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Economic derivatives[1]

Economic derivatives allow traders to take direct positions on the outcomes of macroeconomic data releases. In contrast to survey-based measures, the prices of economic derivatives provide information on the entire probability distribution underlying these expectations, not just point estimates. Measures for uncertainty derived from such distributions offer valuable information on how uncertainty about the economy evolves and affects financial markets.

JEL classification: E44, G13.

Economic derivatives are financial contracts that allow market participants to take positions on macroeconomic data releases. They are different from the "macro securities" proposed by Shiller (1993), which are meant to insure households and corporations against changes in macroeconomic conditions that may affect their livelihood. By contrast, the economic derivatives which are the subject of this feature focus on short-term data surprises.

Macroeconomic data announcements play an important role in price discovery in financial markets, as has been documented by a large body of literature.[2] They are usually scheduled regularly, with a precise date and timing that are known well in advance. The US employment report, for example, is generally released on the first Friday of the month at 08:30 Eastern Time. The importance of data announcements is underscored by the fact that volatility tends to be markedly higher on release days than on other days. For example, the standard deviation of the yield changes of 10-year US Treasuries is almost twice as high on announcement Fridays (Table 1). Higher volatility than usual is also observed for a whole range of other financial instruments, both in the United States and in the euro area.[3] Prices move primarily in

[1] The views expressed in this article are those of the authors and do not necessarily reflect those of the BIS. The authors would like to thank Emir Emiray for help with the data and graphs.

[2] Andersen et al (2005) estimate the effects of US macroeconomic announcements on a large variety of financial prices. See also Fleming and Remolona (1997, 1999) and Balduzzi et al (2001) for US Treasuries, Andersson et al (2006) for euro area bonds and Brooke et al (1999) for the sterling market.

[3] Many financial prices in the euro area react more strongly to US announcements than to national or area-wide releases; see Goldberg and Leonard (2003) and Andersson et al (2006).

Non-farm payroll announcements and asset price volatility			
Instrument	Volatility[1]		p-value[3]
	Announcement Fridays	Other Fridays[2]	
Federal funds futures	1.8 bp	0.9 bp	0.00
Ten-year Treasury note	9.9 bp	5.2 bp	0.00
Ten-year bund	5.3 bp	3.7 bp	0.00
S&P 500	0.84%	0.85%	0.58
EURO STOXX	1.26%	1.16%	0.17
USD/EUR exchange rate	0.87%	0.59%	0.00

[1] Standard deviation of daily price changes (interest rates) or returns (equities, exchange rate), September 2002–December 2006. [2] Last working days of a month have been dropped since they may be affected by window-dressing. [3] Likelihood-ratio test for equal volatility on announcement and non-announcement Fridays. Table 1

intervals of just a few minutes around the announcements, reflecting market participants' forceful and instantaneous reaction to the new information.[4]

This special feature describes economic derivatives and the market where they are traded. It investigates the motives for trading these contracts and explores the use of their prices for measuring market expectations. For illustrative purposes, it concentrates on US non-farm payrolls (NFPs), which are released by the Bureau of Labor Statistics as part of its monthly employment report. NFPs rank among the most influential macroeconomic data releases worldwide.

What are economic derivatives?

Position-taking on macroeconomic data releases

Economic derivatives are financial instruments which allow traders to take positions directly on the outcome of macroeconomic data releases. For instance, they may trade a combination of digital options to bet that NFPs would increase by between 150,000 and 200,000.[5] Alternatively, they might purchase plain vanilla options if they believed that NFPs would be much higher than the market consensus, but did not want to commit to a specific range.[6] Unlike conventional financial instruments, economic derivatives separate the surprise component of announcements (the difference between the outcome and the prior expectation by market participants) from the channel through which such news is transmitted to asset prices.

Gravelle and Moessner (2001) find that Canadian interest rates also react more to US macroeconomic announcements than to Canadian ones.

[4] See, for instance, Fleming and Remolona (1999) and Gadanecz (2003).

[5] Digital call options pay out a fixed amount if the data outcome is higher than the strike price and nothing otherwise. The range of 150,000 to 200,000, for example, can be traded by purchasing call options with a strike price of 150,000 and selling an equal amount of call options with a strike of 200,000. See Kolb (2003) for a discussion of digital options.

[6] Plain vanilla call options pay out an increasing amount as the outcome of the release falls further above the strike price. The payouts from vanilla options are capped based on the highest and lowest strikes in the auction.

Traded in auctions …

Economic derivatives were introduced in October 2002 by Deutsche Bank and Goldman Sachs, first on US NFPs and subsequently also on other releases such as the ISM manufacturing index, US initial jobless claims and retail sales, the euro area harmonised index of consumer prices, and US GDP and international trade balance data. They were initially traded over the counter in Dutch auctions (also known as uniform price auctions), with Goldman Sachs acting as the counterparty. Auctions were subsequently moved to the Chicago Mercantile Exchange (CME) in September 2005, where the clearing house offers the usual services and central counterparty guarantees that are available on an organised exchange.

For each data release, one or more auctions are held, usually on the day of and during the week preceding the announcement. Customers can submit sell and buy offers at a limit price which depends in part on their assessment of the volatility of the underlying macroeconomic data or, in other words, on their estimate that the option will expire in the money. Indicative prices and filled orders are given during the auction, while the final pricing and filled orders are determined at the end of the auction.[7]

… economic derivatives are traded by a number of market participants

The main participants in the market are macro and relative value hedge funds, large banks, dealers, proprietary traders and portfolio managers. They follow strategies similar to those in other markets, including directional and volatility-based trading and relative value strategies. Trading of options can be done individually, or in combinations such as spreads, straddles, strangles and risk reversals (Beber and Brandt (2006)).

Limited market size

The market for economic derivatives still remains very small relative to conventional futures and options traded on exchanges. In 2006, the nominal value of all auctions on one month's NFP release was equivalent to less than 5% of the value-at-risk at the end of that month for the 10-year US Treasury note futures contract of the Chicago Board of Trade (CBOT) (Graph 1), and on average 5,700 times less than the end-month open interest outstanding on the same contract.[8] Trading has been strongest in NFP derivatives, with an average nominal value of approximately $9 million per auction (Graph 1).

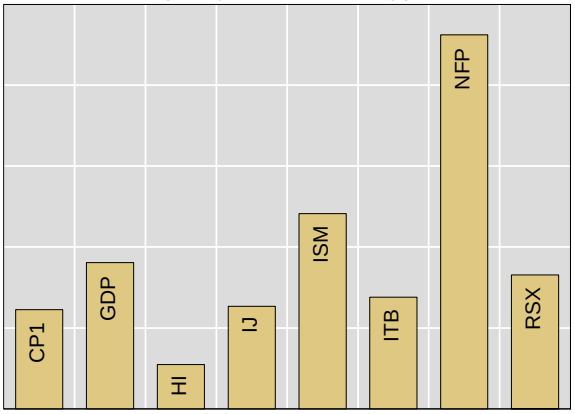
[7] Contrary to traditional order-matching systems, where sell orders are matched with buy orders for the same contract, digital options are traded using a pari-mutuel system similar to the one common in sports betting. Under such a system, the premium collected from the holders of out-of-the-money options is paid out to the holders of in-the-money options. This allows prices to be formed even in the absence of matching buy and sell orders, considering the overall inventory of buy and sell orders as one pool of liquidity.

[8] The nominal value of economic derivatives is obtained by picking the highest total payments of all possible announcement outcomes. Since this amounts to the largest gains or losses, it is more appropriate to compare this measure to large gains or losses in conventional contracts rather than to notional amounts.

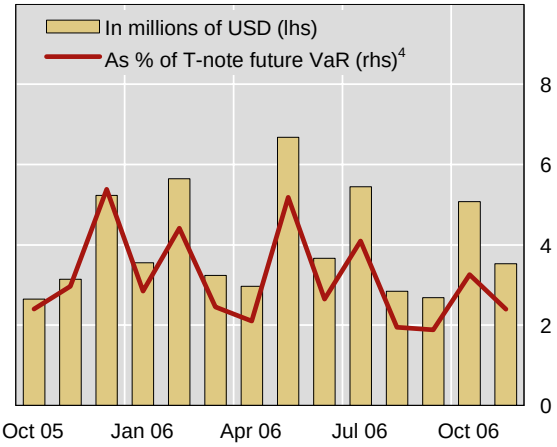
Size of the market for economic derivatives

Nominal values,[1] in millions of US dollars

Auction average, by data release type[2]



NFP derivatives, total nominal value[3]



[1] Maximum gain/loss on filled orders. [2] All data releases are for the United States, except for euro area HICP. All releases are monthly, except where otherwise indicated. CP1: core CPI; GDP: gross domestic product (quarterly); HI: euro area harmonised index of consumer prices excluding tobacco (average of auctions one month and two months before the release); IJ: initial jobless claims (weekly, average of all weeks of the month); ISM: ISM manufacturing PMI; ITB: international trade balance; NFP: non-farm payrolls; RSX: retail sales excluding autos. [3] Sum of all auctions on the month's NFP release. [4] Value-at-risk (VaR) proxy calculated as the end-month open interest of the CBOT's 10-year US Treasury note futures contract multiplied by the fifth percentile over the period October 2005–October 2006 of the daily returns based on the underlying price.

Sources: CME; BIS calculations. Graph 1

Motives for trading NFP announcements

There are several motives for trading economic derivatives. Some market participants may use them to express a view on the outcome of a specific data release while others may want to hedge against the impact of adverse data surprises on their portfolios.

Attractive for speculating on announcements …

Speculating on the outcomes of data releases is perhaps the most common motive for trading economic derivatives. Economists working in financial markets spend substantial resources on trying to predict such announcements, so it seems natural that they would like to trade on these predictions. That said, there are alternatives to economic derivatives for taking positions on data releases. Using conventional financial instruments to trade announcement risk may enable traders to access a deeper pool of liquidity than the one available in the market for economic derivatives. On the downside, strategies using other instruments may run into difficulties if payoffs react in a different way than predicted to the outcome of an announcement. Such risk is often referred to as "basis risk".

… due to absence of basis risk …

A measure of the basis risk involved in taking positions on NFPs can be obtained by regressing the return of an instrument on the surprise component of the announcement. For economic derivatives, the basis risk is zero by construction. For other contracts, the amount of basis risk depends on the presence of a stable (or at least predictable) relationship between their prices and the surprise component of announcements, as well as on the absence of price changes because of factors other than NFPs.

… in contrast to conventional financial contracts

Estimates of the basis risk for a broad variety of financial instruments collected in Table 2 (first regression) show that basis risk is substantial. Although the coefficients on announcement surprises are often statistically highly significant, the fit of the equations tends to be relatively poor. For example, less than one half of the changes in short-term swap rates on announcement Fridays can be attributed to surprises in NFPs. For other contracts, the proportion of returns explained by the release is even lower.

There are several reasons for the poor performance of financial contracts for taking positions on NFPs. First, market participants might also react to the other variables included in the employment report, not just NFPs. However, the fit of the regressions increases only slightly when other indicators released at the same time are included (second regression in Table 2).

A second reason might be the focus on daily returns. However, while moving to a shorter time interval would reduce the likelihood of events other than the announcement affecting prices, it would not eliminate basis risk completely. At least, this is the result of several studies estimating announcement effects using very high frequency data.[9]

Third, and most importantly, basis risk may reflect the fact that, unlike in the case of economic derivatives, the returns on financial derivatives depend both on the announcement surprises and on the sensitivity of asset prices to macroeconomic data, which could vary over time. For example, the Federal

Estimates of basis risk

Indicator	First regression[1]		Second regression[2]					
	Payrolls	R^2	Payrolls	Unemp rate	Man emp	Hourly earnings	Weekly hours	R^2
Fed funds second contract	0.104***	**0.18**	0.127***	–0.044**	–0.022	0.007	0.004	**0.29**
S&P 500	1.928	**0.01**	2.072	0.481	–1.130	–0.756	–0.240	**0.05**
EUR/USD exchange rate	–4.810***	**0.22**	–6.215***	1.531**	0.186	–2.405***	–0.235	**0.41**
US 10-year note	0.708***	**0.38**	0.795***	0.004	–0.058	0.151**	0.001	**0.44**
Swap rate 1-year	0.623***	**0.44**	0.755***	–0.081	–0.088**	0.188***	0.026	**0.58**
Swap rate 2-year	0.876***	**0.44**	1.004***	–0.077	–0.056	0.209***	0.010	**0.52**
Swap rate 4-year	0.937***	**0.42**	1.074***	–0.042	–0.050*	0.257***	0.005	**0.51**
Swap rate 10-year	0.748***	**0.37**	0.851***	–0.004	–0.065	0.178**	0.003	**0.44**

Note: ***, ** and * denote significance at the 1%, 5% and 10% levels, respectively.

[1] LHS variable is the change in the indicator from the day before the release of non-farm payroll data for all variables except S&P 500 and EUR/USD; for these indicators, the growth rate is used. RHS variable: actual minus average Bloomberg analyst forecasts for changes in non-farm payrolls, in millions; constant not reported. Sample ranges from January 2002 to December 2006. [2] LHS variable: as in the first regression. RHS variable: difference between actual and Bloomberg analyst forecasts for: changes in non-farm payrolls, in millions; unemployment rate, in per cent; number of employees on US non-farm payrolls, manufacturing industry, month-on-month net change seasonally adjusted (SA), in hundreds of thousands; US average hourly earnings, private non-farm payrolls, in nominal US dollars, month-on-month change SA, in per cent; US average weekly hours, private non-farm payrolls, total private services SA; constant not reported.

Sources: Bloomberg; BIS calculations. Table 2

[9] Balduzzi at al (2001) report an R^2 of 0.56 for the regression of the 35-minute (five minutes before and 30 minutes after the announcement) returns on 30-year Treasury bonds on NFP surprises. For a similar regression using five-minute returns, Andersen et al (2005) report a value of R^2 of 0.36.

Reserve might react much more strongly to higher than expected payrolls when inflation is high than it would in times of low inflationary pressures. This would be reflected in very different reactions of the prices of federal funds futures. Similar changes in the slope of market reactions to announcements were observed in 2003, when the impact on US Treasury yields of NFP surprises steepened substantially (BIS (2004)). In extreme cases, even the sign of the response may vary over time.[10]

Limited attractiveness for hedging portfolio risk ...

The attractiveness of economic derivatives for speculating on data releases does not necessarily imply that they are the most appropriate instrument for hedging the announcement risk of a portfolio. This is because hedgers are much less likely than speculators to be interested in unbundling data surprises from the sensitivity of asset prices to macroeconomic data since they presumably care primarily about how the value of their portfolio is affected by releases rather than about announcements per se.

... might constrain growth potential of the market

A limited attractiveness of economic derivatives to hedgers could constrain the growth potential of the market. Hedgers might be willing to lose money on average in a market, due to being less well informed than speculators, in order to obtain protection for other positions in their portfolio. Theoretical and empirical research in finance suggests that a certain amount of uninformed trading is often necessary to sustain a market.[11] In the absence of significant demand by uninformed agents, trading might also be sustained by differences of opinion between highly sophisticated traders.[12] Such differences of opinion may arise from differences in information (although macroeconomic data tend to be publicly available), but might also result from traders having different ways of processing these data.

In the case of economic derivatives, it is not clear which, if any, of the two explanations – the one based on uninformed trading or the one based on differences in opinion – provides a better characterisation of the motives underlying trading in that market. The limited attractiveness of these instruments for hedgers would suggest a restricted role for informational advantages in the sense that some actors are better informed than others. Similarly, differences of opinion would suggest that trading volumes tend to be high when there is a lot of disagreement, which is at odds with the negative correlation between volumes and the dispersion of analyst expectations in the data.[13] However, this might also be due to the short time span of the data.

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[10] See Furfine (2001) for an example concerning US Treasury bonds and Andersen et al (2005) for evidence from the stock market.

[11] Another source could be trading by uninformed, but overconfident, participants (Wolfers and Zitzewitz (2006a)).

[12] See Harris and Raviv (1993).

[13] The correlation coefficient of the standard deviation of responses to the Bloomberg survey (see below for a discussion) and volumes is –0.24.

Economic derivatives as indicators of market expectations

Indicators for traders' economic outlook

The market for economic derivatives is of interest to a much broader audience than the limited group of immediate market participants. This is because the prices of these instruments provide useful information about traders' views of the economy. In addition to obtaining market-based mean expectations of data outturns, under some assumptions it is possible to compute the probability distribution underlying expectations. Such information is not available from analyst surveys, which report the *dispersion* of economists' views about data releases but not the uncertainty surrounding those estimates.

Timelier and less prone to misrepresentation than surveys …

In principle, there are two main reasons to believe that the information contained in the prices of economic derivatives is superior to that from surveys. First, it is timelier. Auctions are generally conducted on the day of the release or on the previous day, which contrasts with a lag of one week or longer in the case of surveys. Second, trading economic derivatives involves real money and is therefore much less likely to be affected by economists misrepresenting their views in order to position themselves relative to consensus forecasts.

… but potentially distorted by risk and liquidity premia

On the other hand, market-based forecasts might be distorted by risk premia or by the limited liquidity of the market. Both premia could introduce a wedge between implied expectations and true expectations of market participants, which would distort any inferences of market participants' expectations from prices. Evidence on the existence of such premia may be obtained by running tests for forecast accuracy. These indicate that we cannot fully rule out their presence since the prices of economic derivatives appear to overpredict outturns on average (Box 1).[14] A similar result has been obtained by Gürkaynak and Wolfers (2006) for a shorter sample period but a broader set of contracts. However, the fact that the mean forecast error based on surveys is also non-zero and close to that of the auction-implied mean forecast error (Table 3) indicates that the overprediction may also be due to overoptimistic expectations or to the particular sample period used in the analysis.

Limited importance of risk premia in practice

In practice, the differences between forecasts implied by auctions of economic derivatives and survey-based mean expectations appear to be relatively small. Both indicators are comparable in terms of their mean forecast errors and correlation with actual NFP data outturns (Table 3). This suggests that neither the potential staleness of survey data, nor any strategic misrepresentation of those data, nor the presence of risk or liquidity premia in the market-based indicators is a particularly significant issue.[15]

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[14] Risk premia can be ruled out if forecasts are unbiased and efficient in the sense that the forecast error is not correlated with other information available to the forecaster. However, the reverse need not apply. Biased or inefficient forecasts could reflect irrational expectations as well as risk premia.

[15] In any case, research by Wolfers and Zitzewitz (2006b) suggests that the distortions arising from risk premia are likely to be small and that the prices of economic derivatives therefore efficiently aggregate market participants' beliefs, at least approximately.

Box 1: Unbiasedness and efficiency

This box examines the unbiasedness and efficiency of market-based NFP forecasts. Forecasts are unbiased if the mean of their forecast errors is zero, ie if the forecast errors are zero on average. Forecasts are efficient if forecast errors cannot be systematically explained. They are efficient in a "weak" sense if forecast errors are uncorrelated with past forecast errors.①

A standard test of unbiasedness consists in regressing actual data outturns, d_t, on the market forecasts, d_t^e (Joyce and Read (1999)):

$$d_t = a + bd_t^e + u_t$$

If the market forecasts are unbiased, then we expect that $a = 0$ and $b = 1$ and that the residuals are serially uncorrelated. Table A shows that there is no evidence for serial correlation, but that the hypothesis of ($a = 0$, $b = 1$) can be rejected at the 5% level, though not at the 1% level. It can therefore not be fully ruled out that market-based NFP forecasts show a systematic bias, perhaps reflecting a risk premium.

Test for unbiasedness of market-based NFP forecasts[1]

a	–17.1
b	0.88
R^2	0.51
Durbin-Watson statistic	2.15
LM test for serial correlation of residuals[2]	1.16 [0.35] [3]
Wald test $\chi^2(2)$: $(a,b) = (0,1)$	7.15 [0.03] [3]

[1] Changes in non-farm payrolls, in thousands; NFP data for September 2002 to September 2006. [2] Breusch-Godfrey LM test with 12 lags, F-statistic. [3] p-values in brackets.

Sources: Bloomberg; Goldman Sachs; BIS calculations. Table A

One test of weak efficiency consists in testing directly whether the forecast errors exhibit no first-order autocorrelation, ie testing whether the coefficient b in the equation

$$d_t - d_t^e = a + b\,(d_{t-1} - d_{t-1}^e) + u_t$$

is zero. As Table B shows, b is not significantly different from zero. Another test of weak efficiency consists in testing whether past actual values have no explanatory power for the forecast errors, ie whether the coefficients on lagged data in the following equation are all equal to zero (Joyce and Read (1999)):

$$d_t - d_t^e = a + \Sigma^{12}_{i=1} b_i d_{t-i} + u_t$$

As also shown in Table B, we cannot reject the hypothesis that the coefficients b_i are all equal to zero. These results suggest that market-based forecasts of NFP outturns are weakly efficient.

Test for efficiency of market-based NFP forecasts[1]

Test for absence of autocorrelation of forecast errors	
b	–0.09 [0.53] [2]
R^2	0.01
Durbin-Watson statistic	2.02
Test for weak efficiency	
R^2	0.24
Durbin-Watson statistic	1.93
LM test for serial correlation of residuals[3]	0.99 [0.51] [2]
Wald test $\chi^2(12)$: $b_i = 0$, $i = 1$ to 12	7.63 [0.81] [2]

[1] Changes in non-farm payrolls, in thousands; NFP data for September 2002 to September 2006. [2] p-values in brackets. [3] Breusch-Godfrey LM test with 12 lags, F-statistic.

Sources: Bloomberg; Goldman Sachs; BIS calculations. Table B

① They are efficient in a "strong" sense if forecast errors are uncorrelated with any information available at the time the forecasts are made.

Comparison of expectations with actual NFP data outturns

	Mean[1]	Correlation with actual	Mean surprise[1]	Standard deviation of surprises[1]
Auction-implied	124.1	0.71	–31.8	88.7
Bloomberg survey	123.5	0.70	–31.2	90.6
Actual	92.3	.	.	.

[1] Changes in non-farm payrolls, in thousands; NFP data for September 2002 to September 2006.

Sources: Bloomberg; Goldman Sachs; BIS calculations. Table 3

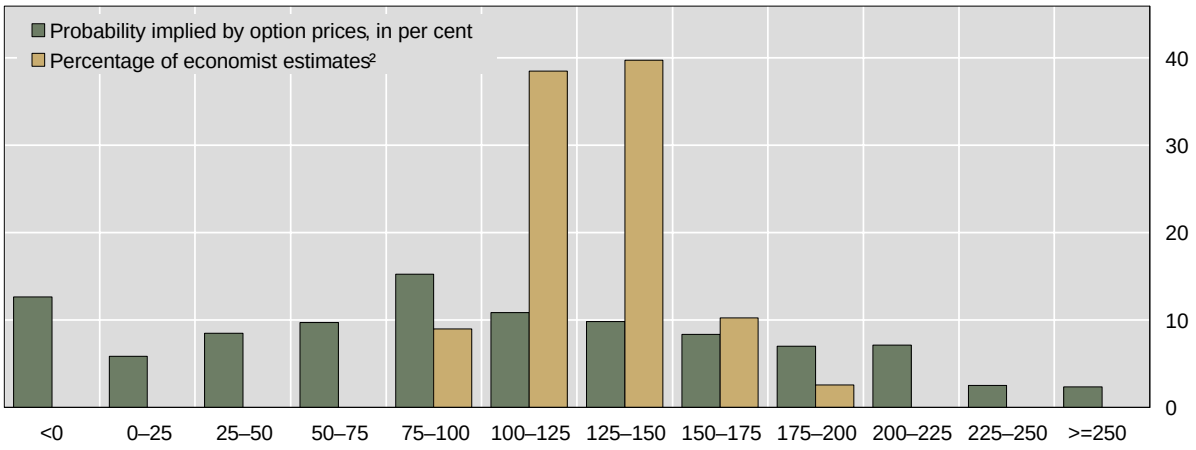
Implied probabilities from economic derivatives …

Given the small difference between the point estimates derived from the prices of economic derivatives and surveys, the main gain from looking at the former arises if one is interested in their uncertainty and the distribution underlying these forecasts. The prices of options with different strike prices can be used to compute implied uncertainty measures and probability distributions of data outturns (see Kolb (2003)).

An example of a probability distribution implied by prices of digital options on NFPs and of the responses of individual analysts to the Bloomberg survey is shown in Graph 2. This distribution is derived at the strike prices with the approximation that the discount factor equals one, which seems reasonable given the proximity of the auction date and the release date. For comparison, Graph 2 also shows the percentage of economists surveyed by Bloomberg forecasting data outturns in the corresponding intervals. Interestingly, the so-called risk neutral probability distribution implied by economic options is wider than the histogram of economists' forecasts. This is to be expected since the market-based probability distribution captures the whole range of market participants' beliefs, including probabilities assigned to tail events, whereas the surveys only capture the central expectations of those surveyed, and contain no information about their expectations of tail events.

Probabilities implied by option prices and economists' forecasts

US non-farm payrolls, August 2006[1]



[1] Bureau of Labor Statistics data releases; changes, in thousands (x-axis). [2] Based on Bloomberg survey.

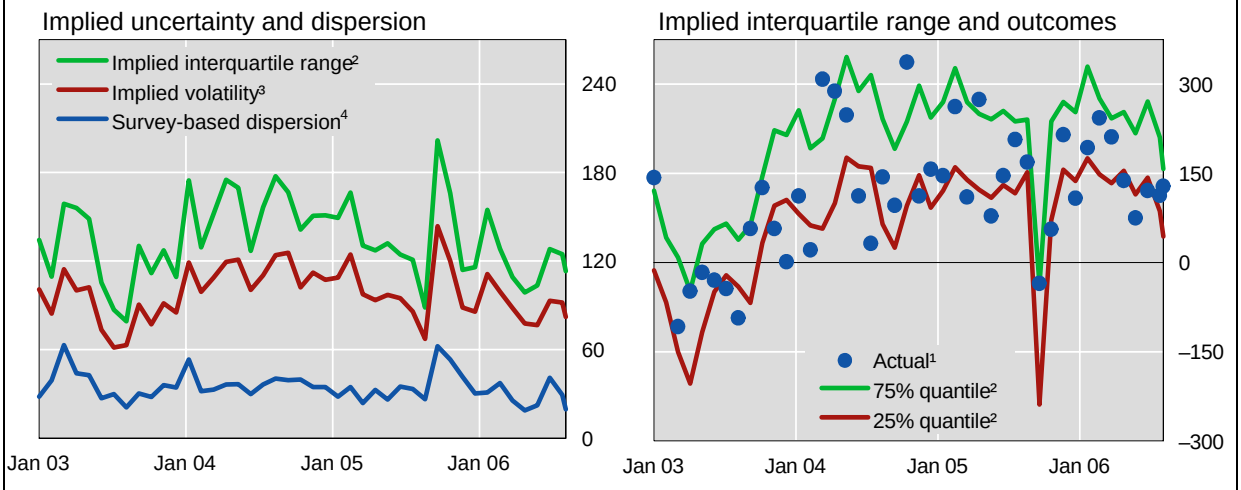
Sources: Bloomberg; Goldman Sachs; BIS calculations. Graph 2

… can be used to assess traders' uncertainty

Implied probability distributions such as the one shown in Graph 2 provide a wealth of information on the market's view prior to a particular release, but they are difficult to track over time. Measures that show the evolution of uncertainty include implied volatility and the implied interquartile range[16] (Graph 3, left-hand panel). Graph 3 (right-hand panel) shows the actual NFP data outturns in relation to the implied interquartile range, for the auction closest in time to the data release each month. Of the data outturns, about 50% fell within the implied interquartile range, as would be expected if the market-based uncertainty measure was an accurate measure. This suggests that economic derivatives provided useful information on the market's uncertainty about NFP data outturns, in line with the findings in Gürkaynak and Wolfers (2006). Survey-based dispersion measures, by contrast, tend to provide only a very noisy measure of uncertainty, as is reflected in the low correlation between the auction-based interquartile range and the survey-based dispersion measure of 0.68. In the past, forecast dispersion has often been used as a proxy for uncertainty (Zarnowitz and Lambros (1987)).

Since surprises in macroeconomic data announcements can affect financial market prices, one would expect that the larger the economic uncertainty about important data releases, the greater the reduction in financial market uncertainty once the data are released. Some evidence suggests that this is indeed the case (Beber and Brandt (2006)). Box 2 shows that when economic uncertainty about NFP outturns is larger, market-based uncertainty about future interest rates, as measured by implied volatilities of options on interest rate swaps, is reduced by more following the announcement of the NFP data.

Uncertainty about US non-farm payrolls[1]



[1] Bureau of Labor Statistics data releases; changes, in thousands. [2] Derived from the cumulative probability distribution implied by option prices. [3] Implied by option prices. [4] Standard deviation of economists' point estimates based on Bloomberg survey.

Sources: Bloomberg; Goldman Sachs; BIS calculations. Graph 3

[16] While the derivation of implied volatility needs to assume a normal probability distribution, the derivation of the interquartile range does not rest on such an assumption. Between the discrete strike prices, the implied cumulative distribution is interpolated linearly in calculating the interquartile range.

Box 2: Impact of economic uncertainty on financial market uncertainty

Since surprises in NFP data releases can affect market interest rates, one might expect that the larger the uncertainty about NFP data releases, the greater the reduction in financial market uncertainty once the data are published (Beber and Brandt (2006)).[①] Here, we investigate this issue using the interquartile range measure, IR_t, of uncertainty about NFP data described in the main text, and using implied volatilities, IV_t, of options on interest rate swaps (swaptions[②]) before ($t–1$) and after (t) the announcement as a measure of financial market uncertainty about interest rates. We consider swaptions with a time to expiry of one month, and with maturities of the underlying interest swap rates of one to 10 years. An advantage of using swaptions is that they have a fixed time to expiry, rather than a fixed expiry date, so that the period over which events can take place and affect uncertainty does not decrease over time. The following regression is estimated on the dates of NFP releases (Beber and Brandt (2006)):

$$(IV_t - IV_{t-1}) / IV_{t-1} = a + b\, IR_t + u_t$$

Table C shows that swaption-implied volatilities have fallen by significantly more when uncertainty about NFP data releases has been larger and that the effect is greatest when the maturities of the underlying swap rates are two years or less.

Uncertainty about NFP data releases and financial market uncertainty[1]

Maturity	One year	Two years	Five years	Ten years
a	0.12*	0.07	0.02	0.03
b	–0.0012**	–0.0008**	–0.0005*	–0.0006*
R^2	0.16	0.13	0.06	0.10

[1] NFP data for January 2003 to August 2006. ** and * denote significance at the 1% and 5% levels, respectively; Newey-West adjusted standard errors.

Sources: Bloomberg; Goldman Sachs; BIS calculations. Table C

① Beber and Brandt (2006) have found evidence for such a relationship, using an implied volatility measure of uncertainty about NFPs, and using options on US Treasuries and eurodollar futures. ② See Fornari (2005) for a description of swaptions.

Conclusions

Economic derivatives allow market participants to trade directly on macroeconomic data releases and unbundle the news component of announcements from the basis risk contained in financial assets traditionally used as proxies.

Policymakers can use the prices of economic derivatives to obtain information on the perceptions of market participants about the state of the economy. In contrast to survey-based measures, they are true density forecasts, covering the whole distribution of the "market's view", not just point estimates. This information could be used to track the uncertainty of market participants about the state of the macroeconomy and to monitor the probabilities they attach to tail events. However, so far this has mainly been possible for US data releases only, with euro area HICP being the exception.

When interpreting the information contained in the prices of economic derivatives, one has to bear in mind that it refers to market participants' perceptions of the *current* economic situation and not to their expectations of outcomes further ahead. While this may be a limitation when analysing issues

such as the transmission mechanism of monetary policy, it may not matter in other settings. For example, the impact of central bank communications might depend on the views of market participants about the current state of the economy, not just on their expectations for the future. That said, it would be useful to have more forward-looking indicators, eg on inflation and growth in the short and medium term, which could complement the information contained in longer-term instruments such as inflation-linked securities.

The potential size of the market for economic derivatives might be limited. In particular, it is not clear whether the market is able to attract a substantial amount of hedging demand, which could serve as a counterweight to highly sophisticated informed traders. In the absence of hedging activity, it is possible that liquidity may dry up in times of limited disagreement between a relatively small number of informed participants.

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