

Reading between the lines – speech by Sarah Breeden

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In this speech Sarah Breeden sets out her views on the outlook for the UK economy and for monetary policy. She discusses the challenges around identifying the nature of shocks hitting the economy and how different shocks have different implications for medium-term inflation.

Speech

It has been a little over a year since I joined the Monetary Policy Committee (MPC). Lots has happened over that period. I'm going to use this speech to review what we have learned and where that leaves my view of the outlook for the economy and for monetary policy. In doing that, I will aim to explain how important it is for us to keep asking ourselves which shocks could be hitting the economy and what implications those different shocks would have for medium-term inflation. We are always reading between the lines.

Before I get into the meat of the speech, I wanted to thank you for inviting me to come to speak to you today. I can think of few better places to come to talk about the economy than one of the homes of Adam Smith, the father of the discipline – I just can't promise to be as insightful and groundbreaking as he was in his day!^[1]

Why do shocks matter?

Inflation has fallen materially over the past year. That is welcome news, especially given the painful high inflation period we found ourselves in during the prior couple of years.

But as monetary policymakers we must stay focused on where the economy might be heading, not where it has been. That means taking a view on which shocks are hitting the economy and how they might play out over time. This is easier said than done. It is notoriously hard to know which shocks are hitting the economy in real time. Reasonable people could take different views on the shocks that explain the same set of data. For example, is a reduction in economic activity a sign of lower domestic demand, lower demand from abroad or a reduction in the supply capacity of the economy? Is a fall in import price inflation a sign of past shocks easing off or a new shock hitting? Does it reflect a weaker global economy or more productive global suppliers?

This isn't just an intellectual exercise. Attributing data news to the 'wrong' shocks can have material implications for our understanding of the evolution of the economy in the future, and therefore what we should do with monetary policy. As policymakers we are constantly discussing and revising our views on which shocks best explain what we are seeing in the economy.^[2] At the

Bank we do this by drawing on a wide range of hard and soft data, reports from people closer to the ground – such as the intelligence gathered via our Agency network, including from here in Scotland – and a large set of modelling and analytical techniques.

Learning from recent experience

In the past few years the economy has been hit by a series of very large shocks.[3] We had no examples of shocks of the same type and scale under our current monetary policy regime, and so little in the way of past experience to guide us on how the economy would react to them. Perhaps naturally then, our understanding of those shocks has evolved with the passing of time, as more data has come in and as we have conducted more analysis.

I am going to walk you through a few important and very practical examples where we have changed our view in a way that makes a difference for our understanding of inflationary dynamics, and therefore for monetary policy. And then I'll turn to some of the current puzzles we are facing.

Example 1: Demand environment

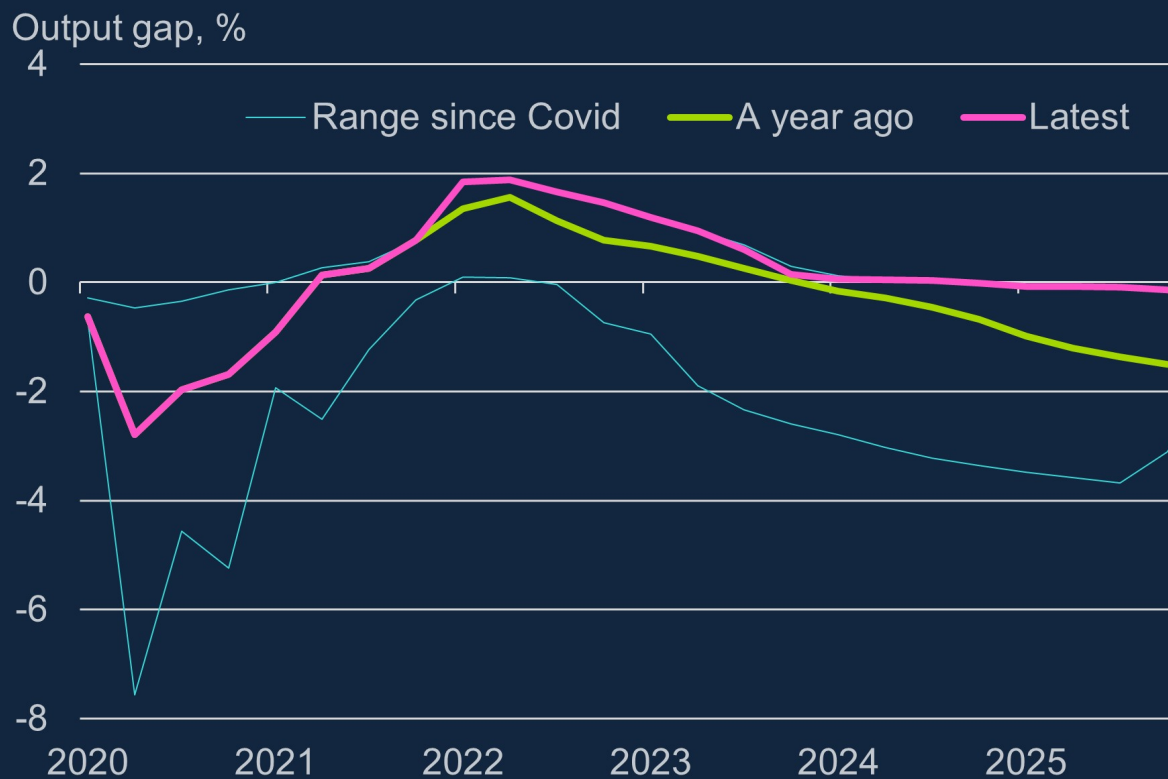
The first example relates to the demand environment – by which I mean the level of demand relative to supply, as captured in the output gap.[4] There was very material uncertainty – considerably more than usual – about the balance of demand and supply during the pandemic, as well as uncertainty about how that balance might respond to the shocks that hit the economy after the pandemic was over.[5] As I'll explain, uncertainty about this balance between demand and supply matters, given its key role in inflationary dynamics.

We reassess the balance of demand and supply, as reflected in the estimated level of the output gap, every quarter using a set of statistical models, which draw on a range of data including nominal and real indicators. We use the steer from those models – along with a judgement overlay and evidence from other indicators of spare capacity, for example in the labour market and within businesses – to judge whether data news reflects demand or supply factors. That process means we sometimes end up revising our view of the past as well as the current level of the output gap, given that the data and so the steer we take from it can change materially over time.[6]

Chart 1 shows the range of our output gap estimates since the pandemic. During the pandemic itself in 2020 the MPC took the view that low inflation was explained by a very large output gap. But given the scale and nature of the changes in the structure of the economy at that time, they highlighted the material uncertainty around those estimates. We have since concluded that the output gap was much less negative than we thought at that time. Our latest estimates – for the recent past and into the future – have been revised up materially and are right at the top of the range.[7] Many of the upwards revisions came in periods when GDP data was coming in stronger than we expected (I'll return to this in my second example).[8]

Chart 1: We have consistently revised up our view of the strength of demand

Range of output gap estimates in all MPR forecasts from Covid to November 2024(a)



Source: Bank of England

(a) Chart shows output gap estimates and projections from MPR forecasts since the Covid pandemic – conditioned on market interest rates – as a percent of potential output. Note that the range of forecasts would narrow mechanically over time because our forecasts only cover the next three years, so fewer forecasts extend to 2026 and beyond.

Taking the changes together, we now judge the output gap to have been 2-3 percentage points stronger in 2022 and 2023 than we previously thought, which changes the picture from an economy that was broadly in balance to one with material excess demand. That upwards revision is sizeable and persistent. The scale of these revisions in a relatively short space of time underlines quite how uncertain output gap estimation can be.

One driver of stronger demand could be our evolving view on how monetary policy affects the economy. Our latest assessment points to a faster and lower peak impact of Bank Rate on the output gap than we thought before this cycle. The reasons for faster transmission to a lower peak are complex relating both to the evolution of interest rates during the tightening cycle and to the conditions prevailing in the economy at the time.

Why might these changes in the output gap matter? The output gap is a key determinant of

medium-term inflation, via the Phillips curve.^[9] A rough rule-of-thumb might map a 1 percentage point increase in the output gap into around a 0.3 to 0.4 percentage point increase in inflation a year or so later. There is of course huge uncertainty around that rough relationship and a large literature on the shape of the Phillips curve, which can change over time. But the main point is that the revisions I am pointing to here are not small. Taken at face value, on their own these revisions might imply higher inflation next year and into 2026 by up to 1 percentage point.

It is important to note that an increase in the output gap does not necessarily imply a positive demand shock. It could just as well be driven by a fall in supply with a less than one-for-one fall in demand, which would open up an output gap alongside weaker activity. Given the absolute weakness of economic activity in the UK data in recent years, it seems plausible that some of the strength in the output gap might have been driven by weaker supply rather than stronger demand.

Example 2: Energy shock

The second example relates to the effects of the energy shock. It has been well-documented that the UK economy faced a very large imported energy shock in 2021 and 2022.^[10] At the peak of the shock, household energy prices were directly adding almost 4 percentage points to CPI inflation in the UK.

Energy price shocks push up on inflation and down on activity, presenting a source of potential trade-off for monetary policymakers.^[11] Beyond the initial direct impact on inflation, we expected the shock to have an indirect effect on inflation via the output gap.^[12] People find it difficult to substitute away from consuming energy, so materially higher energy prices effectively translate into a big reduction in real incomes. This reduction in real incomes would lead to cuts in non-energy consumption, which would reduce demand and open up some slack in the economy, pushing down on inflation in the future via the output gap and the Phillips curve.

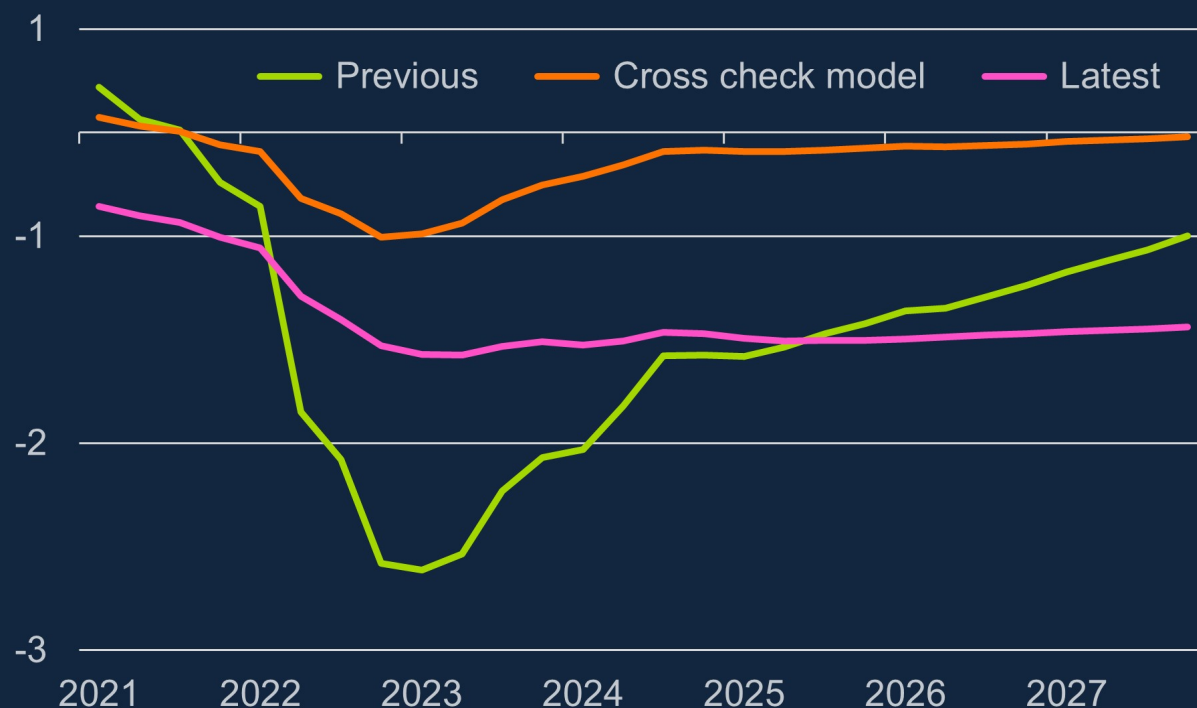
However, whilst economic theory pointed clearly to these channels being relevant in some form, the unprecedented nature of the shock meant it was difficult to know in advance exactly how people would respond, and so how big the effects would be.

Chart 2 sets out what we have learned from the experience of the past few years. Our latest assessment is that the output gap impact of the increase in energy prices in 2021 and 2022 was probably less negative than we thought when the shock first emerged. That is in part because energy consumers revealed a greater willingness and ability to substitute away from energy consumption than we had previously assumed, which reduced the effective hit to their real incomes in the face of the shock. A cross check – drawn from a recently re-estimated version of the Bank's COMPASS model,^[13] which contains a more specific role for the energy sector – points to a significantly smaller impact on the output gap from energy prices, which serves to highlight the material uncertainty around these estimates in general.

Chart 2: The energy price shock might have had a smaller impact on the output gap than we previously thought

Estimated impact of energy prices on output gap, for different model relationships (a)

Energy price impact on output gap, pp



Source: Bank of England

(a) Chart shows the estimated impact of energy prices on the output gap in the November 2024 MPR forecast using different model relationships. All three lines use the same energy price profile, taken from the November 2024 MPR forecast. The line labelled 'previous' refers to the 2021 model relationships. The line labelled 'cross check model' refers to a re-estimated version of the COMPASS DSGE model. See [Box B in the November 2022 MPR](#) for further discussion of the treatment of energy price shocks.

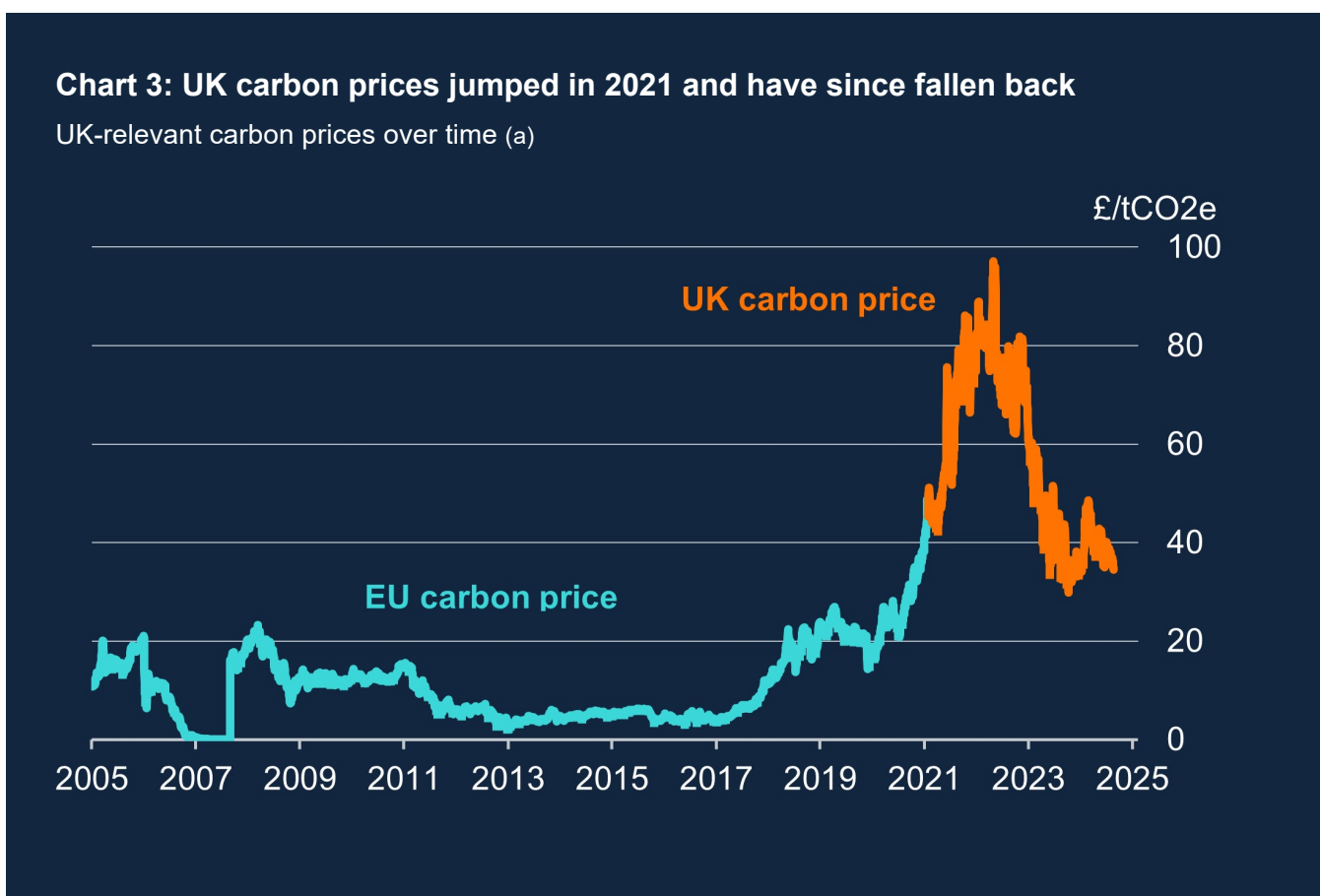
Once again, these changes matter for medium-term inflation. Indeed the lower effect on demand via the energy price channel helps to explain part of the upwards revision in the output gap that I just talked about. As I mentioned earlier, a 1 percentage point upwards revision in the output gap, which is roughly what we have here, might push up on inflation by 0.3 to 0.4 percentage points.

Example 3: Other drivers of energy prices

My final example relates to the role of climate mitigation policy in energy prices where there is now evidence that policies aimed at the climate transition were probably more important contributors to the recent rise and fall in inflation than we previously thought.

As **Chart 3** shows, carbon prices rose materially in 2021 and 2022, peaking at around £100 per tonne of carbon dioxide (CO₂) equivalent in the summer of 2022, a roughly 100% increase in price on the previous year.^[14] From 2021 onwards, the UK's emissions trading scheme^[15] saw a reduction in the supply of carbon permits, a decreasing share of permits being given out for free, and an expansion of sectoral coverage (over the 2021 to 2030 period). This was around the same time as the increase in wholesale gas prices, which could also have contributed to this rise in carbon prices.

These carbon costs are non-trivial in the sectors most exposed to the scheme, like the power sector. In 2022, during the peak of energy price shock, the wholesale price of gas was the dominant driver of high electricity prices. In 2024, however, carbon costs which amounted to roughly 50% of the fuel costs for gas-fired electricity producers in the UK were a major driver of prices.^[16] Overall we might expect close to 100% of carbon costs naturally to be passed on in wholesale market prices.^[17]



Source: Bank of England

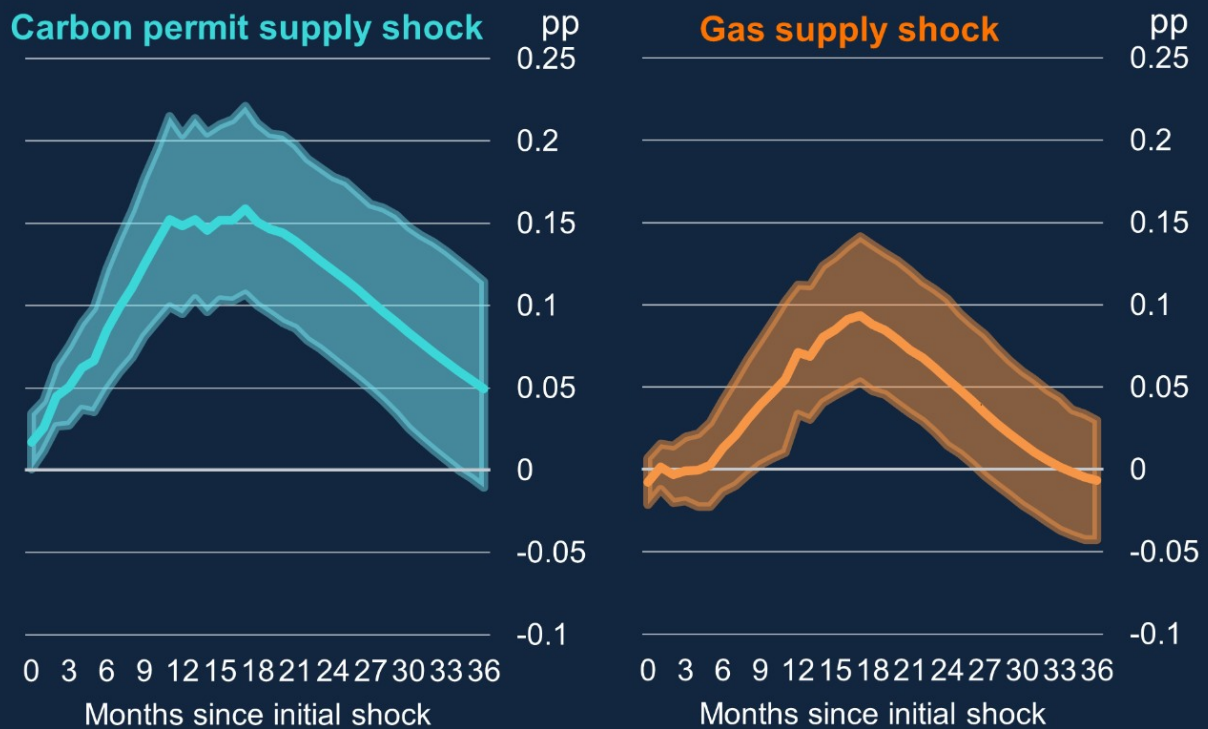
(a) Chart shows the daily UK-relevant carbon price, i.e.: the EU ETS carbon price from 2005-2020, and the UK ETS carbon price from 2021-2024. The EU ETS price has been converted from EUR to GBP.

Given the potential significance of these developments, Bank staff have analysed both how much recent energy price increases have reflected carbon pricing and if the specific source of energy price shocks might matter for medium-term inflation.^[18] **Chart 4** summarises the results of this work. The results suggest that the source of an energy price shock might affect its impact on inflation. Specifically, if energy prices rise due to a carbon permit supply shock, the impact on non-energy price inflation could be about 1.5x as large at its peak – and last several months longer – than if the rise were driven by a gas supply shock. That seems plausible if shocks of this kind are expected to be longer lasting given the stringency and scope of the carbon permits scheme might be expected to increase over time.

This analysis underlines the case for us to stay focused on these issues in the future. It is an example of how models of the economy based on historical outcomes and relationships will naturally miss important changes in the structure of the economy that could be relevant to future monetary policy. That is why cross checks and judgement overlays must continue to be an essential part of our policymaking process.

Chart 4: Carbon price shocks have bigger impacts on non-energy inflation than other forms of energy price shock

Estimated impact of 1% energy price shock on non-energy inflation (a)



Source: Bank of England

(a) Chart shows the response of UK non-energy CPI inflation to restrictive carbon permit and gas supply shocks, as estimated by the BVAR model. Responses are scaled to increase UK energy CPI inflation by 1% at peak. The sample is June 2008 to April 2024. Shaded areas are 80% confidence intervals.

Putting this thinking into practice systematically

In a [recent speech](#) my colleague Clare Lombardelli set out the contours of the Bank's response to the Bernanke review. It's early days still and I don't want to front run any of the important thinking that needs to be done to inform that response. But I did want briefly to offer some thoughts around how we might embed some of the material I've touched on in this speech into our regular policymaking processes.

First, building out our forecast evaluation capabilities – much as I have sought to do through these examples – will mean we can more systematically ask ourselves whether we have learned anything about the shocks that explain past data – and therefore how to think about the medium-term outlook for inflation.

Second, as I hope I have shown, we can learn lessons from a range of models to help us identify shocks.^[19] And we can use these models to build the potential for shock uncertainty into our scenario analysis.

Third, we should routinely be explaining publicly how monetary policy would need to change should we be wrong about the nature of the shocks that are hitting the economy.

Fourth, we should build more sophisticated analysis of climate policy into our bread-and-butter monetary policy work. There is mounting evidence that it matters for price stability. I plan to return to this in a speech later in the year.^[20]

And finally, we need to make sure we explain how we are interpreting the data – in terms of its underlying shocks – and therefore what it is telling us about the medium-term outlook for inflation. That will help reduce the sensitivity of market rates to short-term data volatility and that will ultimately ensure that rates are appropriate for the state of the economy.

Updating my view of the economic outlook

The economy has been undergoing waves of adjustment as the effects of the unprecedented shocks of recent years ease off. In informing my view of the outlook from here I find it helpful to look through the volatility in the data and group the shocks that are driving the economy into two buckets.

First, there is the lagged effect of the large shocks that hit the economy in the past.

The energy price shocks that I talked about earlier imparted downwards pressure on inflation through very mechanical so-called base effects – where headline inflation falls as increases in

prices a year earlier are not repeated – and through a cooling effect on demand. But they are unlikely to have much further impact on activity or inflation as we look ahead. You can see that in part in **Chart 2**, where the impact of energy prices on the output gap is estimated to be very flat from this point onwards.

Monetary policy is still restrictive as it stands – meaning it is imparting downward pressure on demand, with some households and businesses having to refinance loans at higher rates than before. But the tightening in Bank Rate since 2021 won't do much more to activity in growth or levels terms as we look ahead. So following a period where the outlook has been dominated by the unwind of past shocks, if we could press pause on new shocks hitting the economy, we would be entering a period of relative calm (a big if).

One important exception to this general rule is second round effects in the labour market. There is uncertainty about how quickly these second-round effects will dissipate.^[21] I would expect a continued unwind of past shocks, as lower headline inflation translates gradually into lower wage growth and this eases the pressure on price setters to pass on higher labour costs into prices.^[22]

Second, there are new shocks hitting the economy. It is always difficult to work out what these are, but some are easier to identify than others.

For example, we now expect the Budget to lead to a near-term boost in demand relative to previous expectations, to be followed by a planned consolidation. We were also reminded just before Christmas that private sector wage growth remains high, and employment costs will be increased further by the changes to National Insurance Contributions (NICs) that will be implemented in April and the large increase in the National Living Wage at the same time.

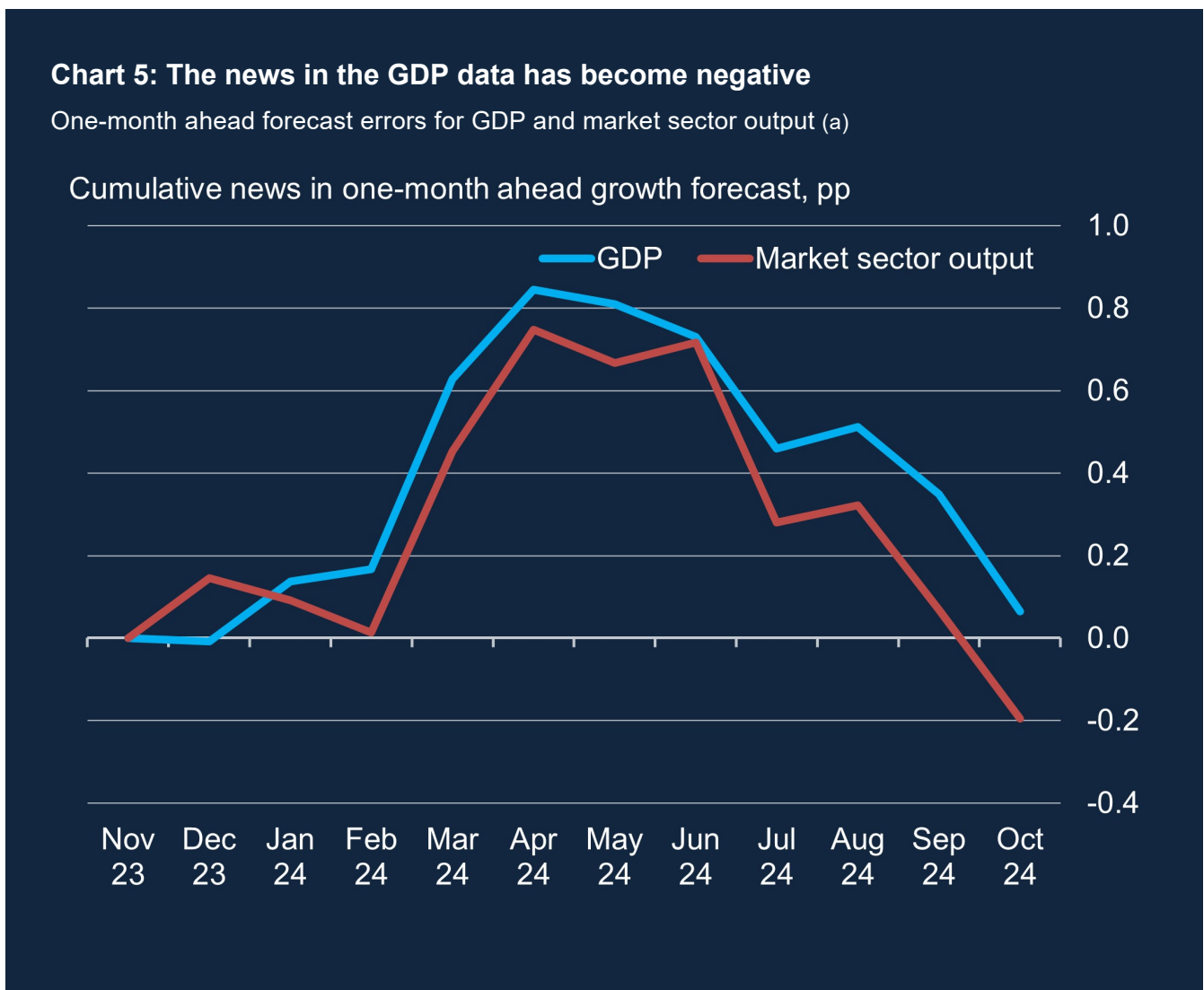
Businesses have many potential margins of adjustment to increased NICs. At one extreme, they might respond by passing the entire cost through into lower wages – indeed, this would be my assumption for where it ends up in the long run. At the other extreme, they might seek to protect wages and increase prices, especially in the short term. They might also respond by reducing employment or by eating into their profit margins. The reality will sit somewhere between these extremes and will depend on the specific circumstances that each business finds themselves in. Whether employers can pass on higher costs to consumer prices will depend on the overall demand environment in the economy.

There is therefore uncertainty around what these shocks will mean for medium-term inflation. But they are likely to be considerably smaller than the large shocks of the recent past.

What explains the slowing in activity?

Zooming out from the specific drivers, it is increasingly clear that the data is pointing to a slowing in economic activity in the UK.

Chart 5 offers one window into that. It shows the news in the monthly growth in GDP and market sector output according to the national accounts – expressed relative to our one-month ahead forecasts – cumulated since November 2023, when I joined the MPC. Having experienced upside surprises in economic activity for around half a year, we have now seen a string of downside surprises for about the same length of time. And we also know that the absolute level of both GDP and market sector output fell in real terms in September and October. It is of course early days to draw strong conclusions either way, but to come back to the need to read between the lines, it underlines the importance of understanding what kind of underlying shock might be driving that slowing.

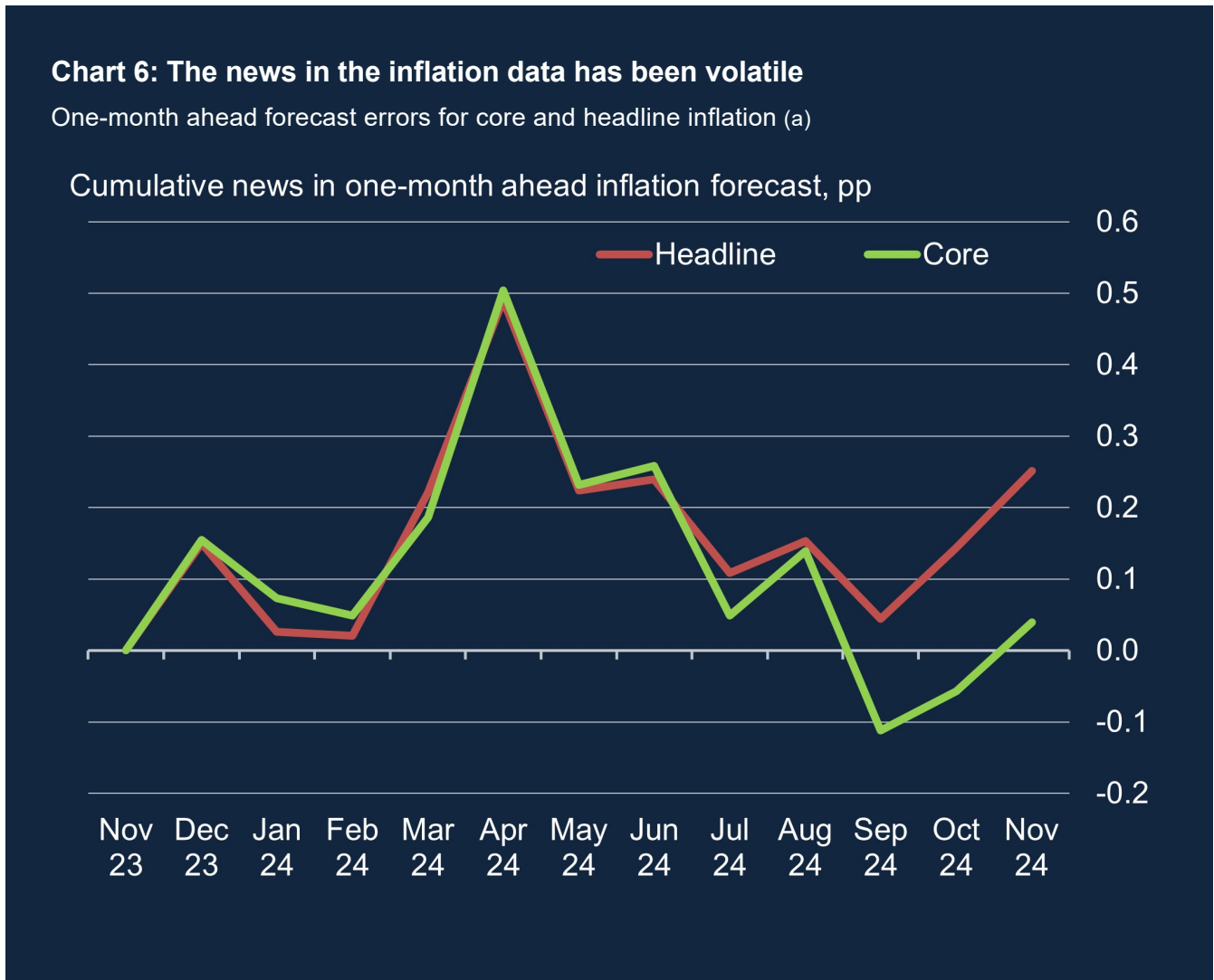


Source: Bank of England

(a) Chart shows the difference between monthly growth outturns and one-month ahead forecasts, cumulated since November 2023.

One obvious step, which can give at least a partial view, is to look at the behaviour of nominal

variables – if inflation looks to be increasing at the same time as real activity is slowing, that tentatively points to a supply shock rather than downside news in demand. **Chart 6** plots the cumulative news in headline and core inflation in recent months. The picture is messy, but it looks tentatively like demand might have been weakening over the past six months or so, up to the last couple of data points.



Source: Bank of England

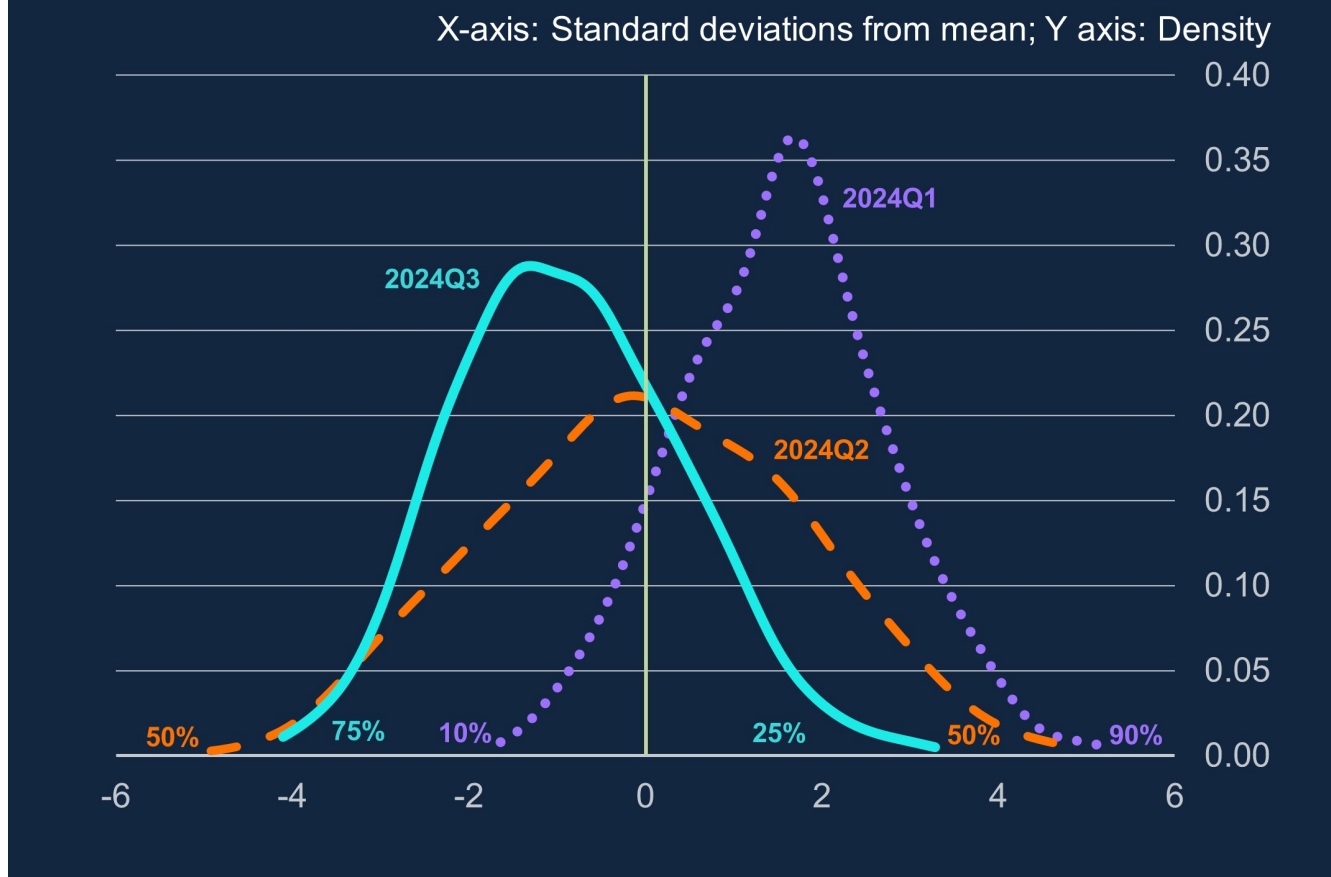
(a) Chart shows the difference between monthly inflation outturns and one-month ahead forecasts, cumulated since November 2023.

A more sophisticated cross check using a model built by Bank staff confirms that demand shocks may have turned negative in Q3 of this year, having been more positive at the start of the year (**Chart 7**). Supply and demand shocks are not mutually exclusive, so there could now be a weakening in both going on at the same time. But trends in supply are particularly uncertain at the moment and so it is difficult to identify where exactly a supply shock could be coming from.^[23] This

uncertainty complicates the appropriate policy response.

Chart 7: Distribution of shocks hitting the economy

Estimated UK and global demand shock probability distributions by quarter (a)



Source: Bank of England

(a) Chart shows the estimated distribution of the demand shocks that have hit the UK economy in 2024 Q3 (aqua line), 2024 Q2 (orange line) and 2024 Q1 (purple line). These shocks are derived from a SVAR model for the UK economy, estimated using Bayesian techniques on data from 1992 Q1 to 2024 Q3. The shocks are identified through zero and sign restrictions. Among various shocks, the SVAR identifies both global and domestic demand shocks, which are pooled together in this figure. See [here](#) for further details on the model.

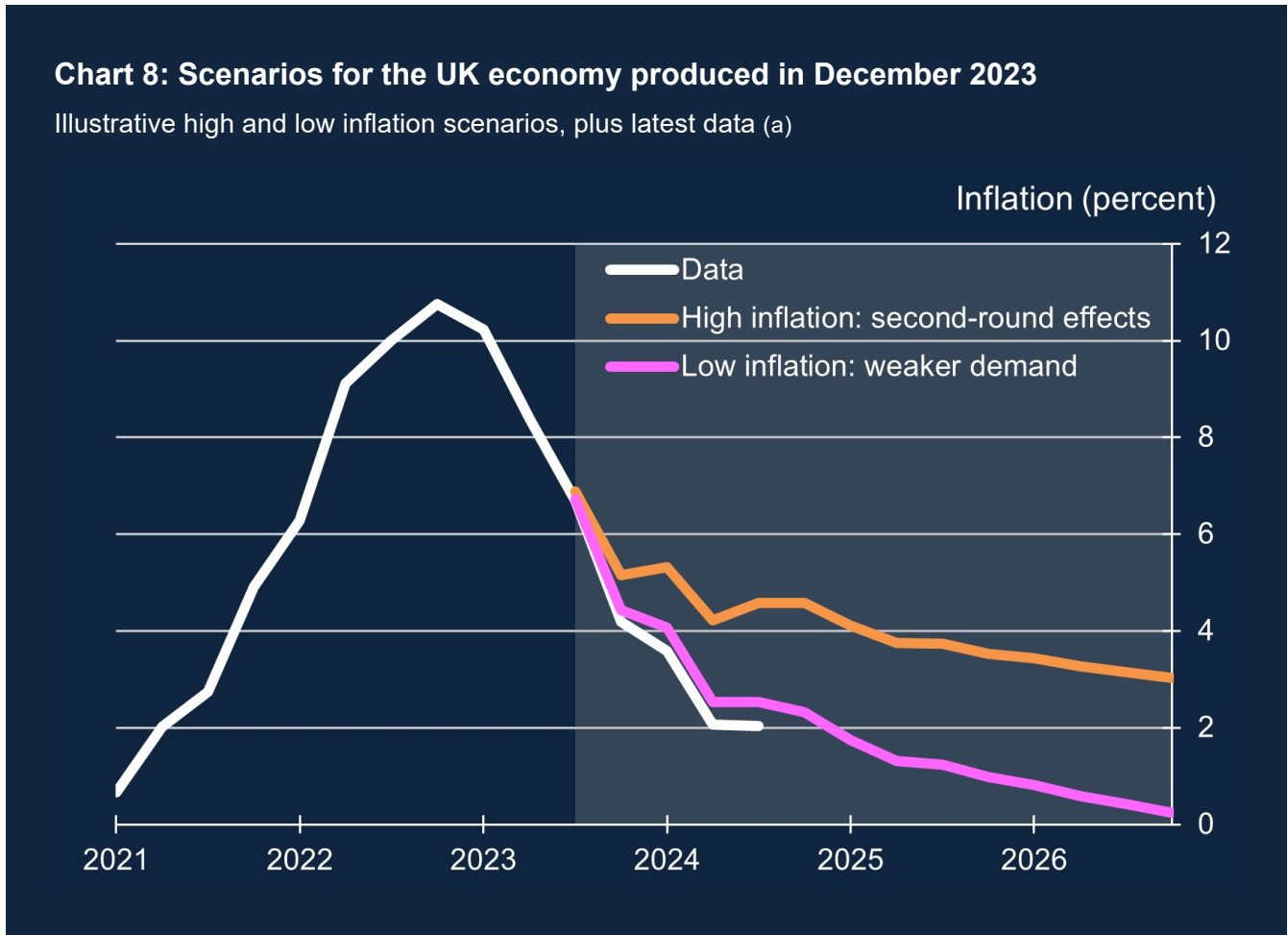
What does this mean for policy?

That all begs the question: what should monetary policy do?

A year ago – in my first speech as an MPC member – I outlined two scenarios I was using to guide my policy strategy. I said I was most concerned about an upside scenario where inflation persistence became entrenched, perhaps facilitated by stronger demand in the economy.

It is clear to me that the risk of that upside scenario has now subsided sufficiently to no longer be a

core consideration in setting policy. Over the past year headline inflation has come in below our expectations – indeed below both of the scenarios I considered – as global shocks abated more quickly than we expected (**Chart 8**).



Source: Bank of England

(a) Chart shows high and low inflation scenarios around the November 2023 forecast for CPI inflation, conditioned on market expectations for Bank Rate at that time. The high inflation scenario could be thought of as one in which, for instance, the labour market remains tight and second-round effects are very significant. The low inflation scenario could be thought of as one in which the economy is hit by negative demand shocks that reduce demand materially relative to the forecast. The scenarios have been adjusted for a base effects judgement applied in February 2023. The white line shows the latest data available up to the November 2024 MPR.

In December I judged that the evidence supported maintaining Bank Rate at 4.75% and that recent developments supported the case for a gradual approach to the withdrawal of policy restrictiveness in the coming months.

Two important questions follow from that judgement.

The first is how restrictive we are and should be – how far away we are from r^* , the neutral level of

interest rates that leaves the economy in balance.

I've spoken already about how hard it is accurately to diagnose the nature of the shocks that are hitting our economy. In my view understanding the impact of these shocks and how they might affect medium-term inflation is the best way to feel our way to the right level of restrictiveness over time, led by the evidence as we see it.

The second question is how quickly we should remove that restrictiveness. That is difficult to know and will depend on how the factors above evolve over time. To be clear, I expect Bank Rate to come down over time as the effects of the large shocks of the past continue to abate.

As we move forward, I will be focused in particular on further diagnosing how much of the slowdown in activity in the economy can be attributed to supply and how much to demand given their differing impacts on the medium-term outlook for inflation. And I will continue to analyse the evidence around how employers are responding to the still-elevated level of growth in employment costs and what that means for inflation persistence.

Conclusion

I'll finish by summing up what I've tried to get across today.

First, as monetary policymakers we must always be analysing which shocks we think are hitting the economy and what their implications might be for the medium-term inflation outlook. We have to remain flexible and constantly challenge ourselves about how wrong we could be and what that would mean. We must always be reading between the lines.









Second, I have updated my views on the shocks that have been driving the economy recently. The demand environment has been more resilient in recent years than we initially thought – partly because the response to the energy price shock was less negative than we thought, and probably also reflecting weaker supply. There is now some tentative evidence that activity is starting to weaken, though we expect it to pick up again.




Third, the recent evidence further supports the case to withdraw policy restrictiveness and I expect to continue to remove restrictiveness gradually over time. The important questions as I look ahead are what combination of shocks explains the recent slowdown in activity and how will employers respond to higher employment costs. The answers to those questions will affect the outlook for medium-term inflation and so the speed at which restrictiveness needs to be removed.

Thank you for listening.

I would like to thank Danny Walker for his assistance in drafting these remarks. I would also like to thank Lennart Brandt, Natalie Burr, Hannah Copeland and Boromeus Wanengkirtyo for their work on the effects of energy price shocks, and Davide Brignone and Michele Piffer for their work on the SVAR model. I would also like to thank Andrew Bailey, Fabrizio Cadamagnani, Alan Castle,

Iain de Weymarn Rich Harrison, Danae Kyriakopoulou, David Latto, Arjun Mahalingam, Josh Martin, Ed Millar, Huw Pill, Dave Ramsden, Fergal Shortall, Dooho Shin, James Talbot and James Tasker for their helpful input and comments. The views expressed here are not necessarily those of the Monetary Policy Committee (MPC) or the Financial Policy Committee (FPC).

1. I'm aware that whilst Adam Smith didn't study at the University of Edinburgh he did live in the city and gave an influential series of lectures at the university following his graduation from Glasgow and Oxford.
2. For a recent example see [this speech](#)  by Philip Lane of the ECB.
3. As Dr Bernanke emphasised in his [review](#) into our forecasting, many of these shocks were global in nature and not unique to the UK.
4. The output gap captures the difference between the level of actual output relative to potential.
5. I discussed these shocks in my [speech](#) a year ago.
6. [Discussion of the challenges of output gap estimation](#) .
7. Part of the revisions to our output gap projections reflects changes to the conditioning assumptions we use in the forecast. An important change relates to energy prices, where more recent forecasts tend to have lower historical paths for energy prices, which would tend to push up on the output gap projections. Our August and November 2022 forecasts were particular outliers in this regard.
8. In addition, the ONS recently revised up its estimates of the level of GDP in 2022, driven in large part by higher consumption. If we had allocated more of that GDP news to demand, and not matched it in supply, we would have an even higher estimated output gap in 2022.
9. [Paper](#)  by my former colleague on the MPC for further discussion of the Phillips curve.
10. [Detailed discussion of the energy shock](#).
11. [Speech](#) by my former colleague Silvana Tenreyro for further discussion of the optimal monetary policy responses to supply shocks. She notes that under some circumstances the optimal response to a temporary supply shock is to look through it.
12. The direct impact of the energy shock on inflation also led to second-round effects in the labour market, where higher inflation led to higher wage growth and this fed back into higher inflation. Whilst I am not focusing on second-round effects in this section of the speech, they have of course been an important policy consideration in recent years.
13. [Further details on COMPASS](#) .
14. Although the carbon price is volatile and has since fallen from this historic high, the UK Government's net zero-consistent carbon price trajectory would see the price back up near £100 per tonne of CO₂ equivalent.
15. [More on the scheme](#) , which is a form of carbon pricing that works  on a 'cap and trade' principle where a cap is set on the total amount of certain greenhouse gases than can be emitted.
16. [This is based on calculations by Bank staff](#) . The estimated carbon cost faced by UK gas-fired power producers in 2024 is around £40 per tCO₂e (UK ETS price) + £18 per tCO₂e (UK CPS)] x 0.4 tCO₂e per MWh (assumed emission intensity of gas-fired power) = £23.2 per MWh. In the context of natural gas fuel, the average UK fuel cost in 2024 is around £50 per MWh.
17. [Example](#) .

18. The analysis uses a BVAR model with energy shocks identified using high-frequency data around policy announcements and news, to estimate how different energy price shocks affect non-energy inflation. [Detail on the carbon shock identification](#) , and [for the gas shock identification](#) . The sample is 2008 to 2024.
19. [Recent speech](#) by my colleague Huw Pill on this topic.
20. My colleague James Talbot led some work on this last year, see the [overview](#) .
21. This uncertainty is captured in the three 'cases' set out in recent MPRs. Persistence in inflation dissipates quickly in the first case as pay and price-setting dynamics continue to normalise following the unwinding of global shocks. In the second case, a period of economic slack is required to normalise these dynamics fully. In the third case, some inflationary persistence reflects structural shifts in wage and price-setting behaviour.
22. My colleague Dave Ramsden has spoken about this process in recent speeches, for [example](#).
23. For example, there has been extensive discussion of the problems with the UK Labour Force Survey, which complicates our analysis of trends in labour supply in particular.

Sarah Breeden

Deputy Governor, Financial Stability