

What can we learn from surveys of business expectations?

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The recent financial crisis was accompanied by an unprecedented deterioration in businesses' expectations for future economic activity. This article examines the strength of the signal that measures of these expectations have provided for output growth in the past. Recessions have typically been preceded by large declines in surveys of business expectations. But these measures have, on occasions, given false signals of recessions, falling sharply with little discernable response in economic activity. And small movements in these survey measures tend to contain little information. The article considers techniques that may help to distinguish whether large declines in measured expectations are meaningful or not. But it concludes that this must ultimately be left to judgement. Consequently, while measures of business expectations are useful economic indicators, they must be interpreted with care.

Introduction

Businesses' expectations about the economy can play an important role in driving movements in economic output, especially during recessions. While these expectations cannot be measured or observed directly, qualitative surveys can provide a guide. These survey measures deteriorated markedly following the onset of the financial crisis in mid-2007. This article examines the strength of the signal that these survey measures of business expectations have typically provided for future output growth.

The article is structured as follows. It begins by explaining why these measures might provide useful information to economic policymakers. It then examines the quality of the signal provided by these measures before considering whether they can be used to forecast economic activity.

Why do we look at measures of business expectations?

Measures of business expectations provide timely indicators of future economic activity that can inform monetary policy decisions. If, for example, businesses revise down their expectations for future activity, then they are also likely to revise down their production plans. And they may also scale back investment plans or hire less labour. This would lead to a fall in output growth unless there was an offsetting policy response or a subsequent change in the economic environment. Changes in monetary policy typically take time to feed through to the wider economy. So monetary policy

makers set policy with a view to how changes in economic conditions are likely to affect future output and therefore inflation, and timely indicators of future economic activity can be very valuable.

Companies' expectations of future output are distinct from their degree of uncertainty about economic prospects. For example, following a change in economic conditions, businesses may revise up their expectations for future economic activity. But if they are sufficiently uncertain about prospects, then they may wait before changing production plans so as to avoid being left with unsold inventory. Hence, changes in the degree of uncertainty could affect the economic impact that results from changes in expectations. Survey measures of expectations are unlikely to reflect businesses' uncertainty about future activity.⁽²⁾ So this article uses the term expectations to represent businesses' main beliefs about future activity and does not consider the impact of uncertainty, or distinguish between optimism and expectations.

Measuring business expectations

Businesses' expectations cannot be measured or observed directly, so qualitative survey-based indicators must be used instead. In the United Kingdom, three large business survey providers all ask a question that captures businesses'

(1) The author would like to thank Geoff Coppins and Rob Elder for their help in producing this article.

(2) An exception to this may be the CBI surveys, which ask businesses about their optimism rather than their expectations for future output.

expectations. The British Chambers of Commerce (BCC) and The Chartered Institute of Purchasing and Supply (CIPS) surveys ask businesses whether their activity or turnover will be higher in twelve months' time.⁽¹⁾ And the Confederation of British Industry (CBI) surveys ask them how optimistic they are about the business situation. These surveys are discussed further in the box on page 192.

What can we learn from surveys of business expectations?

This section explores whether survey measures of business expectations can provide a guide to future growth in market sector output. It also investigates whether understanding the factors that have driven movements in expectations can help to extract a better signal from the surveys.

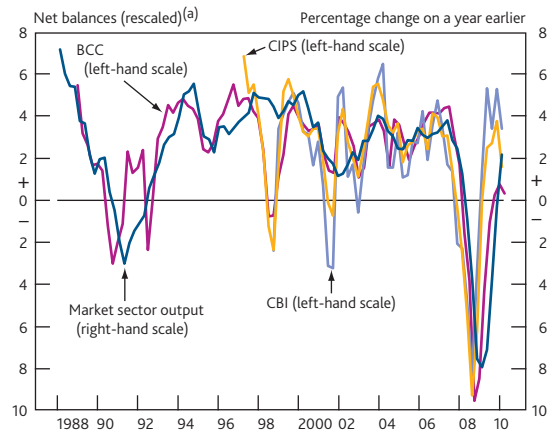
Are surveys of business expectations a good indicator for output growth?

Before assessing whether the surveys are a good indicator of output growth, it is worth considering the horizon over which they might be informative. In principle, surveys might be expected to provide a guide over the next year, which is the time period identified in most of the questions (at least in the BCC and CIPS surveys). But businesses may be more uncertain about the economic situation further ahead and so place more weight on near-term expectations when answering the survey. Or they may answer the survey based on medium-term expectations only to find subsequently that those expectations are derailed. So the horizon over which the surveys provide information may be shorter than that implied by the questions.

Empirically, the surveys do indeed appear to be more closely related to official data over a shorter horizon. **Chart 1** shows the different 'composite' measures of business expectations (as described in the box on page 192) against four-quarter growth in market sector output. Rather than the four-quarter lead that might be expected on the basis of the questions, expectations appear to lead output growth by a much shorter horizon. That finding is supported by correlation analysis, which shows that surveys have a stronger relationship with the change in market sector output over the next quarter, than over the next two to four quarters (**Table A**). The remainder of this article focuses therefore on the relationship between surveys of business expectations and output growth over the subsequent quarter.

Despite the relatively close relationship implied by the correlation analysis, the strength of the relationship between surveys of business expectations and one quarter ahead growth in market sector output appears to have fluctuated over time (**Chart 2**). Broadly speaking, expectations were a good indicator for both the recent recession and that in the early 1990s. But, by and large, they have been less useful for tracking small changes in output; the correlations in **Table A**

Chart 1 Surveys of business expectations and four-quarter growth in market sector output



Sources: BCC, CBI, CIPS/Markit, ONS and Bank calculations.

(a) Business expectations surveys are shown as composites as described in the box on page 192. Each composite is rescaled to have the same mean and variance as market sector output, but is not seasonally adjusted. All series are plotted contemporaneously.

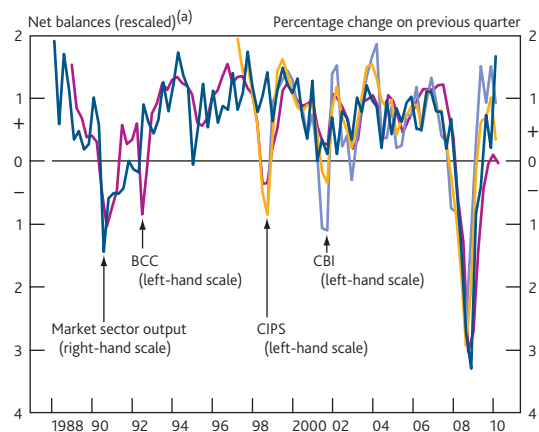
Table A Correlation between surveys of business expectations and growth in market sector output^{(a)(b)}

Quarters	BCC	CBI	CIPS
1	0.68	0.72	0.79
2	0.66	0.70	0.76
3	0.59	0.65	0.68
4	0.51	0.58	0.60
Start date	1989 Q1	1998 Q4	1997 Q2

Sources: BCC, CBI, CIPS/Markit, ONS and Bank calculations.

(a) The top row shows the correlation coefficient between the composite survey measure of expectations in period 0 and the growth in quarterly market sector output between period 0 and 1. The second row shows the correlation coefficient between expectations in period 0 and growth in quarterly market sector output between period 0 and 2 etc.
 (b) The sample ends in 2010 Q2 for all series.

Chart 2 Surveys of business expectations and one-quarter growth in market sector output



Sources: BCC, CBI, CIPS/Markit, ONS and Bank calculations.

(a) Business expectations surveys are shown as composites as described in the box on page 192. Each composite is rescaled to have the same mean and variance as market sector output, but is not seasonally adjusted. All series are plotted contemporaneously.

(1) The CIPS manufacturing survey does not include a question on expectations but the question about new orders can be used as a proxy. As manufacturing has a fairly low weight in output this should not affect markedly the interpretation of the economy-wide composite balance.

Survey measures of business expectations

Three of the large UK business surveys ask a question that should capture businesses' expectations. The surveys have different advantages in terms of the wording of the question, coverage and history. This box examines these differences, which are summarised in **Table 1**.

There are two key differences between the questions asked in the CBI surveys and those asked in the BCC and CIPS surveys. First, the CBI surveys ask businesses about their change in optimism rather than their expectations for growth in activity or turnover. Second, the questions in the CBI surveys ask about conditions in the sector more broadly, rather than for the specific company.⁽¹⁾

There are, however, reasons to believe that the surveys are still comparable despite these differences. According to the CBI Answering Practices Survey for the services sector, many respondents answered the question on the basis of their level of optimism rather than the change. And most based their response on the experience of their own business rather than the sector as a whole.⁽²⁾

The surveys also differ in their sectoral coverage. Each institution carries out multiple surveys, each aimed at a different sector of the economy. These individual surveys can

then be aggregated together to form a composite measure of expectations for the whole economy. But the coverage of each institution's surveys differs. For example, the CBI survey does not cover the construction sector, and the CIPS survey does not cover the distribution sector. The BCC survey covers both these sectors. But none of the surveys cover government sector output, so they should be used as an indicator for market sector output.⁽³⁾

The surveys, and the different components of individual surveys, have been running for different periods of time. This article considers all three composite measures of business expectations where possible. But it focuses mainly on the BCC composite as this is available back to 1989. It also draws on the CBI manufacturing balance as this has a longer history.

Despite differences in both the nature of the questions and the coverage of the surveys, it is however notable that the composite measures of expectations from the three surveys move broadly in line with each other (**Charts 1 and 2**).

(1) An exception is the CBI survey for the distribution sector. This asks businesses whether they expect the overall business situation to improve over the next three months, and does not specify whether businesses should consider their sector or their company.

(2) See Simpson (2007).

(3) For a further discussion of market sector output, see Churm *et al* (2006).

Table 1 Survey measures of business expectations

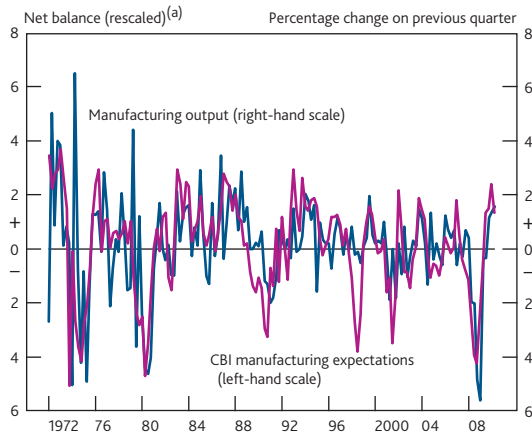
Survey	Frequency	Year began	Coverage	Weight of covered sectors in GDP (2006)	Survey questions
CIPS					
Services	Monthly	1996	Private non-distribution services	0.41	In twelve months' time, do you expect the overall level of activity at your business unit to be higher, the same or lower than now?
Manufacturing	Monthly	1992	Manufacturing	0.13	Please compare the level of new orders received (UK and export) this month with the situation one month ago.
Construction	Monthly	1997	Construction	0.06	As for the CIPS services survey.
BCC					
Services	Quarterly	1989	Private services	0.52	Do you believe that over the next twelve months turnover will: improve/remains the same/worsen?
Manufacturing	Quarterly	1989	Production and construction	0.23	As above.
CBI					
Services	Quarterly	1998	Private non-financial non-distribution services	0.33	Are you more, or less, optimistic than you were three months ago about the general business situation in your sector?
Financial services	Quarterly	1989	Financial services	0.08	Are you more or less optimistic about the overall business situation in your sector?
Distribution	Quarterly	1983	Distribution	0.11	Do you expect the overall business situation over the next three months to: improve/remain stable/deteriorate?
Industrial Trends	Quarterly	1972 ^(a)	Manufacturing	0.13	As for the CBI services survey.

Sources: BCC, CBI, CIPS/Markit and ONS.

(a) This balance is available back to 1972 on a quarterly basis, but back to 1958 on a four-monthly basis.

are much lower if the sample excludes recessions. And the surveys have sometimes given a false signal of a recession, most notably in 1998 and 2001.⁽¹⁾ Extending the sample period — by drawing on the longer-running CBI manufacturing survey — provides support for the idea that expectations balances are good indicators of large swings in output, but less successful at picking up smaller changes (Chart 3).

Chart 3 CBI manufacturing business expectations and one-quarter growth in manufacturing output



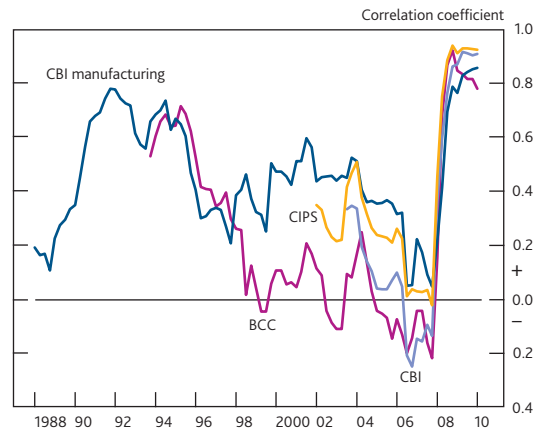
Sources: CBI, ONS and Bank calculations.

(a) The business expectations survey is rescaled to have the same mean and variance as the ONS manufacturing output data, but is not seasonally adjusted. Both series are plotted contemporaneously.

The fluctuating relationship between surveys of business expectations and market sector output is apparent in rolling correlations (Chart 4). During the period of relative macroeconomic stability between 1997 and 2007, composite measures of business expectations appeared to contain little information about future output growth. The relationship is somewhat stronger for the CBI manufacturing survey over that period, perhaps reflecting the relatively greater volatility of the manufacturing sector. More recently, the correlations have all picked up sharply during the financial crisis, as did the correlation for the CBI manufacturing survey during the early 1990s recession. This supports the idea that the signal from surveys of business expectations is stronger during periods of sharp movements in output growth.

There are a number of reasons why surveys of business expectations may have given false signals in the past, such as in 1998, or to a lesser extent 1992 and 2001. In 2001, businesses may have overestimated the economic impact of the terrorist attacks in the United States. Similarly, the false signals in 1992 and 1998 may have reflected businesses overestimating the potential economic impact of sterling's exit from the exchange rate mechanism and the LTCM crisis respectively. Businesses may have also underestimated the size of the policy response: Bank Rate was cut on each occasion, which, along with monetary policy loosening overseas, would have helped to support economic activity. But, given the lags in the monetary policy transmission

Chart 4 Rolling five-year correlations of business expectations surveys and one quarter ahead growth in market sector output



Sources: BCC, CBI, CIPS/Markit, ONS and Bank calculations.

mechanism, that policy response is unlikely to explain fully why near-term output appears to have been affected less than the surveys implied by these events.

In summary, large swings in surveys of business expectations appear to contain useful information for policymakers. That is consistent with the work of Santero and Westerlund (1996), who conducted similar analysis across a sample of eleven OECD countries. In the United Kingdom, however, large swings in expectations have, on occasion, given a false signal. So a forecaster needs to take care whether to interpret a large fall in expectations as a signal for a recession, or simply as noise in the data.

Explaining movements in surveys of business expectations

This section considers the factors that might influence movements in businesses' expectations. Identifying these factors can provide a closer understanding of what influences company behaviour. Furthermore, in a study of consumer confidence, Berry and Davey (2004) found that movements in confidence that could be explained by other factors contained more information for consumer spending than unexplained movements.

Businesses' expectations about future activity are likely to be affected by a number of factors. They may respond to changes in macroeconomic conditions, such as tighter monetary policy, or business-specific conditions, such as weaker orders. They may also be driven by businesses' response to non-economic factors, such as wars or terrorist attacks. It is impossible to identify precisely what a survey will be capturing. But the remainder of this section draws on statistical analysis to explore the degree to which expectations are responding to other 'economic' factors.

(1) The exception here is the BCC survey, which did not give a false signal in 2001.

Table B shows the correlations between the BCC measure of business expectations and a range of economic and financial variables. The BCC measure of business expectations is used as its composite is available back to 1989. The table shows the highest correlation with each variable, whether that is with the level or the change. It also reports both the contemporaneous and one quarter lagged relationships. A contemporaneous relationship may be more likely if the variable is relevant to a businesses' production process (such as input price inflation), or if it summarises high-frequency data that the business can observe (such as the sterling exchange rate). A lag may be more appropriate if the variable reflects something to which the business might respond once it has seen the data release (such as public sector net lending).

Many of the variables have a strong correlation with BCC business expectations. For example, the survey measures of both orders (domestic and overseas) and cash flow have a very strong relationship with expectations, as do the various estimates of GDP growth. For some variables, however — such as changes in both Bank Rate and input price inflation — the nature of the relationship is in the opposite direction to that which economic intuition might suggest. That may reflect a third, common, factor — perhaps demand growth — that is driving both expectations and these variables in the same direction. For example, stronger-than-expected demand is likely to cause companies to revise up their expectations but it may also drive up input price inflation and trigger a tightening in monetary policy.

These simple bivariate correlations do not show how these variables might combine to explain movements in business expectations. Instead, a simple regression model can be constructed to separate movements in business expectations into those that are explained by a combination of other variables, and those that are 'unexplained'. This model is set out in the annex to this article.

The regression model is able to explain the vast majority of the variation in expectations (**Chart 5**). Of the explanatory variables, the BCC survey measure of businesses' orders is the most important and can explain much of the variation. That could reflect, in part, the influence of a common factor — such as business sentiment — on both the orders and expectations survey balances. In addition, Consensus forecasts for GDP also play an important role. These forecasts may act as a summary indicator for much of the information contained in other macroeconomic and financial variables but not picked up in orders. The level of oil prices and businesses' reported cash-flow positions also help to explain movements in the BCC business expectations measure. The residual component — the unexplained part of business expectations — is small, suggesting that surveys of business expectations are driven predominantly by these other observable economic factors.

Table B Correlations between BCC business expectations and other variables^(a)

	Unit	Lag (quarters)	
		0	1
Asset prices			
Bank Rate	Level	0.01	-0.09
	1Q change	0.60	0.35
Oil price	Level	-0.33	-0.43
	1Q percentage change	0.17	0.09
Sterling ERI	4Q percentage change	0.51	0.43
UK equity prices	1Q percentage change	0.33	0.40
UK house prices	1Q percentage change	0.52	0.56
Macroeconomic			
GDP forecast ^(b)	Percentage change over next 4Q	0.79	0.75
GDP (real-time estimate) ^(c)	1Q percentage change	n.a.	0.69
GDP (latest estimate) ^(d)	1Q percentage change	0.79	0.76
Insolvencies	1Q change	-0.46	-0.46
M4 lending to PNFCS	1Q percentage change (annualised)	0.29	0.17
UK-weighted world trade ^(e)	1Q percentage change	0.71	0.58
Unemployment rate	1Q change	-0.73	-0.56
Inflation			
Producer input prices	Annual inflation rate	-0.08	-0.26
	Change in annual inflation	0.31	0.18
Producer output prices	Annual inflation rate	-0.30	-0.45
	Change in annual inflation	0.32	0.11
RPIX	Annual inflation rate	-0.31	-0.40
	Change in annual inflation	0.25	-0.03
Unit labour costs	1Q percentage change	-0.30	-0.28
Fiscal			
Public sector net lending as a share of GDP	Level	0.38	0.24
	1Q change	0.52	0.41
Survey variables^(f)			
Capacity utilisation	Net balance	0.38	0.22
Cash flow	Net balance	0.91	0.76
Employment	Net balance	0.71	0.50
Orders	Net balance	0.90	0.73

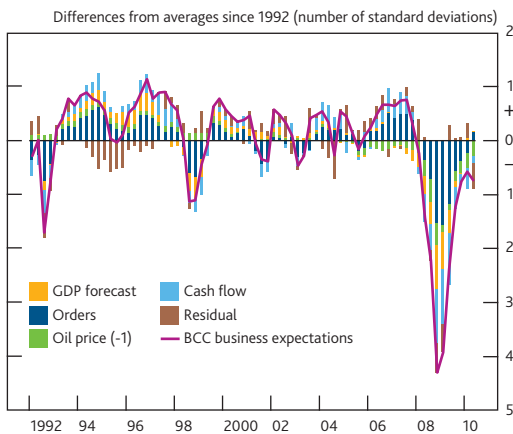
Sources: Bank of England, BCC, Bloomberg, Consensus Economics, IMF, ONS and Thomson Reuters Datastream.

- (a) The BCC business expectations survey is the composite measure described in the box on page 192. It is not seasonally adjusted.
- (b) Forecasts for GDP growth over the next four quarters from Consensus Economics.
- (c) The real-time estimate is the GDP growth rate published by the ONS just prior to when businesses would have completed the survey. As the GDP data are published with a lag, the contemporaneous estimate would not have been available.
- (d) The latest estimate uses the most recently published vintage of data. It will differ from the real-time estimate because the ONS revises data as it receives new information and adopts new methodologies (see Cunningham and Jeffery (2007)).
- (e) As described on page 187 of Domit and Shakir (2010).
- (f) Survey variables from the *BCC Quarterly Economic Survey*. The questions asked are: are you currently operating at full capacity?; during the past three months how has your cash flow changed?; over the past three months has your workforce increased?; excluding seasonal variation, have your domestic (and export) orders increased over the past three months? The first three balances are not seasonally adjusted.

These results are consistent with those of a study of business expectations in New Zealand (Silverstone and Mitchell (2005)). The authors looked at the determinants of movements in a survey of expectations about the 'general business situation' using a panel data set. They found businesses' expected output to be the most influential survey balance and future GDP outturns to be one of the most important macro indicators.⁽¹⁾ However, they found that the

(1) The authors did not use a survey orders balance or consider GDP forecasts.

Chart 5 Contributions to movements in BCC business expectations^(a)



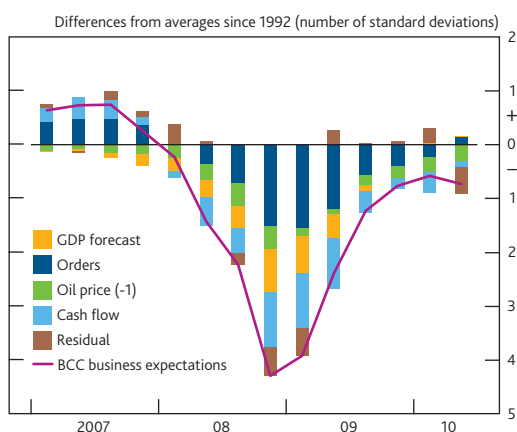
Sources: BCC, Bloomberg, Consensus Economics and Bank calculations.

(a) For definitions of the variables see the footnotes to Table B.

determinants of business expectations vary over time and between companies.

The model for the United Kingdom suggests that two fifths of the sharp fall in expectations during 2008 can be explained by declining orders (Chart 6). The deterioration in companies' cash-flow positions can account for about a quarter, and the fall in GDP forecasts and lagged impact of rises in oil prices also played a role. But the full extent of the fall in business expectations cannot be explained. That is, expectations fell by even more than those factors would have suggested, according to this model.

Chart 6 Contributions to recent movements in BCC business expectations^(a)



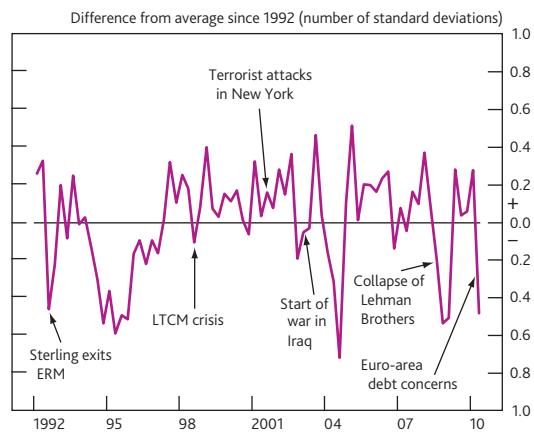
Sources: BCC, Bloomberg, Consensus Economics and Bank calculations.

(a) For definitions of the variables see the footnotes to Table B.

The unexplained weakness in expectations became larger around the time of the failure of Lehman Brothers, an episode that created conditions of near panic in some financial markets. It seems likely that these extreme events caused businesses' expectations to worsen over and above what could be explained by observable economic developments. That is

consistent with certain previous financial events — such as sterling's exit from the exchange rate mechanism and the LTCM crisis — and also the build-up to the Iraq war of 2003, during which the BCC measure of business expectations fell further than could be explained by economic factors alone. But for other events, such as the terrorist attacks in September 2001, the fall in business expectations was less than suggested by the economic factors in the model (Chart 7).⁽¹⁾

Chart 7 The unexplained component of BCC business expectations



Sources: BCC, Bloomberg, Consensus Economics and Bank calculations.

The unexplained weakness in expectations that emerged at the time of the Lehman Brothers crisis dissipated shortly afterwards, as the financial situation stabilised, in part due to policy actions around the world. Following previous crises the fall in the residual component also dissipated quickly, either due to a rapid monetary policy response, or as businesses realised the impact of the crisis was likely to be less than originally feared.

More recently, measures of business expectations fell back in 2010 Q2 (Chart 1).⁽²⁾ The model for BCC expectations suggests that it cannot be explained by identified economic factors. That fall may have reflected concerns about sovereign debt following recent developments in the euro-area periphery.

Can meaningful declines in surveys of business expectations be distinguished from false signals?

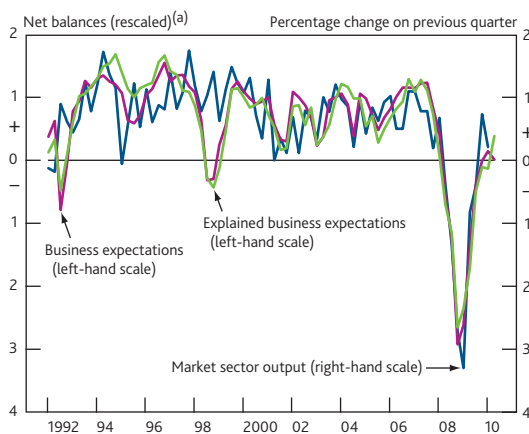
As has been discussed, measures of business expectations have given false signals on several occasions. This subsection examines whether the model of business expectations or other indicators — such as consumer confidence — can help identify when a sharp decline in measures of business expectations might be giving a false signal.

(1) The terrorist attacks in September 2001 did however have a larger impact on both the CBI and CIPS measures of business expectations, which fell more sharply than their BCC counterpart.
 (2) The CBI and CIPS measures of business expectations fell back more sharply than the BCC measure, but from a higher level.

Movements in expectations that can be explained by other economic factors might be expected to provide a better indication of future activity. Indeed, as discussed earlier, Berry and Davey (2004) found that movements in *consumer confidence* that could be explained by other economic factors contained more information for consumer spending than the unexplained component.

However, a similar approach for business expectations is unable to distinguish between false signals and meaningful changes. **Chart 8** compares the BCC expectations balance with the fitted values from the estimated equation. Since the equation can explain many of the fluctuations in expectations, the fitted values move very closely to the surveys themselves. This is the case even when BCC business expectations gave false signals in 1998 and 1992, reflecting the simultaneous fall in several of the explanatory factors. Indeed, survey output balances also gave a false signal for market sector output during these periods. So distinguishing whether a sharp fall can be explained or not does not help identify false signals. It is worth noting however that in the recent recession the raw business expectations balance gave a better signal, so the 'unexplained' component may have held some marginal information.

Chart 8 BCC business expectations, explained BCC business expectations and one-quarter growth in market sector output



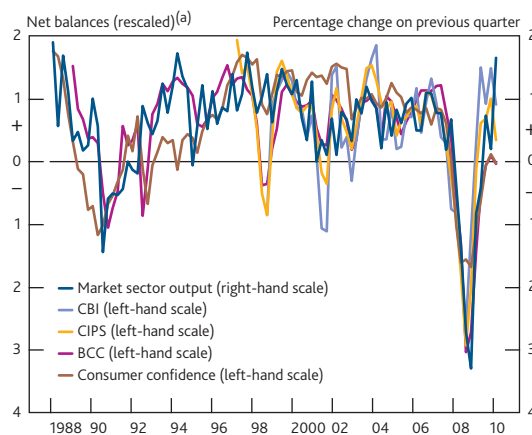
Sources: BCC, Bloomberg, Consensus Economics and Bank calculations.

(a) The BCC business expectations survey is the composite measure described in the box on page 192. It is rescaled to have the same mean and variance as market sector output, but is not seasonally adjusted.

A change in business expectations may provide a better guide to future output if it is accompanied by corroborative evidence, such as a similar movement in consumer confidence. Certainly, consumer confidence also fell sharply during the recent recession when business expectations surveys gave a meaningful signal (**Chart 9**). And consumer confidence remained fairly robust when business expectations gave a false signal in 1998 and 2001. But the evidence is inconclusive. For example, consumer confidence fell alongside business expectations in 1992 but that proved to be a false signal.

A further consideration might be whether the fall in business expectations followed a financial crisis. For example, the false signals in 1992, 1998 and 2001 all followed financial crises. But the timing of the 2001 fall suggests that the terrorist attacks may have had a more significant impact than the bursting of the dotcom bubble. And the fall in business expectations following the recent crisis provided a reasonable guide to future activity.

Chart 9 Surveys of business expectations, consumer confidence and one-quarter growth in market sector output



Sources: BCC, CBI, CIPS/Markit, research carried out by GfK NOP on behalf of the European Commission, ONS and Bank calculations.

(a) Business expectations surveys are shown as composites as described in the box on page 192. Business expectations and consumer confidence are rescaled to have the same mean and variance as market sector output. The business expectations surveys are not seasonally adjusted.

These findings suggest that while measures of business expectations can give a useful leading indicator of sharp movements in output, there is no clear systematic method for identifying meaningful signals from false signals. An element of judgement is still required.

Conclusion

Surveys of business expectations contain useful information for policymakers, but they must be interpreted with care. Past recessions in the United Kingdom have been preceded by a sharp fall in expectations, so the surveys can be a useful leading indicator of a sharp fall in output. But the surveys have given false signals in the past, and small movements in the surveys tend to contain little useful information.

There does not appear to be a systematic method for identifying whether a sharp fall in expectations is giving a false signal. Distinguishing between falls that have or have not followed a financial crisis has not helped in the past. Neither has decomposing movements in business expectations into those driven by economic factors, and those that are unexplained. So a forecaster should monitor surveys of business expectations, but needs to use judgement when deciding how to interpret an abrupt deterioration.

Annex

Model to explain BCC business expectations

$$BE_t = 0.44 * Orders_t + 0.31 * Cash\ flow_t +$$

(4.4) (3.5)

$$0.20 * GDPFC_t - 0.14 * POil_{t-1}$$

(3.6) (-3.5)

$$R^2 = 0.93$$

Sample period: 1992 Q1–2010 Q2.

Brackets show t-statistics.

Series are normalised over the sample period.

Where:

BE is the BCC business expectations balance;

Orders is a weighted average of the BCC survey questions on domestic and export orders: excluding seasonal variation, domestic/export orders are up/same/down;

Cash flow is the BCC survey question on cash flow: during the last three months how has your cash flow changed: improved/same/worsened?;

GDPFC is the forecast for GDP growth over the next four quarters from Consensus Economics; and

POil is the quarterly average of the Brent oil price in sterling terms.

References

Berry, S and Davey, M (2004), 'How should we think about consumer confidence?', *Bank of England Quarterly Bulletin*, Autumn, pages 282–90.

Churm, R, Srinivasan, S, Thomas, R, Mahajan, S, Maitland-Smith, F and Tily, G (2006), 'Measuring market sector activity in the United Kingdom', *Bank of England Quarterly Bulletin*, Vol. 46, No. 4, pages 404–14.

Cunningham, A and Jeffery, C (2007), 'Extracting a better signal from uncertain data', *Bank of England Quarterly Bulletin*, Vol. 47, No. 3, pages 364–75.

Domit, S and Shakir, T (2010), 'Interpreting the world trade collapse', *Bank of England Quarterly Bulletin*, Vol. 50, No. 3, pages 183–89.

Santero, T and Westerlund, N (1996), 'Confidence indicators and their relationship to changes in economic activity', *OECD Economics Department Working Papers no. 170*.

Silverstone, B and Mitchell, J (2005), 'Insights into business confidence from firm-level panel data', *University of Waikato Working Paper in Economics no. 9/05*.

Simpson, W (2007), 'Interpreting the CBI service sector survey', *Service sector survey answering practices survey: 2007*.