

Do inflation expectations currently pose a risk to inflation?

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- People's expectations about future inflation play an important role in determining the current rate of inflation and so in the Monetary Policy Committee (MPC) meeting its remit.
- Measures of inflation expectations at both short and longer horizons have generally fallen over the past year. Despite that, most indicators are broadly consistent with expectations remaining anchored to the MPC's inflation target.
- Lower inflation expectations could lead to weak inflation becoming more persistent, although there are few signs that weaker inflation expectations have weighed significantly on inflation over the recent past.

Overview

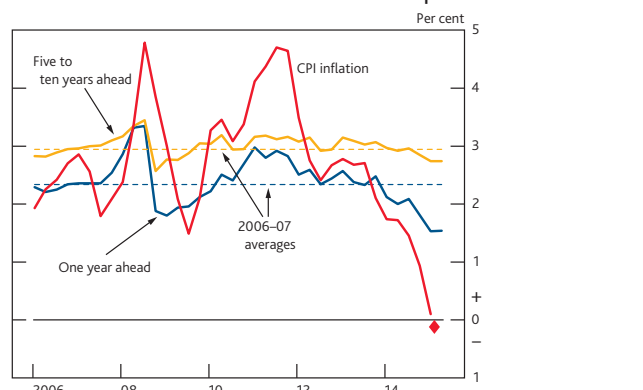
People's expectations about future inflation play an important role in the Monetary Policy Committee (MPC) meeting its inflation target and delivering price stability. The MPC therefore monitors a range of indicators of inflation expectations to assess whether inflation expectations are anchored to the inflation target.

Over the past year, inflation has fallen sharply primarily as a result of falls in the prices of energy, food and other goods prices. Measures of inflation expectations have also fallen at both short and longer horizons over the past year. Short-term inflation expectations are likely to fluctuate over time to reflect news about the short-run outlook for the economy. Measures of longer-term inflation expectations are potentially more informative for judging whether inflation expectations remain consistent with meeting the inflation target, as these ought to be more stable if expectations are well anchored.

Taken together, the range of indicators which the MPC monitors is broadly consistent with inflation expectations remaining anchored to the target. Although measures of households' longer-term inflation expectations are currently below their series averages, there is little sign that households expect a prolonged period of very low inflation, and the proportion of households that was fairly or very confident that inflation would be close to target in the medium term increased over the past year.

Persistently lower inflation expectations could pose a risk to meeting the MPC's inflation target through several channels. First, they could affect wage and price-setting behaviour. Second, lower inflation expectations could also influence future inflation by affecting people's spending decisions. Third, persistently lower inflation expectations could impair the credibility of the MPC or the inflation-targeting regime. Analysis presented in this article suggests that while there is some evidence that inflation expectations may have affected wages and spending over time, their current effect does not appear large. The latest Bank/GfK survey suggests that public satisfaction with the Bank and understanding of the monetary policy framework is close to normal.

Summary chart CPI inflation and summary measures of the levels of various indicators of inflation expectations^(a)



Sources: Bank of England, Barclays Capital, Bloomberg, CBI (Confederation of British Industry, all rights reserved), Citigroup, GfK, HM Treasury, ONS, YouGov and Bank calculations.

(a) See footnote on Chart 1 for more details. The red diamond represents CPI inflation data for April 2015.

(1) The authors would like to thank Gareth Anderson, Richard Blows and Fernando Eguren Martin for their help in producing this article.

The Bank's monetary policy objective is to maintain price stability — defined by the Government's inflation target of 2%, as measured by the consumer prices index (CPI) — and, subject to that, to support the Government's economic objectives, including those for growth and employment. Inflation expectations that are anchored to the inflation target and confidence in the Bank's ability to conduct monetary policy are key factors affecting the Monetary Policy Committee's (MPC's) ability to achieve these policy goals.

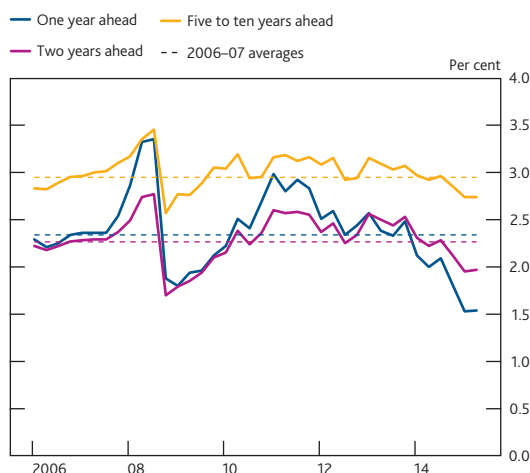
Inflation expectations are considered to be anchored if deviations in inflation from the target are widely expected to be temporary and if people have confidence that inflation will be close to the target over the medium term. If inflation expectations were to become less well anchored, then deviations in inflation from the target might lead households and companies to change their behaviour in a way that could make such deviations more persistent. This could worsen the trade-off for monetary policy between stabilising inflation and avoiding undue volatility in output.

Over the past year, CPI inflation has fallen from 1.8% in April 2014 to -0.1% in April 2015. The MPC judges that this largely reflects the impact of past falls in energy, food and other goods prices, together with some continued drag from domestic slack.⁽¹⁾ As the impact of those past price falls begins to drop out and slack is absorbed, the MPC projects that inflation will return to the target within two years.

Measures of inflation expectations have also generally fallen over the past year, at both short and longer horizons. **Chart 1** shows that summary measures of inflation expectations — which incorporate information about expectations from a range of data sources — are below their pre-crisis averages at both short and long-term horizons. Some measures of uncertainty about future inflation, and of the sensitivity of longer-term expectations to short-term measures, remain elevated compared to the pre-crisis period, but they have not changed significantly over the past year. A key question for the MPC is whether the recent fall in some measures of inflation expectations has any implications for current or future inflation.

Long-term inflation expectations are potentially most informative for judging whether inflation expectations remain consistent with meeting the inflation target, although evidence of less well-anchored inflation expectations might be seen at a range of horizons. At longer horizons, a sign that inflation expectations had become less well anchored would be if people stopped expecting inflation to return to target, or if long-term expectations became more variable in response to news about the economy. Increases in uncertainty about future inflation might also indicate lower confidence in the ability of the MPC to meet its inflation target and deliver price stability.

Chart 1 Summary measures of the levels of various indicators of inflation expectations^(a)



Sources: Bank of England, Barclays Capital, Bloomberg, CBI (all rights reserved), Citigroup, GfK, HM Treasury, ONS, YouGov and Bank calculations.

(a) Data are non seasonally adjusted. The summary measures are estimated with a statistical term structure model, using information from surveys of households, firms and professional forecasters, as well as financial market inflation swaps. For more information on how these measures are constructed, see Anderson and Maule (2014).

Signs of less well-anchored inflation expectations might also be seen at shorter-term horizons. Although the MPC's inflation target applies at all times, the MPC's remit recognises that inflation will occasionally move away from 2% as a result of shocks to the economy. Consistent with that, it is likely that measures of shorter-term inflation expectations will fluctuate as they respond to economic developments. One sign, however, that expectations had become less well anchored would be if people believed that the MPC had become more tolerant of deviations in inflation from the target, such that they expected inflation to eventually be returned to the target but at a slower pace than projected by the MPC.

This article discusses the fall in inflation expectations over the past year and the associated implications for the outlook for inflation. It is split into two sections. The first discusses recent movements in measures of inflation expectations and assesses the extent to which they remain well anchored. The second examines the ways in which changes in inflation expectations might affect future inflation and make it more persistent. A box on page 179 discusses public awareness of monetary policy. The final section concludes.

Recent developments in inflation expectations

The MPC monitors a wide range of indicators to assess whether inflation expectations remain well anchored. These cover a range of horizons and include surveys of households and companies, forecasts by professional economists and indicators based on financial market instruments.

(1) See Bank of England (2015a).

Indicators of short-term inflation expectations have fallen over the past twelve months. Surveys of one year ahead household inflation expectations have fallen by between 0.4 and 0.9 percentage points, while financial market measures, such as inflation swaps, and professional forecasters' one year ahead expectations for CPI inflation have also fallen (Table A). Measures of medium-term expectations, such as the two year ahead measures, have also fallen for households and companies, but have been more stable for financial market measures and professional forecasters.

Table A Measures of inflation expectations

Per cent	Start of data	Whole series average (per cent) ^(a)	Latest ^(b)	Standard deviation ^(a)	Change over last year (percentage points)
One year ahead inflation expectations					
Households:					
Bank/GfK	Nov. 1999	2.7	2.2	0.7	-0.4
Barclays Basix	Nov. 1986	2.9	1.7	0.5	-0.7
YouGov/Citigroup	Nov. 2005	3.3	1.1	0.3	-0.9
Companies^(c)	July 2008	1.8	0.1	1.0	-0.6
Professional forecasters^(d)	May 2006	2.0	1.6	0.3	-0.4
Financial markets^(e)	Oct. 2004	2.7	2.7	0.6	-0.3
Two year ahead expectations					
Households:					
Bank/GfK	Feb. 2009	2.8	2.3	0.5	-0.2
Barclays Basix	Nov. 1986	3.3	2.2	0.5	-0.6
Companies^(f)	Dec. 2013	2.1	1.7	0.3	-0.4
Professional forecasters^(d)	May 2006	2.0	2.0	0.2	-0.1
Financial markets^(e)	Oct. 2004	2.8	3.0	0.4	-0.1
Long-term expectations (four to ten years ahead)					
Households:					
Bank/GfK	Feb. 2009	3.2	2.8	0.3	-0.1
Barclays Basix	Aug. 2008	3.8	3.4	0.4	-0.3
YouGov/Citigroup	Nov. 2005	3.3	2.6	0.3	-0.4
Professional forecasters^(g)	Mar. 2006	2.1	1.9	0.1	-0.2
Financial markets^(h)	Oct. 2004	3.3	3.3	0.3	-0.1
Memo:					
CPI inflation		2.1	-0.1	1.1	-1.8

Sources: Bank of England, Barclays Capital, Bloomberg, CBI (all rights reserved), Citigroup, Deloitte, GfK, HM Treasury, ONS, YouGov and Bank calculations.

- (a) Whole series averages and standard deviation start in 1998 or later, depending on data availability.
 (b) Data are non seasonally adjusted. The latest data for the survey of external forecasters, the HM Treasury survey of external forecasters and the Bank/GfK survey are for 2015 Q2. The latest data for the Barclays Basix, CBI and Deloitte CFO surveys are for 2015 Q1. The latest data for the YouGov/Citigroup survey are for April 2015. The latest data for financial markets are for the 20 working days to 21 May 2015.
 (c) CBI survey data for the distributive trade sector. Companies are asked about the expected percentage price change over the coming twelve months in the market in which they compete.
 (d) Average one and two year ahead CPI inflation forecasts from the survey of external forecasters.
 (e) Instantaneous forward RPI inflation swap rates one and two years forward.
 (f) Based on the estimated median of expected CPI inflation rate two years ahead from the Deloitte CFO Survey. Change is since 2014 Q1.
 (g) Four year ahead CPI inflation forecast from the HM Treasury survey of external forecasters.
 (h) Five-year RPI inflation swap rates five years forward.

measures but have also generally fallen. Survey measures of households' long-term inflation expectations have fallen by up to 0.4 percentage points over the past year (Table A). Financial market measures of inflation expectations and professional forecasters' inflation expectations have also fallen slightly.

Summary 'heat maps' provide a useful way of assessing a range of data about inflation expectations. These summarise the main measures of inflation expectations and assess whether the changes in those measures are statistically significant relative to certain benchmarks, such as the size of their historical movements and changes in the MPC's forecast (see Figure 1).⁽¹⁾ When a cell is coloured green in the heat map, it signals either that the indicator is close to a historical average, or for the shorter-term indicators, that is close to the level that might be expected, given economic circumstances. This suggests the indicator is unlikely to provide a cause for concern. Cells that are yellow and red signal that these indicators are above their historical averages and so inflation expectations might pose an upside risk to inflation, while cells that are blue or dark blue might indicate that inflation expectations may have become less well anchored on the downside. Grey or black cells indicate that uncertainty or the sensitivity of inflation expectations to short-term news is unusually high. For example, if measures of longer-term inflation expectations have become more sensitive to deviations of inflation from the target, it might suggest that people expect deviations to be more persistent than in the past.

Given the falls in the indicators described above, the inflation expectations heat map has become 'cooler' over the past year, although to varying degrees depending on the sector. Figures 1 and 2 show the latest version of the inflation expectations heat map and the May 2014 version shown in Anderson and Maule (2014), respectively. They show that several cells have turned blue compared to a year ago, which could suggest that, in a statistical sense at least, inflation expectations may have become slightly less well anchored.

The heat maps also illustrate that although measures of inflation expectations have generally fallen, these changes have differed by sector. Most of the 'cooling' of the heat map appears for household measures, the levels of which both at short and long-term horizons are low relative to their past averages and given their past relationship within the MPC's inflation projections. For instance, measures of long-term household inflation expectations are between 0.4 and 0.7 percentage points below their series averages (Chart 2). In contrast, measures derived from financial market instruments currently provide a more reassuring picture. Although some of

Measures of long-term inflation expectations (around four to ten years ahead) have been more stable than shorter-term

(1) For a detailed explanation of the methodology behind these heat maps, see Anderson and Maule (2014).

Figure 1 Heat map for the levels, uncertainty and responsiveness of inflation expectations, May 2015^(a)

	Financial markets ^{(c)(j)}	Professional forecasters ^{(d)(k)}		Households			Companies ^(f)
	Swaps	Bank SEF	HM Treasury	Bank/GfK	Citigroup	Barclays Basix	CBI
Short-term expectations (one year) relative to							
– MPC's forecast ^(g)	More than 1 SD above	More than 1 SD above	More than 1 SD above	More than 1 SD above	More than 1 SD below	More than 1 SD below	More than 1 SD below
Medium-term expectations (two year) relative to							
– MPC's forecast ^(g)	More than 1 SD above	More than 1 SD above	More than 1 SD above	More than 1 SD below		More than 2 SD below	
Medium-term expectations (three year) relative to							
– whole-sample average	More than 1 SD above	More than 1 SD above	More than 1 SD above				
– post-crisis average ^(h)	More than 1 SD above	More than 1 SD above	More than 1 SD above				
– pre-crisis average ⁽ⁱ⁾	More than 1 SD above	More than 1 SD above	More than 1 SD above				
– MPC's forecast ^(g)	More than 1 SD above	More than 1 SD above	More than 1 SD above				
Longer-term expectations							
– whole-sample average	More than 1 SD above	More than 1 SD above	More than 1 SD above	More than 1 SD below	More than 1 SD below	More than 1 SD below	More than 1 SD below
– post-crisis average ^(h)	More than 1 SD above	More than 1 SD above	More than 1 SD above	More than 1 SD below	More than 1 SD below	More than 1 SD below	More than 1 SD below
– pre-crisis average ⁽ⁱ⁾	More than 1 SD above	More than 1 SD above	More than 1 SD above	More than 1 SD below	More than 1 SD below	More than 1 SD below	More than 1 SD below
Inflation uncertainty relative to							
– whole-sample average	More than 1 SD above	More than 1 SD above	More than 1 SD above				
– post-crisis average ^(h)	More than 1 SD above	More than 1 SD above	More than 1 SD above				
– pre-crisis average ⁽ⁱ⁾		Somewhat above average					
Longer-term expectations' responsiveness to							
– shorter-term inflation expectations ^(l)	Considerably above average	Considerably above average					
– CPI news ^(l)	More than 1 SD above						
– deviations of inflation from target ^(m)	More than 1 SD above						

Figure 2 Heat map for the levels, uncertainty and responsiveness of inflation expectations, May 2014^(b)

	Financial markets ^{(c)(j)}	Professional forecasters ^{(d)(k)}		Households			Companies ^(f)
	Swaps	Bank SEF	HM Treasury	Bank/GfK	Citigroup	Barclays Basix	CBI
Short-term expectations (one year) relative to							
– MPC's forecast ^(g)	More than 1 SD above	More than 1 SD above	More than 1 SD above	More than 1 SD above	More than 1 SD above	More than 1 SD above	More than 1 SD above
Medium-term expectations (two year) relative to							
– MPC's forecast ^(g)	More than 1 SD above	More than 1 SD above	More than 1 SD above	More than 1 SD below		More than 1 SD below	
Medium-term expectations (three year) relative to							
– whole-sample average	More than 1 SD above	More than 1 SD above	More than 1 SD above				
– post-crisis average ^(h)	More than 1 SD above	More than 1 SD above	More than 1 SD above				
– pre-crisis average ⁽ⁱ⁾	More than 1 SD above	More than 1 SD above	More than 1 SD above				
– MPC's forecast ^(g)	More than 1 SD above	More than 1 SD above	More than 1 SD above				
Longer-term expectations							
– whole-sample average	More than 1 SD above	More than 1 SD above	More than 1 SD above	More than 1 SD below	More than 1 SD below	More than 1 SD below	More than 1 SD below
– post-crisis average ^(h)	More than 1 SD above	More than 1 SD above	More than 1 SD above	More than 1 SD below	More than 1 SD below	More than 1 SD below	More than 1 SD below
– pre-crisis average ⁽ⁱ⁾	More than 1 SD above	More than 1 SD above	More than 1 SD above	More than 1 SD below	More than 1 SD below	More than 1 SD below	More than 1 SD below
Inflation uncertainty relative to							
– whole-sample average	More than 1 SD above	More than 1 SD above	More than 1 SD above				
– post-crisis average ^(h)	More than 1 SD above	More than 1 SD above	More than 1 SD above				
– pre-crisis average ⁽ⁱ⁾		Somewhat above average					
Longer-term expectations' responsiveness to							
– shorter-term inflation expectations ^(l)	Considerably above average	Considerably above average					
– CPI news ^(l)	More than 1 SD above						
– deviations of inflation from target ^(m)	More than 1 SD above						

Key for the levels of inflation expectations

More than 2 standard deviations (SD) above More than 1 SD above Within 1 SD More than 1 SD below More than 2 SD below

Key for uncertainty and responsiveness

Considerably above average Somewhat above average Around or below average

Sources: Bank of England, Barclays Capital, Bloomberg, CBI (all rights reserved), Citigroup, GfK, HM Treasury, ONS, YouGov and Bank calculations.

(a) Data are non seasonally adjusted. The latest data for the Bank and HM Treasury surveys of professional forecasters and the Bank/GfK household survey are for 2015 Q2. For the YouGov/Citigroup household survey, the data are for April 2015 and for the financial markets measure, the data are the averages for the 20 working days to 21 May 2015. For the CBI company and Barclays Basix survey, the latest data are for 2015 Q1.

(b) Data are non seasonally adjusted. The latest data for the Bank and HM Treasury surveys of professional forecasters and the Bank/GfK NOP and Barclays Basix household surveys are for 2014 Q2. For the YouGov/Citigroup household survey, the data are for May 2014 and for the financial markets measure, the data are the averages for the 20 working days to 20 May 2014. For the CBI company survey measures, the latest data are for 2014 Q1.

(c) Financial market measures for each horizon are instantaneous RPI inflation one, two and three years ahead and five-year, five-year forward RPI inflation, derived from swaps.

(d) Taken from the Bank's survey of external forecasters and HM Treasury's medium-term *Forecasts for the UK economy: a comparison of independent forecasts*.

(e) The household surveys ask about expected changes in prices but do not reference a specific price index, and the measures are based on the median estimated price change.

(f) Mean estimated price change for the distribution sector. Companies are asked about the expected percentage price change over the coming twelve months in the markets in which they compete.

(g) Comparisons use the MPC's modal projections for CPI inflation at the relevant horizon.

(h) Post-crisis averages run from 2009 Q1 to 2013 Q2.

(i) Pre-crisis averages run from the start of the series to 2007 Q4.

(j) Inflation uncertainty is measured by the standard deviation of the probability distribution of annual RPI inflation outcomes three years ahead implied by options. For the tests of whether longer-term inflation expectations have become more responsive to shorter-term inflation expectations and CPI news, instantaneous RPI inflation forward rates at horizons between one and ten years (derived from swaps) are used. For the test of whether longer-term inflation expectations have become more responsive to deviations of inflation from target, the monthly-average five to ten-year forward RPI inflation rate (derived from swaps) is used.

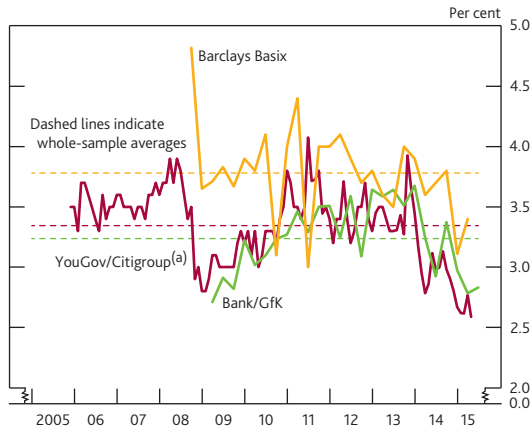
(k) Professional forecasters' uncertainty is calculated as the average probability that inflation will be more than 1 percentage point away from the target three years ahead, calculated from the probability distributions for inflation reported by forecasters responding to the Bank's survey.

(l) This tests whether inflation expectations are more responsive than during 2004–07.

(m) This tests whether inflation expectations are more responsive, relative to a null hypothesis of zero.

these measures have fallen slightly over the past year, most are currently around their historical averages and appear broadly consistent with the MPC’s forecasts.

Chart 2 Survey measures of households’ inflation expectations five years ahead



Sources: Bank/GfK, Barclays Capital, Citigroup, YouGov and Bank calculations.
 (a) YouGov/Citigroup measure is for inflation expectations five to ten years ahead.

These data, by themselves, do not provide an indication of the economic significance of the various measures of inflation expectations. The interpretation of these measures is also complicated by the fact that many do not provide a clean or direct signal of expectations of CPI inflation, the measure of inflation which the MPC targets. For example, household surveys do not refer to a specific price index, and financial market measures reference the retail prices index (RPI) rather than the MPC’s target measure of CPI, and are also affected by a number of market-specific factors unrelated to investors’ expectations of future inflation. The interpretation of recent moves in financial market measures is further discussed in a box on pages 172–73.

The remainder of this section discusses these movements in more detail and assesses the extent to which they could be signalling that inflation expectations have become less well anchored over the past year.

Assessing the extent to which expectations are anchored

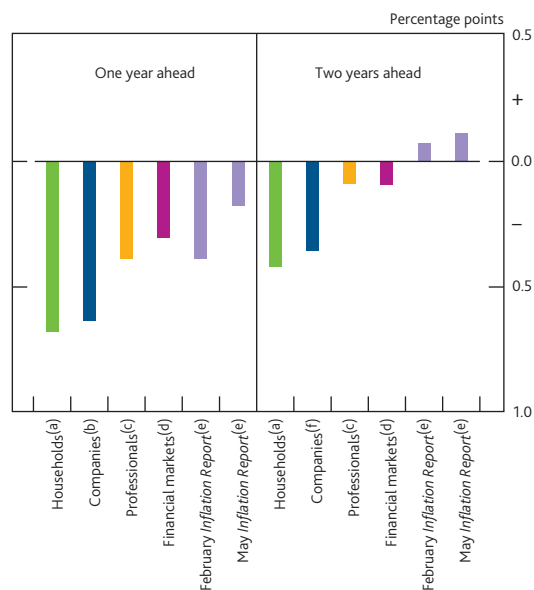
Short and medium-term inflation expectations

Measures of inflation expected one year ahead are likely to respond to news about the short-term outlook for the economy. Therefore the most recent falls in measures of one year ahead inflation expectations are likely to reflect the influence on the short-term outlook for inflation of the large falls in energy and food prices observed over the past year, rather than less well-anchored inflation expectations.

Even if deviations in inflation from the target were expected to persist for the next year, people should expect the MPC to return inflation to the target over the medium term if

expectations are well anchored. Measures of inflation expectations at slightly longer horizons, around two years ahead, might provide information on how quickly people expect inflation to return to target. **Chart 3** compares the changes since 2014 Q2 in the MPC’s forecasts for CPI inflation at the one and two-year horizons, against the equivalent changes for various measures of inflation expectations. Revisions to one year ahead household, company and professional forecasters’ expectations have been broadly similar to the change in the MPC’s CPI inflation projection in the February *Inflation Report*. At the two-year horizon, the MPC’s forecast is broadly unchanged, as it judged that the impact of the factors currently pushing down on inflation are likely to be temporary. Professional forecasters’ inflation expectations and inflation swaps two years ahead were also little changed. By contrast, households and companies have lowered their expectation for inflation two years ahead.

Chart 3 Changes in shorter-term inflation expectations since 2014 Q2



Sources: Bank of England, Bank/GfK, Barclays Capital, Bloomberg, Citigroup, CBI (all rights reserved), Deloitte, HM Treasury, YouGov and Bank calculations.

- (a) Based on average of expectations for inflation from the Bank/GfK, Barclays Basix and YouGov/Citigroup surveys for the one year ahead measure and from the Bank/GfK and Barclays Basix surveys for the two year ahead measure. These surveys do not reference a specific price index and are based on the median estimated price changes. The latest data for the Bank/GfK, Barclays Basix and YouGov/Citigroup surveys are for 2015 Q2, 2015 Q1 and April 2015 respectively.
- (b) Based on CBI data for the distributive sector. Companies are asked about the expected percentage change over the coming twelve months in the markets in which they compete. These expectations for the distributive sector have tended to track CPI inflation more closely than for other sectors. The latest data are for 2015 Q1.
- (c) Measures of one and two year ahead expectations are based on the Bank’s survey of external forecasters. The latest data are for 2015 Q2.
- (d) Based on one and two year ahead instantaneous forward RPI inflation swap rates. Change is between the average for 2014 Q2 and the average for the 20 working days to 21 May 2015.
- (e) Based on changes in the modal CPI inflation projections under market interest rates between the February 2015 and May 2014 *Inflation Reports* and May 2015 and May 2014 *Inflation Reports*.
- (f) Based on the average of the estimated median of expected CPI inflation rate two years ahead from the *Deloitte CFO Survey*. The latest data are for 2015 Q1. Change is since 2014 Q1.

The heat map assesses the extent to which, given these falls, the levels of indicators of short and medium-term inflation expectations are unusually out of line with the MPC’s own

projections for CPI inflation.⁽¹⁾ It suggests that the level of most measures of the medium-term inflation expectations for professional forecasters and those derived from financial market measures is broadly similar, by historical standards, to the MPC's forecast. As a result, most of the heat map cells for most of these measures two to three years ahead are green. However, the levels of inflation expectations from household surveys two years ahead appear to be unusually low relative to their past relationship with the MPC's forecast, suggesting that they may expect inflation to return to target more slowly than the MPC's projections (blue and dark blue heat map cells).⁽²⁾

Another way to assess whether or not the current level of medium-term inflation expectations is broadly where one might expect, given developments in other economic variables, is to use a statistical model. We can do this using a structural vector autoregression (SVAR) model, which estimates the historical relationships and interactions between a number of variables. We estimate an SVAR including households' two year ahead inflation expectations, CPI inflation, real GDP growth, wage growth, Bank Rate and real oil price inflation. By making particular assumptions about how these variables interact, inflation expectations can be decomposed into a component that would be expected, given how other variables have moved, and a component that is an unexpected shock.⁽³⁾

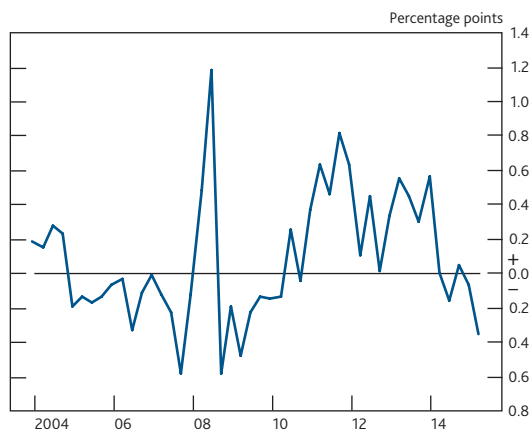
This model suggests that the recent falls in measures of households' two-year inflation expectations are slightly larger than can be accounted for by shocks to other macroeconomic variables. **Chart 4** shows that the component of inflation expectations two years ahead not explained by shocks to other variables in the model has become negative over the past year. This indicates that inflation expectations might currently be lower than can be explained by the contributions of shocks to other variables in the model, such as CPI inflation and GDP growth. Although this could indicate that households expect inflation to return to the target more slowly than in the past, the size of the unexplained component is currently fairly small relative to the past.

Long-term inflation expectations

We can also assess whether measures of long-term inflation expectations appear stable at levels consistent with the inflation target. Assessing whether indicators of long-term inflation expectations are consistent with the inflation target is complicated, however, by the fact that many measures — such as household surveys and financial market instruments — do not directly reference CPI inflation.

One way, therefore, to assess whether long-term inflation expectations are consistent with well-anchored expectations is to compare them against their series averages. If inflation expectations were well anchored in the past, deviations in

Chart 4 SVAR model estimate of the unexplained component of two year ahead inflation expectations^{(a)(b)}



Sources: Bank of England, Barclays Capital, Bloomberg, GfK, ONS and Bank calculations.

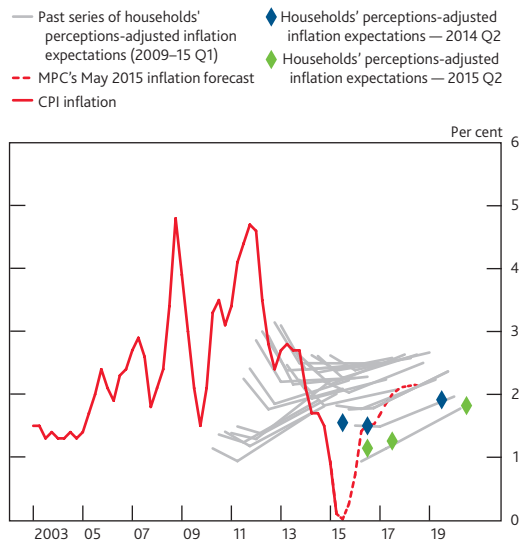
- (a) The SVAR model includes: average earnings growth, CPI inflation, GDP growth, Bank Rate, real oil price inflation and two year ahead household inflation expectations. The model is estimated using data from 1993 Q1 to 2015 Q1. The inflation expectations series is based on the Barclays Basix series. From 2010, the Basix survey is spliced forward using changes in inflation expectations at the two-year horizon in the Bank/GfK survey. The Bank/GfK measure has been spliced to abstract from volatility in the Barclays Basix measure. Earnings growth is based on the quarterly average of average weekly earnings. Prior to 2000, data are projected backwards using the average earnings index.
- (b) The blue line shows the contribution to deviations in two year ahead inflation expectations from trend of past and contemporaneous shocks to inflation expectations unexplained by other economic variables in the model.

measures of inflation expectations from their historical averages might indicate that inflation expectations have become less well anchored. The latest reading in all three survey measures of households' long-term inflation expectations lies below their historical averages, although all these measures have relatively short back runs. The current level of the Citigroup survey, which is the only measure to start before the financial crisis, is 0.7 percentage points — or just over two standard deviations — below its series average (**Table A**). As a result, measures of long-term household inflation expectations are either blue or dark blue in the heat map when assessed against either their pre or post-crisis averages (see **Figure 1**).

Although the household section of the heat map has cooled significantly over the past year or so, there are also reasons why this might not cause concern. First, adjusting for the average difference between perceived and actual CPI inflation where possible, households currently expect inflation to be around 1.8% in five years' time, close to the inflation target of 2% (**Chart 5**). According to this measure, households do expect inflation to increase more slowly than is projected by the MPC, however. Second, there is currently little sign that the current very low rate of inflation has caused households to expect a prolonged period of falling prices in the future.

- (1) 'Unusually' here means that the unexplained difference between the measure of inflation expectations and the MPC's inflation forecast at the same horizon is greater than one standard deviation of the past unexplained differences.
- (2) Data on companies' two year ahead inflation expectations have only a short back run, so there are not enough observations to assess the level of this measure in line with the heat map methodology.
- (3) In particular, we assume inflation expectations are affected by other variables in the model, such as inflation, with a lag. See Barnett, Groen and Mumtaz (2010) for further details.

Chart 5 Term structure of households' inflation expectations, adjusted for inflation perceptions^(a)



Sources: Bank of England, GfK, ONS and Bank calculations.

(a) Although household surveys do not ask directly about CPI inflation, we can use information about households' perceptions of past inflation from the Bank/GfK survey to make the level of their expectations more comparable to the Bank's inflation target. The blue and green diamonds show households' reported inflation expectations one, two and five years ahead from the Bank/GfK survey less the average difference between the perceived inflation rate reported by households and CPI inflation between 1999 Q4 and 2015 Q1, which is 1 percentage point.

According to the latest Bank/GfK survey, the proportion of households expecting flat or falling prices in five years' time is broadly in line with historical averages.

Measures of expectations derived from financial markets and professional forecasters show few signs of having been significantly affected by the recent period of low inflation, although both sets of measures have fallen slightly over the past year. Measures derived from financial markets remain broadly in line with pre and post-crisis averages. And while some survey measures of professional forecasters are currently below their pre and post-crisis averages, warranting blue cells in the heat map, they remain reasonably close to the MPC's inflation target.

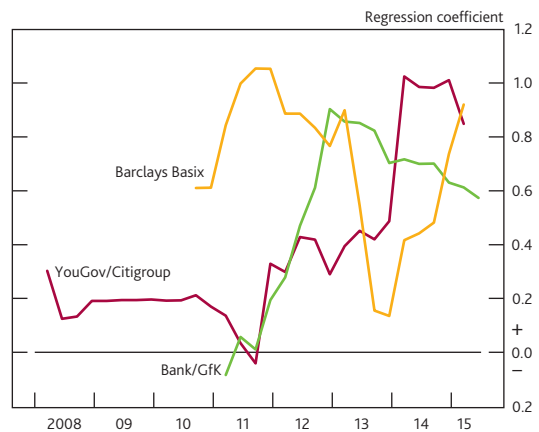
Another way to assess if long-term inflation expectations have become less well anchored is to test whether their sensitivity to economic developments has increased. If people are confident that deviations in inflation will be temporary and that the MPC will deliver inflation back to target in the medium term, short-term developments should have little impact on their expectations for inflation further out.

Financial market measures do not appear to have become significantly more responsive than usual to short-term economic news over the past year. Regressions of inflation swap rates on unexpected CPI inflation outturns or deviations in CPI inflation from the target indicate that they have not been statistically significantly more sensitive to news than before the crisis. This is shown by the two green cells at the bottom of **Figure 1**.⁽¹⁾ And while the responsiveness of

long-term measures to short-term inflation expectations is above average (the black heat map cell), the absolute level of sensitivity is still fairly low.

But there are tentative signs that household measures of long-term inflation expectations may have become more sensitive to the short-term outlook for inflation since the start of the financial crisis. This higher sensitivity has persisted over the past year. **Chart 6** shows how the estimated sensitivity of long-term inflation expectations to one year ahead expectations has changed over time. The YouGov/Citigroup measure, which has the longest back run, appears to have become more sensitive to changes in short-term inflation expectations since the start of the crisis. The results for the other two surveys are harder to interpret given the data started more recently, but are broadly consistent with those for the YouGov/Citigroup survey. This could indicate that households expect deviations in short-term inflation expectations to be more persistent than before. Given the short back run of these surveys, however, it is not possible to establish how unusual this post-crisis increase in responsiveness is.

Chart 6 Two-year rolling estimates of changes in longer-term household inflation expectations in response to a 1 percentage point increase in one year ahead expectations^(a)



Sources: Bank of England, Barclays Capital, Citigroup, GfK, YouGov and Bank calculations.

(a) The lines show the estimated coefficients from two-year rolling regressions of quarterly changes in five or five to ten-year inflation expectations from each survey on the equivalent change in the one year ahead measure.

Uncertainty about inflation

Inflation expectations could also become less well anchored if individuals became more uncertain about how the MPC will react to future developments in the economy.

Various measures suggest that although uncertainty about future inflation is currently elevated compared to the pre-crisis period, it has not increased significantly with the recent fall in inflation. The proportion of households who were fairly or

(1) See Anderson and Maule (2014) for further details of this methodology.

What do financial market measures of inflation expectations tell us?

Financial markets offer a complementary, and higher frequency, insight into inflation expectations to survey-based measures. Both short and long-term sterling inflation swap rates⁽¹⁾ fell in late 2014, but have risen in recent months (**Chart A**). This box explores what has been behind these movements and what signal about inflation expectations can be taken from inflation swap rates.

Chart A UK three-year spot and five-year, five years forward inflation swap rates^(a)



Sources: Bloomberg and Bank calculations.

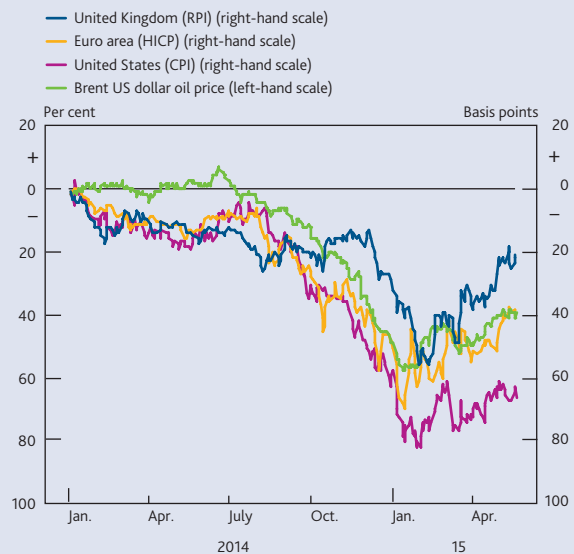
(a) RPI-linked instruments.

What has driven inflation swap rates over the past year?

There have been sizable movements in short and longer-maturity UK inflation swap rates over the past year, with a large fall in late 2014, which partially unwound in recent months. There were broadly similar moves in comparable US and euro-area measures (**Chart B**). The fall in these inflation swap rates coincided with a weakening in the inflation outlook globally, including a fall in the oil price of around 50%.

As discussed on page 166, movements in short-term measures of inflation expectations are often affected by developments in the economy. Like short-term survey-based measures, short-term inflation swap rates tend to vary as the economic outlook changes. And so the large change in oil prices over the past year might be expected to affect inflation expectations at short horizons, but not at longer horizons. A rise or fall in oil prices should affect the price level, feeding through to inflation and short-run inflation expectations, including via second-round effects.⁽²⁾ But it should not be expected to affect inflation expectations beyond the next few years. This is borne out by historical relationships, which show that

Chart B Cumulative changes in UK, US and euro-area five-year, five years forward inflation swap rates and the Brent US dollar oil price since January 2014



Sources: Bloomberg, Thomson Reuters Datastream and Bank calculations.

changes in UK five-year, five years forward inflation swap rates do not appear to be affected in a statistically significant way by changes in the oil price.⁽³⁾ Moreover, for the United Kingdom, longer-horizon forward inflation swap rates have a fairly low sensitivity to short-term inflation swap rates in general (**Chart C**).

Another possible explanation for the moves in inflation swap rates is changes in 'risk premia': the compensation risk-averse investors demand for taking risk. Inflation swap rates encompass both investors' expectations for future inflation outturns, and compensation for risks such as uncertainty about future inflation and for potential illiquidity. Under standard asset pricing theory, the size of 'inflation risk premia' will reflect investors' uncertainty about future inflation, and the degree of investor risk aversion. But the perceived asymmetries in inflation risks — whether investors are more worried about high inflation or deflation, rather than just uncertainty — may also drive the dynamics of inflation risk premia.⁽⁴⁾ So the fall in inflation swap rates coinciding with the oil price fall may have reflected a shift in the balance of future risks to inflation, with very high inflation outcomes perhaps perceived as less likely.

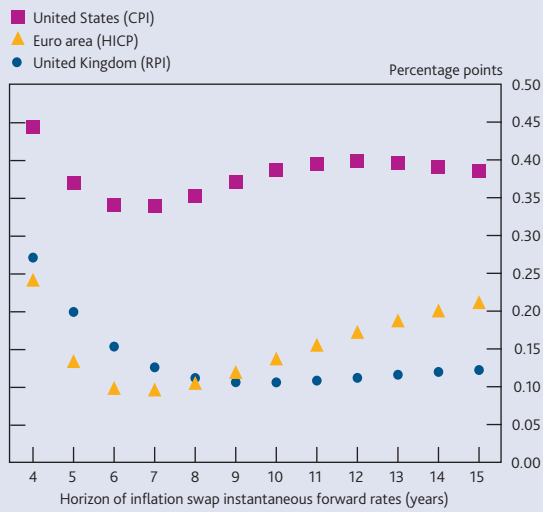
(1) Inflation swap rates are the market price of derivatives that directly reference inflation. They allow counterparties to exchange a fixed interest rate for variable payments linked to inflation. Financial market inflation expectations can also be inferred from index-linked bonds. See Hurd and Relleen (2006).

(2) Second-round effects include the impact of inflation on wages and inflation expectations, feeding back into inflation.

(3) This is based on regressing daily changes in five-year, five years forward inflation swap rates on daily changes in the dollar oil price (and lagged values of oil and the dependent variable) over the period January 2009 to June 2014.

(4) See Garcia and Werner (2010).

Chart C Estimated changes in instantaneous forward inflation swap rates in response to a 1 percentage point change in the three-year spot inflation swap rate^(a)



Sources: Bloomberg and Bank calculations.

(a) The average changes are estimated using the slope coefficients from regressions of daily changes in instantaneous inflation forward swap rates at each horizon on the daily change in the three-year spot inflation swap rate. Sample period is from January 2009 to December 2014.

Other factors may have also played a role in the pattern of moves in UK longer-term inflation swap rates. For example, the Bank’s market contacts report that these rates might have fallen further in 2014 Q4 were it not for increased demand for inflation hedging at that time from institutional investors. There is structural demand for inflation hedging from these investors, in particular defined benefit pension funds, which have liabilities linked to inflation. This can push up levels of medium and long-maturity UK inflation swap rates — particularly as potential pension fund demand far exceeds the supply of index-linked bonds.⁽¹⁾ And the Bank’s market

very confident that inflation would be close to the target in the medium term increased to 49% in the February 2015 Bank/GfK survey, the highest since the question was first asked in 2011 and up from 37% in February 2014. The average probability that professional economists attached to CPI inflation being more than 1 percentage point above or below the target in the medium term fell slightly over the past year, but remains broadly consistent with the elevated level of uncertainty since the start of the crisis (Chart 7). Uncertainty about future inflation implied by options on RPI inflation was broadly unchanged.

Taken together, the range of indicators which the MPC monitors indicates that inflation expectations remain broadly consistent with the 2% target, although the decline in households’ longer-term measures is a risk to monitor. The main channels through which less well-anchored inflation expectations might affect inflation are discussed in the next section.

contacts thought this hedging activity increased towards the end of 2014, perhaps reflecting pension funds seeking to meet end-of-year de-risking targets. Inflation hedging activity is also reported to have continued to support the level of UK inflation swap rates in 2015.

What does the level of longer-term inflation swap rates tell us about inflation expectations?

Although they have risen in recent months, longer-term inflation swap rates have fallen over the past year. And their levels remain broadly in line with pre-crisis averages. But, as well as being affected by changes in risk premia, the level of inflation swap rates cannot be read as a direct estimate of CPI inflation, the measure targeted by the MPC. The vast majority of sterling-denominated inflation-linked instruments reference the retail prices index (RPI) rather than CPI.⁽²⁾ So an estimate of the expected ‘wedge’ between RPI and CPI inflation is needed to gauge expectations of CPI from these instruments.⁽³⁾ The Bank’s market contacts estimate the long-run RPI-CPI wedge to be around 80–100 basis points. While this estimate is slightly higher than pre-crisis, it is not thought to have materially changed in the past year.

The changes in longer-term inflation swap rates over the past year have been reasonably large relative to historic movements. But while the factors discussed in this box mean it is difficult to read investors’ CPI inflation expectations from these instruments, the level of longer-term UK inflation swap rates seems broadly consistent with the MPC’s 2% target.

(1) See McGrath and Windle (2006).
 (2) While inflation swaps referencing CPI do exist, they are not widely traded.
 (3) For a discussion of the factors affecting the long-run RPI-CPI wedge, see a box on page 34 of Bank of England (2014).

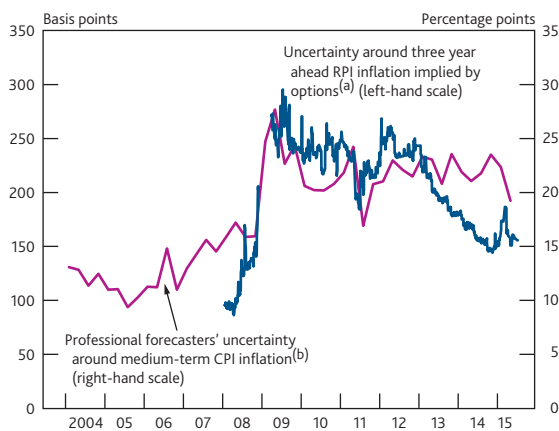
Assessing the impact of changes in inflation expectations on inflation

CPI inflation fell to -0.1% in April 2015. The MPC judges that around three quarters of the recent weakness in inflation relative to the 2% target can be attributed to smaller-than-average contributions from energy, food and other goods prices.⁽¹⁾ The remaining one quarter, or around half a percentage point, is judged to reflect domestic factors. These domestic factors are likely to reflect factors such as slack in the labour market.

Previous falls in households’ inflation expectations, however, do not appear to be a large driver of the current weakness in inflation. One way of assessing whether changes in inflation expectations have contributed to inflation is to use the SVAR

(1) See Bank of England (2015a).

Chart 7 Uncertainty around three year ahead inflation for professional forecasters and financial market participants

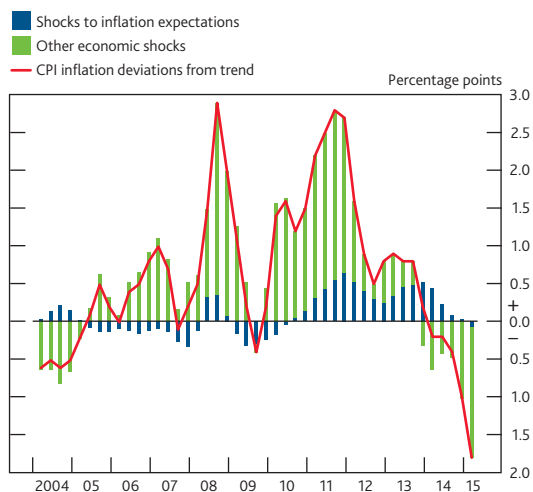


Sources: Bank of England, Bloomberg and Bank calculations.

- (a) Standard deviation of the probability distribution of annual RPI inflation outturns three years ahead implied by options. It is not possible to construct a full set of probability distributions for some days due to technical reasons.
- (b) Professional forecasters' uncertainty is calculated as the average probability that inflation will be more than 1 percentage point away from the target, calculated from the probability distributions for inflation reported by forecasters responding to the Bank's survey. Forecasters' reported probability distributions for CPI inflation two years ahead between February 2004 and February 2006; and for CPI inflation three years ahead from May 2006 onwards.

model discussed in the previous section. That model allows us to identify the independent effect of a particular variable on inflation. **Chart 8** shows how CPI inflation is estimated to have been affected by past and contemporaneous shocks to inflation expectations. It suggests that while shocks to inflation expectations may have pushed up on CPI inflation somewhat in recent years, this effect has since waned and the current impact on inflation is small.⁽¹⁾

Chart 8 Historical decomposition of movements in CPI inflation relative to trend^(a)



Sources: Bank of England, Barclays Capital, Bloomberg, GfK, ONS and Bank calculations.

- (a) Deviations in CPI inflation from the model-implied trend over the period 1993 Q1 to 2015 Q1.

Although the impact of lower inflation expectations on the current rate of inflation appears small, there is a risk that they could lead to weak inflation becoming more persistent in the

future. There are several channels through which this may happen.⁽²⁾ The remainder of this section explores the evidence on two of these channels, in particular: wage-setting and the real interest rate channel. A box on page 179 discusses the latest evidence on awareness of, and satisfaction with, the MPC's conduct of monetary policy.

Wage-setting

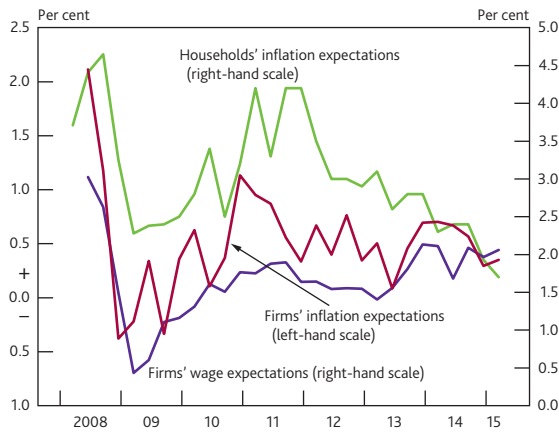
One important channel through which inflation expectations might affect the persistence of inflation is wage bargaining between households and firms. Indeed, a net balance of around 30% of companies thought inflation expectations were likely to bear down on labour cost growth — of which wages are an important part — in 2015 relative to 2014, according to a recent survey by the Bank's Agents.⁽³⁾ If firms expect inflation in their industry to remain low, they might offer smaller increases in nominal wages in order to preserve their margins. Alternatively, if households expect inflation to remain low, they may not push as hard for nominal wage increases, or firms may be able to retain staff without offering large pay rises. Lower wage growth may, in turn, reduce inflationary pressure further if it leads firms to reduce future price increases or if it results in lower real disposable income for households.

Although both households' and companies' expectations are likely to affect the outlook for wages, this analysis focuses on household measures. This is because data on companies' expectations are relatively scarce. But households' expectations may also be a reasonable proxy for companies' expectations.⁽⁴⁾ **Chart 9** suggests that the two have tended to move broadly together over the past few years.

Empirical estimates suggest a positive relationship between wage growth and inflation expectations. In particular, standard estimates of wage equations, which assess the significance of various factors that might affect wage growth, suggest that there has been a positive association between wage growth and inflation expectations in the United Kingdom in recent decades (**Table B**). The strength of the estimated relationship between inflation expectations and wage growth, however, varies depending on the chosen econometric approach and sample. For instance, the correlation between wage growth and inflation expectations in this specification is insignificant when only the period after the introduction of inflation targeting in 1992 is considered.⁽⁵⁾

- (1) The size of the impact of inflation expectations shocks on current inflation is sensitive to the identification scheme and model specification.
- (2) For a comprehensive description of the channels through which inflation expectations could affect the persistence of inflation, see Maule and Pugh (2013).
- (3) From the Bank of England Agents' survey on pay and labour costs. Companies' responses are weighted by number employed. See Bank of England (2015b).
- (4) Coibion, Gorodnichenko and Kumar (2015) find that New Zealand firms' inflation expectations tended to be more like those of households than those of professional forecasters. Bryan, Meyer and Parker (2014) found that US firms' expectations are like those of professionals when both are asked about their expected inflation rate.
- (5) Maule and Pugh (2013) find a significant correlation between inflation expectations and wage growth over the period 1993 Q1 to 2006 Q4, using a different model specification.

Chart 9 Households' and firms' short-term inflation expectations^(a)



Sources: Barclays Capital, CBI (all rights reserved) and Bank calculations.

(a) Households' inflation expectations are based on the one year ahead Barclays Basix series. Firms' inflation expectations are from the CBI surveys and reflect companies' expectations of prices twelve months ahead in their own industry. Firms' wage expectations are from the same survey and reflect companies' expectations of changes in their own wages and salary cost per employee, including overtime and bonuses. Both CBI series are based on the manufacturing, services and distribution sectors, weighted using nominal shares in value added.

Table B Relationship between inflation expectations and wages^(a)

Dependent variable:

Nominal wage growth^(b)

Wage growth ($t-1$) ^(b)	-0.33*** (0.09)
Private sector productivity growth ^(c)	0.37*** (0.10)
Unemployment gap ^(d)	-2.29*** (0.41)
Private sector labour share ($t-1$) ^(e)	-1.51*** (0.38)
Two-year ahead household inflation expectations ($t-1$) ^(f)	1.28*** (0.30)
Constant	1.65 (1.06)
Observations	100
R-squared	0.45

Robust standard errors in parentheses. Three stars, two stars and one star denote statistical significance at the 1%, 5% and 10% levels, respectively.

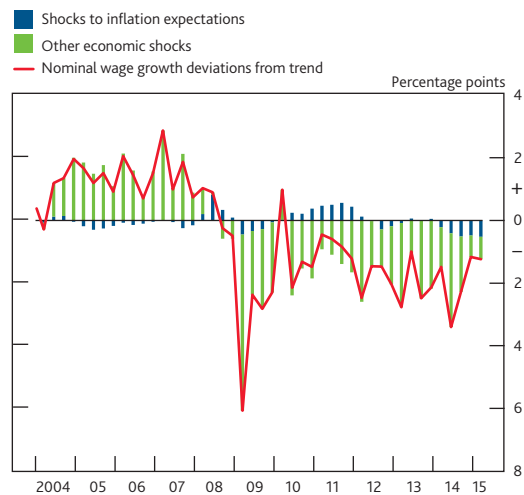
Sources: Bank of England, Barclays Capital, ONS and Bank calculations.

- (a) Estimated using quarterly data between 1990 Q1 and 2015 Q1. Data are seasonally adjusted.
- (b) Annualised quarter-on-quarter growth of private sector total average weekly earnings.
- (c) Annualised quarter-on-quarter growth of private sector gross value added per job.
- (d) The unemployment gap is defined as the unemployment rate minus the Bank staff's estimate of the steady-state unemployment rate.
- (e) The private sector labour share is defined as total average weekly earnings by private sector employees, divided by nominal market sector gross value added.
- (f) Barclays Basix two year ahead household expectations.

Another way to examine the interaction between wages and inflation expectations is to use a structural model. Models such as the SVAR discussed earlier are particularly helpful in isolating the impact of inflation expectations on wages, as they attempt to control for additional feedback effects from other relevant economic variables such as GDP growth and inflation, as well as from wages to inflation expectations. **Chart 10** uses the SVAR model to estimate the extent to

which recent wage growth has been affected by shocks to inflation expectations. Shocks to inflation expectations appear to have had some effect, pushing down recent wage growth relative to its model-implied trend by around half a percentage point, although they would also reflect the impact of factors omitted from the model.⁽¹⁾

Chart 10 Historical decomposition of movements in nominal wage growth relative to trend^(a)



Sources: Bank of England, Barclays Capital, Bloomberg, GfK, ONS and Bank calculations.

(a) Deviations in nominal wage growth from the model-implied trend over the period 1993 Q1 to 2015 Q1.

The evidence from surveys is unclear about whether changes in inflation expectations have affected companies' or individuals' expectations for future wage growth. Companies' expectations about wage growth are little changed compared with a year ago, despite the fall in their inflation expectations (**Chart 9**). But, given recent falls in unemployment, it might be surprising that wage expectations have not risen. Households' own expectations of wage growth appear to have weakened slightly over the past year. According to a recent survey by the CIPD, the mean of expected pay growth of employees was lower in 2015 than in 2014.⁽²⁾ But it is not clear whether this reflects weakness in employees' inflation expectations or the influence of other factors. According to a new question in the February 2015 Bank/GfK inflation attitudes survey about expected earnings growth, there appeared to be little correlation between individuals' inflation expectations in a year's time and their expected increase in earnings. This suggests that individuals' low wage expectations might not reflect their own low inflation expectations.

(1) See Bank of England (2015a) for a wider discussion of the factors behind the weak wage growth over the last year.
 (2) See *Employee outlook: focus on employee attitudes to pay and pensions*, Winter 2014–15. The CIPD is the Chartered Institute of Personnel and Development, the professional body for HR and people development.

Overall, the evidence presented in this section suggests that inflation expectations might affect wage growth. But, while there is some tentative evidence that they may have affected recent wage growth, the effect does not appear to be large.

The real interest rate channel

Less well-anchored inflation expectations could also affect future inflation by influencing households' and companies' spending decisions. One risk, in particular, is that very low inflation expectations may incentivise households to delay spending and companies to delay investment.

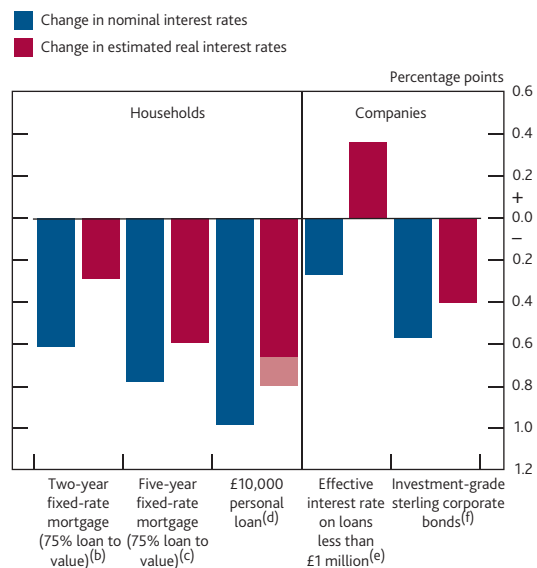
The incentive to save rather than spend is influenced by real interest rates — that is, nominal interest rates adjusted for expected inflation. If inflation expectations are reasonably stable, changes in real interest rates should largely reflect changes in nominal interest rates. But if households' and companies' inflation expectations fall and nominal interest rates remain unchanged, the real interest rates they face could increase. As higher real interest rates increase the real returns from saving and the real cost of servicing nominal debt, this could lead households and companies to postpone some spending and investment.⁽¹⁾

The real interest rates faced by people in the economy will vary according to the nominal interest rates they face and their own inflation expectations. **Chart 11** shows how a range of nominal and estimated real interest rates have changed for households and companies over the past year. Although nominal interest rates for households and companies have fallen over the past year, estimates of real interest rates have fallen by less or increased because of falls in inflation expectations. This change in real interest rates points to a smaller increase in monetary stimulus than would otherwise be implied by the fall in nominal rates.

The importance of this channel depends on how households and companies react to changes in real rates caused by changes in their inflation expectations. On the one hand, companies and households may judge that a change in real interest rates alters the real returns from saving and investment, and so adjust their spending decisions. On the other, it could be that the impact of changes in nominal interest rates on companies' and households' cash flows may be more important for spending decisions than changes in real interest rates.⁽²⁾

The empirical evidence on this issue is mixed. Economic theory suggests that real interest rates should have the most impact on spending decisions that are relevant not just for today but for future periods, such as spending on investment or on durable goods like cars and electrical goods.⁽³⁾ Recent studies of US consumers have found, however, that there was little correlation across individuals between their expected

Chart 11 Changes in nominal and estimated real interest rates since 2014 Q2^(a)



Sources: Bank of England, BofA Merrill Lynch Global Research, used with permission, Bloomberg, CBI (all rights reserved) GfK and Bank calculations.

- Real rates are estimated by subtracting the change in inflation expectations at the appropriate horizon from the change in nominal interest rates since 2014 Q2.
- The change in two-year spot household inflation expectations is estimated from the one year ahead and two year ahead household inflation expectations from the Bank/GfK survey for 2014 Q2 and 2015 Q2. The change in nominal interest rates is between the average rate for 2014 Q2 and April 2015.
- The change in five-year spot household inflation expectations is estimated from the one year ahead, two year ahead and five years ahead household inflation expectations from the Bank/GfK survey for 2014 Q2 and 2015 Q2. The change in nominal interest rates is between the average rate for 2014 Q2 and April 2015.
- Data on personal loan rates include a range of fixation periods. The red bar indicates the change in real rates estimated using the change in two-year spot household inflation expectations from the Bank/GfK survey between 2014 Q2 and 2015 Q2. The combined red and pink bars indicate the change in real rates estimate using the change in five-year spot household inflation expectations from the Bank/GfK survey between 2014 Q2 and 2015 Q2. The change in nominal interest rates is between the average rate for 2014 Q2 and April 2015.
- Calculated using the change in the CBI survey data for the distributive trade sector between 2014 Q2 and 2015 Q1. Companies are asked about the expected percentage price change over the coming twelve months in the market in which they compete. The change in nominal interest rates is between the average rate for 2014 Q2 and April 2015.
- Calculated using the change in five-year spot inflation swap rates between the average rate for 2014 Q2 and 30 April 2015. The change in nominal interest rates is between the average rate for 2014 Q2 and 30 April 2015. The change in nominal interest rates is calculated using the Merrill Lynch Sterling Industrial Index for corporate bonds of a maturity between three and seven years.

rate of inflation and actual or expected spending on such durable goods.⁽⁴⁾ Other studies have, though, found a positive association between inflation expectations and spending. D'Acunto, Hoang and Weber (2015) examine individual responses to the European Commission Consumer Survey conducted by GfK in Germany and find that there is a positive correlation between individuals' inflation expectations and their willingness to purchase durable goods.

To extend the pool of evidence, we examine the relationship between inflation expectations and the willingness to purchase durable goods across a range of European economies. Based on data from the European Commission Consumer Survey for 26 countries since 1993, we estimate the relationship between aggregate one year ahead inflation

(1) See Bank of England (2015a) and Broadbent (2015) for a discussion of the economics of deflation.

(2) See Miles (2015).

(3) See Bachmann, Berg and Sims (2015).

(4) See Bachmann, Berg and Sims (2015) and Burke and Ozdagli (2013).

expectations and the aggregate response of whether it was a good time to make major purchases.⁽¹⁾ These estimates attempt to control for other factors that might also influence consumers' willingness to spend, such as expectations for their own financial situation and the state of the economy. We find that an increase in inflation expectations, which would push down real interest rates, is associated with an increase in the aggregate willingness to make major purchases, controlling for other factors that might also affect willingness to spend (Table C). Conversely, an increase in the central bank's nominal policy rate, which pushes up real interest rates, decreases willingness to spend.

Table C Relationship between inflation expectations and willingness to make major purchases across countries^{(a)(b)}

Dependent variable:
Willingness to make major purchases^(c)

Central bank policy rate	-0.961*** (0.078)
Inflation expectations (one year ahead) ^(c)	0.312*** (0.016)
Past inflation ^(c)	-0.200*** (0.010)
Expected general economic situation (one year ahead) ^(c)	0.387*** (0.023)
Expected household financial situation (one year ahead) ^(c)	0.424*** (0.033)
Expected general economic situation interacted with expected inflation ^(c)	-0.004*** (0.001)
Constant	17.842*** (4.833)
Observations	5,612
R-squared	0.83
Number of countries ^(d)	26

Robust standard errors in parentheses. Three stars, two stars and one star denote statistical significance at the 1%, 5% and 10% levels, respectively.

Sources: Thomson Reuters Datastream, European Commission and Bank calculations.

(a) Estimated between January 1993 and April 2015 using monthly data. The data are bounded between -100 and 100. The interaction term between expected general economic situation and expected inflation is bounded between -10,000 and 10,000.

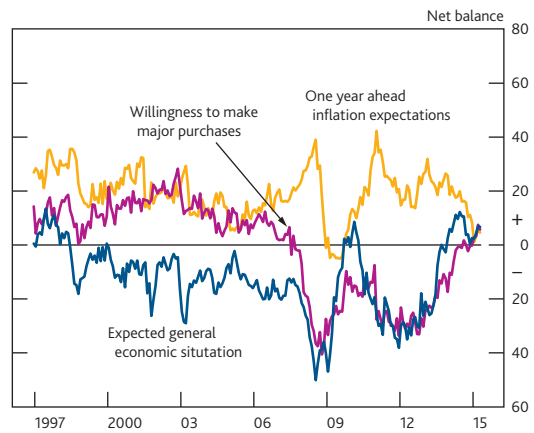
(b) As these data are in panel form, the regression is estimated with fixed effects that control for the characteristics of countries that are constant over time. This allows the regression to control for time-invariant factors specific to each country that might affect households' willingness to make major purchases. It is also estimated with time fixed effects to control for omitted variables that might vary over time but not across countries.

(c) Data are net percentage balances and seasonally adjusted.

(d) These countries are the member states of the European Union sampled by the European Commission Consumer Survey. Latvia and Lithuania were dropped from the regressions due to a small sample size.

These results provide tentative evidence that inflation expectations, as well as nominal interest rates, may matter for households' spending decisions. However, while inflation expectations have fallen in the United Kingdom over the last year, willingness to spend on durables has risen (Chart 12). This could suggest that any impact of inflation expectations on consumers' willingness to spend has been offset by other factors, such as positive expectations for the economic outlook or the boost to real incomes from lower inflation.⁽²⁾ In addition, many real rates for consumers have fallen overall because of larger falls in nominal interest rates over the last year (Chart 11).

Chart 12 Inflation expectations, willingness to make major purchases and consumer confidence in the United Kingdom



Source: European Commission.

In order to gauge the impact of inflation expectations on both investment and consumption growth, we include these variables in the SVAR model discussed earlier in this article.⁽³⁾

Chart 13 compares the responses of the growth of consumption of durable and non-durable goods and total investment to an unanticipated increase in inflation expectations. The initial response of total investment growth is positive and statistically significant. The responses of durable and non-durable consumption growth are also initially positive, but both are statistically significant for only one quarter. This provides some tentative support for a real interest channel in the United Kingdom. The estimated contribution in this model of inflation expectations to the current growth of consumption or investment, however, is reasonably modest.

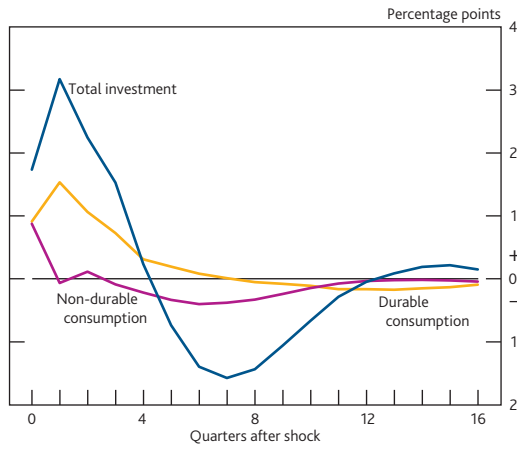
The evidence presented in this section suggests some tentative support for a channel through which inflation expectations affect spending through changes in real interest rates. But lower inflation expectations do not appear currently to be having a large effect on consumers' or companies' spending.

(1) The European Commission Consumer Survey asks individuals 'In view of the general economic situation, do you think now is the right time for people to make major purchases such as furniture or electrical goods?'. The aggregate data report a net percentage balance of whether individuals thought that it is a good time, a bad time or neither. Although these data do not measure actual spending, willingness to spend has been positively correlated with data on the consumption of durable goods in the United Kingdom. The survey also asks those same individuals how they think prices have changed over the last year, and how they think they will evolve over the next year compared to the last year.

(2) See Broadbent (2015).

(3) As in the original model discussed earlier in the article, the shock to inflation expectations is identified by assuming that inflation expectations react to shocks to other variables in the model, including real consumption and investment growth, with a lag.

Chart 13 Impulse responses of real durable and non-durable consumption and total investment growth to a positive 1 percentage point shock to households' inflation expectations^(a)



Sources: Bank of England, Barclays Capital, Bloomberg, GfK, ONS and Bank calculations.

(a) This chart shows results from the same model described in **Chart 4**, but augmented to include real growth in the consumption of durable and non-durable goods and real growth in total investment. The model is estimated over the period 1993 Q1 to 2014 Q4. It shows the impact of a one-period shock to households' two year ahead inflation expectations on year-on-year real growth in the consumption of durable and non-durable goods and in total investment.

Conclusion

Measures of inflation expectations have generally fallen over the past year, at short and longer-term horizons. Taken together, however, the range of indicators which the MPC monitors is broadly consistent with inflation expectations remaining anchored to the target, although the decline in longer-term household measures is a risk to monitor.

There are few signs that weaker inflation expectations have weighed on CPI inflation significantly so far. Although there appears to be some evidence that inflation expectations may have affected wages and spending on average over the past, the current effect does not appear large. A prolonged period of below-target inflation, however, could risk inflation expectations becoming less well anchored, which may in turn affect people's behaviour in the economy and the persistence of inflation. The MPC will continue to closely monitor and assess these developments.

Public attitudes to monetary policy and satisfaction with the Bank

The Bank's success in meeting its objective of price stability depends, in part, on the credibility and the public's understanding of the monetary policy framework. This box examines the latest results from the Bank/GfK survey concerning households' awareness of monetary policy and their satisfaction with the way the Bank is conducting monetary policy, drawing on the results of some additional questions included in the February 2015 survey.

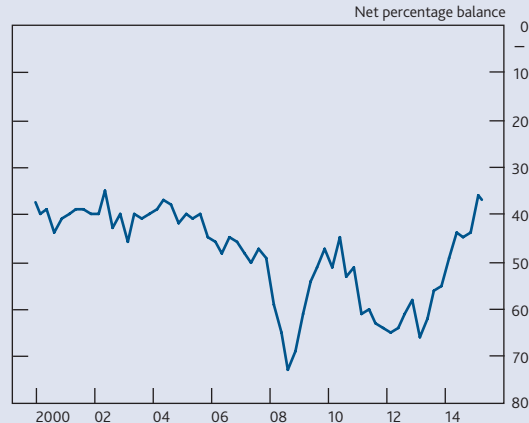
Public awareness of the Bank and monetary policy has remained broadly stable over the past year. In the February 2015 survey, 39% of respondents were able to name, unprompted, the MPC or the Bank of England as the group that sets the United Kingdom's basic interest rate each month. This was in line with previous surveys.

The level of understanding among households of the way in which monetary policy affects inflation — the transmission mechanism — has also remained broadly stable over time. Economists generally believe that a rise in Bank Rate would tend to push down inflation one or two years ahead. This is because higher interest rates would reduce demand and therefore weaken companies' ability to charge higher prices. 37% of respondents agreed with this view in February 2015, which is close to the series average although slightly higher than in the February 2014 survey.

Support for the Bank's objective of maintaining low and stable inflation appeared to remain strong. In May 2015, just over a half thought that the Government's inflation target of 2% was about right. And 58% preferred to raise interest rates to keep inflation down, while only 18% preferred to keep interest rates low and accept higher inflation, according to the February 2015 survey. The balance of respondents who thought that the economy would be stronger if prices started to increase faster rose over the past year (Chart A). This rise may reflect the fact that the current rate of inflation is at historically low levels. On balance, however, households continued to believe that the economy would be weaker if prices increased faster.

The Bank/GfK survey also monitors public awareness of (and expectations for) interest rate changes. In May 2015, 46% of respondents thought that interest rates on things such as mortgages, bank loans and savings had stayed about the same over the past twelve months. In February 2015, around a half expected Bank Rate — the interest rate set by the Bank of England — to be between 0% and 1% in a year's time, compared to its current level of 0.5%.

Chart A Would Britain's economy be stronger or weaker if prices rose faster than they do now?(a)

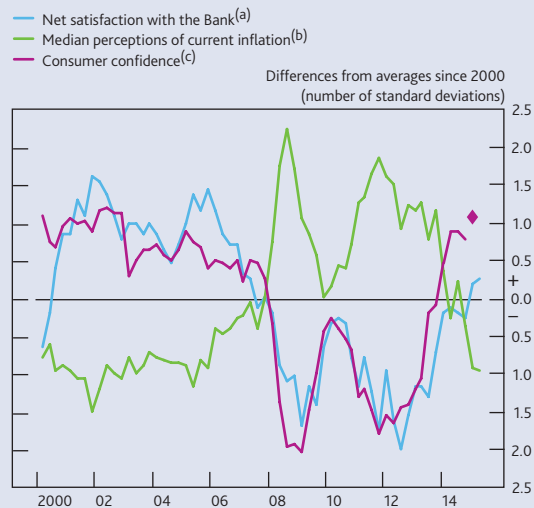


Sources: Bank/GfK and Bank calculations.

(a) The percentage of respondents who thought the British economy would be stronger if prices started to rise faster than they do now minus those who thought it would end up weaker.

The Bank/GfK survey asks respondents how satisfied or dissatisfied they are with the way the Bank is doing its job to set interest rates in order to control inflation. Over the past year, 'net satisfaction' — the difference between those fairly or very satisfied, and those fairly or very dissatisfied — rose a little and is broadly in line with its series average (Chart B). The overall net balance of satisfaction was positive.

Chart B Satisfaction with the Bank, inflation perceptions and consumer confidence



Sources: Bank/GfK and research carried out by GfK on behalf of the European Commission.

- (a) The percentage of respondents who were fairly or very satisfied with the way in which the Bank of England is doing its job to set interest rates in order to control inflation, less the percentage who were fairly or very dissatisfied. Data are to 2015 Q2.
- (b) Respondents were asked how they thought prices had changed over the past twelve months. Data are to 2015 Q2.
- (c) The consumer confidence index is derived by averaging the answers to questions 1, 2, 3, 4 and 8 in the GfK survey carried out on behalf of the European Commission. This chart shows quarterly averages of monthly data. The diamond is the April 2015 observation.

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