Macroeconomic literacy, numeracy and the implications for monetary policy

David G. Blanchflower

Bruce V. Rauner Professor of Economics
Dartmouth College, University of Stirling, NBER, IZA and
Member of the Monetary Policy Committee
Bank of England

Email: blanchflower@dartmouth.edu and
david.blanchflower@bankofengland.co.uk
Webpage: www.dartmouth.edu/~blnchflr

Roger Kelly

Monetary Policy Committee Unit
Bank of England

Email: roger.kelly@bankofengland.co.uk

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In an inflation targeting regime, the expected rate of inflation is ultimately determined by monetary policy. People have to believe that there will be low inflation before they stop building expectations of high inflation into their decision-making process. In order for people to believe that there will be low inflation, the authorities must be credible. Thus the Monetary Policy Committee (MPC) at the Bank of England has an explicit mandate to maintain inflation at a target of 2%, and goes to great lengths to ensure that expectations remain anchored to the target, as a sustained rise in inflation expectations in the short-term runs the risk of heightened inflationary pressures in the medium term. However, the above presupposes an understanding of macroeconomics, not only what the inflation target is, but also why we have such a target. In other words it is founded on the premise of macroeconomic literacy and numeracy.

In this paper we review the theoretical and empirical literature concerning how inflation expectations are formed. We then examine empirically how accurately individuals form inflation expectations. We do so by examining micro-data at the level of the individual drawn from a number of UK sources. One might question the value of such micro-data given recent evidence on the low levels of financial knowledge and especially financial numeracy among the population. There are high non-response rates and where answers are given they frequently don't make sense or simply factually incorrect. Where we can find information on people's expectations they tend to be heavily influenced by past experience or just plain wrong. For example, in November 2005 13% of respondents to a survey said they expected prices to *fall* or remain *constant* over the next twelve months. Most likely, this reflects peoples' difficulty in distinguishing between 'price levels' and 'inflation'.[1]

In private communication our Dartmouth colleague Annamaria Lusardi, a macroeconomist who has worked extensively on financial literacy, has suggested the following:

> "It would not be surprising if in general people know what inflation means but are unable to explain it in rigorous terms. They can potentially become confused when asked about how prices are expected to change and could probably not explain what inflation means. It seems that the framing of the questions matters a lot. Overall, it may be unreasonable to think that the average person who hardly knows about basic economic principles can forecast inflation well, as assumed in macro models. Even macro-forecasters cannot do a good job. However, people read newspapers and older people went through inflationary episodes so they have some ideas about what is going on. Also, in a regime where monetary policy has an inflationary target, people do not have to do much - at least if they believe in the central bank".

We concur. We examine questions of macroeconomic literacy an numeracy using micro-data at the level of the individual, and consider the implications for UK monetary policy. The data are not panels but are a time series of quarterly cross-sections from 2001-2008. First, we examine the literature and market-based evidence on inflation expectations, which, as set out above, is a key interface between monetary policy making and the general public. Based on this literature, we consider the implications of differing degrees of knowledge about the macroeconomy across

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[1] An alternative hypothesis is that these individuals are answering based on their own consumption basked rather than thinking about the general price level – e.g. for individuals who spend a disproportionate amount on high-tech goods, it could be reasonable for them to expect the price of their basket to fall.

the population. We then examine individual's views on the Bank of England and how it is doing its job using data from the *Bank of England's Inflation Attitudes Surveys*. In total we have micro-data from over 50,000 individuals for the years 2001-2008. We find evidence that men, older individuals, home owners, the most educated, those with higher incomes and those living in the South East had a relatively higher probability of being satisfied with the performance of the Bank of England.

We go on to examine individual's views on how they expect *prices* to change over the next twelve months. There seems to be significant non-response bias – in 2008 around one in five respondents did not answer these questions. Non-respondents were especially likely to be young, female, less educated and with lower incomes. We find evidence that individuals are influenced by past experience and that older people, those with higher incomes and more education are more optimistic about the size of any price rises – that is they expect lower increases.

Next, we look at more qualitative data on price expectations using data collected for the European Commission in the *GFK/NOP Survey*. These data are also a time series of cross-sections although they are available monthly and contain data on nearly three hundred thousand individuals from 1996-2008 for 146 months. Patterns in these data are similar to those in the Bank survey although non-response bias are smaller although the patterns are similar in that the least educated in particular are less likely to respond. We also explore expectations about unemployment and find they have broadly similar determinants to those found in the price equations.

We then examine the accuracy of respondent's views on both the inflation rate and the unemployment rate using data from a 2007 *Eurobarometer*. We find evidence of substantial non-response. Males, the more educated and higher income individuals are more accurate in their estimates of the official rates. This evidence is also consistent with predictions made in the Bank of England's Inflation Attitudes Survey where predictions of prices are compared with outcomes a year later. The more highly educated, those with higher incomes, home owners, workers, men and those aged 55-64 have a higher probability of predicting inflation 'correctly' twelve months ahead. We finish by giving a number of conclusions, outlining the implications of macroeconomic literacy for monetary policy.

1. Previous evidence on inflation expectations
Inflation targeting has been adopted by a number of major central banks in recent years. Inflation expectations are deemed to play an important part in an inflation targeting regime. In the neo-Keynesian model (see, for example, Clarida et al. 2000), sticky prices result in forward looking behaviour; inflation today is a function of expected future inflation as well as the pressure of demand, captured in an output gap term. Thus expectations are deemed to be an important link in the monetary transmission mechanism. Monetary policy can be more successful when long-term inflation expectations are well anchored (which is taken to mean insensitive to incoming data). Consider an adverse demand shock in a credible inflation targeting regime. This will lead to the expectation of a reduction in current and future interest rates, giving rise to a depreciation of the exchange rate and a rise in equity prices, offsetting the fall arising due to the initial demand shock. These asset price movements tend to automatically stabilise the economy,

reducing the size of the change needed today. Similarly, when long-term inflation expectations are well anchored – which intuitively means relatively insensitive to incoming data (Bernanke, 2007) - there is less chance of an adverse supply shock triggering second round effects in the shape of a wage price spiral[2]. In other words, such shocks are less likely to spill over into expected and thus core inflation.

What matters most for inflation prospects are the expectations of those directly involved in setting prices and wages. Wages are set on an infrequent basis, thus wage setters have to form a view on future inflation. If inflation is expected to be persistently higher in the future, employees may seek higher nominal wages in order to maintain their purchasing power. This in turn could lead to upward pressure on company's output prices, and hence higher consumer prices. Additionally, if companies expect general inflation to be higher in the future, they may be more inclined to raise prices, believing that they can do so without suffering a drop in demand for their output. A third path by which inflation expectations could potentially impact inflation is through their influence on consumption and investment decisions. For a given path of nominal market interest rates, if households and companies expect higher inflation, this implies lower expected real interest rates, making spending more attractive relative to saving. But if nominal market interest rates rise in response to expectations that the MPC will raise Bank Rate to curtail any inflationary pressure, real rates might not actually decline.

Before we can consider whether expectations are anchored, we must consider how expectations are measured. Mankiw, Reis and Wolfers (2003) undertake a comprehensive study in this area. There are a number of possible ways to measure expectations, which fall into three main groups, namely survey-based measures, market based measures and economic indicators.

a) Surveys
Here we are interested in surveys of consumer attitudes and behaviour, surveys of economists working in industry and surveys of professional forecasters. There is a dearth of corporate surveys; although we have business surveys for individual companies' pricing expectations, there are no good measures for economy-wide expectations.

In the UK, the following surveys are available:

i) Consensus economics survey over 200 city and academic institutions on a monthly, quarterly and biannual basis, of which around 30 usually reply.

ii) HMT surveys 13 academic and 29 city institutions on a monthly basis, asking "what do you expect the rate of inflation, both RPIX and CPI (average for the quarter based on a percentage change on last year) to be in Q4 of this year and Q4 of next year?". On a quarterly basis they ask a similar question but require forecasts of annual inflation for each of the next five calendar years.

iii) Barclays BASIX asks business economists, finance directors, academic economists and trade unions for their inflation expectations based on the RPI index over the next 12 months and the following 12 months. They also ask a randomly selected sample (c.2000) of the general public

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[2] Although note that it could be entirely rational for short-term inflation expectations to rise.

which of a number of ranges they expect the rate of inflation to fall into over the next 12 months and the following 12 months.

iv) The Bank of England/NOP surveys expectations, again by asking around 2000 people in three quarters, and 4000 people in one quarter, how they expect prices in shops generally to increase over the next 12 months, and offering a range of options.

v) Citigroup surveys the public, asking how they expect consumer prices of goods and services to develop in the next 12 months and over the longer term.

vi) The GfK/NOP Consumer Confidence Survey covers around 2000 members of the general public on a monthly basis. Fifteen questions are asked about consumers' opinions on the general economic situation, their own households' financial situation, and cost of living, including how consumer prices have developed over the past 12 months and how they are likely to develop over the next 12 months.

vii) The Bank of England Survey of Professional Forecasters takes place on a quarterly basis, in which the Bank asks professional forecasters for an assessment of the risks around their forecasts.

An important limitation of surveys is that they often do not obtain information on expectations more than twelve months ahead and do not necessarily reflect the opinions of those setting wages and prices.

b) Market-based measures
Market based measures include estimations of nominal and real forward interest rate curves, from which a forward inflation curve is inferred, and inflation swap rates. In both these cases, the indicators may not only reflect markets' inflation expectations, as inflation risk premia and numerous other market factors may also affect the rates. And even when they do provide a good guide, the views of financial market participants may not correspond to the expectations of those directly involved in setting wages and prices.

c) Economic indicators
Private sector regular pay (excluding bonuses which are volatile and so can disguise underlying trends) is a key indicator of inflationary pressures in the labour market. The main economic indicator used by the Bank is wage settlements. Settlements determine in advance the basic wages paid to workers in a particular firm or industry over the next 12 months, so demands partly reflect their expectations of the change in the cost of living over the settlement period. The Bank keeps a database of wage settlements, collating data published by specialist firms such as Incomes Data Services (IDS), Industrial Relations Services (IRS) and the Labour Research Department, as well as deals reported by the regional Agents. Of course, settlement data does not simply reflect inflation expectations, it also reflects factors such as ability to pay, employee productivity and recruitment and retention. Furthermore, bargainers tend to use RPI rather than CPI as their measure of inflation.

1.1. Are expectations anchored, and how would we know if they were not?

What is of interest for monetary policymakers are signs that expectations have become de-anchored. From a technical point of view, inflation expectations are said to be de-anchored when the largest root in the stochastic process describing medium-term inflation expectations is close to the unit circle, i.e. they are, or are near to, a random walk. However, this technical definition is of little practical, given the difficulties in measuring inflation expectations referred to above. Thus we need to consider other ways to establish empirically whether expectations are anchored. Bernanke (2007) provides an intuitive definition, namely that if the public experiences a spell of inflation higher than their long run expectation, but their long run expectation of inflation changes little as a result, inflation expectations can be considered to be well anchored. However, if the public reacts to a short period of higher than expected inflation by increasing their long run expectations, expectations are poorly anchored.

There have been a number of studies that investigate empirically whether expectations are anchored, using survey-based, market-based and macroeconomic indicator based measures of expectations. Most of these studies relate to the US.

Stock and Watson (2007) approach the issue by considering inflation as consisting of two elements: an underlying trend, which follows a random walk, and serially uncorrelated shocks, which cause temporary, transitory fluctuations around the trend. They find that the importance of trend shocks compared to temporary shocks started to rise at the end of the 1960s in the US, and peaked in the 1970s; they stayed elevated for 10 years and then declined to a historical low. Bernanke (2007) notes that it is unlikely that changes in inflation could persist indefinitely unless long run expectations of inflation also changed, and so interprets the Stock and Watson finding as consistent with the view that inflation expectations have become more anchored since the early 1980s. However, they find that there remains some change in the trend component, which suggests that inflation is not fully anchored.

Levin, Natalucci and Piger (2004) show that some survey measures of inflation expectations in the US respond to recent changes in the actual rate of inflation, which would not be the case if expectations were perfectly anchored. They study a variety of inflation targeting and non-inflation-targeting countries. They first examine whether inflation expectations are relatively more anchored in inflation targeting economies. They estimate a pooled regression in order to evaluate the sensitivity of inflation expectations to realised inflation in inflation targeting and non-inflation-targeting countries. They find that longer run inflation expectations have been much less responsive to actual inflation developments in inflation targeting countries than non-inflation targeting countries, suggesting that inflation targeting central banks have been quite successful in de-linking expectations from realised inflation, and that long run inflation expectations are substantially more anchored in inflation targeting economies. The authors also examine whether inflation persistence is lower in inflation targeting countries, and find that for non-inflation-targeting economies core CPI inflation displays behaviour consistent with a unit-root process, while for inflation-targeting countries the unit root null hypothesis can be rejected. The evidence is more mixed for total CPI, as the unit root null hypothesis does not hold for all the non-inflation targeting economies.

Kelly (2008) uses Toda and Yamamoto (1995) causality tests to tests for causality between inflation and survey-based inflation expectations in the UK over three periods: before the introduction of inflation targeting, and the periods under the inflation targeting regime before and after the Bank of England was granted independence, in order to establish whether these monetary regime changes would cause inflation to become anchored. He finds causality from inflation to expectations for the general public in the period prior to the introduction of inflation targeting; in the same period he finds bidirectional causality between inflation and the expectations of professionals. No causality is found for either group in either direction for the period after inflation targeting. One possible explanation given for this is that expectations became anchored in this period.

In two empirical studies using expectations based on market data Gurnayak et al (2002, 2003) show evidence that US forward rates at long horizons react significantly to surprises in macroeconomic data releases and monetary policy announcements, suggesting that private agents in fact adjust their expectations of the long run inflation rate in response to macroeconomic and monetary policy surprises. They find that forward rates derived from inflation-indexed Treasury debt shows little sensitivity to these shocks, indicating that the response of nominal forward rates is mostly driven by inflation compensation. However, they note that in the UK, where the long run inflation target is known by the private sector, long term forward rates have not demonstrated excess sensitivity since the Bank of England achieved independence. Thus their findings likely have implications for the conduct of monetary policy – a central bank can help stabilise long term forward rates and inflation expectations by credibly committing to an explicit inflation target.

Looking at inflation persistence is one way to consider the question of anchoring of inflation expectations. Measuring persistence is commonly undertaken by regressing inflation on several of its own lags, and calculating the sum of the coefficients: if this is around unity, shocks to inflation have long lived effects on inflation; while if it is significantly less than unity, this means that shocks only have a temporary effect, with inflation quickly returning to trend. Mishkin (2007) notes that in the US, inflation persistence which rose during the Great inflation of the 70s has subsequently fallen – he explains this with the observation that there was de-anchoring of trend inflation during the Great Inflation, and re-anchoring in recent years. He finds that various indicators of inflation expectations,   this story. Similar observations can be made using estimates of inflation compensation derived from indexed Treasury yields.

Similar evidence concerning inflation persistence is found for other countries. Levin and Piger (2004) find that there has been a significant decline in inflation persistence since the 1980s for major European economies as well as for Japan, Canada, Australia and New Zealand. However, O'Reilly and Whelan (2005) find little evidence of a recent decline in persistence for the Euro area as a whole.

1.2. How do people form expectations?

Rational expectations is the traditional framework used for modeling inflation targeting. Agents are assumed to share a common information set and form expectations conditional on that information. Thus, we assume that everyone has the same expectations. However, this implies the public has firm knowledge of the long run equilibrium inflation rate. This gives rise to a

conflict between policy practice and policy modeling, which is well described by Orphanides and Williams (2003). Generally, models assume a fixed and perfectly known structure of the economy and specify that expectations are model consistent. In linear fixed parameter models, for example, once the monetary policy rule is specified, inflation expectations can be represented as a fixed linear function of economic outcomes. Economic agents are then assumed to form expectations mechanically based on these simple linear functions of economic outcomes that are assumed to be perfectly known. In such a world, expectations are perfectly anchored, and as such there is no need for central banks to monitor and analyse information regarding inflation expectations, and no need for central bank communications.

However, once imperfect knowledge is acknowledged, the mechanical link from economic outcomes to the expectations formation process breaks down. There have been a large number of papers documenting the general failure of the rational expectations hypothesis to account for the survey data on inflation expectations (for example Pacquet, 1992, Batchelor and Dua, 1987) The widely cited reason for the failure is that agents lack the sophistication to form expectations rationally. The presence of information costs is a major factor. To form rational expectations, agents must know the time structure and probability distribution of the economy, and the costs of information may exceed the benefits, making it rational for agents to form their expectations some other way. Most empirical tests of rationality of surveyed expectations have focused on the inflationary expectations of economists (e.g. Keane and Runkle, 1990), although a few studies have examined inflationary expectations of consumers in general, mainly using aggregated Michigan survey data (Maddala, Fishe and Lahiri (1981), Gramlich (1983), Batchelor (1986)). However, these studies suffer from aggregation bias, meaning that the implications of tests for individual rationality are difficult to derive.

More recently, a few studies have attempted to empirically test rationality of expectation formation on an individual basis (Bakhshi and Yates (1988) provide a review of tests of rationality commonly used in the literature). Souleles (2004), for example, seeks to test rationality of consumer expectations (including inflation expectations) by looking at the relationship between answers to the US Michigan survey over a number of years, in order to capture an individual's expectational error. They find that expectations appear to have been biased, but that the bias is inconsistent, and related to inflation regime and business cycle.

In a similar approach to Souleles (2004), Mitchell and Weale (2007) use the British Household Panel Survey (BHPS) to test the rationality of individual-level expectational data in Britain. They statistically identify the characteristics of individuals for whom the costs of forming rational expectations exceed the benefits. They find that the British are more optimistic about the future when they recently seen their household income rise, and vice versa. Using a regime switching model, they find that 40% of individuals form expectations consistent with rationality, and that the propensity to form rational expectations increases with age rather than education. However, they do not investigate the alternative model used by the other 60% to form their expectations.

Another class of study has investigated empirically the increasing consensus that expectation formation is heterogeneous across agents. Three main possible reasons for this heterogeneity have been proposed. First, reliance of agents on different models; second, the use of different information sets by agents; and third, agents have different capacities for processing information.

Using US Michigan data, Branch (2004) finds evidence that agents rely on different models and use different information sets. He looks at rationally heterogeneous expectations, stemming from the notion of Adaptively Rational Equilibrium Dynamics (ARED) proposed by Brock and Hommes (1997). Under this framework, agents forecast inflation rates using a predictor function chosen from an increasingly sophisticated set of alternative predictors; the probability of any predictor being chosen depends on its relative net benefit. His results show that agents do dynamically select predictor functions. This suggests that rational expectations are not rejected because agents blindly follow an ad-hoc rule; rather because it is not worthwhile for them to invest the effort to use more complex predictor functions. Agents are rationally heterogeneous in the sense that each predictor choice is individually optimal.

Carroll (2003) focuses on the idea that agents use different data sets to form expectations. He proposes an epidemiology framework to study how households model inflation expectations. In the framework, household expectations are updated probabilistically towards the views of professional forecasters – i.e. people obtain macroeconomic news from the media, but that it takes time to dissipate. He finds differences between household expectations and the views of professional forecasters narrow when inflation is more significant, probably because of increased media coverage and household interest. His model is successful in capturing much of the variation in the Michigan survey measures of inflation expectations.

Models of learning allow us to abstract from the idea that agents have full information about the economy and the objectives of the central bank; instead individuals make statistical inferences about the unknown parameters governing the evolution of the economy. Pfajfar and Santoro (2006) focus on learning and information stickiness as the roots of the heterogeneity in expectation formation between agents. Using data from the Michigan survey, they identify three regions of a distribution corresponding to different expectation formation processes, which display a heterogeneous response to the main macroeconomic indicators. On the left hand side of the distribution, a static or lightly autoregressive group, in the middle a nearly rational group, and on the right hand side a group of agents behaving according to adaptive learning and sticky information. The latter respond in too pessimistic a manner, overacting to macroeconomic fluctuations. Similar to Carroll (2003), they find that agents are more likely to update information sets regularly when inflation matters.

Orphanides and Williams (2003) also look at the implications of learning. They find that the presence of learning increases the sensitivity of inflation expectations and the term structure of interest rates to economic shocks, in line with empirical evidence. They find that inflation expectations under learning are much less sensitive to inflation when the inflation target is assumed to be known by the public, indicating that the benefit of better anchored inflation expectations that is associated with successful communication of the central bank's inflation target can be significant. This is consistent with the experience of the UK following the adoption of inflation targeting.

From the above, it's clear that in practice there is little evidence that agents form their expectations rationally; in fact they are likely to form their expectations heterogeneously, not only because they use different information sets, but also because they rely on different models and have different capacities for processing the information. This heterogeneity is noted in a

useful study from the Bank of England (Driver and Windram 2007). The study reports that some households may form their expectations based on a structural relationship, such as the trade off between inflation and unemployment or demand; others may use an empirical approach, e.g. their recent memories of inflation data. Furthermore, people may be entirely forward looking or entirely backward looking, or a combination of both. In inflation targeting countries, people may simply assume inflation will equal the target. Indeed, as mentioned above, there is some evidence that expectations of some households have been formed on the basis of their perceptions of inflation in the recent past.

Tests at the Bank of England (Groen, 2006) show that the correlation between inflation expectations and CPI has risen since the introduction of CPI as the target measure of inflation, indicating that more agents are basing their expectations on this measure of inflation. The median expectation is also found to be highly correlated with the inflation rate of essential products, but uncorrelated with the inflation rate of discretionary purchases, so it may be that people react to changes in essential prices than focusing on the overall CPI basket.

1.3. What has happened to inflation expectations in the recent past?

Chart 1 provides background to our discussion, plotting RPI, RPIX inflation and from 1989, CPI inflation which is now targeted by the Monetary Policy Committee at the Bank. Inflation was very high during the 1980s, with both RPI and RPIX rising to over 20% in 1980. They both subsequently fell only to rise again in the early 1990s to over 10% in the case of the RPI. Since inflation targeting was introduced in late 1992, all three measures have been below 5%, and especially so since the independence of the Bank of England. CPI inflation has been below the other two measures since around 1994, only once rising above 3%, to 3.1%, which required the Governor of the Bank to write a letter to the Chancellor explaining why and what was being done, in March 2007.

Survey measures of household inflation expectations have picked up markedly since early 2005 alongside the increase in inflation. The quarterly survey carried out by GfK/NOP for the Bank has picked up over the past two years, as has an alternative survey for the European Commission. In January there was a marked rise in 12-month ahead expectations in the YouGov/Citigroup survey but this has fallen back subsequently. As discussed above, there is evidence that households' inflation expectations are closely related to their perceptions of current inflation. Thus, some of the rise in expectations in recent months is likely to reflect the rise in inflation during 2005-6. However, expectations have remained elevated during 2007 despite the easing in inflation during the first half of the year.

Recent movements in inflation perceptions and expectations have diverged markedly from movements in CPI inflation, possibly reflecting a potential link between inflation perceptions and prices of high visibility items such as food and energy bills (Bank of England Inflation Report February 2008 p.36).

Household inflation expectations may also be influenced by the degree of public coverage of inflation (Driver and Windram, 2007). More frequent discussions of inflation may increase awareness of inflation among members of the general public. Newspaper coverage was on an upward trend through much of 2006 and rose sharply in early 2007 (Bank of England 2008).

This may have contributed to the rise in households' inflation expectations during this period. However, both current CPI inflation and media coverage of inflation fell back through 2007, while expectations remained elevated. This may suggest that expectations are sticky, that is they may persist at a new higher level for a period of time, despite actual inflation moving down again. Or it may be that survey respondents were more focused on RPI inflation, which did not fall back as much as CPI.

It is possible that households believe that past above-target inflation outturns, combined with the prospect of further increases in inflation in the near term, are indicative of monetary policy being less restrictive in the future. If so, the rise in these short term measures of inflation expectations would contain information about medium term beliefs, which could have significant implications for wage and price setting. Of course, as discussed above, the surveys may be influenced by RPI, rather than CPI inflation; although the former has eased since its March 2007 peak, the fall has been less marked than for CPI inflation.

Financial market measures are derived from instruments linked to RPI rather than CPI inflation. Implied RPI inflation forwards have picked up steadily since 2005 at five and ten year horizons, to 3.5% and 4% respectively. As long-horizon inflation expectations of professional forecasters have remained broadly unchanged over this period it is possible that the rise reflects a higher inflation risk premium and/or a change in the wedge between RPI and CPI inflation, as discussed earlier. There is some evidence to suggest that institutional factors, including strong pension fund demand for inflation-protected bond has pushed down their yields down relative to those on conventional bonds, thereby pushing up implied inflation forwards.

2. Empirical evidence

Having examined the literature on inflation expectations, we now turn to examine empirical evidence relating to macroeconomic literacy and numeracy among the UK population. This includes data from a number of sources including surveys conducted for the Bank of England and the European Commission. Initially we focus on data on how people think the Bank of England has performed. We then look at how inflation expectations have changed. We also briefly examine other macroeconomic indicators as evidence of the macroeconomic knowledge of the population.

2.1. Satisfaction with the Bank of England

As discussed earlier, the success of an inflation targeting regime is grounded in the credibility of the central bank, and the ability of the Central Bank to educate those whose expectations in turn impact monetary policy. We first turn to questions asked of the general public in regard to their satisfaction with the performance of the Bank of England. Obviously this involves more than just the setting of interest rates and in recent times is likely to reflect the public's views on the handling of the bailout of Northern Rock. Table 1 report the views of respondents in the Bank of England's *Inflation Attitudes Surveys* to the question: "how satisfied are you with how the Bank of England is doing its job to set interest rates to control inflation?". Aggregated data are available quarterly from November 1999. Summaries of the aggregate responses in each survey are available on the Bank of England's website (http://www.bankofengland.co.uk/statistics/nop/index.htm). On a yearly basis since 2001 the Bank of England has published an article in its Quarterly Bulletin discussing the results of the survey - the latest available is Driver and Windram (2007).

On average, thirteen percent of respondents said they had 'no idea' how well the Bank was doing. Interestingly, there were much higher non-response rates for women (16.2%) than for men (8.6%). Non-response rates for women were especially high in February 2008 (19.0% for women and 10.9% for men respectively) [3]. High non-response rates for women are also an issue in the Bank's survey when respondents are asked to predict what the inflation rate will be in twelve months time. We will discuss this in more detail below.

Throughout the period August 2000 to November 2006, the majority of respondents were fairly satisfied or very satisfied with the Bank's performance. Since November 2006 there has no longer been majority satisfaction with the Bank's performance, although the decline in support has not been dramatic. The proportion *very satisfied* reached a peak at 13% in May 2005 and has deteriorated since then, and especially so at the end of the period, standing at 7% in February 2008. Satisfaction with the Bank's performance (but bear in mind the earlier caveat on the distinction between the MPC and the Bank more generally) in the period after the Northern Rock rescue has clearly fallen. In the most recently available data for February 2008 the proportion reporting that they were 'fairly satisfied' or 'very satisfied', at 44% was the lowest level since May 2000, also a low point for the FTSE.[4]

We have obtained access to the micro data at the level of the individual from twenty three of these quarterly surveys, starting in February 2001 through February 2008. We have pooled these surveys together. In total there are 64,334 responses. Sample sizes are approximately two thousand in May, August and November Surveys and around 4,000 in the February sweeps, of which we have all eight. These are not panels; the same people are not interviewed repeatedly, rather they are repeat cross-sections.

It is useful to model the determinants of people's views on how the Bank is performing, but at the outset it is important to examine the non-response bias, because if it appears that this is non-random, this may bias any results. The results of doing so are reported in column 1 of Table 2. If the respondent reported they had 'no idea' the dependent variable was set to one, zero otherwise. The equation estimates a dprobit in STATA which calculates the probability that a respondent will reply that they have 'no idea'.[5] Worryingly, the probability of non-response is

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[3] Interestingly, non-responses to several other questions in the February 2008 also had historically high non-response rates. With non-response rates for November 2007 in parentheses for comparison. a) The Government has set an inflation target of 2%. Do you think this target is too high or too low or about right or no idea – 19% (12%). b) How would you expect interest rates to change over the next 12 months? – 20% (15%) c). What do you think would be best for the British economy - for interest rates to go up over the next few months, or to go down, or to stay where they are now, or would it make no difference either way? – 20% (13%). d) And which would be best for you personally, for interest rates to go up, go down, stay where they are, make no difference, no idea. 12% (5%). See http://www.bankofengland.co.uk/statistics/nop/inflationattitudesfeb08.xls

[4] On 5/22/2000 the FTSE All Share, at close of business was at 2884.22 which was 8.2% below its close on January 4th 2000 of 3141.25. On 3/7/2008 the FTSE All Share at close of business was at 2958.72, down 10.6% on the year, down from 3291.47 at close of business on 1/3/2008.

[5] *Dprobit* in STATA fits maximum-likelihood probit models and is an alternative to probit. Rather than reporting the coefficients, dprobit reports the marginal effect, that is the change in the probability for an infinitesimal change

higher for females, the young, those on lowest incomes, for those not working and council renters. When the equation was re-estimated excluding February 2008[6] and including education controls, non-response was highest among the least educated (results not reported). Non-response in 2008 was at its highest point since November 2004. The concern here is that any results will be biased because of the higher relative exclusion of women, the least educated and the poorest individuals. There is no obvious fix to this problem, so we need to proceed with caution.

Table 3 uses the micro data pooled across the six years 2001-2007 to estimate an ordered logit and includes controls for age, gender, schooling, housing tenure; working or not working, year dummies and region of residence. An ordered logit fits models the responses to an ordinal or qualitative variable. The actual values taken on by the dependent variable are irrelevant, except that larger values are assumed to correspond to 'higher' outcomes.[7] A positive coefficient thus implies an individual is more satisfied and a negative one implies less satisfied. Individuals who reported they had 'no idea' are excluded and hence sample size is now just over fifty-six thousand in column 1. Unfortunately comparable education controls are unavailable in February 2008 so the sample size is reduced in columns three through five.

Column 1 of Table 3 suggests that satisfaction with the Bank of England is lower among women, council renters and those with the lowest income and lowest for the young. Satisfaction rises with age. It is particularly low in February 2008. These results are stable across the various specifications. Column 2, which adds four region dummies, suggests that there is a regional component to satisfaction as the February 2008 dummy rises somewhat. Column 3 adds education controls and results are very stable to changes in specification and dropping observations; satisfaction rises with education. Column 4 splits the sample into those who completed their education at age eighteen or earlier while column 5 is for those who left school after the age of eighteen. The broad pattern of the results is similar although there appears to have been a sharper deterioration in satisfaction among the more educated than the less educated since 2007.

It is apparent that satisfaction is higher among men, those with the highest level of schooling; those who own their own homes whether with a mortgage or outright and in London and the South East. The time dummies for the last three surveys in 2007 suggest growing dissatisfaction with the Bank's performance. Interestingly, satisfaction with how the Bank is doing its job rises linearly with age, being highest with those aged 65 and over. Satisfaction is also higher among home owners (column 2) and lower among renters (column 3). Among both individuals of working age (column 4) and for older workers age 65 and over, dissatisfaction was highest in the second half of 2007.

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in each independent, continuous variable and, by default, reports the discrete change in the probability for dummy variables.

[6] February 2008 is excluded because it does not contain comparable education variables.
[7] Use of ordered logits is commonplace in the analysis of happiness data which is similarly ordered - see Blanchflower and Oswald (2004).

2.2. Price expectations – quantitative measures

We now turn to examine a further question in the survey which asks "How much would you expect prices in the shops generally to change over the next 12 months? The full distribution of responses is presented in Table 4. The median response has risen from a low of 1.7% in November 2001 to a high of 3.3% in February 2008, the same date when the respondents' satisfaction with the Bank of England was at its lowest (Table 1). As in the case of attitudes to the job the Bank has been doing, non-response is high and especially so for females. Weighted responses presented over the twenty three quarterly surveys for which we have micro data suggest that on average 14% of individuals say they have 'no idea' (16% for females and 11% for males). Particularly worrying, in the February 2008 survey, 19.6% of respondents said they had no idea with 23.4% of females and 15.7% of males in that category. In column 2 of Table 2 the probability of non-response is estimated and, once again, found to be higher among females, the young, those with low incomes and council renters and significantly higher among the least educated (results not reported). The probability of non-response in February 2008, holding constant characteristics was significantly higher than in any other survey.

There is not only an issue of non-response but also whether individuals understand what they are being asked especially given the fact that ten percent of respondents say that they expect prices to remain unchanged (7.4%) or to go down (2.7%). Our suspicion is that respondents are mixing up changes in prices with changes in inflation. The concern here is whether or not people actually understand what is being asked. In a series of papers Lusardi and Mitchell (2006, 2007, 2008) have shown how little financial numeracy older people in the US actually have. They devised a simple question on inflation for a module on financial literacy inserted in the 2004 the Health and Retirement Study. Here is the exact wording of that question:

'Imagine that the interest rate on your savings account was 1% per year and inflation was 2% per year. After 1 year, would you be able to buy more than, exactly the same as, or less than today with the money in this account?".

Lusardi and Mitchell (2006) showed that about 75% of the older respondents (50 and older in the HRS module) got this simple question right, but some groups were much more likely to answer incorrectly. For example, women were less likely to get this question right (Lusardi and Mitchell, 2008) and so were Black and Hispanic respondents and those with low education. They also asked another simple question: "Suppose you had $100 in a savings account and the interest rate was 2% per year. After 5 years, how much do you think you would have in the account if you left the money to grow: more than $102, exactly $102, less than $102?". Only 50% of respondents got the inflation AND this question right. In Lusardi and Mitchell (2007) they showed that people cannot do simple calculations. For example, they cannot divide 2,000,000 by 5 and cannot do simple compound interest calculations. In a further survey conducted by the global market research firm TNS, Lusardi and Tufano (2008) asked 1,000 Americans about credit card debt. Over 64 percent of respondents could not correctly estimate how their interest would compound over time. The majority of people also said they did not understand minimum payments, and few could determine the different financial consequences between paying monthly installments or a lump sum.

Interestingly, in a recent *Eurobarometer survey*, conducted in the Spring of 2007, across all member countries of the EU, 57.8% of UK respondents said they didn't now the official inflation rate. Of those that did, the mean reported inflation rate was 5.15%, well above both CPI (Chart 1) and RPI.[8] Similarly, respondents were also asked if they knew the official unemployment rate and 63.2% said they did not. Of those who gave a response, the mean estimate was 9.5%: LFS unemployment rate for 2006 was 5.6% and the claimant count was 3.0%.[9] These data suggest the respondents have little knowledge of official macro data. We explore the accuracy of these predictions in more detail in section 2.4.

Table 5 now moves on to model price/inflation expectations econometrically using the only available micro data files from the Bank Inflation Attitudes Surveys for the period February 2001-February 2008, a total of twenty-three surveys in all. All respondents reporting they had 'no idea' are dropped. Because of the fact that there are open ends and intervals the procedure used here is interval regression. Specifically we make use of the *intreg* command in STATA which fits a model where, for the dependent variable, each observation is either point data, interval data, left-censored data, or right-censored data. The model is consistently estimated by a maximum likelihood procedure. The model assumes that the responses in each interval are distributed normally, and so it is the mid-point in the interval that is used to represent the inflation expectation. For the censored interval no mid-point is assumed and the likelihood function consists of probabilities for the left/right-censored observations. A positive coefficient means the individual expects higher prices and vice versa. Column 1 includes controls for age, gender, location, housing status, income and year. Column two adds eight additional controls for the individual's perceptions from Q1 of the survey of how prices changed over the preceding twelve months. Column three drops the February 2008 observation and adds controls for education while columns four and five present splits by low and high education.

The results are broadly consistent with those above relating to the performance of the Bank of England. The February 2008 dummy is large and there is evidence of a steady trend up in perceptions since May 2007. The most educated expect inflation to be lower than the least educated as do mortgage holders. Council renters are especially pessimistic. Perceptions of price increase are significantly higher in the excluded category, the South East and London. Those over the age of 45 expect higher price increases than young people do. The fact that older people expect higher price increases is interesting given they were more satisfied with the job the Bank of England had been doing.

In contrast to the findings above on the Bank of England's performance, in column 1 men report that prices will rise significantly more than women, although this may well be due to the selection problem discussed above. This is a puzzle and an apparent contradiction, given that in all of the other evidence presented in this paper men are significantly more *optimistic* than

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[8] Eurobarometer #67.2: European Union Enlargement, Personal Data Privacy, the National Economy, and Scientific Research, April-May 2007 ICPSR #21160

[9] The exact questions were a) What was the official inflation rate, the rate of which consumer prices increased or decreased, in (OUR COUNTRY) in 2006? I can tell you that the exact figure is between -1% and 20% b) What was the official unemployment rate, the percentage of active people who do not have a job, in (OUR COUNTRY) in 2006? I can tell you that the exact figure is between 0% and 20%.

women.   However, in column 2 the male coefficient is no longer significant once perceptions of current inflation are controlled for: males not only think future inflation is higher but also think current inflation is higher. The variables identifying perceptions of how inflation had changed over the preceding twelve months are highly significant and large. As Ellis (2006) notes, since the survey began inflation expectations have moved closely with the perceptions of past inflation.   Indeed, as noted by Driver and Windram (2007) over half of respondents in the February 2007 survey who expressed an opinion on both questions, inflation over the next twelve months was expected to be in the same range as their perception of past inflation.   In February 2008 the proportion was 49.4% compared with 49.0% across the twenty-three surveys. One of the main determinants of price expectations appears to be current inflation. Expectations of some households thus appear to have been formed on the basis of their perceptions of inflation in the recent past.

Lombardelli and Saleheen (2003) also modeled econometrically the price data from the Bank survey for 2001-2003. They also found that the most educated, mortgage payers and individuals below age 55 had lower inflation expectations.   They found no evidence of any gender differences as we have found with our bigger sample sizes and longer time series. They also found no evidence of a significant effect from working status and we confirm that finding.

2.3. Price expectations – qualitative measures

Micro data on inflation expectations at the individual level are also available from a further data source.   GfK/NOP collects nationally representative data for those aged 16+ from a random sample of telephone owning households for the EU. Sample sizes are approximately 2000 per month. These data are collected monthly across each member state of the European Union. In the UK these data are available since 1985.[10] GfK has been conducting a monthly consumer survey called the Consumer Confidence Barometer (CCB) in the UK since June 1995. GfK carries out this survey on behalf of the European Commission, who sponsors the same consumer survey in all EU and EU candidate countries, as part of the Joint Harmonised EU Programme of Business and Consumer programme (known as the BCS programme). The BCS programe was first launched by the European Commission in 1961 (although the programme did not extend to the consumer sector until 1972). GfK has been conducting a monthly consumer survey called the Consumer Confidence Barometer (CCB) in the UK since June 1995. GfK carries out this survey on behalf of the European Commission, who sponsors the same consumer survey in all EU and EU candidate countries, as part of the Joint Harmonised EU Programme of Business and Consumer programme. The programme was first launched by the European Commission in 1961 (although the programme did not extend to the consumer sector until 1972). The main aim of GfK's CCB is to monitor the general public's confidence in the British economy; it is a monthly monitor showing consumer confidence in the present economic climate in the UK, and consumer expectations for the year ahead. In the CCB survey respondents are asked a slightly different, qualitative, question on price expectations to the one used in the Bank survey:

"Q6. In comparison with the past 12 months, how do you expect consumer prices will develop in the next 12 months? They will…increase more rapidly; increase at the same rate: increase at a slower rate; stay about the same; fall or don't know."

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[10] http://ec.europa.eu/economy_finance/indicators/business_consumer_surveys/bcsseries_en.htm

Responses are reported in the form of a survey balance: after some investigation we determined that there is a small difference between the series and the one published by the EU Commission who seasonally adjusts the data. The EU seasonally adjusted survey balance is plotted in Chart 1 against the CPI twelve months ahead. These expectations balances dropped steadily after the independence of the Bank of England was announced in 1997. The survey balance has picked up since August 2007 from 21 to 28 in 2008, consistent with the findings from the Bank Inflation Attitudes Survey outlined above. The most recent balances are reported below.

Jan-07	21	May-07	16	Sep-07	20	Jan-08	28
Feb-07	16	Jun-07	17	Oct-07	21	Feb-08	28
Mar-07	16	Jul-07	19	Nov-07	22		
Apr-07	16	Aug-07	21	Dec-07	24		

The correlation between the inflation survey balance and the CPI twelve months ahead is .72. Chart 3 presents plots of the equivalent series for six EU countries (Denmark; Germany; Ireland; France; Italy and the Netherlands) also plotted against the inflation rate twelve months ahead. Note only Denmark is not a member of the Euro. Note how to read the charts – time on the X-axis is plotted in relation to the CPI so data for January 2008 refers to the January 2008 inflation rate plotted against the expectation 12 months earlier. Hence the series goes out to 2009. With the exception of Italy, the correlations are somewhat lower than in the UK. It is notable how volatile the series is in Denmark since 2003 and in Germany since 2007. Expectations dropped in Italy and the Netherlands between 2003 and 2004. There is evidence of an uptick in expectations in all six countries over the last year. Expectations of inflation in Denmark have risen steadily since the beginning of 2005.

Correlation Coefficient, r:	Denmark	Germany	Ireland	France	Italy	Netherlands	United Kingdom
Inflation expectations and inflation actual 12 months ahead	0.34	0.56	0.52	0.32	0.80	0.61	0.72

We also obtained access to the micro data from the CCB Inflation survey taken monthly in the UK, from January 1996 through January 2008, making 145 surveys in all and a total of 294,573 observations. The distribution of the data by year is reported in Table 6. The first thing to note is that there is much less of a problem of non-responses to this question than is the case in the Bank Survey - on average 5% report that they don't know. This is higher for females (6%) than for males (4%). There is no evidence, however, that this is higher in 2007 or in January 2008. The proportion of individuals saying that prices had 'risen a lot' was particularly high in 2008 at 21%. Column 1 of Table 7 estimates a non-response dprobit which models the probability of non-response to the inflation question. Non-responses are higher for women; the least educated, older respondents and those not working.

Column 1 of Table 8 estimates an ordered logit where 1 is set to equal a fall while 5 means 'increase more rapidly', so a positive coefficient implies a higher increase and vice versa for a negative coefficient. Controls available are region, year, age and gender which are included in

column 1. Males believe that prices will rise more slowly than females as do the more highly educated. Consistent with the findings from the Bank survey and Lombardelli and Saleheen (2003), expectations are higher among older workers, females and the least educated. Here we find also that they are higher among non-workers and are especially high in London.

Given that we have a long time run of monthly data it is feasible to determine if current inflation predicts expectations, in line with the earlier-reported findings of Driver and Windram (2007), using Bank/NOP data. So we mapped in the monthly CPI in the month the survey was taken, across a total of 145 months and clustered the standard errors accordingly. Column 2 adds the monthly CPI rate which is positive and significant. In column 3, as we did with the BOE data a series of controls are also added for perceptions of current inflation, which are highly significant. Their addition lowers the significance of the CPI variable. The final two columns split the sample into high and low education groups. The CPI variable is significant for the more highly educated but not for those with lower levels of schooling.

There is also evidence that other measures of current well-being enter into price expectations equations. Guven (2007) found that happy people expect lower prices in the future. Guven examined data on prices for the Netherlands using data from the Dutch National Bank (DNB) Household Survey which is a panel of about 4500 individuals from 1993 to 2006. Data on price expectations are of particular interest to macro-policy makers. Guven found that happier people expect lower prices than unhappy people for the next year and also in five years time. Questions asked were 1) "Do you expect prices in general to rise, to remain the same, or to go down, in the next 12 months? 1=go down 2= remain the same 3= rise" 2) "By what percentage do you expect prices in total to have risen after 5 years?".

2.4. Expectations of changes in the number of unemployed

The GfK survey also asks respondents to report on what they think will happen to unemployment over the next 12 months. The series is plotted in Chart 2 against the unemployment rate 12 months ahead to assess its predictive power. The series tracks unemployment quite well until mid-2005 and then takes off at a time when there was a large influx of workers from the A8 Accession countries (Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia, Slovenia) along with Malta and Cyprus and later from the A2 (Bulgaria and Romania). In an earlier paper this was interpreted as a rise in the 'fear of unemployment' (Blanchflower and Shadforth, 2007). Non-responses average 6.4% and were again higher for women (7.6%) than men (5.0%). Column 2 of Table 7 estimates the probability an individual will not respond to the question and once again this probability is higher for females, the least educated and those over the age of 65 and living in London. In contrast to inflation expectations, expectations about unemployment in the UK fell from 35 at the beginning of 2007 to 26 in October 2007 but then started to pick up in 2008, rising to 30 in February 2008. The balances were as follows.

Jan-05	16	Jul-07	27	Dec-07	27
Jul-05	21	Aug-07	26	Jan-08	29
Jan-06	26	Sep-07	25	Feb-08	30
Jul-06	33	Oct-07	26		
Jan-07	35	Nov-07	27		

Chart 4 contains these data for six EU countries. Unemployment expectations picked up recently in the UK, Ireland, Germany, France and the Netherlands and to a lesser extent in Italy.

Correlation Coefficient, r:	Denmark	Germany	Ireland	France	Italy	Netherlands	United Kingdom
Unemployment expectations and unemployment actual	0.64	0.37	0.61	0.50	0.23	0.29	0.46

Table 9 uses the CCB data to estimates an ordered logit with the dependent variable whether the individual thinks that unemployment will increase over the next twelve months.[11] The probability is highest among those ages 50-64, women, in the West Midlands, those who left school under the age of 16 and among skilled manual workers. It is also positively impacted by the monthly unemployment rate. This unemployment variable enters significantly and positively in columns 2-4 no matter what the level of education. It is also clear that there has been a rise in people's expectations of unemployment since 2000 and especially so in 2006 for the least educated group.

3. Accuracy in reporting levels and changes in prices and unemployment
As mentioned earlier, a typical individual's knowledge of current macroeconomic data, let alone his/her ability to form expectations about these data, might be somewhat scant. In this section we examine in more depth the degree or otherwise of an individual's knowledge of the 'official' inflation and unemployment rates in 2006 and how these have changed since 2005 using retrospective data from a *Eurobarometer* survey at the level of the individual taken in the UK in 2007. We also then use data from the February 2005, 2006 and 2007 *Bank of England Inflation Attitude Surveys* to determine the accuracy of the respondent's predictions of what will happen to prices over the following twelve months compared to the actual observed outcomes a year later.

a) Inflation in 2006
In *Eurobarometer* #67.2 respondents were asked the following question -

"What was the official inflation rate, the rate of which consumer prices increased or decreased, in 2006? I can tell you that the exact figure is between -1% and 20%.?"

It is possible to compare the responses to this question with the actual inflation rates, although it is uncertain precisely which rate is being referred to. In 2006 the CPI averaged 2.3% while the RPI averaged 3.2%. To allow some margin of error we assume a response was 'correct' and set to zero if the response was in the interval of 1.3% to 4.2%, zero otherwise. Individuals who did not know were also set to zero. According to this criterion 25.9% of respondents reported correctly. In column 1 we report a dprobit modeling the probability of an individual reporting the correct answer. The probability of doing so is higher the higher the level of education,

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[11] The exact question is "how do you expect the number of unemployed people in this country will change over the next 12 months – fall sharply (1.2%); fall slightly (17.8%); remain the same (29.6%); increase slightly (35.0%), increase sharply (9.9%) or don't know (6.4%)?" The numbers in parentheses are the weighted averages for the 145 months (n=294,573).

among men, and is higher among workers especially among employed professionals and managers. The probability rises in an inverted U-shape in age maximizing at age 59 and declining thereafter.

b) Inflation in 2006 compared with inflation in 2005.
Respondents were also asked a further question on inflation – "Do you think that the inflation rate in 2006 was higher, lower or equal to the one in 2005?" Given that both the CPI and the RPI were lower in 2005 (2.1% and 2.8% respectively), in column 2 of Table 10 we model the probability of an individual reporting that inflation in 2006 was higher in 2006 than it had been in 2005. Analogously to the reports on the level of inflation, males, the more highly educated workers and especially managers were more likely to be 'correct'.

c) Unemployment in 2006 and compared with 2005
Similar questions to those asked on inflation were also asked on unemployment.[12] The ILO unemployment rate in 2005 was 4.8% and in 2006 was 5.3% while the claimant count was 2.7% and 3.0% respectively. Once again we allow a 1% margin of error o a correct report on 2006 unemployment was if it fell in the interval 2.% to 6.3% and the correct answer on the changes was that unemployment was higher in 2006 than 2005. The probabilities of being correct were higher among the educated, men and maximizes in the early forties. We found no evidence that the probability varied by labour market status.

d) Predicting inflation twelve months ahead
In Table 11 we examine the probability that an individual in the Bank of England survey correctly forecasts what inflation will be twelve months ahead. We do this using the February surveys of 2005, 2006 and 2007 and then compare these responses with the percentage change in prices that occurred over the next twelve months. A 'correct' response is taken to be within a 1% interval of the CPI on the low side (CPI was 2.0% in February 2006, 2.8% in February 2007 and 2.5% in February 2008) and a 1% interval on the high side for the RPI (2.4%; 4.6% and 4.1% respectively). Columns 1 through 3 are for February 2005 through 2007 respectively while column 4 pools the three years and adds two year dummies. As was found above, the probability of being 'correct', as one might expect, is higher among males, home owners, workers, the more educated, richer individuals, those aged 55-64 and residents of the South East.

4. Conclusions and implications for monetary policy
This paper has made some interesting observations about consumer surveys and a number of generalizations can be made about the findings.

First, there is evidence that significant numbers of individuals do not know what the inflation rate is, how it has changed and are increasingly unable to predict how it might change in the future. This is consistent with recent evidence from the United States suggesting very low levels of financial literacy.

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[12] a) "What was the official unemployment rate, the percentage of active people who do not have a job, in 2006? I can tell you that the exact figure is between 0% and 20%". b) "Do you think that the unemployment rate in 2006 was higher, lower or equal to the one in 2005?"

Second, there is evidence of very high non-response rates in these various surveys to questions on how satisfied respondents are with the job the Bank of England has been doing as well as to how much prices have risen in the past or in the future. Non-responses are especially high among the least educated, females, the poorest individuals and the young. We cannot assume that non-response implies a lack of understanding, but it is one possibility. From the responses received, there is evidence that satisfaction with the job the Bank of England is doing has deteriorated since mid-2007, post Northern Rock and alongside significant increases in both fuel and commodity prices.

Third, we find that *price* expectations are influenced by past experience. There is evidence that expectations of the future path of prices are highly correlated with individual's evaluation of current inflation. Similarly, expectations of future changes in *unemployment* are highly correlated with the current unemployment rate.

Fourth, older people, the more highly educated and those with higher incomes are more optimistic about the path of prices, believing they will rise at a slower pace than younger, less educated and less affluent individuals.

Clearly, there is evidence of widespread inaccuracy in estimating current levels of macroeconomic variables, and forming views on future values. This may reflect lack of knowledge concerning macroeconomic variables; the substantial non-response levels in a number of the surveys support this observation. To what extent is this lack of knowledge of (and possible lack of understanding of) rudimentary macroeconomic data an issue? We mentioned earlier the assumed importance of inflation expectations in macroeconomic models used for conducting monetary policy. What are the implications of people's expectations being poorly founded? To assess this, we need to consider how expectations are included in macroeconomic models.

Macroeconomic models (including the Bank of England Quarterly Model) generally do not depend on any particular assumptions about how expectations are formed; rather they assume that agents have 'model-consistent' expectations. In simple terms this means that if agents know the model and the past histories of the relevant endogenous and exogenous variables, and they have point expectations for the future paths of exogenous variables, then their expectations of future endogenous variables coincide with the core model solutions generated by those paths.

Given our above findings, how realistic is the assumption of model-consistent expectations? In monetary theory, inflation expectations affect inflation through two main channels - by individuals bargaining over nominal pay and companies setting prices. As long as those who are actually in a position to influence the rate of inflation (i.e. those who are in a position to bargain for their wages/set prices) have an understanding of what inflation is and a well-grounded expectation of what it is likely to be in the future, then the assumption of model-consistent expectations holds. It is probably safe to assume that companies involved in setting prices are on the whole sufficiently sophisticated to fall into this category. And our findings above demonstrate that the awareness of what inflation is (and the accuracy of peoples awareness/expectations of inflation) is higher among those categories who tend to have a higher employment rates (i.e. males, the more educated, the employed, the 'not young' etc.). This is

likely to be because the inflation rate is a far more relevant concept to them, as they are likely to be in more of a position to influence their income (through the wage bargaining process) than those who do not receive an income from employment. So on this basis, it would seem that the assumption of model-consistent expectations cannot be rejected.

By demonstrating that our findings are not in conflict with the use of model-based monetary policy with model-consistent expectations, we have tried to show that our findings of widespread lack of macroeconomic knowledge does not mean that the use of inflation expectations in monetary policy is not useful, or worse detrimental.

Table 1. Satisfaction with the Bank of England, 2001-2008 (%)

	Very dissatisfied	Fairly dissatisfied	Neither	Fairly satisfied	Very satisfied	No Idea
November 1999	4	7	26	41	7	16
February 2000	5	12	28	37	4	14
May 2000	4	9	27	38	5	17
August 2000	4	9	25	45	6	12
November 2000	3	8	26	48	7	9
February 2001	3	8	28	53	8	11
May 2001	2	6	23	49	9	12
August 2001	2	6	23	45	10	14
February 2002	2	6	20	50	12	11
May 2002	2	6	23	49	10	11
August 2002	3	7	22	46	11	11
November 2002	3	7	23	42	11	11
February 2003	3	7	24	47	8	11
May 2003	2	7	22	46	9	14
August 2003	2	6	22	40	12	17
November 2003	2	6	22	45	10	15
February 2004	3	7	24	46	8	12
May 2004	2	9	23	43	9	14
August 2004	3	10	24	43	8	12
November 2004	3	7	21	44	8	17
February 2005	2	7	23	45	11	12
May 2005	3	6	21	46	13	12
August 2005	2	6	22	45	11	15
November 2005	2	5	21	49	11	12
February 2006	2	6	23	47	10	12
May 2006	3	7	23	44	10	13
August 2006	3	8	25	45	9	11
November 2006	3	8	25	45	9	11
February 2007	4	9	25	41	9	12
May 2007	4	10	26	43	7	11
August 2007	4	12	23	40	8	13
November 2007	5	12	23	41	7	12
February 2008	4	10	26	37	7	15
Average	*3*	*8*	*24*	*44*	*9*	*13*

Source: *Bank of England Inflation Attitudes Surveys*.
Notes: Responses to Q14. "How satisfied are you with how the Bank of England is doing its job to set interest rates to control inflation?"

Table 2. The probability of non-response (dprobits)

	Satisfaction with Bank of England	Price changes next 12 months
Male	-.0691 (27.42)	-.0395 (14.62)
February 2008	.0434 (6.27)	.0649 (8.67)
November 2007	.0158 (1.87)	-.0110 (1.25)
August 2007	.0274 (3.16)	.0073 (0.81)
May 2007	.0033 (0.40)	-.0035 (0.41)
February 2007	.0091 (1.38)	-.0092 (1.33)
November 2006	-.0041 (0.51)	-.0158 (1.85)
August 2006	.0039 (0.48)	-.0138 (1.62)
May 2006	.0244 (2.85)	-.0036 (0.41)
February 2006	.0036 (0.55)	-.0008 (0.12)
November 2005	.0089 (1.10)	-.0084 (0.99)
August 2005	.0349 (4.11)	.0206 (2.32)
May 2005	.0128 (1.53)	.0056 (0.63)
February 2005	.0032 (0.50)	.0282 (3.87)
November 2004	.0499 (5.74)	.0052 (0.60)
August 2004	.0069 (0.87)	-.0102 (1.21)
May 2004	.0178 (2.12)	.0078 (0.88)
February 2004	-.0006 (0.10)	.0026 (0.37)
November 2003	.0267 (3.14)	.0374 (4.08)
August 2003	.0441 (5.17)	.0026 (0.31)
May 2003	.0227 (2.70)	.0182 (2.04)
February 2003	-.0115 (1.82)	.0119 (1.69)
February 2002	-.0117 (1.85)	-.0114 (1.67)
25-34	-.0377 (9.95)	-.0216 (4.68)
35-44	-.0556 (14.99)	-.0360 (7.92)
45-54	-.0612 (15.90)	-.0424 (8.96)
55-64	-.0742 (19.20)	-.0404 (8.29)
>=65	-.0604 (15.44)	.0048 (0.96)
Not working	.0381 (12.79)	.0309 (9.32)
<£9,500	-.0107 (3.07)	-.0229 (5.94)
£9,500-£17,499	-.0424 (11.89)	-.0477 (12.28)
£17,500-£24,999	-.0499 (10.88)	-.0485 (9.78)
Mortgage	-.0133 (3.48)	-.0111 (2.75)
Council rent	.0953 (20.42)	.0540 (11.51)
Private rent	.0686 (14.78)	.0419 (8.77)
Scotland	.0383 (7.26)	-.0094 (1.71)
North	.0109 (3.25)	.0207 (5.64)
Midlands	.0046 (1.19)	.0237 (5.59)
Wales/West	.0099 (2.44)	.0173 (3.92)
N	64,334	64,334
Pseudo R^2	.0756	.0342

Source: *Bank of England Inflation Attitudes Surveys*: Notes: excluded categories ≥£25,000; 16-24; own home outright; South East; February 2001. T-statistics.

Table 3. Ordered logits modeling satisfaction with the performance of the Bank of England, 2001-2008

	All	All	All	ALS<19	ALS 19+
Male	.5643 (34.28)	.5652 (34.32)	.5795 (33.93)	.5627 (29.24)	.6319 (16.88)
15-24	-.3642 (12.00)	-.3639 (11.98)	-.3565 (11.22)	-.2698 (7.62)	-.7175 (9.45)
25-34	-.2365 (8.99)	-.2399 (9.11)	-.2854 (10.46)	-.2445 (7.55)	-.4021 (7.87)
45-54	.1071 (3.95)	.1082 (3.99)	.1307 (4.62)	.1816 (5.59)	-.0156 (0.27)
55-64	.2883 (9.58)	.2961 (9.83)	.3391 (10.63)	.3731 (10.37)	.2937 (4.15)
>=65	.4258 (13.29)	.4326 (13.50)	.4870 (14.20)	.5447 (14.35)	.3376 (3.91)
Not working	.0141 (0.70)	-.0180 (0.84)	-.0769 (3.61)	-.0838 (3.51)	-.0313 (0.63)
Owned outright	.3147 (11.31)	.3189 (11.44)	.2975 (10.25)	.3146 (9.71)	.2103 (3.16)
Mortgage	.3272 (13.38)	.3458 (14.09)	.3531 (13.85)	.3600 (12.31)	.2965 (5.61)
Council rent	-.1868 (6.53)	-.1523 (5.30)	-.1110 (3.72)	-.0932 (2.89)	-.2670 (2.94)
£9,500-£17,499	.0113 (0.47)	.0231 (0.95)	.0177 (0.70)	.0504 (1.83)	-.1100 (1.70)
£17,500-£24,999	.1528 (5.09)	.1612 (5.36)	.1483 (4.76)	.1951 (5.52)	.0195 (0.29)
>£25,000	.3612 (15.56)	.3578 (15.38)	.3142 (12.97)	.3439 (11.66)	.2381 (5.58)
Scotland		-.4765 (14.49)	-.4345 (12.71)	-.4259 (11.21)	-.4559 (5.74)
North		-.1609 (7.43)	-.0973 (4.31)	-.0999 (3.94)	-.0584 (1.16)
Midlands		-.2011 (8.11)	-.1495 (5.78)	-.1389 (4.83)	-.1943 (3.20)
Wales/West		-.0952 (3.68)	-.0580 (2.16)	-.0532 (1.76)	-.0676 (1.16)
ALS 16			.0528 (2.28)	.0657 (2.77)	
ALS 17-18			.1746 (6.54)	.1849 (6.76)	
ALS 19+			.4147 (15.66)		
Feb 2002	.2455 (6.00)	.2870 (6.98)	.2774 (6.73)	.3200 (6.96)	.1011 (1.09)
Feb 2003	-.0175 (0.43)	.0227 (0.56)	.0123 (0.30)	.0790 (1.73)	-.2575 (2.82)
May 2003	.0527 (1.00)	.0910 (1.72)	.0910 (1.71)	.1642 (2.80)	-.2538 (2.00)
Aug 2003	.0984 (1.87)	.1358 (2.57)	.1249 (2.36)	.1887 (3.18)	-.1354 (1.15)
Nov 2003	.0617 (1.17)	.1006 (1.90)	.0842 (1.58)	.1279 (2.16)	-.1150 (0.96)
Feb 2004	-.1031 (2.53)	-.0622 (1.52)	-.0774 (1.89)	-.0508 (1.11)	-.1952 (2.15)
May 2004	-.1122 (2.13)	-.0704 (1.33)	-.0842 (1.59)	-.0292 (0.50)	-.3289 (2.73)
Aug 2004	-.1851 (3.68)	-.1440 (2.86)	-.1612 (3.19)	-.1166 (2.05)	-.3499 (3.16)

Nov 2004	-.0318 (0.60)	.0077 (0.15)	-.0092 (0.17)	.0449 (0.76)	-.2333 (2.00)
Feb 2005	.0595 (1.43)	.1030 (2.46)	.0818 (1.95)	.1230 (2.62)	-.0949 (1.02)
May 2005	.2058 (3.88)	.2494 (4.69)	.2389 (4.48)	.2625 (4.44)	.1430 (1.16)
Aug 2005	.1088 (2.08)	.1506 (2.87)	.2007 (3.92)	.2166 (3.74)	.1150 (1.04)
Nov 2005	.1752 (3.44)	.2184 (4.27)	.1213 (2.31)	.1279 (2.14)	.0510 (0.46)
Feb 2006	.0336 (0.82)	.0812 (1.96)	.0549 (1.32)	.0936 (2.01)	-.1149 (1.26)
May 2006	-.0473 (0.90)	-.0008 (0.02)	-.0244 (0.46)	.0175 (0.29)	-.2000 (1.75)
Aug 2006	-.1036 (2.02)	-.0615 (1.20)	-.0849 (1.65)	-.1076 (1.85)	-.0372 (0.34)
Nov 2006	-.1585 (3.12)	-.1178 (2.31)	-.1363 (2.67)	-.0857 (1.49)	-.3445 (3.06)
Feb 2007	-.2478 (6.01)	-.2021 (4.88)	-.2253 (5.42)	-.1944 (4.15)	-.3665 (4.06)
May 2007	-.3449 (6.69)	-.2991 (5.78)	-.3258 (6.28)	-.3106 (5.29)	-.4242 (3.82)
Aug 2007	-.4261 (8.22)	-.5105 (9.73)	-.5033 (9.59)	-.4897 (8.19)	-.5743 (5.22)
Nov 2007	-.4012 (7.75)	-.4859 (9.28)	-.4813 (9.17)	-.4139 (6.93)	-.7390 (6.68)
Feb 2008	-.4907 (11.82)	-.4425 (10.61)			
cut1	-2.9427	-3.0146	-2.9188	-2.8053	-3.7251
cut2	-1.5574	-1.6285	-1.5263	-1.4327	-2.2243
cut3	.0381	-.0288	.0815	.1734	-.6048
cut4	2.7803	2.7219	2.8509	2.9830	2.0567
Pseudo R^2	56,302	56,302	52,591	41,742	11,209
N	.0303	.0319	.0338	.0313	.0353

Source: *Bank of England Inflation Attitudes Surveys*, February 2001-February 2008
Notes: excluded categories February 2001; private renter; South East; <£9,500 and ALS <16. T-statistics in parentheses.
ALS not available in February 2008.

Table 4. Responses to inflation expectations questions - Bank of England Survey, 2000-2008

Q2. How much would you expect prices in the shops generally to change over the next 12 months?

	Nov-99	Feb-00	May-00	Aug-00	Nov-00	Feb-01	May-01	Aug-01	Nov-01	Feb-02
Go down	10	7	4	6	4	5	5	4	5	3
Not change	14	8	9	9	9	11	11	9	13	9
Up by 1% or less	10	7	7	10	8	9	9	10	10	10
Up by 1% but <2%	16	15	14	15	16	16	17	16	18	17
Up by 2% but <3%	17	21	21	19	21	20	20	21	20	22
Up by 3% but <4%	6	12	10	12	12	11	9	11	9	11
Up by 4% but <5%	3	7	7	6	6	5	7	6	5	6
Up by 5% or more	8	10	11	9	11	10	9	9	7	9
No idea	16	13	16	13	12	13	13	13	13	12
Median	1.5	2.2	2.4	2.2	2.3	2.1	2.1	2.2	1.9	2.2

	May-02	Aug-02	Nov-02	Feb-03	May-03	Aug-03	Nov-03	Feb-04	May-04	Aug-04
Go down	2	4	4	3	3	4	2	2	2	2
Not change	9	9	10	7	0	11	5	7	6	8
Up by 1% or less	10	10	8	7	8	9	8	8	9	9
Up by 1% but <2%	16	20	17	15	18	15	16	17	17	18
Up by 2% but <3%	22	22	20	20	21	20	20	22	21	23
Up by 3% but <4%	11	11	10	12	11	11	15	11	12	12
Up by 4% but <5%	8	6	5	8	6	6	7	7	6	7
Up by 5% or more	9	9	10	13	8	9	11	11	12	8
No idea	13	10	16	15	15	14	17	14	14	12
Median	2.3	2.1	2.1	2.5	2.2	2.2	2.6	2.4	2.4	2.3

	Nov-04	Feb-05	May-05	Aug-05	Nov-05	Feb-06	May-06	Aug-06	Nov-06	Feb-07
Go down	2	3	3	5	4	2	2	2	2	2
Not change	8	8	9	8	9	7	7	6	6	6
Up by 1% or less	9	9	12	9	9	6	8	9	8	6
Up by 1% but < 2%	18	17	20	18	18	13	15	15	14	14
Up by 2% but < 3%	22	20	20	20	21	21	22	21	21	20
Up by 3% but < 4%	10	12	9	12	10	14	13	13	13	16
Up by 4% but < 5%	7	6	6	6	7	8	7	8	9	9
Up by 5% or more	11	8	7	8	10	16	14	14	16	14
No idea	14	16	13	15	12	13	13	12	11	12
Median	2.4	2.2	2.0	2.2	2.2	2.7	2.5	2.5	2.7	2.7

	May-07	Aug-07	Nov-07	Feb-08
Go down	2	1	2	2
Not change	6	5	3	4
Up by 1% or less	8	6	5	4
Up by 1% but < 2%	14	14	13	9
Up by 2% but < 3%	19	22	22	17
Up by 3% but < 4%	17	15	16	14
Up by 4% but < 5%	9	9	10	10
Up by 5% or more	13	14	19	21
No idea	12	13	11	20
Median	2.7	2.7	3.0	3.3

Source: *Bank of England Inflation Attitudes Surveys.*

Table 5. Interval regressions of CPI over next 12 months

	All	All	All	ALS<19	ALS 19+
Male	.0962 (5.80)	.0224 (1.76)	.0207 (1.60)	.0139 (0.93)	.0498 (1.92)
15-24	-.0105 (0.34)	.0095 (0.40)	.0124 (0.51)	.0032 (0.12)	.0258 (0.48)
25-34	-.1728 (6.39)	-.0569 (2.75)	-.0381 (1.80)	-.0205 (0.79)	-.0747 (2.09)
45-54	.3080 (11.17)	.1368 (6.46)	.1394 (6.40)	.1157 (4.52)	.2067 (5.10)
55-64	.3687 (12.07)	.1575 (6.71)	.1593 (6.51)	.1493 (5.28)	.1819 (3.68)
>=65	.3112 (9.51)	.1095 (4.36)	.1028 (3.88)	.0767 (2.56)	.2352 (3.88)
Not working	.0078 (0.38)	-.0015 (0.10)	.0089 (0.55)	.0032 (0.17)	.0649 (1.86)
ALS 16			.0293 (1.64)	.0265 (1.42)	
ALS 17-18			-.0064 (0.31)	-.0073 (0.34)	
ALS 19+			-.0810 (4.00)		
Owned outright	-.0304 (1.07)	-.0149 (0.68)	-.0239 (1.07)	-.0369 (1.44)	.0204 (0.44)
Mortgage	-.1091 (4.35)	-.0812 (4.22)	-.0838 (4.25)	-.1083 (4.68)	-.0097 (0.26)
Council rent	.2275 (7.71)	.0821 (3.62)	.0681 (2.94)	.0576 (2.25)	.0348 (0.55)
Scotland	-.1562 (4.54)	-.0240 (0.91)	-.0316 (1.21)	-.0436 (1.47)	.0164 (0.29)
North	-.0418 (1.83)	.0022 (0.13)	-.0067 (0.38)	-.0123 (0.62)	.0074 (0.21)
Midlands	.0088 (0.33)	-.0152 (0.76)	-.0250 (1.24)	-.0233 (1.02)	-.0353 (0.83)
Wales/West	-.1010 (3.70)	-.0764 (3.66)	-.0835 (4.03)	-.0886 (3.71)	-.0718 (1.73)
£9,500-£17,499	.0446 (1.79)	.0038 (0.20)	.0002 (0.01)	.0065 (0.30)	-.0267 (0.58)
£17,500-£24,999	.0385 (1.26)	.0170 (0.73)	.0107 (0.45)	-.0128 (0.47)	.1130 (2.39)
>£25,000	.0181 (0.77)	.0293 (1.62)	.0469 (2.53)	.0400 (1.73)	.0496 (1.66)
Feb 2002	.1000 (2.38)	.1983 (6.16)	.1999 (6.27)	.1803 (4.96)	.2800 (4.26)
Feb 2003	.5312 (12.51)	.4036 (12.40)	.4039 (12.54)	.4322 (11.73)	.3114 (4.74)
May 2003	.0854 (1.59)	.0768 (1.86)	.0759 (1.86)	.0723 (1.57)	.0823 (0.93)
Aug 2003	.0891 (1.69)	.0620 (1.54)	.0623 (1.56)	.0459 (1.01)	.1279 (1.55)
Nov 2003	.5028 (9.19)	.3418 (8.14)	.3430 (8.26)	.3068 (6.49)	.4973 (5.73)
Feb 2004	.3690 (8.72)	.2278 (7.02)	.2293 (7.14)	.2280 (6.18)	.2458 (3.81)
May 2004	.4000 (7.43)	.3042 (7.37)	.3068 (7.51)	.2869 (6.14)	.3944 (4.71)
Aug 2004	.2168 (4.24)	.1275 (3.26)	.1312 (3.38)	.1208 (2.70)	.1882 (2.45)
Nov 2004	.2383 (4.49)	.1498 (3.68)	.1526 (3.79)	.1492 (3.23)	.1760 (2.16)

Feb 2005	.1002 (2.33)	.0753 (2.28)	.0790 (2.42)	.0927 (2.46)	.0493 (0.76)
May 2005	-.0622 (1.16)	.0132 (0.32)	.0160 (0.40)	-.0125 (0.27)	.1583 (1.84)
Aug 2005	.1203 (2.32)	.0920 (2.32)	.0942 (2.40)	.0869 (1.92)	.1280 (1.65)
Nov 2005	.0070 (0.13)	-.0403 (0.99)	-.0344 (0.85)	-.0291 (0.62)	-.0392 (0.51)
Feb 2006	.7079 (16.61)	.2958 (9.02)	.2988 (9.20)	.3024 (8.09)	.3120 (4.82)
May 2006	.5416 (10.07)	.1681 (4.07)	.1708 (4.18)	.1783 (3.77)	.1688 (2.11)
Aug 2006	.5392 (10.32)	.1333 (3.32)	.1359 (3.42)	.1461 (3.17)	.1275 (1.65)
Nov 2006	.7800 (14.92)	.2902 (7.21)	.2899 (7.28)	.2435 (5.32)	.4699 (5.87)
Feb 2007	.6779 (16.03)	.1731 (5.32)	.1752 (5.44)	.1567 (4.21)	.2754 (4.32)
May 2007	.5804 (10.89)	.0379 (0.93)	.0404 (1.00)	-.0013 (0.03)	.2029 (2.61)
Aug 2007	.7132 (13.39)	.3123 (7.63)	.3085 (7.61)	.3229 (6.84)	.3015 (3.87)
Nov 2007	1.0260 (19.29)	.3936 (9.60)	.3895 (9.60)	.3883 (8.21)	.4184 (5.39)
Feb 2008	1.2500 (28.23)	.2625 (7.64)			
Not changed		.6456 (18.14)	.6492 (18.27)	.6634 (16.38)	.5985 (8.13)
0-1%		.6944 (17.74)	.7102 (18.13)	.7162 (15.88)	.6809 (8.64)
1% but < 2%		1.2390 (35.44)	1.2481 (35.69)	1.2546 (31.46)	1.2189 (16.84)
2% but <3%		1.9655 (58.86)	1.9835 (59.39)	1.9915 (52.37)	1.9410 (27.91)
3% but < 4%		2.7826 (80.04)	2.8007 (80.34)	2.8295 (71.42)	2.6929 (36.88)
4% but <5%		3.4094 (90.87)	3.4194 (90.28)	3.4519 (80.54)	3.2950 (40.77)
5% or more		4.2832 (119.35)	4.2924 (118.35	4.4246 (107.63)	3.7322 (48.33)
No idea		1.7537 (42.74)	1.7354 (42.03)	1.7404 (37.02)	1.7149 (19.97)
Constant	2.0797	.2882	.2854	.3021	.1306
Left-censored	1,720	1,720	1,657	1,341	316
Right-censored	7,924	7,924	7,074	6,074	1,000
Interval	45,825	45,825	43,547	33,891	9,656
N	55,469	55,469	52,278	41,306	10,972
LR chi^2	2,752	31,993	30,159	24,279	5,814

Source: *Bank of England Inflation Attitudes Survey*, February 2001-November 2007. Notes: excluded categories February 2001; private renter; South East and ALS <16. T-statistics in parentheses. Q2 "How much would you expect prices in the shops generally to change over the next 12 months?".

Table 6. Responses to GFK Attitudes Survey, 1996-2008 (January) - weighted %

	1996	1997	1998	1999	2000	2001	2002
Risen a lot	14	17	19	14	15	15	15
Risen moderately	41	39	37	36	41	38	35
Risen slightly	22	21	22	20	17	18	25
Stayed about the same	16	13	14	18	17	19	17
Fallen	2	1	2	6	4	3	4
Don't know	6	8	6	6	5	7	4

	2003	2004	2005	2006	2007	2008	Average
Risen a lot	16	15	13	16	17	21	16
Risen moderately	33	33	31	32	31	32	36
Risen slightly	20	19	19	19	21	20	20
Stayed about the same	23	26	28	25	23	20	20
Fallen	4	4	6	3	3	3	4
Don't know	4	4	4	5	5	4	5

Table 7. Non-response dprobit, 1996-2008 - GfK/EU survey

	Prices	Unemployment
Male	-.0154 (19.08)	-.0254 (29.06)
30-49	-.0009 (0.80)	.0015 (1.29)
50-64	.0037 (2.97)	.0044 (3.27)
65+	.0248 (17.37)	.0390 (24.41)
1996	.0240 (11.66)	.0374 (16.44)
1997	-.0019 (1.04)	.0078 (3.76)
1998	.0032 (1.68)	.0100 (4.77)
1999	-.0018 (0.96)	.0003 (0.15)
2000	.0112 (5.70)	.0019 (0.93)
2001	-.0156 (8.60)	-.0152 (7.69)
2002	-.0169 (9.39)	-.0213 (11.01)
2003	-.0200 (11.22)	-.0246 (12.85)
2004	-.0135 (7.42)	-.0223 (11.58)
2006	-.0049 (2.65)	-.0155 (7.91)
2007H1	-.0082 (3.82)	-.0116 (5.02)
2007H2	.0020 (0.83)	-.0040 (1.54)
2008	-.0179 (3.72)	-.0098 (1.78)
ALS ≤16	.0060 (5.26)	.0086 (6.87)
ALS =16	.0006 (0.74)	.0026 (2.60)
Not working	.0123 (13.37)	.0080 (8.12)
North	-.0079 (4.15)	-.0191 (9.73)
North West	.0132 (8.34)	-.0082 (5.21)
Yorks/Humber	-.0042 (2.63)	-.0042 (2.47)
East Midlands	-.0051 (2.97)	-.0074 (4.05)
West Midlands	-.0048 (3.03)	-.0083 (4.98)
East Anglia	-.0071 (3.31)	-.0085 (3.76)
London	.0025 (1.71)	.0046 (2.90)
South West	-.0041 (2.50)	-.0065 (3.82)
Scotland	-.0030 (1.86)	-.0098 (5.86)
Wales	.0042 (2.12)	-.0032 (1.55)
Northern Ireland	-.0048 (1.98)	-.0052 (2.01)
N	291,578	291,578
Pseudo R^2	.0240	.0316

Source: GFK survey. Excluded categories 2005; South East: ALS >16

Table 8. Ordered logits of GFK expectations 12 months ahead on prices.

	All	All	All	ALS≤16	ALS >16
30-49	-.1291 (13.93)	-.1291 (9.57)	-.0383 (3.05)	-.0501 (2.91)	-.0337 (2.12)
50-64	.0431 (4.14)	.0427 (2.68)	.1027 (6.94)	.0837 (4.41)	.1201 (6.24)
65+	.0451 (3.87)	.0445 (2.69)	.0492 (3.11)	.0314 (1.62)	.0649 (2.76)
Male	-.1882 (26.76)	-.1881 (19.53)	-.1108 (12.04)	-.1180 (10.80)	-.1006 (7.87)
North	-.0510 (3.03)	-.0509 (2.43)	-.0248 (1.19)	-.0586 (2.14)	.0286 (1.03)
North West	-.0445 (3.31)	-.0448 (2.48)	-.0094 (0.52)	-.0127 (0.53)	-.0027 (0.12)
Yorks/Humber	-.0093 (0.66)	-.0096 (0.51)	.0177 (0.94)	.0173 (0.76)	.0186 (0.75)
East Midlands	-.0344 (2.26)	-.0344 (1.99)	-.0119 (0.68)	-.0039 (0.17)	-.0205 (0.82)
West Midlands	.0319 (2.27)	.0322 (1.93)	.0176 (1.11)	.0037 (0.19)	.0386 (1.63)
East Anglia	-.0038 (0.21)	-.0035 (0.18)	.0045 (0.21)	-.0147 (0.56)	.0338 (1.19)
London	.0746 (5.78)	.0750 (4.74)	.0516 (3.49)	.0653 (3.17)	.0419 (2.24)
South West	-.0208 (1.45)	-.0209 (1.16)	-.0170 (0.96)	-.0230 (1.04)	-.0060 (0.24)
Scotland	-.0030 (0.21)	-.0028 (0.14)	.0245 (1.24)	.0029 (0.12)	.0554 (2.21)
Wales	.0022 (0.13)	.0022 (0.10)	-.0139 (0.58)	-.0201 (0.67)	-.0039 (0.13)
Northern Ireland	.2315 (10.79)	.2322 (6.41)	.1370 (4.10)	.1631 (4.18)	.0953 (2.40)
1996	.5086 (30.01)	.4592 (8.34)	.3317 (7.00)	.3346 (6.75)	.3392 (6.17)
1997	.6705 (39.12)	.6944 (13.46)	.6023 (11.92)	.5576 (10.82)	.6976 (12.35)
1998	.6390 (37.57)	.6921 (9.79)	.6033 (9.35)	.6368 (10.33)	.5590 (7.77)
1999	.3298 (19.26)	.4105 (6.24)	.3381 (6.11)	.3822 (6.77)	.2730 (4.19)
2000	.5378 (31.70)	.6777 (7.75)	.5155 (6.87)	.5196 (6.25)	.5013 (6.85)
2001	.4581 (26.85)	.5486 (5.70)	.5598 (6.99)	.5841 (6.88)	.5110 (6.60)
2002	.3514 (20.65)	.4402 (7.07)	.5105 (10.11)	.5236 (8.95)	.4946 (10.44)
2003	.2764 (16.20)	.3535 (3.71)	.3329 (3.16)	.3458 (2.90)	.3192 (3.42)
2004	.1856 (10.86)	.2633 (3.78)	.2058 (3.57)	.1732 (2.80)	.2381 (4.19)
2006	.2331 (13.59)	.2017 (4.14)	.0707 (1.85)	.0513 (1.02)	.0863 (2.49)
2007H1	.2561 (12.93)	.1922 (3.35)	.0002 (0.00)	-.0318 (0.53)	.0231 (0.55)
2007H2	.5059 (23.87)	.5084 (14.96)	.2523 (6.18)	.2495 (6.84)	.2554 (4.89)
ALS =16	-.0777 (7.71)	-.0779 (5.98)	-.0485 (3.92)		
ALS>16	-.1103 (10.62)	-.1104 (8.30)	-.0261 (2.07)	-.0430 (3.44)	

Self-employed	-.0474 (4.55)	-.0486 (4.10)	-.0000 (0.00)	-.0293 (1.59)	.0176 (1.14)
Self – farmer	-.0882 (1.74)	-.0897 (1.56)	-.1395 (2.45)	-.1403 (1.93)	-.1352 (1.57)
Clerical & sales	-.0787 (7.27)	-.0796 (7.02)	-.0356 (3.27)	-.0466 (3.03)	-.0233 (1.53)
Skilled manual	-.0505 (4.16)	-.0511 (3.65)	-.0497 (3.65)	-.0622 (3.53)	-.0262 (1.33)
Other manual	-.0249 (1.99)	-.0246 (1.91)	-.0355 (2.77)	-.0351 (2.35)	-.0440 (1.81)
Monthly CPI		.1128 (1.94)	.0830 (1.63)	.0710 (1.20)	.0989 (2.11)
Risen a lot*			2.9421 (78.06)	2.9261 (60.87)	2.9084 (66.10)
Risen moderately*			2.3036 (82.08)	2.2183 (61.70)	2.3980 (67.14)
Risen slightly*			1.8894 (63.94)	1.7607 (52.90)	2.0396 (51.61)
Stayed same*			1.0234 (40.81)	.9442 (29.01)	1.1104 (33.51)
Don't know*			1.5874 (34.62)	1.5140 (24.78)	1.6674 (26.69)
Cut1	-3.1337	-2.9045	-1.3633	-1.4924	-1.1903
Cut2	-.9763	-.7469	.9484	.8218	1.1209
Cut3	-.0110	.21850	2.0203	1.9032	2.1819
Cut4	1.8043	2.0341	3.9771	3.8238	4.1924
N	276,059	276,059	276,059	156,216	119,843
Pseudo R^2	.0063	.0064	.0517	.0515	.0517

Source: *GFK survey*

Notes: excluded categories 2005; South East; 16-29; fallen. * refers to how prices changed over preceding 12 months. The survey question is (Q6): How do you expect consumer prices will rise over the next 12 months? Standard errors on the monthly inflation variable are adjusted for clustering. 2007H2 also includes January 2008.

Table 9. Ordered logits of GFK expectations 12 months ahead on unemployment.

	All	ALS<16	ALS =16	ALS>16
30-49	.2302 (14.92)	.1838 (6.61)	.2162 (10.07)	.2592 (15.59)
50-64	.4023 (15.61)	.2632 (7.67)	.4314 (13.81)	.4300 (15.28)
65+	.3315 (11.99)	.2131 (6.18)	.3193 (8.73)	.4063 (13.42)
Male	-.0374 (2.84)	-.0328 (1.92)	-.0514 (2.98)	-.0305 (1.70)
North	.0397 (1.65)	.0319 (0.89)	.0464 (1.37)	.0403 (1.23)
North West	-.0625 (3.35)	-.0524 (1.48)	-.0862 (3.26)	-.0450 (1.66)
Yorks/Humber	.0055 (0.26)	.0240 (0.67)	.0072 (0.27)	-.0040 (0.14)
East Midlands	.0437 (2.48)	.0220 (0.59)	.0656 (2.34)	.0318 (1.24)
West Midlands	.0967 (4.89)	.1084 (3.01)	.1086 (3.98)	.0792 (3.07)
East Anglia	.0713 (3.24)	.0118 (0.27)	.1022 (3.16)	.0713 (2.25)
London	.0137 (0.84)	.0414 (1.46)	.0433 (1.66)	-.0136 (0.59)
South West	.0013 (0.08)	.0090 (0.25)	-.0094 (0.37)	.0055 (0.22)
Scotland	.0183 (0.70)	.0177 (0.45)	.0531 (1.53)	-.0125 (0.40)
Wales	.0209 (0.87)	.0006 (0.01)	.0096 (0.28)	.0406 (1.23)
Northern Ireland	-.1184 (3.73)	-.1204 (2.18)	-.1751 (3.95)	-.0631 (1.54)
1996	-.2450 (1.45)	-.2438 (1.42)	-.2083 (1.22)	-.3029 (1.71)
1997	.5608 (1.92)	.4885 (1.74)	.4859 (1.72)	.6378 (2.01)
1998	.7856 (2.82)	.6137 (2.29)	.7570 (2.75)	.8723 (2.85)
1999	.8252 (2.50)	.7473 (2.30)	.7971 (2.40)	.8426 (2.39)
2000	1.2019 (3.13)	1.0770 (2.95)	1.1818 (3.03)	1.2312 (2.96)
2001	1.2356 (3.52)	1.0522 (3.07)	1.1343 (3.19)	1.3259 (3.50)
2002	1.3543 (3.64)	1.3251 (3.64)	1.2622 (3.36)	1.3839 (3.46)
2003	1.3296 (3.30)	1.4087 (3.58)	1.2955 (3.18)	1.2786 (2.95)
2004	1.3944 (3.56)	1.3699 (3.54)	1.3311 (3.36)	1.3983 (3.34)
2006	1.6237 (5.09)	1.7191 (5.52)	1.5606 (4.86)	1.6123 (4.69)
2007H1	1.5075 (4.67)	1.5213 (4.83)	1.5197 (4.66)	1.4636 (4.19)
2007H2	1.4839 (4.39)	1.4696 (4.46)	1.4642 (4.27)	1.4636 (4.03)
ALS ≤16	-.0832 (6.30)			
ALS>16	-.1659 (9.46)			
Self-employed	-.0105 (0.83)	.0063 (0.17)	.0296 (1.29)	-.0236 (1.59)
Self – farmer	.2611 (5.10)	.3440 (2.66)	.2962 (4.19)	.1857 (2.17)
Clerical & sales	-.0207 (1.74)	-.0159 (0.49)	-.0405 (2.20)	-.0045 (0.27)
Skilled manual	.0766 (5.07)	.0811 (2.89)	.0487 (2.38)	.1174 (4.99)
Other manual	.0175 (1.35)	.0487 (1.75)	.0129 (0.64)	.0025 (0.10)
Unemployment rate	.2780 (2.31)	.2877 (2.46)	.2597 (2.13)	.2607 (2.01)
Cut1	-1.6955	-1.4274	-1.6994	-1.8245
Cut2	1.2684	1.2492	1.2106	1.3464
Cut3	2.7610	2.7252	2.6986	2.8525
Cut4	4.8771	4.5901	4.7840	5.1369
N	269,333	51,926	100,370	117,037
Pseudo R^2	.0179	.0165	.0177	.0192

Source: *GFK survey.* Notes: excluded categories 2005; South East; 16-29; fallen. The survey question is (Q6): How do you expect the number of people who are unemployed to change over the next 12 months? Standard errors on the monthly unemployment rate are adjusted for clustering. 2007H2 also includes January 2008. T statistics in parentheses.

Table 10. Probability of correctly reporting the level/changes in the official inflation and unemployment rates, 2005/2006 (dprobits).

	Inflation		Unemployment	
	2006	*2006-2005*	*2006*	*2006-2005*
Age	.0199 (4.82)	.0110 (2.47)	.0068 (2.39)	.0042 (1.02)
Age^2	-.00017 (4.27)	-.00013 (2.97)	-.00006 (2.31)	-.0000 (1.26)
Male	.2196 (8.29)	.1039 (3.45)	.0723 (3.81)	.0395 (1.39)
ALS 16-19	.1058 (3.17)	-.0548 (1.47)	.0085 (0.36)	-.0179 (0.51)
ALS ≥20	.2124 (4.63)	.0856 (1.75)	.0826 (2.53)	-.0569 (1.26)
Still studying	.2862 (2.54)	.0752 (0.82)	.1956 (2.26)	-.0285 (0.33)
Home worker	.0862 (1.06)	.1371 (1.88)	.0987 (1.58)	.0828 (1.18)
Unemployed	.0466 (0.56)	.0078 (0.10)	.0807 (1.28)	.0115 (0.16)
Retired	.1928 (2.79)	.1155 (1.71)	.0589 (1.18)	.0572 (0.89)
Professional lawyer	.3318 (2.69)	.0465 (0.39)	.1627 (1.76)	.0470 (0.41)
Shop owner	.0651 (0.54)	-.1374 (1.07)	-.0400 (0.48)	-.0450 (0.37)
Business proprietor	.3755 (2.44)	.0992 (0.65)	.1848 (1.58)	.1700 (1.15)
Employed professional	.4668 (4.71)	.2491 (2.73)	.0820 (1.19)	-.0697 (0.81)
General management	.5564 (3.76)	.2791 (2.00)	.1589 (1.48)	.0204 (0.15)
Middle management	.2411 (2.84)	.0814 (1.03)	.0786 (1.28)	.1291 (1.69)
Employed at desk	.2455 (2.83)	.2168 (2.80)	.0383 (0.63)	.0693 (0.92)
Employed traveling	.2950 (1.95)	-.0842 (0.54)	-.0029 (0.03)	-.1539 (1.06)
Employed in a service	.1352 (1.48)	.2394 (2.91)	.0842 (1.24)	.0544 (0.68)
Supervisor	.2871 (1.99)	.1286 (0.91)	.0975 (0.88)	.3598 (2.57)
Skilled manual	.0926 (1.18)	.1126 (1.47)	.0663 (1.11)	.0998 (1.35)
N	1303	1300	1303	1303
Pseudo R^2	.1633	.0612	.0575	.0155

Source: Eurobarometer #67.2: European Union Enlargement, Personal Data Privacy, the National Economy, and Scientific Research, April-May 2007. Notes: Excluded categories: unskilled manual: ALS <16. Inflation rates were as follows 2005 CPI 2.1% RPI 2.8% 2006 CPI 2.3% RPI 3.2%. We take a 'correct' answer in the interval of 1.3% to 4.2%. Non answers were taken as an incorrect answer. Unemployment rates in 2005 were ILO 4.8% and claimant count 2.7% and in 2006 ILO was 5.3% and claimant count 3.0%. We take a correct estimate of unemployment in 2006 to be 2.0% to 6.3%. Columns 1 and 3 relate to whether the respondent reported the 2006 rate correctly (±1%) while columns 2 and 4 relate to whether the respondent was able to report correctly that inflation or unemployment was higher in 2006 than in 2005. T-statistics in parentheses.

Table 11. Probability of correctly reporting the inflation rate 12 months ahead, February, 2005, 2006 & 2007 (dprobits)

	2005	*2006*	*2007*	*2005-2007*
25-34	.0201 (0.62)	.0216 (0.88)	.0016 (0.05)	.0176 (1.01)
35-44	.0153 (0.48)	.0505 (2.12)	-.0377 (1.24)	.0144 (0.84)
45-54	.0159 (0.48)	.0866 (3.57)	.0208 (0.67)	.0475 (2.68)
55-64	.0608 (1.83)	.0772 (3.12)	.0873 (2.74)	.0810 (4.56)
$\geq$65	.0001 (0.00)	.0622 (2.50)	.0237 (0.73)	.0335 (1.86)
Male	.0369 (2.26)	.0414 (3.07)	.0240 (1.49)	.0359 (3.95)
Not working	-.0239 (1.15)	-.0076 (0.45)	-.0458 (2.27)	-.0268 (2.34)
£9500-£17499	.0455 (1.88)	.0997 (5.17)	.0521 (2.22)	.0686 (5.17)
£17500-24999	.0730 (2.35)	.1047 (4.36)	.1187 (4.03)	.1037 (6.19)
$\geq$£25000	.0739 (3.10)	.0759 (3.95)	.1099 (4.70)	.0893 (6.81)
Owned house	.0477 (1.81)	-.0364 (1.61)	.0615 (2.30)	.0235 (1.58)
Mortgage	.0495 (1.94)	-.0128 (0.59)	.0531 (2.08)	.0299 (2.09)
Other housing	.0012 (0.04)	-.0486 (2.05)	.0100 (0.37)	-.0138 (0.90)
ALS 16	-.0127 (0.57)	.0117 (0.66)	-.0077 (0.35)	-.0032 (0.26)
ALS 17-18	.0451 (1.76)	.0481 (2.42)	.0186 (0.74)	.0386 (2.76)
ALS $\geq$19	.0915 (3.59)	.0737 (3.67)	.0560 (2.30)	.0753 (5.43)
South East	.0274 (1.59)	.0016 (0.12)	.0577 (3.41)	.0281 (2.94)
2006 dummy				.1968 (18.49)
2007 dummy				-.0026 (0.25)
N	3842	3939	3967	11748
Pseudo R^2	.0195	.0308	.0242	.0496

Source: Bank of England Inflation Attitudes Surveys, February, 2005/6/7
Notes: excluded categories ALS<16: income<£9500 and 15-24 years of age. CPI in February 2006 2.0%; February 2007 2.8% and in February 2008 2.5%. RPI in February 2006 2.4%; February 2007 4.6% and in February 2008 4.1%. Hence scored as correct in 2005 if inflation in range >=1% and <5%. Scored as correct in 2006 as 1% to over 5% and correct in 2007 if inflation in range 1% but under 4%. T-statistics in parentheses.

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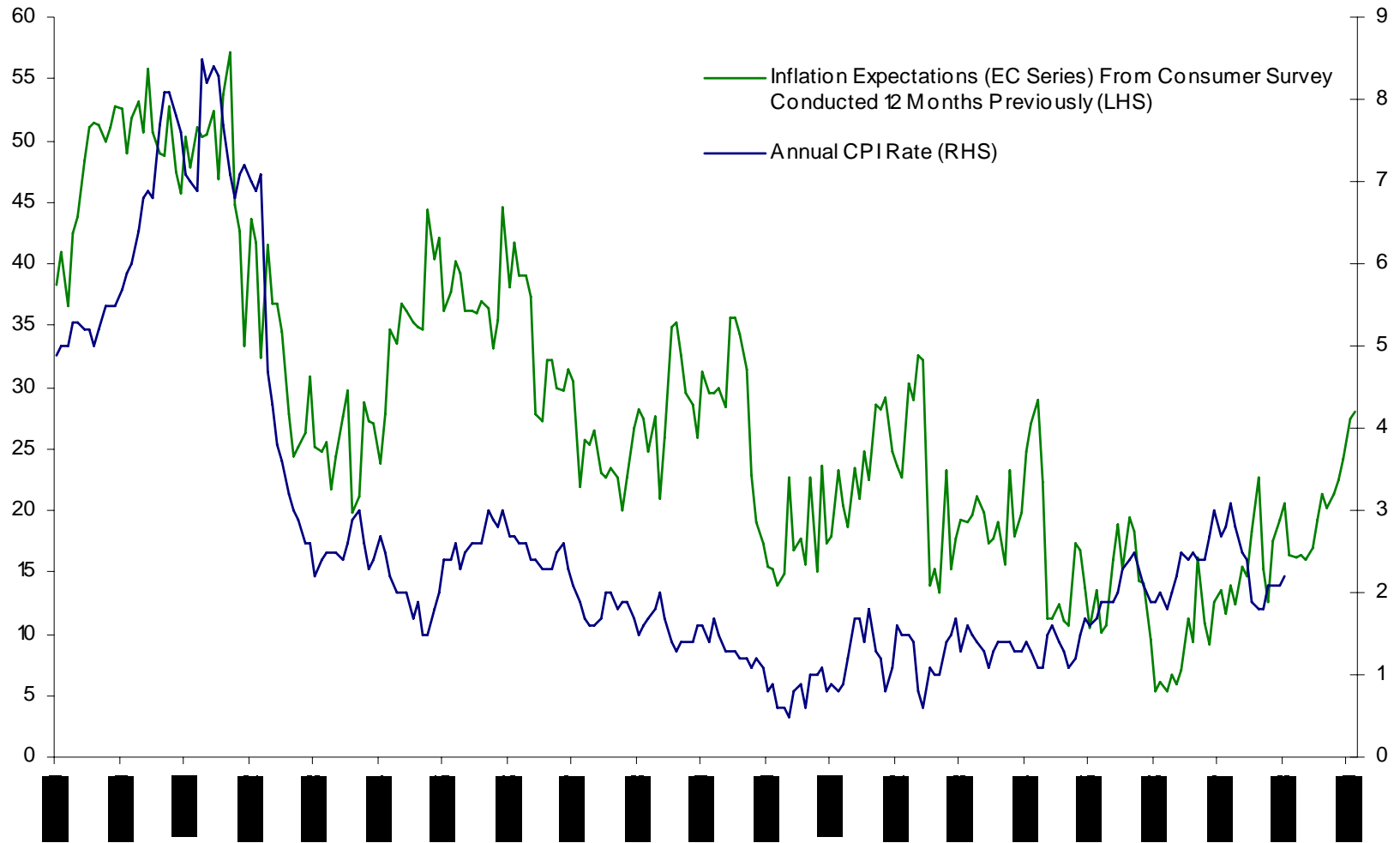Chart 1: UK Inflation (monthly % change in prices on a year earlier)
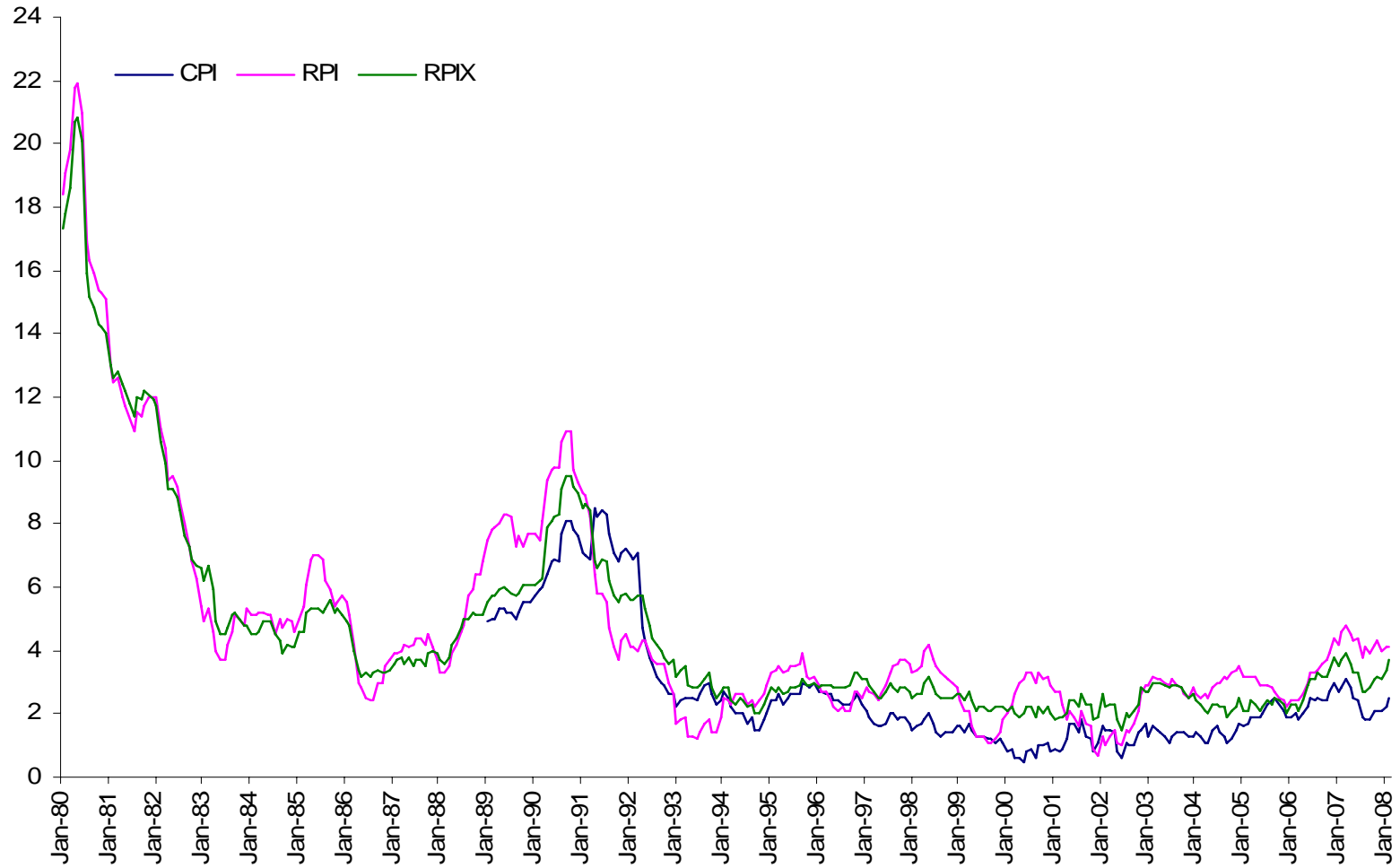
Source: Bank of England

Chart 2: consensus long-term survey based inflation expectations (RPI) and implied market 5-yr fixed 5yr ahead (RPI & CPI)
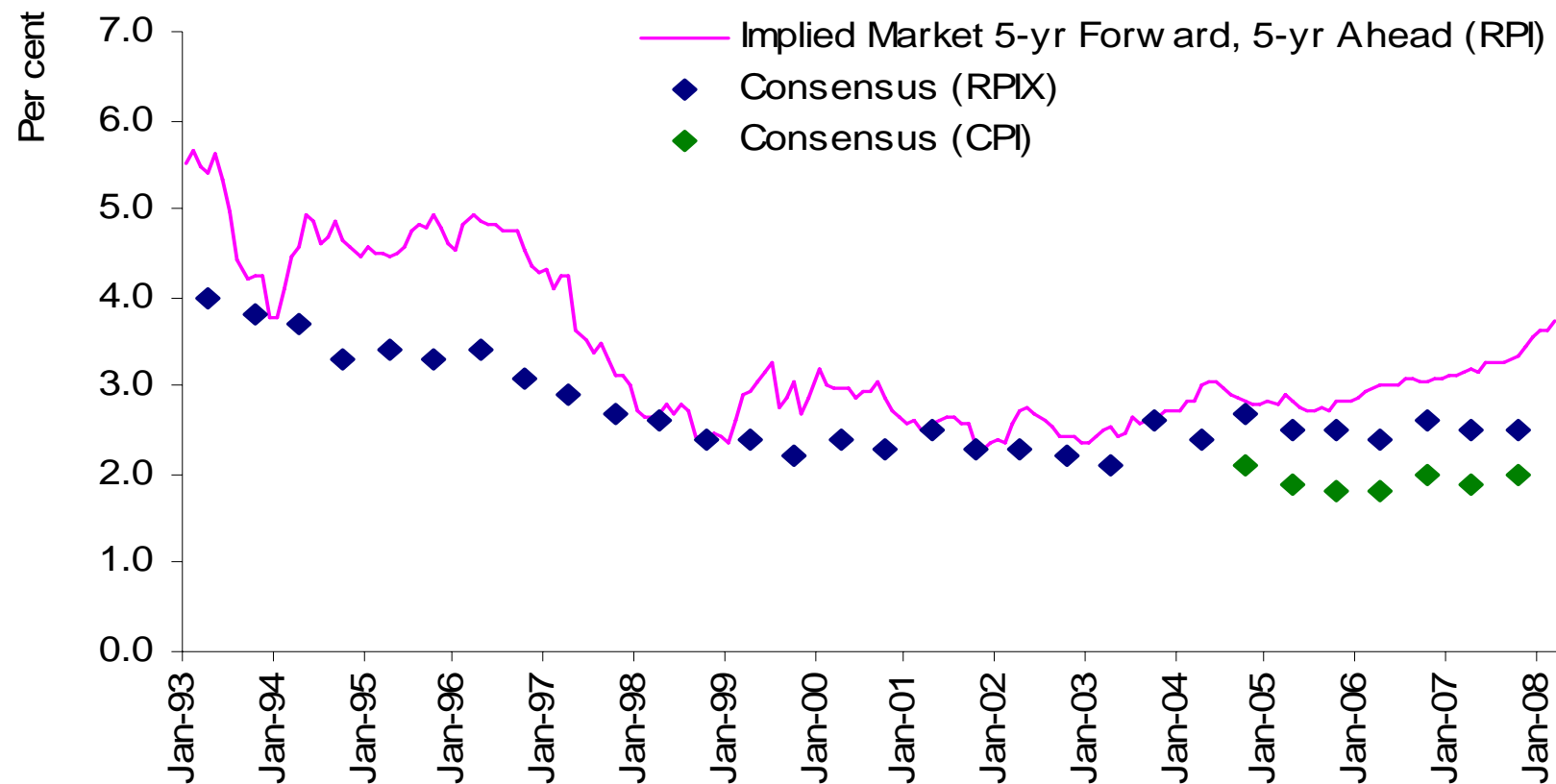
Source: Consensus Economics and Bank of England

Chart 3: Consumer Survey of Inflation Expectations in the UK vs Actual Inflation

Source: EC, Bank of England

Chart 4: Consumer Survey of Unemployment Expectations in the UK vs Actual Unemployment

Unemployment Expectations (EC Series) From Consumer Survey Conducted 12 Months Previously (LHS)

Unemployment Rate (RHS)
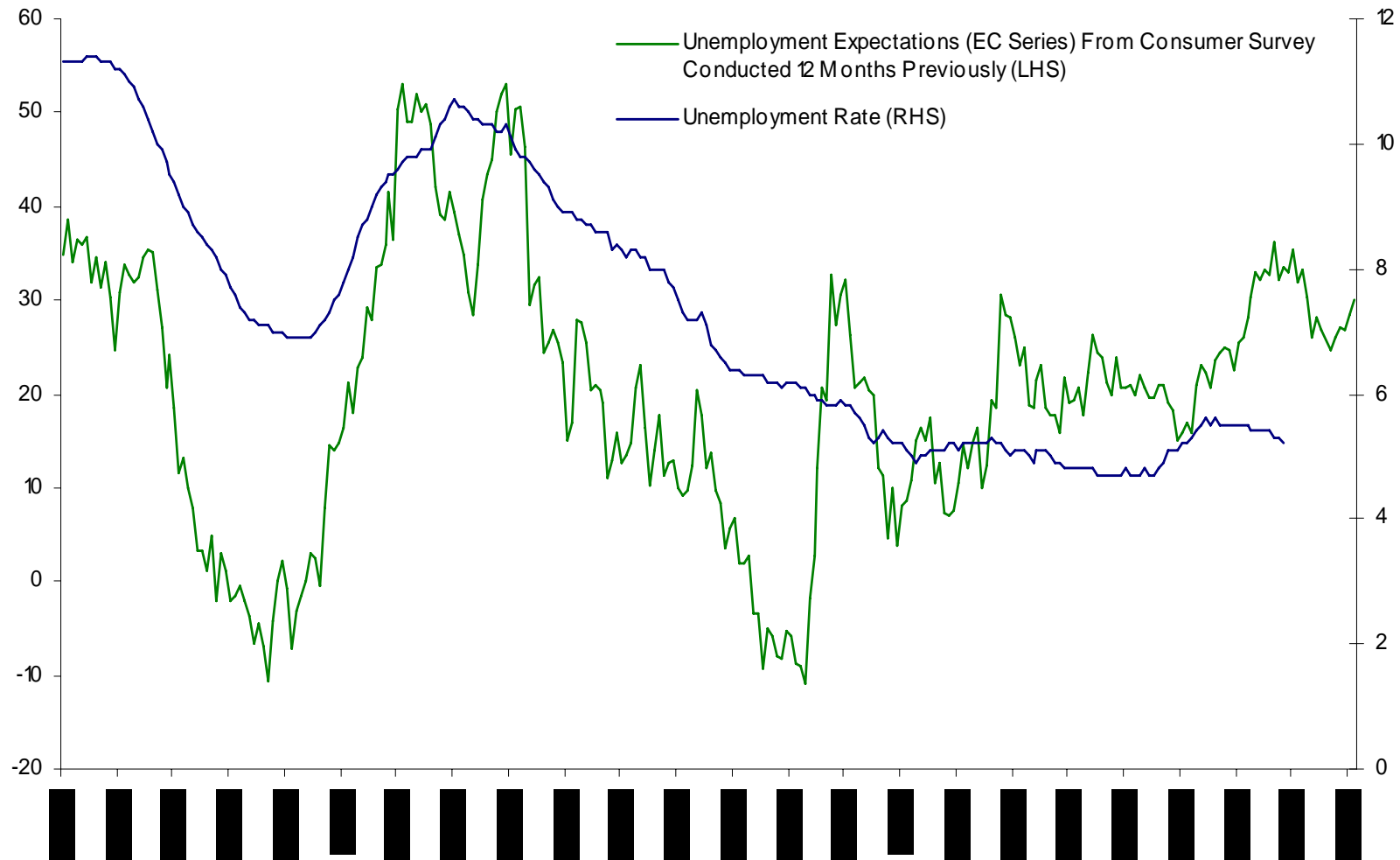
Source: EC, LFS

Chart 5: Consumer Survey of Inflation Expectations vs. Actual Inflation, EU-6

Chart 5.1 Denmark
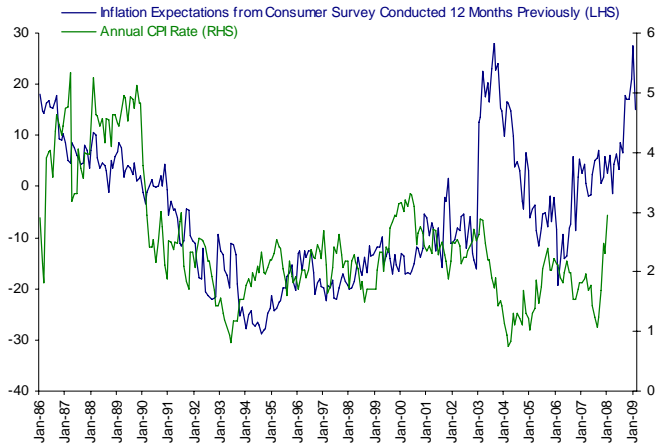
Source: EC, Danmarks Statistik

Chart 5.2 Germany
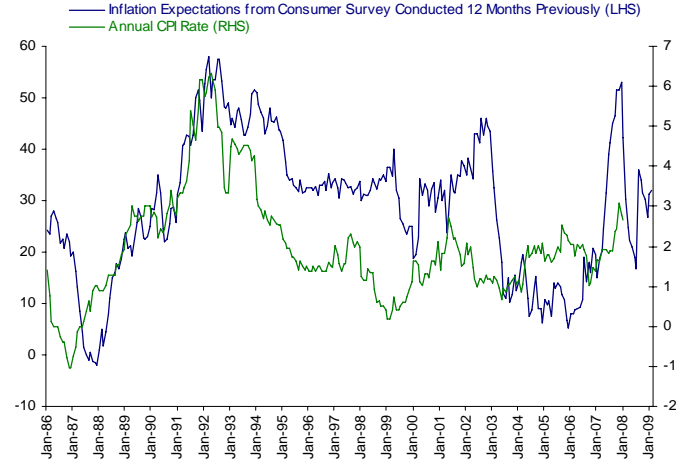
Source: EC, Statistisches Bundesamt Wiesbaden

Chart 5.3 Ireland
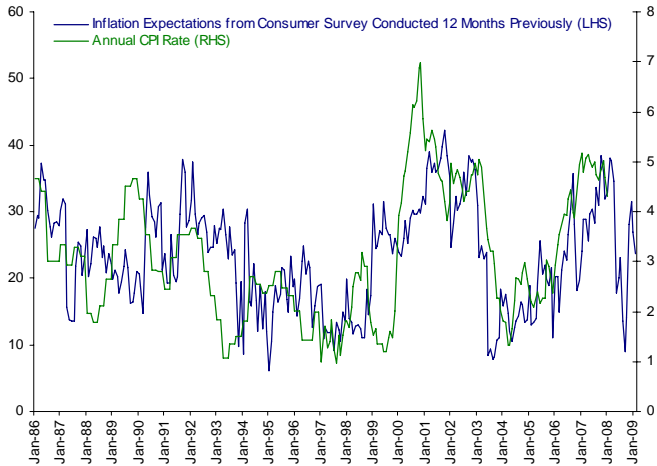
Source: EC, Central Statistics Office Ireland

Chart 5.4 France
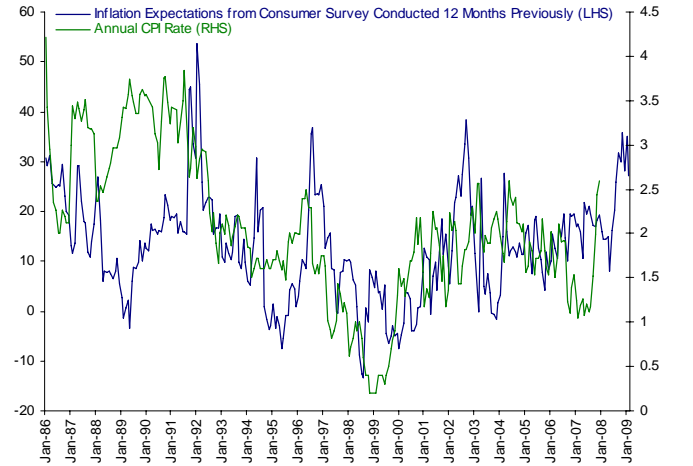
Source: EC, I.N.S.E.E.

Chart 5.5 Italy
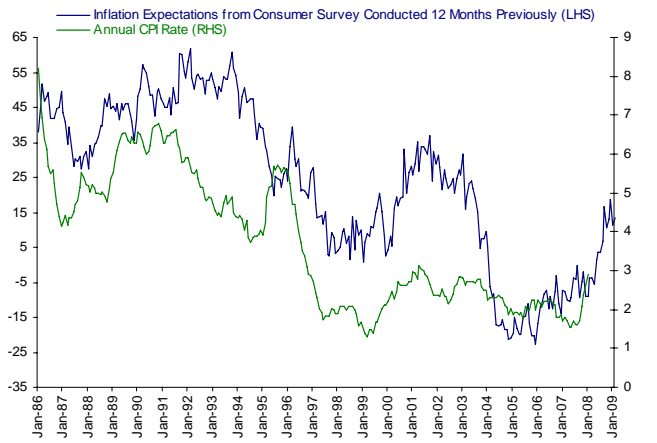
Source: EC, Thompson Datastream

Chart 5.6 Netherlands
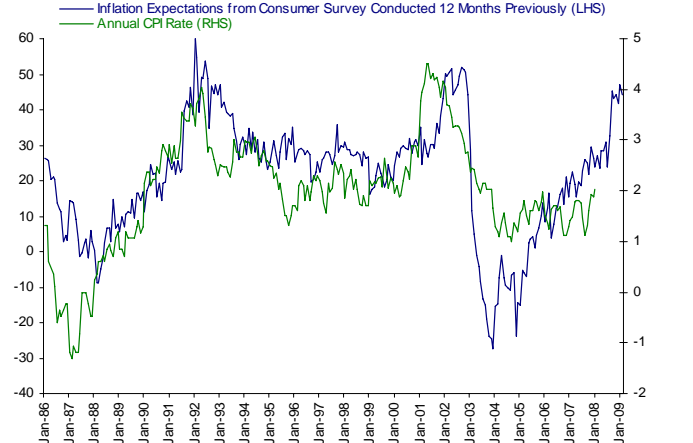
Source: EC, Centraal Bureau Voor de Statistiek

Chart 6: Consumer Survey of Unemployment Expectations vs. Actual Inflation and Unemployment, EU-6

Chart 6.1 Denmark
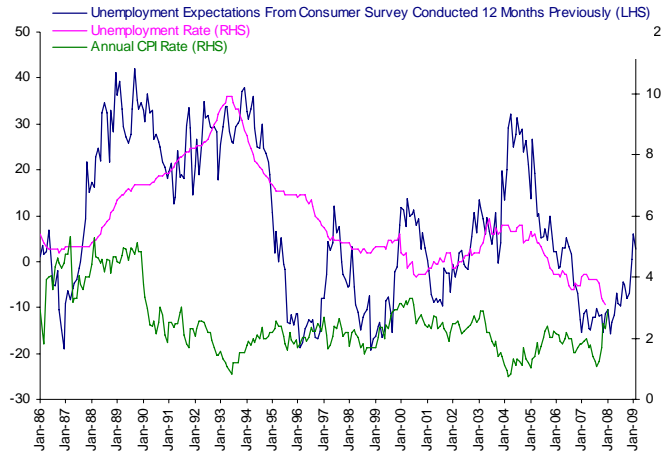
Source: EC, Eurostat, Danmarks Statistik
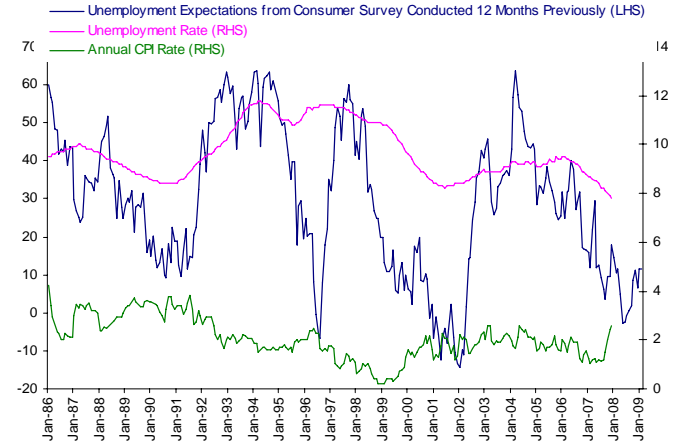
Chart 6.2 Germany
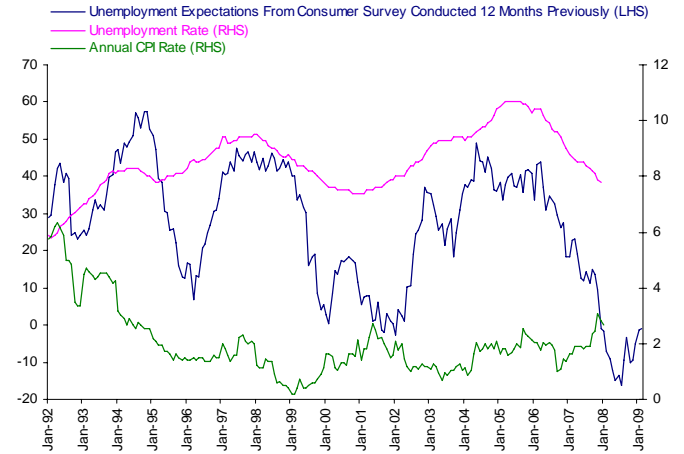
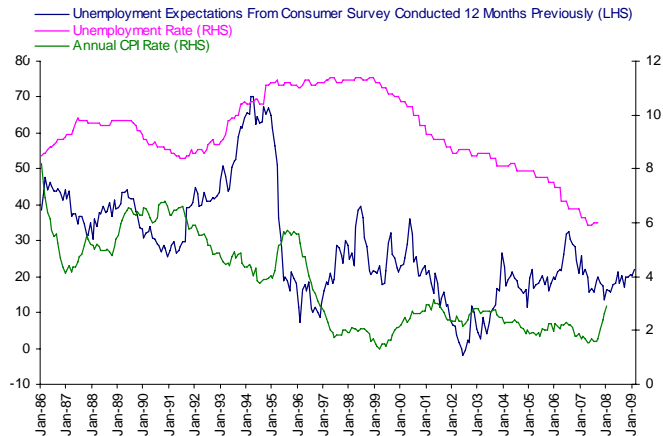Source: EC, Eurostat, Statistisches Bundesamt Wiesbaden

Chart 6.3 Ireland
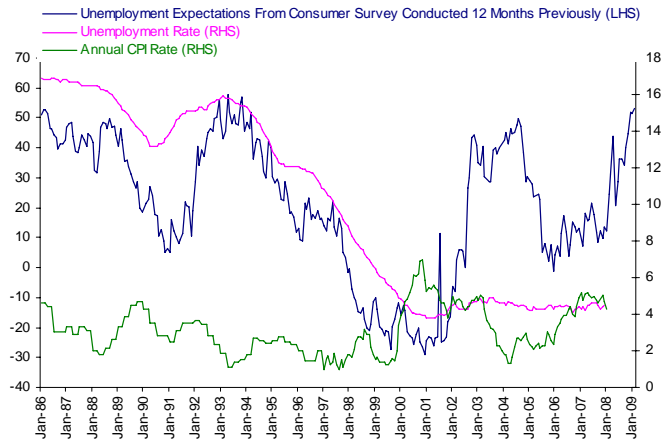
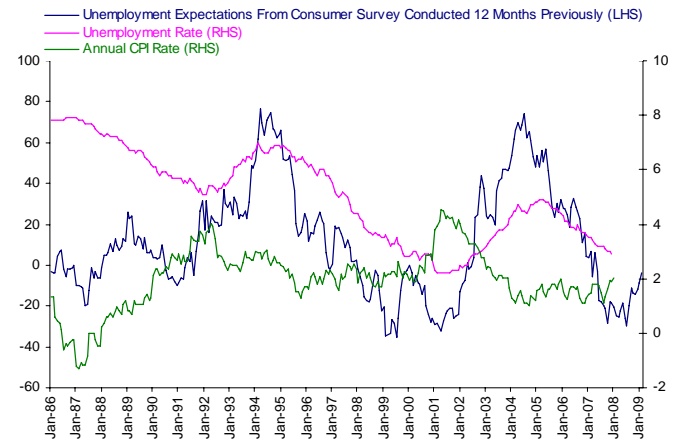Source: EC, Eurostat, Central Statistics Office Ireland

Chart 6.4 France

Source: EC, Eurostat, I.N.S.E.E.

Chart 6.5 Italy

Source: EC, Eurostat, Thompson Datastream

Chart 6.6 Netherlands

Source: EC, Eurostat, Centraal Bureau Voor de Statistiek