291-304 (Madrid: Fundación de las Cajas de Ahorros).
- ¹¹ cf., Answer to questionnaire question 3, in particular the first stream of academic work identified there.
- ¹² cf., Answer to questionnaire question 3, in particular the second stream of publications and analyses identified there.
- ¹³ Bailey, A., J. Bridges, R. Harrison, J. Jones and A. Mankodi (2020), “The central bank balance sheet as a policy tool: past, present and future,” Bank of England staff working paper no. 899.