BANK OF ENGLAND

Speech

The use of business intelligence in monetary policy

Speech given by

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Introduction

When an economist needs detailed economic data, it is traditional to turn to official records – in the United Kingdom the data compiled by the Office for National Statistics (ONS). And in many ways this traditional approach is the best place to start. Getting one's hands dirty trawling through time series and year-on-year rate comparisons of inflation and GDP components is the bread and butter of policy-makers seeking to understand what is happening and where the economy is headed. In most cases, these data are a comprehensive, accurate, and timely source. But they only go so far. To be in the best position to make informed policy decisions it is necessary to go beyond the official sources and supplement their data with other forms of intelligence, including business surveys and other qualitative data. So today, I would like to look at the role that this type of intelligence plays in helping policy makers such as the Monetary Policy Committee better understand the economy. I suspect that my broad conclusions would be shared by most monetary policy makers, though, to declare an interest, my background in helping design and deliver such surveys while Chief Economic Advisor to the Confederation of British Industry (CBI) probably makes me more of an enthusiastic advocate than some.

Let me start by outlining the range of business intelligence I find useful and why, before turning to how such intelligence can be an invaluable support in setting policy.

A survey of business intelligence

At the Bank of England, business intelligence consists of two primary sources: data collected by the Bank's own network of regional agents via their contacts with individual businesses across the United Kingdom, and other surveys of businesses conducted by external bodies, such as the CBI, the British Chambers of Commerce (BCC) and others.

The Bank's Agency Network gives the MPC direct access to the heart of the UK economy – the businesses whom our policy decisions will influence, through their decisions to spend, hire and invest. Collectively, the Agents meet with around 9000 companies a year either bilaterally or in panel discussions to assess business conditions and gather real-world insight into recent developments and future prospects. One of the most interesting elements of my job on the MPC is to accompany the Agents to some of these meetings, allowing me and my colleagues to hear directly from people who run firms about how they are faring, as well as offering an opportunity for us to explain our views and policy decisions.

The key vehicle for the intelligence gathered by the Bank's Agents is the Agents' Summary of Business Conditions, which can be found on the Bank of England website[1]. It provides the MPC with a summary of economic conditions derived from a broad cross-section of companies, over a range of different sectors,

[1] The monthly Agents' Summary of Business Conditions can be found at http://www.bankofengland.co.uk/publications/Pages/agentssummary/default.aspx.

locations and firm size. This information helps to frame our understanding of demand conditions, both at home and abroad, trends in output, credit conditions, supply and capacity, employment and wages, and costs and prices. The information is provided both in descriptive terms but also through a system of scores, or quantitative judgements, for various economic factors[2]. The scores provide a systematic way of registering changes in conditions, for some 25 variables, usually based on an annual comparison of the most recent three months compared with the same period a year earlier. The scores therefore try to track the underlying trends in key data series, and many have demonstrated a high correlation with subsequently published ONS data.

In addition to their regular monthly update on the macro-economy, the Agents also undertake surveys of special interest to the MPC. These surveys are designed to generate deeper knowledge about specific issues. They are particularly helpful in times of high uncertainty, and have been a useful aid to explore some of the big puzzles facing policy makers in the years following the financial crisis. In the last five years, the Agents have conducted 46 special surveys on topics such as the relationship between credit conditions and investment in the aftermath of the financial crisis, understanding the impact on trade from the 25% depreciation of Sterling from 2007-2009, investigating company motivations behind a rising corporate surplus, and, more recently, productivity growth and the relationship with spare capacity[3].

Beyond the Bank's own gathering of business intelligence, the MPC also relies heavily on the information provided by a range of external business surveys.

Such surveys can be particularly useful in forecasting the short-term outlook, and Table 1 shows an example of the intelligence that contributes to the Bank's weighted survey model for this purpose. The model uses 18 series from surveys run by the CBI, the BCC, and Markit and the Chartered Institute of Procurement and Supply (Markit/CIPS).

But short term forecasting is not their only use. Other, more sector-specific surveys are used to understand in more detail trends in individual sectors or regions of the economy. For example, surveys from the British Retail Consortium (BRC) and the Society of Motor Manufacturers and Traders (SMMT) both provide information on consumer spending. Finally, surveys such as the Deloitte CFO Survey, which focuses on a small sample of very large firms, provide reliable information on specific issues, such as investment trends.

No two surveys are completely alike. They differ in terms of the information collected and the phrasing of the questions. Their sample sizes vary considerably, as do the types of companies surveyed. They also vary greatly in terms of the timing and the manner in which the information is obtained.

[2] For more detail on the scoring system, see Ellis, C. and Pike, T. (2005), "Introducing the Agents' Scores", Bank of England Quarterly Bulletin, Winter 2005.
[3] For a review of the special surveys between 2007 and 2012 Q1, see: Belsham, T., Caunt, S. and Duff, I. (2012), "Agents' Special Surveys since the start of the financial crisis", Bank of England Quarterly Bulletin, 2012 Q1.

In all cases, a thorough understanding of the way in which the survey is compiled, the size and nature of its sample, and how its questions are formulated is critical to being able to draw inferences from its results. In addition, we as policy makers need to understand the potential trade-offs - such as being timely versus covering a large sample - between different surveys, such that we need to consider the broad range of survey intelligence when looking to supplement the official data.

But together, the Agency and external survey data play an essential role in helping us understand and assess the constant stream of official figures. But what exactly does this intelligence offer?

What do surveys add to our understanding?

As a policy maker, the official data provided by the ONS are the first port of call. There are a number of good reasons for this. ONS data, based on quantitative time series, give policy makers directly both the direction and a precise magnitude of the change in a variable, unlike surveys, in which such information usually has to be inferred, often from questions asking respondents whether a measure has increased, decreased or stayed the same. ONS data are also usually derived from larger samples; for example, the Markit/CIPS service sector index covers some 700 firms, significantly smaller than the 23,000 or so services firms which form part of the ONS' Monthly Business Survey[4].

Nevertheless, in other respects, survey data possess qualities that make them of great value to policy makers, such that there are key benefits to supplementing the official data with survey intelligence.

1. Survey data provide additional coverage

There are a number of areas of interest to policy makers not well covered by the official data. Surveys lend themselves to providing information on both sentiment and intentions. For policy-makers, having a sense of the economic mood is vital and provides a reality check on the outputs from economic models which are a necessary simplification of the actual economy. Surveys can also help in identifying those elusive "animal spirits" by asking businesses questions about levels of confidence and uncertainty. They are also able to ask firms about their expectations for economic variables, providing a forward looking view which can be used as an input to assessing the near term outlook.

One example of the additional coverage provided by survey data is the thorny issue of capacity utilisation. An estimate of spare capacity is critical to monetary policy making, particularly for the MPC at present, when assessing the balance between future demand and available supply, and hence future inflationary pressures. However, official statistics provide little information about capacity; the task is left to businesses to provide a view through survey responses. The Bank uses three main surveys provided by the BCC, CBI and Agents

[4] Office for National Statistics (2012), "External coherence, measuring coherence between official estimates of economic activity and external indicators".

when considering spare capacity in firms. The responses are mainly qualitative – asking firms if they are operating above or below capacity, rather than by how much[5]. These various surveys are then summarised into a comparable form to create a swathe of capacity utilisation.

Throughout its history, this information about capacity and capacity usage has provided useful information to the MPC. But recent experience shows how we need to take care in interpreting the messages from the data. In the UK, capacity usage data is derived in part from the number of firms reporting that they are operating below normal capacity, not directly from how far each is below that level. In more normal times, one measure can be taken as an approximation for the other. But during the financial crisis, when output fell at its sharpest rate for many years, the qualitative measure of capacity became less reliable, as not only were there a high number of firms operating below normal capacity, but each firm also was much further below normal than at any time in the survey history. As a result, the approximation broke down, and the surveys appeared to underestimate the true level of spare capacity within firms (Chart 1).

2. Survey data provide "narrative"

One big advantage of surveys is that as well as asking questions about what is happening, they ask questions about why. The CBI surveys, for example, ask a series of questions about drivers and constraints to output, exports and investment. Surveys can therefore enrich the narrative about what is going on.

One recent example, relevant through the financial crisis, involved the impact of credit constraints, as reported in survey data, on corporate behaviour[6]. Using data from the CBI Industrial Trends Survey over an eleven year period, Bank of England researchers showed that those firms reporting financial constraints had insufficient capacity more often and took longer to free themselves of their capacity restriction. For a financially-constrained firm, the closure of its utilisation gap leaves it with a level of capacity about 20% lower than for a firm that does not report financial constraints. Clearly an important finding when considering supply and the level of spare capacity.

3. Survey data can be more timely

Not only do survey data give us insight into questions which are not captured by the official statistics, they also help provide an early steer to the official data. For example, monthly surveys of activity, such as the purchasing manager's index, give an early view of the official output data for the quarter, which is released about a month after the quarter end. Providing an early picture of key economic variables is a critical benefit for MPC members having to set policy each month.

[5] There is one capacity utilisation survey conducted by the CBI which asks for a quantitative estimate but this only covers the manufacturing sector.
[6] Von Kalckreuth, U. and Murphy, E. (2005), "Financial constraints and capacity adjustment in the United Kingdom: evidence from a large panel of survey data, Bank of England working paper no. 260.

But the fact that survey data are generally available earlier in the data cycle provides no guarantee that they are necessarily a good predictor of later official outturns. Fortunately, it appears that they are. My colleague Martin Weale, together with co-authors, has used data from the CBI to investigate this issue[7]. The quantitative information provided by individual firms to the ONS for the monthly index of production were compared with the qualitative survey response on output collected by the CBI. Encouragingly, the output question from the CBI, asking firms whether the trend in output over the past four months was up/same/down, was found to provide a good signal for the subsequent firm level data collected by the ONS. This result has wider implications, for it helps to raise confidence in the information content of those survey data which have no counterpart in official sources.

Research has shown that these early survey balances can also be used to forecast official data[8]. An econometric investigation found that the qualitative data yields an early and reliable guide to recent and expected business developments. In particular, forecasting equations which include survey balances from the CBI would have accurately predicted the movements in official UK manufacturing in the 1980s. But it's worth stressing a note of caution. Even though survey balances should be a linear mapping from one economic variable to another, this is merely an approximation as there will be a loss of information when using only qualitative balances data. Indeed, survey balances for some variables are better forecasts of official data than others. Forecasting output using survey data, for example, has proved more difficult than for other variables. So while this avenue is fruitful, it is important to employ considered judgement.

The predictive power of survey data allows the Bank to provide reasonable "nowcasts", or in-period forecasts of official measures of activity (Chart 2)[9]. These nowcasts are a key input into the MPC's quarterly forecast round. One key benefit of using survey data for nowcasting is that it does not require forecasts of monthly official data, as it is possible to place full weight on the more timely survey data. Moreover, the Bank can also use survey data to produce a one quarter ahead forecast, as surveys of business expectations tend to be good indicators of output one quarter ahead.

4. Survey data can be more accurate for early data vintages

Finally, the official data are often subject to revision and in some cases survey data can paint a more accurate picture of real time developments until the revisions have been absorbed. For example, one of the recent puzzles facing the MPC was understanding the dynamics underlying business investment following the crisis. Early vintages of the official data suggested that in late 2012 and early 2013, business investment fell sharply. In many ways this was unexpected and difficult to reconcile with improving confidence, a more buoyant consumer sector and easier credit conditions. Survey data, by contrast, pointed to a stable,

[7] Lui, S., Mitchell, J. and Weale, M. (2011), "Qualitative Business Surveys: Signal or Noise?", Journal of the Royal Statistical Society, 174 Part 2 pp. 327–348.
[8] Yaun, P. (1983), "Econometric and empirical evidence on the relationship between survey data and official data and its relevance for monitoring the business cycle" in "Twenty five years of 'ups' and 'downs'", Confederation of British Industry, 1983.
[9] For more detail on the Bank's approach to nowcasting, see Bell, V., Co, L., Stone, S. and Wallis, G. (2014), "Nowcasting UK GDP growth", Bank of England Quarterly Bulletin, 2014 Q1.

improving path for investment. This can be seen by the blue swathe in Chart 3 which shows a range of different survey measures of investment. More recent revisions to official data have confirmed that, consistent with the strong steer from surveys at the time and contrary to the early vintage official data, there was indeed no puzzling fall in investment growth over the period.

In addition, this attribute of survey data allows it to be used to predict future revisions to the official data.

Surveys are qualitative, but have quantitative applications

One of the criticisms often levelled at business intelligence data is that because it is ultimately qualitative, it is of lesser value than the official data. The previous section showed the additive value of business intelligence in its own right, but it is also the case that what starts out as qualitative data can have valuable quantitative applications too.

One example is contained in Chart 3. One of the components of the investment survey swathe is based on the scores collected by the Bank's Agents that I mentioned earlier, systematising the intelligence that the Agencies gather from month to month on investment plans. These scores are assessed as a time series, both in comparison with official data and as a direct indicator of how economic conditions are evolving. As such, they are a valuable input into the policy making process.

One potential shortcoming of using aggregate scoring, however, is that it is easy to miss some of the distributional nuances in economic behaviour which can themselves have aggregate implications. As a result, Bank staff have now started to analyse the disaggregated data contained in the data set collected from the confidential meetings with individual UK firms. These Company Visit Scores (CVS) are a particularly useful set of panel data, reflecting information from over 23,000 company visits from a broad cross-section of UK firms (Chart 4).

The CVS data include a broad spectrum of variables covering demand and output, factor utilisation, and costs and prices. Such a data set is potentially of great value, but only if it is robust and if the CVS broadly track known trends across the economy. There is now evidence for this. For example, CVS demand scores reflecting growth in business turnover follow a broadly similar trend to official data for private sector nominal output growth (Chart 5).

One application of this disaggregated dataset is the ability to compare the behaviour of businesses across different metrics and across different periods. Aggregate employment figures, for example, can mask a wide variety of experiences at the company level, and focusing on these aggregate trends can mask the underlying motivations for firms' decisions. CVS data can help to shed light on these employment trends, in particular the limited flows out of employment seen in the years since the crisis. This can help policy-makers

better understand whether staff retention reflected companies needing to retain a minimum staffing level or an anticipation of more normal demand growth in the future.

In particular, CVS data can shed light on the relationship between firms' profitability and their employment decisions in 2011/2012 compared to 2009/2010. Chart 6 shows the average score for expected employment given a profit score, with the size of the bubbles reflecting the proportion of firms reporting.

These firm-level data provide a number of insights which would be missed by focusing exclusively on the aggregate data. First, the relationship between profitability and employment is not linear. This goes against the intuition of many economic models which posit a mechanical relationship between profits today and hiring and firing decisions tomorrow. Instead, there is an area of inaction where firms within this range appear to be relatively unlikely to change employment in response to small variations in profitability. Second, there was a shift from firms reporting very low profits in 2009 shown in the lower left quadrant to more firms sitting in the area of inaction by 2012. These firms may have found it too costly to reduce employment which is consistent with the sharp rise in net flows into employment being in part due to a reduction in gross flows out of employment. And third, there was an evident shift in the relationship between employment and profit scores with firms reporting a higher expected employment score in 2012 for given a profit, consistent with the idea that some firms had started to hire workers in anticipation of a recovery in demand.

Another example of how such data can be employed, drawing on my own work, was its use in an examination of the current UK productivity puzzle. Most approaches to understanding the productivity puzzle have appealed to whole-economy explanations, which is quite natural for monetary policy makers concerned with fluctuations in aggregate demand. But the behaviour of aggregate productivity has masked stark differences across sectors. As such, the Agency intelligence drawn from company visits is a particularly useful source of information and presented an opportunity to examine the puzzle from a different angle. The research analysed the output and employment dynamics at the disaggregated two-digit SIC level using official ONS data, and matched this with the Agency data to form a narrative explanation for why different sectors experienced different productivity dynamics.

So, using these and other techniques, what was originally qualitative information can be converted into more quantitative measures for direct comparison and analysis alongside the more standard, official data, adding further to the usefulness of such intelligence in assessing the economy.

Let me now turn to how surveys can help inform monetary policy more specifically.

What does survey data bring to the monetary policy table?

As I have shown, surveys are an indispensable aide for policy-makers. They both supplement the official data and act as a cross check. They cover areas of the economy important for monetary policy not covered

by the official data, and, critically, they give an early indication of where they economy is heading, important given the lags inherent in policy making. Finally, they help us paint a narrative around the news and understand the reasons behind economic trends, also critical in designing good policy measures. It would be a lot harder setting monetary policy without them.

But, for monetary policy makers, context is important. Getting the most out of the survey data involves recognising that some information is more relevant at certain points in the economic cycle. Consider a stylised chart of a business cycle (Chart 7).

First, survey intelligence can be particularly revealing at turning points in the cycle, providing advance warning of potential downturns or upturns in economic activity. Measures of business confidence are particularly useful in this regard, as are data on firms' intentions to hire or spend. And these measures have proven their worth in identifying such inflection points, usually earlier than the official data. In late 2001, indicators of business confidence highlighted the dramatic hit to confidence and ensuing "paralysis of decision making" that followed the 9/11 attack, which then led to a sharp slowdown in economic activity. And in autumn 2008, as Lehman Brothers collapsed, the Bank's Agents were quick to pick up the marked change in business sentiment and sharp fall in orders, which was quickly reflected in the Bank's nowcast (Chart 8).

Business surveys can also provide an early signal of recovery. Most famously, Norman Lamont, Chancellor in the early 1990s, used survey data from the CBI and Institute of Directors to declare in late 1991 that "the green shoots of economic spring are appearing once again" following the long and deep recession. The initial vintages of official data were not supportive of what to some seemed at the time a heroic claim. But later revisions to real GDP showed that the trough of the recession had occurred shortly thereafter, with positive economic growth resuming from late 1992 (Chart 9).

But survey use is not confined to turning points. Key survey questions have relevance throughout the economic cycle:

- For an economy in an upswing, particularly after a long and deep recession during which resources have been heavily underemployed, survey intelligence can help the policy-maker to better understand the pace of the recovery and the degree to which spare capacity in the economy is being absorbed

- In addition to the data directly on capacity utilisation, information on constraints to output and investment can be critical in assessing the evolution of supply, and the extent to which tightness in the labour market, constraints in supply chains and physical limitations on capacity are emerging

- Data on investment intentions provide one of the few leading indicators of the business investment cycle

- Changes in inventory behaviour can provide early information of changes in the pace of the economy

- Timely information about the demand for labour, intentions on pay, and trends in skill shortages enrich our understanding about conditions in the labour market

- Intelligence on input prices, pricing and margin intentions can provide early signals of emerging inflationary pressure
  and

- Of particular relevance recently, data on constraints in the access to finance can track the evolution of a credit crunch, in real time.

Conclusion

Monetary policy is all about forming judgements in conditions of uncertainty about quite how the economy is performing and where it is headed. Survey data are a valuable aid in our deliberations. They provide a timely source of information, which in some instances can give a more helpful steer than early vintages of official data. They are also vital in filling in some of the gaps which official data are not able to cover. And "softer" questions about people's intentions, confidence and expectations can act as a cross-check on the output from economic models and help shape the policy narrative.

The nature of survey data means that one needs to be careful when interpreting it. In that regard, greater transparency around survey methodology and freer access to the data for research purposes would be helpful. But it would be wrong to consider survey data of minor importance. Survey data is a complementary good and needs to sit alongside the official data as a means to help policy-makers frame their economic judgements. Indeed, in my career, there have been occasions when the survey data have initially conflicted with the official data, and the survey data have proven a better guide! So let me take this opportunity to thank both the Bank's Agency Network and all of those external organisations that, through the conduct of their surveys, contribute to the sum of knowledge available to monetary policy makers. I hope they long continue to do so.

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Table 1: Business surveys used in the weighted survey model[a]

Survey: specific indicator	Industries included
BCC: domestic and export sales, past three months	Manufacturing,[b] services
BCC: confidence about future turnover	Manufacturing,[b] services
CBI: volume of output, past three months; volume of business, past three months; volume of sales this month compared with a year earlier[d]	Manufacturing,[c] business and professional services, consumer services, distributional trades[e]
CBI: volume of output, past three months; volume of business, past three months; volume of sales next month compared with a year earlier[d]	Manufacturing,[c] business and professional services, consumer services, distributional trades[e]
Markit/CIPS:[e] Output Index;[f] Business Activity Index;[f] Total Industry Activity Index[f]	Manufacturing, services, construction
Markit/CIPS:[e] New Orders Index;[f] Business Expectations Index; Future Business Activity Index	Manufacturing, services, construction

(a) BCC stands for British Chambers of Commerce and CBI stands for Confederation of British Industry.

(b) Construction firms are included in the manufacturing total

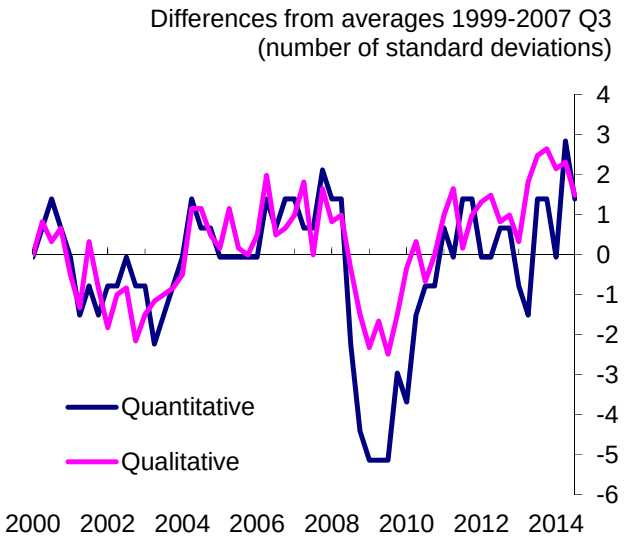
(c) In the months in which the *CBI Industrial Trends Survey* is not released, updated indicators are obtained from the CBI Monthly Trends Enquiry.

(d) An indicator for the volume of sales compared with the previous quarter is only available from 2003 onwards.

(e) These monthly indicators are mapped into a quarterly growth rate before they are used in the model.

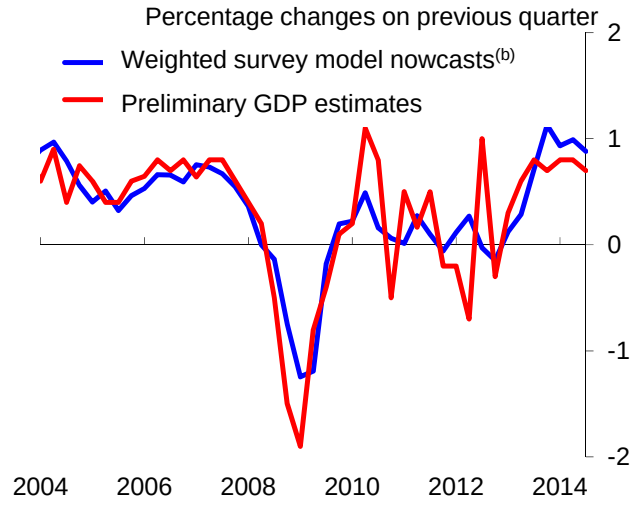
(f) Seasonally adjusted measure.

Chart 1: Quantitative versus qualitative measures of capacity usage from CBI Industrial Trends Survey



Source: Confederation of British Industry, Quarterly Industrial Trends Survey.

Chart 2: Weighted survey model nowcasts at the time of the *Inflation Report*[(a)]

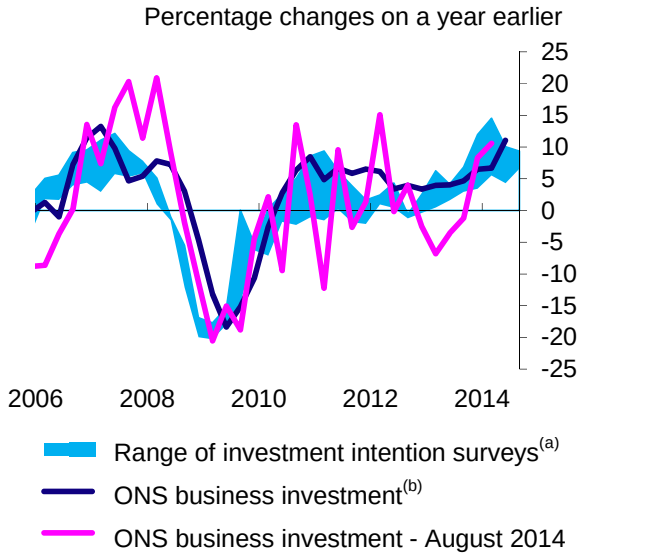


Sources: ONS and Bank Calculations.

(a) The chart shows, for each quarter at the time of the *Inflation Report*, the nowcast from the weighted survey model alongside the preliminary estimate of GDP growth, which is published around 10-11 weeks after the *Inflation Report*. Chained-volume measures. GDP is at market prices.

(b) The nowcasts shown in the chart are produced using the survey indicators available at the time of each *Inflation Report* – that is, the weighted survey model uses a subset of the survey information because not all of the 'output' measures of activity for the nowcast quarter are available at this time. For more detail on the Bank's approach to Nowcasting, see Bell, V., Co, L., Stone, S. and Wallis, G. (2014), "Nowcasting UK GDP growth", Bank of England Quarterly Bulletin, 2014 Q1.

Chart 3: Investment growth: official data revisions versus business surveys

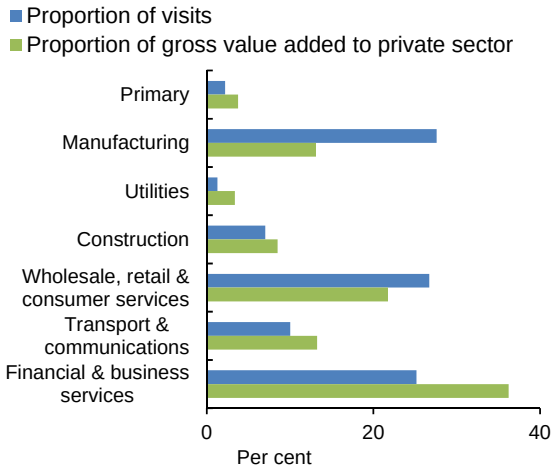


Sources: Bank of England, BCC, CBI, ONS and Bank calculations.

(a) Includes survey measures of investment intentions from the Bank's Agents (companies' intended changes in investment over the next twelve months), BCC (net percentage balance of companies who say they have increased planned investment in plant and machinery over the past three months) and CBI (net percentage balance of companies who say they have revised up planned investment in plant and machinery over the next twelve months), scaled to match the mean and variance of four-quarter business investment growth since 2000. Measures weight together sectoral surveys using shares in real business investment. BCC data are non-seasonally adjusted.

(b) Chained-volume measure. Data are to 2014 Q2 and take account of the transfer of nuclear reactors from the public corporation sector to government in 2005 Q2.

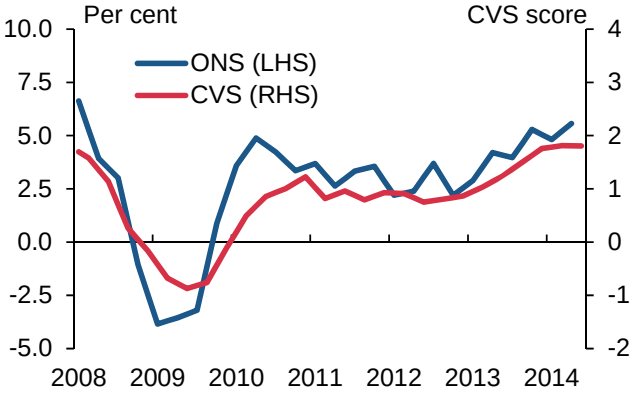
Chart 4: Distribution of private sector firms covered by the CVS data set[(a)]



Sources: ONS and Bank calculations.

(a) Proportion of visits and gross value added are both measured as a share of private sector totals. Many companies are recorded in the dataset more than once as Agents typically visit firms at roughly 12 month intervals.

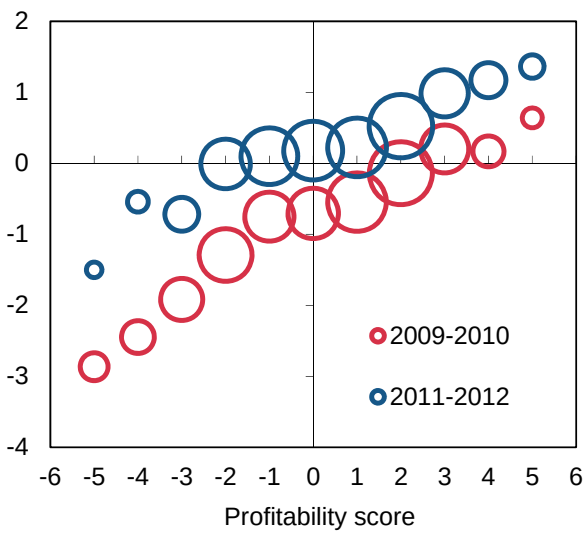
Chart 5: CVS for demand and official data for private-sector nominal output growth[(a)(b)]



Sources: ONS and Bank calculations.

(a) Quarterly averages of CVS and annual growth in quarterly data for private-sector nominal output. Private-sector output is used given the low proportion of CVS assigned to public sector bodies.
(b) The CVS series is shifted back by half a quarter to be more consistent with ONS data. This is because, in a given meeting, Agents ask firms about their previous three months' activity (relative to the year before). Taking the average of CVS data from meetings in a given quarter therefore reflects a period covering six months in total. Hence CVS data are plotted between the two quarterly ONS observations covering this six-month period.

Chart 6: Average score for expected employment for a given profitability score[a][b]



Source: Bank calculations.

(a) The area of each bubble indicates the proportion of firms reporting the corresponding profit score.
(b) All scores collected over these calendar years.

Chart 7: Stylised economic cycle

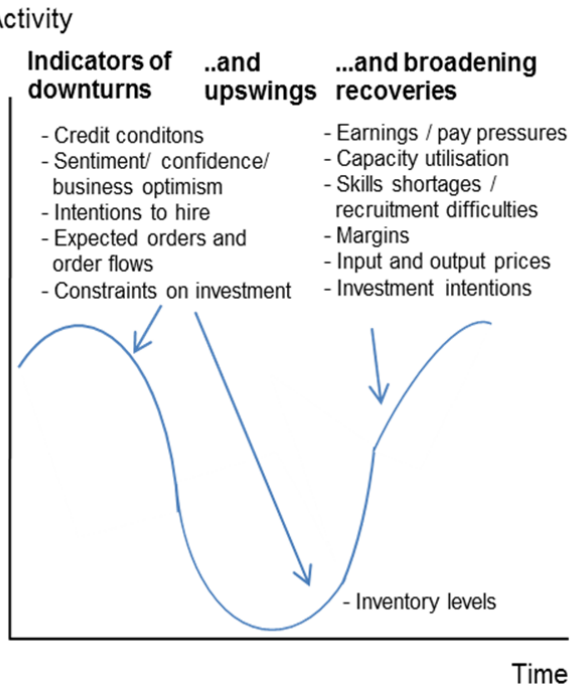
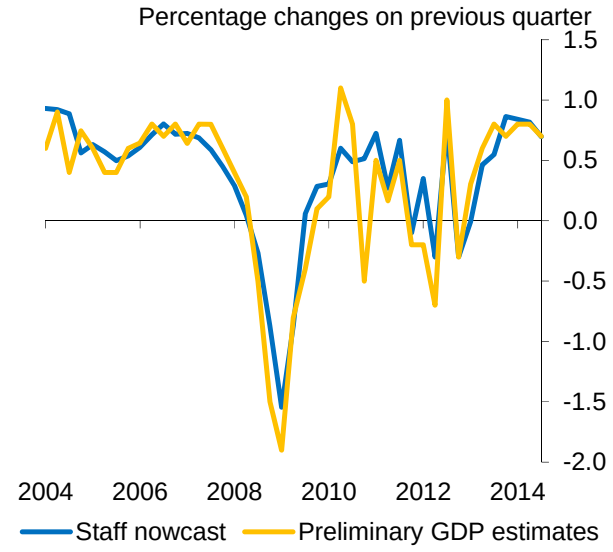


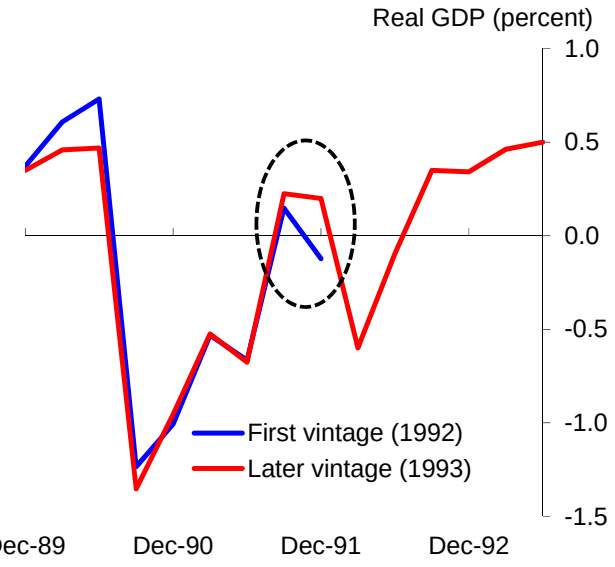
Chart 8: Staff nowcast versus ONS preliminary estimate of GDP[a]



Sources: ONS and Bank calculations.

(a) The chart shows, for each quarter at the time of the *Inflation Report*, the staff nowcast alongside the preliminary estimate of GDP growth, which is published around 10-11 weeks after the *Inflation Report*. Chained-volume measures. GDP is at market prices.

Chart 9: Different vintages of real GDP in early 1990s



Sources: ONS and Bank calculations.