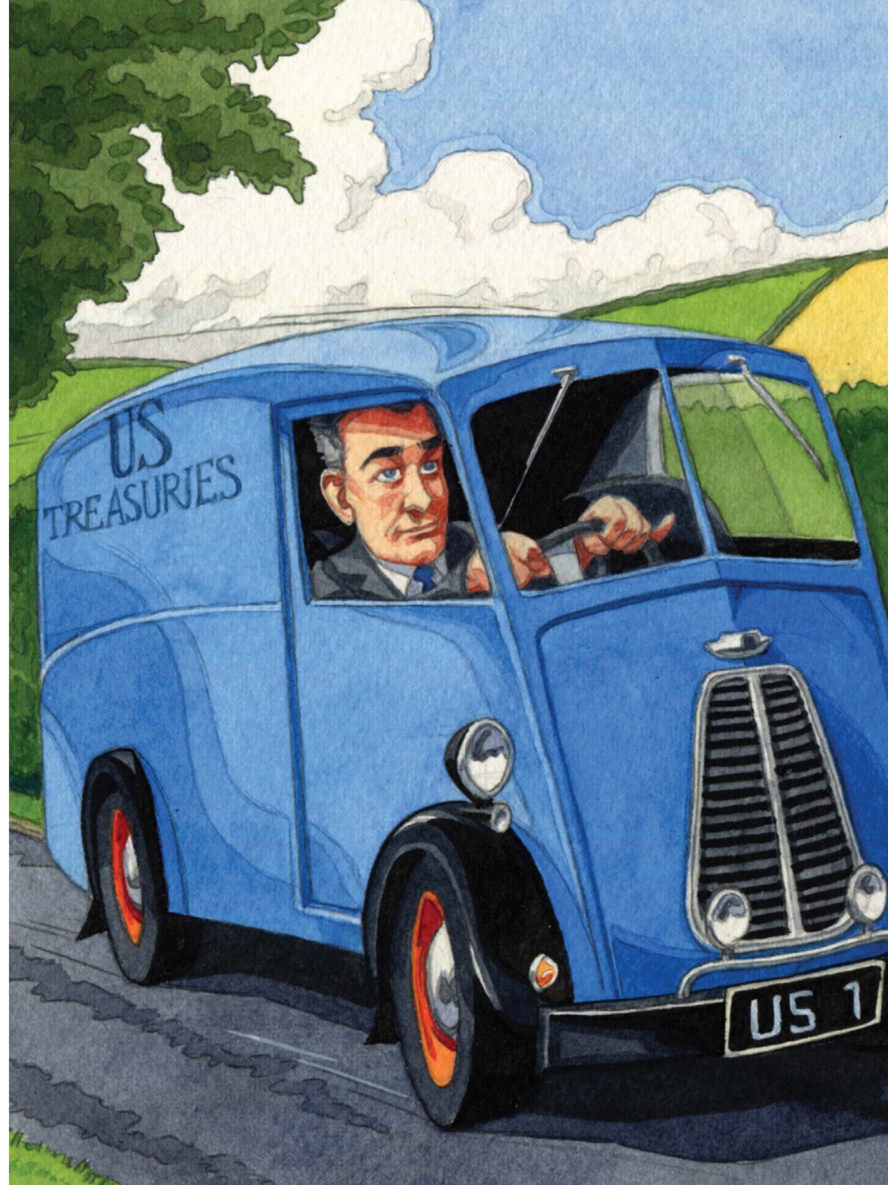
The makings of a Treasury meltdown

Flight to quality, bad bets, short covering and a gamma trap – those are the reasons US Treasury yields briefly behaved like penny stocks, according to buy- and sell-side traders. The fear now is that similar bouts of volatility could be a feature of post-crisis markets. Kris Devasabai reports



Need to know

- Yields on the 10-year US Treasury bond fell 34 basis points on October 15, before rebounding in a matter of hours – a "seven-standard-deviation move" according to one senior trader.
- Market participants say crowding was the cause – many hedge funds were short rates, and were forced to abandon those positions by a series of losing bets.
- For some funds, one of the bets was on a big pharmaceuticals merger – Paulson & Co was holding nine million shares in the target company, worth $2.3 billion.
- Analysis conducted for *Risk* puts the total unrealised loss for hedge funds on that trade at $1.82 billion.
- Funds holding short rates positions capitulated – in total, investors closed out 581,000 interest rate and futures contracts at CME on October 15.
- Dealers may also have been forced to buy US Treasuries to hedge short gamma exposure – with a change of strategy at Pimco making it harder for dealers to cover themselves.
- "The only way this happened is that someone got very, very short gamma," says one head of flow rates trading.

Financial markets witnessed one of the biggest, weirdest moves in their history on October 15 – the intraday collapse and rebound of US Treasury yields – prompting an immediate inquest. In the days that followed, regulators on both sides of the Atlantic quizzed banks, hedge funds and other big trading firms about the causes. What they heard surprised them.

The early explanation was that big hedge funds had been crowding into the same, loss-making trades – for example, a bet on the proposed pharmaceuticals mega-merger between AbbVie and Shire, which was called off after markets closed on October 14 – and had been forced to massively cut their risk.

"The regulators were trying to understand why this happened, and how we were affected," says the trading head at one firm, who spoke with supervisors two days after the event. "They were surprised by the interconnectedness – how a merger decision could upend the rates market. But one thing I've learned during 20 years of trading is that markets are incredibly efficient at finding the path of most pain."

Risk has mapped that path by speaking to 24 banks, hedge funds and others. It's a colourful tour of the financial markets, linking together some of its big beasts – John Paulson's hedge fund, for example, which had sunk almost 10% of its total assets into Shire stock, and Pimco, which reversed its strategy of selling rates volatility after co-founder Bill Gross left at the end of September.

The tour passes through oil and inflation markets, as well as preferred shares in Fannie Mae and Freddie Mac, and it gets complicated at points, with some participants insisting the missing link – the only thing that

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could explain the US Treasury market's V-shaped move – is what options traders know as a gamma trap.

Structural changes to the market cut through it all – the reduced risk-taking capacity of the biggest banks, which are all trying to conserve capital. That makes dealers less willing to warehouse client positions, particularly if all of those clients are trying to exit at the same time (*Risk* August 2013, *www.risk.net/2285352*).

"AbbVie, energy prices, US retail sales, financial regulation – there is no obvious connection between these events and, on a standalone basis, none of them are enough to cause what happened. But when you add all of it together – compounded by the reduced tolerance for risk among hedge funds and dealers – you can see why the market went into meltdown," says Arvin Soh, a portfolio manager in New York with GAM, an asset management firm.

The story begins on the buy side, where large global macro and fixed-income hedge funds spent much of the year building up exposure to the US growth trade – shorting US Treasuries, while going long equities, commodities and the US dollar. The bet was that stronger economic growth, rising inflation expectations and falling unemployment would force the Federal Reserve Board to raise interest rates sooner rather than later – sending US Treasuries tumbling and the US dollar soaring.

"Hedge funds have a tendency to get into crowded trades, and the US growth/short rates trade was one that a lot of hedge funds were piling into over the course of the year," says Tilak Lal, head of risk management at K2 Advisors, a Stamford, Connecticut-based fund-of-hedge-funds manager.

But not everyone was convinced rates would move lower – and some large asset managers chose to take the other side. That included Pimco. The bond giant had a contrarian view that it dubbed 'The New Neutral' in a research paper published in May. The firm argued the global economy would struggle to generate pre-crisis levels of growth and inflation for many years to come, leaving real rates fixed at zero or even lower for some time. The conclusion was that bond yields and market volatility could remain at historic lows for the rest of the year, and perhaps even longer.

Pimco put this theory into practice. Gross, who was still the firm's chief investment officer at the time, was characteristically candid about the strategy. "We sell insurance, basically, against price movements," he told Bloomberg in an interview on June 19, adding that the firm had been pursuing this strategy for "the last four or five weeks". He told attendees at the Morningstar Investment Conference in Chicago the same story: "Sounds dangerous – and is, sometimes. Obviously the volatility has to be underwritten properly and priced appropriately. It doesn't pay to write flood insurance before a flood, but over time it has been a very respectable structural template alpha generator," Gross said in his speech, according to a report in the *Financial Times*.

The firm increased its holdings of short-term US Treasuries in the second quarter and embraced a yield enhancement strategy of selling interest rate volatility in the form of options and swaptions. It quickly became the largest supplier of volatility to the Street, according to four sources who spoke to *Risk* on condition of anonymity. Pimco did not respond to repeated requests for comment.

"Dealers got used to constantly buying gamma from that client – and banks were probably buying it and then selling much longer-dated

Illustration: Stephen Lee, nbillustration.co.uk

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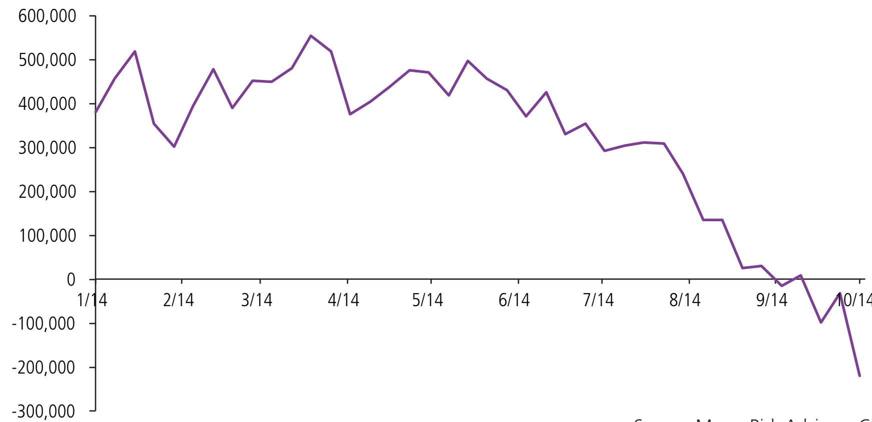

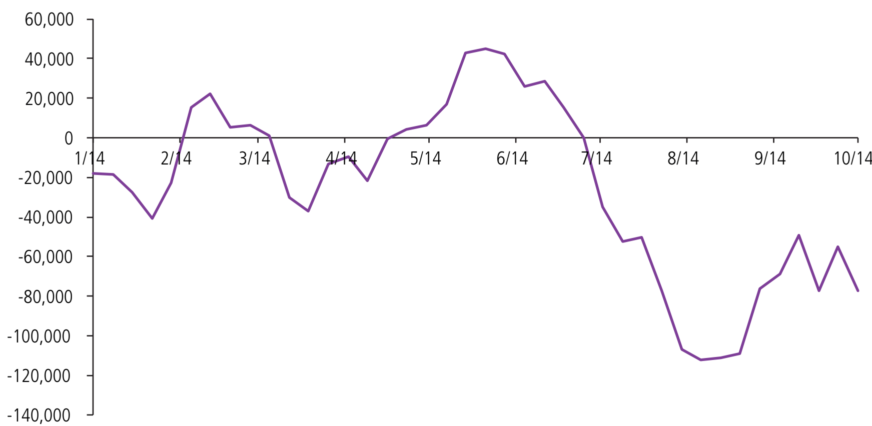

swaptions on the other side," says a senior rates trader in London.

These gamma dynamics, coupled with the crowded short rates trade, are essential background to the October 15 meltdown. Both trades were doing poorly in the preceding weeks. The Merrill Lynch Move Index, which captures options volatility in US Treasuries, dropped to a 12-month low of 53 basis points on June 30 but rose steadily to 65bp on September 26 – a 23% move that was squeezing firms that sold volatility as a yield enhancer.

Meanwhile, 10-year US Treasury yields – which started 2014 at 3% – had fallen to 2.22% at the end of September. Shorting US Treasuries came to be dubbed "the pain trade" in hedge fund circles. As yields ground tighter, and short sellers lost money, the cheaper and more attractive it became. Still convinced of the logic, hedge funds doubled down, selling more Treasuries short even as the market moved against them.

According to data from the Commodity Futures Trading Commission (CFTC), leveraged investors went from being long 554,030 10-year Treasury note futures contracts on April 1 to short 220,410 contracts on October 14 – a $22 billion short position.

The other legs of the US growth trade – long equities, oil prices and the US dollar – were also showing signs of weakness. The S&P 500 reached an all-time high of 2,011 on September 18 and then entered a drawdown that would take it all the way to 1,862 on October 15.

Hedge funds had wagered rising oil prices and the shale boom would benefit US energy companies at a time of rising economic activity. Analysis from research firm Novus Partners shows hedge funds in aggregate had a 14.33% weighting to energy stocks on the long side – compared to a 10.79% weighting for the sector in the S&P 500 – at the end of the second quarter. This exposure to energy stocks remained fairly stable at 13.85% at the end of September, compared with 9.85% for the S&P 500.

The energy bet also turned sour. Oil prices fell from a peak of $115 on June 19 to under $100 on September 5 and below $90 in October. US energy stocks went from being the best-performing sector in the S&P 500 in the first half of the year with a 13% gain, to the worst performers in the third quarter – losing 9.2%.

More bad news came on September 30, when a district court judge in Washington, DC dismissed an investor lawsuit challenging the terms of the US government's takeover of Fannie Mae and Freddie Mac. Anticipating a more favourable outcome for investors, hedge funds had acquired large quantities of preferred shares in the mortgage guarantors. Those shares fell 30% to 50% on the news.

In summary, September was a horrible month for hedge funds. The HFRI Fund Weighted Composite Index, a broad-based measure of hedge fund performance, dipped 0.9% for the month. But many prominent hedge funds fared much worse. Paulson & Co's Advantage funds, for instance, lost 8% to 11% in September, while Chase Coleman's Tiger Global Management lost 7.2% and Bridgewater Associates' flagship Pure Alpha II fund fell 4.8%. Other big macro firms such as Brevan Howard Asset Management, Fortress Investment Group and Discovery Capital Management were also having a tough time.

Still, many hedge funds entered October with high hopes that a bet on US pharmaceutical giant AbbVie completing its proposed $55 billion mega-merger with Dublin-based Shire would pull them through. So-called tax inversion deals, in which a US company buys a foreign rival in order to re-domicile to a lower tax jurisdiction, had been a favourite of hedge funds, and managers were confident the AbbVie/Shire deal would close.

Novus collated data on hedge fund positioning for *Risk*, which shows 78 prominent hedge funds held a combined 28.2 million shares of Shire – with a market value of $7.3 billion – at the end of September. Paulson & Co was by far the biggest holder of Shire, with nine million shares worth $2.3 billion. The position accounted for nearly 10% of the firm's total assets (table A, page 18).

As hedge funds were licking their wounds and waiting for the AbbVie/Shire merger to close, Pimco was having its own problems. After nine months of sub-par performance, over $25

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billion in outflows and clashes with senior executives, Bill Gross abruptly announced his resignation from the firm on September 26.

The news sent shockwaves through the fixed-income world. Traders at other bond firms started selling inflation-linked securities and went long volatility in rates in anticipation of liquidations from Pimco (see box, *Inflation breakevens: a Gross exaggeration*).

The new leadership at Pimco also reversed Gross's policy of selling volatility to enhance yields, according to several sources. This had a significant impact on dealers, leaving them increasingly short gamma as Pimco covered its positions, while mortgage servicers and other clients held onto their receiver swaptions on the other side.

As traders returned to work on October 14 after the long Columbus Day weekend in the US, demand for US Treasuries was growing.

Stock market losses – with hedge fund de-risking adding to the downward pressure – were approaching the 10% level that signals a bear market and investors were buying US government bonds in classic flight-to-quality fashion. Falling inflation expectations and weaker-than-expected economic data also had hedge funds re-thinking their short rates bet.

Dealers, meanwhile, were scrambling to cover their short gamma exposure because Pimco and other bond firms were no longer selling volatility.

The pressure continued to mount through the day. Oil prices plunged $4 – the largest drop in more than two years – decimating energy stocks. All told, the energy stocks favoured by hedge funds lost 16% between September 1 and October 15, according to data from Novus. Hedge funds continued to sell equities into a falling market in an effort to de-risk. The CBOE Volatility Index (Vix) hit 26, a jump of more than 60% from the previous week.

Then, after the market closed, AbbVie announced it was abandoning its merger with Shire in light of new rules from the US Treasury Department, which made tax inversion deals less attractive. It was the anvil that broke the camel's back. A large number of hedge funds were suddenly sitting on massive losses. Novus modelled the merger arbitrage trade for *Risk*, assuming a hedge of 0.896 shares of AbbVie for every share of Shire. The firm estimates hedge funds had $5.8 billion of net exposure to the Shire trade on October 14, falling to $3.43 billion on October 15 as the shares sold off, resulting in an unrealised loss of $1.82 billion.

The deal's failure sent many hedge funds into crisis mode. Shares of Shire fell 30% on 15 October. Firms cut exposure across the board to raise cash, and the losses spread to other crowded hedge fund trades.

Stan Altshuller, co-founder and chief research officer of Novus Partners, says hedge fund liquidations had a contagion effect as losses spreads from one firm to the next and across the wider market. "The ability of hedge funds to liquidate their portfolios has decreased over time due to greater crowding and herding behaviour. The critical point is that managers don't appreciate this new hidden risk. They're looking at their own books and calculating their liquidity as if they would be the only ones selling. They're not thinking about the huge number of other managers that are in the exact same security," he says.

On October 15, dealers were the first to realise what was happening. "A few funds had that merger arb position on in huge size and it created a significant risk-reduction moment. We had no idea what positions would be cut next and it turned out to be rates," says the head of global markets at a large international bank in London.

Even funds that did not have the AbbVie deal in their portfolio were fleeing the short rates trade, potentially pushed by numbers showing a

WHAT CAUSED THE UST MOVE ON OCTOBER 15?

The backdrop

The macro picture was darkening over the summer, amid slowing growth in the US, Europe, China and Japan, geopolitical tensions in Russia/Ukraine and the Middle East/ISIS, and the Ebola scare.

Despite this, hedge funds and other trading-orientated fast-money accounts were crowding into a handful of trades – namely the Shire/AbbVie merger, Fannie/Freddie preferred shares, oil/energy stocks, and short US rates. Meanwhile, Pimco was dealing with internal turmoil and poor performance.

September 26: Bill Gross announces his resignation from Pimco. Pimco starts unwinding short volatility strategies in rates, causing implied volatility to rise. Anticipating further liquidations from Pimco, inflation traders start selling Tips and other inflation-linked bonds, which were favoured by Gross. The 5y5y inflation rate falls steadily through October.

September 30: DC district court dismisses an investor lawsuit challenging the terms of the government bailout of Fannie and Freddie, causing the preferred shares owned by hedge funds to drop 30–50%. On the same day, a Reuters report shows Opec oil output is at its highest level since 2012. The news torches oil prices and energy stocks, pushing some hedge funds close to their loss limits and fuelling more selling in an already bearish market for equities.

The Fed and other policy-makers see market-based inflation measures falling and equities selling off and soften their language on rate hikes – pulling the rug out from under the short US rates trade. This is reflected in the FOMC minutes released on October 8, which many believe were "massaged" to appease market bears.

Hedge funds experience a series of negative days through the end of September and the first half of October.

October 14: Oil prices fall $4 to $85 from a peak of $115 in June, decimating energy stocks. The 5y5y inflation rate drops to 1.52%, a three year low. The Vix jumps to above 26 at the close, its highest level in more than two years. The Shire deal collapses at the end of the day. Facing huge losses on Shire and energy stocks, hedge funds cut risk across the board. Equity funds sell longs and multi-strats also cover their UST shorts, having lost conviction in the trade. The S&P 500 drops sharply in the final minutes of trading on hedge fund selling and sparks a flight to quality among real-money investors.

October 15: The US equity market opens sharply lower. Investors flee equities and move into Treasuries. Hedge funds capitulate and rush to cover UST shorts. Dealers are caught by surprise and switch off automated pricing systems. Liquidity is non-existent. The initial move in UST prompts mortgage investors with exposure to prepayment risk to increase their hedges, putting more pressure on yields. The yield on the 10-year Treasury note tumbles more than 30bp in less than three hours – a seven standard deviation move. Subsequently, bargain hunters move in and the 10-year rebounds to close at above 2%.

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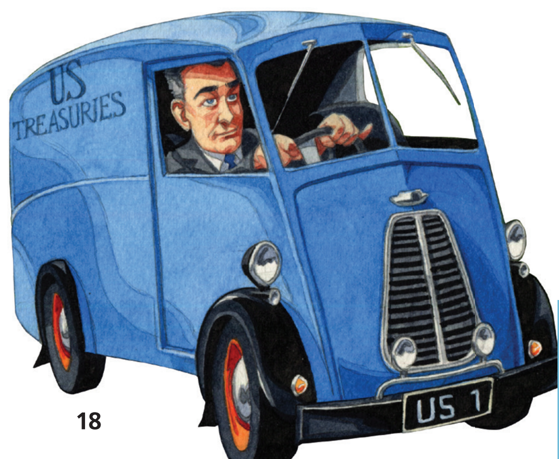
A. Top 10 hedge fund holders of Shire				
Hedge Fund	Quantity	Market value	Market value owned	Manager position size
Paulson & Co	9,046,000	$2,343,366,000	4.58%	9.73%
Adage Capital Management	3,267,220	$846,373,000	1.65%	2.09%
OrbiMed Advisors*	2,169,000	$561,880,000	1.10%	5.82%
Citadel Investment Group	933,401	$241,797,000	0.47%	0.30%
Mason Capital Management	832,014	$215,533,000	0.42%	2.26%
AQR Capital Management	816,116	$211,415,000	0.41%	0.50%
Westchester Capital Management	810,337	$209,918,000	0.41%	2.59%
Third Point	750,000	$194,288,000	0.38%	2.51%
Cadian Capital Management	730,925	$189,346,000	0.37%	4.97%
Perry Capital	695,800	$180,247,000	0.35%	6.54%
*including call options				
				Source: SEC filings, Novus Partners

slowdown in US retail sales, which had been published that morning. The data pulled the rug from under the US growth theme and prompted funds that were short rates to capitulate. This is reflected in statistics from CME Group, which shows investors closed out around 581,000 interest rate and Treasury futures contracts worth a whopping $458.79 billion on October 15.

"Hedge funds were having a bad year on average. Their ability to take risk was impaired and firms were quick to take profits and cut losses. If you're flat for the year, what's your incentive to risk another 300bp? The shorts didn't have any staying power and we saw a massive wave of capitulation," says a senior portfolio manager at a large hedge fund in New York.

Another hedge fund manager in New York tells a similar story: "Most of the stories we heard were of short covering, de-risking and liquidations. There was pain among equity and event-driven funds and there were rumours of multi-strategy firms reducing risk across the board because of big losses in one part of their business. In Treasuries, the longs were getting longer and the shorts had to cover. The dealers were looking for the other side, but they weren't going to take the other side."



Inventories of US Treasuries had dropped from a peak of $146 billion last October to $18.3 billion in mid-July – leaving dealers unable to facilitate surging client buy orders.

The result was the biggest intraday move in US Treasuries since 2009 – described as a "seven-standard-deviation event" by one senior rates trader. The yield on the 10-year bond, which closed at 2.21% the previous day, dived to an intra-day low of 1.87% at 9.39am before recovering sharply to settle at 2.14% at the close.

So far, so sensible, but some market participants say the velocity, magnitude, and shape of the down and up move in Treasury yields requires more explanation than that.

"This certainly wasn't a common-or-garden-variety flight to quality," says a portfolio manager at a buy-side firm in New York. "The last time we saw something like this in the Treasury market, Lehman was collapsing."

This is where Pimco's decision to stop selling swaptions comes in, according to some.

"The only way this happened is that someone got very, very short gamma. You don't get a move like that in a linear product," says one bank's European head of flow rates trading.

CFTC data shows call open interest in 10-year Treasury options around the 125 to 127 strikes dropped from 233,447 contracts on October 13 to 217,027 contracts at the close two days later, which is consistent with volatility sellers covering their positions as yields moved tighter. If the same kind of behaviour was repeated in the swaptions market, it would have left the Street with a short volatility position on October 15. Summed up crudely, the market sees asset managers and hedge funds selling payer swaptions for yield enhancement on one side, and mortgage servicers and originators buying receiver swaptions to hedge pre-payment risk on the other.

Payer swaptions have a short gamma profile and receivers are long gamma. Dealers intermediate the flows and dynamically hedge their gamma, which measures the sensitivity of the delta to changes in the price of the underlying. Given the structural demand for receivers from the mortgage community, dealers rely on asset managers selling payer swaptions to offset their gamma – with any residual exposure hedged with Treasuries and swaps.

The abrupt exit of Gross from Pimco – and of Pimco from its short volatility strategy – left the market unbalanced.

"Part of the effect was hedgers not being able to hedge. If someone is reversing short gamma positions, it means the counterparties to those positions face losses in a big move, so they are forced to trade with any trend," says a senior executive at a US asset manager.

Traders that find themselves in a gamma trap have to buy or sell the underlying as it moves against them. "If you're short Treasury calls and want to hedge that exposure, you have to buy Treasuries as they go up, and sell as they go down. It forces you to trade badly – essentially buy high and sell low. This hedging action can lead to sharp V-shaped moves like the one we saw in October," says Pravit Chintawongvanich, a derivatives strategist at Macro Risk Advisors in New York, which provides risk analysis and derivatives trade structuring services to investors.

Another wrinkle in the story is that the skew

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in Treasury options was reversed over the preceding months. "There is generally greater demand for downside protection than upside, making puts expensive relative to calls. But this past year, calls in Treasuries have been expensive relative to puts – meaning investors are seeking upside protection. The market was more worried about Treasuries rallying sharply than it was about prices falling. Whoever was short those upside calls likely took a lot of pain on October 15," says Chintawongvanich.

For now, dealers remain tight-lipped about their gamma positioning on October 15, but fourth-quarter results may reveal more.

"Anecdotally, I've heard some dealers were onside and some were offside. Some were long gamma when the day started but as rates moved lower they got short gamma and had to buy more duration to cover their risk. Some did quite well – they were long gamma and selling into the move – but some were positioned the other way and probably did quite badly," says a rates trader at a bank in New York.

The theory is shared by a number of buy-side traders: "Being in the markets for 30 years, I can say these things don't happen unless there is a big short gamma position," says a senior fixed-income portfolio manager at a firm in New York.

Despite the consensus, a lack of evidence means the gamma component of the story remains a theory only. The rest is easier to stand up – one head of markets says the account *Risk* has constructed is "pretty much spot on" – but attempts to work out what it means are ongoing.

For now, traders offer two conclusions. First, post-crisis regulatory change means markets will be more fragile, but banks should have less money at risk and more capital to withstand any shocks. The same is not true of other market participants, of course (*Risk* September 2014, *www.risk.net/2361104*).

Second, it will also be harder for any one participant, or group of participants, to know exactly what is happening in the market at any point in time – and how it is likely to behave when a hidden pain point is reached.

"There is no ability to really understand much of the dynamics of this market anymore," says the international bank's head of global markets. "We used to be able to tell regulators, five years ago, 'We know where the bodies are buried, we know who has the risk'. That's not true anymore and risk capacity has been soaked up by predatory buy-side firms – with lots of lawyers – and their commercial interest is not to make markets more stable; it is to make the market more unstable." **R**

INFLATION BREAKEVENS: A GROSS EXAGGERATION

When Bill Gross announced his departure from Pimco on September 26, inflation investors immediately started drawing up their own exit strategies. Gross – the asset manager's chief investment officer – ran its Total Return Fund, which as of the end of June had been holding about $27.5 billion in US Treasury inflation-protected securities (Tips), or about 2% of the total outstanding.

The fear was that redemptions would cause the fund to cut its position, consuming available liquidity and resulting in losses for anyone that was dawdling. Dealers say nervy buy-side firms started calling as soon as the news broke, asking for breakdowns of holdings in the funds Gross managed.

"Everyone went through the same exercise. You go through all their filings, you go through the big Total Return Fund, you go through Tip by Tip, add them all up and you get to what most people would consider an overweight Tips position," says one head of US inflation trading at a European bank. "We saw Tips get offered down immediately on a breakeven basis but not though any particular flow. It's like an employment report coming out and it's really strong, so you just immediately re-price."

Breakevens for 10-year Tips – which reflect the yield difference between nominal bonds and linkers, and are therefore used as a market-based measure of inflation expectations – started the day on 201 basis points and ended on 197bp. European breakevens also fell, even though Pimco was not a big holder of European inflation-linked debt.

This worries some traders. Central banks use inflation markets as a policy cue. Speaking at the Jackson Hole meeting of central bankers and finance ministers at the end of August, Mario Draghi, president of the European Central Bank (ECB) cited five-year-forward, five-year inflation swap levels. Then, on October 2, at an ECB meeting in Naples, Draghi again referred to subdued inflation expectations as a reason to keep interest rates low, while also announcing policy actions including purchases of covered bonds and asset-backed securities.

Some traders saw this as a misreading of the market. "Draghi and other central bankers pointed to the five-year, five-year inflation swap and said, 'Oh my God, inflation expectations are falling – we need to take action'. Well, at this point in time, it was not moving because of changing expectations of inflation – it was driven by the resignation of this guy out on the west coast of the US," says one bank's London-based head of markets, referring to Pimco's Newport Beach headquarters. "Inflation is not the most liquid instrument at the best of times, but this was driving policy decisions. I was sitting at my desk saying 'The world is going bloody mad'."

Inflation traders recognise those concerns but say it's wrong to conclude policymakers were misled. "Five-year inflation rates, five years forward can move a lot on practically not very much so to base an entire monetary policy on that data is quite brave. But it is not in a vacuum" says Borut Miklavcic, chief investment officer at London-based hedge fund, Lindengrove Capital. "I wouldn't say European inflation expectations in the market are incorrect. They seem reasonable."

Dariush Mirfendereski, head of inflation trading at HSBC, shares that view: "I think that narrative is grossly exaggerated – pun intended. If you look at the trend in global breakevens since the start of the year, there has been a very steady downward trend in eurozone and UK breakevens. In the US, they had also dropped a lot before the Bill Gross announcement and a lot of that drop was tied to weak economic data and oil prices."

The bigger point is about the effect a big player can have when it cuts positions in a relatively illiquid market – or, in this case, even when there is a fear it will cut. According to traders, the Pimco Total Return Fund has so far done little selling of Tips – in fact, one says the proportion of Tips in the fund relative to other assets has risen. But the anxiety remains.

Most are not concerned about Pimco's ability to exit in calm markets – a typical Tips auction is $12 billion, one buy-side trader points out, and the market absorbs that every month. But liquidity is not what it used to be, says Lindengrove's Miklavcic.

"It concerns everybody. When things are going well, of course, everything is fine. People trade large sizes and the market functions normally. But clearly there is an accident brewing because the size of some positions is out of line with the liquidity available – particularly during times of higher volatility. Look at what happened in October in US Treasuries. If that doesn't scare you, then I don't know what does. That tells you the market is not really functioning properly," he says.

Joe Rennison

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