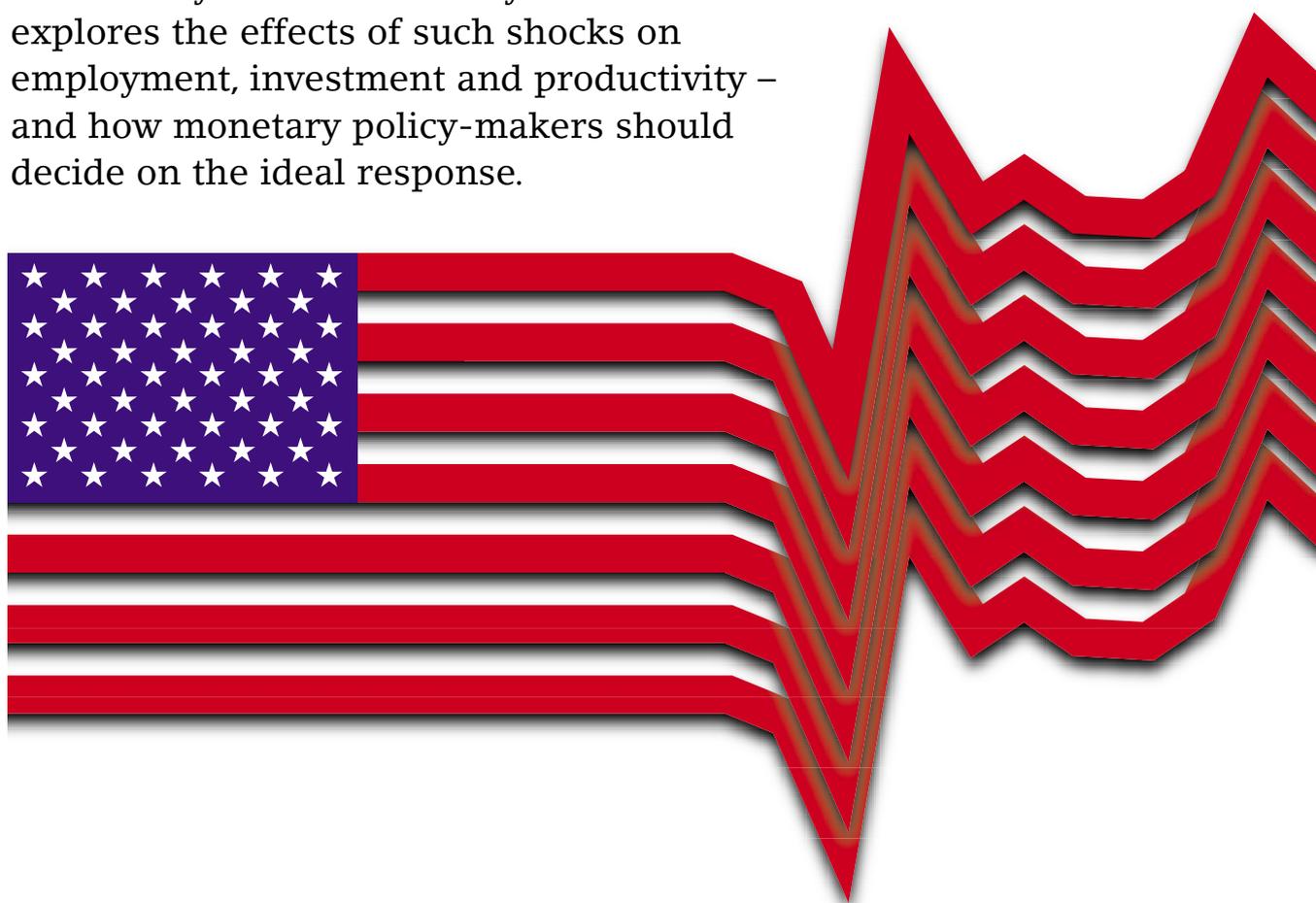
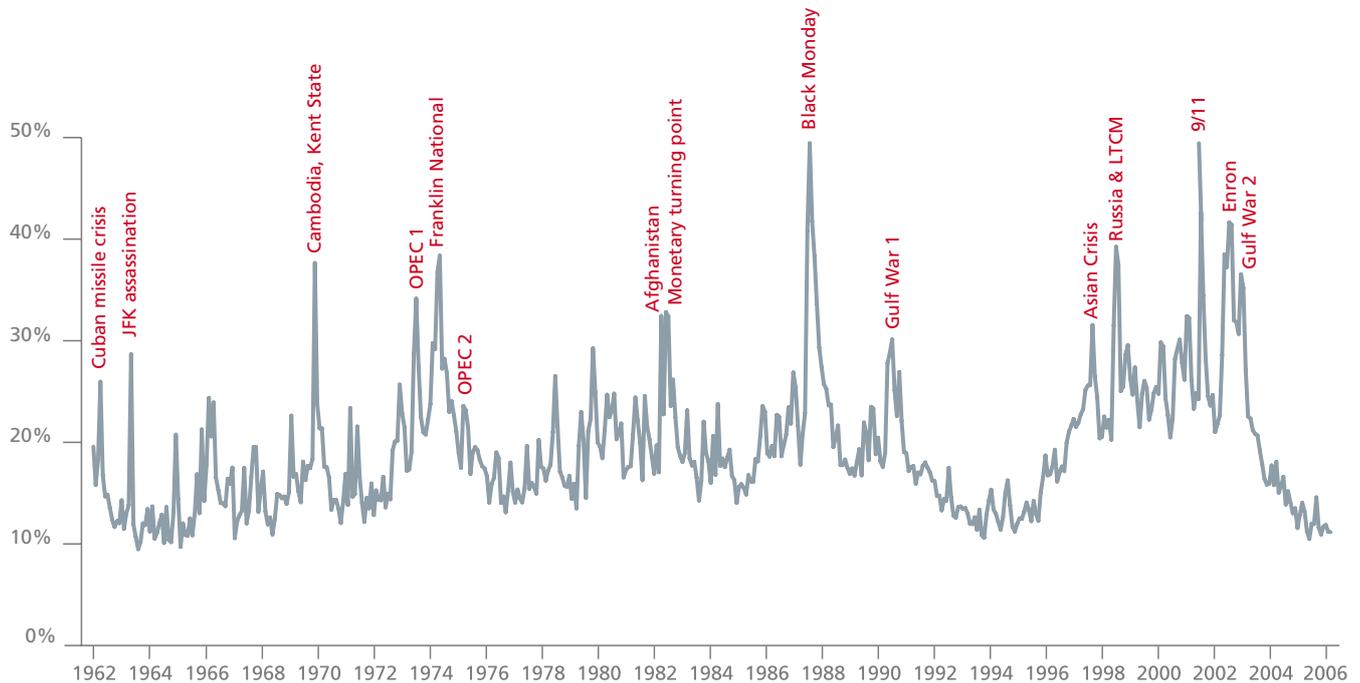


Major events like the terrorist attacks on New York of 11 September 2001 generate large but typically short-lived bursts of uncertainty. New research by **Nick Bloom** explores the effects of such shocks on employment, investment and productivity – and how monetary policy-makers should decide on the ideal response.



The economic impact of 9/11

Figure 1:
Monthly US stock market volatility, 1962-2006



Note: The vertical axis shows a percentage measure of volatility known as 'annualised standard deviation'. Prior to 1986, this is calculated as the percentage actual volatility of monthly returns on the S&P500 index of the US stock market. After 1986, it is calculated using the percentage 'implied volatility' from an option on the S&P100 index.

What is the impact of shocks like high-profile terrorist attacks on firms' hiring

and investment decisions and on their productivity? My research finds big short-run effects from the fear and uncertainty: a temporary drop in GDP as everyone pauses and the economy freezes. But six months on from one-off incidents like 9/11, the uncertainty effects are much more muted as firms resume activity and make up for lost time.

There has been extensive research on the impact of major shocks via the *levels* of future demand and productivity – what economists call 'first moment' effects (examined in the research literature on business cycles). But until now, there has been very little investigation of the *uncertainty* – or 'second moment' – effects of economic and political shocks.

This is surprising as it turns out that uncertainty shocks occur regularly. As Figure 1 shows, uncertainty – as measured

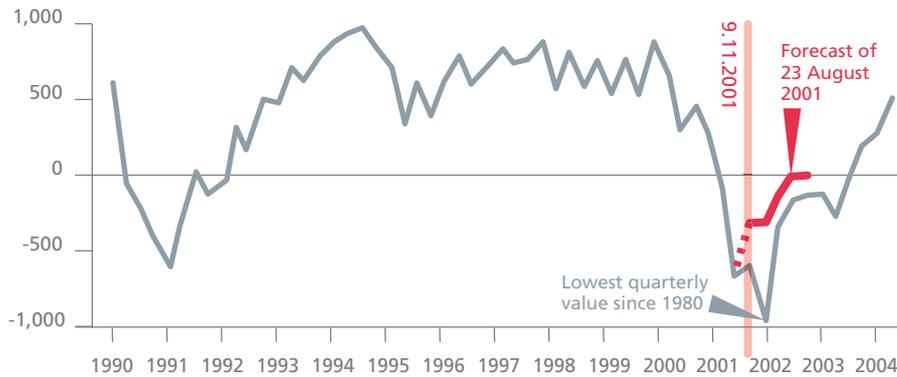
by the widely accepted indicator of monthly stock market volatility – doubled after events like the Cuban missile crisis, the assassination of President Kennedy, the Gulf War and 9/11.

The closest previous work to mine was done as a doctoral thesis over 20 years ago by the current chairman of the US Federal Reserve Ben Bernanke. Indeed, in a way, my study is a test of the 'Bernanke hypothesis': extending his examination of the impact of uncertainty on investment to its effects on hiring and productivity; quantifying it using firm-level data; and confirming via a simulation the prediction that the response to an uncertainty shock is a rapid drop and rebound in economic activity.

Comparing the simulated data with actual data from the period immediately following 9/11 produces a remarkably good fit. Figure 2, which plots actual quarterly changes in net employment growth in the quarter after 9/11, with a rapid rebound in the first quarter of 2002.

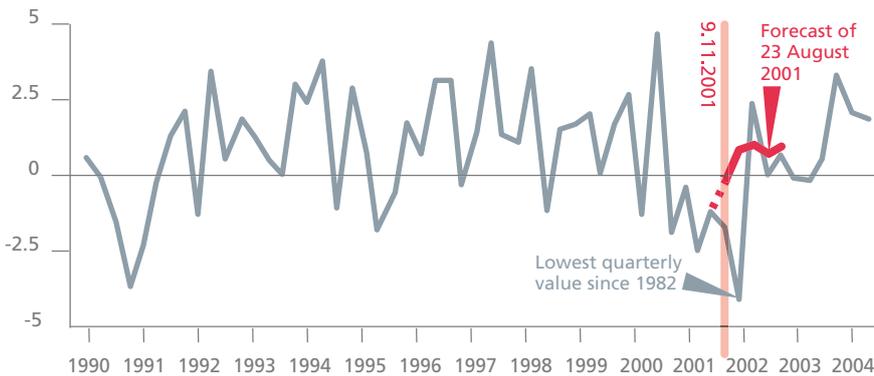
9/11 led to the loss of one million jobs and investment equivalent to 3% of GDP over the next four months

Figure 2:
US quarterly net hiring



Note: The vertical axis measures quarterly changes in net employment in the private sector (in thousands of people); the data are from the Current Employment Statistics survey produced by the Bureau of Labor Statistics; the forecast is an average of 33 economic forecasters collected by the Federal Reserve Bank of Philadelphia on 23 August 2001.

Figure 3:
US quarterly investment



Note: The vertical axis measures the quarterly percentage contribution of investment to real GDP growth; the data are from the National Income and Product Accounts produced by the Bureau of Economic Analysis; the forecast is an average of 33 economic forecasters collected by the Federal Reserve Bank of Philadelphia on 23 August 2001.

The immediate decrease was the largest quarterly fall in employment growth since 1980, and compared with predicted employment changes from the consensus forecasts of 23 August 2001, 9/11 appears to have generated a net job loss of one million jobs in the subsequent four months. But comparison with the forecasts for further ahead suggests that there was little longer-run fall in employment growth.

The data for quarterly investment as a percentage contribution to real GDP growth follow a similar pattern. As Figure 3 shows, there was a sharp fall after 9/11, with the last quarter of 2001 representing the lowest quarterly value for investment since 1982.

Again, compared with the pre-9/11 consensus forecasts, the short-run effects were large – with the drop in investment cutting annual GDP growth by about 3% over the subsequent four months. But there was a rapid bounceback in the first quarter of 2002 and there were no apparent longer-run effects.

Central bank statements of the time provide a broader confirmation of the uncertainty that 9/11 created. Figure 4 plots the frequency of the word ‘uncertain’ in the minutes of the Federal Open Market Committee (FOMC), which displays a clear jump and subsequent decay around 9/11. For example, the minutes of 2 October 2001 said:

‘The events of September 11 produced a marked increase in uncertainty... depressing investment by fostering an increasingly widespread wait-and-see attitude about undertaking new investment expenditures.’

Almost two months later, on 27 November, FOMC member and president of the Chicago Federal Reserve Board Michael Moskow commented:

‘Because the attack significantly heightened uncertainty, it appears that some households and some businesses would enter a wait-and-see mode... They are putting capital spending plans on hold.’

The FOMC minutes of 6 November noted the additional effects of uncertainty on risk aversion:

‘The heightened degree of uncertainty and

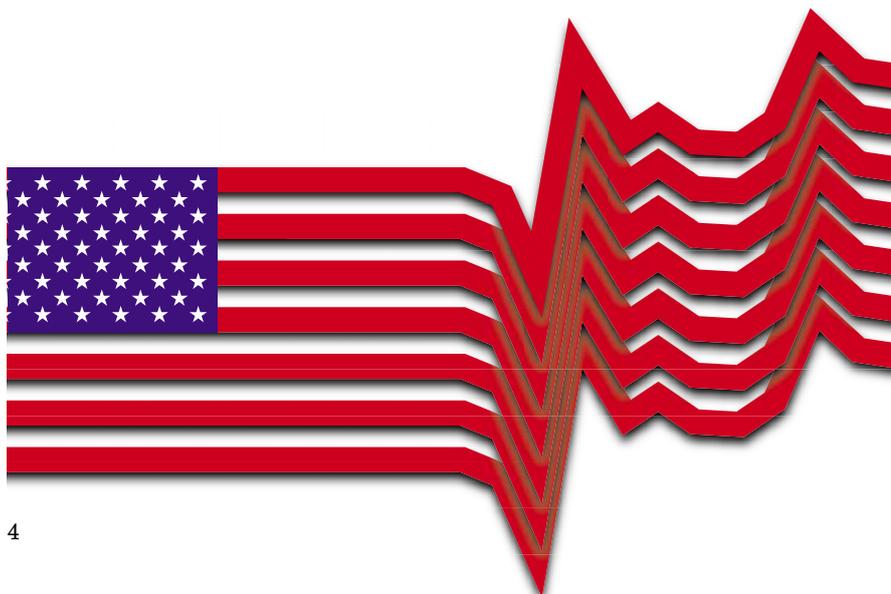
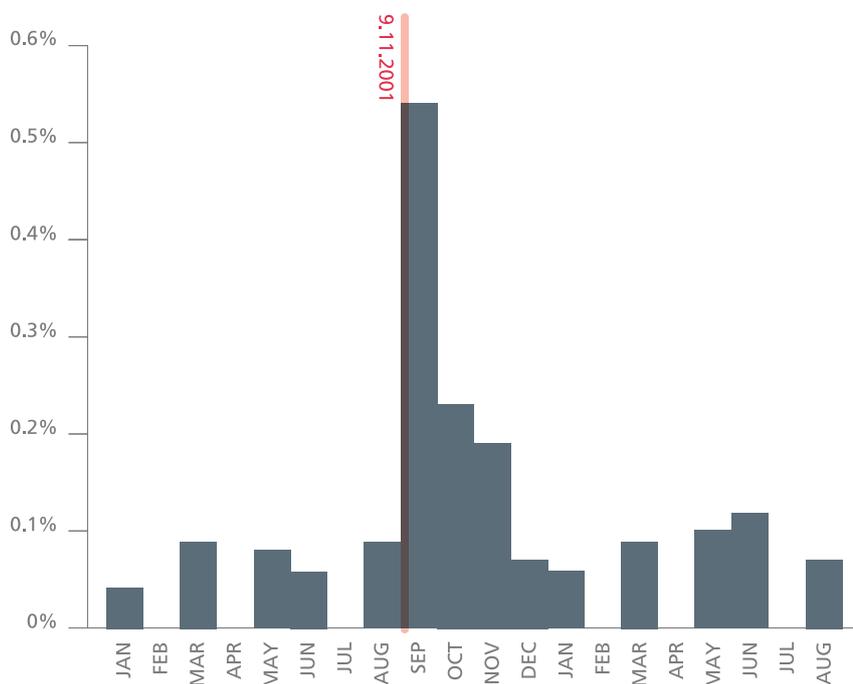


Figure 4:
Frequency of the word 'uncertain' in the minutes of the
Federal Open Market Committee (FOMC)



Source: FOMC minutes; note that the FOMC typically meets only eight times a year so some months have no meetings.

risk aversion following the terrorist attack seemed to be having a pronounced effect on business and household spending.'

And other central banks also discussed this phenomenon. For example, the 17 October minutes of the Bank of England's Monetary Policy Committee stated that:

'A general increase in uncertainty could lead to a greater reluctance to make commitments... Labour hiring and discretionary spending are likely to be deferred for a while, to allow time for the situation to clarify.'

Uncertainty is clearly a ubiquitous concern of monetary policy-makers – and it becomes of particular importance in the immediate aftermath of a major shock. When deciding whether to adopt a contractionary, neutral or expansionary stance in response, it is critical to distinguish between persistent first moment effects (which will generate a drop in activity lasting several quarters) and temporary second moment effects like those of 9/11 (which will generate a big

drop in the first month but a complete rebound by six months out).

My research suggests two pieces of information that monetary policy-makers might use to assess the likely impact of any shock. The first thing to look at is measures of financial uncertainty from indices of implied stock market volatility. The second is the spread of activity across firms: first moment shocks will lead to a fall in activity across all firms while a second moment shock will lead to a compression of activity across firms.

Given the rapid drop and rebound from second moment shocks and the long delays in monetary policy, the best response is a limited one. So the cautious stabilisation pursued by the Federal Reserve and the Bank of England in late 2001 looks entirely appropriate based on these results, and with hindsight was proved correct.

The rapid drop in economic activity was followed by a strong rebound with limited longer-term impact

This article summarises 'The Impact of Uncertainty Shocks: Firm Level Estimation and a 9/11 Simulation' by Nick Bloom, CEP Discussion Paper No. 718 (<http://cep.lse.ac.uk/pubs/download/dp0718.pdf>).

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Further reading

Ben Bernanke (1983), 'Irreversibility, Uncertainty and Cyclical Investment', *Quarterly Journal of Economics* 98, 85-106.