

UK inflation since the pandemic: How did we get here and where are we going? – speech by Jonathan Haskel

Given at the University of Warwick

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Speech

1. Introduction

I am delighted to be back at the University of Warwick. My thanks to the students who run the Warwick Finance Society and the Economics Society for kindly inviting me.

I want to take this occasion to pay tribute to Professor Nick Crafts, who passed away on October 6th, 2023. He was Professor here from 2005-2019 and was rightly described in his obituary in *The Times* as “the most distinguished British economic historian of his generation” and in the *Financial Times* as writing “the definitive account of Britain’s Industrial Revolution”.¹ He was brilliant, generous and always good-natured. An example to us all.

My subject tonight is UK inflation.

UK inflation is now falling rapidly. From the 11.1% peak in October 2022, it is now 4.6% (annual CPI inflation in the year to October 2023). In this speech I try to set out (a) how I think we got here and (b) future prospects.

I look backwards and forwards since I believe there are some misleading narratives that seem to have taken hold regarding UK inflation. One oft-stated backward-looking narrative holds that the Bank of England was wrong to treat rising inflation during the recovery from the pandemic over 2021 as transitory. One equally off-stated forward-looking narrative holds that with inflation falling interest rates can be cut sooner rather than later.

I shall in this speech try to argue that neither of these narratives are true. In making this argument I try to bring some empirical evidence to the debate. I do so by reporting my interpretation of an estimated model of inflation applied originally to the US by Ben Bernanke and Olivier Blanchard ([Bernanke and Blanchard, 2023](#)).² The details and

¹ [The Times, 15 November 2023](#). [Financial Times, 13 October 2023](#).

² I have been working with Bank of England colleagues Josh Martin and Lennart Brandt in recent months to apply Bernanke and Blanchard’s model to UK data. Other Bank of England researchers have also worked on this, notably Daniel Albuquerque and May Rostom, from whom I have learned a lot. Our work is part of a wider project comparing European economies, Japan, Canada and the US: likewise, we have learned a lot from Ben Bernanke, Olivier Blanchard and other colleagues on this project. I should be clear that this speech is my personal interpretation of the results we have obtained for the UK. For those interested who are unfamiliar with the people involved, Bernanke and Blanchard have had highly distinguished careers in academia and policymaking. Ben Bernanke has published extensively on macroeconomics, notably on the inter-war period. He was Chairman of the US Federal Reserve from February 2006 to January 2014 and was awarded the Nobel Prize in Economics in 2022. Olivier Blanchard has likewise published very widely, notably on unemployment and debt. He was Chief Economist at the IMF between September 2008 and September 2015.

results are set out in a paper which accompanies this speech. Of course, we should be cautious of what models tell us, but we need *some* sort of model to get started at least.

The Bernanke and Blanchard (henceforth BB) framework is simple and transparent and follows a rich tradition of evidence on wage-price interactions dating at least from Michael Bruno and Jeffrey Sachs, exemplified in work by, among many others, Richard Jackman, Richard Layard, Stephen Nickell, Andrew Newell and James Symons, all of which is well summarised by Charles Bean.³ The framework supposes that firms and workers bargain over wages and firms then set prices based on the bargained wage, and other costs, such as energy. It is straightforward that when unanticipated rising energy prices hit the economy, firm costs rise and hence they raise their prices and there is inflation.

What happens next? Suppose there is *no* feedback to wage bargaining. In this case, the process stops there. The sudden increase in the price level in, say, April 2022 corresponds to a one-off burst in inflation. It is one-off because it lasts a year. This is because inflation is measured as an *annual* change. The new higher price level in the months after April 2022 are compared with the lower price level before April 2022, but in April 2023, the comparison is relative to the higher price level at which point inflation ends. Conventional monetary policy “looks through” such inflation because it is powerless to stop it. Why? Monetary policy cannot create new energy supply to lower the energy price, so the price level of energy remains high, but changes in the price level, inflation, are temporary. In any case, since monetary policy takes more than a year to work through the economy, it is ineffective for such transitory shocks.

Matters are more complicated if there are a series of shocks, and/or or changes in labour market conditions and/or the increase in prices feeds back to wage bargainers. A so-called “wage-price spiral”, or “second-round effects”, arise as wage increases chase price increases which feed back into further wage increases.

Our purpose of estimating a model is then to examine the evidence on the strength of these various mechanisms.

What do we find? Our estimates reveal three important properties of the modern UK economy which turn out to have important policy implications.

1. Typical shocks to energy and food prices “wear off” quickly. The economy is flexible enough such that typical shocks cause one-off bursts of inflation that do not last much more than a year.
2. By contrast, sustained rises in labour market “tightness”, that is, strong demand for labour relative to supply, does lead to sustained inflation.

³ See the accompanying paper for references.

3. Whilst inflation expectations have risen with headline inflation, they remained pretty well-anchored to the inflation target.

I draw three policy conclusions from this evidence.

1. Since the initial burst of inflation during the spring and summer of 2021 was from energy prices and shortages, it was perfectly reasonable, given what policymakers knew at the time, to regard these shocks as transitory.
2. The subsequent inflation over 2022, largely again due to more energy price shocks, and latterly food prices, was also fuelled by increasing labour market tightness. The MPC raised policy rates over this period, and this was the correct response.
3. What is the outlook? While it is right to think that the direct effect of these energy and food shocks will fade away, they have been so large and so concatenated that it will continue to take some time to work through the system, making inflation persistent. But the still-high degree of labour market tightness continues to impart inflationary pressure. This will need higher rates for longer to get inflation sustainably to target. This is why I have been voting for higher rates at recent meetings.

In the rest of this speech, I describe briefly the Bernanke Blanchard framework, the drivers of the recent surge in UK inflation, and some thoughts on the future path of inflation and associated monetary policy. Much more on the empirical work is available in the accompanying paper.

2. A framework

A stylised representation of the BB framework is set out in Chart 1.

Starting in the upper box, firms and workers settle on wages. Wage growth depends on (a) expected inflation, (b) labour market tightness and (c) the real wage workers aspire to, and (d) productivity growth. The outcome of this process determines wage inflation.

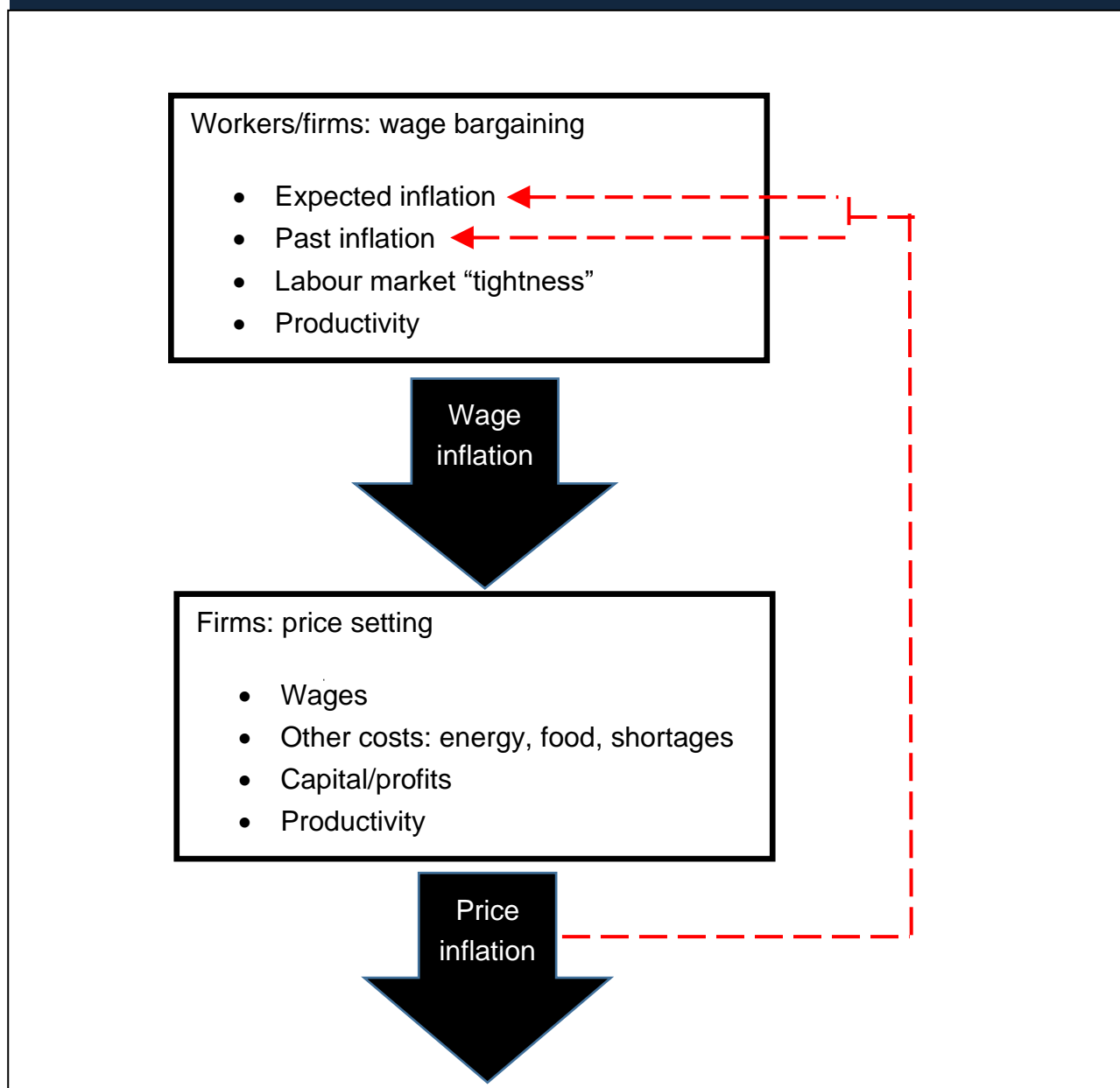
Then, proceeding to the lower box, firms set prices as a mark-up over those wages and other costs, such as energy etc, taking account of productivity and a return on the capital firms have invested in. The outcome of this determines price inflation.⁴

However, it is not a one-way relationship between wages and prices. As illustrated by the red line, for example, a shock to prices potentially changes both expected inflation and

⁴ Some readers will prefer an account of inflation that includes the money supply. In the current conjuncture, the argument goes that a combination of QE and loose monetary policy fuelled inflation by excessive money growth, allied with abnormally high household bank deposits that were accumulated during lockdown. Money does not appear explicitly in the BB framework, but we can think of money and credit as influencing demand in the economy, and, in this framework, determining labour market tightness and/or inflation expectations.

aspiration real wages and so changes wage settlements, which feeds back into pressure on prices. Inflation expectations (short- and long-run) are modelled as functions of (past and present) actual inflation and expectations. Wage-price dynamics arise via assumed lags in the system, including a possible adjustment of real aspiration wages to actual real (consumption) wages if, for example, workers attempt to “catch-up” their current real wage settlements to past real wage losses. Dynamics also arise as inflation expectations adjust to current inflation.

Chart 1: Stylised representation of the Bernanke and Blanchard model of wages and prices ^(a)



Source: Authors’ elaboration of [Bernanke and Blanchard \(2023\)](#).

(a) The representation is stylised. Short-run and long-run inflation expectations are also determined in the model but not shown here. The price equation in the model does not include an explicit regressor for profits.

BB have two main findings on US quarterly data. First, estimates suggest that shocks to the system from, for example, energy or food prices, dissipate quite quickly, restoring inflation to previous rates. This is because there is little catch-up effect and inflation expectations, despite rising inflation, have remained quite anchored. Second, US inflation, after initially being due mostly to external shocks, is increasingly driven by a tight labour market.

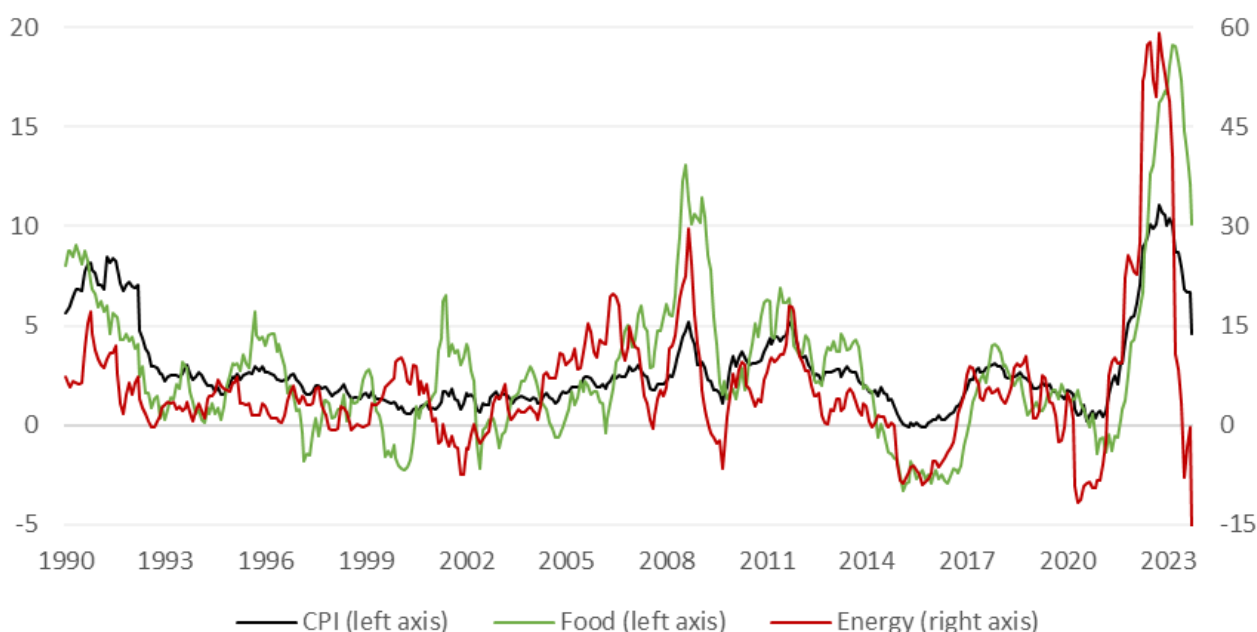
3. Inflation, wages and expectations: the facts

The model suggests that to explain inflation we need to review the shocks to inflation, the labour market and expectations.

Inflation

Starting with inflation, Chart 2 shows annual inflation in CPI, food and energy in the UK between 1990 and 2023. The following points are worth noting.

Chart 2: Annual inflation, CPI, food and energy, Jan 1990 to Oct 2023 ^(a)



Source: ONS, authors' calculations.

(a) Series are annual percentage changes on monthly frequency (the model is fitted on quarter-on-quarter annualised natural log changes). Energy includes household gas and electricity bills, and fuels and lubricants used in personal transport equipment (i.e. petrol, diesel). Food includes non-alcoholic beverages. CPI and Food shown against left-hand side axis, Energy against right-hand side axis. Figures 1 and 2 in the accompanying paper shows this on a quarter-on-quarter annualised basis.

First, the size of shocks to the economy. As is well known, UK inflation has recently been historically high. But Chart 2 also shows that the food and energy price changes have also been historically very high. This can be seen by comparing the standard deviation (a measure of the typical variability of data) of price shocks before the pandemic, with the maximum shock sizes over the last few years. Based on the same measures used in the model⁵, the shocks to energy prices, food prices, and shortages, during the pandemic and post-pandemic period, are 10.8, 3.4 and 36.1 times larger than typical pre-pandemic shocks respectively.

Second, there has been much discussion of UK inflation relative to other countries (see, for instance, [August 2023 MPR](#), Chart 2.2). The responsiveness of UK inflation to energy price shocks is both larger and has different lags due to, respectively, the structure of UK energy markets (the marginal source of supply is gas) and energy price regulation ([Haskel, 2022](#)).

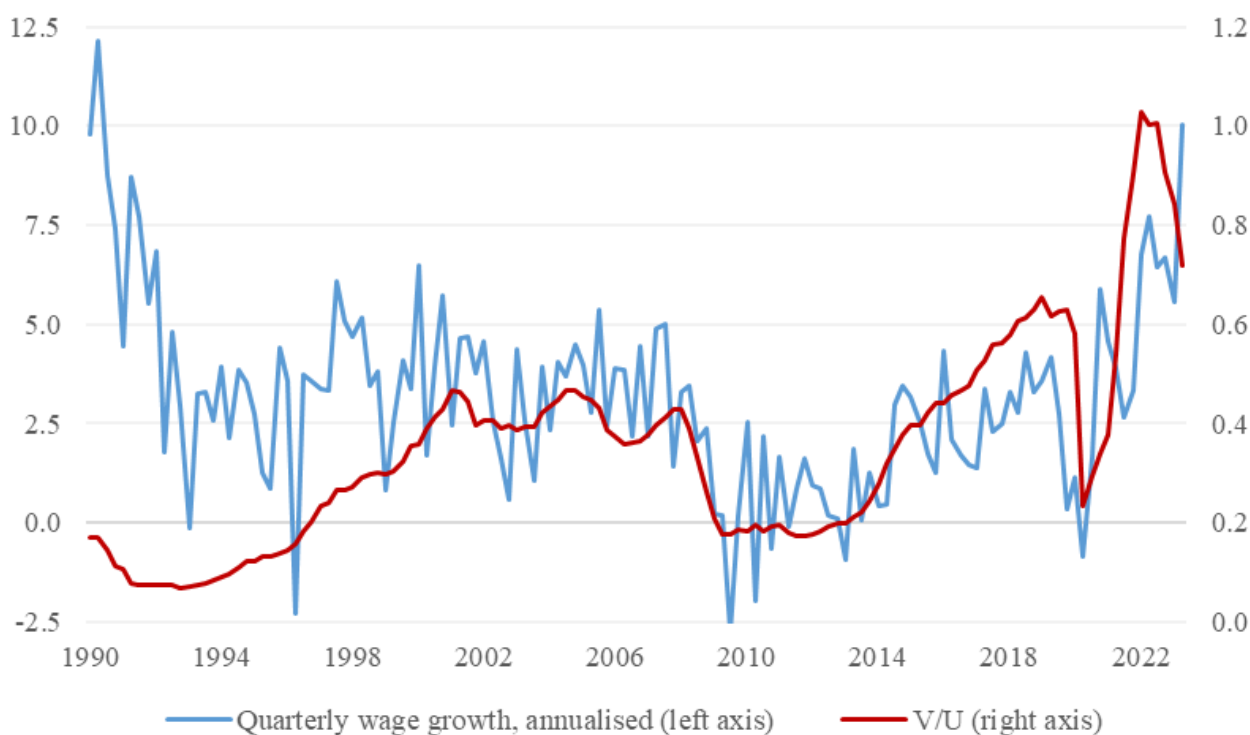
Third, on timing, annual CPI inflation started to rise through 2021, starting the year at 0.7% and finishing at 5.4%. Notice that energy prices started to rise in 2021 Q2, well before the outbreak of the Ukraine war in 2022 Q1. Food prices started to rise materially in 2021 Q4 and rose strongly from 2022 Q2 and onwards.

⁵ These are the relative price of energy to wages, the relative price of food to wages (both measured in quarter-on-quarter annualised log changes), and the shortages index.

The labour market

Turning to the labour market, Chart 3 shows nominal wage growth⁶ and a labour market tightness measure, namely the V/U ratio, that is, the ratio of vacancies to unemployment. You can think of this as a measure of how available jobs are relative to searchers: a higher number indicates more job availability relative to searchers. When V/U is high, more firms are competing over fewer workers, which tends to put upward pressure on wages. Indeed, as a rough correlation, the data show a strong rise in the V/U ratio in recent times along with a strong rise in wage inflation, although V/U has receded somewhat in the first half of 2023.

Chart 3: Wage growth and labour market tightness (vacancies-to-unemployment ratio), 1990 Q1 to 2023 Q2 ^(a)



Source: ONS, Bank of England, authors' calculations.

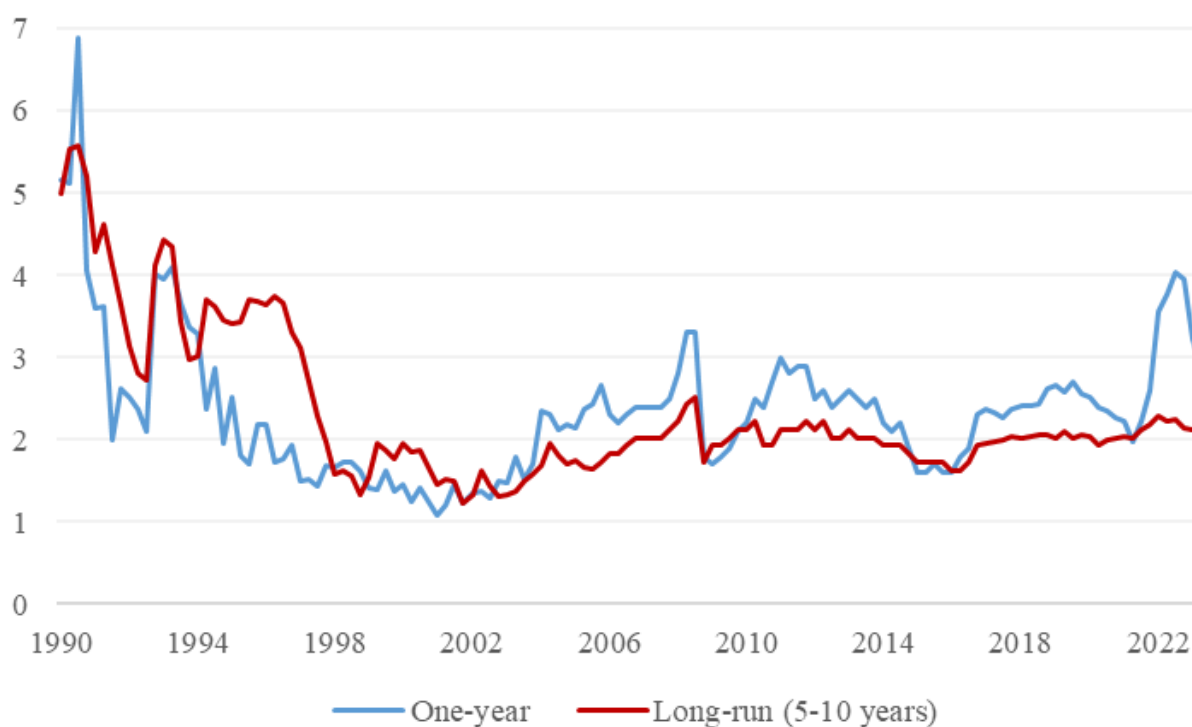
(a) Wage growth is private sector regular pay (i.e. excluding bonuses etc.), from the Average Weekly Earnings, seasonally adjusted. It is adjusted for changes in composition of the workforce, and for the effect of furlough during the pandemic. Wage growth is quarter-on-quarter log changes, annualised by multiplying by four. The V/U ratio covers all vacancies and all unemployed (meeting standard definitions). Equivalent to Figure 3 in accompanying paper.

⁶ Adjusted for furlough and composition effects.

Expectations

Turning to expectations, Chart 4 shows the series of short- and long-run inflation expectations we use. Both are amalgams of financial, professional forecaster and household inflation expectation survey data in a way that is as historically comparable as possible, and that avoid recent distortions in financial measures owing to a forthcoming change in the UK inflation measure used for some financial instruments. Both short- and long-run measures have risen somewhat in recent quarters and then fallen again.

Chart 4: One-year and long-run inflation expectations, 1990 Q1 to 2023 Q2 (a)



Source: Bank of England, authors' calculations.

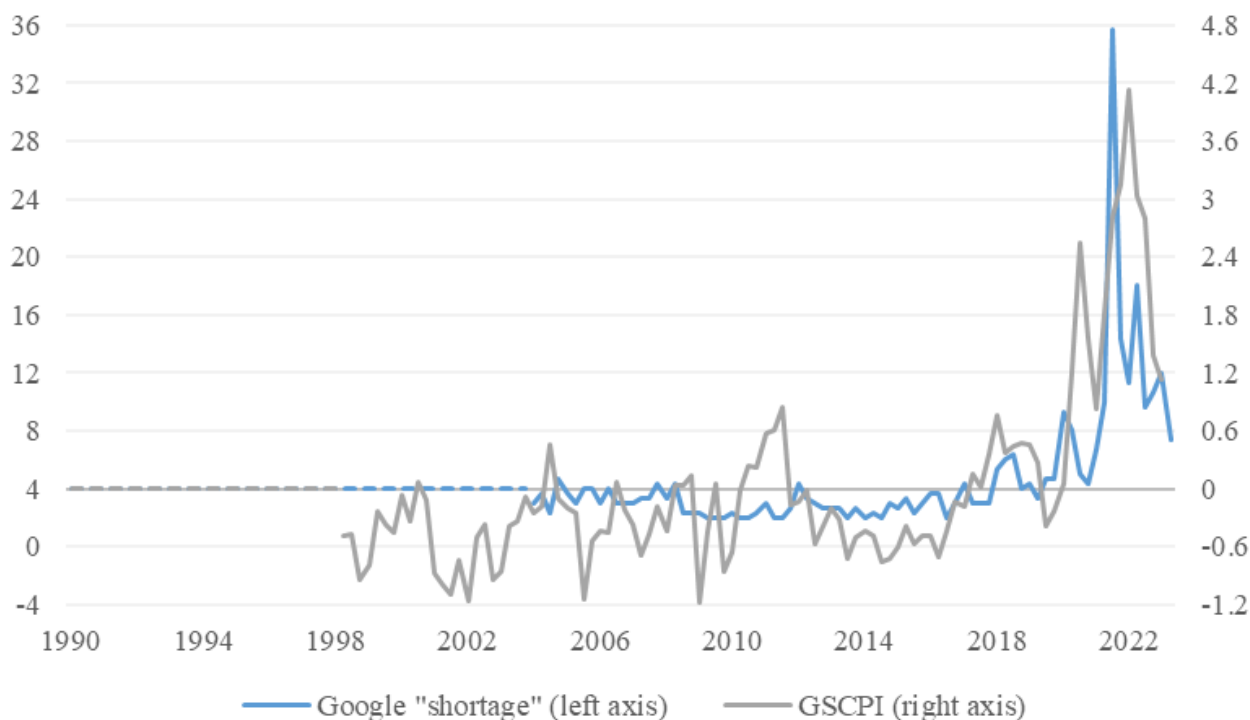
(a) One-year inflation expectations is a composite series covering expectations of households and professional forecasters. Long-run inflation expectations is a composite series covering expectations of households, professional forecasters and financial markets, benchmarked to average inflation over the sample period. See accompanying paper for more details. Equivalent to Figure 4 in accompanying paper.

Product market shocks

As well as food and energy shocks, the product market has seen supply chain shocks especially during the recovery from the pandemic. Chart 5 shows two shortage measures: one derived from Google searches, and the other the Global Supply Chain Pressure Index (GSCPI) produced by the Federal Reserve Bank of New York. Note, the GSCPI is not a UK-specific measure. The Google search data starts in 2004, and the GSCPI in 1998.

They behave similarly over the pandemic, rising strongly in 2021 Q1, just when UK inflation starts rising and strongly again in the last quarters of 2021 and into 2022 before easing back.

Chart 5: Shortage measures, 1990 Q1 to 2023 Q2 (a)



Source: Google, Federal Reserve Bank of New York, authors' calculations.

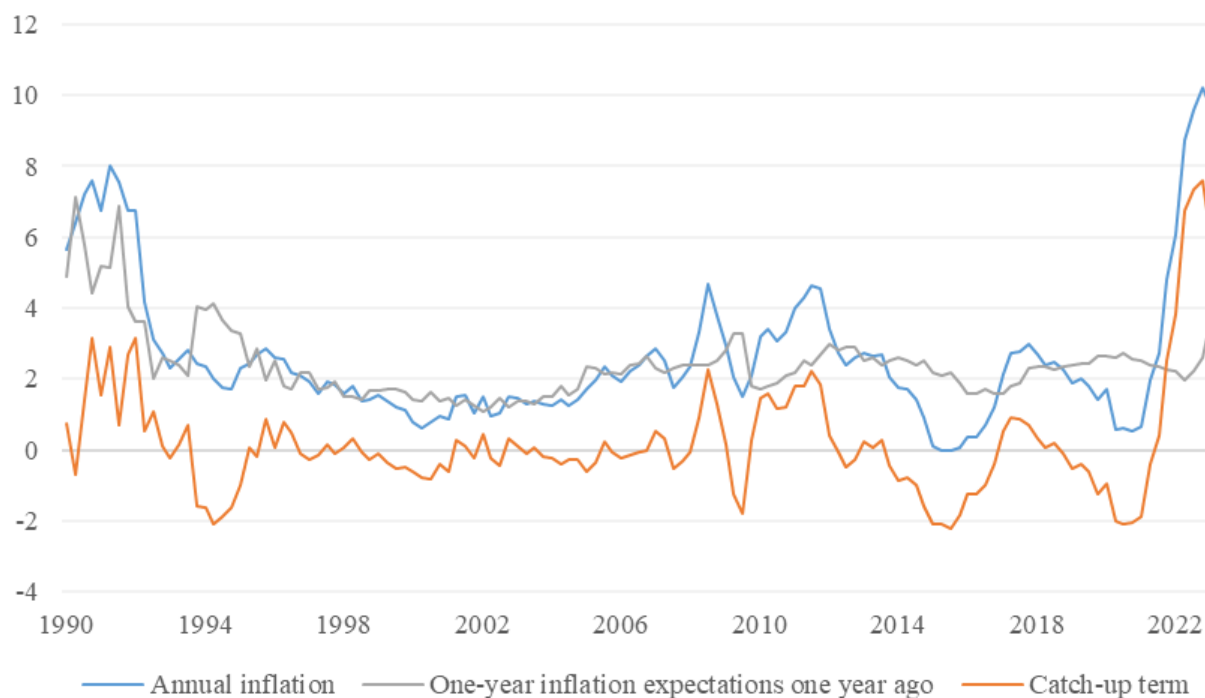
(a) GSCPI = **Global Supply Chain Pressure Index**, published by the New York Fed. Dashed line represent assumed backseries prior to the start of the series – GSCPI set to 0 in the backseries, and Google "shortage" set to 4 in the backseries, both approximate averages over observed pre-covid data. BB use 5 as assumed backseries for Google "shortage". Series and axes aligned such that GSCPI=0 and Google=4 are aligned. Equivalent to Figure 5 in accompanying paper.

Surprises and "catch-up"

As the framework illustrates, workers might bid for higher wages both if they expect higher inflation and to restore previous real wage levels. One neat measure which summarises this, developed by Bernanke and Blanchard, is what they call the "catch-up" term. As they point out, this mechanism is more likely when inflation rises unexpectedly. To capture this, Chart 6 shows annual inflation in a given quarter, less what inflation was expected to be four quarters earlier, with the "catch-up" measure the difference between the two. The strong gap between actual and expected in recent quarters is notable. And so it will be important to estimate how important this tendency is for inflation.

Chart 6: Annual inflation, one-year inflation expectations (advanced four quarters), and “catch-up” term, 1990 Q1 to 2023 Q2 ^(a)

Catch-up = realised annual inflation less one-year inflation expectations one year ago



Source: ONS, Bank of England, authors' calculations.

(a) Graph shows annual inflation, one-year inflation expectations one year ago, and catch-up term = annual inflation minus one-year inflation expectation one year ago. Equivalent to Figure 6 in accompanying paper.

Summary

Let us summarise this section. The key facts about inflation since the pandemic are these:

- a) The UK economy was subject to a series of historically large shocks to energy prices, food prices, and supply chains.
- b) At the same time, the labour market tightened sharply.
- c) Inflation expectations remained remarkably anchored around the target.
- d) These shocks were unexpected, creating a large gap between actual inflation and what inflation was expected to be. This has the potential to create conditions for “catch-up”.

4. The model in action

Given what happened, we now need to estimate how significant these effects all were. The estimates of the model are set out in detail in an accompanying paper ([Haskel, Martin and Brandt, 2023](#)). For now, let me summarise some of the key findings of the model.

One key question is: how does the UK economy respond to “typical” shocks? That is, when a typical shock hits, how long does it take to percolate through the economy?

This is as much a live issue as it was in the 1970s. At that time, the economy was also hit with a series of large shocks, notably to energy prices, and sustained high inflation was a result. What do our estimates say about the current day?

Starting with shocks to relative food and energy prices, and shortages, let us define a typical pre-pandemic shock to be a one standard deviation in the variable in question between 1990 Q1 and 2019 Q4. These are one-period price shocks which are not reversed, so that the level of prices and shortage rises and stays higher than before the shock, but do not continue to rise. This seems a sensible experiment: energy and food prices, for example, have risen to higher levels but, at least in the case of energy, are not rising further.

Chart 7 shows the effect of such typical pre-pandemic shocks on annual inflation and suggests an important conclusion. These typical shocks broadly support the view **that policymakers should “look through” such price shocks**, since the effect on inflation is short-lived.

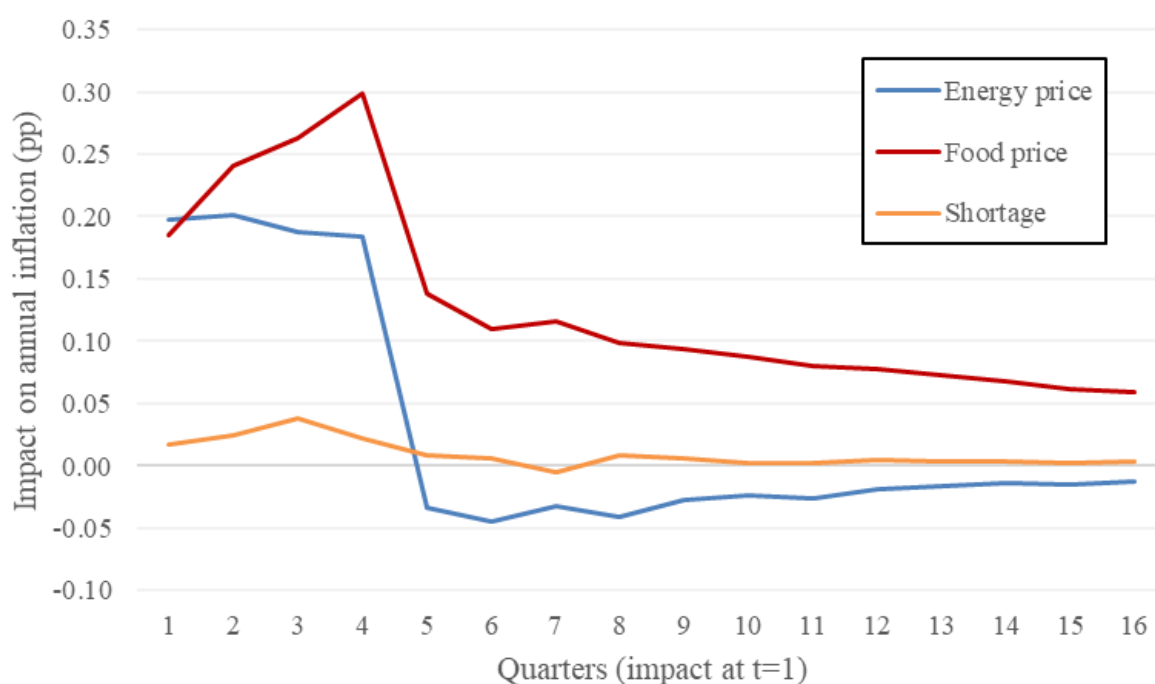
How does this conclusion follow? Start with *shortages*. The peak effect from shortages is after three quarters, which then unwinds towards zero fairly quickly, and settles at close to zero (though marginally positive) from around two years (eight quarters) onwards. Pre-covid shortages shocks in the UK were relatively small, adding just 0.04pp to annual inflation at peak. However, the shortages shock during 2021 was much larger.

For *energy prices*, there is little impact on quarter-on-quarter inflation after the first quarter, such that the effect on annual inflation of a typical pre-covid shock to relative energy prices is little changed across the first four quarters at about 0.2pp. Then, by base effects, this effect reverses, and actually drags on annual inflation by a small amount thereafter. This may capture the volatile nature of UK energy prices, where increases are often followed by decreases.⁷

⁷ Since gas is usually the marginal fuel for UK energy production ([Haskel, 2022](#)), and gas prices are largely determined on global markets, the price of energy faced by UK consumers is volatile, and increases are often followed by decreases. See Chart 2 for instance. Another way to see this is that the prices of energy products are not very persistent, as found by [ONS \(2023\)](#) – see their Table 1.

The peak effect on annual inflation of a typical pre-covid shock to relative *food prices* is after four quarters, at which point it would add about 0.3pp to annual inflation. After this, the effect dissipates as the initial increase falls out of the annual calculation. However, it continues to push up on inflation for several years, adding close to 0.05pp to annual inflation four years after the shock. Food price shocks in the UK, it seems, are more persistent than other price shocks.⁸

Chart 7: Impulse response functions of annual inflation to shocks to the relative price of energy, relative price of food, and shortages (a)



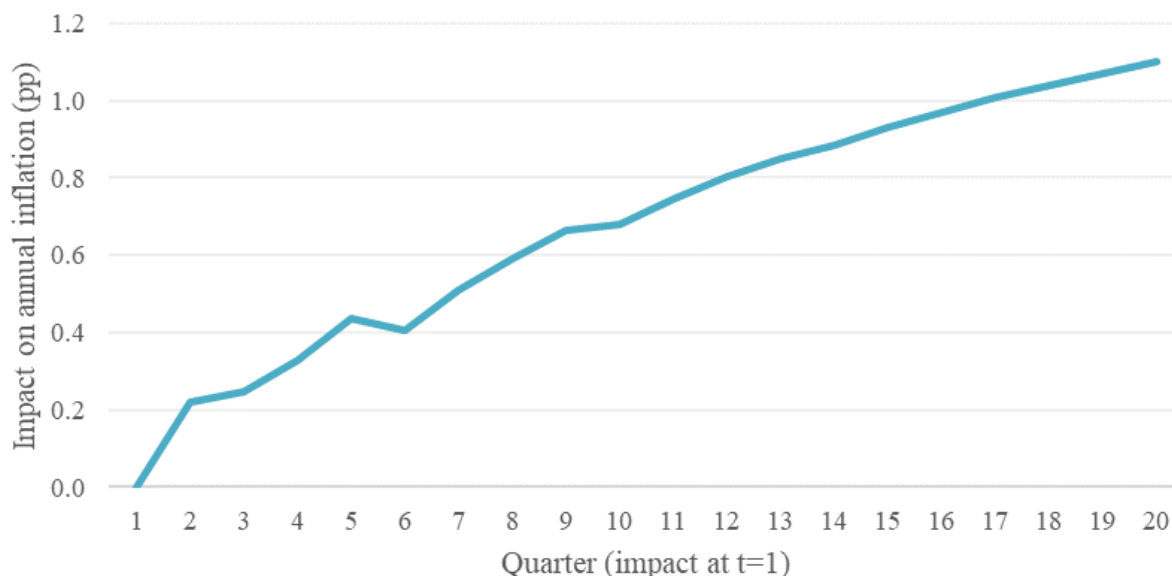
Source: Haskel, Martin and Brandt (2023), Figure 12.

(a) Shows the full-model response of quarter-on-same-quarter-a-year-ago inflation (i.e. annual inflation) to a one-quarter (i.e. one-off) positive shock to relative energy prices, relative food prices, and shortages. Shocks equal to the standard deviation of the exogenous variable over 1990 to 2019 (a typical pre-covid shock).

What about the labour market? As Chart 3 showed, the V/U ratio has drifted upwards over the past decades. Chart 8 shows the response of annual inflation to a permanent increase in the V/U ratio. As it shows, a persistently tighter labour market (in levels terms) produces persistently faster wage growth and thus inflation. Whereas persistently higher levels of food prices only temporarily raise inflation but have a permanent effect on the price level.

⁸ In a recent speech ([Bailey, 2023](#)), Andrew Bailey reviewed UK food price inflation in some detail.

Chart 8: Impulse response function of annual inflation to a permanent increase in V/U ^(a)



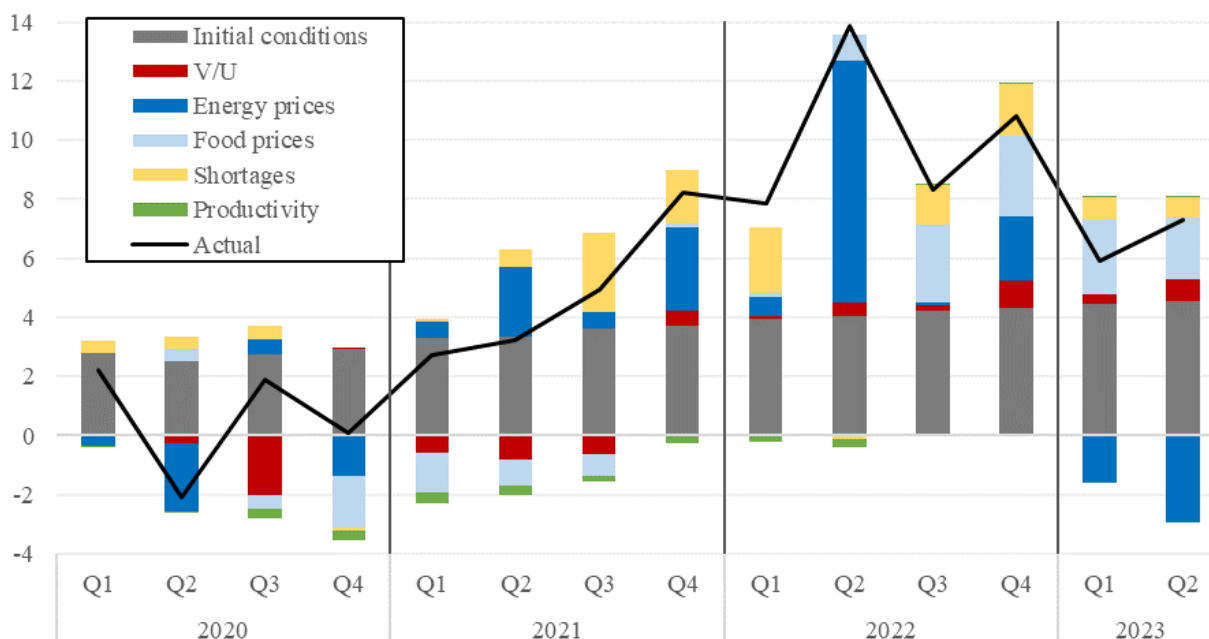
Source Haskel, Martin and Brandt (2023), Figure 13.

(a) Shows the full-model response of annual inflation to a permanent one standard deviation rise in V/U. Standard deviation calculated over 1990 Q1 to 2019 Q4, such that it represents a typical pre-pandemic shock.

5. What caused recent UK inflation?

As we have seen, the model suggested the UK economy responds quickly and sharply to price shocks, and shows a persistent increase in inflation with a permanent rise in labour market tightness. But over the pandemic the magnitude of these shocks has been vastly greater than before, and a number of them have occurred in succession. So the finding that UK inflation disappears quickly with a typical shock, whilst reassuring in normal times, will not help us understand the most recent period. Indeed, this finding strongly suggests that there is something to the argument that the concatenation of shocks is important.

So, what does the model say caused recent UK inflation? Chart 9 shows the decomposition of inflation when we take account of all the shocks in the model and the way that they are working through and interrelating. The chart shows inflation on a quarter-on-quarter annualised basis – that is, scaling the quarterly changes to annual rates by assuming that the same quarterly rate would prevail for four quarters. This measure is thus different to, and more volatile than, our usual headline measure of inflation.

Chart 9: Decomposition of price inflation, 2020 Q1 to 2023 Q2 ^(a)

Source: Haskel, Martin and Brandt (2023), authors' calculations.

(a) "Initial conditions" reflect the model response under hypothetical conditions where V/U remains at the level in 2019 Q4, relative food and energy price changes are 0, shortages remain at roughly their historic average, and productivity matches its 2012-2019 average; see text for interpretation of these conditions. This is an adaption of Figure 14 from Haskel, Martin and Brandt (2023), where I have removed the dynamic effects of two dummies for the pandemic period – see the paper for more details.

Let us split the path of inflation into two. First, the **underlying path** reflecting the initial conditions at the start of the pandemic. Second, the **additional path**, reflecting the actual shocks that occurred over this.

Let's start with the **underlying path**, which are the grey bars shown in Chart 9. This shows the inflation prediction in the model of labour market tightness maintained at its level in 2019 Q4, the working through of food, energy and shortage shocks up to 2019 Q4, and no further price shocks thereafter. You should think of this as showing what inflation in the UK economy would have been if there had been no pandemic, and no change in economy conditions after the end of 2019.⁹

That path shows gently rising inflation to around 4% at the end of the period. How do we interpret this? Since the various price shocks would all have worn away by now, it

⁹ This is on the basis of the model estimated on data that includes the recent high inflation period. However, similar results for the initial conditions are obtained if using a pre-pandemic sample. See the accompanying paper for more details.

suggests that the labour market in 2019 Q4 was in fact too tight, and the underlying wage dynamics that it would have set off would have raised inflation well above target by now.

This should not come as too much for surprise. A glance at the Monetary Policy Reports written at that time (end of 2019 and start of 2020, before the pandemic had begun) all pointed out that the labour market was tight and the MPC was monitoring it closely. But they likewise noted that inflation at the time was below target. Had the pandemic not struck, and had the labour market remained so tight, the MPC would likely have taken action.¹⁰

The story of inflation over the pandemic is then better understood from what happened **in addition** to those grey bars. Let us divide up the years. Starting in 2020 you can see from Chart 9 that quarterly inflation was volatile, with a pattern of sharp increases and decreases over the four quarters of the year. Clearly the once-in-a-century conditions of the pandemic – involving lockdowns, furlough, and shortages, amongst much else – are a challenge for pretty much any economic model.

Let us move to 2021. As the black line in Chart 9 shows, and as the Bank's critics have noted, inflation starts to increase through 2021. In 2021 Q2 there was sizable energy price increase (blue bars in Chart 9), associated with the Ofgem price cap increase in April 2021, which pushed up inflation. And in 2021 Q3, a large shortage shock (yellow bars) pushed up inflation. A further energy price increase occurred in 2021 Q4, and shortages continued to be important. There was a moderate inflationary effect from labour market tightness (as measured by the V/U ratio, red bars) in 2021 Q4.

Chart 9 offers an important lesson for why inflation rose over 2021. By far the most important contributors were energy prices and shortages. As we have seen from Chart 7, based on historical relationships, these shocks wear out quickly. This suggests that it was appropriate, based upon the knowledge at the time, for the MPC to “look through” these shocks and for monetary policy not to react. Once again, by the time monetary policy could have taken effect, those shocks, on the basis of historical experience would have worn away.

Two things changed in 2021 Q4. First, the price shocks continued to roll in, while past shocks continued to work through the economy. Chart 8 shows the effect of a single price shock, which indeed fades quickly. But if there is a succession of shocks, each with a profile as in Chart 8, then they will cumulatively push up on inflation for an extended

¹⁰ As set out in the [November 2019 Monetary Policy Report](#), the MPC forecasted inflation to be rising over the subsequent three years, conditioned on a roughly flat path for interest rates based on the yield curve at the time. One reason the MPC gave for this was faster pay growth, consistent with a tight labour market. However, the outlook at that time was dominated by the uncertainty over the terms of the UK's Exit from the EU. The MPC stated (p.14) that were a smooth Brexit to occur, rates would have to rise to return inflation to target.

period. If inflation stays above target for longer, than has implications for second-round effects, as inflation expectations may increase, and “catch-up” dynamics may come into effect.

Second, the labour market tightened rapidly, and started to push up on inflation. Returning to Chart 3, the speed of tightening of the labour market over this period is unprecedented. While tightness was still a small contributor to inflation in 2021 Q4 (the small red bar in this quarter in Chart 9), the MPC did raise rates at its December 2021 meeting. For the record, I note that the Bank of England was the first major central Bank to raise interest rates in the current hiking cycle, with the Federal Reserve increasing for the first time in March 2022, and the ECB in July 2022.

That said, it is worth recalling for a moment the extraordinary conditions of the time. The Omicron strain of covid-19 had struck the UK, and there was uncertainty about how infectious it would be, and even some discussion that it would evade the vaccine. Had that come to pass, we would be in a very different position today. Similarly, the labour market picture was obscured by the fact that the furlough scheme did not close until the end of September 2021, and the official labour market data lags real-time by around two months. We had to wait until mid-December to be sure that the closing of the furlough scheme would not lead to a huge spike in unemployment.

Returning to Chart 9, what was the story in 2022? The key event in Q2 was the sharp increase in household energy prices, associated with the Ofgem price cap in April 2022, with energy prices of course shooting up at the time of the Russian invasion of Ukraine. Throughout 2022 there were still lingering effects from shortages, and food prices (light-blue bars) began to have a material effect on inflation from 2022 Q3 onwards. Labour market tightness also continued to push up on inflation.

Finally, what is the picture for the first half of 2023? Energy prices are now falling, dragging on inflation (the negative blue bars in Chart 9). Food inflation is still a major contributor to inflation (light-blue bars), reflecting still-high (though reducing) food price inflation and the relatively more persistent effects of food price shocks in Chart 8. Shortages are still having some effect. A tight labour market is also contributing upwards to inflation (red bars). So, in the first half of this year, the supply shocks are still major movers of inflation, although with falling energy prices more or less outweighing rising food prices and shortage effects, leaving a tight labour market a positive net contributor.

On the face of it, Chart 9 suggests that the role of labour market tightness in recent UK inflation has been small. However, there is a complication with this interpretation. Recall that the underlying path (the grey bars in Chart 9) assumes that the V/U ratio would have stayed at its 2019 Q4 level indefinitely, which leads to a rising path for inflation. The rising underlying path thus embodies a persistently tight labour market, with the red V/U bars

representing only the inflationary effects of labour market tightness above that underlying level.

We would ideally show the effect of labour market tightness relative to a counterfactual where the pandemic did not occur, and the economy evolved in some 'normal' way. Of course, we cannot know what that counterfactual is. But if in that counterfactual world, the path for V/U was lower – if, for instance, the MPC would have acted to cool the economy to prevent a tight labour market from moving inflation so far above target – then the grey bars in chart 9 would be smaller, and the red bars larger. In short, a large degree of labour market tightness is buried in the grey bars in Chart 9, obscuring the narrative.

This model also suggests that two channels, which some had been concerned about, may not have been very material. First, long-run inflation expectations are estimated not to be very responsive to current inflation. Thus, even the large inflation shock we have experienced has not seen inflation expectations become de-anchored. In fact, the model predicts that long-run inflation expectations would increase by more than they actually did, suggesting an unusual degree of anchoring. This is good news for policymakers. That said, this is a very unusual episode: on current projections, inflation will have been above target for at least four years, and possibly longer, by the time it returns to 2%. We do not yet know what the effects of that might be, and do not have a similar episode in our recent history with which to compare it to.

Second, catch-up is estimated to have a near-zero role in determining wage growth (and thus inflation) in the long-run. However, it can have dynamic effects, as can be seen in the accompanying paper. The role of catch-up is hidden in Chart 9, since the method attributes the inflation via catch-up mechanics to the exogenous variable which caused the gap between actual and expected inflation to open up in the first place. For instance, the energy bars in Chart 9 reflect the direct effect of energy prices on CPI, indirect effects via supply chains, and second-round effects via inflation expectations and catch-up. Separating the effects of price shocks via the catch-up channel alone suggests that catch-up may have added a little over one percentage point to annual wage growth in the year to 2023 Q2, and around half a percent to price inflation in the same period.

6. The future

We can also use this model to make some predictions. To do this, we need to decide upon some paths for the exogenous variables. Data for energy and food prices for 2023 Q3 are already known from official statistics. For the subsequent two quarters we will match the paths in the November 2023 MPR. Thereafter, we'll use a path for energy prices based on the market futures curve, and assume relative food price inflation reverts to its historic average. For the shortages measure we can take the latest Google trends up to November

2023, and so fill in data for the second half of 2023. Thereafter is rather harder to predict, so we shall revert to the historic average.

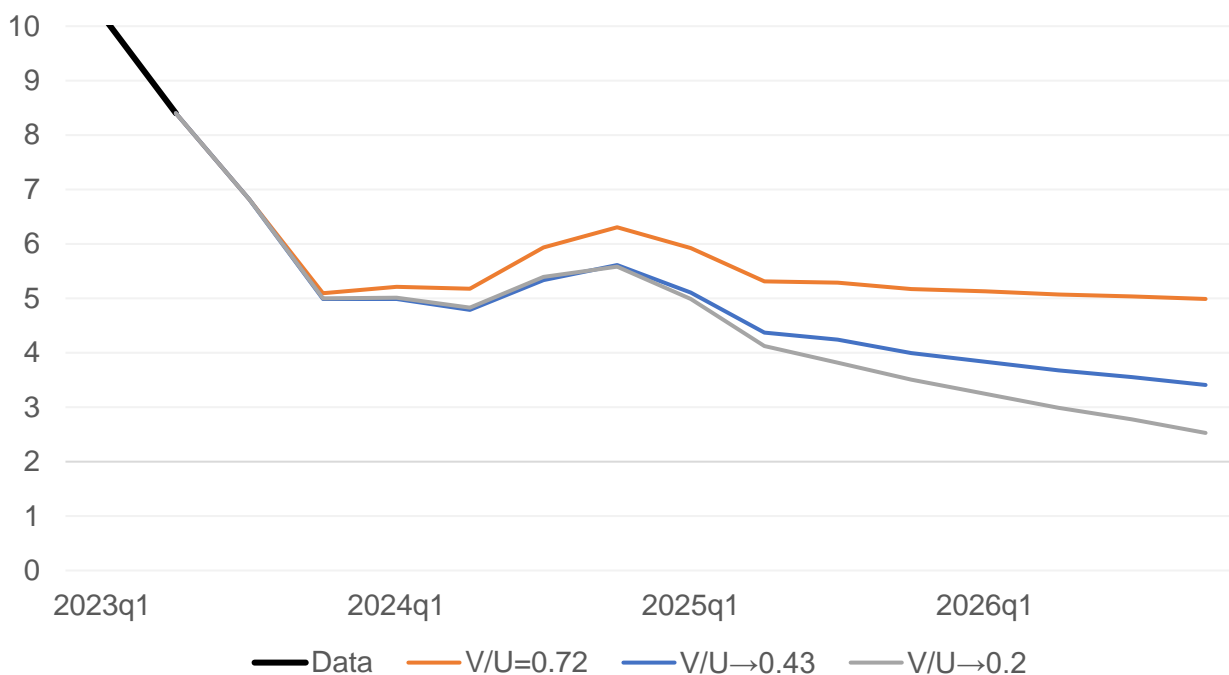
The path for V/U is most material for the path of inflation. A glance at Chart 3 suggests three options: (a) V/U stays at its elevated level in 2023 Q2, (b) it falls linearly over four quarters to its 2012-2019 average, and (c) it falls linearly over eight quarters to roughly its lowest level in recent times (that observed after the economic downturn in 2008/09). Paths (b) and (c) reflect declines at roughly the pace V/U is currently falling, for a year or two years respectively.

A more formal approach would be to estimate the V/U consistent with the MPC's November 2023 MPR forecast. The MPR contains a forecast for unemployment, but not for vacancies and not for V/U. We could assume that the current (post-pandemic) Beveridge curve (the relationship between vacancies and unemployment over time) remains stable, and thus project the rate of vacancies according to the rate of unemployment, and so derive an associated V/U ratio. I note that the current Beveridge curve (estimated on data over recent quarters) has shifted out relative to before the pandemic, likely reflect reduced matching efficiency (see a previous speech ([Haskel, 2023](#)) for a discussion).

This would impose the fairly strong assumption that the Beveridge curve will not shift further (either back in towards the pre-pandemic relationship, or further out), but gives at least a more empirically grounded approach for our projections. It turns out that this exercise gives a path for V/U that looks very much like path (b) described above. We can therefore think of path (b) as being broadly consistent with the evolution of the economy in the November 2023 MPR, applied to our BB model.

Chart 10 shows the result of these projections. I should first be careful to stress that these are not intended as forecasts of inflation, but rather projections from our model conditional on a range of inputs and assumptions. I find it instructive to think about my policy decision but would not expect inflation to evolve precisely in the ways set out.

The three coloured lines in Chart 10 reflect the three paths for V/U, with all sharing common assumptions regarding the other exogenous variables. All three lines decline sharply through the end of 2023, consistent with the observed sharp drop in annual inflation in the latest official data. However, from the start of 2024 all three lines show a marked slowing in their declines. I do not over-interpret the apparent pick-up in inflation in mid-2024, which is associated with the negative coefficients on lags of energy prices. Looking through this, however, is a clear slowing in the decline of inflation after the initial disinflationary effects of waning energy and food price inflation wash out.

Chart 10: Model projections of annual inflation with different V/U ratiosAnnual inflation (i.e. quarter on same quarter a year ago percentage changes) ^(a)

Source author's calculation, based on Haskel, Martin and Brandt (2023).

(a) Assumptions as described in text. See accompanying paper for more details. Note that the assumptions used here differ to those for Figure 20 in the paper.

The **top line**, corresponding to V/U staying at its current level, sees little decline in inflation. This suggests that the current level of V/U is not consistent with a 2% inflation target, and indeed V/U is currently more than twice its historic average.

The **middle line** has V/U fall to its 2012-2019 average – this reduces inflation, albeit quite slowly. By the end of 2026, inflation is still well above target in this scenario.

The **bottom line** of the three embodies a fall in V/U to a level last seen around 2009-2013, when the labour market was very loose and wage growth was historically low (see Chart 3). This scenario sees inflation fall more rapidly, approaching the 2% target by the end of 2026. It is worth noting that this is still a relatively slow decline in inflation, and slower than that in the [November 2023 MPR](#) forecast (under both mode and mean forecasts). That is, the BB model finds UK inflation to be 'stickier' than the MPC forecast.

7. Conclusion and policy

We have used a simple and transparent model to ask and answer a number of pressing questions around UK inflation. Our questions and answers are as follows.

First, regarding the past:

- **Was the MPC right to regard the shortages and energy price shocks of 2021 as transitory?**
- **Yes.** The average shock to energy prices and shortages works quickly through the inflation process. Food price shocks are more persistent, but food price inflation only contributed meaningfully to CPI inflation in 2022. In the event, the *repeated, co-incident* and *large* shocks meant sustained high inflation. Crucially, nobody could have reasonably foreseen this historically unprecedented pattern of shocks.

Second, turning to the future:

- **Does the current outlook suggest scope for moderation in rates anytime soon?**
- **No.** The labour market is still historically tight. At current rates of change it would take at least a year to fall back to average pre-pandemic tightness, with the precise time depending critically on the greater the degree to which matching in the labour market has been impaired. Rates will have to be held higher and longer than many seem to be expecting.

Two final comments on past and the future. The first point above leads one to ask the question: was the MPC too late in tightening policy? The model cannot tell you about the optimal speed or timing of rate rises. But I would offer the following comment. What the model clearly suggests was that inflation started rising during mid-2021 not because of excessive demand, but because of supply: the energy and shortages shocks. Further, rising inflation gathered momentum because of the *sequence* of very large shocks.¹¹ It was only in late 2021 that labour market pressures emerged, which was when the MPC started tightening.¹² And it tightened well ahead of the Federal Reserve and the ECB.

Finally, on the future, my thinking about the medium-term path of rates is informed by the framework above, which suggests some important signals of persistent inflation (which also have been stressed in recent MPC communications). First, the matching efficiency of

¹¹ Huw Pill has stressed the multiplicity of shocks hitting the economy.

¹² I base this remark on the evidence of a speech I gave in Glasgow in November 2021 ([Haskel, 2021](#)). I stated that if the labour market were to tighten, as shown for example by the V/U ratio, rates would have to rise. I think this helps explain my subsequent voting.

the labour market appears to have been impaired since the pandemic, “tightening” the labour market.¹³ Second, productivity growth remains in the doldrums, putting upward pressure on costs. Third, if “catch-up” becomes more apparent, this would indicate continuing unexpected wage pressure. Finally, expectations are crucial, but are currently well-anchored. Monitoring these measures is, in my view, important in setting policy to return inflation sustainably to target.

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¹³ I discussed this in a recent speech ([Haskel, 2023](#)).