



BANK OF ENGLAND

# Speech

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## **Financial Market Volatility and Liquidity – a cautionary note.**

Speech given by

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I would like to thank Andrew Butcher, Jonathan Rand, Allison Parent, Joseph Noss, Olga Cielinska, Liam Crowley-Reidy, Sebastian Vismara, Lu Liu and Yuliya Baranova for their comments and contributions.

As Executive Director for Markets at the Bank of England it is my job to manage the balance sheet, implementing various policy decisions that the Bank makes. I am also responsible for ensuring that the Bank extracts as much 'market intelligence' from financial market developments as is possible to inform those decisions. But it's not my job to set policy.

Given that, my remarks will focus on the key insights we have drawn from financial market developments over the past year or so, in the context of what has been quite a dynamic period for monetary policy. But I will not speculate on the future course of policy by the Bank of England or any other central bank, nor the likely effectiveness of the different strategies employed by central banks to achieve their targets.

And my punch line will reveal me to be the central banker that I am: there are reasons to be cautious. In particular, recent periods of financial market volatility suggest that there are reasons to be cautious about the robustness of liquidity in core financial markets.

To set the scene let me return to the middle of last summer, when volatility was exceptionally low across a range of financial markets; both compared to the period of heightened volatility that we saw in the crisis years and the period preceding it. That can be seen from this spider chart which shows measures of short-term implied volatility for a number of assets relative to these two periods. Anything less than zero is less volatile than the past, with the opposite true for positive plots (Chart 1).

Our market intelligence suggests that a number of factors contributed to these stable outcomes. There was a relatively low level of uncertainty about the macroeconomic outlook. The extraordinary policy easing from central banks had depressed both implied and realised volatility. Forward guidance, as well as repeated rounds of quantitative easing had also led to market participants to take comfort from the mantra of "low-for-long". This in turn incentivised investors to "search for yield", which of course was an intended consequence of the monetary stance, but which depressed volatility and compressed risk premia in a self-reinforcing cycle.

Since last summer volatility in many financial markets has picked up and there have been a number of short-lived episodes of extreme volatility and impaired market liquidity. Implied volatilities have risen and in a number of the cases I showed earlier have returned to around pre-crisis levels (Chart 1). Moreover, longer-term measures of volatility have generally increased alongside shorter-term measures, as this chart which plots 2-year implied volatilities alongside 3-month volatilities suggests (Chart 2).

We have also witnessed some very large moves in financial markets over the past six-months. Here I am going to draw on two examples – the 15 October increase in US Treasury yields following the publication of unexpectedly weak US retail sales data, and the 15 January appreciation of the Swiss franc following the SNB's decision to remove its peg to the euro. The events had different drivers, but there are some common themes I would like to draw out.

What unites the 15 October and 15 January episodes is that the immediate intra-day reaction to the news was unprecedented. The intra-day change in 10-year US bond yields was 37 bps, with most of this move happening within just an hour of the data release. The intraday range represented nearly eight standard deviations, exceeding the price moves that happened immediately following the collapse of Lehman Brothers. On 15 January, the Swiss franc appreciated by 14%. The intraday range was several times that number, and market participants continue to debate the highest traded value of the franc on the day.

Such events could imply that a number of major asset markets may have become more sensitive to news, so that a given shock causes greater volatility. A number of recent statistical studies also imply this conclusion, suggesting that these recent episodes are a part of a broader pattern, even if they were exceptional in their scale. The following chart, using the output of a model estimated by Bank staff, is representative of the statistical analysis just referred to<sup>1</sup>. The chart compares the estimated impact on UK equity and corporate debt asset price volatility of a given price shock in the post-crisis period relative to the pre-crisis period (Chart 3). Post crisis, both corporate debt volatility and equity market volatility appear to have become more responsive to a given price shock. This pattern is also apparent when the model is applied to a number of other important asset markets, including for example US-listed equities.

Liquidity was clearly affected on each of 15 October and 15 January. Measures of trading volumes, which provide one metric of liquidity, were reportedly high on both days for most affected markets. But the ability of market participants to trade without affecting prices, or in some cases, to trade at all, was clearly very limited at various points on these days. The intra-day loss of liquidity was probably even starker on 15 January, from what we can tell, with widespread feedback that foreign exchange trading platforms stopped quoting Swiss francs for periods of time, while liquidity in the Swiss fixed income market was all but lost on the day and remained impaired for a few days. The performance of the US Treasury market was also materially affected on each of these days, such that much smaller trades than normal moved prices.

But in each of these cases there were stabilising forces that meant volatility subsided and liquidity returned relatively quickly. In the case of the 15 October event, what had been a crowded trade was pushed so far from prices viewed as 'justified' by fundamentals that market participants were willing to provide support to the market. Similarly there was a re-appraisal of the fundamentally justified level of the Swiss franc in the days that followed the removal of the peg, following public comments by the SNB. Volatility declined, if not all the way back to the pre-news level, relatively quickly following these initial spikes. This is most true of the 15 October episode: the implied volatility of 10-year interest rate swaps retraced about half of its upward move after two days, and was back to pre-October 15th levels within just two weeks. This quick stabilisation helped to limit contagion to other markets.

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<sup>1</sup> An EGARCH model is fitted to FTSE All-Share daily returns and returns on a sterling-denominated investment-grade corporate bond flat price index. The EGARCH model allows for conditional volatility to react differently to negative and positive shocks to returns. The model is fitted on returns data split into two sub-samples of approximately equal length: pre-crisis (Jan 2001 – Jun 2007) and post-crisis (Apr 2009 – Jan 2015).

Neither the increase in 'baseline' volatility, nor the recent episodes I have just described, in of themselves materially affected stability in the United Kingdom. For us then, the question becomes what lessons can we learn? Why have volatility and liquidity evolved in this way? And is there an important 'So what?'

Starting with the 'Why?', market intelligence suggests that uncertainty surrounding the global outlook has been one factor; itself in no small part a consequence of the unexpected rough halving in the price of oil since last summer. This uncertainty can be seen in the recent increase in the dispersion of economists' forecasts for inflation in the US, UK and euro area during 2015.

Central banks themselves have reacted to the changed global outlook and monetary policy makers have been active in recent months. Indeed, so far this year 24 central banks have cut their policy rates. Moreover, the decisions by the ECB and three other central banks since last summer to set negative policy rates have raised questions about where the lower bound for monetary policy exists. Clearly the answer is no longer as simple as just above zero for all central banks. And those decisions are raising questions about how markets work when negative rates persist several years down the yield curve (Chart 4). The combination of this macroeconomic news and central bank action means the assumed known of "low-for-long" (but positive) policy rates which market participants could cite as little as a year ago has been replaced by a less than certain landscape, helping to explain why 'baseline' volatility has picked up since last summer.

But while this increase in macroeconomic uncertainty and central bank activity can explain some of the general increase in the level of volatility, it cannot explain the severity of events such as 15 October or 15 January. To explain these events we probably need to look elsewhere. The obvious place to turn to is market structure, given that FICC markets, which rely on intermediaries to make markets and warehouse risk, are going through considerable change.

Here I want to highlight two important contributing themes noted by market participants in our Fair and Effective Markets Review, both related to the provision of liquidity. First, market makers have become more reluctant to commit capital to warehousing risk. During our market intelligence conversations some have suggested that this reflects a combination of reduced risk tolerance since the financial crisis, and the impact of regulation designed to improve the resilience of the financial system.

This reduction in market making capacity has been associated with increased concentration in many FICC markets, as firms have been more discriminating about the markets which they make, or the clients they serve. And this trend has gone hand-in-hand with a growth in assets under management by the buy-side community. The combination has served to amplify the implications of reduced risk warehousing capacity of the intermediary sector relative to the provision of liquidity from market makers during times of market stress relative to the past.

That said, I would hesitate in drawing too much of a comparison between the market liquidity of today and that of pre-crisis. You don't need a long memory to recall the impact of under-pricing liquidity risk on the highly leveraged market makers. Returning to such a situation would be a misplaced aspiration.

The second theme I want to draw out is the evolution of market micro-structure. Electronic platforms are now increasingly used across the various FICC markets. In some cases regulation has been the cause but in others, such as foreign exchange markets, firms have over a number of years increasingly embraced electronic forms of trading. This includes using 'request-for-quote' platforms to automate processes previously carried out by phone.

Electronic platforms are effective in pooling liquidity in 'normal' times but may have the potential, at least as currently calibrated and given today's level of competition, to contribute to discontinuous pricing in periods of stress if circuit-breakers result in platforms shutting down. There has been much commentary about the temporary unavailability of a number of electronic trading platforms in the immediate aftermath of the removal of the Swiss franc peg.

A contrarian view, which I do not ascribe to, would be that no explanation is required. The argument would be that the apparent change in ability of markets to digest news is a mirage: the statistical analysis would prove to have captured a transient trend, and that intermediaries were never prepared to stand in the way of large market moves, during good times or bad. On this view, the reduction in balance sheet and the move towards electronic structures have been correlated with, but are not a cause of, the events we have seen. And the fact that the spikes in volatility have been visible in equity as well as bond markets, where market structure has not undergone as profound change as FICC markets, would be taken as supporting evidence. This view would caution against over-interpreting a few isolated case studies, where excessive market conviction – that the next move in US rates would definitely be up; and the Swiss peg was immutable – led to highly crowded trades accentuating the price moves and the impact on volatility.

But this is not the interpretation I lean towards. Not least because we hear from market participants that, far from biting in extreme circumstances, these are issues that FICC businesses are grappling with on a daily basis. An eight standard deviation move in US Treasuries, on weaker-than expected US retail data, lies outside the bounds of what could be considered a transient trend. Consolidation and electrification have plausibly combined to accentuate the sharp moves seen last autumn and this January. The apparent increase in the incidence of such spikes in recent months may be because the 'comforting cloak' of "low-for-long" has been less of a factor in suppressing volatility in preceding months.

Turning to the 'So what?', it is definitely not that the rise in volatility that is a concern per se: if anything, policymakers have long been concerned about the potential financial stability risks associated with a long period of low volatility. Even with the recent rises, volatility in most asset classes is only close to the average level of

the pre-crisis period; a period which after the fact proved to have been associated with the under-pricing of risk and suppressed market volatility.

Nor is it that necessarily the case that some decline in the liquidity of financial markets would be a concern: the correct answer is not always maximal liquidity as I noted earlier. We are unlikely to return to this pre-crisis world and should not see it as an aspiration.

But, if we accept the hypothesis that the market's ability to digest significant news has changed such that sudden increases in volatility and loss of liquidity are more likely, then the concern is that the stabilising factors which dampened the impact of such events in recent months may not always kick-in. In those circumstances the period of market dislocation could become more persistent, increasing the scope of spillovers across financial markets, with potentially more significant impacts for financial stability.

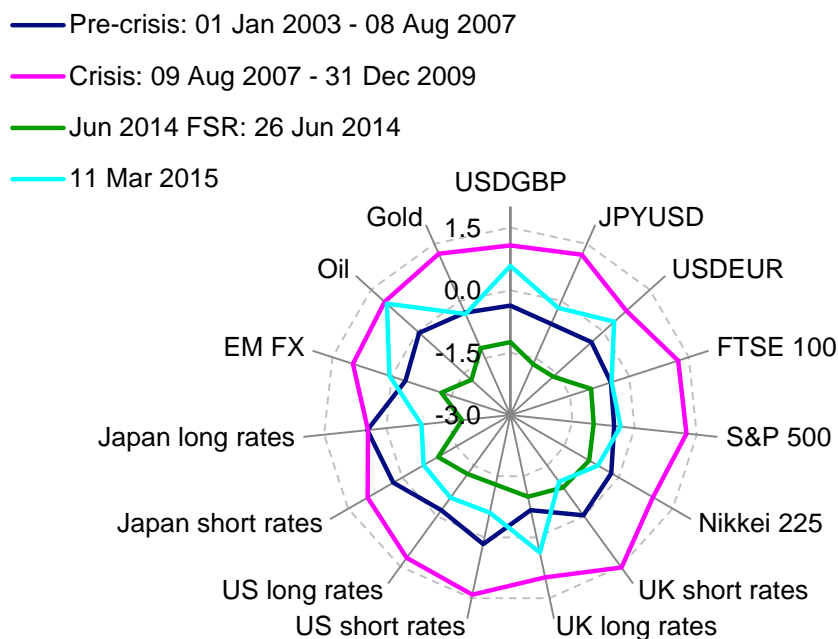
Put another way, recent months have shown the potential for short, sharp shocks. But financial markets may not have been truly tested for the ability to absorb price moves or flows that persist for a prolonged period, or for a wider spillover between markets. As such, the 'So what?' is that market participants need to take note of the recent periods of volatility and illiquidity and remain aware of the possibility of these events occurring more frequently, and the potential for them to have more persistent effects. As the Bank's December Financial Stability Report concluded, "Adjustments will be more disruptive if investors' pricing of liquidity risk does not fully reflect structural changes in market liquidity."

In conclusion, financial market conditions have changed quite noticeably over the past year or so. In part this is conjunctural: the macroeconomic outlook has changed and perhaps become less certain. Central banks have reacted, and in some cases pushed the innovation envelope further. Unsurprisingly these developments have been associated with more volatile financial markets. Given that policy-makers have previously been concerned that persistently tranquil financial markets could encourage excessive risk-taking, this development is not necessarily an unwelcome development. But recent months have also seen a number of short episodes of sharply-higher volatility which coincided with periods of much impaired market liquidity. There are good reasons to believe that the severity of these events was accentuated by structural change in the FICC markets. There must be a risk that future shocks could have more persistent and more widespread impacts across financial markets than has been the case in the recent past. One tool available to all central bankers to address such concerns is to raise awareness, so that traders appropriately price risk.

And that is why it is only fit and proper for me to finish on a cautionary note: market participants take heed.

## Appendix

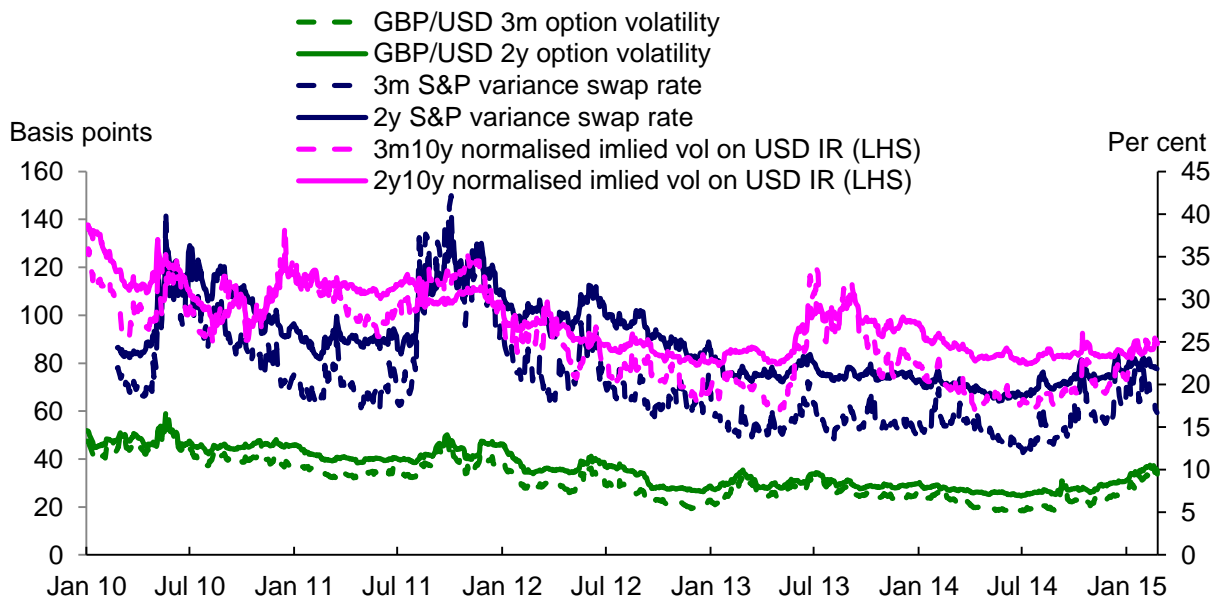
**Chart 1: Option-implied volatilities across selected asset classes**



Sources: Bank of England, Barclays Live, Bloomberg and Bank calculations.

(a) Number of standard deviations from historical mean of three-month implied volatilities. Historical means calculated over the period since 2003.

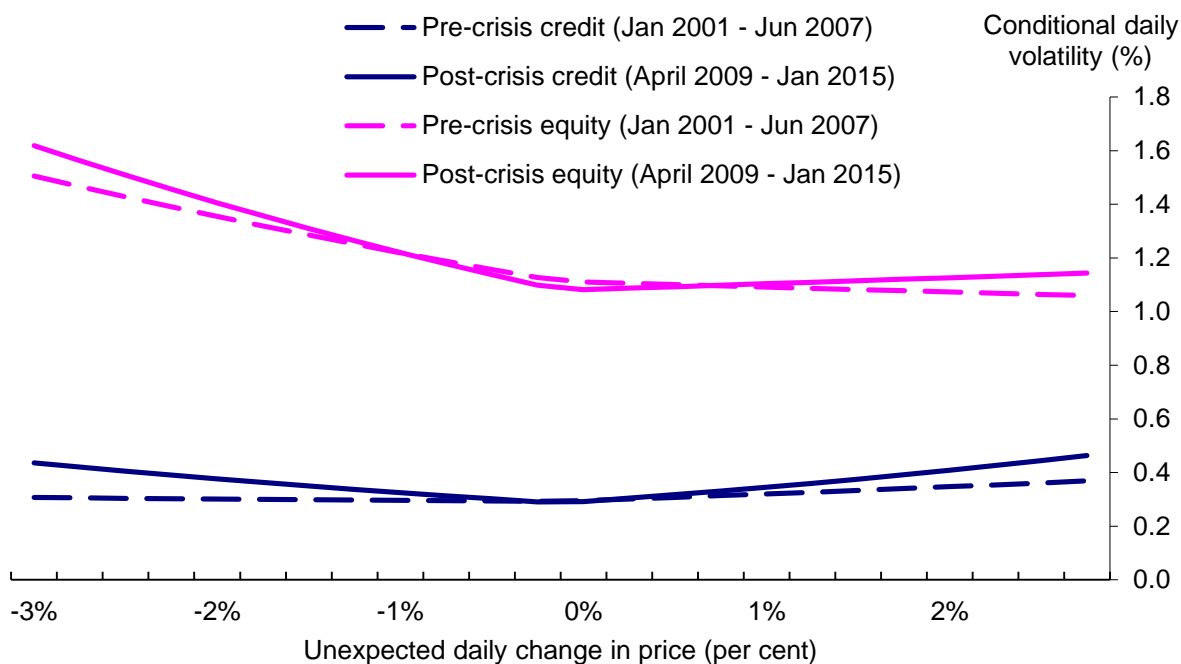
**Chart 2: Longer-term measures of option-implied volatility**



Sources: Barclays Live, Bloomberg.

(a) Implied volatilities are 'normalised' by the level of interest rates, so the data show the volatility of absolute (rather than percentage) changes in swap rates.

**Chart 3:** Impact of asset price news on volatility in UK equity and debt markets



Sources: Bank of American Merrill Lynch, Thomson Reuters Datastream and Bank calculations.

**Chart 4:** Negative rates in European government bond markets



Bloomberg and Bank calculations